



Darling Point Wharf Upgrade

Review of Environmental Factors

Transport for NSW

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Transport for NSW | April 2022

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Executive summary

The proposal

Transport for NSW proposes to upgrade the Darling Point Wharf (the proposal) as part of the Transport Access Program (TAP) which includes both landside and waterside work.

The water-based features of the proposal would include:

- A new covered fixed waiting area (about 16 metres by 11 metres) over the water with a nine metre by 13.5 metre curved zinc roof, steel columns, glass weather protection screens, stainless steel balustrades, seating, information boards and opal card readers. The waiting area would be supported by eight new piles
- A new covered three metre by 18 metre aluminium gangway connecting the fixed waiting area with the hydraulic platform
- A new hydraulic platform (about 90 square metres) for safe and level customer boarding and alighting. The platform would be held in place by three new piles, and protected by six fender piles
- Safety features including ladders to the water and life buoys
- Demolition of the existing wooden jetty, tidal steps and piles.

The land-based features of the proposal would include:

- A new 55 metre long *Disability Standards for Accessible Public Transport 2002* (DSAPT) compliant foreshore path connecting the new waiting area to the lower lift landing area via a suspended bridge structure
- An 11 metre high lift and adjacent stairs to take customers between the street and foreshore
- A new DSAPT compliant path from Darling Point Road to a new lift and stairs
- A kiss-and-ride drop off zone at the end of the Darling Point Road cul-de-sac
- Removal and relocation of the existing bicycle parking hoops
- Safety and security features including lighting, closed circuit television (CCTV) cameras, and tactile ground surface indicators (TGSIs).

The key features of the proposal are shown on Figure E-1.

Need for the proposal

The need for the proposal was identified in response to the Transport for NSW TAP which is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

The primary objective of the TAP is to achieve 100 per cent DSAPT compliance for all assets, access paths and transport services within the wharf interchange.

The DSAPT and *Disability Discrimination Act 1992* (DDA) standards require all public transport infrastructure, including wharves, to have fully compliant disabled access by December 2022.

Therefore, Darling Point Wharf needs upgrading due to its lack of accessible pathway for passengers on and around the wharf.



E-1 Overview of proposal

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Proposal objectives

The objectives of the proposal are to:

- Ensure compliance with legislative, functional and operational requirements, in particular DSAPT and DDA standards that require all public transport infrastructure, including wharves, to have fully compliant disabled access
- Maximise equity of access for all customers
- Improve accessibility, passenger safety and comfort for all customers
- Maximise the use of the ferry wharf 'Kit-of-Parts' (standardised design elements) to provide continuity across Sydney Harbour wharves
- Accommodate forecast growth in patronage and changes to travel patterns
- Provide safe berthing of ferry vessels
- Minimise walking distances, conflict and crowding points and queuing
- Improve security and safety
- Minimise cost of ownership and maintenance.

Options considered

The following options were considered:

- 'Do nothing' – no upgrade and regular maintenance would continue
- Option 1 – lift and stairs in McKell Park
- Option 2 – lift and stairs in Darling Point Reserve and over water boardwalk
- Option 3 – switchback ramp in Darling Point Reserve and over water boardwalk.

Although having the lowest initial capital cost and least environmental impact, the 'do nothing' option was discounted as it would not meet the objectives of the proposal to improve accessibility, passenger safety and comfort and to meet future demand.

Advantages and disadvantages of options 1, 2 and 3 were presented to key stakeholders at a workshop on 15 January 2019 and their relative performance was assessed using a multi-criterion analysis (MCA) process. Following the MCA process and consultation with an additional stakeholder, option 2 was selected as the preferred option. Option 2 was refined to address all stakeholder feedback and a refined concept design was developed.

The refined concept design was placed on public exhibition between 28 May 2021 and 4 July 2021. Following the public exhibition further changes were made to the refined concept design to address stakeholder feedback and to minimise impacts to biodiversity, heritage, and visual amenity. The proposed boardwalk and associated piles were removed from the design, and a foreshore path connects the new waiting area to the lower lift landing area via a suspended bridge structure.

A detailed description of the options considered is included in section 2.4.

Statutory and planning framework

The proposed facility is a wharf or boating facility within the meaning of the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP).

The proposal is for a wharf or boating facility and is to be carried out by Transport for NSW and can therefore be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* (NPW Act).

Community and stakeholder consultation

Community and stakeholders were invited to provide feedback on the proposal's refined concept design between 28 May and 4 July 2021.

Consultation with the Woollahra Municipal Council, Department of Planning and Environment (DPE) (formerly the Foreshores and Waterways Planning and Development Advisory Committee), Port Authority of NSW, Department of Primary Industries (DPI) Fisheries and Crown Lands was undertaken during the preparation of this review of environmental factors (REF). Feedback received from the consultation has been addressed in this REF.

Consultation will continue during the public display of the REF to capture community feedback. Should the proposal proceed to construction, consultation with the community and stakeholders would continue throughout the construction phase.

Environment impacts

The main environmental impacts of the proposal and the safeguards and management measures to address the impacts are summarised in the following sections.

Biodiversity

A biodiversity assessment has been prepared which investigates the existing environment within the study area to assess impacts to biodiversity as a result of construction and operation of the proposal.

The proposal is not expected to remove any terrestrial vegetation (trees or shrubs) but would impact minimal areas of mown lawn and hard surfaced areas (e.g. footpaths and roads).

The proposal would require 17 piles to be driven into either intertidal rocky reef, subtidal rocky reef, or subtidal soft sediment habitat. The respective habitat and marine vegetation under the footprint of the piles would be permanently lost and shading of structures over these areas would result in altered community assemblages.

The proposal is expected to impact around 180 square metres of low-medium relief subtidal rocky reef (Type 2 – moderately sensitive key fish habitat, KFH), 20 square metres of intertidal rocky reef (Type 2 KFH) and around 120 square metres of soft sediment (Type 3 – Minimally sensitive KFH). However, these areas are proportionally small compared to what is available in the study area and/or the wider harbour and community assemblages are generally abundant.

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

Offsets for the residual loss of marine vegetation in subtidal rocky reef (Type 2 KFH) would be considered in accordance with the *Guideline for Biodiversity Offsets* (RMS, 2016a).

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* (EPBC Act). A referral to the Australian Department of the Agriculture, Water and the Environment (DAWE) is therefore not required for biodiversity matters.

Noise and vibration

A noise and vibration impact assessment has been prepared to predict construction and operational noise and vibration impacts on nearby sensitive receivers.

Construction noise was assessed in accordance with *the Interim Construction Noise Guidelines* (ICNG) (DECC, 2009) and the *Construction Noise and Vibration Guidelines* (CNVG) (RMS, 2016b). The assessment concluded that:

- Construction noise levels are predicted to exceed management levels for standard and non-standard hours of operation for all construction scenarios at nearby residential receivers
- The most likely source of potential sleep disturbance from non-standard hours of operation would be from piling proposed as short duration and intermittent late at night and/or early morning works
- The proposed plant likely to generate the most vibration includes the piling rig, vibratory roller and truck movements. This plant would only be required to operate for short periods of time and would not be constant over the duration of work.

It should be noted that the assessment has carried out worst case noise modelling with noise levels predicted based on all sources operating simultaneously within the worksite. This is unlikely to be the case in practice as plant and machinery are likely to be used intermittently and construction noise levels would generally be less than those predicted.

There is potential for vibration impacts to locally listed heritage structure within close proximity to the work due to work being undertaken within the theoretical safe working distances recommended for heritage structures. However, only a small number of piles are required and the potential impacts could be largely mitigated through control measures such as vibration monitoring and regular inspections. As a result, it is expected that any potential impacts resulting from vibrations would be minimal.

A Construction Noise and Vibration Management Plan (CNVMP) would be prepared prior to construction and implemented throughout the construction period. The CNVMP would incorporate the best practice mitigation measures outlined in Chapter 7 of this REF.

Works are to occur within standard daytime hours, with the exception of piling or lifting works which, for safety reasons may be required to be carried out late at night and/or early in the morning. Should operations be required outside of standard hours, an Out of Hours procedure detailing works schedule, approval process, communications requirements and management measures would be prepared.

Potentially affected receivers would be informed of night-time construction activities at least seven calendar days prior to commencement. A community information email and phone line would be provided throughout the work to respond to any enquiries.

There would be no expected increases in operational noise from the proposal.

Landscape character

A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared to identify the overall impact of the proposed work on each of the Landscape Character Zones (LCZ) and to identify the visual changes and impacts on the site and its surroundings when viewed from key vantage points.

The landscape character impact of the proposed Darling Point Wharf Upgrade is considered to be high to moderate on the surrounding LCZs, as the lift, foreshore path, waiting area and pontoon would introduce large built elements to the vegetated foreshore setting in views from Sydney Harbour, the McKell Park foreshore and Darling Point Reserve.

The overall visual impact of the proposal is considered high to moderate following assessment of the viewpoints. The majority of views of the proposed wharf from land include high visual quality distant views of Sydney Harbour, Sydney Harbour Bridge and Sydney Harbour northern foreshore. The impact of the proposed wharf structures would vary depending on the degree of moderation by tree canopies and/or topography. The lift and waiting area in particular would increase the overall size of the wharf infrastructure for most of these land-based views and as such, there is considered to be an overall high to moderate impact to these sensitive views in addition to closer/foreground views from the harbour and foreground. The new foreshore path and waiting area would provide an additional viewpoint of the Sydney Harbour Bridge and central business district (CBD) backdrop.

Non-Aboriginal heritage

A Statement of Heritage Impact (SoHI) and a Maritime Archaeology SoHI have been prepared to assess the potential impacts to listed heritage items and potential archaeological remains as a result of the proposal.

There are a number of listed heritage items within or adjacent to the proposal area including: Fence, gates, and foundation remains of former house *Canonbury* (Woollahra Local Environmental Plan 2014 (Woollahra LEP) no. 112 and A1); Remains of bath house and site of jetty (Woollahra LEP no. 113); House and interiors, grounds, gardens (Woollahra LEP no. 136); *Craigend* (Woollahra LEP no. 102) and *Lindesay* (Woollahra LEP no. 80 and the State Heritage Register (SHR) 00686). The assessment concluded the proposed works would not impact the overall significance of the heritage items within and adjacent to the proposal area.

The preliminary archaeological assessment has identified that the proposal area has generally high potential to contain locally significant archaeological remains associated with the fence, gates, and foundation remains of former house *Canonbury*, located within McKell Park (Woollahra LEP no. 112 and A1) and Remains of bath house and site of jetty (Woollahra LEP no. 113) heritage items. The proposed work, primarily consisting of the proposed piling work, could cause minor impacts to existing and potential (including underwater) archaeological remains associated with the former wharf structures, boathouse and bath house. The proposed work would therefore cause minor archaeological impacts to McKell Park (Woollahra LEP no. 112 and A1) and remains of bath house and site of jetty (Woollahra LEP no. 113).

The maritime archaeological assessment identified that two piles may intersect with the footprint of the former public jetty however the scale of impact of the piling works is assessed to be minor in relation to the heritage values of the potential archaeological resource.

An application for an exception under section 139(4) of the *Heritage Act 1977* would be required for the proposed work.

There are no items within or in the immediate vicinity of the proposal footprint listed on the World Heritage List (WHL), National Heritage List (NHL) or the Commonwealth Heritage List (CHL).

Sustainability

The design of the proposal has been based on the principles of sustainability, including aiming for a 'Silver' rating under the *Sustainability Design Guidelines (SDG) version 4.0* (TfNSW, 2017a). Key design elements and strategies developed during concept design would be used to further develop the design and construction.

Justification and conclusion

The need for the proposal was justified under the TAP as the existing structure does not provide access that complies with DDA and DSAPT standards. The assessment of the environmental and social impacts has determined the proposal is not likely to have a significant impact and therefore assessment under Division 5.2 of the EP&A Act is not required.

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1 Introduction

This chapter introduces the proposal and provides the context of the environmental assessment and outlines the purpose of the report.

1.1 Proposal identification

Transport for NSW proposes to construct a new wharf interchange at Darling Point (the proposal) as part of the NSW Government's Transport Access Program (TAP, <https://www.transport.nsw.gov.au/projects/tap>, refer to section 2.1.1).

The proposal is located within the local government area (LGA) of Woollahra Municipal Council. Darling Point Wharf is located near McKell Park and Darling Point Reserve on the southern shore of Sydney Harbour. The wharf is accessed from the Darling Point Road cul-de-sac via pathways through McKell Park.

Figure 1-1 shows the regional setting and Figure 1-2 shows the local setting and existing features. The wharf is situated on the F7 Double Bay Loop, which provides connections between Circular Quay, Double Bay and Darling Harbour. The proposal is to improve access to the wharf via a new lift, foreshore path and waiting area, to allow for accessible and more efficient passenger services.

The water-based features of the proposal would include:

- A new covered fixed waiting area (about 16 metres by 11 metres) over the water with a nine metre by 13.5 metre curved zinc roof, steel columns, glass weather protection screens, stainless steel balustrades, seating, information boards and opal card readers. The waiting area would be supported by eight new piles
- A new covered three metre by 18 metre aluminium gangway connecting the fixed waiting area with the hydraulic platform
- A new hydraulic platform (about 90 square metres) for safe and level customer boarding and alighting. The platform would be held in place by three new piles, and protected by six fender piles
- Safety features including ladders to the water and life buoys
- Demolition of the existing wooden jetty, tidal steps and piles.

The land-based features of the proposal would include:

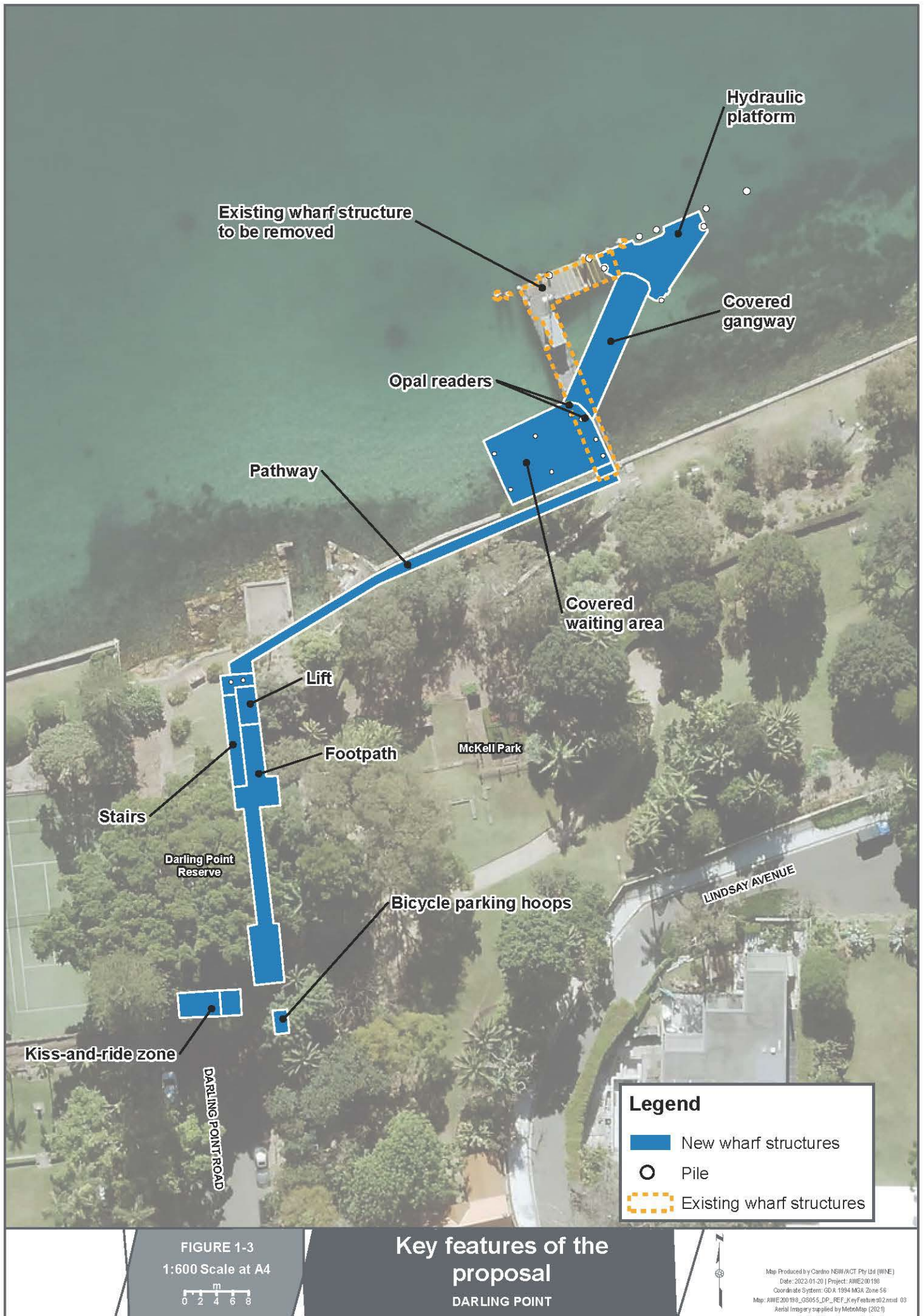
- A new 55 metre long *Disability Standards for Accessible Public Transport 2002* (DSAPT) compliant foreshore path connecting the new waiting area to the lower lift landing area via a suspended bridge structure
- An 11 metre high lift and adjacent stairs to take customers between the street and foreshore
- A new DSAPT compliant path from Darling Point Road to a new lift and stairs
- A kiss-and-ride drop off zone at the end of the Darling Point Road cul-de-sac
- Removal and relocation of the existing bicycle parking hoops
- Safety and security features including lighting, closed circuit television (CCTV) cameras, and tactile ground surface indicators (TGSI).

The key features of the proposal are shown on Figure 1-3. Chapter 3 describes the proposal in more detail.

The proposal would be constructed over a duration of up to eight months starting in the third quarter of 2022. During construction the wharf would be closed.







1.2 Purpose of the report

This review of environmental factors (REF) has been prepared by Cardno (NSW/ACT) Pty Ltd on behalf of Transport for NSW. For the purposes of this work, Transport for NSW 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 section 171 of the Environmental Planning and Assessment Regulation 2021, 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 Transport for NSW 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 will 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 (SIS) or a Biodiversity Development Assessment Report (BDAR)
- 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 Agriculture, Water and the Environment (DAWE) 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 selection of the preferred option for the proposal.

2.1 Strategic need for the proposal

The TAP is an ongoing 'initiative to deliver modern, safe and accessible transport infrastructure' in NSW (TfNSW, 2015a). The focus of the program is improving access to the transport network for less mobile passengers. As a result, Roads and Maritime Services (Roads and Maritime, now Transport for NSW) assessed the condition of all ferry wharves across the transport network in 2009 in terms of:

- Safety and structural integrity
- Access for less mobile and disabled passengers
- Existing and predicted future patronage and use.

The DSAPT and *Disability (Access to Premises – Buildings) Standards* (2010) (Disability Standards 2010) made under the *Disability Discrimination Act 1992* (DDA), require all public transport infrastructure, including wharves, to have fully compliant disability access by 2022.

It was concluded that the Darling Point Wharf needs upgrading due to its lack of accessible path from Darling Point Road to the wharf entry within McKell Park, and embarking and disembarking the ferry requires use of tidal steps.

The proposal was also developed to respond to the objectives of various Government policies as described below.

2.1.1 Transport Access Program (TAP)

The TAP aims to provide the following benefits:

- Improve the accessibility for passengers who use wheelchairs and prams by removing stairs and supplying ramps
- Build facilities for all transport modes to meet the needs of a growing population
- Provide an effective and seamless interchange that supports an integrated transport network
- Deliver safety and signage improvements to help with the customer user experience
- Provide other aesthetic improvements.

Ferry Wharf Upgrade Program

The Ferry Wharf Upgrade Program (FWUP) forms part of the TAP. Its objectives are to:

- Improve access for less mobile people
- Improve passenger amenity
- Improve passenger embarking/disembarking times
- Develop an iconic design across the commuting wharf network
- Cater for current and future passenger numbers
- Minimise customer and wharf operator impacts during any refurbishment and upgrade work

- Minimise ownership and maintenance costs
- Ensure the design complies with current safety laws
- Discourage inappropriate activities on public wharves
- Aim to comply with the DDA by 2022.

This proposal has been developed to respond to, and comply with, these objectives.

2.1.2 Sydney's Ferry Future

Published in 2013, the *Sydney's Ferry Future* plan acknowledges, and builds on TAP and the FWUP by outlining the short and long term initiatives for getting the most out of the 'ferry network today while investing in the infrastructure and services to attract more passengers in the future' (TfNSW, 2013). The plan:

- Focuses on short term timetable, service and infrastructure improvements and the long-term expansion of the network
- Reinforces the need to upgrade wharf infrastructure and make it more accessible in line with TAP.

The proposal directly responds to this by analysing how improvements could be made to best achieve the objectives of this plan in relation to the wharf facilities at Darling Point.

2.1.3 Future Transport Strategy 2056

The *Future Transport Strategy 2056* (TfNSW, 2018) is an update of the *Long Term Transport Master Plan for NSW* (TfNSW, 2012). It is a 40 year strategy, supported by plans for Greater Sydney and Regional NSW, which sets the vision, directions and outcomes for customer mobility. The *Future Transport Strategy 2056* sets six state-wide outcomes to guide investment, policy and reform and service provision, which includes:

- A customer focus
- Successful places
- A strong economy
- Safety and performance
- Accessible services
- Economic and environmental sustainability.

The upgrading and expanding the ferry wharf network, as part of the FWUP, would support meeting the above objectives of this strategy.

Transport for NSW has a key role in working towards economic and environmental sustainability. Addressing the environmental sustainability of the transport system is essential to minimise direct and indirect impacts on the natural environment. To minimise the impacts, all investments across the transport cluster will improve the resilience of the network in a changing climate and support the NSW Governments aspirational target of achieving net-zero greenhouse gas emission by 2050.

The design and construction of the proposal would comply with the *Transport for NSW Sustainability Design Guidelines version 4.0* (TfNSW, 2017a) supporting environmental sustainability, reducing emissions and mitigating for significant weather events. Refer sections 6.13 and 6.14 for further information.

2.1.4 Supporting NSW strategies and policies

The proposal is also supported under the policies, goals, objectives and targets of several other strategic planning documents as summarised in Table 2-1.

Table 2-1: Supporting NSW strategies and policies

| Strategy / Policy | Description |
|---|---|
| <i>State Infrastructure Strategy 2018-2038</i> (INSW, 2018) | The strategy identifies the NSW Government's infrastructure vision for the state over the next 20 years, across all sectors. It is supported by the <i>Future Transport Strategy 2056</i> (TfNSW, 2018). As passenger numbers are expected to increase in the future, this proposal responds to the above by improving the wharf infrastructure and access provisions at Darling Point. |
| <i>Disability Inclusion Action Plan 2018-2022</i> (TfNSW, 2017b) | The <i>Disability Inclusion Action Plan 2018–2022</i> (TfNSW, 2017b) is Transport for NSW's plan for delivering high quality services to all customers including those with disability, including compliance with the disability standards outlined below. |
| Disability Standards | The DSAPT and Disability Standards 2010 form part of the DDA. Each prescribe the minimum accessibility standards for disabled access to public transport services and infrastructure, including a timetable for implementation. The proposal meets the above requirements within the timeframes specified in both standards by providing suitable access for people with a disability. |
| State Priorities: <i>NSW Making it Happen 2015</i> | <p><i>NSW Making it Happen 2015</i> is the NSW Government's plan for making NSW a better place to live. Thirty priorities are identified to grow the economy, deliver infrastructure and improve health, education and other services.</p> <p>The proposal would:</p> <ul style="list-style-type: none"> • Improve the existing transport infrastructure, consistent with the building infrastructure priority • Be built and would operate under environmental safeguards and management measures to avoid and minimise environmental impacts consistent with the keeping our environment clean priority. |
| <i>A Plan for Growing Sydney</i> (DPE, 2014) | Focused on the concept of growth centres and transit corridors, <i>A Plan for Growing Sydney</i> (DPE, 2014) realises the need to strengthen transport connections into and out of central Sydney. A key action of the plan is to deliver a vision for Sydney Harbour including enabling opportunities to improve ferry services. The proposal responds to this action. |
| <i>A Metropolis of Three Cities – The Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018a) | <p><i>A Metropolis of Three Cities – The Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018a) is the NSW Government's regional plan for Greater Sydney which provides key directions and actions to rebalance growth and deliver its benefits equally to residents across Greater Sydney. The plan coordinates with the <i>Future Transport Strategy 2056</i> (TfNSW, 2018) and <i>State Infrastructure Strategy 2018-2038</i> (INSW, 2018) to align land use, transport and infrastructure planning to establish Greater Sydney as three distinct but connected cities.</p> <p>The proposal would directly address the following directions outlined by the plan:</p> <ul style="list-style-type: none"> • Infrastructure use is optimised • Infrastructure aligns with forecast growth • Services and infrastructure meet communities' changing needs • Integrated land use and transport creates walkable and 30-minute cities. |

| Strategy / Policy | Description |
|---|---|
| | <p>The NSW Government has prepared five district plans that guide the implementation of <i>A Metropolis of Three Cities – The Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018a). The district plans outline objectives and actions for the future development of the relevant district and are structured around the strategies for infrastructure and collaboration, liveability, productivity, sustainability and implementation. The Eastern City District Plan is the relevant district plan for Woollahra LGA.</p> |
| <p><i>Eastern City District Plan</i> (Greater Sydney Commission, 2018b)</p> | <p>The Eastern City District covers the Bayside, Burwood, City of Canada Bay, City of Sydney, Inner West, Randwick, Strathfield, Waverley and Woollahra LGAs. The <i>Eastern City District Plan</i> (Greater Sydney Commission, 2018b) is a 20-year plan to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. It contains the planning priorities and actions for implementing <i>A Metropolis of Three Cities – The Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018a) at a district level and is a bridge between regional and local planning. Planning priorities that are relevant to the upgrade include:</p> <ul style="list-style-type: none"> • Priority E1: Planning for a city supported by infrastructure (particularly prioritising infrastructure investment to support the vision of A Metropolis of Three Cities) • Priority E3: Providing services and social infrastructure to meet people's changing needs (particularly in relation to accessibility, inclusion and safety). <p>The proposal would support these priorities by providing improved ferry facilities, with a design that provides efficient embarking and disembarking. One of the objectives of the proposal is also to provide DSAPT compliance.</p> |
| <p><i>Woollahra – 2030</i> (WMC, 2018)</p> | <p>Woollahra Municipal Council's <i>Woollahra – 2030</i> (WMC, 2018) provides a 10-year strategic direction for the LGA which was prepared following input from residents, ratepayers and other stakeholders to determine common issues and interests to prioritise plans for the future. <i>Woollahra – 2030</i> outlines 11 goals across five strategic themes for the LGA. The proposal would support the following goals:</p> <ul style="list-style-type: none"> • Goal 6 - Getting around • Goal 7 - Protecting our environment • Goal 8 - Sustainable use of resources. |
| <p><i>McKell Park and Darling Point Reserve Plan of Management</i> (Marler, 2013)</p> | <p>The <i>McKell Park and Darling Point Reserve Plan of Management</i> (Marler, 2013) guides Woollahra Municipal Council in the future planning, use and management of McKell Park and Darling Point Reserve.</p> <p>The proposal would support the principle and objectives of the Access value, that is "ensure access to the parks for everyone wherever possible". The proposal would support the strategies for the Access value, including:</p> <ul style="list-style-type: none"> • Upgrade the public wharf • Provide and incorporate universal access principles in Darling Point Reserve • Provide lighting along the path from Darling Point Road through McKell Park to the ferry wharf • Link Darling Point Park and the lower level of McKell Park • Encourage park visitors and ferry passengers to ride a bike to the park. |

| Strategy / Policy | Description |
|---|--|
| <i>Draft Generic Plan of Management for Crown Land Reserves</i> (WMC, 2021) | <p>The Woollahra Municipal Council <i>Draft Generic Plan of Management for Crown Land Reserves</i> (WMC, 2021) applies to certain Crown Land within Woollahra LGA, including McKell Park.</p> <p>The proposal supports the objectives of the Plan, including:</p> <ul style="list-style-type: none"> • Objective 1 - Safe, clean, well maintained, functional and varied • Objective 2 – Accessible and inclusive. |

2.2 Existing infrastructure

The existing infrastructure at Darling Point Wharf includes the jetty, wharf structure, tidal steps, shelter and land-based infrastructure. The existing Darling Point Wharf does not currently meet the DSAPT or DDA requirements, as it does not allow for equitable access to the wharf or boarding the ferry. The wharf currently enables Transdev to operate a ferry service for passengers between Circular Quay and Darling Point.

Table 2-2 summarises the existing wharf elements and descriptions of current infrastructure.

Table 2-2: Existing wharf infrastructure

| Element | Description |
|-------------------------|---|
| Existing infrastructure | <p>Existing wharf, comprising:</p> <ul style="list-style-type: none"> • An uncovered timber wharf (jetty and tidal steps) • Four seating spaces under covered waiting shelter. <p>Land based infrastructure, including:</p> <ul style="list-style-type: none"> • Footpaths and stairs connecting the wharf to Darling Point Road through McKell Park • Lighting and way finding signs • Three bicycle parking hoops. |
| Operation | <ul style="list-style-type: none"> • Darling Point Wharf operates as part of the F7 Double Bay Loop, which provides connections between Circular Quay, Garden Island (not currently in operation), Darling Point and Double Bay. • Public ferry services typically operate every 60 minutes during off peak times and 30 minutes during on peak times. |
| Ancillary services | <ul style="list-style-type: none"> • Limited on-street parallel parking along Darling Point Road. • Nearest bus stop is located 300 metres away at the intersection of Darling Point Road and Thornton Street. • Double Bay Wharf is located two kilometres from the Darling Point Wharf. • Edgecliff train Station is located 1.5 kilometres away from the Darling Point Wharf and is on the T4 Eastern Suburbs and Illawarra Line travelling from Bondi Junction, Sydney central business district (CBD) and southern Sydney. |
| Land ownership | <p>Public owned land and assets owned by Transport for NSW:</p> <ul style="list-style-type: none"> • Existing wharf and associated features • Wayfinding signs. <p>Public owned land and assets owned by Woollahra Municipal Council:</p> <ul style="list-style-type: none"> • Roads |

| Element | Description |
|---------|---|
| | <ul style="list-style-type: none"> • Pavements • Footpaths • On street parking • Path and stairs between McKell park and the wharf. |

2.2.1 Patronage

The Darling Point Wharf serviced 24 passengers in the busiest peak hour and 42 passengers in the case of a special event based on 2017 Opal card patronage data.

Future patronage of Darling Point Wharf in 2036 was forecast at 32 in the busiest peak hour and 55 in the case of special events. The future patronage is based on population and employment forecasts for areas surrounding the wharf and an additional 15 per cent increase.

The wharfs future patronage potential is limited by the residential character of the surrounding land use, steep topography of the area and its limited connectivity to other public transport modes.

2.3 Proposal objectives and development criteria

2.3.1 Proposal objectives

The objectives of the proposal are to:

- Ensure compliance with legislative, functional and operational requirements, in particular DSAPT and DDA standards that require all public transport infrastructure, including wharves, to have fully compliant disabled
- Maximise equity of access for all customers
- Improve accessibility, passenger safety and comfort for all customers
- Maximise the use of the ferry wharf 'Kit-of-Parts' (standardised design elements) to provide continuity across Sydney Harbour wharves
- Accommodate forecast growth in patronage and changes to travel patterns
- Provide safe berthing of ferry vessels
- Minimise walking distances, conflict and crowding points and queuing
- Improve security and safety
- Minimise cost of ownership and maintenance.

2.3.2 Urban design objectives

Urban design objectives for the proposal include:

- Integrate the wharf within its local area, taking into consideration the nature of the site, local context and the surrounding biodiversity
- Integrate the wharf with its future urban context
- Create a high quality, secure and positive addition to the public domain.

2.4 Options considered

This section describes the options considered to deliver the proposal.

2.4.1 Methodology for selection of the preferred option

The method by which Transport for NSW developed options for replacing the wharf considered:

- Existing and future passenger use and service demand
- Engineering design requirements and current structural integrity
- Passenger safety
- Environmental and social constraints
- Build and maintenance cost
- Accessibility offered
- Stakeholder feedback.

2.4.2 Identified options

Three concept design options, in addition to the 'do nothing' option, were considered for Darling Point Wharf. These options were developed based on the strategic design, future needs analysis and site-specific requirements.

The following options were considered (refer Figure 2-1):

- 'Do nothing' – no upgrade and regular maintenance would continue
- Option 1 – lift and stairs in McKell Park
- Option 2 – lift and stairs in Darling Point Reserve and over water boardwalk
- Option 3 – switchback ramp in Darling Point Reserve and over water boardwalk.



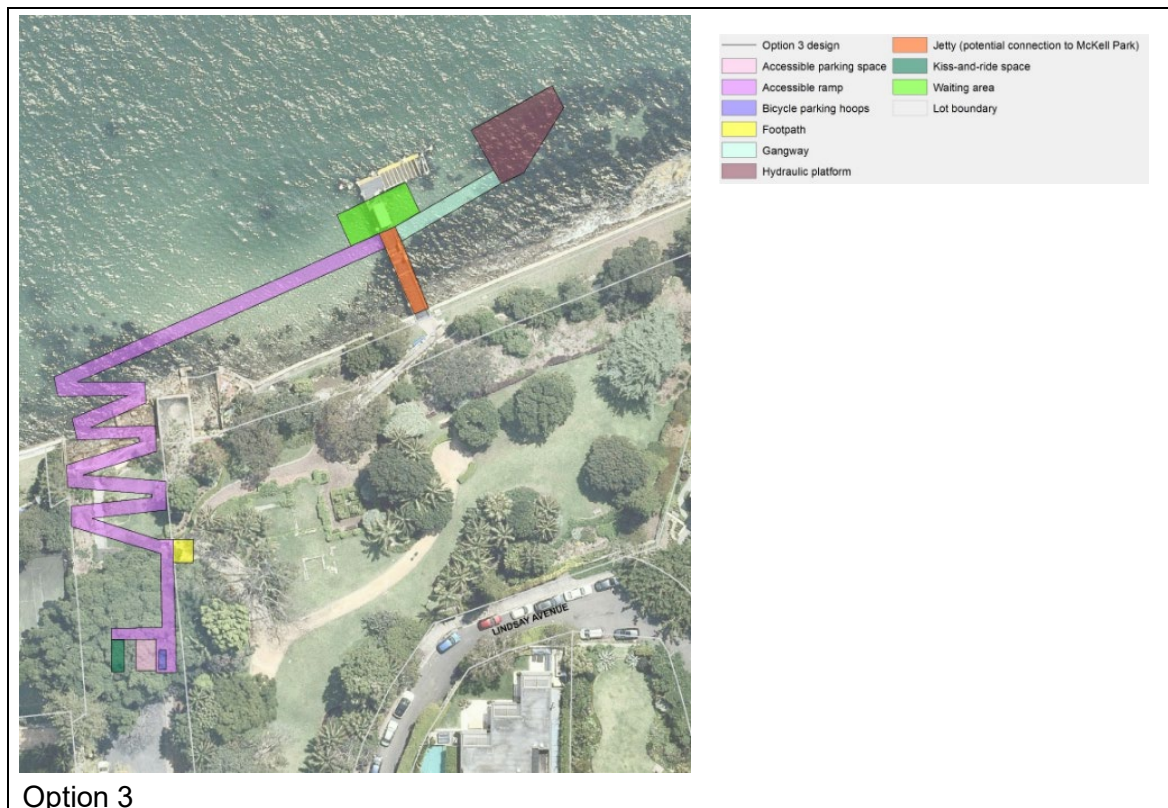
- | | |
|--------------------------|-------------------------|
| Option 1 design | Jetty (accessible ramp) |
| Accessible parking space | Kiss-and-ride space |
| Bicycle parking hoops | Lift |
| Footpath | Waiting area |
| Gangway | Lot boundary |
| Hydraulic platform | |
| Jetty | |

Option 1



- | | |
|--------------------------|---|
| Option 2 design | Jetty (potential connection to McKell Park) |
| Accessible parking space | Kiss-and-ride space |
| Accessible ramp | Lift |
| Bicycle parking hoops | Waiting area |
| Footpath | Lot boundary |
| Gangway | |
| Hydraulic platform | |

Option 2



Source: Aurecon, 2019a

Figure 2-1: Identified options

2.4.3 Analysis of options

Do nothing

The 'do nothing' option would limit the scope of work to carrying out activities required to maintain operation of the existing wharf, including undertaking regular maintenance. Parts of the existing structure are in poor condition, are not currently suitable for long term operation and are not DDA compliant. Undertaking regular maintenance would not correct these issues.

Although it would present the lowest initial capital cost and least environmental impact, the 'do nothing' option was discounted as it would not meet the objectives of the proposal to improve accessibility, passenger safety and comfort and to meet future demand.

Option 1, option 2 and option 3

Advantages and disadvantages of options 1, 2 and 3 (refer Table 2-3) were presented to key stakeholders (including Transport for NSW, former Roads and Maritime and Aurecon) at a workshop on 15 January 2019 and their relative performance was assessed using a multi-criterion analysis (MCA) process, which included consideration of:

- Accessibility
- Infrastructure
- Wharf interchange operation
- Wharf interchange maintenance
- Deliverability
- Customer experience

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- Transport integration
- Urban design and precinct planning
- Environment, sustainability and heritage.

Table 2-3: Options analysis

| Option | Advantages | Disadvantages |
|----------|---|--|
| Option 1 | <ul style="list-style-type: none"> • Footprint of new infrastructure is similar to the existing wharf and smaller than options 2 and 3. • All customers experience the amenity of accessing the wharf through McKell Park. • No impact to heritage listed bath house and jetty remains. • No impact to Darling Point Reserve. • No impact to existing parking spaces. • No impact to moorings. • Accessible connection to accessible parking and kiss-n-ride spaces. | <ul style="list-style-type: none"> • Poor natural surveillance of lift and stairs. • Visual impact to McKell Park. • Greater visual impact from land and water than existing but less than option 3. • Lift requires specialist maintenance. • Lift is far from Darling Point Road (maintenance access). • Direct impacts to McKell Park fence. • Reduction in areas of McKell Park available for recreation. • Removal of one Jacaranda tree. • Work in proximity to significant Hills Weeping Fig. • 90 degree parking is slower to exit/less safe than parallel parking. • Pontoon has potential to cause customer discomfort due to sea conditions. • Existing wharf closed during construction. |
| Option 2 | <ul style="list-style-type: none"> • Better natural surveillance of lift and stairs than existing and option 1. • No impact to existing parking spaces. • No impact to moorings. • Accessible connection to accessible parking and kiss-n-ride spaces. • Minimal direct impact to McKell Park • Lift is closer to Darling Point Road than option 1 (maintenance access). | <ul style="list-style-type: none"> • Footprint of new infrastructure is larger than existing and option 1 but smaller than option 3. • Not all customers experience the amenity of accessing the wharf through McKell Park. • Greater visual impact from land and water than existing and option 1 but less than option 3. • Lift requires specialist maintenance. • Direct impact to Darling Point Reserve (but less than option 3). • Ramp in proximity to heritage listed bath house and jetty remains. • Removal of one Jacaranda tree. • Work in proximity to significant Hills Weeping Fig. • 90 degree parking is slower to exit/less safe than parallel parking. • Pontoon has potential to cause customer discomfort due to sea conditions. • Existing wharf closed during construction. |

| Option | Advantages | Disadvantages |
|----------|--|--|
| Option 3 | <ul style="list-style-type: none"> • Better natural surveillance of lift and stairs than existing and options 1 and 2. • No impact to existing parking spaces. • No impact to moorings. • Accessible connection to accessible parking and kiss-n-ride spaces. • Minimal direct impact to McKell Park. | <ul style="list-style-type: none"> • Footprint of new infrastructure is larger than existing and options 1 and 2. • Not all customers experience the amenity of accessing the wharf through McKell Park. • Switchback ramp provides a less direct route to the wharf than options 1 and 2. • Greater visual impact from land and water than existing and options 1 and 2. • Direct impact to Darling Point Reserve (but less than option 2). • Ramp in proximity to heritage listed bath house and jetty remains. • Removal of one Jacaranda tree . • Work in proximity to significant Hills Weeping Fig. • 90 degree parking is slower to exit/less safe than parallel parking. • Pontoon has potential to cause customer discomfort due to sea conditions. • Existing wharf closed during construction. |

Source: Aurecon, 2019a

Preferred option

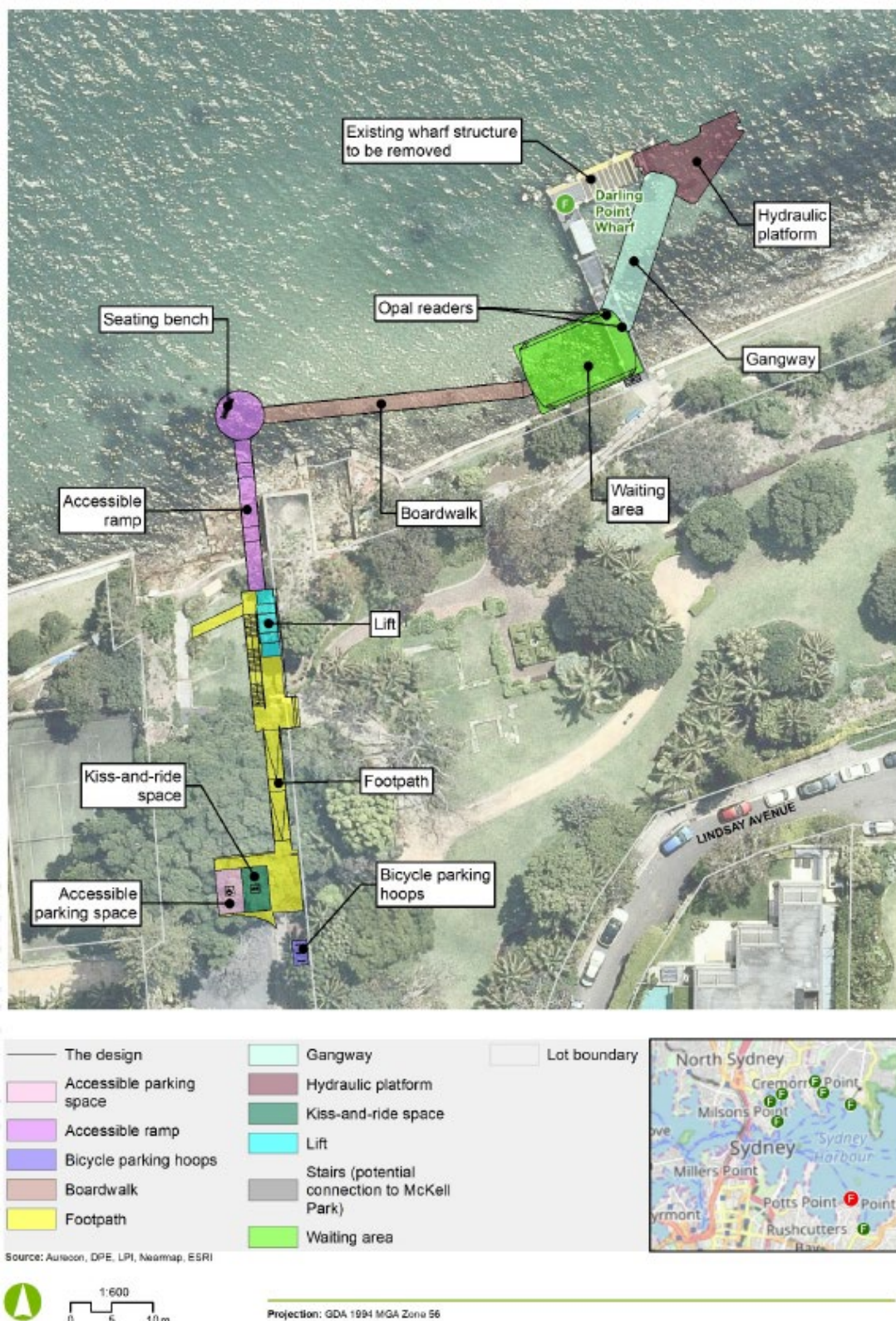
Following the MCA assessment of the options at the workshop with relevant stakeholders options 1 and 2 received the top MCA scores. While option 1 scored slightly higher, an additional stakeholder who was consulted following the workshop had concerns about the heritage, vegetation and visual impact on McKell Park. Option 2 was therefore chosen as the preferred option as it still aligned with other stakeholder preferences from the workshop and meet the project objectives while having lower impacts on the park.

2.5 Design refinements

2.5.1 Refinements of Option 2

Feedback on the preferred option was received during the initial stakeholder workshop. The design was subsequently updated to address this feedback and an updated option 2 design was presented at a second workshop with key stakeholders.

Comments from the second stakeholder workshop were considered and further design development was undertaken to address these comments. The subsequent concept design is shown on Figure 2-2.



Source: Aurecon, 2019a

Figure 2-2: Concept design

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2.5.2 Refinements to concept design

Minor refinements to the concept design were undertaken as follows:

- Accessible parking space was removed for further investigation
- Kiss and ride zone was located at the end of the Darling Point Road cul-de-sac, opposed to within Darling Point Reserve.

The accessible parking space was considered desirable however it was not feasible without compromising the viability of the Jacaranda and large Hills Weeping Fig in Darling Point Reserve.

The refined concept design was placed on public exhibition between 28 May 2021 and 4 July 2021 as outlined in section 5.2. Following the public exhibition further changes were made to the refined concept design to address stakeholder feedback and to minimise impacts to biodiversity, heritage, and visual amenity. The proposed boardwalk and associated piles were removed from the design, and a foreshore path connecting the new waiting area to the lower lift landing area via a suspended bridge structure was proposed.

The final concept design assessed in this REF is described in Chapter 3 and shown on Figure 3-1. This design may be further refined during detailed design.

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

The proposal is to upgrade the Darling Point Wharf as part of the TAP.

The water-based features of the proposal would include:

- A new covered fixed waiting area (about 16 metres by 11 metres) over the water with a nine metre by 13.5 metre curved zinc roof, steel columns, glass weather protection screens, stainless steel balustrades, seating, information boards and opal card readers. The waiting area would be supported by eight new piles
- A new covered three metre by 18 metre aluminium gangway connecting the fixed waiting area with the hydraulic platform
- A new hydraulic platform (about 90 square metres) for safe and level customer boarding and alighting. The platform would be held in place by three new piles, and protected by six fender piles
- Safety features including ladders to the water and life buoys
- Demolition of the existing wooden jetty, tidal steps and piles.

The land-based features of the proposal would include:

- A new 55 metre long DSAPT compliant foreshore path connecting the new waiting area to the lower lift landing area via a suspended bridge structure
- An 11 metre high lift and adjacent stairs to take customers between the street and foreshore
- A new DSAPT compliant path from Darling Point Road to a new lift and stairs
- A kiss-and-ride drop off zone at the end of the Darling Point Road cul-de-sac
- Removal and relocation of the existing bicycle parking hoops
- Safety and security features including lighting, CCTV cameras and TGSi.

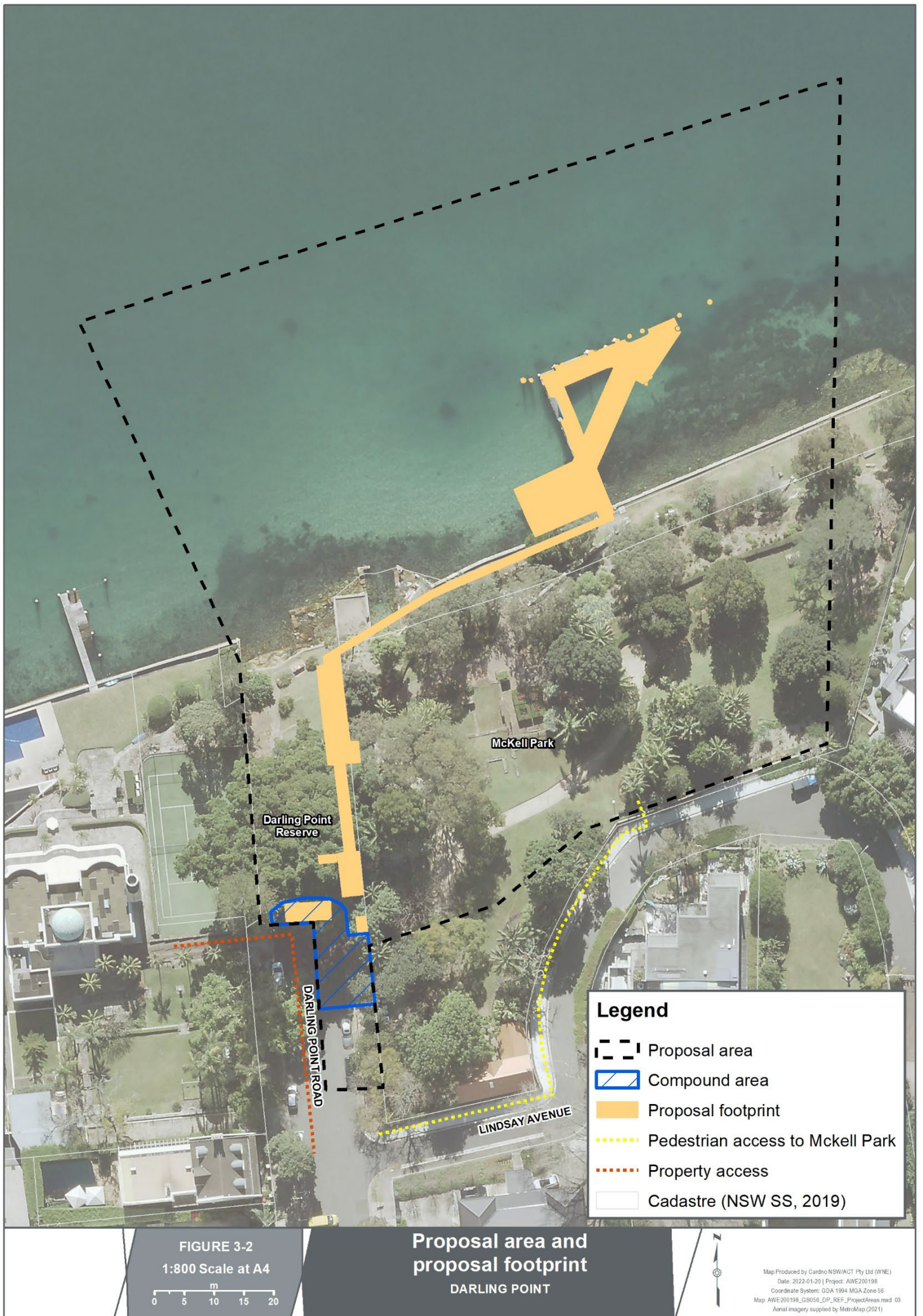
Figure 3-1 shows the key features of the proposal including the water-based and land-based features.

For the purposes of the REF the proposal footprint, proposal area and compound area have been defined as follows (refer Figure 3-2):

- Proposal footprint – the area directly impacted by proposed works, including the installation and removal of structures
- Proposal area – the area around the proposal footprint required for construction including the compound areas
- Compound area – the temporary facilities required for construction, including for example an office and amenities compound, construction compound and materials storage compound. The compound area for the landside works would likely be located in the cul-de-sac of Darling Point Road and on a barge for the waterside works. The exact location would be determined prior to construction.

Study areas for specialist disciplines are defined in Chapter 6.





3.1.1 Design criteria

The proposal has been designed to NSW and Australian engineering and safety standards, including:

- Roads and Maritime: *Guidelines for the Assessment of Public Ferry Wharf Safety 2016*
- DSAPT and amendments
- DDA
- National Construction Code (NCC) 2019 Volumes 1, 2 and 3 (Formerly Building Code of Australia- BCA)
- Australian Maritime Safety Authority (ASMA): navigation and safety
- Standards Australia: AS4997: 2005 *Guidelines for the Design of Maritime Structures*.

These standards provide guidance on:

- Overall height of the wharf above the water to allow for operation during extreme low and high tide, whilst also considering climate change impacts
- Maintaining vessel navigational channel
- Access and safety requirements
- Operation and stability during extreme storms, accounting for wind, wave and current conditions
- Sufficient water depths at extreme low tide to allow ferries to safely berth without the risk of either grounding or causing notable sediment disturbance and scour from propeller wash
- Appropriate materials selection and durability to support the operational design life of the wharf for a minimum of 50 years
- Additional safety and security measures consistent with the provisions of *Crime Prevention through Environmental Design* (DPE, 2001).

Overall, the wharf has been designed:

- With a 50 year design life, where achievable on structural elements
- To cater for low mobility passengers and expected passenger growth in the future
- To operate in different tidal conditions over its design life and take into account climate change and possible sea level rise
- To be regarded as an attractive, safe and secure piece of public transport infrastructure.

Figure 3-3, Figure 3-4 and Figure 3-5 show views of the proposal from various angles.



Figure 3-3: View of proposal from Darling Point Reserve looking east



Figure 3-4: View of proposal from McKell Park looking west

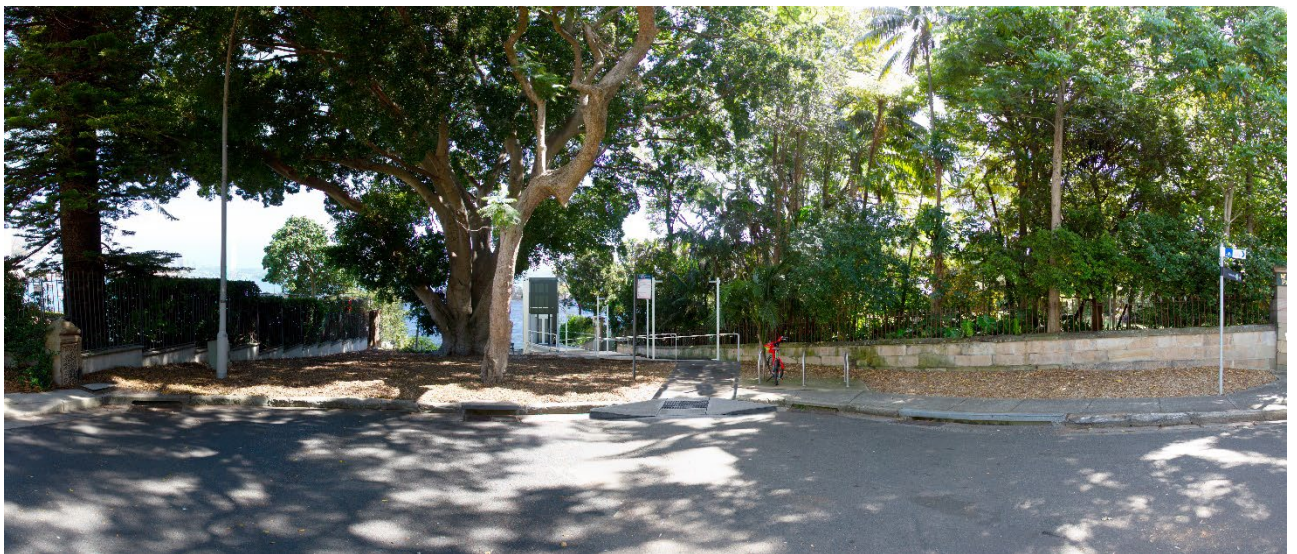


Figure 3-5: View of proposal from Darling Point Road cul-de-sac looking north

3.1.2 Engineering and development constraints

Table 3-1 lists the main constraints to the development and describes how they have been addressed in the concept design.

Table 3-1: Engineering and development constraints

| Constraint | Concept design provision |
|--|--|
| Heritage: Two local heritage items within the proposal footprint. Two additional items adjacent to the proposal footprint. | Various design options were considered. Impact to the adjacent heritage items would be minimised and consultation with a heritage advisor and Woollahra Municipal Council would be undertaken. |
| Wind, wave, current and climate change | The design allows the wharf to be used in all tidal 'states' (i.e. highest astronomical tide (HAT) and lowest astronomical tide (LAT), with an additional allowance and climate change adaptation and sea level rise). |
| Accessible access | The new wharf and landside infrastructure upgrades are accessible to all customers including people with a disability to meet the standards of the DDA, DSAPT and current legislative standards for disabled access. |
| Vegetation | The design does not impact the existing Hills Weeping Fig and Jacaranda in Darling Point Reserve. |

3.1.3 Major design features

This section describes the proposals main design features.

Major water based features

Waiting area

A fixed waiting platform is proposed at the eastern end of the foreshore path. The deck area of the waiting platform (about 13.5 metres by nine metres) is supported by three headstocks, each of which is supported by two piles. An additional headstock (supported by two piles) supports the waiting platform and gangway.

The canopy shelter is a curved zinc roof supported by steel columns. The covered waiting area has stainless steel handrails and glass screens on the western side, the northern side and part of the southern side. The glass screens provide weather protection for the centrally located seating. The seating would face outwards to maximise the view while waiting for the ferry and to improve separation of pedestrian flows.

A services pod would include stilling wells, hydraulic control system, waste bins, information screen, and a data/electrical cabinet. The services pod would be located along the southern side of the waiting area.

Ancillary features including a help point, safety and security facilities including lighting, CCTV cameras, ladders to the water and a life buoy, glass weather protective screens and TGSi where required would be installed on the fixed waiting area.

Gangway

The covered aluminium gangway (about 18 metres long by three metres wide) would connect the waiting area to the hydraulic platform. A transition plate would be installed over the join between the waiting area and the gangway and the gangway and hydraulic platform. The gradient of the gangway would vary according to the height of the hydraulic platform.

Hydraulic platform

Construction and installation of a triangular shaped steel floating platform at the eastern end of the gangway that rests on three piles with hydraulic arms that can vary the platform level depending on the tide and approaching vessel's requirements. The hydraulic platform would automatically adjust in height according to the tide, to allow for a level landing between the vessel and the platform and to achieve DSAPT required gradients.

The platform would have one 'sweep' berthing face on the northern side for the ferries. The northern berthing face would be around 14 metres, while the eastern face, where the gangway would rest is around 10 metres.

The platform would be held in place by three steel piles. The berth face would be formed by six fender piles. There would be no roof on the platform. Two of the three sides of the platform would have stainless steel handrails. The berthing face would not have handrails.

Ancillary furniture and installation of safety and security facilities including lighting, CCTV, ladders to water, a life buoy and TGS1 would be placed on the platform.

Major land based features

Streetscape

Access to the upgraded Darling Point Wharf would be from Darling Point Road and through Darling Point Reserve. An accessible path and skybridge would lead from the road to the lift and staircase. All new access paths would be DSAPT compliant and contain metal balustrades when the gradient requires it.

Lift and stairs

Access to the wharf from street level would be via the accessible path to the lift or stairs.

The lift would be of steel framed construction. The materials used on the external lift walls would be investigated during detailed design to complement the park and minimise the visual impact. The overall height of the lift (seen from the water) is around 11 metres. Five metres of this structure (the lift entry point) would be seen from street level.

The staircase would be of concrete construction and contain metal balustrades. The staircase would contain three flights of 1.5 metre wide stairs.

The entry and exit point of the lift and stairs would be an excavated or suspended landing platform.

The lower end of the lift landing platform would connect to a compliant pathway that leads to the new wharf.

Pathway

A compliant accessible pathway would stretch between the lower lift level and the covered waiting area. The path would be about 1.2 metres wide and 55 metres long. The path would follow the foreshore and may be supported by up to two piles at the western end.

Kiss-and-ride zone

It is proposed to provide a kiss-and-ride drop off zone at the end of Darling Point Road cul-de-sac.

Cyclist facilities

The three bicycle parking hoops at the cul-de-sac end of Darling Point Road would be relocated nearby. This location would be selected to be close to the lift entrance, while not impeding pedestrian flow to and from the lift.

Wayfinding

Wayfinding signage would be confirmed and further developed in the detail design phase of the upgrade.

There are no direct sightlines from Darling Point Road to the proposed wharf, which makes wayfinding signage important at this site, particularly the green circular Mode ID sign which would be placed in close proximity to the lift. The new path connection from Darling Point Road leads directly to the proposed lift and staircase. From this vantage point, the waiting area and wharf structure becomes visible.

Supporting infrastructure

While the specifics of the supporting infrastructure, lighting, signage, and furniture would be confirmed during the detailed design, they would be consistent with the provisions included on the other wharves on the network. It would therefore include:

- Opal fixed location readers (tap on/off machines) to be relocated
- Safety and security lighting at the entry to the lift, along the foreshore path, in the waiting area and on the hydraulic platform
- Passenger information boards, notices, and (electronic and display board) timetables
- Safety ladders around the waiting area
- Concealed cabling and ducting to provide power and communications
- CCTV
- Passenger facilities
- Tactile flooring
- New signage to assist with information and navigation (wayfinding).

The above would be developed in accordance with Transport for NSW design specifications.

3.2 Construction activities

The appointed Contractor would confirm the final construction activities in discussion with Transport for NSW. As such, this section only indicates a likely method and work plan as it may vary due to the identification of additional constraints before work starts, detailed design refinements, community and stakeholder consultation feedback, and Contractor requirements/limitations. Should the work method differ from what is proposed in this REF, the Contractor would consult Transport for NSW to determine if additional assessment is required. Some additional land would be needed temporarily to support construction, as described in Section 3.3.

3.2.1 Work methodology

The proposal would be built under Transport for NSW specifications as managed by the Contractor under a Construction Environmental Management Plan (CEMP). These specifications cover environmental performance and management supplemented by aspects such as materials storage and management, and erosion and sediment control.

The proposal would likely comprise a sequence of work activities similar to that summarised in Table 3-2.

Table 3-2: Construction activities

| Activity | Associated work |
|---|--|
| Site establishment and enabling works (Scenario 1a) | <ul style="list-style-type: none"> • Prior to the construction of the new wharf, the existing wharf would be closed and site entry and exit points would be established for the work site in this location. • Establishment of a temporary site compound (erect site offices, amenities and plant/material storage areas etc.) on the land. The site compound is likely to be located at the end of Darling Point Road. • Establishment of a work site using floating booms to delineate this area. This would make allowance for the outward reach of the construction barge's four anchorage points, over which marine vessels may not cross for safety reasons. The anticipated size of the barges is up to about 20 metres by 30 metres in size. • Traffic control measures (including for vehicles, watercraft, pedestrians and cyclists) would be established in accordance with the Traffic Management Plan (TMP) and maritime TMP. • Environmental controls would be established in accordance with the CEMP. |
| Removal of the existing Darling Point Wharf (Scenario 1b) | <ul style="list-style-type: none"> • Up to three barges would travel to the site from an off-site facility. One barge would be fitted with a crane (about 12 metres high), another is likely to contain materials piles etc. When on-site it would be anchored by four points but would reposition around the site during the work, as required. • The existing shelter, wharf furniture, fixed tidal structure and jetty decking would be cut away from the piles and loaded onto a barge by crane to be transported to an appropriately approved and licensed facility for reuse and/or disposal. • The existing timber piles would be removed by vibratory methods. If a pile is unable to be extracted by vibratory methods, it would be cut off level with the harbour bed. Divers would cut the pile at seabed level using appropriate underwater equipment. Piles would be transported by barge to an appropriately approved and licensed facility for reuse and/or disposal. |
| Installation of steel piles within the waterway and landside (Scenario 2a, 2b and 2c) | <ul style="list-style-type: none"> • Steel locator piles for the hydraulic platform and foundation piles for the waiting area would be installed into bedrock. These piles would be transported by barge to the site from the off-site facility. There is a risk that there is insufficient draught to construct some of the piles closest to the water's edge. This would require further investigation during detailed design. • The installation of the piles on the land side would likely be undertaken by a small (16 tonne) excavator with an auger attachment. This would limit the size of the pile to around 600 millimetres in diameter. • Construct pile foundation systems in bedrock as follows: <ul style="list-style-type: none"> ○ Pre-drill into rock ○ Position steel pile casing with crane mounted driving unit and piling guide ○ Drive or vibrate the steel pile casings into position ○ Cut the steel pile casings to length and backfill with concrete. |
| Construction of foreshore pathway from lift to waiting area including suspended bridge structure (Scenario 3) | <ul style="list-style-type: none"> • The suspended bridge structure for the foreshore path would be fabricated at an off-site facility and floated to site by barge. The bridge structure would be lifted into position by a large barge mounted crane. The material and shape would be investigated during detailed design. • The remainder of the foreshore pathway would be constructed at grade adjacent the McKell Park seawall. Excavation depths of up to 300 millimetres are possible to meet accessibility requirements. |

| Activity | Associated work |
|---|--|
| Installation of the hydraulic platform, fixed waiting structure, and gangway (Scenario 4) | <ul style="list-style-type: none"> The installation of the hydraulic platform and gangway would be by a large barge mounted crane. This activity needs to be undertaken during calm conditions (i.e. still water and minimal wind). The bracing (assumed to be stainless steel) would be prefabricated off site and brought to site on barges. The bracing would be lifted into position by a large barge mounted crane. The new hydraulic platform would be constructed at an off-site facility and floated to site. The hydraulic platform would be secured to the locator piles. The hydraulic platform system would be installed and commissioned The new fixed waiting structure would be constructed at an off-site facility and floated to site. The fixed waiting structure would be secured to the locator piles. The new gangway would be fabricated at an off-site facility and floated to site by barge. The gangway would be lifted into position by a large barge mounted crane. Installation of architectural treatments, services, handrails, glass panels etc. |
| Installation of lift tower, lift car, and stairs over land (Scenario 5) | <ul style="list-style-type: none"> The lift tower (the material for which would be determined during detailed design) and lift car would be lifted into position from either the water side (from a large barge mounted crane) or installed from smaller components from land side via Darling Point Road. Lifting from the water side would require calm conditions whilst installation from Darling Point Road would require smaller components to be 'walked' in by small mobile cranes (Frannas) or forklifts to avoid impacting the large Hills Weeping Fig at the end of Darling Point Road. Access for excavation and piling would likely be from Darling Point Road however this would be confirmed during detailed design, ensuring no impact to adjoining vegetation or built structures. The stairs would be cast-in-situ concrete from the land side. All concrete works for the land side would require delivery of concrete to the end of Darling Point Road and the use of line pumps to pump the concrete past the large Hills Weeping Fig. |
| Landside infrastructure (Scenario 6) | <ul style="list-style-type: none"> Landside upgrade would involve regrading of the footpaths and may also include accessible parking if feasible while protecting the Hills Weeping Fig. This would be determined during detailed design. |
| Installation of new or improved facilities (Scenario 7) | <ul style="list-style-type: none"> Installation of bicycle racks adjacent to the lift. Installation of way-finding signage. Re-landscaping of the construction areas. |
| Site clean-up (Scenario 8) | <ul style="list-style-type: none"> The site would be cleaned up and restored to its previous state. Sedimentation controls and temporary structures would be removed. Safety assessment of the structure would be carried out to identify any risks and rectify any safety hazards resulting from construction before opening these areas to the public. All construction fencing/hoarding and signage would be removed. |

Source: Aurecon, 2019a

3.2.2 Construction hours and duration

This section describes the time it would take to build the proposal and the working hours.

Start date and length of construction

The proposal would be built over a duration of up to eight months starting in the third quarter of 2022. Construction may not be continuous as it would rely on materials delivery and the manufacture of the prefabricated components. The construction program would be affected by the need to coordinate with Woollahra Municipal Council, residents, and other key stakeholders (refer to Chapter 5).

Working hours

The work would take place within and outside of standard working hours. Standard working hours are as follows:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm.

For safety reasons the piling, lifting of structures and concrete work in the harbour may need to take place at late night and/or early in the morning when the water is calm and still and the harbour is least busy. It is estimated that about 30 night shifts (from 11pm to 7am) would be required across the construction period of up to eight months.

During piling activities, a work schedule similar to the following may be adopted:

- Drilling of piles (preferred method):
 - Setup: 11pm to 12am (approximately)
 - Drilling: 12am to 6am (approximately)
 - Pack up: generally, 6am to 7am (approximately)
- Hammering of piles (alternative method):
 - Setup: 4am to 5am (approximately)
 - Hammering: 5am to 7am (approximately).

3.2.3 Workforce

While about 25 people would be needed to carry out the main construction activities it is expected that there would be about 10-15 people onsite at one time.

3.2.4 Plant and equipment

The plant and equipment needed to build the proposal would be typical of any construction site. It would vary depending on the construction activity. The largest and most complex equipment needed would be to lift and install the prefabricated units and undertake the piling work. Table 3-3 indicates the plant and equipment that would be likely used to build the proposal, however this would be confirmed by the Contractor.

Table 3-3: Indicative plant and equipment

| Activity | Equipment |
|--------------------------|---|
| Water based construction | <ul style="list-style-type: none"> • Truck • Pneumatic drill • Barge • Mobile crane (50 tonne) • Crane mounted vibrator • Workboat • Generator • Hand tools • Daymaker • Barge pneumatic piling hammer • Barge mobile crane • Oxeye acet cutting • Auger/bored drill rig/excavator • Concrete truck and kibble • Excavator |
| Land based construction | <ul style="list-style-type: none"> • Excavator • Trucks • Jack hammer • Pavement profiler • Generator • Bob cat • Concrete truck and pump • Truck (medium rigid) • Vibratory roller (7.5 tonne) • Hand tools • Chainsaw • Crane • Elevated work platform |

3.2.5 Earthwork

There would be limited earthwork associated with the proposal. A small amount of harbour sediment would be disturbed during the piling work and demolition of the existing wharf, however, no sediment would be removed.

Earthwork during construction of the land based elements would be excavation primarily for construction of the stair, lift slot and foreshore path. Construction of the pavement and kerbs may also involve limited earthwork.

Any materials collected would be tested and waste classified. All materials would be re-used where practicable with the exception of non-exempt waste which would be shipped (barged) or trucked offsite for collection and disposal at a licenced waste management facility.

3.2.6 Source and quantity of materials

Various standard construction materials would be needed to build the proposal. They would be either transported or shipped (barged) to site as prefabricated units ready for installation, or delivered in small quantities for use as needed. The main materials needed to build the proposal would comprise:

- Marine-grade steel, aluminium and zinc for the superstructure (gangway, canopy and barriers), substructure (piles) and land side work (stairs and lift)
- Precast concrete
- Prefabricated signage, light fittings, barriers and fencing
- Prefabricated glazing units
- Electrical cabling and other electronic infrastructure
- Additional materials such as relatively small quantities of paint, oils, fuels and other materials.

Materials would be sourced from overseas and local commercial suppliers, using local suppliers wherever feasible and cost effective.

3.2.7 Traffic management and access

Maritime and road traffic management would be required while certain elements of the proposal are being built and installed. This may involve:

- Closure of the wharf, with no ferry services running from Darling Point Wharf. Commuters could use nearby bus services, ferry services at Double Bay and train services at Edgecliff Station. No additional services are proposed during the construction period
- Changes to the F7 Double Bay navigation route to avoid the construction site
- Potential temporary partial closure of the Darling Point Road cul-de-sac (a TMP would be prepared for the project)
- Additional construction traffic along Darling Point Road
- No access for pedestrians to Darling Point Reserve during construction
- Pedestrian access to the foreshore around Darling Point Reserve would be closed. The lower end of McKell Park may be restricted however access to the upper end of McKell Park would remain.

Where feasible, materials and equipment for water based elements of the proposal would be shipped (barged) into and out of the area to limit excessive impact on Darling Point Road reserve and surrounds. This would provide the best method to build the marine components. It may also be the best method to deliver materials to the land based areas providing there is adequate access for loading and unloading, however it is anticipated that most materials and equipment required for land based elements of the proposal would be delivered by road. The amount of materials shipped to site, over being delivered by road, would be confirmed during detailed design.

3.3 Ancillary facilities

Given the limited space and road access, the preference would be to ship any major machinery, equipment and prefabricated units to site, making use of an offshore storage barge. A maritime exclusion zone would be established during construction to prevent unauthorised access to the area.

A temporary site compound (erect site offices, amenities and plant/material storage areas etc.) may be established on the land in the cul-de-sac of Darling Point Road (refer Figure 3-2). Hoarding would be erected around the site compound.

The marshalling and storage of most waterside construction equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs for the wharf, would be carried out by a contractor at an approved off-site facility. The operation of this off-site facility does not form part of this proposal but would have the necessary approvals in place for such activities to be undertaken.

3.4 Public utility adjustment

3.4.1 Existing utilities

A preliminary assessment of existing utilities near the wharf was undertaken through a Dial Before You Dig (DBYD) search in February 2019 (Aurecon, 2019a). During detail design, further assessment of impacts to local utilities would be undertaken including on-site services locating. The preliminary assessment identified that the following services are present around Darling Point Wharf that would not be impacted:

- Electrical low voltage (LV) cables (Ausgrid)
- Gas services (Jemena).

However, the following services are present and may be impacted and/or require protection during construction, and would be confirmed during detailed design:

- Submarine cable
- Optic fibre/cable (NBN)
- Underground communication cable (Telstra)
- Sewer main, water main and maintenance hole.

Any public utility adjustment would be assessed separately by the public utility provider.

3.4.2 Services for the new wharf

It is likely a new electricity supply would need to be sourced from the existing Ausgrid power on Darling Point Road to power the lifts, lights and the pontoon hydraulic system. Final utility requirements would be confirmed during detailed design and would be subject to a separate environmental assessment if required.

There is a requirement to provide water supply for the maintenance of the wharf. Woollahra Municipal Council owned water sources and fire hydrants are available in the nearby McKell Park which could be utilised for wharf maintenance.

3.5 Property

No property would be acquired under the proposal. The additional land needed to support construction would be either leased from, or used under agreement with Woollahra Municipal Council.

The NSW Aboriginal Land Council (NSW ALC) has a land claim over McKell Park including the lower end of the park along the seawall (Lot 1553 DP 752011). Transport for NSW is in consultation with the NSW ALC on this matter.

The La Perouse Local Aboriginal Land Council (LP LALC) has a claim over unidentified Crown land being the northern boundary of the La Perouse LALC at the centre of Port Jackson, generally north easterly to outer North Head, then directly to South Head, by the mean high tide watermark to Potts Point/Derrawun then to the commencement point. Transport for NSW is in consultation with the LP LALC on this matter.

4 Statutory 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(4A) of ISEPP permits development ‘for the purposes of associated public transport facilities for a public ferry wharf’ to be carried out by or on behalf of a public authority without consent on any land. However, such development may only be carried out on land reserved under the NPW Act if the development is authorised by or under that Act.

As the proposal is for the purposes of associated public transport facilities for a public ferry wharf and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the EP&A Act. Development consent from council is not required. The proposal is not located on land reserved under the NPW Act.

The proposal does not trigger an approval or development consent under *State Environmental Planning Policy (Coastal Management) 2018* (Coastal Management 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 SRD 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 less than \$30 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 gives effect to the objectives of the new *Coastal Management Act 2016* from a land use planning perspective, specifying how development proposals are to be assessed if they fall within the coastal zone.

The proposal falls within land identified as coastal use area and coastal environment area under Clause 13 and Clause 14 of the Coastal Management SEPP, however Clause 13(3) and Clause 14(2) details that land that falls within the Foreshores and Waterway Area in the *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (Sydney

Harbour SREP), the Coastal Management SEPP does not apply. As such, the provisions of the Coastal Management SEPP have not been considered further.

State Environmental Planning Policy (Sydney Harbour Catchment) 2005

The proposal is located within the Sydney Harbour Catchment and is subject to the Sydney Harbour SREP, which is deemed a SEPP. The aims of the Sydney Harbour SREP as outlined in clause 2 are considered in Table 4-1.

Table 4-1: Aims of the Sydney Harbour SREP (Clause 2)

| Aim | Comment |
|--|---|
| 2(1)(a) To ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained: (i) as an outstanding natural asset (ii) as a public asset of national and heritage significance, for existing and future generations. | Chapter 7 of this REF includes safeguards and management measures to protect and maintain the areas natural and heritage values. This would ensure the values of Sydney Harbour are recognised, protected, enhanced and maintained. |
| 2(1)(b) To ensure a healthy, sustainable environment on land and water. | Providing relevant standard controls are implemented and monitored, as set out in Transport for NSW guidelines (refer Chapter 7), the proposal's environmental impact is expected to be minimised. |
| 2(1)(c) To achieve a high quality and ecologically sustainable urban environment. | The design of the proposal has been based on the principles of sustainability outlined in the Transport for NSW <i>Sustainability Design Guidelines</i> . The proposal's urban design includes high quality, durable and low impact materials to minimise ongoing maintenance requirements. The design also provides thematic consistency across the entire network (refer Chapter 3). Both factors provide for a sustainable urban environment over its 50 year design life. |
| 2(1)(d) To ensure a prosperous working harbour and an effective transport corridor. | With a 50 year design life, the proposal would allow for the operation of a ferry wharf at Darling Point for future generations. The work also forms part of a network-wide upgrade program to help sustain the ferry service in its role as part of an effective and integrated transport corridor and system. The existing wharf would be closed during the construction of the proposal. Passengers would be notified ahead of time as detailed in Chapter 7. |
| 2(1)(e) To encourage a culturally rich and vibrant place for people. | Following construction, the proposal would continue to provide Darling Point residents with access to the ferry network. This would sustain Darling Point as a vibrant place to visit. |
| 2(1)(f) To ensure accessibility to and along Sydney Harbour and its foreshores. | The upgrade would ensure that Darling Point visitors are provided with ongoing access to Sydney Harbour and its foreshore areas over the next 50 years. It would also improve access for low mobility passengers. The existing wharf would be closed during the construction of the proposal. Passengers would be |

| Aim | Comment |
|---|---|
| | notified ahead of time about the works as detailed in Chapter 7. |
| 2(1)(g) To ensure the protection, maintenance and rehabilitation of watercourses, wetlands, riparian lands, remnant vegetation and ecological connectivity. | The proposal would not have a significant impact on notable terrestrial or marine environments or values in the area. Safeguards and management measures would be implemented to prevent any indirect impact on the wider ecological environment from spills and sediment disturbance, mobilisation and smothering. |
| 2(1)(h) To provide a consolidated, simplified and updated legislative framework for future planning. | The proposal is being delivered under the relevant planning provisions covering waterfront and marine development set at a State and Commonwealth level. |

Zoning

The proposal footprint has been considered in respect of the objectives from clause 17 of the Sydney Harbour SREP for the W8 Scenic Waters Passive Use zone (refer Table 4-2).

Table 4-2: Zone W8 Scenic Waters: Passive Use objectives

| Objective | Comment |
|--|---|
| a) To give preference to unimpeded public access along the intertidal zone, to the visual continuity and significance of the landform and to the ecological value of waters and foreshores. | <p>Minor disruption would be caused during construction, which would be communicated to water users before starting work.</p> <p>The proposal would involve the construction of a new wharf at Darling Point, ensuring public access to this location whilst minimising impacts to biodiversity and the landform in this locality.</p> |
| b) To allow low-lying private water-dependent development close to shore only where it can be demonstrated that the preferences referred to in paragraph (a) are not damaged or impaired in any way, that any proposed structure conforms closely to the shore, that development maximises open and unobstructed waterways and maintains and enhances views to and from waters in this zone. | <p>Upgrading the wharf in the same location as the existing wharf would limit the impact of introducing additional infrastructure in a new location.</p> <p>There would be an adverse impact from increasing the mass, scale, form, composition, design and structure of the wharf, as discussed in section 6.5.</p> |
| c) To restrict development for permanent boat storage and private landing facilities in unsuitable locations. | The proposal does not include permanent boat storage. |
| d) To allow water-dependent development only where it can be demonstrated that it meets a demonstrated demand and harmonises with the planned character of the locality. | <p>Minor disruption would be caused during construction, which would be communicated to water users before starting work.</p> <p>The proposal would involve the construction of a new wharf at Darling Point, ensuring water dependent transport development remains in this locality. The new wharf would allow for more effective and efficient public water transport for its 50 year design life.</p> |
| e) To ensure that the scale and size of development are appropriate to the locality and protect and improve the | The upgrade would ensure that Darling Point residents and other users would be provided with access to a ferry service (and public |

| Objective | Comment |
|--|---|
| natural assets and natural and cultural scenic quality of the surrounding area, particularly when viewed from waters in this zone or areas of public access. | transport) over the next 50 years. The upgrade would allow the social and cultural association of a wharf in this location to be retained, including the relationship it provides for people between the harbour and foreshore. |

The proposal area is located in the W8 Scenic Waters Passive Recreation, W1 Maritime Waters and W3 Naval Waters zones.

Under section 18 of the Sydney Harbour SREP, the proposal is permissible as a public water transport facility with development consent in the W8 zone. In any case, the development is permissible without development consent pursuant to the provisions of ISEPP which override the zoning provisions of the Sydney Harbour SREP (see clause 7(5) of the Sydney Harbour SREP).

Matters for consideration

The matters for consideration by public authorities before they carry out activities are listed in Division 2 at clauses 21-27 of the Sydney Harbour SREP, and are provided in Table 4-3.

Table 4-3: Division 2 matters

| Division 2 matter | Comment |
|--|---|
| Clause 21 Biodiversity, ecology and environment protection | Section 6.3 describes the terrestrial and marine impacts associated with the proposal. With the implementation of the safeguards and management measures, impacts would be minimised, managed and/or offset. |
| Clause 22 Public access to, and use of, foreshores and waterways | The wharf would be closed during the construction period. Access to Darling Road Reserve and parts of McKell Park would be restricted during construction work. The local community and ferry passengers would be notified ahead of the commencement of work. |
| Clause 23 Maintenance of a working harbour | The upgrade would ensure that Darling Point visitors would be provided with access to a ferry service (and public transport) over the next 50 years. |
| Clause 24 Interrelationship of waterway and foreshore uses | The upgrade would allow the social and cultural association of a wharf in this location to be retained, including the relationship it provides for people between the harbour and foreshore. |
| Clause 25 Foreshores and waterways scenic quality | Upgrading the wharf in a similar location as the existing wharf would limit the visual impact of introducing infrastructure in a new location, including any impact on areas zoned as 'scenic waters'. There would be an adverse visual impact from increasing the mass, scale, form, composition, design and structure of the wharf, as discussed in section 6.5. |
| Clause 26 Maintenance, protection and enhancement of views | Section 6.5 describes the landscape character and visual impacts associated with the proposal. The new wharf was assessed as having an overall high to moderate impact on surrounding landscape characters and views. |

| Division 2 matter | Comment |
|------------------------------------|---|
| | Urban design principles would be integrated throughout the detailed design to further minimise the impacts. |
| Clause 27 Boat storage facilities | There is no boat storage works associated with, or impacted by, the proposal. |
| Clause 27A Floating boat platforms | <p>Public access would not be adversely affected once the wharf is operational. Section 6.8 describes the impacts to access.</p> <p>Section 6.5 describes the landscape character and visual impacts associated with the proposal. Urban design principles would be integrated throughout the detailed design to further minimise the impacts.</p> <p>The proposal is in the location of the existing wharf. Section 6.1 describes the hydrology and water depths.</p> <p>Seagrass would not be impacted as described in section 6.3.</p> <p>Development consent is not required under ISEPP.</p> |
| Clause 27B Mooring pens | There are no mooring pens associated with the proposal. |

Consultation

At the time this REF was initially drafted, section 31 of the Sydney Harbour SREP required consultation for certain development proposals not requiring development consent. Section 31 and the consultation requirements have since been repealed. Consultation, including under the Sydney Harbour SREP, is discussed in Chapter 5 of this REF.

Heritage provisions

Part 5 of the Sydney Harbour SREP contains heritage provisions that are to be taken into account in respect of Division 5.1 activities. One Sydney Harbour SREP listed heritage item; Remains of Bath House and site of jetty (item no. 46), is located within the proposal area.

Heritage items are discussed further in section 6.6 and section 6.7. The heritage objectives from the Sydney Harbour SREP in clauses 53(1) and 53(2) are considered in Table 4-4.

Table 4-4: Heritage objectives (clause 53)

| Objective | Comment |
|--|---|
| 53(1)(a) To conserve the environmental heritage of the land to which this Part applies. | <p>The proposal has been designed to be sympathetic to the area's heritage values.</p> <p>A Statement of Heritage Impact (SoHI) prepared to support this REF concludes that the proposal would not impact the overall significance of the heritage items within and adjacent to the proposal area, or the heritage items within the visual buffer zone (refer section 6.6).</p> |
| 53(1)(b) To conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items. | The proposal has been designed to preserve the heritage and conservation values of surrounding heritage items. |

| Objective | Comment |
|---|--|
| 53(1)(c) To ensure that archaeological sites and places of Aboriginal heritage significance are conserved. | As described in section 6.7, the proposal would not impact known archaeological site or places of Aboriginal heritage. |
| 53(1)(d) To allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items. | Based on the preliminary archaeological assessment, the proposed works would result in minor impacts to potential archaeological (including maritime) remains of local significance. |
| 53(2)(a) To establish a buffer zone around the Sydney Opera House so as to give added protection to its world heritage value. | The proposal is not located in the Sydney Opera House buffer zone. |
| 53(2)(b) To recognise that views and vistas between the Sydney Opera House and other public places within that zone contribute to its world heritage value. | The proposal would not impact on the views and vistas from the Sydney Opera House. |

Sections 54 and 55 of the Sydney Harbour SREP provide for the protection of heritage items and places.

The SoHI (refer section 6.6) concludes that overall, the proposed works would result in a minor direct, potential direct and visual impact to the Remains of Bath House and site of jetty (item no. 46).

The due diligence assessment of the *Stage 1 Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) prepared for the proposal concluded that the proposed work is unlikely to have an impact on Aboriginal cultural heritage (refer section 6.7).

Wetlands protection

Part 6 of the Sydney Harbour SREP relates to wetlands protection. The SREP identifies 'Wetlands Protection Areas' to conserve and protect any wetland habitats. In Sydney Harbour these include mangroves, seagrasses, saltmarshes, sedgeland, wet meadows and mudflats and the wetlands protection areas cover a 40 metre buffer around these to account for movement, growth and seasonal variation.

The proposal area is identified as being located within a Wetlands Protection Area under the Sydney Harbour SREP. The vegetation and habitat in the proposal area includes seagrass.

Although the foreshore is highly modified and no mangroves or saltmarshes occur in the area mapped as the Wetlands Protection Area in the proposal area, the entire Parramatta Estuary is considered an estuarine wetland (estuarine waterbody) by Kingsford et al. (2004). A precautionary approach has been adopted to address the objectives in relation to estuarine habitat in the Wetlands Protection Area within the proposal area. The wetlands objectives in section 61 of the Sydney Harbour SREP are considered in Table 4-5.

Table 4-5: Wetland objectives (section 61)

| Objective | Comment |
|--|---|
| 61(a) To preserve, protect and encourage the restoration and rehabilitation of wetlands. | <p>Potential impacts of the proposal to the wetland include (refer section 6.3):</p> <ul style="list-style-type: none"> Loss of habitat under the footprint of the piles to be installed |

| Objective | Comment |
|--|---|
| | <ul style="list-style-type: none"> • Mobilisation of fine and coarse debris (e.g. sediments) and mobilisation of contaminants known to persist in the sediments • Scour from vessel and barge movements during construction. <p>These were not considered to substantially impact the estuarine habitat as the marine vegetation and subtidal habitat features are not unique to the proposal area and are widespread throughout the harbour. The macroalgae lost from the removal of existing wharf structures are expected to recolonise the newly installed wharf structures. Management measures would be implemented to limit removal/disturbance of marine vegetation and habitat to the areas defined in the biodiversity assessment (refer section 6.3.3).</p> <p>Mitigation measures would be implemented to avoid or minimise the mobilisation of fine and coarse debris and the habitat in the area are currently exposed to substantial scouring from an ambient level of vessel traffic at the wharf. Thus, the proposal is unlikely to interfere with the preservation and protection of the wetland and the reinstatement or offset of lost habitat features may promote restoration and rehabilitation of this and other wetland areas.</p> <p>Refer to section 6.3 for more information.</p> |
| 61(b) To maintain and restore the health and viability of wetlands. | Refer 61(a). The reinstatement of removed macroalgae and habitat-forming species by natural recruitment is aimed to maintain the health and viability of wetlands. Also, providing relevant standard controls are implemented and monitored as set out in Transport for NSW guidelines and quality assurance specifications (refer section 7.2), the proposal's environmental impacts during construction are expected to be safeguarded and minimised thus maintaining the health and viability of the wetlands in the local area. |
| 61(c) To prevent the fragmentation of wetlands. | The proposal would not impact on the connectivity of the broader Parramatta Estuary hence, would not fragment the Wetlands Protection Area. |
| 61(d) To preserve the scenic qualities of wetlands. | The proposal would replace existing wharf structures. The location and construction of the wharf has been selected to minimise visual impacts along the Wetlands Protection Area. The overall visual impact of the proposal is considered to be high to moderate (refer section 6.5). |
| 61(e) To ensure that wetlands continue to perform their natural ecological functions (such as the provision of wetland habitat, the preservation of water quality, the control of flooding and erosion). | As described above, the proposal preferred design in combination with the proposed safeguards described in Chapter 7 are aimed at protecting the ecological function of the marine environment. The Wetlands Protection Area in the proposal area would continue to provide wetland habitat to flora and fauna and water quality would not be substantially or permanently impacted. The foreshore in the proposal area has been |

| Objective | Comment |
|-----------|--|
| | previously modified to minimise the risk of flooding and erosion thus, the proposal is unlikely to interfere with this function. |

The matters to be considered for works within a Wetlands Protection Area from clause 63(2) of the Sydney Harbour SREP are considered in Table 4-6.

Table 4-6: Section 63(2) matters

| Objective | Comment |
|---|---|
| 63(2)(a) The development should have a neutral or beneficial effect on the quality of water entering the waterways. | The proposal would have a neutral effect if relevant standard safeguards in Transport for NSW guidelines, quality assurance specifications and this REF are implemented and monitored. The proposal is expected to have minimal, temporary environmental impact on the marine environment and water quality (refer to section 6.2). |
| 63(2)(b) The environmental effects of the development, including effects on: (i) the growth of native plant communities, (ii) the survival of native wildlife populations, (iii) the provision and quality of habitats for both indigenous and migratory species, (iv) the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding areas, including salinity and water quality and whether the wetland ecosystems are groundwater dependent | <p>The proposal is not expected to interfere with the growth of native plant communities in the Wetlands Protection Area. The Wetlands Protection Area in the proposal area is highly urbanised and the disturbance during construction of the proposal is unlikely to impact the long-term survival of native wildlife populations of commonly occurring species.</p> <p>The proposal is unlikely to substantially impact threatened species, populations, communities or migratory species. The proposal area is not considered optimal habitat for most threatened species, populations, communities or migratory species. Disturbances to potential habitat during construction would largely be temporary and constitute a very small proportion of available habitat.</p> <p>There are no aquatic or terrestrial groundwater dependent ecosystems in the proposal area.</p> <p>Providing the relevant safeguards described in Chapter 7 are implemented and monitored, the proposal's environmental impacts on the area's surface water quality are expected to be minimal and temporary.</p> |
| 63(2)(c) Whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment. | Chapter 7 sets out the safeguards and management measures to protect the local environment. The section also includes offset requirements, post-construction measures, and corrective actions needed during an accident or emergency to manage any impacts. |
| 63(2)(d) Whether carrying out the development would be consistent with the principles set out in The NSW Wetlands Management Policy (as published in March 1996 by the then Department of Land and Water Conservation). | <p>The Policy lists five principles for wetland protection (clauses 61a-e). Part of the proposal is located in the same position as the existing wharf and changes to ferry wash impacts to the near-shore habitat is unlikely to substantially change. A CEMP would be implemented during construction to minimise impact to shallow habitat (e.g. use of floating mooring lines). As such, the proposal aims meets the Policy's principles by:</p> <ul style="list-style-type: none"> • Avoiding and minimising impacts first |

| Objective | Comment |
|---|---|
| | <ul style="list-style-type: none"> • Mitigating impacts where avoidance is not possible • Offsetting where residual impacts cannot be avoided. |
| 63(2)(e) Whether the development adequately preserves and enhances local native vegetation. | The proposal would not clear landside native vegetation. Refer to section 6.3 for further detail. |
| <p>63(2)(f) Whether the development adequately demonstrates:</p> <p>(i) how the direct and indirect impacts of the development will preserve and enhance wetlands,</p> <p>(ii) how the development will preserve and enhance the continuity and integrity of the wetlands,</p> <p>(iii) how soil erosion and siltation will be minimised both while the development is being carried out and after it is completed,</p> <p>(iv) how appropriate on-site measures are to be implemented to ensure that the intertidal zone is kept free from pollutants arising from the development</p> <p>(v) that the nutrient levels in the wetlands do not increase as a consequence of the development,</p> <p>(vi) that stands of vegetation (both terrestrial and aquatic) are protected or rehabilitated,</p> <p>(vii) that the development minimises physical damage to aquatic ecological communities,</p> <p>(viii) that the development does not cause physical damage to aquatic ecological communities.</p> | <p>(i) Section 6.1 and Table 4-5 describe how the proposal has been designed and environmental safeguards proposed to protect the area in which the proposal is located.</p> <p>(ii) Refer Table 4-5.</p> <p>(iii) The shoreline in the Wetlands Protection Area has been modified to remove/limit the risk of erosion and siltation. To minimise localised sediment mobilisation during construction, a silt boom and curtain may be used, while additional erosion management controls for land-based works have been identified in the safeguards and management measures in Chapter 7.</p> <p>(iv) Chapter 7 includes a range of standard pollution management controls that would be implemented and monitored during construction as set out in Transport for NSW guidelines and quality assurance specifications. If implemented, then the proposal's environmental impact on the intertidal zone are expected to be avoided or minimised.</p> <p>(v) The proposed standard pollutant management and sediment disturbance controls included in Chapter 7 are likely to prevent any nutrient loading into the marine environment.</p> <p>(vi) Refer to the address of Clause 63 (2b) in Table 4-6.</p> <p>(vii) The proposal's direct impact to aquatic ecological communities would be limited to the removal and installation of piles and submerged wharf structures, as described in section 6.3. The impact of this on marine communities have been minimised through optioneering and design. Impacts to marine communities on existing piles and structures are likely to be restored naturally through recruitment.</p> <p>(viii) As above.</p> |
| 63(2)(g) Whether conditions should be imposed on the carrying out of the development requiring the carrying out of works to preserve or enhance the value of any surrounding wetlands. | Chapter 7 includes safeguards and mitigation measures that Transport for NSW, and its contractor(s), would commit to implementing and monitoring during construction to avoid and minimise any impact on the surrounding wetland values. |

4.1.2 Local Environmental Plan

Woollahra Local Environmental Plan 2014

The landside component of the proposal is located within the Woollahra local government area (LGA). Local development control and land use zoning and planning in this LGA is currently governed under the *Woollahra Local Environmental Plan 2014* (Woollahra LEP).

As development without consent, the proposal is not subject to local environmental planning policy or development control. However, the Woollahra LEP is useful in identifying the proposal's consistency with its land use and planning policy as described in Table 4-7.

Table 4-7: Relevant LEP land use zoning policies

| Objective | Proposal consistency |
|---|---|
| RE1 - Public Recreation | |
| <ul style="list-style-type: none">To enable land to be used for public open space or recreational purposes.To provide a range of recreational settings and activities and compatible land uses.To protect and enhance the natural environment for recreational purposes | <ul style="list-style-type: none">Provides improvement as use as a ferry wharf.Although new infrastructure would be placed in Darling Point Reserve the proposal is consistent with the objectives of the zone.Short-term impacts to McKell Park during construction. |

4.2 Other relevant NSW legislation

Table 4-8 lists the NSW legislation relevant to the proposal or the land on which the proposal would be built.

Table 4-8: Other relevant NSW legislation

| Legislation and application | Relevance to proposal and further requirements |
|---|---|
| <i>National Parks and Wildlife Act 1974</i> : provides for the protection of Aboriginal heritage values, national parks and ecological values. Makes it an offence to harm Aboriginal objects, places or sites without permission. | A Stage 1 PACHCI assessment confirmed that the proposal would avoid impacts to known Aboriginal heritage items (Appendix I). An Aboriginal heritage impact permit (AHIP) is not required for the proposal. Section 6.7 provides further details. |
| <i>Heritage Act 1977</i> : provides for the protection of conservation of buildings, works, maritime heritage (wrecks), archaeological relics and places of heritage value through their listing on various State and local registers. Makes it an offence to harm any non-Aboriginal heritage values without permission. | <p>A SoHI has been prepared to assess the potential impacts to heritage items and potential archaeological remains as a result of the proposal.</p> <p>The assessment concluded that the proposed works would not impact the overall significance of the heritage items within and adjacent to the proposal area, or the heritage items within the visual buffer zone.</p> <p>A Maritime Archaeology Statement of Heritage Impact (MASoHI) has been prepared to assess the potential impacts to maritime and underwater cultural heritage. An application for an exception under section 139(4) of the <i>Heritage Act 1977</i> should be submitted to the Heritage NSW, Department of Premier and Cabinet (DPC) prior to the works commencing.</p> |

| Legislation and application | Relevance to proposal and further requirements |
|--|---|
| | Section 6.6 provides further details. |
| <i>Roads Act 1993</i> : provides for the construction and maintenance of public roads. Requires consent to dig up, erect a structure or carry out work in, on or over a road. | <p>The proposal would include impacts to Darling Point Road, a local road managed by Woollahra Municipal Council.</p> <p>Consultation with Woollahra Municipal Council is required for works on Darling Point Road.</p> |
| FM Act: provides for the protection of fishery resources and values for current and future generations. Makes it an offence to harm fisheries and resources without an appropriate assessment, inclusion of safeguards and/or the appropriate permissions to carry out certain work. | <p>The biodiversity assessment (refer section 6.3) noted the proposal is expected to impact subtidal rocky reef and soft sediment.</p> <p>Due to the presence of suitable habitat in the study area and/or known populations in the harbour, two threatened aquatic species (Black Rockcod and White's Seahorse) were considered to have a moderate to high likelihood of occurrence. However, the 7 part tests determined the proposal is unlikely to have a significant impact on these threatened species.</p> <p>A section 37 permit under the FM Act to relocate Syngnathids collected during the targeted pre-clearance would be required as part of the Syngnathids relocation. Relocation may be undertaken by a pre-qualified permit holder.</p> <p>Notification to Department of Primary Industries (DPI) Fisheries has occurred in accordance with section 199 of the FM Act for dredging and reclamation (refer section 5.6).</p> <p>DPI Fisheries has advised a section 205 permit under the FM Act for harm to marine vegetation is not required for this proposal (refer section 5.6).</p> <p>Offsets for the residual loss of subtidal rocky reef would be considered in accordance with the <i>Guideline for Biodiversity Offsets</i> (RMS, 2016a). NSW DPI (Fisheries) advised that offsetting under the <i>Policy and guidelines for fish habitat conservation and management Update 2013</i> (DPI, 2013) is not required for this proposal.</p> |
| BC Act: provides for a strategic approach to conservation in NSW. It includes provisions for risk based assessment of native plant and animal impacts, including a Biodiversity Assessment Method (BAM) to assess the impact of actions on threatened species, threatened ecological communities and their habitats. | <p>Under the BC Act, an assessment of significance must be completed to determine the significance of impacts to threatened species, populations and/or communities or their habitat.</p> <p>The biodiversity assessment (refer section 6.3), carried out to support the REF, identified that 10 terrestrial threatened species under the BC Act were considered to have a moderate to high likelihood of occurrence in the study area. However, the five part tests determined the proposal is unlikely to have a significant impact on the threatened species and a SIS is not required.</p> <p>The proposal would remove around 150 square metres of mown lawn and ground cover in landscaped gardens at Darling Point Reserve and</p> |

| Legislation and application | Relevance to proposal and further requirements |
|---|---|
| | <p>McKell Park. Proposed impacts on vegetation and terrestrial habitat would not substantially fragment or isolate existing habitat. The proposal does not require further assessment under the Biodiversity Assessment Method.</p> <p>Section 6.3 provides further details.</p> |
| <p><i>Protection of the Environment Operations Act 1997</i> (PoEO Act): focuses on environmental protection and provisions for the reduction of water, noise and air pollutions and the storage, treatment and disposal of waste. Introduces licencing provisions for scheduled activities that are of a nature and scale that have potential to cause environmental pollution. Also includes measures to limit pollution and manage waste.</p> | <p>The proposal would not involve undertaking or carrying out a scheduled activity.</p> <p>If standard controls set out in Transport for NSW guidelines and quality assurance specification are implemented and monitored, there is unlikely to be any material harm, water, noise or air pollution impact (refer to Chapter 7). Appropriate waste management controls would be introduced to classify, store, transport, and dispose of all construction and work-generated waste.</p> |
| <p><i>Marine Pollution Act 2012</i>: sets out provisions to prevent pollution in the marine environment.</p> | <p>The proposal is unlikely to result in any oil, noxious liquid, pollutant, sewage or garbage discharge as controlled under this Act, providing relevant standard controls are implemented and monitored (refer to Chapter 7).</p> |
| <p><i>Ports and Maritime Administration Regulation 2021</i>: requires Harbour Master permissions to alter any structure or disturb the harbour floor within Sydney Port</p> | <p>The proposal is likely to disturb sediment within Sydney Harbour (section 110 of the Regulation). Written permission of the Harbour Master is required. Section 5.6 details the consultation that has taken place.</p> |
| <p><i>Marine Safety Act 1998</i> and Marine Safety Regulation 2016: sets out the requirements for marine safety and the roles of the Harbour Master and marine pilots. Includes provisions relating to marine and navigational safety including: collision prevention, spill limits, no-wash zones, shipping operations, and controls on reckless, dangerous or negligent navigation.</p> | <p>The proposal is located in the harbour (a navigable water under the terms of the Act) and would restrict its use by the public, therefore the proposal is subject to licencing under the terms of section 97 of the Regulation.</p> <p>Navigational exclusion zones would be installed while the work is taking place. This would include updating the Port Authority of NSW. Where required, nautical charts would be updated once the wharf is upgraded.</p> |
| <p><i>Crown Lands Management Act 2016</i>: to provide for the ownership, use and management of the Crown land of New South Wales, to provide clarity concerning the law applicable to Crown land, to require environmental, social, cultural heritage and economic considerations to be taken into account in decision-making about Crown land, to provide for the consistent, efficient, fair and transparent management of Crown land for the benefit of the people of NSW, and to provide for the management of Crown land having regard to the principles of Crown land management.</p> | <p>Lot 1553 DP 752011 and Lot 7051 DP 93654 (lower and upper McKell Park, respectively) are Crown Land.</p> <p>Woollahra Municipal Council is responsible for care, control and management of Mc Kell Park (Reserve 100101).</p> |

| Legislation and application | Relevance to proposal and further requirements |
|---|---|
| <p>Contaminated Land Management Act 1997: Must report to Environmental Protection Agency (EPA) if contaminated land is encountered during the works that meets the duty to report contamination requirements under Section 60 of this Act</p> <p>Aims to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3.</p> <p>The Act aims to set out accountabilities for managing contamination if the EPA considers the contamination is significant enough to require regulation under Division 2 of Part 3.</p> | <p>A Preliminary Site Investigation (PSI) for the proposal details the site history, contaminants of potential concern (CoPCs) and undertakes a conceptual risk assessment. The PSI concludes the proposal presents a medium, low and high residual risk to impact on CoPCs in sub-surface materials, groundwater and sediment, respectively.</p> <p>Further details are provided in section 6.1.</p> |
| <p>Biosecurity Act 2015: The object of this Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.</p> | <p>One priority weed listed under the <i>Biosecurity Act 2015</i> for the Greater Sydney region was recorded in the vegetated areas in the proposal area during the field survey: Madeira Vine (<i>Anredera cordifolia</i>).</p> <p>Reporting and managing biosecurity risks in the marine environment is considered a general biosecurity duty under the <i>Biosecurity Act 2015</i>.</p> |

The proposal is mapped as Coastal Use Area and Coastal Environment Area under the Coastal Management SEPP. The Coastal Management SEPP gives effect to the objectives of the *Coastal Management Act 2016*.

Table 4-9 lists the objectives of the *Coastal Management Act 2016* and whether the proposal is consistent with the objectives.

Table 4-9: Coastal Management Act 2016 Clauses 8 and 9 objectives

| Objectives | Relevance to proposal |
|---|--|
| 8 (2)(a) to protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity | The proposal would not significantly impact on the coastal environmental values and natural processes of coastal waters. Biological diversity and ecosystem integrity are unlikely to be impacted. |
| 8 (2)(b) to reduce threats to and improve the resilience of coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change | The proposal would have a neutral impact to coastal waters and estuaries. |
| 8 (2)(c) to maintain and improve water quality and estuary health | The proposal would maintain the long term water quality and ecological environment provided the safeguards and management measures in this Chapter 7 of this REF are implemented. |

| Objectives | Relevance to proposal |
|---|--|
| 8 (2)(d) to support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons | Social and cultural values have been considered in the design process by providing safe and equitable access to public transport on coastal waters. |
| 8 (2)(e) to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place | Beaches and dunes would not be impacted by the proposal. |
| 8 (2)(f) to maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms | The proposal would have short term impacts to public access to the foreshore, however the proposal would provide long term improvements to access and amenity. |
| 9(2)(a) to accommodate both urbanised and natural stretches of coastline. (i) the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast, and | The proposal is appropriate for the location. |
| (ii) adverse impacts of development on cultural and built environment heritage are avoided or mitigated, and | Heritage impacts have been considered in sections 6.6 and 6.7, and safeguards and management measures are detailed in Chapter 7. |
| (iii) urban design, including water sensitive urban design, is supported and incorporated into development activities, and | Urban design has been considered during the concept design process, and would be further considered during detailed design. |
| (iv) adequate public open space is provided, including for recreational activities and associated infrastructure, and | During construction, the proposal would impact users of the wharf and limit access to the area for fishing and recreation. |
| (v) the use of the surf zone is considered | The proposal would not impact the surf zone. |
| 9 (2)(b) to accommodate both urbanised and natural stretches of coastline. | The proposal would retain a coastline similar to the existing environment. |

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the 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 (MNES) or the environment of Commonwealth land. These are considered in Appendix A and Chapter 6 of the REF.

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

4.3.2 Disability Discrimination Act 1992

The DDA is the Commonwealth legislation that seeks to provide equity for people with disabilities. The main objects of the DDA include the elimination, as far as possible, of discrimination against persons on the grounds of disability in relation to access to premises and the provision of facilities and services. The proposal has been designed to respond to the requirements of the DDA.

Disability Standards for Accessible Public Transport (DSAPT) 2002

The DSAPT, made under the DDA, prescribes minimum standards of accessibility in relation to both public transport buildings and conveyances to remove discrimination from public transport services. The proposal has been designed to respond to the development standards identified under the DSAPT.

4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of a public ferry wharf and is being carried out by or on behalf of a public authority. Under clause 68(4A) of the ISEPP, the proposal is permissible without consent. The proposal is not State significant infrastructure and is subject to environmental impact assessment under Division 5.1 of the EP&A Act.

Accordingly, Transport for NSW is the determining authority for the proposal, with this REF fulfilling the obligation under Section 5.5 of the EP&A Act '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 Communications and Stakeholder Engagement Plan

A community and stakeholder engagement plan (Cardno, 2022f) has been prepared for the proposal in accordance with the International Association for Public Participation Spectrum and the Stakeholder Engagement Toolkit. The overall objectives are to:

- Provide customers, community and stakeholders with balanced and objective information to assist them in understanding the project proposal objectives, key activities and opportunities
- Provide information on how to have their say in the planning approval process
- Obtain feedback on aspects of the project proposal from customers, community and stakeholders
- Consider the feedback and demonstrate where amendments (where reasonable and feasible) were made to the proposal as a result
- Discuss project elements including potential risks and opportunities in detail with identified stakeholders to develop potential mitigation measures in partnership, where feasible and possible.

5.2 Community involvement

The community and stakeholders were invited to provide feedback on the proposal's refined concept design between 28 May 2021 and 4 July 2021. The refined concept design included a lift and stairs in Darling Point Reserve and over water boardwalk.

The purpose of this consultation was to:

- Display the proposed concept design (site plan and artist impression)
- Obtain feedback from the community on the proposal
- Consider and provide responses to feedback and questions received.

Community members and stakeholders were encouraged to provide feedback, leave comments and make submissions via phone, email, online survey, in person at the community drop-in session or by mail.

A community consultation report (Aurecon and TfNSW, 2021) was prepared regarding this consultation. Ninety-seven submissions were received.

The key areas of support for the proposed wharf upgrade included:

- The lift would provide safe access for those who can't use the existing stairs
- The design and amenities are an improvement on the existing wharf
- The upgrades would allow more regular use of the ferry.

The key feedback raised during the consultation is summarised in Table 5-1.

Table 5-1: Issues raised through community consultation

| Feedback raised | Response/where addressed in REF |
|---|---|
| Questions, concerns and suggestions around the wharf design including the location of the lift and boardwalk, and the visual amenity including privacy impacts. | Design refinements were made to connect the lift and waiting area via a path along the lower foreshore instead of an over water boardwalk (refer section 2.5.2) |
| Questions around project justification | The need for the proposal is described in section 2.1, and justification is considered in section 8.1. |
| Questions and suggestions around closure of the wharf, construction timing and alternative transport | Wharf closure and construction timing is described in section 3.3.2, and section 3.2.7 describes the traffic management and access arrangements during the construction phase. Alternative transport is also discussed in section 6.8. |
| Concerns around fishing. | Fishing is considered in section 6.9. |

Following the public exhibition, changes to the design were made to address community and stakeholder feedback and to minimise impacts to biodiversity, heritage, and visual amenity. The proposed boardwalk and associated piles were removed from the design, and replaced with a foreshore path connecting the new waiting area to the lower lift landing area via a suspended bridge structure (the design assessed in this REF).

5.3 Aboriginal community involvement

Aboriginal heritage impacts have been considered under the four-stage *Procedure for Aboriginal Heritage Cultural Heritage Consultation and Investigation* (PACHCI, RMS, 2011). The PACHCI is outlined in Table 5-2.

Table 5-2: Summary of Transport for NSW PACHCI

| Stage | Description |
|---------|--|
| Stage 1 | Initial Transport for NSW assessment |
| Stage 2 | Site survey and further assessment |
| Stage 3 | Formal consultation and preparation of a cultural heritage assessment report |
| Stage 4 | Implement environmental impact assessment recommendations |

Stage 1 of the PACHCI process was completed for the proposal by the Transport for NSW Aboriginal Cultural Heritage Officer, which confirmed there is unlikely to be any impact on Aboriginal cultural heritage (refer section 6.7, Appendix I). An AHIP under the NPW Act is not needed for the proposal.

5.4 ISEPP consultation

Appendix B contains an ISEPP consultation checklist documenting how ISEPP consultation requirements have been considered.

This proposal triggers the notification requirements with Woollahra Municipal Council under Clause 13 as it would involve the installation of a temporary structure on, or the enclosing of, a public place.

Transport for NSW has been consulting with Woollahra Municipal Council since 2019 to develop a design which is acceptable to Council as owners and operators of the landside elements of the proposal.

A formal ISEPP letter was issued on 16 July 2021 to Woollahra Municipal Council as part of the public exhibition of the refined concept design which included an over water boardwalk (refer section 5.2). Issues raised by Council and how they have been addressed in this REF are summarised in Table 5-3.

Table 5-3: Issues raised through Woollahra Municipal Council consultation

| Item | Issue raised | Response/where addressed in REF |
|-------------------------|---|--|
| Non-Aboriginal Heritage | <p>The proposal is likely to have physical impact over the following heritage items:</p> <ul style="list-style-type: none"> Fence, gates and foundation remains of former house <i>Canonbury</i>, listed on the Woollahra LEP (no. 112 and A1) Remains of Bath House and site of jetty, listed on the Woollahra LEP (no.113) and the Sydney Harbour SREP (no. 46). <p>Other heritage items in close proximity would not be impacted by proposal.</p> | <p>The SoHI and MASoHI prepared for the proposal concluded the proposed work would result in minor impacts to the heritage items identified. However, the overall significance of heritage items would not be impacted. Appropriate safeguards would be implemented.</p> <p>Refer section 6.6.</p> |
| | <p>The early Darling Point jetty used to be accessed from Darling Point Road, and the proposal in a way is a return to the original access point. The location of the new wharf would sit on the maritime archaeological Remains of Bath House and site of jetty (Woollahra LEP no. 113). It would be preferable if the design would avoid the sandstone remains altogether. However where this is not possible it is recommended that the conclusions and mitigation measures in the SoHI are included in the REF.</p> | <p>The SoHI and MASoHI concluded the proposed works could potentially result in a minor impact to the identified maritime archaeological heritage.</p> <p>The conclusions and mitigation measures outlined in the SoHI and MASoHI have been incorporated into this REF.</p> <p>Refer section 6.6.</p> |
| | <p>No major concerns with the demolition of the current jetty and pontoon.</p> | <p>Noted.</p> |
| | <p>The following recommendations are made in relation to the proposal:</p> <ul style="list-style-type: none"> Unexpected findings protocol should be applied for both historic archaeology and Aboriginal heritage Consider cladding the new structure in Darling Point Reserve with a sandstone finish to mitigate its visual impacts | <p>Mitigation measures for the proposal (refer Chapter 7) include the implementation of an unexpected finds procedure for heritage items (Aboriginal and non-Aboriginal) during construction and consideration of materials, finishes and landscape elements during detailed design that minimise visual impacts. Appendix F</p> |

| Item | Issue raised | Response/where addressed in REF |
|-------------------------------|--|---|
| | <ul style="list-style-type: none"> Avoid any new structure leaning on the fence separating Darling Point Reserve from McKell Park, which is listed on the Woollahra LEP Limit removal of sandstone steps and fences as much as possible. Where not possible, existing salvaged sandstone is to be carefully removed, safely stored and provided to council for reuse in landscaping. | <p>provides examples of some alternative facades (e.g. sandstone) that would be considered for the lift and stairs.</p> <p>The current design does not impact on the boundary fence between Darling Point Reserve and McKell Park, and would not remove the existing sandstone steps within Darling Point Reserve.</p> |
| Aboriginal heritage | The Woollahra Aboriginal heritage sensitivity mapping describes the land in Darling Point Reserve as being potentially sensitive. An Aboriginal Heritage Impact Assessment should be provided as part of the REF. | <p>The PACHCI (RMS, 2011) assessment was completed with reference to the <i>Code of Practice for the Protection of Aboriginal Objects in NSW</i> (DECCW, 2010).</p> <p>The <i>Unexpected Heritage Items Procedure</i> (RMS, 2015) would be followed in the event that unknown or potential Aboriginal object(s) are found during construction.</p> <p>Refer section 6.7.</p> |
| Biodiversity | <p>Little Penguins sighting have been recorded in the area however they are not known to nest in the area.</p> <p>The Biodiversity Conservation Strategy lists the foreshore area as a 'key habitat area' which provides foraging habitat for Little Penguins and habitat diversity for marine fish species and potentially the protected seahorse. The area is also part of a habitat corridor.</p> <p>NSW DPI mapping does not show any seagrass at the site of the existing wharf.</p> <p>It is understood no vegetation would be removed from McKell Park.</p> | <p>The biodiversity assessment prepared for the proposal included an aquatic field survey and provided an assessment of impacts on Little Penguins, seahorse and other marine species. The assessment concluded the proposal is unlikely to significantly impact these species provided mitigation measures are implemented.</p> <p>Seagrass (mixed <i>Halophila</i> and <i>Zostera</i>) meadows were recorded in the proposal area during the field survey however the meadows would not be impacted as part of the proposal. About 80 square metres of key fish habitat (Type 2) would be impacted. Offsets for residual impacts of the proposal are outlined in section 7.3.1.</p> <p>Only mown lawn and ground cover in McKell Park and Darling Point Reserve would be impacted by the proposal, no vegetation would be removed.</p> <p>Refer section 6.3 and Appendix D.</p> |
| Sediment and erosions control | Appropriate erosion and sediment control should be in place during the construction to prevent any sediment entering Sydney Harbour. | Proposed sediment and erosion control measures to prevent sediment entering Sydney Harbour are outlined in section 6.1.4. |

| Item | Issue raised | Response/where addressed in REF |
|--------|--|---|
| Design | <p>Woollahra Municipal Council's preference is to relocate the boardwalk to the foreshore to connect Darling Point Reserve and McKell Park. This connection is in line with the McKell Park and Darling Point Reserve Plan of Management (Marler, 2013) and the draft Generic Plan of Management for Crown Land Reserves (WMC, 2021).</p> <p>Any re-design would need to consider the memorial pond located in the lower section of McKell Park.</p> | <p>Following stakeholder feedback, Transport for NSW modified the design, and replaced the over water boardwalk with a foreshore path connecting the lift and waiting area. The design minimises impact to the lower end of the park including to vegetation, heritage items and memorial pond. The re-design was done in consultation with key stakeholders including Woollahra Municipal Council and the NSW ALC.</p> |

5.5 Sydney Harbour SREP consultation

Appendix B contains a Sydney Harbour SREP consultation checklist documenting how the Sydney Harbour SREP consultation requirements have been considered. Legislative changes have occurred during the drafting of this REF and consultation under the Sydney Harbour SREP for this proposal is no longer required. However, the consultation that had already been undertaken has been included in this REF.

This proposal triggered the consultation provisions of Part 3: Division 3, clause 31 of the Sydney Harbour SREP as the proposal:

- Involves the development of public water transport facilities (Schedule 2)
- Involves demolition (Schedule 2)
- Includes retaining walls (Schedule 2)
- Requires the provision of services (water).

The Department of Planning and Environment (DPE) (former Foreshores and Waterways Planning and Development Advisory Committee) and Woollahra Municipal Council were consulted about the proposal as per the requirements of clause 31 of the Sydney Harbour SREP.

The response from Woollahra Municipal Council is provided in Table 5-3. No response has been received from DPE at this time.

5.6 Government agency consultation

The following government agencies and stakeholders were consulted as part of the public exhibition of the refined concept design which included an over water boardwalk (refer section 5.2):

- DPI Fisheries
- DPE Crown Land
- Port Authority of NSW (Harbour Master).

Issues that have been raised as a result of consultation with these agencies and stakeholders are outlined in Table 5-4.

Table 5-4: Issues raised through government agency consultation

| Agency | Issue raised | Response/where addressed in REF |
|--|---|---|
| DPI Fisheries (June 2021) | DPI Fisheries has no objection to replacement of existing wharf provided that Syngnathid (seahorse, pipefish, seadragons) relocations are undertaken immediately prior to works commencing in the harbour. DPI Fisheries is concerned about adequate like-for-like habitat for Whites seahorse at the site if existing pylons are removed. Seahorse hotels may need to be installed. | A pre-clearance survey for Whites seahorse would be undertaken prior to water based construction activities. Any animals found would be relocated in line with a Syngnathid Relocation Plan to be prepared in consultation with DPI Fisheries. Refer section 6.3.4. |
| | The proposed boardwalk would be built over seagrass causing permanent shading (and likely loss) to Type 1 Highly Sensitive key fish habitat (KFH). DPI Fisheries recommends alternatives for the boardwalk location be considered. | Following stakeholder feedback, Transport for NSW modified the design, and replaced the over water boardwalk with a foreshore path connecting the lift and waiting area. The new design would not impact seagrass. Further consultation was undertaken with DPI Fisheries as outlined below. |
| DPI Fisheries (March 2022 following design updates) | From the revised plans, the proposal now avoids all seagrass and includes seven driven piles onto subtidal rocky reef. | Noted. |
| | A section 205 permit and offsetting for marine vegetation would not be required for this project. Hard surfaces provided by the new wharf structure replace old structures at a ratio of 2:1. DPI Fisheries consider this adequate to allow macroalgae to recolonise. | Noted. |
| | Transport for NSW may have its own offset policies that go over and beyond DPI Fisheries offset policies. If Transport for NSW are looking for an offset opportunity, DPI Fisheries recommend seahorse hotels. | Noted, refer section 7.3.1. |
| | A section 37 licenced contractor must inspect the subtidal structures of the existing wharf and surrounding natural habitat within the work area for Syngnathids. | Noted, refer section 6.3.4. |
| | If Syngnathids are found, they must be relocated in accordance with Transport for NSW's Syngnathid Relocation Plan for the FWUP. | Noted, refer section 6.3.4. |

| Agency | Issue raised | Response/where addressed in REF |
|--|--|---------------------------------|
| Port Authority of NSW (Harbour Master) | No comments regarding the nautical/navigation side of the proposal at this stage. | Noted. |
| DPE Crown Land | No objection in regards to the proposal. Woollahra Municipal Council is responsible for care, control and management of McKell Park (Reserve 100101). | Noted. |

5.7 Ongoing or future consultation

This REF will be placed on public display for comment by Government agencies, stakeholders and the community. Following the public display period, Transport for NSW will collate and consider the submissions received then determine whether the proposal should proceed as described or whether any changes are required. It will also decide if any additional environmental assessment, safeguards or management measures are needed.

A submissions report will be published responding to the comments received. Transport for NSW will notify those who made submissions and distribute a community update. The update will summarise the submissions report process and the actions Transport for NSW took to address these comments. Transport for NSW will also meet with affected residents, businesses and other stakeholders as required.

6 Environmental assessment

This chapter 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 section 171(1) of the Environmental Planning and Assessment Regulation 2021 and the *Marinas and Related Facilities EIS Guideline* (DUAP, 1996). The factors specified in section 171(2) of the Environmental Planning and Assessment Regulation 2021 are also considered in Appendix A.

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

6.1 Land surface and hydrology

This section describes the existing land surface and hydrology at the wharf and describes the potential impacts associated with the proposal.

6.1.1 Methodology

Water based

Published mapping and data were used to define the hydrodynamic and physical characteristics of the aquatic environment. This included:

- Hydrographic and bathymetric mapping and data
- NSW Tide Tables (BoM, 2022a)
- Climate data (BoM, 2022b)
- Ocean and Tidal Summary 2019-2020 (MHL, 2020)
- PSI (Cardno, 2022a) provided as Appendix C
- Geotechnical Desktop Investigation (Aurecon, 2019b).

Land based

Published mapping and data were used to define physical characteristics of the terrestrial environment. This included review of:

- Sydney 1:100,000 Geological Series Sheet 9130 (Herbert, 1983)
- NSW Planning portal
- EPA online contaminated land register
- Environmental protection licences (EPL) under the PoEO Act
- Concept design report (Aurecon, 2019a)
- Geotechnical desktop investigation (Aurecon, 2019b)
- PSI (Cardno, 2022a), provided as Appendix C.

Construction assessment

The assessment considered how the proposed construction activities, work methods, and required management controls (refer section 3.3) would temporarily affect the physical characteristics of the aquatic and terrestrial environment including localised sediment and pollutant disturbance and dispersion.

Operational assessment

The operational assessment considered how the final aquatic and terrestrial infrastructure would potentially result in hydrodynamic changes in terms of erosion and scour.

6.1.2 Existing environment

Water based

The proposal is located within the Port Jackson (Sydney Harbour) estuary. Port Jackson is a tide dominated drowned valley estuary with an open entrance.

Tides

The proposal is located on the southern shores of Sydney Harbour to the south of Clark Island. Water levels of Port Jackson are subject to ocean tides and the site has similar tides to Fort Denison where the conditions are as follows (BoM, 2022a):

- Tides are semi-diurnal meaning that two high and two low tides normally occur each day
- Chart datum (CD) (0.0 m CD) is 0.925 metres below Australian Height Datum (AHD)
- Mean sea level is 0.937 metres CD
- Maximum recorded sea level of 2.4 metres CD (May 1974)
- Minimum recorded sea level of -0.19 metres CD (August 1982).

Currents

The location of the wharf, south of Clark Island, is a reasonable distance from the main navigation channel through Sydney Harbour. Currents at the existing wharf are negligible as the predominant tidal flow through Sydney Harbour is north of Clark Island (Aurecon, 2019a).

Local currents may be attributed to tidal flows, wind shear, propeller wash and localised flows at stormwater outlets. Currents may also be generated by the passing of other vessels nearby.

Waves

The wave climate at the site is contributed by wind waves and boat-generated waves (vessel wash).

Wind waves are generated when the wind blows across a body of water. The size and frequency of these waves depend on the wind speed, the distance over which the wind blows (fetch) and the water depth. Primary wind waves are likely to emanate from the north east and secondary waves from the north west with 1 in 5-year average recurrence interval (ARI) heights of up to 0.57 metres (Aurecon, 2019a).

The site is also subjected to vessel generated waves which are governed by the submerged shape of the boat hull, the boat speed and the water depth. Swell waves are not likely to propagate at this location in Sydney Harbour (Aurecon, 2019a).

Storm surge

During extreme events, the water level can be elevated higher than the predicted tidal level due to barometric pressure, and wind and wave setup. This increase in water level due to reduced barometric pressure and wind setup is known as storm surge. The 100-year ARI storm surge level at Fort Denison in Sydney Harbour is 2.4 metre CD, based on measurements taken during the severe 1974 storms (Aurecon, 2019a).

Bathymetry

The bathymetry at the site slopes from 0 metres CD, at the seawall, to -2.5 metres CD about 25 metres from the seawall, at the end of the existing wharf. Water depths up to -3.5 metres CD are situated within and to the east of the existing berthing pocket. The deeper water depths is presumably a result of propeller scour (Aurecon, 2019a).

Wind conditions

Three common wind patterns are known on Sydney Harbour. The strongest of the three originate from the south (southerlies) and occur about 17 per cent of the time. The most frequent of the three (about 22 per cent of the time) are north easterlies while the least common of the three patterns are westerlies which usually occur during the winter months (Sydney Institute of Marine Science, 2014).

Sydney Harbour (Wedding Cake West) weather station (station number 066196) is located about 4.5 kilometres to the east of the proposal area. Morning and afternoon wind rose directional data is summarised in Table 6-1 (BoM, 2022b) and shown on Figure 6-1.

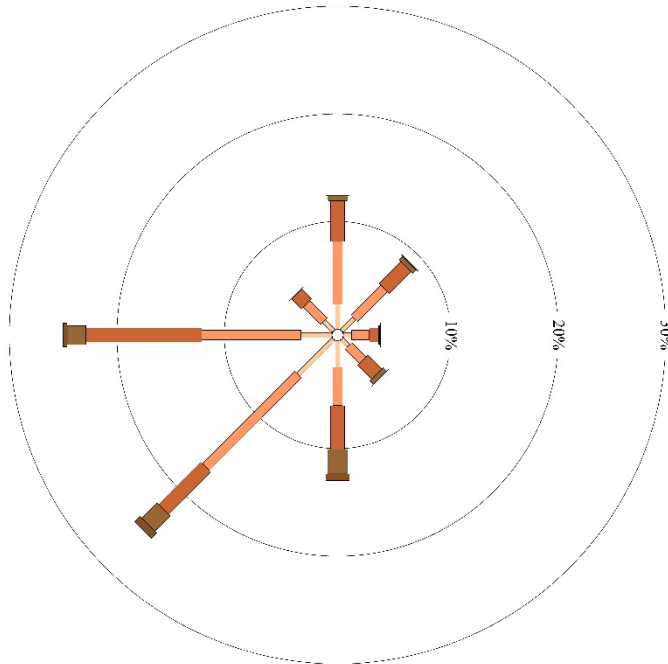
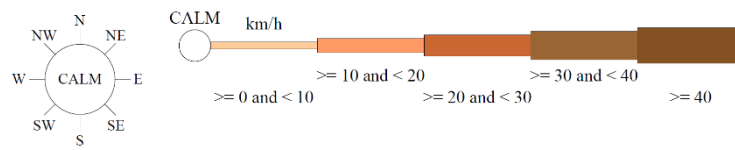
Table 6-1: Wind conditions at Sydney Harbour (Wedding Cake West) weather station

| | N | NE | E | SE | S | SW | W | NW | Calm |
|-----|-----|-----|-----|-----|-----|-----|-----|----|------|
| 9am | 12% | 9% | 4% | 5% | 13% | 25% | 25% | 5% | 3% |
| 3pm | 11% | 27% | 12% | 13% | 19% | 7% | 9% | 2% | 1% |

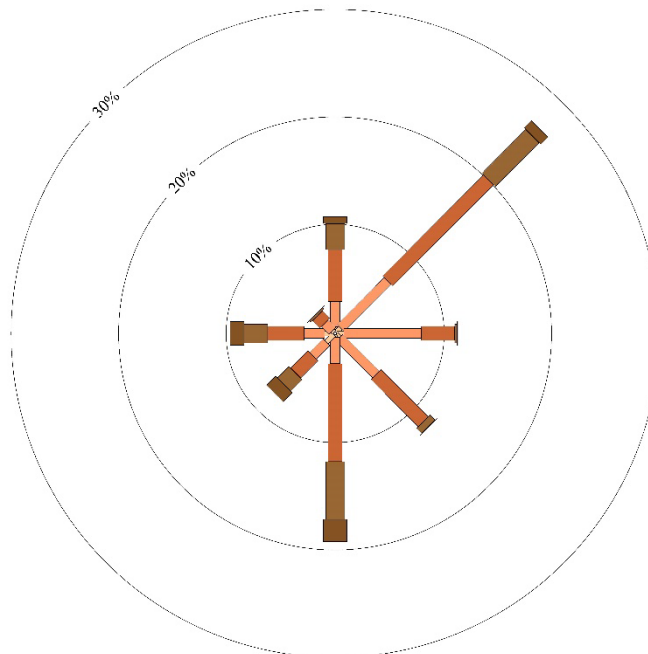
*NB: Percentages may not add to 100 due to rounding
Source: BoM, 2022b*

Afternoon winds are generally stronger than morning winds tending towards 20-28 kilometres per hour with morning winds generally 16-19 kilometres per hour (BoM, 2022b).

Sydney Harbour (Wedding Cake West) Site No. 066196
18 September 1997 to 11 August 2021



9am (Calm 3%)



3pm (Calm 1%)

Source: BoM, 2022b

Figure 6-1: Sydney Harbour rose of wind direction versus wind speed

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Geology and topography

Sydney Harbour is a flooded river valley. The Sydney 1:100,000 Geological Map Sheet 9130 (1983) accessed from NSW Resources and Energy indicates that the proposal is underlain by Hawkesbury Sandstone, which is characterised by medium to coarse grained quartz sandstone, very minor shale and laminite lenses.

The landside portion of the proposal area slopes from approximately 20 mAHD in the south to approximately 4 mAHD in the north at the foreshore. A sandstone retaining wall separates the landside portion and waterside portion.

Soils

The area around the Darling Point Wharf interchange is located on Hawkesbury Sandstone and Estuarine Plane; alluvial deposits of sand, silt and clay beyond the shoreline.

Most of the estuarine plane layer is likely to be composed of clay and silt, with variable shell content, however the shallow margins close to the shoreline are likely to contain high sand content. The high silt and clay content in a marine environment could create concerns with water turbidity associated with construction and low particle settlement rates. The thickness of this layer is variable, with estimates to be made based on available previous investigations (Aurecon, 2019b).

The immediate landscape has been disturbed by human activity as a result of residential development in the area, construction on seawalls along the waterfront, and the creation of a park adjacent to the wharf. Significant maritime traffic and previous developments and investigations are likely to have disturbed the underlying fluvial sediments in the shallow waters near the wharf.

Acid sulfate soils (ASS)

A review of the Australian Atlas of Acid Sulfate Soils (ASRIS) on the 1 February 2021 indicated that there is a high probability of occurrence for ASS in the subtidal marine environments.

The Woollahra LEP risk map indicated that the landside portion of the proposal area is primarily Class 5 ASS (low risk), with the north western portion identified as Class 2.

Contamination

Sydney Harbour has extensive areas of polluted sediments mainly associated with the historical industrial character of the catchment.

A Stage 2 contamination assessment was undertaken in 2016 for the proposed Darling Point Wharf upgrade (Coffey, 2016). The project area for this assessment was in the approximate location proposed wharf and involved taking two sediment samples in the harbour to assess the contamination and ASS potential of sediments as well as to provide an indicative waste classification. The sediment encountered was described as medium grained, dark yellow to pale brown sand with some coarse grained, well graded shells to a depth of 2.5 metres below the sea floor which was underlain by a layer of clayey sand and sandstone. Analytical laboratory results indicated that shallow sediments within the top 0.2 metres reported concentrations above the *Interim Sediment Quality Guidelines* (ISQG) contained in the *Australia and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC) (2000). Potential ASS was not identified in the shallow sediment samples collected for analysis, however it is anticipated that deeper sediments could contain ASS.

A PSI was prepared for the proposed Darling Point Wharf upgrade (Cardno, 2022a, Appendix C) to identify historical sources of potential contamination or potentially contaminating activities that may have taken place on or adjacent to the proposal footprint.

A review of the site history identified historical activities with potential to result in contamination in the proposal area, including:

- Use of fill material of unknown origin from landside levelling and road construction
- Surface water runoff from the road
- Use of machinery and equipment from the construction and decommissioning of the former Darling Point Wharf and construction of existing wharf
- Contaminant transport from the greater Sydney Harbour and fuel leaks from vessels
- Tidal flows of contaminated water into the subsurface profile
- Potential ASS in the waterside portion and parts of the landside portion.

The corresponding CoPCs in the proposal area include: Polycyclic aromatic hydrocarbons (PAH), heavy metals, Organochlorine pesticides/Organophosphorus pesticides (OCP/OPP).

A risk assessment conducted as part of the PSI identified that the proposal area represents a:

- Medium residual risk in subsurface materials
- Low residual risk in groundwater
- High residual risk in sediments.

Further detail is provided in Appendix C.

A search of the list of Contaminated Sites Notified to the EPA, the Contaminated Land Record of Notices and the Public Register under PoEO Act, on 31 January 2022, did not identify any sites within 500 metres of the proposal.

6.1.3 Potential impacts

Construction

Water based

Hydrodynamic effects

The proposal involves activities that would cause physical disturbance to the aquatic environment. This includes piling and the installation of the prefabricated wharf elements using a barge mounted crane. The scale of the disturbance would be minimal and insufficient to cause any dynamic changes in current speed, wave characteristics, saline/freshwater mixing or flushing during construction.

Localised sediment disturbance and smothering

Potential impacts would be limited by the requirement for safety reasons to undertake the piling work during calm conditions, when there would be the least water movement in the harbour (refer section 3.2.2). Potential disturbance of seabed sediments during removal of piles and the existing wharf elements would be localised and temporary in nature.

Locally, the distributed coarser sediments would settle out of suspension almost immediately while the finer sediments could mobilise over a greater area as they would remain buoyant in the water column. Disturbance of sediments would be minimised through the work methodology, including use of silt curtains to contain sediments and progressing the work in sections to allow sediments to settle between work.

Further information on sediment disturbance and impacts on marine vegetation and habitat is provided in section 6.3.3.

Erosion and scour

Any work taking place in the aquatic environment has the potential to cause erosion and scour. This is caused from introducing new structures typically on, or close to, the seabed, as this may alter sediment transport patterns.

Under construction of the proposal, the temporary use of jack-ups/anchors during lifting and piling work would be the only equipment to impact the seabed. The associated equipment would typically only be in place for a few weeks. Some localised impacts are expected within a few metres of where jack-ups/anchor point would be temporarily installed, however, this would be an insufficient amount of time to cause any material scour or erosional impacts. The number of jack-ups/anchors would be reduced to the minimum required, with the placement of the equipment selected to avoid any areas of sensitive habitat. With the introduction of this safeguard and the other standard safeguards described in section 6.1.4, it is concluded that impacts would be avoided and/or minimised.

Contamination and ASS

The PSI indicates that sediment at the site could contain elevated levels of contaminants. CoPCs include PAH, heavy metals and OCP/OPP. The probability of these CoPCs are considered likely, with a residual risk rating of high. The sediments would be disturbed during demolition work and piling.

There is potential ASS in sediments greater than 0.2 metres below the seabed level, however the current piling methodology would not remove sediment from the water column. As such, impacts from potential ASS would be low.

Land based

Erosion and sedimentation

Construction of the land-based elements would involve earthworks including excavation for the lift, stairs and footpath construction, and piling for the lift and stairs. During construction soils would be exposed, potentially leading to erosion and sedimentation of the stormwater system and harbour. Implementation of mitigation measures outlined in section 6.1.4 would reduce the impacts.

Contamination and ASS

The PSI indicates that soils in the proposal area could contain elevated levels of contaminants. CoPCs include PAH, heavy metals, OCP/OPP. The probability of these CoPCs are considered possible, with a residual risk rating of medium.

There is potential for ASS where excavation is required below ground level for the lift shaft and piling for the stairs.

Accidental material spill within the compound area may occur from storing, handing and/or transferring the required small volumes of welding materials, lubricants, solvents, fuels, oils and diesels. Potential impacts would be mitigated through the appropriate management of the storage of such materials, and inclusion of spill kits as noted in section 6.2.4.

Operation

Water based

Erosion and scour

New piles would be installed as part of the proposal. As water flows around these structures there is the potential to create local scour and erosion. In this location, expected impacts would be limited to within a few metres of each pile given:

- The low dynamic character close to the bed around the piles located within the sub-benthic sediments

- The limited amount of sediment substrate locally.

Local sediment conditions would adjust over time.

A climate change risk assessment has been completed which identifies climate variables that are a risk to the proposal including sea level rise and increased coastal erosion. Refer section 6.13 for further information. These risks would be addressed in detailed design through the implementation of adaptation measures.

Further information on erosion and scour impacts on marine vegetation and habitat is provided in section 6.3.3.

Sedimentation

Ferry services would resume during operation, with minimal change in ferry movements required to service the new wharf. As such, no significant impacts from sedimentation are anticipated.

Land based

As described in section 3.1, there are various landside modifications proposed including the lift, stairs and the accessible path from Darling Point Road.

These new elements would introduce additional hardstand areas to Darling Point Reserve, however as the new elements would be elevated in parts significant changes to overland flow during operation are not expected.

6.1.4 Safeguards and management measures

Table 6-2 lists the safeguards and management measures that would be implemented to protect the land surface and hydrology to account for the impacts identified in section 6.1.3.

Table 6-2: Land surface and hydrology safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|-------------------|--|--------------------------------|---|
| LS1 | Soil and water | A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the 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 | Pre-construction |
| LS2 | Soil and water | Any excavated sediments or soil that require disposal will be sampled, tested and classified in accordance with the EPA's <i>Waste Classification Guidelines: Part 1 Classifying Waste</i> (EPA, 2014) prior to being disposed of at a waste facility licensed to accept the relevant class of waste. Any materials classified as Hazardous Waste may require treatment or an immobilisation approach in accordance with Part 10 of the Protection of the Environment Operations (Waste) Regulation 2014 prior to off-site disposal. | Contractor | Construction |
| LS3 | Soil and water | Clean and suitable topsoil will be stockpiled and reused on site where appropriate. | Contractor | Construction |
| LS4 | Contaminated land | Landside soils will be analysed for ASS for waste classification. This can be undertaken in-situ prior to excavation to inform any design implications or following excavation if the materials are stockpiled on site. If in-situ sampling is undertaken, samples must be taken to the depth of excavation. All sampling should be conducted by a suitably qualified contaminated land specialist. | Transport for NSW / Contractor | Detailed design / Pre-construction / Construction |
| LS5 | Contaminated land | If unexpected contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site specific controls or further actions identified in consultation with the Transport for NSW Environment Manager and/or EPA. | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------------|--|----------------|------------------|
| LS6 | Contaminated land | The piling activity shall mitigate the risk of sediment dispersal by applying industry best practice of minimising sediment disturbance during construction using piling methods or any other seabed interference. | Contractor | Construction |
| LS7 | Erosion and sedimentation | <p>Site specific Erosion and Sediment Control Plan/s will be prepared and implemented as part of the SWMP. Control measures are to be implemented and maintained (in accordance with the Landcom/Department of <i>Housing Managing Urban Stormwater, Soils and Construction Guidelines</i>, 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 | Pre-construction |
| LS8 | Erosion and sedimentation | <p>Prior to commencement of construction activities, sediment control device (such as sediment boom and curtain) will be installed around the site to contain disturbed sediment from the water surface by allowing suspended sediments to settle back on the bottom of the seabed overtime. The silt boom and curtain should extend from a minimum of 100 millimetres above the water line to a minimum of 2.5 metres below the water line before starting work.</p> <p>Installation should be undertaken during high tide periods from a boat. The device should be designed to rise and fall with the tide to prevent disturbance. Inspection of the device should be undertaken on a daily basis after ebbing tides, with additional inspection carried out following storm events. Prior to removing the sediment control device, conditions within the curtain should be assessed visually and with a field instrument to verify that sediment has settled resulting in similar water turbidity to that outside the curtain.</p> | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|------|---------------------------|--|----------------|-----------------|
| LS9 | Erosion and sedimentation | <p>Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.</p> <p>Results of the observations are required to be recorded. Records are required to be kept on the site and to be made available for inspection by persons authorised by Transport for NSW.</p> | Contractor | Construction |
| LS10 | Erosion and scour | The number of barge anchor points will be minimised where possible. Anchoring locations should be selected to avoid areas of sensitive habitat and moderate/high archaeological potential. | Contractor | Construction |
| LS11 | Erosion and scour | Works associated with positioning barges, drilling and pile driving will occur during calm conditions to prevent excessive scouring and other impacts. | Contractor | Construction |
| LS12 | Design changes | If there are significant changes to the design or layout of piles then further delineation assessment of the known contamination should be undertaken to evaluate the vertical and lateral extent of sediment impact prior to work commencement. | Contractor | Detailed design |

6.2 Water quality

This section describes the existing water quality at the wharf and describes the potential impacts associated with the proposal.

6.2.1 Methodology

Published mapping and data were used to define the water quality characteristics of the proposal area. This included:

- Sydney Harbour Water Quality Improvement Plan (LLS, 2015)
- State of the Beaches Annual Reports 2011-2021 (OEH, 2012, 2013, 2014a, 2015, 2016a, 2017, 2018; DPIE, 2019a, 2020, 2021)
- Beachwatch Enterococci data download (DPE, 2022a).

6.2.2 Existing environment

Darling Point is in the Port Jackson catchment of Sydney Harbour (LLS, 2015). The majority of this catchment is residential land use (40 per cent), with roads (20 per cent), commercial (17 per cent) and parklands (11 per cent) making up the majority of the catchment (LLS, 2015). Sewer overflows are also a substantial issue in the catchment. These overflows generally operate during high flow events and discharge a mix of stormwater and untreated sewage (LLS, 2015).

The hydrodynamics of Sydney Harbour play an important role in the state of its water quality. Stormwater is mainly generated under high rainfall events. Sydney Harbour is well flushed near the entrance but poorly flushed in the upper reaches. During high rainfall and consequential stormwater events, pollutants that are discharged near to the outlet can be flushed to the ocean, but otherwise they will linger within the estuaries (LLS, 2015).

In Port Jackson, industrialisation in the Sydney area has caused marine pollution and anthropogenic sediment to be deposited into the harbour. There are several sewer overflow points and stormwater drain discharges throughout the region, thus water quality compliance is varied across the Port Jackson region (LLS, 2015).

Stormwater discharge and surface water runoff are considered to be the main sources of contamination to the estuary. Pollutants commonly associated with stormwater discharge include:

- Sediment from erosion and stormwater inflows, impacting turbidity
- Pathogens such as faecal coliforms
- 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.

Stormwater outlets were observed along the seawall in the proposal area.

A review of water quality data for the last 10 years for Murray Rose Pool (formerly Redleaf Pool) in the Woollahra LGA (OEH, 2012, 2013, 2014a, 2015, 2016a, 2017, 2018; DPIE, 2019a, 2020, 2021) indicates that water quality is generally safe for swimming most of the time but can be susceptible to pollution from several potential

sources of contamination. Enterococci levels generally increase with increasing rainfall, regularly exceeding the safe swimming limit in response to 5-10 millimetres of rainfall or more.

6.2.3 Potential impacts

Construction

Pollutants

The main impact to water quality would be from the disturbance to sediments during placement and removal of piles. Impacts associated with the works and potential pollutants are discussed in section 6.1.3.

During removal of the existing wharf elements there is potential for pollutants and debris to enter the waterway.

Accidental spills

The materials required to upgrade the wharf would be generally inert and harmless except for the small quantities of welding materials, lubricants, solvents, fuels and oils. As such, there would be some potential for accidental spills, including:

- Accidents during loading, unloading and installation work
- Leaks and drips from poorly maintained machinery and equipment
- The mismanaged storage of waste materials, including potential for debris to enter the water.

These risks would be greater when undertaking work over, or in, the waterway namely:

- Drilling / hammering the piles
- Transferring equipment and machinery
- Installing the new piles and structures.

The primary impact from spills would be a decline in water quality which would have an impact upon the aquatic environment. The impact would depend on the quantity and type of material spilt. However, providing relevant standard controls, such as those identified in section 6.1.4 and section 6.2.4 are implemented the impacts are expected to be minimised.

Accidental material spill within the compound area may occur from storing, handing and/or transferring the required small volumes of welding materials, lubricants, solvents, fuels, oils and diesels.

Operation

No significant impacts to water quality are anticipated during operation of the proposal, as ferries would operate similarly to the current movements. No additional sediment disturbance is anticipated.

Any impacted stormwater drainage would be reinstalled within the construction footprint to maintain the existing drainage regime, no impact to stormwater quality is anticipated.

There is the potential for an accidental spill or discharge during operation. This would be most likely during berthing at the wharf. While this is the case, the same potential exists from the current wharf and would be managed under the standard controls already in place across the ferry network. As such, the impacts are expected to be safeguarded against and therefore minimised.

6.2.4 Safeguards and management measures

Table 6-3 lists the safeguards and management measures that would be implemented to protect the water quality to account for the impacts identified in section 6.2.3.

Table 6-3: Water quality safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|------------------|--|----------------|---------------------------------|
| WQ1 | Accidental spill | <ul style="list-style-type: none"> A spill management plan will be developed as part of the CEMP and communicated to all staff working on site. Appropriate land and aquatic spill kits are to be maintained on site and on barges. Aquatic spill kits must be specific for working within the marine environment. The spill kit must be appropriately sized for the volume of potentially polluting liquids stored at the site. All workers will be advised of the location of the spill kit and trained in its use. | Contractor | Pre-construction / Construction |
| WQ2 | Accidental spill | If an incident (e.g. spill) occurs, the Transport for NSW <i>Environmental Incident Classification and Reporting Procedure</i> is to be followed and the Transport for NSW Contract Manager notified as soon as practicable. | Contractor | Construction |
| WQ3 | Accidental spill | In the event of a maritime spill, the incident emergency plan will be implemented in accordance with Port Authority of NSW's response to shipping incidents and emergencies outlined in the <i>NSW State Waters Marine Oil and Chemical Spill Contingency Plan</i> (RMS, 2016c). | Contractor | Construction |
| WQ4 | Accidental spill | Emergency contacts will be kept in an easily accessible location on vehicles, vessels, plant and site office. All workers will be advised of these contact details and procedures. | Contractor | Pre-construction / Construction |
| WQ5 | Accidental spill | Vehicles, vessels and plant must be properly maintained and regularly inspected for fluid leaks. | Contractor | Construction |
| WQ6 | Accidental spill | No vehicle or vessel wash-down or re-fuelling will occur on site. | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|------------------|--|----------------|------------------|
| WQ7 | Accidental spill | Any chemicals or fuels stored at the site or equipment barges will be stored in a bunded area. | Contractor | Construction |
| WQ8 | Pollution | An environmental work method statement (EWMS) will be developed for the removal of the existing wharf elements (e.g. jetty, piles and pontoon) to minimise the risk of pollutants and debris entering the waterway and/or disturbing the seabed. The EWMS must be approved by Transport for NSW prior to the demolition works. | Contractor | Pre-construction |

6.3 Biodiversity

This section describes the existing biodiversity at the wharf and describes the potential impacts associated with the proposal. Appendix D contains a supporting technical paper prepared by Cardno (Cardno, 2022b).

6.3.1 Methodology

The assessment included a desktop review of published State and Commonwealth records, data and literature to confirm the likely presence of threatened flora, fauna and endangered communities in the local environment. This was followed by a site walkover and aquatic survey of the environment covering an area extending to about 50 metres from the proposal footprint (excluding private property). The biodiversity study area (referred to as the 'study area' in section 6.3) is shown on Figure 6-2. The study locality refers to an area within five kilometres of the proposal footprint (for the purpose of the background search).

The following published records were reviewed:

- Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman and Murphy, 1989)
- Native Vegetation of the Sydney Metropolitan Area – Version 3.1 VIS_ID 4489 (OEH, 2016b)
- DPE – Environment, Energy and Science (DPE-EES) vegetation information system (VIS) Classification
- BioNet: containing information on threatened and protected species
- DPE-EES Threatened Biodiversity Data Collection
- DPI Fish Communities and Threatened Species Distribution of NSW (DPI, 2016a)
- DPI Threatened species lists and Listed Protected Fish Species
- DPI Mapping the Habitats of NSW Estuaries (Creese, et al., 2009)
- Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST): containing information on Commonwealth protected species
- National System for the Prevention and Management of Marine Pest Incursions for information on marine pests.

The impact assessment was prepared in accordance with *Environmental Impact Assessment Practice Note: Biodiversity Assessment* (EIA-N06, RMS, 2016d) with consideration of the:

- *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)
- *Guidelines for Biodiversity Offsets* (RMS, 2016a).

Further detail on the methodology for the assessment of biodiversity is provided in Appendix D.

6.3.2 Existing environment

Water based

Protected areas

There are no Coastal Wetland or Littoral Rainforests, as defined in the Coastal Management SEPP, in the study area. The closest Coastal Wetland is over three kilometres south of the study area at Centennial Park. The closest Littoral Rainforest is over two kilometres north of the study area in Sydney Harbour National Park.

There are no nationally important wetlands or Ramsar Wetlands in the study area or the wider study locality. The Parramatta Estuary is considered an estuarine wetland (Kingsford, et al., 2004).

No Aquatic Reserves or Marine Parks occur within the study area or the study locality.

Marine vegetation and habitat

The marine study area comprised of the artificial seawall and the intertidal and subtidal areas surrounding the existing Darling Point Wharf. The harbour is mapped as key fish habitat (KFH) and is estuarine thus, considered a Class 1 waterway – Major KFH (DPI, 2013; DPI, 2020).

The modified shoreline in the study area did not support mangroves or saltmarsh. This is generally characteristic of the lower reaches of the harbour and evident in the lack of mapped mangroves or saltmarsh in the study locality. Although seagrass meadows were not historically mapped in the study area, they were recorded during the field survey.

DPI Fisheries identify three types of KFH in their *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) comprising:

- Type 1 (highly sensitive KFH)
- Type 2 (moderately KFH)
- Type 3 (minimally sensitive KFH).

Three distinct fish habitat zones were mapped during the field survey:

- Seagrasses (Type 1 KFH) - *Zostera* and *Halophila* seagrass meadows were recorded during the field survey. These occurred from about 19 metres west of the existing wharf and extended west to the edge of the study area. A medium density *Halophila* and *Zostera* meadow was contiguous with smaller, mixed patches of low density *Halophila* and *Zostera* and formed a seagrass bed of about 320 square metres. Seagrass in these meadows were covered with epiphytes and the seabed was blanketed with filamentous algae, however seagrass shoots appeared to be healthy and fresh shoots were observed during the field survey
- Intertidal and subtidal rocky reefs (Type 2 KFH) – Subtidal rocky reefs were located in two areas east of the existing jetty and transitions from a narrow intertidal area in other parts. The width of subtidal rocky reefs varied between two and over 20 metres with the reef to the east of the existing wharf structures being the widest. The intertidal area was limited to the vertical sandstone seawall, the upper portions of the submerged existing wharf structures and two narrow rock platforms abutting the seawall, although the adjoining subtidal rocky reef may be exposed during low spring tides. The western platform is about 140 square metres and is constructed of natural bedrock and seawall rubble from historic foreshore infrastructure, and the eastern platform is about 260 square metres and intergrades into subtidal rocky reefs. Sydney Rock Oysters (*Saccostrea glomerata*), barnacles (Infraclass Cirripedia) and a number of common gastropods (e.g. *Nerita atramentosa*, Mulberry Whelk (*Tenguella marginalba*), *Patteloida latistrigata*) colonised these areas and

extended about 20 centimetres up the seawall from the base of the intertidal area or the subtidal rocky reef.


- Soft sediments (Type 3 KFH) – Soft sediment habitat occupied the largest portion of the study area (about 5440 square metres) and mostly comprised of bare sand and shell grit. Rock rubble or solid waste materials that had settled on the sandy seabed formed small patches of 'reef' in soft sediment habitat. These consolidated materials provided colonisation platforms for some habitat-forming species including *E. radiata* and *Sargassum spp.* However, these 'reefs' are generally no larger than one to two metres in diameter, have potential to mobilise during inclement weather or from vessel wash thus, considered to form the unconsolidated soft sediment landscape. No visible epifauna (i.e. fauna that lives on the surface of the seafloor) were observed during the field survey, however, infauna (ie fauna that lives in the sediment) were observed.

Aquatic vegetation and habitat within the study area is shown on Figure 6-2.



Legend

 Compound area

 Proposal footprint





Pile

 Biodiversity study area

KFH

 Type 1 - Highly sensitive KFH

 Type 2 - Moderately sensitive KFH

 Type 3 - Minimally sensitive KFH

Terrestrial vegetation and habitat

 Landscaped gardens and parks

 Roadside verge

 Artificial pond

 Nestbox

Aquatic vegetation and habitat

 Intertidal rocky reef

 Low density Halophila and Zostera

 Medium density Halophila and Zostera

 Low relief rocky reef

 Low-medium relief rocky reef

 Soft sediment

FIGURE 6-2
1:1,100 Scale at A4

0 5 10 15 20
m

Aquatic and terrestrial vegetation within the study area

DARLING POINT

Map Produced by Cardno NSW/ACT Pty Ltd (WINE)
Date: 2022-03-18 | Project: AWE200198
Coordinate System: GDA 1994 MGA Zone 56
Map: AWE200198_GS_ECO_D58_DP_REF_AquaticHabitat.mxd 04
Aerial imagery supplied by MetoMap (July, 2021)

Threatened species, populations and ecological communities

All marine vegetation, including seagrass, saltmarsh, mangroves and macroalgae, are protected under the FM Act. The study area does not encompass saltmarsh or mangroves however, seagrass was present and macroalgae was observed colonising intertidal and subtidal rocky reefs and debris in the soft sediment habitats. Seagrass and macroalgae are considered as marine vegetation and Division 4 of the FM Act protects marine vegetation from 'harm' in the form of gathering, cutting, pulling up, destroying, poisoning, digging up, removing, injuring or preventing light from reaching or otherwise harm marine vegetation or any part of it.

No remnant vegetation or Plant Community Types (PCTs) occur within the study area and therefore no threatened ecological communities (TECs) occur within the study area.

A review of the DPE-EES BioNet database, DPI Threatened species list and the DAWE PMST revealed fifteen threatened aquatic species (including corals, marine plants, marine mammals, marine reptiles, fish and elasmobranchs) listed under the FM Act and/or EPBC Act with potential to occur in the study locality. A full list is provided in Appendix D.

No threatened species were observed during the field survey, however, potential habitat for some threatened species occurs in the study area. An assessment of the likelihood of occurrence of all threatened species based on the study area habitat was carried out to determine the potential for these species to occur within the study area.

Due to the presence of suitable habitat in the study area and/or known populations in the harbour, two threatened aquatic species were considered to have a moderate to high likelihood of occurrence. These are:

- White's Seahorse (*Hippocampus whitei*) listed as endangered under the FM Act and EPBC Act
- Black Rockcod (*Epinephelus daemeli*) listed as vulnerable under the FM Act and vulnerable under the EPBC Act.

Some species of fish have been formally protected because they are naturally scarce or their numbers have been substantially reduced over recent decades. These species are protected to help prevent them becoming threatened in the future. The FM Act and the EPBC Act provide for the protection of species. Thirty marine fauna protected under the FM Act and/or EPBC Act have potential to occur within the study locality. These are listed in Section 3.12 of Appendix D.

The marine vegetation and subtidal areas of the study area form potential habitat however, marine vegetation and subtidal habitat features are not unique to the study area and are widespread throughout the harbour, similar to the distribution of these species.

Marine pests

Like a great number of other estuaries and waterways, Sydney Harbour is at risk of infestation from the marine pest *Caulerpa taxifolia* (DPI, 2016b). *Caulerpa taxifolia* is a fast-growing marine alga native to tropical Australia and the South Pacific (DPI, 2016b). This species is known to alter the physical and chemical environment, which can affect biodiversity. Populations have been recorded in Port Jackson at Neutral Bay, Mosman, Clifton Gardens, Rushcutters Bay, Double Bay, Rose Bay and many locations in North Harbour and Middle Harbour. This species has not been mapped in the study area and was not detected during the field survey, however has been recorded in nearby embayments. *Caulerpa taxifolia* is known to spread via fishing and boating activities as well as natural hydrology and has potential to occur in the study area.

Underwater noise and vibration sensitivity

Marine fauna in the harbour are likely to be exposed to an ambient level of noise from existing marine activities. Tolerance to changes in noise, vibration and water quality may vary among species, but the response is generally similar to these types of activities in a busy harbour (i.e. movement away from unfavourable conditions).

Land based

Protected areas

The study area does not fall in nor is it next to any National Parks, Conservation Reserves, Nature Reserves or Regional Parks. The closest National Parks estate is Clark Island, which forms part of Sydney Harbour National Park, about 300 metres north of the study area.

Terrestrial vegetation and habitat

The foreshore of the peninsula between Rushcutters Bay and Double Bay is highly urbanised with little to no areas of natural shoreline or remnant foreshore vegetation. Residential dwellings and recreational space fringe the foreshore and the peninsula is characterised by hardstands, landscaped gardens, street plantings or open parks.

The study area is located on land sloping from Darling Point Road and Lindsay Avenue to the seawall. The area below the sandstone escarpment to the seawall is reclaimed land. The vegetation in this area was not considered remnant or has been altered so much by planted vegetation and landscaping that it no longer conforms to any PCT. Some potentially remnant trees, including Swamp Oaks (*Casuarina glauca*), Smooth-barked Apples (*Angophora costata*) and Turpentines (*Syncarpia glomulifera*) were recorded in the landscaped gardens but these individuals stood with native and exotic ornamental plantings with a landscaped midstorey and groundcover.

Vegetation in the study area was found in Darling Point Reserve, McKell Park and roadside verges along Darling Point Road. Vegetation in McKell Park was limited to terraced gardens extending from Lindsay Street and Darling Point Road to the seawall. Mature Swamp Oaks and a Hoop Pine (*Araucaria cunninghamii*) were observed in the terrace abutting the seawall, east of the existing wharf structure. These trees were observed in areas of mown lawn and a community of exotic vines and scramblers along the edge of the escarpment, some of which are priority weeds. West of this, and the existing wharf structure, is a small freshwater/brackish pond. The surface of this waterbody was densely colonised by the native *Azolla filiculoides* and the emergent *Eleocharis* sp. Ornamental semi-aquatic species were also observed in this waterbody and on escarpment ledges where water had trickled down. The upper terraces of McKell Park were planted with a mix of native and exotic ornamental species. Some potentially remnant individuals (e.g. Smooth-barked Apples and Turpentines) occur amongst the densely planted gardens. Two clusters of Kentia Palms (*Howea fosteriana*) and a single Bangalow Palm (*Archontophoenix cunninghamiana*) are listed in Woollahra Municipal Council's Register of Significant Trees (WMC, n. d) due to their historical and aesthetic values.

Terrestrial vegetation and habitat within the study area is shown on Figure 6-2. The 'Landscaped gardens and parks' and Roadside verge' areas on Figure 6-2 refer to the areas below the canopy only.

A full list of flora species recorded in the study area is provided in Appendix D.

Threatened species, populations and ecological communities

A review of the DPE-EES BioNet database, DPI Threatened species list and the DAWE PMST identified 90 threatened terrestrial species listed under the BC Act and/or EPBC Act with potential to occur in the study locality. A full list is provided in Appendix D.

No threatened species were observed during the field survey, however, potential habitat for some threatened species occurs in the study area. Due to the presence of suitable habitat in the study area and/or known populations in the harbour, 10 terrestrial species were considered to have a moderate to high likelihood of occurrence. These are:

- Two amphibians:
 - Green and Golden Bell Frog (*Litoria aurea*) listed as endangered under the BC Act and vulnerable under the EPBC Act
 - Red-crowned Toadlet (*Pseudophryne australis*) listed as vulnerable under the BC Act
- Little Penguin in the Manly Point Area (*Eudyptula minor*) listed as an endangered population under the BC Act
- Six microbats listed as vulnerable under the BC Act:
 - Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
 - Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)
 - Little Bent-winged Bat (*Miniopterus australis*)
 - Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
 - Southern Myotis (*Myotis macropus*)
 - Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*)
- Grey-headed Flying Fox (*Pteropus poliocephalus*) listed as vulnerable under the BC Act and the EPBC Act.

The Little Penguin (*Eudyptula minor*) was not observed during field surveys but was noted to use the Darling Point area in the *McKell Park and Darling Point Reserve Plan of Management* (Marler, 2013). The plan of management indicated that some holes have been built into the McKell Park seawall to provide habitat. During the field survey it was noted that these holes in the seawall were positioned such that they were at risk of inundation and exposed to frequent vessel and pedestrian disturbance. No signs of recent occupancy were observed during the field survey. The shoreline of the study area is not considered moulting or breeding habitat for the Little Penguin. Although the waters of the harbour provide potential foraging habitat for this species, high vessel traffic in the study area renders the waters to be suboptimal.

No remnant vegetation or PCTs occur within the study area and therefore no TECs occur within the study area.

Priority weeds

One priority weed listed under the *Biosecurity Act 2015* for the Greater Sydney region was recorded in the vegetated areas in the study area during the field survey: Madeira Vine (*Anredera cordifolia*).

6.3.3 Potential impacts

Construction

Water based

Direct and indirect impacts to aquatic vegetation and habitat

The proposal would not require large-scale disturbance of the seabed. To install the waiting area and hydraulic platform, 11 support piles would be installed in the intertidal and subtidal habitat in the harbour. Six more fender piles would be installed as part of the new wharf. An additional four piles would be installed landward of the existing seawall and would not disturb the seabed.

Of the 17 waterside piles to be installed:

- One pile would be installed in the intertidal area to support the waiting area. The waiting area could shade about 20 square metres of the horizontal and vertical intertidal assemblages (Type 2 KFH). The removal of the existing wharf structures would offset a very small proportion of this area (less than 10 per cent of area to be shaded). The removal of a small proportion of these assemblages during piling is not considered to be ecologically significant to intertidal assemblages in the study area or the harbour
- Seven piles would be installed in the low-medium relief subtidal rocky reef to support the waiting area and the pontoon. These structures and the gangway could also shade up to 130 square metres of the same habitat (Type 2 KFH). The removal of the existing wharf structures would offset a very small proportion of this area (less than 5 per cent of the area to be shaded)
- Three support piles and six fender piles would be installed in soft sediment habitat. About 120 square meters of soft sediment habitat would also be permanently shaded by the pontoon, gangway, and waiting area (Type 3 KFH). The removal of the existing wharf structures would offset about 70 square metres of this area.

The area of soft sediment habitat (Type 3 KFH) under the footprint of the piles would be permanently lost while the anchor areas for the barge during construction would be temporarily impacted. This would include the direct removal of epifauna and infauna from soft sediment habitats although there is little to no marine vegetation to be impacted by shading. However, soft sediment habitats in the study area are characteristic of the majority of subtidal habitat in the harbour and community assemblages are generally ubiquitous and quick to recolonise following disturbance.

The removal of the existing structure would also result in the removal of marine vegetation, habitat and sessile/less mobile fauna on the piles and pontoon. This constitutes a total vertical marine vegetation/habitat area of about 50 square metres.

These existing structures are currently densely colonised by species commonly found in other intertidal areas and subtidal rocky reefs and are likely to quickly colonise the new piles and pontoon. The total vertical submerged area of the new wharf available for colonisation is double the vertical area to be removed (about 100 square metres). It is assumed that the materials proposed for the new piles are suitable for colonisation.

A summary of the area of aquatic habitat directly or indirectly impacted by the proposal is provided in Table 6-4.

Table 6-4: Area of vegetation and habitat impacted and reinstated by the proposal

| Vegetation and habitat | Area directly or indirectly impacted by the proposal (m ²) | Area to be reinstated (m ²) |
|--|---|--|
| Low-medium relief subtidal rocky reef (Type 2 KFH) | 180 (including vertical areas of 50) | Removal of existing wharf: less than 5 Vertical area: 100 |
| Intertidal rocky reef (Type 2 KFH) | 20 (including vertical areas) | less than 5 |
| Soft sediment (Type 3 KFH) | 120 | 70 |
| Landscaped gardens and parks | McKell Park – 50 (as mown lawn/groundcover) Darling Point Reserve – 100 (as mown lawn/groundcover) | N/A |
| Total | ~470 | ~180 |

There is potential for coarse and fine debris to be mobilised during piling, removal of existing structures and vessel movement. This can crush, damage and/or smother marine vegetation and habitat depending on the size of debris. Larger debris would be disposed offsite and should not cause any impacts to marine biodiversity. Mobilisation of finer debris (ie sediments) can also result in the mobilisation of contamination known to persist in study area sediments. Depending on the volume and the size of fine debris, wave, tide and current actions, finer particles may not reside in the area for long and this may only be a temporary nuisance to marine assemblages. The waters at Darling Point and the wider harbour periodically experiences impacts from elevated turbidity, usually as a result of rainfall, tides, swell and stormwater discharge. Thus, marine assemblages in the study area are likely to be frequently exposed to these conditions and the proposal is unlikely to introduce vastly different conditions.

Water-based construction activities would result in vessel and barge movements in and around the study area. This has potential to temporarily increase the frequency of vessel wash impact on intertidal and subtidal rocky reefs and the scour of soft sediment areas. Marine vegetation and sessile fauna can be scoured from the rocky reefs and epifauna, including scattered colonies of macroalgae on hard substratum, and infauna in soft sediment habitats can be removed/relocated. As large and small vessels currently frequent the study area, the community assemblages are likely to be well-adapted to vessel wash and scour. Thus, impacts as a result of vessel and barge movements are unlikely to substantially impact marine biodiversity in the study area with considerations to anchoring.

Injury and mortality

A temporary increase in vessel and barge activity during construction is associated with an increased risk of vessel strikes with marine turtles and mammals. The proposal footprint is considered suboptimal habitat for most marine mammals and very few individuals, if any, would be present during construction. The increased risk, however, is proportional to the increase in vessel traffic for the proposal relative to overall vessel traffic. This proportional increase is considered to be very small. Given these species regularly breach the surface to breathe, vessel strike can be mitigated by observation and slow vessel speeds that minimise collisions.

Underwater noise and vibration

Marine mammals and fish are sensitive to the impacts of underwater noise and vibration and it is anticipated there would be temporary disturbance from vessel/barge traffic, piling noise and vibration and anchoring during construction. These species are likely to recolonise the study area once conditions return to pre-construction conditions.

Provided the mitigation measures outlined Table 6-5 are implemented no residual impacts to marine mammals are anticipated.

Pests

Construction activities over water have a small potential to introduce marine pests if vessels, equipment or plant are used and controls are not implemented.

Land based

Direct loss of terrestrial vegetation and habitat

The proposal would remove up to 150 square metres of mown lawn and groundcover in landscaped gardens at Darling Point Reserve and McKell Park. No trees or shrubs would be removed, however, the proposal footprint would be partly located in the dripline of a Hills Weeping Fig at the end of Darling Point Road. It is noted there is currently a concrete footpath in a portion of this drip zone. Impacts to the Hills Weeping Fig would be avoided provided mitigation measures are implemented.

The proposed compound area encompasses the Jacarandas planted on the roadside verge of Darling Point Road. These trees would not be removed and mitigation measures would be implemented to avoid indirect impacts to these trees.

The proposal would not directly impact the artificial pond in McKell Park, located adjacent to the proposed foreshore path and waiting area.

Vegetation to be removed does not form part of any remnant PCT and the area of mown lawn and groundcover to be removed forms potential foraging habitat and movement corridors habitat for some highly mobile, disturbance tolerant native fauna. The removal of habitat resources is unlikely to have a significant impact on native fauna as there is an abundance of similar habitat across the study locality of which the study area only forms a small proportion. Further, no tree or shrubs would be cleared and there is little to no habitat in the ground layer.

Disturbance of vegetation can result in the introduction or spread of exotic flora (i.e. weeds). This can occur by the spread of opportunistic exotic vegetation from adjacent private properties or new species can be introduced via equipment, plant and footwear. Any foreign equipment or materials brought onto the construction site also have potential to introduce diseases such as *Phytophthora* (*Phytophthora cinnamomi*) and Myrtle Rust (*Puccinia psidii*). The vegetation and habitat in the study area and the surrounding areas would be susceptible to weeds and diseases if not managed during construction.

A summary of the area of terrestrial habitat to be directly impacted by the proposal is provided in Table 6-4.

Erosion and sedimentation

Ground disturbance could expose soils and components of reclaimed land which can then be easily mobilised. Contaminants in the soil and landfill can also be subsequently released into the surrounding environment.

Erosion and sedimentation is most likely to impact the small artificial pond in McKell Park and harbour waters, particularly during inclement weather (e.g. rainfall, high winds) if controls are not implemented. This could result in turbid conditions, the smothering of macrophytes, sessile marine vegetation, habitat and fauna, and/or sediment and biota contamination in the waters of the artificial pond, Darling Point and the wider harbour.

Threatened, migratory and protected species

The proposal is unlikely to significantly impact threatened species and disturbances to potential habitat would largely be temporary. The details of the assessments of significance (AoS), which assessed impacts on threatened species under the BC Act, FM Act and EPBC Act considered potentially occurring in the study area, are in Appendix D.

Water-based activities have potential to impact habitat for the Southern Myotis, Black Rockcod and White's Seahorse. The foraging resource that the study area represents would be made available for these species following the completion of construction thus, proposal impacts to potential foraging habitat for these species are only temporary. The impact from the removal of the existing structure is considered minimal for Black Rockcod and White's Seahorse. Some of this habitat would be altered but would not be removed from the areas of occupancy for these species. These are also very small proportions of available habitat in their distribution and the installation of new piles and structures would provide similar, if not the same habitat for these species during operation. Additional controls would be implemented to survey for Black Rockcod and White's Seahorse immediately prior to the start of construction so that individuals in the area are not harmed.

The removal of existing wharf structures and construction activities has potential to remove and temporarily disturb roosting and foraging habitat for the Eastern False Pipistrelle, Eastern Coastal Free-tailed Bat, Little Bent-winged Bat, Large Bent-winged Bat, Southern

Myotis and Yellow-bellied Sheath-tail-bat. However, the area of removal is considered suboptimal and a very small proportion of the available habitat for these species and is not expected to reduce species' range, disrupt breeding or reduce population sizes. The new wharf structures are likely to provide new roosting habitat for these species.

Operation

Aquatic

All elements of the proposal, with the exception of the piles, would sit permanently on or above the water's surface and avoid impacts to the seabed. However, these structures would shade a portion of intertidal rocky reef (about 20 square metres), subtidal rocky reef (about 130 square metres) and subtidal soft sediment habitat (about 120 square metres).

The subtidal rocky reef habitat assemblage may change and manifest in a reduction of macroalgae, however this impact area is a very small proportion of subtidal rocky reef habitat in the study area and the wider harbour and is not considered ecologically significant. Shading of intertidal and soft sediment habitat is not expected to substantially change community assemblages as these areas generally lack marine vegetation. Removal of the existing wharf interchange would leave portions of subtidal rocky reef (less than 5 square metres) and soft sediment habitat (about 70 square metres) exposed to sunlight. This is not expected to have any substantial impacts to soft sediment communities and subtidal rocky reef assemblages are likely to revert to those in adjacent, unshaded areas.

There is also potential that changes in currents in the vicinity around the piles could cause a scour footprint of about 1.5 metres in diameter around each pile. It is not expected that the impact of scour would extend beyond the shading footprint of the new wharf structures with the exception of the fender piles. However, scour in soft sediment habitat would likely stabilise and soft sediment communities would continue to persist in these areas.

The relocation of the ferry wharf also moves localised ferry wash and underwater turbulence. The waters of Darling Point currently experience substantial vessel traffic and ferry routes are likely to vary from time to time. Impacts from the small changes to the docking and departing ferry route at the new terminal are unlikely to be detectable in a highly variable boating environment. There is potential for soft sediment habitat to be scoured from ferry jets while docking and departing the new terminal, however, these habitats are quick to recover. Sediment mobilisation from ferry jets may affect nearby rocky reef habitat, however, communities in the study area are likely to be well-adapted to turbidity and sedimentation from existing vessel traffic.

Terrestrial

As there is not expected to be any change to operational activities around the wharf there is limited potential for any operational terrestrial ecology impacts.

Conclusion on significance of impacts

The proposal is unlikely to significantly impact threatened species and disturbances to potential habitat would largely be temporary and constitute a very small proportion of available habitat. The proposal would not fragment or isolate threatened species populations or substantially impact any species' lifecycle. SISs or referrals are not required for the proposal.

Offsets for the residual loss of marine vegetation in subtidal rocky reef (about 80 square metres, Type 2 KFH) should be considered in accordance with the *Guideline for Biodiversity Offsets* (RMS, 2016a).

The proposal is not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the EPBC Act. A referral to the Australian Government DAWE is not required for biodiversity matters.

6.3.4 Safeguards and management measures

Table 6-5 lists the biodiversity safeguards and management measures that would be implemented to account for the impacts identified in section 6.3.3.

Table 6-5: Biodiversity safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|----|--|---|----------------|------------------|
| B1 | All project impacts | <p>Integrate the management of flora and fauna into the construction environmental management plan (either as a standalone flora and fauna management plan or a subplan). This is to include all terrestrial and marine flora and fauna and include but not be limited to such measures as:</p> <ul style="list-style-type: none"> • Documenting and establishing site clearing limits and including on the sensitive area plans • Establishing no go zones (including the artificial pond and no anchoring in seagrass) and including on the sensitive area plans • Implementing tree protection measures in accordance with Eco Logical (2019) • Pre-clearing surveys, vegetation removal, weed management and unexpected finds measures in line with the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Pre-construction |
| B2 | Removal of threatened species habitat and habitat features | <p>Pre-clearing surveys will be undertaken by a suitably qualified ecologist / fauna spotter/catcher in accordance with Guide 1: Pre-clearing process of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). Any roosting microbats in the wharf structures to be removed and the seawall to be impacted/disturbed will be captured and relocated to similar or higher condition habitat. Release will only be done at dusk and roosting individuals should be kept in a secure, dark and warm location until then. Injured individuals or unfurred juveniles are to be transported to a veterinarian. Seawalls will also be inspected for Little Penguins.</p> | Contractor | Pre-construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|------|--|---|----------------------------------|-------------------|
| B3 | Disturbance of threatened species habitat and habitat features | The unexpected species finds procedure is to be followed under <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified on site. | Contractor | Construction |
| B4 | Removal of marine vegetation and habitat | <p>Considerations during detailed design to promote colonisation of habitat-forming species could include the installation of structures (e.g. piles and pontoons) which provide habitat complexity (e.g. designs available as part of the Living Seawalls Project).</p> <p>Consideration to the use of perforated materials for the gangway and waiting area to minimise shading impacts on marine vegetation and habitat.</p> | Transport for NSW and Contractor | Detailed design |
| LS10 | Removal of marine vegetation and habitat | The number of barge anchor points will be minimised where possible. Anchoring locations should be selected to avoid areas of sensitive habitat and moderate/high archaeological potential. | Contractor | Construction |
| B6 | Removal of marine vegetation and habitat | Complete a targeted survey for Black Rockcod and White's Seahorse within 24 hours prior to the commencement of water-based construction activities. Black Rockcod individuals will be encouraged to move away from the study area prior to silt curtain installation and White's Seahorse will be captured and relocated to nearby similar habitat using methods approved by DPI Fisheries. A White's Seahorse relocation plan will be developed in consultation with DPI Fisheries to dictate this activity. These activities are to be completed by a qualified marine ecologist. | Contractor | Pre- construction |
| B7 | Removal of marine vegetation and habitat | A Section 37 permit under the FM Act to relocate Syngnathids collected during the targeted pre-clearance survey will be required as part of the White's Seahorse relocation. Relocation may be undertaken by a pre-qualified permit holder. | Contractor | Pre-construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|------|-----------------|--|----------------|--------------|
| B8 | Aquatic impacts | Aquatic habitat will be protected in accordance with Guide 10: Aquatic habitats and riparian zones of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011) and Section 3.3.2 Standard precautions and mitigation measures of the <i>Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013). | Contractor | Construction |
| LS8 | Aquatic impacts | <p>Prior to commencement of construction activities, sediment control device (such as sediment boom and curtain) will be installed around the site to contain disturbed sediment from the water surface by allowing suspended sediments to settle back on the bottom of the seabed overtime. The silt boom and curtain should extend from a minimum of 100 millimetres above the water line to a minimum of 2.5 metres below the water line before starting work.</p> <p>Installation should be undertaken during high tide periods from a boat. The device should be designed to rise and fall with the tide to prevent disturbance. Inspection of the device should be undertaken on a daily basis after ebbing tides, with additional inspection carried out following storm events. Prior to removing the sediment control device, conditions within the curtain should be assessed visually and with a field instrument to verify that sediment has settled resulting in similar water turbidity to that outside the curtain.</p> | Contractor | Construction |
| LS11 | Aquatic impacts | Work associated with positioning barges, drilling and pile driving will occur during calm conditions to prevent excessive scouring and other impacts. | Contractor | Construction |
| WQ1 | Aquatic impacts | <ul style="list-style-type: none"> A spill management plan will be developed as part of the CEMP and communicated to all staff working on site. Appropriate land and aquatic spill kits are to be maintained on site and on barges. Aquatic spill kits must be specific for working within the marine environment. The spill kit must be appropriately sized for the volume of potentially polluting liquids stored at the site. All workers will be advised of the location of the spill kit and trained in its use. | Contractor | Construction |
| B9 | Aquatic impacts | Piling to stop if marine mammals, reptiles or Little Penguin are observed within approximately 100 metres of the site and only to recommence once they have moved beyond 100 metres of the site or are not seen for at least 20 minutes. | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--|--|-------------------|-----------------|
| B10 | Changes to coastal processes | The detailed design will aim to avoid/minimise any impact to coastal processes and hydrology. | Contractor | Detailed design |
| B11 | Injury and mortality of fauna | Fauna will be managed in accordance with Guide 9: Fauna handling of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Construction |
| B12 | Invasion and spread of weeds, pests and diseases | Weed species will be managed in accordance with Guide 6: Weed management of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA projects</i> (RTA, 2011). | Contractor | Construction |
| B13 | Invasion and spread of weeds, pests and diseases | Pathogens will be managed in accordance with Guide 2: Exclusion zones of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Construction |
| B14 | Invasion and spread of weeds, pests and diseases | Water-based equipment and vessels to be sourced from local suppliers where possible. Equipment and vessels must be cleaned and inspected prior to entering the site. | Contractor | Construction |
| B15 | Invasion and spread of weeds, pests and diseases | Occurrence of any marine pests must be reported to DPI Fisheries. | Contractor | Construction |
| B16 | Noise, light and vibration | Shading and artificial light impacts will be minimised through detailed design. | Contractor | Detailed design |
| B17 | Tree protection | An Arboricultural impact assessment will be prepared to ensure trees on site are not adversely impacted and to outline tree protection measures to be implemented during construction. | Transport for NSW | Detailed design |

6.4 Noise and vibration

This section describes the existing noise and vibration at the wharf and describes the potential impacts associated with the proposal. Appendix E contains a supporting technical paper prepared by Cardno (Cardno, 2022c).

6.4.1 Methodology

Construction assessment

The construction assessment reviewed how the proposed activities, methods and scheduling described in section 3.2 would affect noise and vibration sensitive receivers in the local area. The assessment was completed in accordance with the *Interim Construction Noise Guidelines* (ICNG) (DECC, 2009) and the *Construction Noise and Vibration Guideline* (CNVG) (RMS, 2016b). Noise levels from construction works were predicted using 3D noise modelling software (SoundPLAN).

The noise modelling has been completed for an earlier iteration of the wharf design which has subsequently been updated to the current wharf design as described in Section 3. The noise assessment in the technical paper and summarised in this chapter assesses a design with an over water boardwalk connecting the waiting area to the lift, instead of a foreshore path. The wharf would be constructed using a similar construction methodology as detailed in the technical report and this chapter.

While the design change may result in some localised differences in predicted noise impacts, the change would not result in modification to the identified noise mitigation measures. However, as the current wharf design moves vibration sources closer to the heritage structures, a revised vibration assessment has been carried out in this chapter.

Operational assessment

The operational assessment reviewed how the lift would affect noise sensitive receivers in the local area. The assessment was completed in accordance with the *Noise Policy for Industry* (NPI) (EPA, 2017). Noise levels from operation of the lift were predicted using 3D noise modelling software (SoundPLAN).

Operational noise from ferry activity has not been assessed as it is not expected to differ as a result of the proposal.

6.4.2 Existing environment

Noise monitoring and ambient noise levels

Existing noise levels surrounding the proposal were determined through unattended noise monitoring between 10 and 17 September 2020. Details of noise monitoring locations and results are identified in Table 6-6. Monitoring for the unattended survey was performed across three time spans: day, evening and night. Figure 6-3 displays the noise logger locations.

The existing acoustic environment is generally dominated by intermittent local road traffic and nearby waterway vessels.

Table 6-6: Unattended noise monitoring locations and noise levels

| ID | Location | Noise level (dBA RBL ¹) | | |
|----------|-------------------------------|-------------------------------------|----------------------|--------------------|
| | | Day ² | Evening ² | Night ² |
| Logger 1 | Lindsay Avenue, Darling Point | 44 | 41 | 36 |
| Logger 2 | Duff Reserve, Point Piper | 43 | 43 | 34 |

1. RBL – rating background level. The overall single-figure background level representing each assessment period (daytime/evening/night-time) as defined in the NSW Noise Policy for Industry (EPA 2017)

2. Time periods defined as – Day: 7am to 6pm Monday to Saturday, 8am to 6pm Sunday; Evening: 6pm to 10pm; Night: 10pm to 7am Monday to Saturday, 10pm to 8am Sunday.

It should be noted that the background noise monitoring was conducted during COVID-19 and may represent non-typical background noise levels on this basis.



Figure 6-3: Noise logger locations

Sensitive receivers

The existing wharf is located off Darling Point Road on the northern bank of McKell Park, approximately 50 metres from residential properties located to the south east on Lindsay Avenue. The existing wharf is surrounded by a range of noise sensitive receivers, mostly residential. Non-residential receivers include areas such as McKell Park, Darling Point Reserve, Yarranabbe Park and Clark Island Reserve.

A Royal Australian Navy Base is located approximately one kilometre to the west of the existing Darling Point Wharf. While the majority of uses associated with the base would not be considered noise sensitive, it has been identified as a residential receiver to take into account potential onsite accommodation.

Sensitive receivers around the proposal are listed in Table 6-7 and shown on Figure 6-4.

Table 6-7: Sensitive receivers and land uses around the proposal

| Label | Description | Land use |
|-------|-----------------------------------|----------------------|
| 1 | Residential south | Residential |
| 2 | Residential east | Residential |
| 3 | Residential southwest | Residential |
| 4 | Navy Base | Military/Residential |
| 5 | McKell Park/Darling Point Reserve | Passive Recreation |
| 6 | Yarranabbe Park | Passive Recreation |
| 7 | Beare Park/Elizabeth Bay Marina | Passive Recreation |
| 8 | Clark Island Reserve | Passive Recreation |

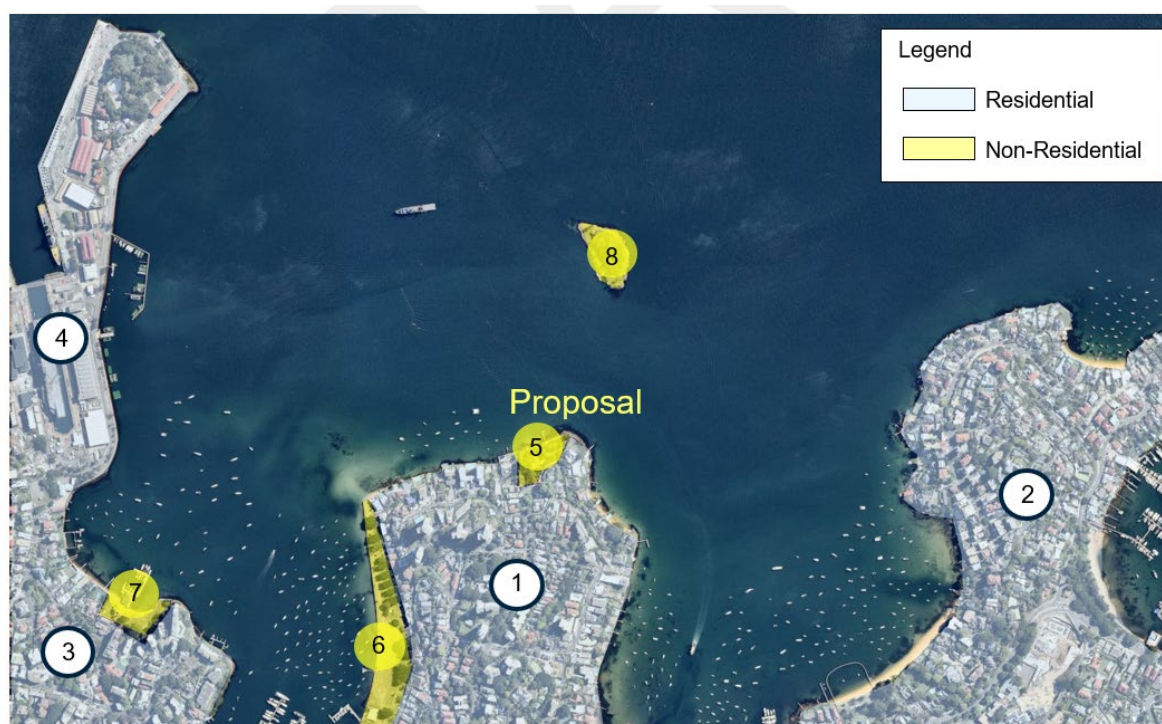


Figure 6-4: Sensitive receivers and surrounding land uses

Sensitive receivers were assessed through the identification of noise catchment areas (NCAs) where ambient noise levels are likely to be similar. NCA 1 encompassed the suburbs of Darling Point, Elizabeth Bay and Potts Point, while NCA 2 encompassed the suburbs of Double Bay and Point Piper. The NCAs are shown on Figure 6-5.

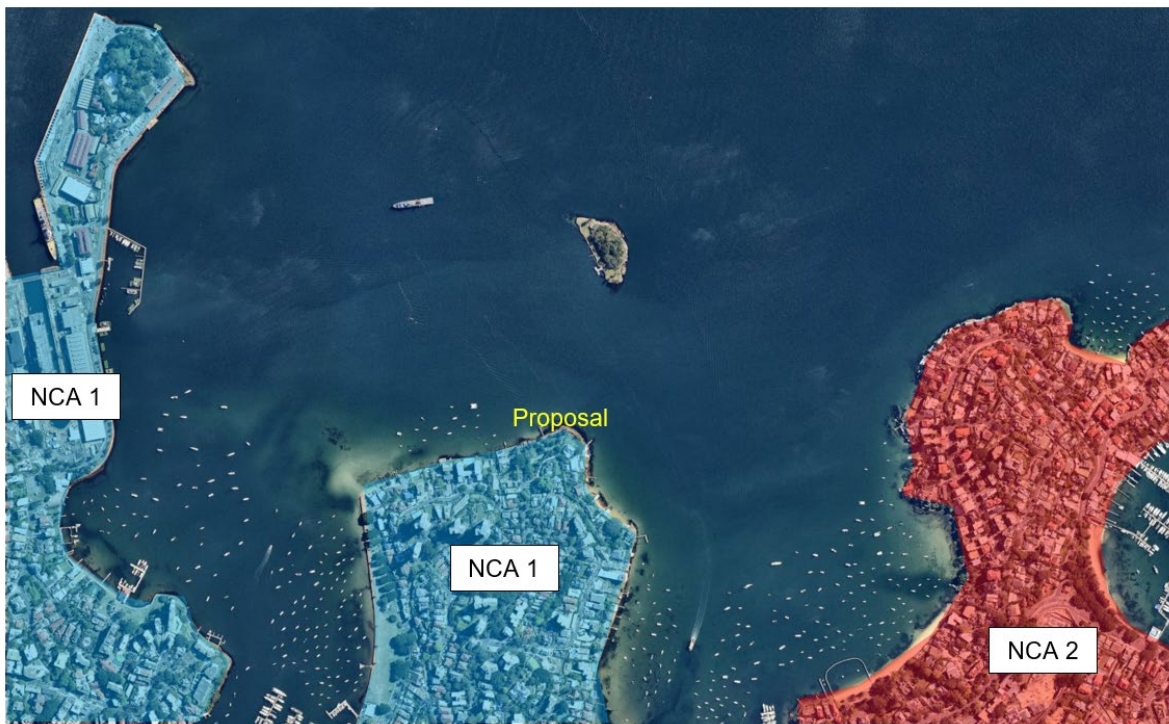


Figure 6-5: Noise catchment areas

6.4.3 Criteria

Construction noise criteria

The CNVG provides a framework for the assessment of noise during the construction phase of the proposal. The CNVG references the following documents to provide the criteria for the assessment of construction noise and vibration impacts:

- INCG
- *Assessing Vibration – Technical Guideline* (AV:ATG) (DEC, 2006)
- *Road Noise Policy* (RNP) (DECCW, 2011).

The CNVG provides recommended minimum separation distances between vibration intensive plant and sensitive receivers for minimising the risk of cosmetic damage. The CNVG further states that the minimum working distance for cosmetic damage must be complied with at all times, unless otherwise approved by Transport for NSW or under the environmental licence as relevant.

Construction noise assessment criteria

Noise management levels (NMLs) for residences have been calculated for both standard and non-standard hours. The NMLs for residences are detailed in Table 6-8 and are based on the measured RBLs and the noise criteria detailed in the INCG.

Table 6-8: NML for residences in each noise catchment area

| NCA | NML, dB(A) | | | *Sleep disturbance L _{A1} , 1 min |
|-----|------------------------------------|---|-------|---|
| | Standard hours (RBL + 10 dB(A)) | Outside standard hours (RBL + 5 dB(A)) | | |
| | Day | Evening | Night | |
| 1 | 54 | 46 | 41 | 60 |
| 2 | 53 | 48 | 39 | 60 |

**Sleep disturbance criteria has been calculated based on an assumed typical internal LAeq noise level of 35 dB(A) referenced from Australian Standard AS:2107 and corrected with a typical inside to outside noise reduction of 10 dB(A).*

Construction vibration assessment criteria

The minimum working distance for vibration intensive plant from sensitive receivers is listed in Table 2 of the CNVG. Table 6-9 presents these recommended minimum working distances for specific construction activities.

Table 6-9: Recommended minimum working distances for vibration intensive plant from sensitive receivers

| Plant item | Rating / Description | Minimum working distance | | |
|-------------------------|-----------------------------------|------------------------------|--|---|
| | | Cosmetic damage (BS 7385) | Cosmetic damage (DIN 4150) Heritage and other sensitive structures | Human response (OH&E Vibration Guideline) |
| Vibratory Roller | < 50 kN (Typically 1-2 tonnes) | 5 m | 14 m | 15 to 20 m |
| | < 100 kN (Typically 2-4 tonnes) | 6 m | 16 m | 20 m |
| | < 200 kN (Typically 4-6 tonnes) | 12 m | 33 m | 40 m |
| | < 300 kN (Typically 7-13 tonnes) | 15 m | 41 m | 100 m |
| | > 300 kN (Typically 13-18 tonnes) | 20 m | 54 m | 100 m |
| | > 300 kN (> 18 tonnes) | 25 m | 68 m | 100 m |
| Small Hydraulic Hammer | (300 kg - 5 to 12t excavator) | 2 m | 5 m | 7 m |
| Medium Hydraulic Hammer | (900 kg – 12 to 18t excavator) | 7 m | 19 m | 23 m |
| Large Hydraulic Hammer | (1600 kg – 18 to 34t excavator) | 22 m | 60 m | 73 m |
| Vibratory Pile Driver | Sheet Piles | 2 to 20 m | 50 m | 20 m |

| Plant item | Rating / Description | Minimum working distance | | |
|-------------|----------------------|---------------------------|--|---|
| | | Cosmetic damage (BS 7385) | Cosmetic damage (DIN 4150) Heritage and other sensitive structures | Human response (OH&E Vibration Guideline) |
| Pile Boring | ≤ 800 mm | 2 m (nominal) | 40 m | 4 m |
| Jackhammer | Hand Held | 1 m (nominal) | 2 m | 2 m |

Operational noise criteria

In assessing the operational noise impact from the lifts, the NPI requires the consideration of two separate criteria in developing the project specific criteria. These are the intrusiveness criteria and the amenity criteria.

The more stringent of the intrusiveness and amenity criteria is generally applied to the assessment, therefore the applicable proposal specific criteria are summarised Table 6-10.

Table 6-10: Proposal specific criteria Leq, dB(A)

| NCA | Assessment period | Proposal specific criteria, Leq(15min) dB(A) |
|-----|-----------------------|--|
| 1 | Day (07:00-18:00) | 49 |
| | Evening (18:00-22:00) | 46 |
| | Night (22:00-07:00) | 41 |
| 2 | Day (07:00-18:00) | 48 |
| | Evening (18:00-22:00) | 48 |
| | Night (22:00-07:00) | 39 |

6.4.4 Potential impacts

Construction

Construction scenarios

For assessment of construction noise impacts, four worst case construction scenarios were determined as listed in Table 6-11. Table 3-2 outlines the corresponding construction activities in each scenario.

Table 6-11: Modelled construction scenarios

| Scenario No. | Description | Construction hours |
|--------------|---|--|
| 1b | Removal of existing Darling Point Wharf | Standard hours |
| 2a | Installation of steel piles within the waterway - screwing | Standard hours and outside of standard hours |
| 2c | Installation of steel piles within the waterway - hammering | Standard hours and outside of standard hours |
| 6 | Landside infrastructure | Standard hours |

Construction plant and equipment

Each construction scenario would include various types of equipment which would be used during various times of the day. Table 6-12 lists the number, type and sound power level (SPL) of equipment to be used during each construction scenario. The table also identifies the total SPL for each scenario.

Table 6-12: Plant and associated sound power levels

| Plant | SPL* | 1b | 2a | 2c | 6 |
|---------------------------------|------|-----|-----|-----|-----|
| Asphalt paving | 103 | | | | 1 |
| Auger/bored drill rig/excavator | 112 | | 1 | | |
| Barge | 108 | 1 | | | |
| Barge crane | 110 | | | 1 | |
| Barge pneumatic piling hammer | | | | 1 | |
| Chainsaw | 114 | 1 | | | |
| Concrete truck | 109 | | | 1 | |
| Crane mounted vibrator | 115 | 1 | | | |
| Day-maker | 98 | | 2 | | |
| Excavator | 108 | 1 | | | 1 |
| Generator | 98 | | 1 | 1 | 1 |
| Hand tools | 94 | | | | 1 |
| Jack hammer | 115 | | | | 1 |
| Mobile crane 50t | 113 | 1 | | | |
| Oxy acetylene cutting | 96 | | 1 | | |
| Pavement profiler | 117 | | | | 1 |
| Pneumatic drill | 115 | 1 | | | |
| Road truck | 108 | 1 | | | |
| Truck | 110 | | 1 | | 1 |
| Truck (medium rigid) | 103 | | | | 1 |
| Vibratory roller | 109 | | | | 1 |
| Work boat | 108 | | 1 | 1 | |
| Total L_{Aeq} | | 121 | 115 | 115 | 120 |

* SPL – Sound Power Level, L_{Aeq} , dB(A)

Predicted construction noise levels

The predicted noise impact from construction activities in the form of noise contour maps and predicted levels at discrete receivers is presented in Appendix E.

Predicted construction noise levels for the most affected receivers (in each modelled NCA) for each scenario are shown in Table 6-13. Noise levels at the remaining receivers within each associated NCA are predicted to be lower than the levels presented in Table 6-13. NCA 1 includes receivers within the suburb of Double Bay which are expected to experience the highest predicted noise levels during construction.

Table 6-13: Noise impact summary

| Criteria / Scenario | NCA1 | NCA2 |
|---|------|------|
| RBL standard hours dB(A) | 44 | 43 |
| RBL out of hours (evening) dB(A) | 41 | 43 |
| RBL out of hours (night) dB(A) | 36 | 34 |
| Highly noise affected dB(A), L_{Aeq} 15min | 75 | 75 |
| Scenario 1b (standard), dB(A), L_{Aeq} 15min | 78 | 55 |
| Scenario 2a (standard), dB(A), L_{Aeq} 15min | 74 | 48 |
| Scenario 2a (outside evening), dB(A), L_{Aeq} 15min | 74 | 48 |
| Scenario 2a (outside night), dB(A), L_{Aeq} 15min | 74 | 48 |
| Scenario 2c (standard), dB(A), L_{Aeq} 15min | 76 | 52 |
| Scenario 2c (outside evening), dB(A), L_{Aeq} 15min | 76 | 52 |
| Scenario 2c (outside night), dB(A), L_{Aeq} 15min | 76 | 52 |
| Scenario 6 (standard), dB(A), L_{Aeq} 15min | 81 | 53 |
| Noticeable: RBL +5 dB(A) to RBL +10 dB(A) | | |
| Clearly audible: RBL +10 dB(A) to RBL + 20 dB(A) | | |
| Moderately intrusive: RBL +20 dB(A) to RBL + 30 dB(A) | | |
| Highly Intrusive: >RBL + 30 dB(A) or >75 dB(A) | | |

Construction noise levels are predicted to exceed NMLs for standard and non-standard hours of operation for all construction stages at the nearby residential receivers.

General noise and vibration impacts on the local community would be mitigated by restricting construction work to the day wherever possible. However, due to the requirement for calm water conditions during pile installation and for intricate lifts, some activities would need to be carried out at late at night or early in the morning. It is estimated that about 30 night shifts (from 11pm to 7am) would be required across the construction period of up to eight months. Piling would be restricted to be carried out from 5am to 7am only.

It should be noted that the assessment has carried out worst case noise modelling with noise levels predicted based on all sources operating simultaneously within the worksite. This is unlikely to be the case in practice as plant and machinery are likely to be used intermittently and construction noise levels would generally be less than those predicted.

Sleep disturbance

The most likely source of potential sleep disturbance from outside of standard hours work would be from piling proposed as late at night and/or early morning works.

Maximum noise levels have been predicted to the nearest affected residential receivers to allow a review of the potential for sleep disturbance from construction activities at night. In the absence of measurement data typical construction source L_{Amax} noise levels were assumed to be 10 dB(A) above the predicted L_{Aeq} noise levels, on the basis of measurements from previous projects.

The predicted L_{Amax} results detailed in Table 6-9 of Appendix E indicate that maximum construction noise levels at NCAs 1 and 2 are likely to exceed the sleep disturbance criteria, 60 dB(A), for the outside of standard hours construction scenarios, at many of the assessed receivers. For this reason, it is recommended that activities with potentially high maximum levels such as the use of pneumatic tools and drilling are minimised at these locations during the quietest periods of the overall night-time period.

Vibration impacts

For the purposes of this assessment, the following proposed plant with the potential to generate the most vibration have been considered:

- Bored piling rig
- 7.5 tonne vibratory roller
- Pile hammers
- Truck movements.

Construction vibration levels vary depending on the distance from the equipment in use, the energy level imparted to the ground by the construction process, and the bedrock type. The highest vibration sources associated with the construction work would be bored piling rigs, vibratory rollers and pile hammers. It is anticipated that no blasting would be required for the proposal.

As outlined in section 6.4.1, the supporting technical paper (Appendix E) was completed based on a previous design. However, as the current design moves vibration sources closer to heritage items a revised vibration assessment has been carried out in this section. Based on the current design (refer to Figure 3-1), the following assessment applies to heritage items and non-heritage items.

Heritage items

The closest heritage items to the proposal are located approximately less than one metre to 20 metres from the proposed construction work (piling and/or vibratory roller), and include the Remains of bath house and site of jetty (Woollahra LEP no. 113), Fence, gates and foundation remains of former house *Canonbury* (Woollahra LEP nos. 112 and A1) and *Craigend* (Woollahra LEP no. 102). The location of the heritage items are shown on Figure 6-13.

The proposed works would be located within the minimum safe working distance for cosmetic damage to heritage fabric, which is identified in the CNVG as being within 41 metres of a 7.5 tonne vibratory roller and within 40 metres of pile boring. Therefore, due to the close proximity of the works, the vibrations associated with the piling and roller have potential to cause impacts to these heritage items.

With respect to piling, only a small number of piles are required and the potential impacts could also be largely mitigated through control measures. As a result, it is expected that any potential direct impacts resulting from vibrations would be minimal.

In regards to the 7.5 tonne vibratory roller, due to the close proximity of the pathway construction work (less than one metre) to the Remains of bath house and site of jetty (Woollahra LEP no. 113), alternative low vibration technology is likely to be required.

Heritage items located outside the safe working distances are unlikely to be impacted by the proposed work.

Non-heritage items

Use of a 7.5 tonne vibratory roller would be undertaken within the safe working distances for cosmetic damage to the residential buildings located within 15 metres of construction activities.

Potential impacts could also be largely mitigated through control measures (refer Table 6-14) and as a result, it is expected that any impacts resulting from vibrations would be minimal. Critically, where works are proposed within the safe working distances, of any buildings in accordance with the safe working distances listed in Table 6-9, test vibration measurements of vibratory rolling and other vibration intensive plant at the work locations closest to the structures should be carried out prior to works commencing to determine the level of vibration at the sensitive structure.

Operation

Operational scenarios

One scenario was modelled to assess the lift noise associated with the proposal which included the lift itself and two ventilation fans operating simultaneously.

Predicted operational noise levels

The predicted noise levels indicate that operation of the lift is not likely to impact on amenity at any of the nearby sensitive receivers and associated noise emissions are likely to comply with NPI criteria at all nearby sensitive receiver locations.

The upgraded wharf would service a similar patronage to the existing environment, and no change in operational traffic is anticipated.

6.4.5 Safeguards and management measures

Table 6-14 lists the noise and vibration safeguards and management measures that would be implemented to account for the impacts identified in section 6.4.4.

Table 6-14: Noise and vibration safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------|---|----------------|------------------|
| NV1 | Noise and vibration | <p>Preparation of a Construction Noise and Vibration Management Plan (CNVMP) based on recommendations provided within the ICNG and <i>Australian Standard AS 2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites</i>. This is to include, but not be limited to:</p> <ul style="list-style-type: none"> Plant controls: <ul style="list-style-type: none"> Use of noise attenuating controls at the source, such as mufflers, acoustic screens, etc Maintain plant and equipment in good working order to prevent excess noise generation Locate static sources of noise such as the generators as remotely as possible from noise sensitive receivers Use of broadband reversing alarms, or 'quackers' (instead of standard tonal alarms), on mobile equipment in accordance with the relevant health and safety regulations Use of temporary noise barriers where practical. The height and location of these barriers will be determined during preparation of the CNVMP when more information regarding the proposed plant to be used for each construction scenario is available Investigate whether 'at plant' mitigation or muffled plant is available for plant with high source noise levels such as rock hammers and piling rigs, and plant emitting continuous noise such as generators Acoustic curtains will be investigated for stationery plant within the site once a detailed schedule of works and plant is available. Management and behavioural controls: | Contractor | Pre-construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------|---|----------------|--------------|
| | | <ul style="list-style-type: none"> – Ensure managers effectively communicate acceptable and unacceptable work practices for the site, through staff site inductions, notice boards, and prestart meetings – Avoid the need for reversing in the construction area by creating a loop road or similar – Avoid dropping materials from height – Workers should avoid shouting, minimise talking loudly, and avoid slamming vehicle doors. • Conducting noise monitoring during landside, piling and out of hours construction scenarios considering the potential exceedances for the purposes of assisting in noise mitigation and to verify the findings of this noise assessment. • Implementing a procedure for dealing with complaints to ensure that all complaints are registered and dealt with appropriately. • Conducting additional monitoring if complaints are received or proposed activities and number of plants exceed those assumed in this assessment. • Modifying work activities where noise or vibration is found to cause unacceptable impact. • Implementation of additional mitigation measures in accordance with the CNVG as reasonable and feasible. | | |
| NV2 | Noise and vibration | <ul style="list-style-type: none"> • Carrying out works within standard daytime hours as follows: <ul style="list-style-type: none"> – 7:00 am to 6:00 pm Monday to Friday – 8:00 am to 1:00 pm Saturdays, no work on Sundays or public holidays. • Do not carry out operations during evening or night-time hours, unless required for safety reasons when the water is calmer during the night period. • Should operations be required outside standard hours, an Out of Hours procedure detailing works schedule, approval process, communications requirements and management measure will be prepared. • All reasonable and feasible efforts will be undertaken to ensure noise levels will not exceed the ICNG noise management levels by carrying out night-works with reduced numbers of plant for example. | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---|--|--------------------------------|------------------|
| NV3 | Noise and vibration | <ul style="list-style-type: none"> Notification of potentially affected receivers detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the work (where applicable) and contact telephone number. Notification will be a minimum of seven calendar days prior to the start of work. A contact telephone number and email address will be available for community feedback. | Transport for NSW / Contractor | Pre-construction |
| NV4 | Noise and vibration | Conduct short term background noise monitoring prior to construction to confirm the ambient noise levels presented in this report, which were carried out during COVID 19 and may not be representative of typical levels. | Contractor | Pre-construction |
| NV5 | Vibration impact to heritage structures | <ul style="list-style-type: none"> Determine safe working distances based on proposed plant and where possible, smallest plant able to carry out required work should be utilised to minimise potential impacts. Where works are proposed within the safe working distances, for the heritage structures, specialist advice will be sought from an appropriately qualified structural engineer who is familiar with heritage structures to assess if vibrations associated with the proposed works will potentially result in impacts to heritage structures. A vibration monitoring plan will be prepared as part of the CNVMP (where works are proposed within safe working distances) and implemented to confirm vibration levels prior to construction commencement. Where exceedances are recorded, works will be modified in consultation with the identified specialist to reduce vibration levels. | Contractor | Pre-construction |
| NV6 | Vibration impact to heritage structures | <p>Assessment and monitoring of vibration impacts to heritage items within the safe working distances will adhere to:</p> <ul style="list-style-type: none"> British Standard BS 7385: <i>Part 2: Evaluation and Measurement for Vibrations in Buildings –Part 2 Guide to Damage Levels from Ground-Borne Vibration</i> German Standard DIN 4150, <i>Part 3: Structural Vibration in Buildings: Effects on Structures.</i> | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---|--|----------------|---|
| NV7 | Vibration impact to heritage structures | Where heritage structures are located within the safe working distance, pre and post construction dilapidation surveys will be carried out. | Contractor | Pre-construction / Construction / Post-construction |
| NV8 | Vibration | Where structures are located within the safe work distance (non heritage structure), pre-construction sampling vibration monitoring will be carried out to ensure compliance with the required criteria. If exceedances are recorded, works will be modified accordingly to reduce vibration levels. | Contractor | Pre-construction / Construction |
| NV9 | Vibration impact to heritage structures | Where structures are located within the safe work distance (heritage structure), pre-construction sampling vibration monitoring will be carried out to ensure compliance with the required criteria. If exceedances are recorded, alternative construction methodology may be required, and/or restrictions applied on the type of plant that can be used. | Contractor | Pre-construction / Construction |

6.5 Landscape character and visual impact

This section describes the existing landscape character and visual amenity at the wharf and describes the potential impacts associated with the proposal. Appendix F contains a supporting technical paper prepared by Cardno (Cardno, 2022d).

6.5.1 Methodology

The Landscape Character and Visual Impact Assessment (LCVIA) was prepared based on Transport for NSW's *Environmental Impact Assessment Practice Note EIA-N04 - Guideline for landscape character and visual impact assessment* (TfNSW, 2020a).

The assessment intends to identify the overall impact of the proposed work on each of the landscape character zones (LCZ) through predicting the sensitivity of the LCZ to changes as a result of the proposed work followed by identifying the anticipated magnitude change that would result from implementation of the proposed work within each LCZ.

The assessment also provides a visual impact assessment to identify the visual changes and impacts on the site and its surroundings when viewed from key vantage points. The assessment combines the viewers' sensitivity to the proposed works/structures with the magnitude of the proposed works/structure within the existing views. Table 6-15 details the landscape character and visual impact grading matrix.

Table 6-15: Landscape character rating matrix

| Sensitivity | Magnitude | | | | |
|-------------|------------|---------------|---------------|--------------|------------|
| | | High | Moderate | Low | Negligible |
| | High | High | High-moderate | Moderate | Negligible |
| | Moderate | High-moderate | Moderate | Moderate-low | Negligible |
| | Low | Moderate | Moderate-low | Low | Negligible |
| | Negligible | Negligible | Negligible | Negligible | Negligible |

Source: TfNSW, 2020a

6.5.2 Existing environment

Darling Point Wharf is positioned at the edge of McKell Park, on the southern shore of Sydney Harbour. The wharf is accessed from the Darling Point Road cul-de-sac via pathways through the park.

Landscape and urban context

The existing Darling Point Wharf is connected to the foreshore incorporating a timber wharf with jetty and tidal steps, single-berthing and a small shelter.

The wharf entrance is located on the northern edge of McKell Park at the Darling Point foreshore comprising of a sandstone seawall. There are numerous pathways across the park leading to steps down to the wharf, and the park comprises of grassed landscaping with significant Sydney Harbour views, manicured gardens and several large mature trees.

Darling Point Reserve is adjacent to McKell Park and slopes downwards from Darling Point Road to the waterfront. The wharf is not visible from Darling Point Road due to vegetation and topography. There are two large trees (Hills Weeping Fig and Jacaranda) located in

the Darling Point Reserve, providing a prominent streetscape element. The reserve contains a set of stairs allowing access to the waterfront at the lower end of the reserve with seating benches that overlook Sydney Harbour.

Landscape character zones

In assessing the landscape character of Darling Point and how the proposed wharf upgrade would fit within the surrounding landscape, the study area was divided into three LCZ as described in Table 6-16 shown on Figure 6-6.

Table 6-16: Landscape character zones

| LCZ | Description |
|-----------------------------------|--|
| LCZ1 - Residential slopes / flats | <ul style="list-style-type: none"> This zone is characterised by a mix of two to three storey residential dwellings and four to 15 storey residential flat buildings. Architectural styles and buildings vary from large Federation dwellings, to tower form residential flats. The terrain generally slopes down from Darling Point Road to the harbour and Double Bay foreshore. Tree lined streets and mature vegetation is interspersed through the residential areas which form a significant part of the appearance of the zone, with residential flats exceeding through the canopy and achieving visibility of the harbour. |
| LCZ2 - Sydney Harbour | <ul style="list-style-type: none"> Sydney Harbour is a large body of water, which formed from a flooded river estuary. The landform around the harbour includes peninsulas with steep slopes rising to ridgelines. Natural sandstone outcrops and manmade sandstone walls can be seen lining parts of the Harbour foreshore. Much of the foreshore surrounding the harbour is vegetated recreational areas, and residential dwellings. Visually, parts of the harbour also include moored yachts flanking the foreshores and industrial waterside work areas. |
| LCZ3 - Foreshore parks / beaches | <ul style="list-style-type: none"> McKell Park is a public recreational space on the Darling Point peninsula, adjacent to the harbour. The area consists of grassed areas and manicured gardens containing mature vegetation. The park slopes down towards the harbour, steepened by the sandstone retaining walls near the edge of the water. Darling Point Reserve is an unmade road reserve adjacent to McKell Park and is an integral open space/parkland within this foreshore parkland precinct. The foreshore reserves provide relief from the denser built form. |

Adapted from Aurecon (2019a)

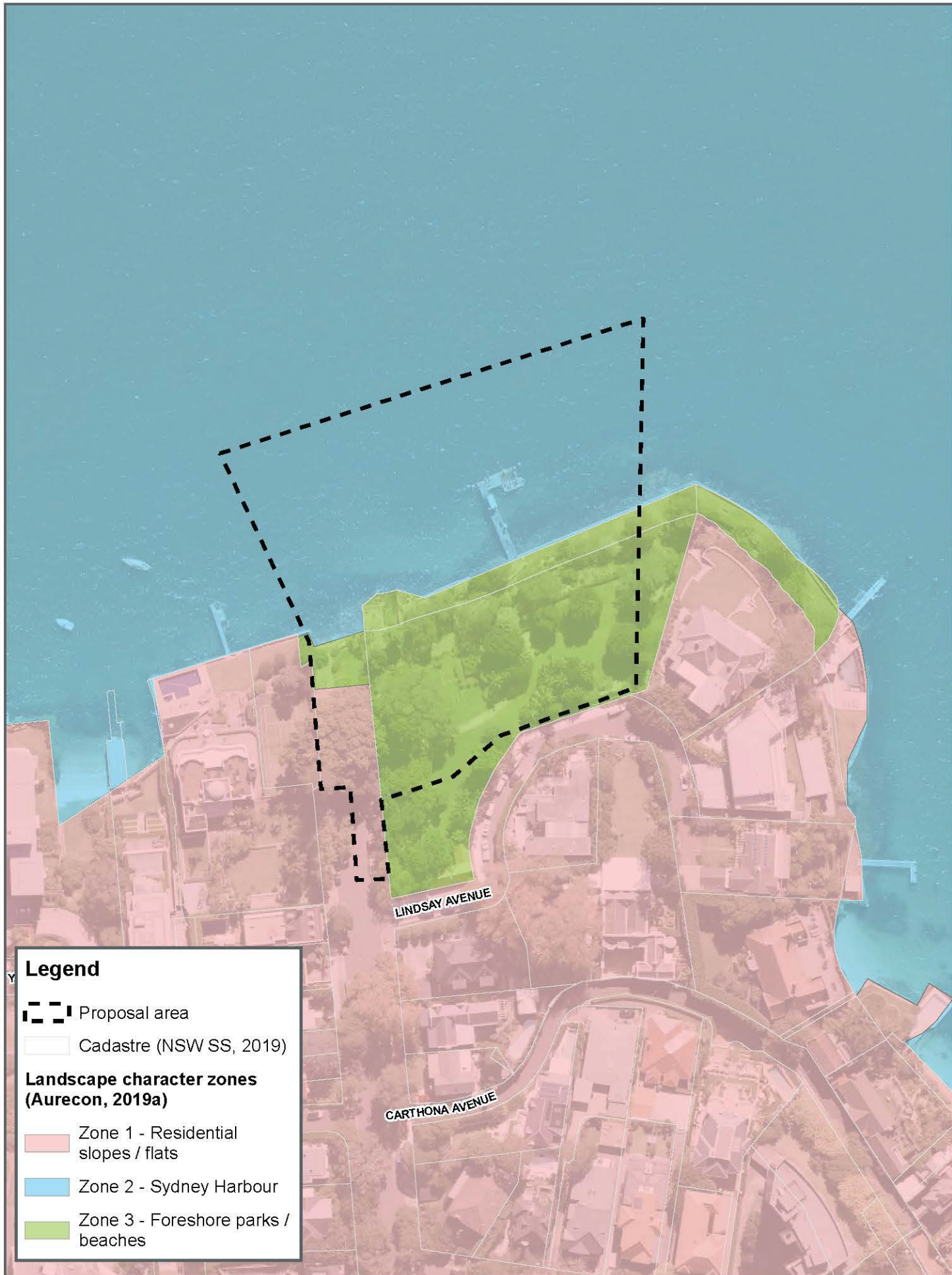


FIGURE 6-6
1:1,500 Scale at A4

0 10 20 30 40
m

Landscape character zones

DARLING POINT



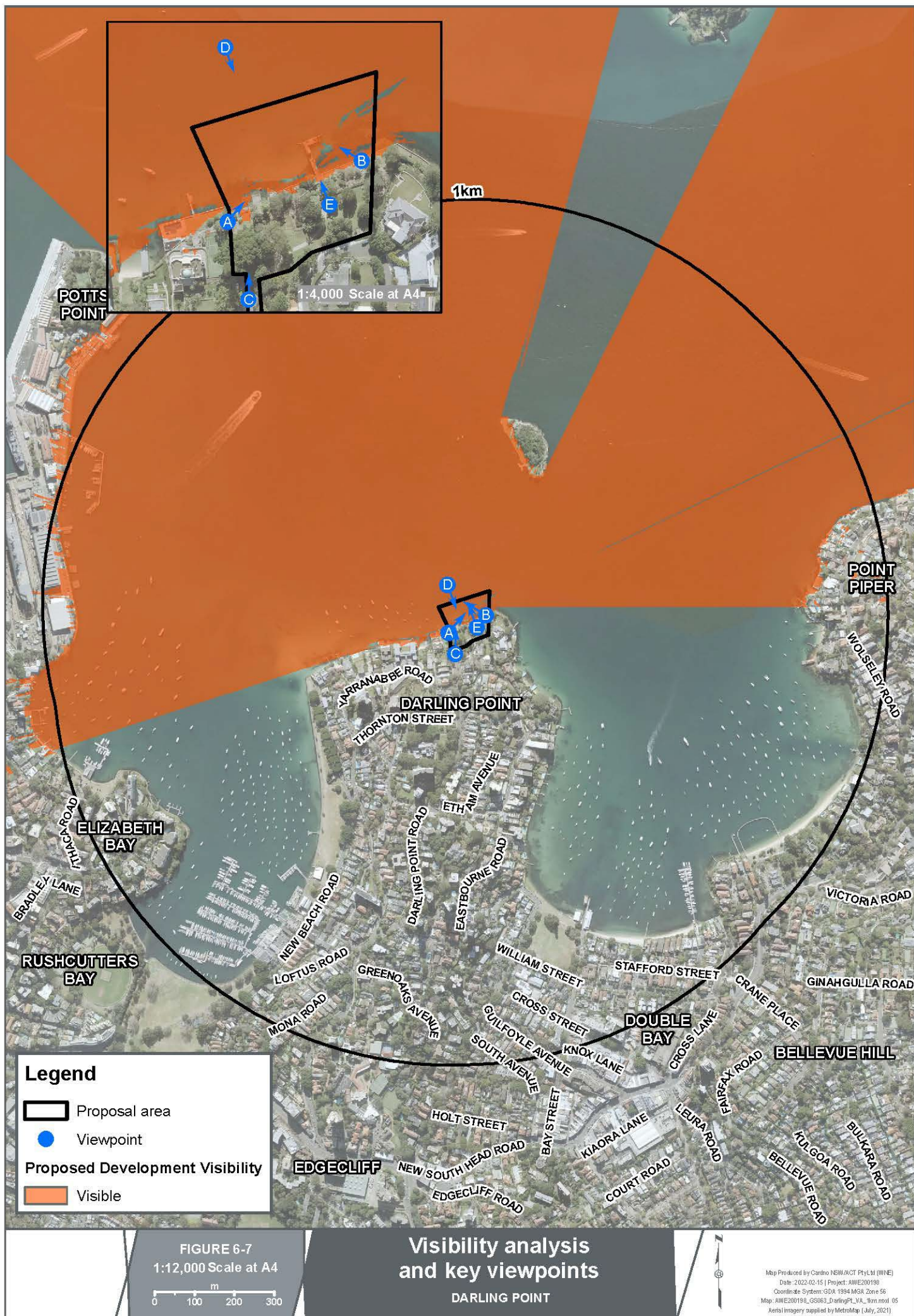
Map Produced by Carlinio NSW/ACT Pty Ltd (MINE)
Date: 2021-06-24 | Project: AWE200198
Coordinate System: GDA 1994 MSA Zone 56
Map: AWE200198_GS065_DarlingPL_LandscapeCZ.mxd 02
Aerial Imagery supplied by MetrolMap (April, 2021)

Viewpoints

The following distance zones have been established to assist in the assessment on key views within the vicinity of the proposal. The zones are categorised as follows:

- Foreground zone (FZ): 0 – 250 metres from the viewer
- Middle ground zone (MZ): 250 – 500 metres from the viewer
- Background zone (BZ): 500 metres or greater from the viewer.

Five viewpoints were selected in consultation with Transport for NSW to assess the visual impact of the proposal. The location of the viewpoints are shown on Figure 6-7 and described in the following sections.



Viewpoint A

Viewpoint A is described in Table 6-17 and shown on Figure 6-8.

Table 6-17: Viewpoint A description

| Viewpoint | Description | Distance zone |
|---|---|---------------|
| Viewpoint A – Darling Point Reserve looking east toward wharf | Viewpoint A is located at Darling Point Reserve looking east toward the wharf, with views extending towards Clark Island in the distance and including the locally heritage listed Remains of bath house and site of jetty (Woollahra LEP no. 113). This viewpoint captures the vegetation within McKell Park along the embankment. | FZ |



Source: Urbaine, 2022

Figure 6-8: Viewpoint A

Viewpoint B

Viewpoint B is described in Table 6-18 and shown on Figure 6-9.

Table 6-18: Viewpoint B description

| Viewpoint | Description | Distance zone |
|---|---|---------------|
| Viewpoint B – McKell Park looking west toward wharf | Viewpoint B is located in McKell Park further west along a less vegetated part of the embankment. The view includes Sydney Harbour, Sydney Harbour Bridge and Sydney CBD. | FZ |



Source: Urbaine, 2022

Figure 6-9: Viewpoint B

Viewpoint C

Viewpoint C is described in Table 6-19 and shown on Figure 6-10.

Table 6-19: Viewpoint C description

| Viewpoint | Description | Distance zone |
|--|---|---------------|
| Viewpoint C – Darling Point Road cul-de-sac looking north toward wharf | Viewpoint C is located at the end of the Darling Point Road cul-de-sac looking north towards Sydney Harbour, over Darling Point Reserve. The viewpoint is elevated slightly above the site due to the landform, and is adjacent to the gated entry point to McKell Park and a residence, both of which are locally listed heritage items. The mature, ornamental Hills Weeping Fig is listed in Woollahra Municipal Council's Register of Significant Trees (WMC, n.d). | FZ |



Source: Urbaine, 2021

Figure 6-10: Viewpoint C

Viewpoint D

Viewpoint D is described in Table 6-20 and shown on Figure 6-11.

Table 6-20: Viewpoint D description

| Viewpoint | Description | Distance zone |
|---|---|---------------|
| Viewpoint D – Sydney Harbour looking south toward wharf | Viewpoint D is located in the Harbour and looks back toward the wharf from the north. The viewpoint encompasses the elevated highly vegetated landscape of McKell Park and Darling Point Reserve. | MZ |



Source: Urbaine, 2022

Figure 6-11: Viewpoint D

Viewpoint E

Viewpoint E is described in Table 6-21 and shown on Figure 6-12.

Table 6-21: Viewpoint E description

| Viewpoint | Description | Distance zone |
|---|---|---------------|
| Viewpoint E – McKell Park looking north west toward wharf | Viewpoint E is located in McKell Park along the vegetated embankment of the park, which sits in an elevated position to the wharf. This viewpoint incorporates views of the north and north west shores of Sydney Harbour, including the Sydney Harbour Bridge. | FZ |



Source: Urbaine, 2021

Figure 6-12: Viewpoint E

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6.5.3 Potential impacts

Construction

Landscape character and visual impacts are expected due to the following construction components:

- Presence of equipment, barges and piling equipment around the wharf
- Removal of the existing wharf infrastructure
- Removal of mown lawn and groundcover in landscaped gardens in Darling Point Reserve
- Established temporary compound site and/or barge to include site sheds, amenities shed and storage containers for tools and materials
- Excavation during construction of lift, footpaths, optional parking spaces.

Work would have an impact to the values of the three LCZs including:

- Change in the composition and setting of the wharf by its removal
- Temporary introduction of construction equipment into the landscape, affecting overall amenity and setting.

This impact would be limited to the construction period.

Operation

Landscape character

Table 6-22 summarises the impact on the LCZs identified in section 6.5.2.

Table 6-22: Landscape character assessment summary

| Zone | Sensitivity | Magnitude | Description of impact |
|-----------------------------------|---|---|--|
| LCZ1 - Residential slopes / flats | High <ul style="list-style-type: none">• The residential slopes have a strong association with the significant Sydney Harbour, Double Bay and Rushcutters Bay.• The proposed upgrades are located in close proximity to, and within, the Darling Point Reserve and along the foreshore of McKell Park, and would be visible within part of this immediate residential zone only. | Low <ul style="list-style-type: none">• The new wharf would have some impact to the character of the area from the very few residential dwellings closest to Darling Point Reserve nearest the shoreline, due to additional built elements required for accessibility, principally the prominent lift structure. Other dwellings on the residential slopes within close proximity to the site and further away would have a negligible to low view of the proposal. | Moderate <ul style="list-style-type: none">• The topography from the residential slopes nearest the shoreline to the wharf location, with the mature vegetation in the suburban area would assist in physically separating the proposal from the residential slopes. |
| LCZ2 - Sydney Harbour | High <ul style="list-style-type: none">• The wharf boasts significant views of Sydney Harbour foreshore areas consisting of iconic | Moderate <ul style="list-style-type: none">• The new wharf would impact the Harbour area as the wharf structures would comprise an increased | High-Moderate <ul style="list-style-type: none">• The new wharf would impact the character of Sydney Harbour due to additional elements required for accessibility |

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| Zone | Sensitivity | Magnitude | Description of impact |
|----------------------------------|--|--|---|
| | landmarks, vegetated reserves and exclusive residencies. | footprint and bulk than the existing aging jetty and would comprise more modern/contemporary materials. | <p>and passenger amenity such as increased footprint and size of the structures (i.e. covered waiting area and covered gangway), in addition to new materials.</p> <ul style="list-style-type: none"> Sydney Harbour is one of the more scenic harbours in the world, and in proximity to the existing wharf contains minimal marine structures and a vegetated foreshore associated with McKell Park. The new wharf facilities provide an additional excellent viewpoint of the Harbour Bridge and CBD backdrop. |
| LCZ3 - Foreshore parks / beaches | <p>High</p> <ul style="list-style-type: none"> The foreshore reserves have a strong association with Sydney Harbour, Double Bay and Rushcutters Bay. McKell Park is a popular recreational reserve and is often used for wedding ceremonies and special events. This is typically limited to the higher levels of the park that would have lower impacts from the proposal. The lower levels of the park (harbourfront) would have higher sensitivity to the new wharf elements. Darling Point Reserve is an informal and small adjacent 'pocket park' (limited to a bench seat and pathway). The site contains a significant tree and enjoys excellent Harbour views. The new lift structure and | <p>High</p> <ul style="list-style-type: none"> The new wharf would impact the character of the area from the foreshore of McKell Park due to additional elements required for accessibility such as the covered waiting area and gangway . However these structures have very limited visibility from the upper levels of McKell Park. The introduction of the new lift structure and associated accessible pathway network as viewed from the McKell Park would contrast from the existing situation. | <p>High</p> <ul style="list-style-type: none"> The new wharf would impact the character of Sydney Harbour due to additional elements required for accessibility such as increased size of the structure and new materials, primarily the vertical views of the lift. The new wharf would impact the character of Sydney Harbour due to additional elements required for accessibility, such as the lift and pathway. Most views of these elements from the higher points of McKell Park are minimal, however these elements are more prominent from the foreshore of McKell Park looking towards Sydney Harbour. Sydney Harbour is one of the more scenic harbours in the world, and in proximity to the existing wharf contains minimal marine structures and a vegetated foreshore |

| Zone | Sensitivity | Magnitude | Description of impact |
|------|--|-----------|------------------------------|
| | associated stairs and accessible pathway network would alter the existing character and setting of this space. | | associated with McKell Park. |

The surrounding LCZs include foreshore and suburban areas containing a dominant tree canopy from a vegetated McKell Park and Darling Point Reserve, which is a prominent landscape element of the area. Darling Point and McKell Park also have a strong association with Sydney Harbour which is prominent within the landscape.

The magnitude of the proposed design is considered highest from Sydney Harbour and the foreshore parks as a result of the topography of the area, with vegetation sheltering the majority of views from higher points in McKell Park and remaining residential areas. The lift, covered waiting area and gangway would introduce larger and visually substantial built elements to the vegetated foreshore setting in views from Sydney Harbour, the McKell Park foreshore and Darling Point Reserve locations.

It is considered that the overall landscape character impact of the proposed Darling Point Wharf is high to moderate.

Viewpoints

Visual impact from each key viewpoint is established through an assessment of the sensitivity of the view combined with the magnitude of the proposal within that viewpoint. Table 6-23 summarises the visual impact assessment.

Table 6-23: Visual impact assessment summary

| Visible element | Sensitivity | Magnitude | Description of impact |
|--|-------------|-----------|--|
| Viewpoint A (Figure 6-8) | | | |
| Lift structure and stairs. Suspended bridge structure and foreshore pathway including balustrade and lighting. Covered waiting area and gangway of wharf structure beyond. | High | Moderate | <p>High to moderate</p> <p>Viewpoint A is representative of a close perspective of McKell Park and the Harbour towards the proposal site.</p> <p>The sensitivity of Viewpoint A is high for the following reasons:</p> <ul style="list-style-type: none"> • The central location of the wharf complex in the view • Close proximity to the wharf • Medium views of McKell Park vegetation • McKell Park and the remains of the bath house and former jetty are locally listed heritage items • Viewers would be expected to be highly sensitive to changes to these views due to the lift structure, adjacent stairs, balustrade of the proposed suspended bridge and pathway, and covered wharf structures in front of Sydney Harbour waters. • The more modern proposed waterside structures are larger in terms of scale and footprint and visibility at this viewpoint. However, the new structures would replace the existing wharf (to be removed), reducing this impact to low-moderate. The magnitude of impact of the new suspended bridge and footpath (ie. visible balustrade) while a new element, is considered |

| Visible element | Sensitivity | Magnitude | Description of impact |
|--|-------------|-----------|--|
| | | | moderate as it would not totally alter the landscape character or result in loss of character. The most prominent element is the new form to the Darling Point Reserve (principally lift structure) which is highly sensitive to change. Overall, the magnitude of the proposed wharf facilities is considered to have a moderate rating. |
| Viewpoint B (Figure 6-9) | | | |
| Waiting area, pontoon and gangway. Balustrade and lighting to foreshore footpath and suspended bridge beyond. | High | High | <p>High</p> <p>Viewpoint B is representative of close perspective views from McKell Park of the new infrastructure associated with the proposal.</p> <p>The sensitivity of Viewpoint B is high for the following reasons:</p> <ul style="list-style-type: none"> • The central location of the wharf complex in the view • High sensitivity quality distant views of Sydney Harbour, Sydney Harbour Bridge and Sydney CBD • Close proximity to the wharf • The quality of the view is moderated by the presence of built form of variable visual quality (including the existing wharf). <p>The magnitude of impact on the view of the new wharf complex is considered high as the proposal would introduce new form to the existing view in front of Sydney Harbour, Sydney Harbour Bridge and Sydney CBD which are highly sensitive to change. This is somewhat moderated as it would replace the existing wharf structures which are also highly visible in this location.</p> <p>The proposed foreshore footpath and suspended bridge (and associated balustrade) beyond the over-water structures would be visible but are of relatively low magnitude and sensitivity from this viewpoint.</p> |
| Viewpoint C (Figure 6-10) | | | |
| Pathway and lift. | Moderate | Moderate | <p>Moderate</p> <p>Viewpoint C is representative of close perspective views from Darling Point Road cul-de-sac of the new infrastructure associated with the proposal.</p> <p>The sensitivity of Viewpoint C is moderate for the following reasons:</p> <ul style="list-style-type: none"> • The elevated location of the wharf infrastructure (primarily the lift) in the view. While the lift is located close to the eastern side of the reserve, it adds a new built structure • The quality of the view is moderated by the presence of built form which currently provides a view through to the Harbour. <p>The magnitude of impact on the view is considered moderate as the proposal would introduce new form to the existing view in front of Sydney Harbour through the tree canopies of the lift, which is highly sensitive to change.</p> |

| Visible element | Sensitivity | Magnitude | Description of impact |
|--|-------------|-----------|--|
| | | | <p>The impact of this however is moderated by the relatively minor proportion of the structure within the overall broader landscape.</p> <p>A kiss and ride drop off zone located at the entrance to Darling Point Reserve at the end of Darling Point Road cul-de-sac is proposed, however there are no visible elements relevant to this assessment.</p> |
| Viewpoint D (Figure 6-11) | | | |
| <p>Covered waiting area, gangway and hydraulic platform.</p> <p>Balustrade to foreshore pathway and suspended bridge structure.</p> <p>Lift and adjacent stairs.</p> | High | Moderate | <p>High-moderate</p> <p>Viewpoint D is representative of moderately close views from Sydney Harbour adjacent to the wharf of the new infrastructure associated with the proposal.</p> <p>The sensitivity of Viewpoint D is high for the following reasons:</p> <ul style="list-style-type: none"> The well vegetated foreshore from McKell Park and Darling Point Reserve The quality of the view is moderated by the presence of built form of variable visual quality (including the existing wharf). <p>The more modern proposed waterside structures are larger in terms of scale and footprint and visibility at this viewpoint. However, the new structures would replace the existing wharf (to be removed), reducing this impact to low-moderate.</p> <p>The overall magnitude of impact on the view is considered moderate as the proposal would introduce new form to the existing view from Sydney Harbour of the foreshore of McKell Park of the on-water covered gangway and waiting area, and landside suspended bridge structure and associated balustrade, and in particular a new lift and adjacent stair structure at the Darling Point Reserve (having a higher visual impact).</p> <p>The impact of the all structures is moderated by the distance of the viewpoint and the structures appearing as relatively minor components of the landscape.</p> |
| Viewpoint E (Figure 6-12) | | | |
| <p>Covered waiting area and hydraulic platform of wharf</p> | Moderate | Moderate | <p>Moderate</p> <p>Viewpoint E is representative of close higher perspective views from the embankment of McKell Park of the new infrastructure associated with the proposal.</p> <p>The sensitivity of Viewpoint E is moderate for the following reasons:</p> <ul style="list-style-type: none"> The central location of the wharf infrastructure (primarily the waiting area) in the view. This sensitivity is minimised by the structure being located closer to the sea wall/land edge than the current covered wharf structure. Hence, the viewpoint is likely to be 'up and over' the structure to the spectacular distant views |

| Visible element | Sensitivity | Magnitude | Description of impact |
|-----------------|-------------|-----------|--|
| | | | <ul style="list-style-type: none"> High visual quality distant views of Sydney Harbour, Sydney Harbour Bridge and Sydney Harbour north shore. <p>The magnitude of impact on the view of the new wharf is considered moderate as the proposal would introduce new form to the existing view of Sydney from a higher point of McKell Park, which would be moderated by the tree canopy.</p> <p>The built form of the waiting area and hydraulic platform would also introduce new structures to Sydney Harbour views, offset by an improved quality of built form and finishes.</p> |

The overall visual impact of the proposed concept design for Darling Point Wharf, is considered high to moderate following the assessment of the viewpoints. The visual impacts generated by the proposal would be variable depending on the location of the viewer and distance from the wharf site as summarised as follows:

- McKell Park: From the upper levels of McKell Park, the visual impact is low as the proposed Darling Point Wharf infrastructure has limited visibility due to the waiting area structure located close to the shore, in addition to the gangway and platform being at a lower level and partly screened by vegetation. The wharf platform and gangway would have a similar (or lesser) visibility than the current wharf structure (to be demolished). The proposed infrastructure is only visible at the edge of the McKell Park and the viewer's eye is drawn up and over these structures to the high quality distant views of the Sydney Harbour and Bridge beyond
- McKell Park: From the lower levels of McKell Park (foreshore/current wharf access point), the visual impact is high to moderate as the covered waiting area and gangway structures are immediately adjacent to the foreshore seawall which are relatively substantial elements compared to the existing wharf facility. In addition, the landside pathway and suspended bridge structure to the west of the wharf (linking the lift) are located on a sensitive area as McKell Park and locally listed heritage items and moderately utilised by the public. The design of the wharf and pathway has been conscious of minimising impacts to heritage items as much as possible, including incorporating the accessway into the current path utilised by the public to access the wharf or harbourside
- Darling Point Road and Darling Point Reserve and adjacent harbourside: The proposed elements (predominantly lift and stair structure) and suspended bridge/pathway are distinct new elements in the landscape that would have high to moderate impact to views from these locations. Darling Point Reserve is a low-key harbourside pocket park that would be transformed by the proposed upgraded wharf facilities, both through additional structures and increased foot traffic (as primary access to the wharf would be via this route rather than through McKell Park). From Darling Point Road and the southern edge of the Reserve, a clear view corridor to the Harbour is currently available between McKell Park vegetation to the east and a large fig tree. This would be obscured by the proposed lift structure
- Private views: Impacts to private properties/residences views are considered to be low as the proposed wharf structures are at a lower level than McKell Park. The proposed lift structure may impede existing view corridors from dwellings on Darling Point Road, but these would be minimal in the context of the broader available views from these residences

- Views from Harbour: The more modern proposed waterside structures are larger in terms of scale and footprint and visibility at this viewpoint, and new landside structures are proposed. However, the new structures would replace the existing wharf (to be removed), moderating the magnitude of this impact, as does the distance of this viewpoint. The proposed waterside wharf structures would provide visual consistency, having the same maritime look and feel as the other commuter wharves around the harbour.

The majority of views of the proposed wharf from land include high visual quality distant views of Sydney Harbour, Sydney Harbour Bridge and Sydney Harbour north shore. The impact of the proposed wharf structures vary depending on the degree of moderation by tree canopies or topography. The accessible lift and adjacent stairs, suspended bridge/pathway (and balustrade), covered waiting area and gangway in particular would increase the overall size of the wharf infrastructure for most of these land-based views and as such, there is considered to be an overall high to moderate impact to these sensitive views in addition to closer/foreground views from the Harbour and foreground. The new wharf facilities would provide an additional excellent viewpoint of the Sydney Harbour Bridge and CBD backdrop.

6.5.4 Safeguards and management measures

Table 6-24 lists the landscape character and visual amenity safeguards and management measures that would be implemented to account for the impacts identified in section 6.5.3.

Table 6-24: Landscape character and visual amenity safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------------|--|-------------------|-------------------|
| LV1 | Landscape and visual | <p>Urban design principles will be integrated throughout the detailed design and construction of the proposal and include:</p> <ul style="list-style-type: none"> • Consideration of tinted and less reflective glazing for the lift structure rather than light and highly reflective clear panels • Judicious use of materials and finishes to minimise reflectivity and maximise transparency of the new structures. Consideration of contemporary design practices and lightweight materials and muted finishes • Consideration of colours that blend in to the landscape (as viewed from the Harbour) and that complement the materiality and heritage listing of McKell Park elements (e.g. sandstone). In particular the balustrade to the suspended bridge structure and foreshore pathway, and lighting poles. Darker colours would blend into the landscape more than white, light colours and/or or silver/metal materials • Incorporate landscaping elements, such as green walls and suitable shrubs which can also ameliorate impacts of these structures. | Transport for NSW | Detailed design |
| LV2 | Landscape and visual | Hoarding will be erected around the construction compound where possible, to reduce visibility. | Contractor | Construction |
| LV3 | Landscape and visual | Where out of hours work is required, lighting will be directionally controlled to limit potential impacts of light spill on surrounding receivers, including residential properties. | Contractor | Construction |
| LV4 | Landscape and visual | All impacted areas and ground surfaces will be reinstated as near as possible to their original state following the completion of work. | Contractor | Post-construction |

6.6 Non-Aboriginal heritage

This section describes the existing non-Aboriginal heritage at the wharf, including maritime heritage, and describes the potential impacts associated with the proposal. Appendix G contains a supporting technical paper prepared by Artefact (Artefact, 2022). Appendix H contains a supporting technical paper and supplementary advice regarding maritime archaeology prepared by Cosmos Archaeology (Cosmos, 2021 and 2022).

6.6.1 Methodology

Non-maritime heritage

A SoHI was prepared in accordance with the guidelines outlined by the Heritage Office, now Heritage NSW, DPC), and Department of Urban Affairs and Planning (DUAP) in the document *Statements of Heritage Impact* as part of the *NSW Heritage Manual* (Heritage Office and DUAP, 2002). The SoHI was prepared in accordance with the principles contained in the most recent edition of *The Burra Charter: The Australian ICOMOS Charter for Places of Cultural Significance*.

Heritage listed items within and in the vicinity of the proposal area were identified through a search of the relevant state and federal statutory and non-statutory heritage registers, including:

- World Heritage List (WHL)
- Commonwealth Heritage List (CHL)
- National Heritage List (NHL)
- Australasian Underwater Cultural Heritage Database (AUCHD)
- State Heritage Register (SHR)
- Section 170 Heritage and Conservation Registers
- Shipwreck Register
- Woollahra LEP
- *Sydney Local Environmental Plan 2012* (Sydney LEP)
- Sydney Harbour SREP
- NSW State Heritage Inventory (SHI) Database
- Register of the National Estate (RNE)
- Register of the National Trust of Australia (NSW) (RNTA).

A site inspection was conducted on 3 February 2021. The aim of the site inspection was to inspect the area of proposed impacts to inform a preliminary assessment of archaeological potential and to identify heritage items in the vicinity of the proposal area that may be affected by the proposal. The inspection was undertaken on foot and a photographic record was made.

Assessment of heritage impact

In the SoHI, impacts on heritage are identified as either:

- Direct impacts, resulting in the demolition or alteration of fabric of heritage significance
- Potential direct impact, resulting in impacts from vibration and demolition of adjoining structures

- Indirect impacts, resulting in changes to the setting or curtilage of heritage items or places, historic streetscapes or views.

Specific terminology and corresponding definitions (refer Table 6-25) are used in this assessment to consistently identify the magnitude of the proposal's direct, indirect or potentially direct impacts on heritage items or archaeological remains.

Table 6-25: Terminology for assessing the magnitude of heritage impact

| Magnitude | Definition |
|------------|---|
| Major | Actions that would have a long-term and substantial impact on the significance of a heritage item. Actions that would remove key historic building elements, key historic landscape features, or significant archaeological materials, thereby resulting in a change of historic character, or altering of a historical resource. These actions cannot be fully mitigated. |
| Moderate | This would include actions involving the modification of a heritage item, including altering the setting of a heritage item or landscape, partially removing archaeological resources, or the alteration of significant elements of fabric from historic structures. The impacts arising from such actions may be able to be partially mitigated. |
| Minor | Actions that would results in the slight alteration of heritage buildings, archaeological resources, or the setting of an historical item. The impacts arising from such actions can usually be mitigated. |
| Negligible | Actions that would results in very minor changes to heritage items. |
| Neutral | Actions that would have no heritage impact. |

Methodology for the assessment of visual impacts, vibration impacts and archaeological potential are provided in Appendix G.

Maritime heritage

A MASoHI was prepared following recommendation in the SoHI that a maritime survey be undertaken to determine the extent and condition of archaeological remains in the proposal footprint.

The MASoHI has been prepared in accordance with Transport for NSW's *Maritime Heritage Procedure Assessment* (RPS, 2020) and includes:

- Supplementary archival and historic research, to identify known and potential maritime archaeological resources within the proposal area that have not already been identified in the SoHI report
- A maritime archaeological dive inspection and survey undertaken on 12 July 2021, comprising transects and searches within the proposal footprint
- Assessment of the potential for maritime and underwater cultural heritage, assessment of significance in accordance with guidelines outlined by the Heritage Office, now Heritage NSW, DPC, assessment of potential impacts and identification of recommendations.

6.6.2 Existing environment

Darling Point Wharf historical background

Historical mapping from the 1830s shows Darling Point as a rocky and indented shoreline. A small Gothic cottage is known to have been built within the proposal area around 1841 by Charles and Mary Bones (*Brackensberg* or *Blackenburg*). Arthur Dight purchased the property in 1858 and enlarged the cottage, which would become known as *Lansdowne*. Dight constructed a seawall and terrace, bathing house, sea balcony, water storage tank, iron palisade and sandstone wall and gates at the *Lansdowne* property.

An 1856, historical mapping shows the location of *Lansdowne*, at this point known as *Blackenburg*, also indicating the location of the earliest wharf at the site. The wharf, located at the end of Darling Point Road, is likely to have been constructed during the 1840s. Substantial intact remains of the early wharf are unlikely to remain at the site, however degraded elements of the wharf may be incorporated into the visible remains directly west of the former boathouse. This location served as the base for the long public jetty which served a steamer ferry from about the 1880s to the 1960s, with aerial imagery indicating that this wharf had been demolished by 1965.

The *Lansdowne* Bathing House is thought to have been constructed by the 1880s. Remains of the bath house and wharf/s exist at the site today and are locally listed on the Woollahra LEP as Remains of Bath House and site of jetty (LEP no. 113).

By the beginning of the twentieth century, a boathouse had been constructed between the public wharf and bath house, using a rubble reclamation fill foundation, with the sandstone foundations visible at the site today. Following the 1904 demolition of *Lansdowne* and the construction of *Canonbury*, the bathing pool and dressing room are thought to have been upgraded, with its entry formalised. In addition, a seawall with reclamation infill was completed along the remaining waterfrontage.

The proposal area was largely associated with the *Canonbury* property throughout the majority of the twentieth century (1904 to 1980s). The property comprised the 1904 residence, bathhouse, boathouse, 1905 caretaker's cottage (extant) and seawall. In 1919 the *Canonbury* was sold to the Australian Jockey Club (AJC) who altered the mansion and opened it in 1920 as a home to returned World War I sailors and soldiers suffering disabilities. The mid-twentieth century saw the residence utilised as a hospital.

Canonbury was approved for demolition by the 1980s, with McKell Park (existing) opened in 1985. Aerial imagery indicates that the existing Darling Point Wharf was also constructed during this time, further to the east of the 1880s jetty. The archaeological remains of the *Canonbury* residence and a number of associated features exist within the proposal area today, listed on the Woollahra LEP as Fence, gates and foundation remains of former house *Canonbury*, located within McKell Park (LEP no. 112 and A1).

Listed heritage items

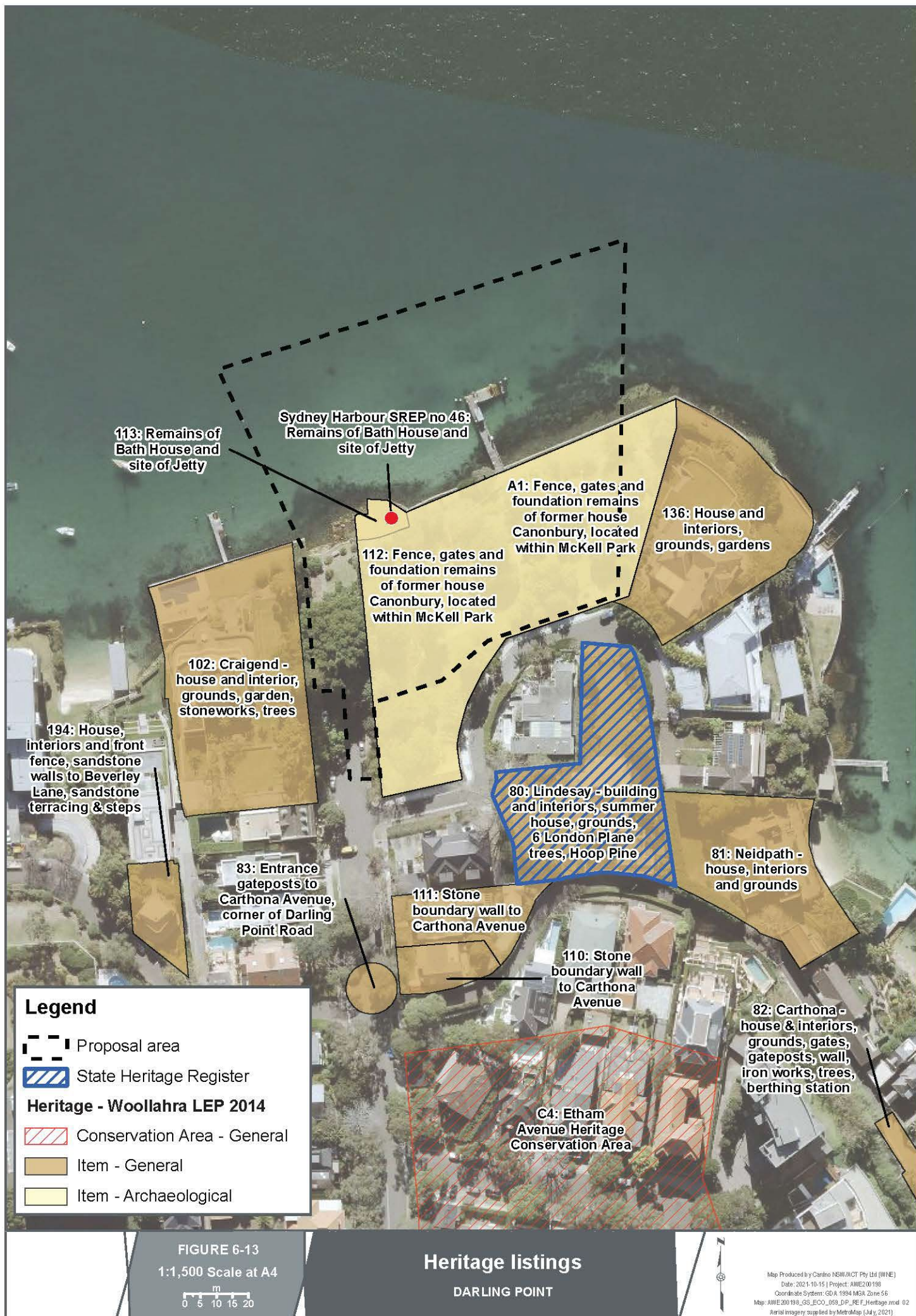
The heritage items located within or next to the proposal area are listed in Table 6-26 and shown on Figure 6-13. The heritage items within the one kilometre visual buffer zone are also included in Table 6-26. The extent of the one kilometre visual buffer zone is based on the visibility analysis shown on Figure 6-7.

There are no items within or in the immediate vicinity of the proposal area or within the visual buffer zone listed on the WHL, NHL, CHL, AUCHD, Shipwreck Register or the Section 170 Heritage and Conservation Registers.

Table 6-26: List of heritage items in the vicinity of the proposal

| Item | Address | Significance | Listing | Distance and direction from proposal area |
|--|---------------------------------------|--------------|---|---|
| Fence, gates and foundation remains of former house <i>Canonbury</i> , located within McKell Park | 159 Darling Point Road, Darling Point | Local | Woollahra LEP no. 112 and A1 | Within |
| Remains of Bath House and site of jetty | 159 Darling Point Road, Darling Point | Local | Woollahra LEP no. 113 Sydney Harbour SREP no. 46 | Within |
| House and interiors, grounds, gardens | 5 Lindsay Avenue, Darling Point | Local | Woollahra LEP no. 136 | Adjacent |
| <i>Craigend</i> - house and interiors, grounds, gardens, stoneworks, Norfolk Island Pine, Pak-Lan, 10 Queen Palms, 11 Kentia Palms, Curly Palm | 86 Darling Point Road, Darling Point | Local | Woollahra LEP no. 102 | Adjacent |
| <i>Lindesay</i> — building and interiors, summer house, grounds, 6 London Plane trees, Hoop Pine | 1A Carthona Avenue, Darling Point | State | SHR 00686 Woollahra LEP no. 80 RNTA no. restricted RNE Place ID 2488 | 10m south |
| House, interiors and front fence, sandstone walls to Beverley Lane, sandstone terracing and steps | 99 Yarranabbe Road, Darling Point | Local | Woollahra LEP no. 194 | 60m south west |
| <i>Neidpath</i> — house, interiors and grounds | 2 Carthona Avenue, Darling Point | Local | Woollahra LEP no. 81 | 65m south |
| Stone boundary wall to Carthona Avenue | 155 Darling Point Road, Darling Point | Local | Woollahra LEP no. 111 | 35m south |
| Entrance gateposts to Carthona Avenue, corner of | Carthona Avenue, Darling Point | Local | Woollahra LEP no. 83 | 55m south |

| Item | Address | Significance | Listing | Distance and direction from proposal area |
|---|---------------------------------------|--------------|---|---|
| Darling Point Road | | | | |
| Stone boundary wall to Carthona Avenue | 153 Darling Point Road, Darling Point | Local | Woollahra LEP no. 110 | 55m south |
| Etham Avenue Heritage Conservation Area | Darling Point | Local | Woollahra LEP no. C4 | 90m south |
| Elizabeth and Rushcutters Bays Conservation Area | Elizabeth and Rushcutters Bays | Local | Sydney LEP no. C20 | Visual buffer zone (900m south west) |
| Sydney Harbour Naval Precinct | Cowper Wharf Roadway, Garden Island | State | SHR 01705 | Visual buffer zone (900m west) |
| Edgerley / House <i>Ramona</i> including interior and grounds | 18-18a Billyard Avenue, Elizabeth Bay | State | SHR 00671 Sydney LEP no. I572 RNTA no. 7377 | Visual buffer zone (1000m south west) |



Archaeology

Overall, the preliminary archaeological assessment has identified that the proposal area has potential to contain archaeological remains of local significance associated with the development of the *Brackenbury*, *Lansdowne* and *Canonbury* residences. These archaeological remains may include archaeological 'relics'. However, with the exception of the proposed pathway to the wharf, the area associated with these potential archaeological remains is located outside of the proposal footprint.

Archaeological remains that may extend into the proposal footprint itself include locally significant evidence of the former bathhouse, boathouse, and wharf infrastructure. This includes existing archaeological remains of the former structures that were identified during the site inspection, as well as additional potential maritime archaeological remains such as evidence of former wharfage infrastructure or discard from maritime vessels.

A summary of the findings of archaeological potential and significance is provided in Table 6-27. Areas of archaeological potential are shown on Figure 6-14.

Table 6-27: Summary of archaeological potential and significance

| Phase | Potential remains | Potential | Significance |
|------------------------|--|--------------|-------------------------------------|
| Phase 1 (1788-c1840s) | Evidence of informal land use, land clearance | Nil-low | Local |
| Phase 2 (c1840s-1904) | Evidence of former <i>Blackenburg</i> and <i>Lansdowne</i> residences including footings, cesspits, yard surfaces, refuse deposits, drains | Low-moderate | Local (with potential for 'relics') |
| | Evidence of bathhouse and associated dressing room, boathouse, wharves and discard from vessels | High | Local (with potential for 'relics') |
| | Evidence of early Darling Point Road surface | Low | Local ('works') |
| Phase 3 (1904-1983) | Evidence of former <i>Canonbury</i> residence including footings, cesspits, yard surfaces, refuse deposits, drains | High | Local (with potential for 'relics') |
| | Evidence of bathhouse and associated dressing room, boathouse, wharves, and discard from vessels | High | Local (with potential for 'relics') |
| Phase 4 (1983-present) | Nil | Nil | N/a |



Legend

Proposal footprint

Proposal area

Seawall

Sandstone steps and bastion

Darling Point Road boundary wall

Woollahra LEP 2014

Low archaeological potential for locally significant remains associated with Phase 2

High archaeological potential for locally significance remains associated with Phases 2 and 3

Canonbury residence remains

Blackenburg/Lansdowne residence remains

Bath house remains and stairs

Boathouse and reclamation remains

Former wharf remains

FIGURE 6-14
1:1,000 Scale at A4

0 4 8 12 16
m

Areas of archaeological potential

DARLING POINT



Map Produced by Cardno NSW/ACT Pty Ltd (WNE)
Date: 2022-03-18 | Project: AWE200198
Coordinate System: GDA 1994 MGA Zone 56
Map: AWE200198_GS_ECO_060_DP_ArchHeritage.mxd 04
Aerial imagery supplied by MetroMap (July, 2021)

Maritime archaeology

The known maritime archaeological sites within the vicinity of the proposal area are associated with the remains of the Remains of Bath House and site of jetty (Woollahra LEP no. 113).

There has been a jetty at the north end of Darling Point Road since at least 1856, possibly as early as the 1840s. The former jetty was demolished in the 1960s and it is likely that the piles were pulled out, and those that were not were either cut or snapped off at the seabed. It is likely this jetty was timber piles with a timber decking and would have been repaired and replaced over the course of its lifespan which indicates that there is potential sub-seabed presence of earlier piles and superstructure. As a result, there is a moderate potential for maritime archaeological remains associated with the wharf and use of the wharf to be within the proposal area (refer Figure 6-15).

The bath house was first outlined on a map in 1887 associated with the *Lansdowne* residence. A boat house was added and both structures refined during the building of the mansion *Canonbury* and the AJC running the house as a convalescence hospital for returned servicemen. The boat house appears to have been built on a sandstone rock base and infilled. The infill appears to have washed away leaving the foundation base remaining. There is a high maritime archaeological potential associated with the bath house and boat house with regards to the structures and activities that took place within and around these structures (refer Figure 6-15).

During the dive survey no artefacts other than rocky rubble and modern material, including old service pipes, construction debris, brick rubble and a range of glass bottles were identified. The swim survey conducted under the existing ferry located some wharf infrastructure including loose timbers piles and cut off piles next to existing ones.

Based on the cultural activities that have occurred to the west of the current ferry wharf including movements of people through Sydney Harbour, development of the foreshore and recreational and commercial boating activities, there are a number of potential maritime heritage remains that may be present. These potential remains are outlined in Table 6-28 and shown on Figure 6-15.

Table 6-28: Summary of maritime archaeological potential and significance

| Activity | Remains | Potential | Significance |
|--|---|---|--------------|
| Maritime infrastructure (19th century onwards) | Remains of undocumented sea walls, jetties, mooring devices, beacons and slipways. | There is low potential for maritime archaeological deposits associated with undocumented structures. | Local |
| Discard from maritime infrastructure | Accidental and/or deliberate discard of items such as personal objects, food and drink containers, fishing equipment as well as damaged and removed material from the infrastructure. | There is low potential for maritime archaeological deposits associated with discard from maritime infrastructure. | |
| Undocumented shipwrecks | Small undocumented recreational vessels. | There is low archaeological potential for undocumented wrecks or wreckage. | Local |

| Activity | Remains | Potential | Significance |
|----------------------|--|---|--------------|
| Discard from vessels | Accidental and/or deliberate discard of items such as personal objects, food and drink containers, ship fittings and equipment as well as fishing and boating equipment. | There is low archaeological potential for artefacts associated with discard from vessels. | Local |

There is potential for the presence of remains from the construction, maintenance and use of the wharf from its construction in the 1840s to its demolition in the 1960s. In addition, there is potential for remains from the construction, maintenance and use of the boat house and bath house from the boat house's construction in the 1880s until the structures' demolition by the 1940s. Remains may include old structural material from the construction or maintenance of the wharf or personal items from those who worked and used the wharf such as tools, food, drink and fishing gear.

Based on the above points, there is reason to believe that the proposal area could contain physical evidence of historical interest that may benefit from further recording and study. Additionally, there is a likelihood that historic cultural objects may be buried in sediment that are of integrity and/or condition that could yield information through detailed investigation.

The maritime archaeological remains associated with the occupation of Darling Point and the development of the peninsula as an enclave for the 'elite' of Sydney, provides the ability to contribute to the understanding of the site. The heritage value of these archaeological remains is limited due to their relatively low level of contextual integrity which reduces the ability to attribute the majority of artefacts which form this resource to any specific function or historical period of occupation. As such, the cultural heritage values of the maritime archaeological remains on the northern end of Darling Point within the study area can be classified as having local significance.



Figure 6-15: Areas of maritime archaeological potential within the maritime study area

6.6.3 Potential impacts

Construction

Direct and potential direct (physical) impacts

Fence, gates, and foundation remains of former house *Canonbury*, located within McKell Park (LEP no. 112 and A1)

The fence, gates, and foundation remains of former house *Canonbury*, located within McKell Park (LEP no. 112 and A1) are located within proposal area. However, most of the proposed activities within the item are largely temporary in nature for site access during work, and only a small portion of the actual proposal footprint enters the heritage curtilage of the item.

The proposed work would comprise the demolition of the existing wooden jetty and the installation of a new platform, waiting area, and gangway. The existing Darling Point Wharf structure adjoins the sandstone seawall along the Darling Point foreshore within the curtilage of the heritage item. It is noted that the existing wharf structure is not individually heritage listed, nor is it encompassed by the *Canonbury* heritage item curtilage. Therefore, the removal of the current wharf would not impact significant fabric of the heritage item.

The connection of the proposed pathway from the lift to the covered waiting area would require the modification of the sandstone seawall, however, which is part of the heritage item. To install the access point from the waiting area a section of the top course of the seawall measuring about two metres long would need to be removed. The seawall and heritage curtilage of McKell Park (LEP no. 112 and A1) also extend above the existing structural and archaeological remains of the former maritime features located at the end of Darling Point Road. The installation of the pathway above the former boathouse may

require the removal of two to three courses of the more modern section of seawall on the east and west sides of the former boathouse, with the impacted section measuring up to two metres wide. This would cause a moderate localised impact to the seawall element of the heritage item, however, the impact to the overall heritage item would be minor. This impact would be partially reversible in the future though if the removed sections of seawall are retained and then reinstated if the pathway was removed. It is not expected that the removal of the seawall would not directly impact the underlying sandstone footings of the former boathouse.

The pathway may require the support of two piles where it crosses over the former boathouse. The two piles would be drilled into the sandstone bedrock at the base of the former boathouse. However, the piles would not directly impact the footings of the former boathouse.

The proposed pedestrian footpath works on Darling Point Road would enter a small portion of western side of the heritage curtilage. However, these works would not involve any extensive excavations and would not impact any significant fabric within the heritage item. As a result, the small portion of the footpath works that overlap the heritage curtilage would not cause any direct impacts. The proposed footpath and parking work would also avoid impacts to the jacaranda tree on Darling Point Road, which is located outside of but adjacent to the curtilage of McKell Park (LEP no. 112 and A1).

The proposed work would involve piling and the use of other vibration intensive plant in close proximity to McKell Park (LEP no. 112 and A1). These works would be located within the minimum safe working distance for cosmetic damage to heritage fabric, which is identified in the CNVG as being within 41 metres of vibration intensive plant (refer to 7.5 tonne vibratory roller in Table 6-9). In particular, the proposed piling for the new wharf and pathway would be located immediately adjacent to the sandstone seawall and the existing structural remains of the sandstone boathouse and bath house. As a result, vibrations associated with the piling and additional plant may cause potential direct impacts to the sandstone structural elements. Although the piling work would be localised, it is noted that about 12 piles would be located within about 10 metres of the sandstone structural elements. However, it is expected that the potential impacts could be largely mitigated through the implementation of appropriate control measures (refer section 6.6.4). As a result, it is expected that any potential direct impacts resulting from vibrations would be minor and would be subject to controls and monitoring.

Overall, the proposed work would result in a minor direct and minor potential direct impact to the fence, gates, and foundation remains of former house *Canonbury*, located within McKell Park (LEP no. 112 and A1).

Remains of bath house and site of jetty (LEP no. 113)

The remains of bath house and site of jetty (LEP no. 113) heritage item is located within the proposal area. The remains of bath house and site of jetty (LEP no. 113) partially shares the same curtilage as McKell Park (LEP no. 112 and A1), including the sandstone wall, which would be impacted for the construction of the proposed pathway. The pathway would impact two to three courses of the more modern section of seawall on the east and west sides of the former boathouse where the pathway traverses the open space above the boathouse. Each impacted section would be up to two metres wide. However, it is not expected that the work would impact the underlying sandstone footings of the former bath house or boathouse, and the two piles that may be drilled into the sandstone bedrock to support the pathway would not directly impact the footings. As a result, the proposed work would cause a moderate localised impact to the seawall element of the heritage item, but the impact to the overall heritage item would be minor. This impact would be partially reversible in the future if the pathway was removed and the impacted sections of the seawall are reinstated.

The proposed work would involve piling and the use of other vibration intensive plant however, which may result in potential direct impacts to the remains of bath house and site of jetty (LEP no. 113). The proposed piling for the pathway would be located immediately adjacent to the existing structural remains of the sandstone boathouse and bath house, and the remaining piles would be located within the recommended safe working distance. As a result, vibrations associated with the piling and additional plant may cause potential direct impacts to the sandstone structural elements. Although the piling work would be localised, it is noted that two piles for the pathway would be drilled into the sandstone bedrock which the structural remains also appear to be founded on. Some of the sandstone footings also do not appear to feature any mortar bonding and therefore may be more susceptible to vibrations. However, it is expected that the potential impacts could be largely mitigated through the implementation of appropriate control measures (refer section 6.6.4). As a result, it is expected that any potential direct impacts resulting from vibrations would be minor and would be subject to controls and monitoring.

Overall, the proposed work would result in a minor direct and minor potential direct impact to the remains of bath house and site of jetty (LEP no. 113).

[House and interiors, grounds, gardens \(LEP no. 136\)](#)

The house and interiors, grounds, gardens heritage item (LEP no. 136) is located outside of the proposal area. As a result, there would be no direct impact to the heritage item.

House and interiors, grounds, gardens (LEP no. 136) is located 55 metres south east of where the construction activities would take place, with significant structural elements within the heritage curtilage located 55 metres south east. As a result, the heritage item would be located outside the minimum safe working distance for cosmetic damage and the vibrations associated with the proposed work are unlikely to result in potential direct impacts.

Overall, the proposed works would result in a neutral direct and neutral potential direct impact to the house and interiors, grounds, gardens (LEP no. 136).

[Craigend – house and interiors, grounds, gardens, stoneworks, Norfolk Island Pine, Pak-Lan, 10 Queen Palms, 11 Kentia Palms, Curly Palm \(LEP no. 102\)](#)

The proposed work is located outside of the curtilage of *Craigend* – house and interiors, grounds, gardens, stoneworks, Norfolk Island Pine, Pak-Lan, 10 Queen Palms, 11 Kentia Palms, Curly Palm (LEP no. 102). As a result, there would be no direct impact to the heritage item.

The heritage item is located within 10 metres of the nearest proposed work (earthworks for the lift and pathway construction). As a result, the heritage item would be located within the minimum safe working distance for cosmetic damage and the vibrations associated with the proposed work could result in potential direct impacts, namely to the house structure. It is expected that any potential direct impacts resulting from vibrations would be minimal.

Overall, the proposed work would result in a neutral direct and negligible potential direct impact to *Craigend* – house and interiors, grounds, gardens, stoneworks, Norfolk Island Pine, Pak-Lan, 10 Queen Palms, 11 Kentia Palms, Curly Palm (LEP no. 102).

[Lindesay – building and interiors, summer house, grounds, 6 London Plane trees, Hoop Pine \(SHR 00686\)](#)

Lindesay – building and interiors, summer house, grounds, 6 London Plane trees, Hoop Pine (SHR 00686) is located outside the proposal area. As a result, there would be no direct impact to the heritage item.

Lindesay (SHR 00686) is located 45 metres south east of where the construction activities would take place, with significant structural elements within the heritage curtilage located 60 metres south east. As a result, the heritage item would be located outside the minimum

safe working distance for cosmetic damage and the vibrations associated with the proposed works are unlikely to result in potential direct impacts.

Overall, the proposed work would result in a neutral direct and neutral potential direct impact to *Lindesay* (SHR 00686).

House, interiors and front fence, sandstone walls to Beverley Lane, sandstone terracing and steps (LEP no. 194)

House, interiors and front fence, sandstone walls to Beverley Lane, sandstone terracing, and steps (LEP no. 194) is located outside of the proposal area. As a result, there would be no direct impact to the heritage item. The heritage item is located 80 metres south west of where the construction activities would take place. As a result, the heritage item would be located outside the minimum safe working distance for cosmetic damage and the vibrations associated with the proposed work is unlikely to result in potential direct impacts. As a result, potential direct impacts resulting from vibrations would be unlikely.

Overall, the proposed work would result in a neutral direct and neutral potential direct impact to the House, interiors and front fence, sandstone walls to Beverley Lane, sandstone terracing, and steps (LEP no. 194).

***Neidpath* – house, interiors, and grounds (LEP no. 91)**

Neidpath - house, interiors and grounds (LEP no. 91) is located outside of the proposal area. As a result, there would be no direct impact to the heritage item. The heritage item is located 95 metres south east of where the construction activities would take place. As a result, the heritage item would be located outside the minimum safe working distance for cosmetic damage and the vibrations associated with the proposed works are unlikely to result in potential direct impacts. As a result, potential direct impacts resulting from vibrations would be unlikely.

Overall, the proposed work would result in a neutral direct and neutral potential direct impact to the *Neidpath* - house, interiors and grounds (LEP no. 91).

Stone boundary wall to Carthona Avenue (LEP no. 110 and 111)

Stone boundary wall to Carthona Avenue (LEP no. 110 and 111) is located outside of the proposal area. As a result, there would be no direct impact to the heritage item.

The heritage item is located 65 metres south of where the construction activities would take place. As a result, the heritage item would be located outside the minimum safe working distance for cosmetic damage and the vibrations associated with the proposed work is unlikely to result in potential direct impacts.

Overall, the proposed work would result in a neutral direct and neutral potential direct impact to the stone boundary wall to Carthona Avenue (LEP no. 110 and 111).

Other heritage items

The proposed works would generally result in neutral direct and neutral to negligible potential direct to the other heritage items adjacent to the proposal area and within the visual buffer zone.

Impacts to archaeological resources

Evidence of former Blackenburg and Lansdowne, and Canonbury (Phase 3) residences

The preliminary archaeological assessment has identified that the proposal area has generally high potential to contain locally significant archaeological remains associated with the fence, gates, and foundation remains of former house *Canonbury*, located within McKell Park (LEP no. 112 and A1) heritage item. This may include evidence of the Phase 2 and Phase 3 residences including footings as well as associated yard surfaces and refuse deposits. These could include artefactual 'relics', however, historical overlays indicate that

although these remains are located within the proposal area, the former residences where most of the archaeological remains would be expected are located outside of the proposal footprint. Only a small portion of the proposal footprint on the north and west sides extend into the area of archaeological potential associated with the former residences, however, this work is located away from the area of the former residences themselves (refer Figure 6-14). As a result, it is expected that the proposed work would result in neutral impacts to archaeological remains associated with the former *Brackenbury* and *Lansdowne* (Phase 2) and *Canonbury* (Phase 3) residences within McKell Park (LEP no. 112 and A1).

Evidence of the former bathhouse, boathouse, and wharf infrastructure (Phase 2 and 3).

The proposed pathway would cross over the remains of the former maritime structures at the end of Darling Point Road in the heritage curtilages of McKell Park (LEP no. 112 and A1) and the remains of bath house and site of jetty (LEP no. 113). These items include visible archaeological remains in the form of sandstone footings and may also feature additional underwater remains or material buried beneath the soil immediately behind the seawall. Earthwork for the pathway would involve the excavation of a trench measuring about 1200 millimetres wide and 300 millimetres deep through the footprint of these former structures. However, although the excavations would pass through the historical structures, due to the shallow nature of the excavations it is not expected that any archaeological remains would be impacted by the pathway excavations. Where the excavations pass through the footprint of the former boathouse, it is expected that the works would be shallow enough that the excavations are likely be limited to built-up topsoil, and where the excavations are undertaken near the former bath house, the historical photographs do not indicate that structural remains are likely to be present.

The proposed piling works would also be undertaken in close proximity to the existing structural remains of the former maritime structures. As a result, the archaeological remains may be subject to potential direct impacts caused by vibrations. This could potentially dislodge some of the sandstone footings, resulting in a minor impact to the archaeological remains associated with McKell Park (LEP no. 112 & A1) and the remains of bath house and site of jetty (LEP no. 113).

Overall, it is assessed that the proposed work would result in minor impacts to archaeological remains of local significance. However, it is anticipated that the impacts would be limited to archaeological 'works' and would not cause impacts to archaeological 'relics'.

Evidence of early Darling Point Road surface (Phase 2)

The proposed work that may impact archaeological remains include excavations for the lift, stairs and roadwork within the alignment of Darling Point Road which has low potential for former locally significant road surfaces. Excavations within the area of archaeological potential for former road surfaces would generally be shallow in nature, and the area has likely been disturbed by previous road upgrades and maintenance works. As a result, if archaeological remains of former road surfaces are present, it is expected that any impact to them would be negligible. However, these remains would be classified as archaeological 'works'.

Refer to section below for impacts to maritime archaeology.

Impacts to marine archaeology

Piling along the alignment would destroy any cultural material within the footprint of each pile. Piling may also inadvertently impact any artefacts laying on or in the seabed which could have been deposited in association with the activities of the boathouse and jetty and other activities in the area. Two piles may intersect with the footprint of the former public jetty however the scale of impact of the piling work is assessed to be minor in relation to the heritage values of the potential archaeological resource.

Anchoring during construction of new wharf may impact artefacts by damaging or dragging them out of position, altering their context. If a wreck or wreckage is present the impact and significance on site could be high.

Overall, the proposed work would have a minor impact to the known and potential maritime archaeological resource. As a result, the works are considered an acceptable impact and qualify for an exception (Type 1B) under section 139(4) of the *Heritage Act 1977*. This impact would be maintained as minor or reduced to negligible with the implementation of suitable mitigation measures as outlined in Table 6-30.

Operation

Indirect (visual) impacts

The visual impact of the proposal was assessed for all heritage items identified within or adjacent to the proposal area, and heritage items within the visual buffer of the proposal (refer Table 6-29, and Appendix G for further details).

It was determined that the proposal would result in minor indirect (visual) impact to Fence, gates, and foundation remains of former house *Canonbury*, located within McKell Park (LEP no. 112 and A1) and Remains of bath house and site of jetty heritage item (LEP no. 113) as a result of visually intrusive elements within sight of the heritage item from the construction of the proposal.

The proposal would result in a negligible or neutral visual impact to the remaining heritage items.

Summary

A summary of the heritage impacts of the proposal during construction and operation is provided in Table 6-29.

Table 6-29: Summary of heritage impacts

| Item | Listing | Direct | Potential direct | Indirect (visual) | Archaeo-logical |
|--|---|---------|------------------|-------------------|-----------------|
| Fence, gates and foundation remains of former house <i>Canonbury</i> , located within McKell Park | Woollahra LEP no. 112 and A1 | Minor | Minor | Minor | Minor |
| Remains of Bath House and site of jetty | Woollahra LEP no. 113 Sydney Harbour SREP no. 46 | Minor | Minor | Minor | Minor |
| House and interiors, grounds, gardens | Woollahra LEP no. 136 | Neutral | Neutral | Negligible | Neutral |
| <i>Craigend</i> - house and interiors, grounds, gardens, stoneworks, Norfolk Island Pine, Pak-Lan, 10 Queen Palms, 11 Kentia Palms, Curly Palm | Woollahra LEP no. 102 | Neutral | Negligible | Negligible | Neutral |

| Item | Listing | Direct | Potential direct | Indirect (visual) | Archaeo-logical |
|---|---|---------|------------------|-------------------|-----------------|
| <i>Lindesay</i> - building and interiors, summer house, grounds, 6 London Plane trees, Hoop Pine | SHR 00686 Woollahra LEP no. 80 RNTA no. restricted RNE Place ID 2488 | Neutral | Neutral | Neutral | Neutral |
| House, interiors and front fence, sandstone walls to Beverley Lane, sandstone terracing and steps | Woollahra LEP no. 194 | Neutral | Neutral | Neutral | Neutral |
| <i>Neidpath</i> —house, interiors and grounds | Woollahra LEP no. 81 | Neutral | Neutral | Neutral | Neutral |
| Stone boundary wall to Carthona Avenue | Woollahra LEP no. 111 | Neutral | Neutral | Neutral | Neutral |
| Entrance gateposts to Carthona Avenue, corner of Darling Point Road | Woollahra LEP no. 83 | Neutral | Neutral | Neutral | Neutral |
| Stone boundary wall to Carthona Avenue | Woollahra LEP no. 110 | Neutral | Neutral | Neutral | Neutral |
| Etham Avenue Heritage Conservation Area | Woollahra LEP no. C4 | Neutral | Neutral | Neutral | Neutral |
| Elizabeth and Rushcutters Bays Conservation Area | Sydney LEP no. C20 | Neutral | Neutral | Neutral | Neutral |
| Sydney Harbour Naval Precinct | SHR 01705 | Neutral | Neutral | Neutral | Neutral |
| Edgerley / House <i>Ramona</i> including interior and grounds | SHR 00671 Sydney LEP no. I572 RNTA no. 7377 | Neutral | Neutral | Neutral | Neutral |

6.6.4 Safeguards and management measures

Table 6-30 lists the non-Aboriginal safeguards and management measures that would be implemented to account for the impacts identified in section 6.6.3.

Table 6-30: Non-Aboriginal safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|----|--|---|-------------------|------------------|
| H1 | Heritage Interpretation Strategy | In accordance with the sustainability requirements for the project, opportunities for the implementation of heritage interpretation will be investigated during detailed design. | Transport for NSW | Detailed design |
| H2 | Photographic Archival Recording | A Photographic Archival Recording will be undertaken of Fence, gates, and foundation remains of former house <i>Canonbury</i> , located within McKell Park (LEP no. 112 and A1) and Remains of bath house and site of jetty (LEP no. 113) to document their current visual setting prior to any impacts and modifications. Recording should be prepared in accordance with the guideline for <i>Photographic Recording of Heritage Items Using Film or Digital Data Capture</i> (Heritage Council, 2006). | Contractor | Pre-construction |
| H3 | Non-Aboriginal heritage | A sensitive area plan (SAP), identifying all heritage items (including maritime archaeology) in close proximity to the works, will be prepared under the CEMP. | Contractor | Pre-construction |
| H4 | Non-Aboriginal heritage (including maritime) | A heritage induction will be provided to workers prior to construction, informing them of the SAP and identifying the location and significance of known heritage items and the implementation of the unexpected finds protocols if unanticipated heritage items or deposits are located during construction. | Contractor | Pre-construction |
| H5 | McKell Park seawall | A work method statement will be prepared to guide the modification of the seawall within McKell Park (LEP no. 112 and A1) for the pathway to the covered waiting area. | Contractor | Pre-construction |
| H6 | McKell Park seawall | Where the sandstone seawall within McKell Park (LEP no. 112 and A1) and Remains of the bath house and site of jetty (LEP no. 113) is modified, then the | Contractor | Pre-construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---|---|--------------------------------|-------------------|
| | | sandstone blocks to be removed would be salvaged and handed to Woollahra Municipal Council for re-use as appropriate. | | |
| H7 | Unexpected finds | Terrestrial archaeological remains will be managed under the <i>Unexpected Heritage Items Procedure</i> (RMS, 2015) if unanticipated heritage items or depositions are located during construction. | Contractor | Construction |
| H8 | Archaeological significance | If unexpected 'relics' are encountered during excavation, a section 146 relics notification under the <i>Heritage Act 1977</i> will be forwarded to Heritage NSW, DPC. 'Relics' cannot be impacted without appropriate approvals under the <i>Heritage Act 1977</i> . | Contractor / Transport for NSW | Construction |
| H9 | Archaeological significance | If significant archaeological remains are encountered during excavation, works will cease and design options for avoiding impacts to the significant archaeological remains will be considered where practicable and opportunities will be investigated for the implementation of heritage interpretation. | Contractor | Construction |
| H10 | Non-Aboriginal heritage | Impacts to the sandstone seawall and all impacted road and footpath surfaces must be made good and reinstated as near as possible to their original state following the completion of works. | Contractor | Post-construction |
| NV5 | Vibration impact to heritage structures | <ul style="list-style-type: none"> Determine safe working distance based on proposed plant and where possible, smallest plant able to carry out required work should be utilised to minimise potential impacts. Where works are proposed within the safe working distance, for the heritage structures, specialist advice will be sought from an appropriately qualified structural engineer who is familiar with heritage structures to assess if vibrations associated with the proposed works will potentially result in impacts to heritage structures. A vibration monitoring plan will be prepared as part of the CNVMP and implemented to confirm vibration levels prior to construction commencement. Where exceedances are recorded, works will be modified in consultation with the identified specialist to reduce vibration levels. | Contractor | Pre-construction |
| NV6 | Vibration impact to | Assessment and monitoring of vibration impacts should adhere to: | Contractor | Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---|--|-------------------|---|
| | heritage structures | <ul style="list-style-type: none"> British Standard BS 7385: <i>Part 2: Evaluation and Measurement for Vibrations in Buildings – Part 2 Guide to Damage Levels from Ground-Borne Vibration</i> German Standard DIN 4150, <i>Part 3: Structural Vibration in Buildings: Effects on Structures</i>. | | |
| NV7 | Vibration impact to heritage structures | Where heritage structures are located within the safe working distance, pre and post construction dilapidation surveys will be carried out. | Contractor | Pre-construction / Construction / Post construction |
| NV9 | Vibration impact to heritage structures | Where structures are located within the safe work distance (heritage structure), pre-construction sampling vibration monitoring will be carried out to ensure compliance with the required criteria. If exceedances are recorded, alternative construction methodology may be required, and/or restrictions applied on the type of plant that can be used. | Contractor | Pre-construction / Construction |
| H11 | Vibration impact to heritage structures | If vibration monitors are attached to the heritage items, they must not be attached with permanent fixings. They will be removable without causing damage. Bees wax may be a suitable attachment method | Contractor | Construction |
| H12 | Design change | Any project redesign resulting in new ground/seabed disturbance, vegetation removal, or new features must be assessed in an addendum or consistency assessment to the SoHI and/or MASoHI as required. | Transport for NSW | Detailed design / Pre-construction |
| H13 | Maritime archaeology | An application for an exception under section 139(4) of the <i>Heritage Act 1977</i> should be submitted to the Heritage NSW, DPC prior to the works commencing. | Contractor | Pre-construction |
| H14 | Maritime archaeology Unexpected finds | <p>An Unexpected Finds Protocol will be prepared by a suitably qualified maritime archaeologist and implemented for all maritime works. This document will include:</p> <ul style="list-style-type: none"> Unexpected finds, stop work triggers and notification protocols Heritage induction for contractors Recording methods and procedures Artefact collection and retention policies. | Contractor | Pre-construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|------|-----------------------------------|--|----------------|--------------|
| LS10 | Maritime archaeology Anchoring | The number of barge anchor points will be minimised where possible. Anchoring locations should be selected to avoid areas of sensitive habitat and moderate/high archaeological potential. | Contractor | Construction |

6.7 Aboriginal cultural heritage

This section summarises the existing Aboriginal heritage at the wharf and describes the potential impacts associated with the proposal.

6.7.1 Methodology

The Transport for NSW Aboriginal Cultural Heritage Officer has issued a Stage 1 clearance letter for the proposal in accordance with *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (RMS, 2011) on 16 August 2021, included as Appendix I.

The PACHCI assessment was completed for Aboriginal heritage assessment in reference to the *Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010).

The assessment included a desktop review of published records, data and literature, including a records search of the Aboriginal Heritage Information Management System (AHIMS) to confirm the presence of values in the local area

6.7.2 Existing environment

The Stage 1 PACHCI assessment assessed the proposed works as being unlikely to have an impact on Aboriginal cultural heritage.

The assessment is based on the following due diligence considerations:

- The proposal is unlikely to harm known Aboriginal objects or places (AHIMS sites)
- The AHIMS search did not indicate the presence of Aboriginal objects or places in the immediate proposal area
- The study area does contain landscape features that indicate the presence of Aboriginal objects, based on the *Due Diligence Code of Practice for the Protection of Aboriginal objects in NSW* (DECCW, 2010) and the PACHCI, however the potential for Aboriginal cultural heritage items has been reduced in the form of landscaping of McKell Park.

6.7.3 Potential impacts

Construction

The proposed work is unlikely to result in harm to Aboriginal objects and sites, as the work is limited to the existing wharf structure and minor public domain works; all of which are within heavily disturbed land. Stage 1 of the Roads and Maritime PACHCI was completed for the proposal, which concluded the proposal was unlikely to have an impact on Aboriginal cultural heritage and did not require further investigations or assessment.

Operation

The Darling Point Wharf would continue to operate as a wharf, serviced by the same vessels, so it is not expected that there would be any change in the nature or severity of impact to unknown Aboriginal objects or sites.

An AHIP under the NPW Act is not required for the proposal.

No impacts to Aboriginal heritage items are anticipated during operation of the proposal as no significant change to the existing operation is proposed.

6.7.4 Safeguards and management measures

Table 6-31 lists the Aboriginal heritage safeguards and management measures that would be implemented to account for the impacts identified in section 6.7.3.

Table 6-31: Aboriginal heritage safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------------|---|-------------------|------------------|
| AH1 | Aboriginal heritage | Should the scope of the proposed work change, further consultation with Transport for NSW's Aboriginal Cultural Heritage Officer and regional environmental staff must be undertaken to reassess any potential impacts on Aboriginal cultural heritage. | Transport for NSW | Pre-construction |
| AH2 | Unexpected heritage finds | The <i>Unexpected Heritage Items Procedure</i> (RMS, 2015) will be followed in the event that (an) unknown or potential Aboriginal object(s), including skeletal remains, is/are found during construction. This applies where Transport for NSW does not have approval to disturb the object(s) or where a specific safeguard for managing the disturbance (apart from the procedure) is not in place. Work will only restart once the requirements of that procedure have been satisfied. | Contractor | Construction |

6.8 Transport, traffic and access

This section describes the existing traffic, transport and access at the wharf and describes the potential impacts associated with the proposal.

6.8.1 Methodology

A qualitative assessment of transport, traffic and access was performed and considers the following:

- Desktop assessment of existing transport options near the proposal
- Evaluation of construction and operation impacts to maritime and landside transport and access.

6.8.2 Existing environment

Land transport

Road network

Darling Point Wharf is located on the northern extent of Darling Point and is accessed via Darling Point Road which terminates in a cul-de-sac. Darling Point Road connects to the broader road network from New South Head Road which is located about 1.4 kilometres to the south.

The road network within the vicinity of the wharf is characteristic of a residential area and speed limits are generally 50 kilometres per hour in the vicinity of the proposal.

Parking

Darling Point Road has (restricted) kerbside parking, with limited opportunity for short term parking at the end of Darling Point Road. This is due to private property access directly into the cul-de-sac near McKell Park (and wharf access). There is currently no accessible parking or kiss and ride drop off zones at Darling Point Road in the vicinity of McKell Park.

Bus network

The nearest bus stop is located 300 metres away at the intersection of Darling Point Road and Thornton Street (stop ID 202746). As of January 2022, only one bus route services this stop, route 328 – Bondi Junction to Darling Point via Edgecliff. From Monday to Friday, between 9am and 3:37pm, there are buses from Thornton Street to Edgecliff Station, Double Bay and Bondi Junction Station. The bus services to Double Bay only occur on weekdays during these times. Additional services are provided between Thornton Street and Edgecliff Station from 7:21am to 8:35am and 4:08pm to 9:23pm Monday through Friday.

On the weekend and public holidays buses run hourly between 7:24am (8:24am for Sunday and public holidays) and 7:24pm. The entire journey from Darling Point to Bondi Junction is about 25 minutes. During the weekend and public holidays, the buses only service between Bondi Junction, Edgecliff Station to Darling Point and return.

Train network

Edgecliff Station is located 1.5 kilometres from the wharf. The station is on the T4 Eastern Suburbs and Illawarra Line which connects the eastern suburbs and the CBD. Frequency along this line ranges from five minutes between trains during the peak period and 10 minutes during off-peak periods.

Bicycle network

The wharf currently has three bicycle parking hoops at the cul-de-sac end of Darling Point Road at Darling Point Reserve.

The *Woollahra Bike Plan and Strategy 2009* (WMC, 2009) identifies both the existing and proposed bike routes which run along Darling Point Road, Mona Road, Greenoaks Avenue, Ocean Avenue and New South Head Road. There is a proposed on-road bike route which runs the length of Darling Point Road from New South Head Road to the existing wharf.

Pedestrian access

Pedestrian access to the wharf is along Darling Point Road and through McKell Park, which is approximately 120 metres walking distance, with no direct vehicle access.

Water transport

Ferry services

The Darling Point Wharf mainly functions as a local wharf due to its surrounding residential land use.

The wharf is serviced by the F7 Double Bay route travelling in a linear direction from Circular Quay to Garden Island (not currently in operation), Darling Point, Double Bay, and return.

The journey from Darling Point Wharf to Circular Quay is about 13 minutes, and five minutes to Double Bay Wharf. For commuters travelling to the city on weekdays, ferry services from Darling Point Wharf are limited to the morning period with the last ferry leaving the wharf at 12:25 for Circular Quay. On weekends and public holidays ferries operate between Darling Point Wharf and Circular Quay between 09:25 and 13:25. Ferry services from Circular Quay to Darling Point are limited to the afternoon/evening hours of 12:57 to 20:57 on weekdays and 13:57 to 20:57 on weekends and public holidays. Extended services are available from Circular Quay to Darling Point on Fridays and Saturdays.

A review of 2017 opal card data completed during the concept design stage indicated that the highest average patronage in a one-hour period at Darling Point Wharf was 24 patrons (23 boarding, one alighting). Ferry patronage in the case of a special event was also recorded, with the maximum number of boarding and alighting passengers in an hour as 42 patrons.

Transdev Sydney Ferries is considered to be the primary public transport network operator using the wharves within the Inner Harbour, Outer Harbour and Parramatta River areas. Transdev Sydney Ferries operates the services under a commercial contract with Transport for NSW.

Commercial and recreational activity

Charter boats and recreational vessels are able to use the existing wharf in accordance with the Transport for NSW *Wharf Access Policy* (TfNSW, 2015b). Public transport ferry services have priority to access the wharf based on their timetabling.

6.8.3 Potential impacts

Construction

Land transport

Construction vehicles would access the proposal via Darling Point Road. Heavy vehicles would access the site via Darling Point Road during earthworks for the lift, stairs, footpath regrading and other land based infrastructure works. It is anticipated that most materials and equipment required for land based elements of the proposal would be delivered by road. Although Darling Point Road would remain open, temporary partial closure of the cul-de-sac and/or traffic management may be required during construction and demolition activities. These can potentially be undertaken at night to avoid any impacts to Darling Point residents and visitors. Residents would be notified in advance of any partial closures to roads.

Up to five heavy vehicles are likely to be used for construction and a maximum of ten light and heavy vehicles would be used for deliveries to site. The additional construction traffic expected within the area is considered minor and would be unlikely to affect the capacity of the road network.

Some commuters may also use private vehicles while the wharf is closed during construction which may result in additional commuter traffic on the roads. This traffic would be spaced over the day and would be from different locations around the wharf catchment area, therefore is not likely to result in congestion related impacts to the existing road network.

The existing bus and train services would remain operational during construction, and these services would be used to support access to Darling Point and surrounding areas. Further detail on alternate transport options is provided in section 6.9.

Pedestrian and cyclist access around the wharf may be restricted at times due to potential temporary partial closure of the Darling Point Road cul-de-sac. However, this would be maintained by providing an alternate route around construction activities. Pedestrian and cyclist access to the foreshore would be limited during construction but still available.

The ancillary facilities identified in section 3.3 do not include provision for light vehicle parking. It is anticipated that any parking requirements during construction would utilise the existing parking arrangements available locally. Final access and parking arrangements would be confirmed by the Contractor. Some workers may travel to and from the site by boat from the off-site facility minimising impacts to parking in the vicinity of the proposal.

Water transport

Darling Point Wharf would be closed for up to eight months during construction. Based on the patronage data for the Darling Point Wharf, the closure would potentially disrupt up to 24 passengers during peak hour.

A maritime exclusion zone may be required around construction activities to prevent commercial and recreational traffic and swimmers entering the area. This would also include changes to the F7 Double Bay ferry route to avoid the construction activities.

Where feasible, materials and equipment for water based elements of the proposal would be shipped (barged) into and out of the area to limit any impact on Darling Point Road and surrounds. This would provide the best method to build the marine components and may also be used to deliver materials for the land-based components of the proposal. The amount of materials shipped to site, over being delivered by road, would be confirmed prior to construction.

Construction of the proposal would result in up to four vessels travelling between an off-site facility and the wharf each day. The minor increase in vessel movements is not considered to be significant in the context of the harbour.

Operation

Ferry operations to Darling Point Wharf would continue once the new wharf is operational.

The proposal would result in the improvement of efficiency and user experience of ferry services from the wharf. This may result in an increase to patronage of the wharf and ferry service and additional commuter traffic travelling to and from the wharf. However, this is not considered to be significant based on the existing patronage of the wharf.

The footpaths around the wharf would be regraded to meet DDA standards, improving accessibility to the wharf from Darling Point Road.

The number of bicycle hoops would be maintained as part of the proposed works.

6.8.4 Safeguards and management measures

Table 6-32 lists the transport, access and parking safeguards and management measures that would be implemented to account for the impacts identified in section 6.8.3.

Table 6-32: Land transport, access and parking safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|----|----------------------------|--|-------------------|---------------------------------|
| T1 | Land transport and parking | <p>A TMP will be prepared and will include the following:</p> <ul style="list-style-type: none"> • Final access and parking arrangements • Alternate pedestrian and cyclist access around the construction area • Measures to ensure light vehicle parking is strictly in accordance with Woollahra Municipal Council requirements and prevents parking on footpaths and grassed areas adjacent the site • Plans to maintain access to adjoining properties. | Contractor | Pre-construction |
| T2 | Land transport and parking | Where possible, the preferred means of transporting equipment and materials to the site will be via boat and barge over land transport so as to limit impacts to the local road network. | Contractor | Construction |
| T3 | Land transport and parking | Public transport passengers will be notified of any impacts to transport services and the alternative transport options prior to the commencement of construction and ancillary facilities on Darling Point Road. This will include updates to the ferry timetable indicating closure during construction at the wharf. | Transport for NSW | Pre-construction / Construction |
| T4 | Water transport | <p>A Maritime TMP will be prepared and implemented during the water based construction work. The Maritime TMP will be prepared consultation with Transport for NSW and approved by the Harbourmaster. In addition, the proposal will:</p> <ul style="list-style-type: none"> • Fit all buoys with lights • Prepare Response Plans for emergencies and spills for all construction vessels • Fit at least one vessel with an Automatic Identification System (AIS) • Retrieve any material associated with the construction of the development that enters the water to prevent the obstruction of vessel movements | Contractor | Pre-construction / Construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|----|-----------------|---|-------------------|---------------------------------|
| | | <ul style="list-style-type: none"> Prepare a Communications Plan for implementation during the work which must include 24/7 contact details, protocols for enquiries, complaints and emergencies. Any variation to the above will be agreed in advance with the Harbourmaster. | | |
| T5 | Water transport | <ul style="list-style-type: none"> A maritime navigation exclusion zone will be established during construction to prevent unauthorised vessels entering the area. This zone will be clearly defined to communicate access for other water users. | Contractor | Pre-construction / Construction |
| T6 | Water transport | Commercial, recreational operators and private services that use the existing wharf will be advised of the wharf closure at least two weeks prior to closure. | Transport for NSW | Pre-construction / Construction |

6.9 Socio-economic

This section summarises the existing socio-economic setting at the wharf and describes the potential impacts associated with the proposal. Appendix J contains a supporting technical paper prepared by Cardno (Cardno, 2022e).

6.9.1 Methodology

The Socio-economic Impact Assessment (SEIA) assesses the socio-economic impact of the proposal in accordance with the *Environmental Impact Assessment Practice Note EIA-N05 – Socio-economic assessment* (TfNSW, 2020b).

For the purpose of defining a boundary for assessing social and economic characteristics, Australian Bureau of Statistics (ABS) geographic boundary referred to as the Darling Point state suburb (refer Figure 6-16) has been used, and the Woollahra LGA was used as a comparison.

The following data sources were used to define the socio-economic baseline:

- Data on population and demography, income and employment, and business and industry were sourced from the ABS Census 2016, and Commonwealth, State and local government agencies
- Existing socio-economic policies and strategies in the Woollahra LGA, including local government policies and strategies:
 - *Annual Report 2019 - 2020* (WMC, 2020a)
 - *Delivery Program 2018 – 2021 and Operational Plan 2019 – 2020* (WMC, 2020b)
 - *Woollahra – 2030* (WMC, 2018)
 - *Woollahra Municipal Council Environmental Sustainability Action Plan 2013 – 2025* (WMC, 2012)
 - *Community and Environment Committee Minutes* (WMC, 2016)
 - *Disability Inclusion Action Plan 2017* (WMC, 2017)
- *Greater Sydney Harbour Estuary Coastal Management Program Scoping Study* (BMT, 2018)
- DPE population projections (DPIE, 2019b)
- Analysis of social infrastructure based on a review of publicly available information, including Council's webpage
- Available mapping and imagery from Google maps and from government agencies.

This assessment was also informed by studies commissioned as part of the REF development process.

6.9.2 Existing environment

The proposal is located within the Woollahra LGA which is about 1230 hectares in size. The Woollahra LGA includes the suburbs of Bellevue Hill, Darling Point, Double Bay, Edgecliff, Paddington (parts are located within City of Sydney Council), Point Piper, Rose Bay, Vaucluse (parts are located within Waverley Council), Watsons Bay and Woollahra.

The proposal is situated in the Darling Point state suburb (the socio-economic study area, refer Figure 6-16). Darling Point has an area of 70 hectares and is bounded by the state suburbs of Rushcutters Bay to the west, Edgecliff to the south and Double Bay to the east.

Population and demography

At the time of the 2016 Census, the study area had an estimated residential population of about 4190 people, of these 46 per cent were male and 54 per cent were female. Aboriginal and/or Torres Strait Islander people made up 0.4 per cent of the population.

The median age of people in the study area was 48 years. Children aged 0-4 years made up 3.8 per cent of the population and people aged 65 years and over made up 29.3 per cent of the population.

The study area experienced a six per cent population growth between 2011 and 2016. This is higher than the rate of population growth in the Woollahra LGA (four per cent) and lower than the Greater Sydney (10 per cent) for the same period.

Transport and access

The majority of the employed residents in the study area travelled to work by car, either as driver or as passenger (40 per cent), while 31 per cent used public transport (train, ferry, bus, tram/light rail) as at least one of their methods of travel to work. Comparatively a high proportion (31 per cent) of study area residents rely on public transport to reach work when compared with Greater Sydney region (20 per cent). About two per cent of the study area use ferry as the primary method of travel to work. Travelling to work primarily via bus is not common within the study area (two per cent of residents) when compared to Woollahra LGA (eight per cent) or in Greater Sydney (six per cent). This could be due to its proximity to strategic transport corridors and hubs such as Edgecliff Station, and New South Head Road and the Cross City Tunnel.

Darling Point Wharf is accessible by both the Sydney ferry network and bus route 328. On-road cycling routes and bushwalking tracks are also provided around the foreshore area.

The transport network is described in further detail in section 6.8.

Economic profile

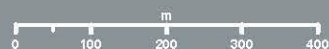
In 2016 the median weekly household income in the study area was \$2,966. This was higher than that for the Woollahra LGA (\$2,687) and Greater Sydney (\$1,750).

About 66 per cent of the study area's labour force was employed full time and about 27 per cent were employed part time. Labour force participation (51 per cent) in the study area is slightly lower than the Woollahra LGA, which is 53 per cent. This correlates with the low percentage of the younger workforce cohort resident in the study area. The most common occupations in the study area include professionals (43 per cent), managers (26 per cent), and clerical and administrative workers (12 per cent). People in the study area mainly worked for the professional, scientific and technical services, and financial and insurance industry sectors.



FIGURE 6-16

1:10,000 Scale at A4



Administrative boundaries of the study area

DARLING POINT



Map Produced by Cardno NSW/ACT Pty Ltd (MNE)
Date: 2021-07-07 | Project: AWE200198
Coordinate System: GDA 1994 MGA Zone 56
Map: AWE200198_GS_ECO_061_DP_REF_AdminBoundaries.mxd 02
Aerial imagery supplied by MetroMap (April, 2021)

Local business and services

The study area has a large number of local businesses. In 2019-2020 period, there were 10,006 local businesses located within the Woollahra LGA, providing about 25,381 local jobs. Woollahra is the location of some of Sydney's premier shopping precincts, such as Double Bay, Paddington and Queen Street.

Darling Point Wharf is located primarily within a low-density residential area, therefore only a few local businesses are located within close proximity to the proposal. Local businesses and service providers within 500 metres of the wharf include (refer Figure 6-16):

- *Canonbury Cottage* - This is a historic Federation house located within McKell Park. This is available to hire for social gatherings and weddings
- National Trust of Australia's *Lindesay House* – This is a heritage listed site. This was the first house built on Darling Point and is open for weddings and events, as well as guided tours
- Richies Cafe and Convenience (convenience store)
- The Hamper Collective Australia
- Rolanda Adams Financial Services.

Social infrastructure

Social infrastructure refers to community facilities, services and networks which help individuals, families, groups and communities meet their social needs, maximise their potential for development, and enhance community wellbeing.

Social infrastructure located near the proposal includes (refer Figure 6-16):

- Local parks and recreational areas including:
 - McKell Park and Darling Point Reserve
 - Yarranabbe Park
 - Rushcutters Bay Park
- Community infrastructure including such as St. Mark's Church and the Ascham School
- Canonbury Cottage and Lindesay House are available to hire for community gatherings and weddings
- Public transport facilities such as bus stops operating in the Darling Point Road, New Beach Road, Thornton Street and Etham Avenue.

Darling Point Reserve and McKell Park are enjoyed by local residents, recreational fishing enthusiasts and by the broader community. The values of McKell Park and/or Darling Point Reserve, which are valued by the local residents, include; open grassed areas, views to and from the harbour and through the park, the memorial pond on the foreshore, garden beds, shrubs and trees. McKell Park is often used for special events and social gatherings such as wedding as it has superb harbour views and manicured gardens surrounded by mature trees.

Currently, recreational fishing is allowed to take place at the existing wharf structure.

Community values

Community values are those socio-economic aspects considered to be important to quality of life and well-being. They include social factors such as a sense of safety, well-being, belonging and community diversity, as well as physical assets, such as parks and recreational areas.

Woollahra - 2030 (WMC, 2018), Woollahra Municipal Council's community strategic plan, identifies the values and priorities of the community, as expressed through a range of community engagement activities. They are:

- Community wellbeing
- Quality places and spaces
- A healthy environment
- Local prosperity
- Community leadership and participation.

Other

The existing background noise levels and the landscape character of the area are described in sections 6.4.2 and 6.5.2 respectively.

6.9.3 Potential impacts

Construction

The proposal would be constructed over a period of up to eight months starting in the third quarter of 2022. During construction the wharf would be closed.

Transport and access

Existing bus services would be used to support access to Darling Point and surrounding areas as bus transport would remain unchanged. The nearest bus stop to Darling Point Wharf which is serviced by bus route 328 is located about 300 metres to the south.

Ferry customers travelling to or from the City could catch the existing 328 bus service to or from Edgecliff station and a train service as an alternative to using the ferry service during the week and on weekends. This would increase the travel time by 20 minutes.

The existing bus service (route 328) to or from Edgecliff station has reduced operating hours compared to the ferry service. The bus service generally operates between 7am to 9pm on weekdays and between 7am and 7pm on the weekend and public holidays. However, the F7 ferry generally services Darling Point Wharf from 7am to 11pm on weekdays and between 9am and 11pm on the weekends and public holidays. Discussions would be held with the State Transit Authority to determine if bus services need to be increased and operating hours extended to cater for the potential increase in demand during the construction period.

Alternatively, customers could travel to Double Bay wharf which is also serviced by bus route 328, and catch a ferry service to the Circular Quay. However, Double Bay wharf is not serviced by route 328 on the weekends and operates on a limited timetable on weekdays (9am to 4pm).

Ferry customers currently have a direct route to Circular Quay, and during wharf closure they would face increased travel times and multiple transitions from buses to trains. Any disruptions would be managed via notification ahead of construction, and consequent updates provided to customers.

The proposal is located on the F7 Double Bay Loop, which provides connections between Circular Quay, Double Bay and Darling Harbour. The FWUP includes planned upgrades to multiple wharves in the Sydney Ferries Network including Double Bay (F7). Patrons of the ferry network would encounter increased travel times should the closure of both Double Bay Wharf and Darling Point Wharf overlap. Alternative transport options would be the combination of bus (238) and trains. However, this scenario brings about increased impacts

to the patrons and disruptions would be managed via notification ahead of construction, and consequent updates provided to customers.

Although Darling Point Road would remain open, temporary partial closure of the Darling Point Road cul-de-sac may be required during landside construction activities. Any such closures could potentially be undertaken at night to minimise impacts to property access. The delivery of wharf components would be via the water on a barge and installed by barge mounted crane.

There would be a number of heavy vehicles accessing the proposal site via Darling Point Road for the landside component of the works during demolition, earthworks, and for installation of the lift. It is anticipated that most materials and equipment required for the land-based elements of the proposal would be delivered by road. Temporary traffic lights or stop-go provisions on Darling Point Road may be required if major deliveries take place by road. The additional construction traffic is considered minor in the context of existing levels of traffic in the general area and would be unlikely to affect the capacity of the road network. Any potential impact associated with construction vehicles accessing the site would be mitigated through the preparation and implementation of a construction traffic management plan which would be updated as required as the construction activities progress.

The existing jetty and foreshore area is popular with recreational fishers and swimmers. A maritime exclusion zone would be required during construction to prevent unauthorised commercial and recreational vessels entering the work area.

It is expected that these short-term impacts during construction would be offset by the benefits of the upgraded wharf and interchange during operation.

Local amenity

Pedestrian access to the foreshore around Darling Point Reserve and lower McKell Park would be restricted. One entrance to McKell Park would be closed and the park would be accessed via the entrance on Lindsay Avenue. A land exclusion area may also need to be established for the safety of people using the park and other recreational users during construction. As a result, recreational users may be temporarily impacted during the construction period. At the end of construction, the exclusion zones would be removed and the area would be landscaped and access re-instated.

For safety reasons, some construction activities may require work to be carried out during early mornings or late at night when the water is calm and the harbour is least busy, a time of day where residents may be more likely to be at home and therefore disrupted by the activities. Construction activities conducted at night-time or the use of high voltage lighting may also disrupt nearby residents.

Local businesses

Canonbury Cottage is located within the McKell Park and is available to hire for social gatherings and weddings. The National Trust of Australia's *Lindesay* House is located about 100 metres from the wharf and is open for weddings and events, as well as guided tours. Construction traffic, noise, air quality and visual impacts may indirectly affect the patronage of these businesses. Consultation with these businesses would be undertaken to determine sensitive and/or peak periods.

Noise impacts

The noise and vibration impact assessment (refer section 6.4) identified that for a worst case scenario, construction noise levels are predicted to exceed management levels for standard and non-standard hours of operation for all construction stages at some residential receivers. The most likely source of potential sleep disturbance from outside of

standard construction hours' work would be from piling proposed during calm sea conditions either late at night or early morning works.

A CNVMP would be prepared prior to construction and implemented throughout the construction period to minimise noise impacts on nearby residents.

Further information is provided in section 6.4.

Opportunities

Construction activity would generate regional demand for services such as recruitment agencies, construction companies, suppliers and construction services. Local businesses such as cafes would benefit from the presence of construction personnel.

Operation

Transport and access

Currently, the Darling Point Wharf does not provide equitable access to ferry services and it does not meet the DSAPT or DDA requirements. Customers with mobility needs are currently unable to access the wharf. The proposed wharf design includes a new DSAPT compliant foreshore path from the lift to the covered fixed waiting area, a new 11 metre high lift to take customers between the street and water levels, and a DSAPT compliant footpath from Darling Point Road.

The proposal would result in the improvement of accessibility, efficiency and customer experience of ferry services from the wharf. The proposal would potentially increase access to services, and provide economic opportunities for locals, by upgrading and improving accessibility to the wharf.

As part of the proposal, a kiss-and-ride drop off zone would be located at the end of the Darling Point Road cul-de-sac and the new path would now form a connection from the McKell Park to the waiting area. The accessible connection between the new wharf structure and McKell Park would provide the community with direct accessible connectivity to the lower part of McKell Park which is frequently used for passive recreation and social gatherings. Provision of a kiss and ride space would make it easier for passengers including those with mobility issues to access the wharf.

The memorial pond located on the foreshore (between the new path and rock escarpment) would not be impacted by the new path and access to the harbour would be maintained in the vicinity of the existing sandstone steps that lead into the water.

Landscape and visual amenity

The landscape character and visual impact assessment for the proposal is outlined in section 6.5. The overall visual impact of the proposed concept design for Darling Point Wharf, is considered high to moderate following the assessment of the viewpoints. The visual impacts generated by the proposal would be variable depending on the location of the viewer and distance from the wharf site.

Further information is provided in section 6.5.

Local businesses and community

During operation, the extra lighting and security cameras at the wharf would deter antisocial behaviour and provide a safer night-time environment for ferry users. The design of the ferry wharf generally creates a clear hierarchy of space, enables safe access/egress, and provides for both formal and passive surveillance. There would be an emergency button on the waiting area for the security of waiting passengers.

Responsible fishing activities would be permitted from the new wharf structure.

6.9.4 Safeguards and management measures

Table 6-33 lists the socio-economic safeguards and management measures that would be implemented to account for the impacts identified in section 6.9.3.

Table 6-33: Socio-economic safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------------------|--|--------------------------------|---------------------------------|
| SE1 | Socio-economic | <p>A Communications and Stakeholder Engagement Plan will be developed prior to the commencement of construction and will be implemented during construction to provide timely and accurate information to stakeholders during construction. It will include (as a minimum):</p> <ul style="list-style-type: none"> • Mechanisms to provide details and timing of proposed activities to affected residents and local businesses, including changes to traffic, public transport services and access • A contact name and telephone number for complaints. <p>The Plan will be prepared in accordance with the <i>Community Involvement and Communications Resource Manual</i> (RTA, 2008).</p> | Contractor | Pre-construction / Construction |
| SE2 | Socio-economic | <ul style="list-style-type: none"> • A webpage and free-call number will be established for enquiries regarding the project and will remain active for the duration of construction. • Contact details will be clearly displayed at the entrance to the site. • All enquiries and complaints will be tracked through a tracking system and acknowledged within 24 hours of being received. | Transport for NSW / Contractor | Pre-construction / Construction |
| SE3 | Sustainability | Investigate opportunities to encourage the Contractor to purchase goods and services locally. | Transport for NSW | Pre-construction / Construction |
| SE4 | Sustainability | Investigate opportunities to incorporate community health and wellbeing initiatives in the design and construction of the project. | Transport for NSW | Detailed design / Construction |
| SE5 | Land transport and parking | Explore opportunities to provide alternative transport during construction. | Transport for NSW | Pre-construction |

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------------------|--|-------------------|---------------------------------|
| SE6 | Local businesses | Discussions will be held with nearby local businesses who may be indirectly impacted by the project, including <i>Canonbury</i> Cottage and <i>Lindesay</i> House to seek opportunities to minimise the impact of the project during the construction phase. | Transport for NSW | Pre-construction |
| T2 | Land transport and parking | Where possible, the preferred means of transporting equipment and materials to the site will be via boat and barge over land transport so as to limit impacts to the local road network. | Contractor | Construction |
| T3 | Land transport and parking | Public transport passengers will be notified of any impacts to transport services and the alternative transport options prior to the commencement of construction and ancillary facilities on Darling Point Road. This will include updates to the ferry timetable indicating closure during construction at the wharf | Transport for NSW | Pre-construction / Construction |
| T5 | Water transport | <ul style="list-style-type: none"> A maritime navigation exclusion zone will be established during construction to prevent unauthorised vessels entering the area. This zone will be clearly defined to communicate access for other water users. | Contractor | Pre construction / Construction |

6.10 Air quality

This section describes the existing air quality at the wharf and describes the potential impacts associated with the proposal.

6.10.1 Existing environment

The existing air quality near the location of the proposal is primarily influenced by emissions from motor vehicles and residential activities. Air quality is also influenced by the prevailing weather and climatic conditions, bushfires and other natural factors such as pollen.

The nearest long term air quality monitoring site is located at Cook and Phillip Park (Sydney CBD) which is part of the Sydney East monitoring network. A review of air quality data for the year to February 2022 for Cook and Phillip Park indicates that air quality is generally categorised as 'Good' based on the air quality category (AQC) (DPE, 2022b).

The closest Bureau of Meteorology (BoM) monitoring station to the location of the proposal with rainfall data is located at Sydney Botanic Garden, Sydney (station number 066006). Data from the BoM (BoM, 2022c) reports that the average annual rainfall recorded at Sydney Botanic Garden is 1230.1 millimetres.

Sydney Harbour (Wedding Cake West) weather station (station number 066196) is located about 4.5 kilometres to the east of the proposal area. Morning and afternoon wind rose directional data is summarised in Table 6-1 (BoM, 2022b) and shown on Figure 6-1. Afternoon winds are generally stronger than morning winds tending towards 20-28 kilometres per hour with morning winds generally 16-19 kilometres per hour (BoM, 2021b).

6.10.2 Potential impacts

Construction

During the construction of the proposal temporary impacts on air quality may arise from:

- Minor generation of particles and dust from general construction work (e.g. demolitions, excavations, concrete cutting and breaking)
- Minor emissions (primarily diesel exhaust) from plant and machinery
- Minor emissions from construction traffic and water vessels.

These impacts are expected to be short-term, low intensity and be able to be managed through identified safeguard and management measures.

Operation

The level of operation of the ferry services would not increase so no additional impacts to the air quality are expected from the operation of the proposal.

6.10.3 Safeguards and management measures

Table 6-34 lists the air quality safeguards and management measures that would be implemented to account for the impacts identified in section 6.10.2.

Table 6-34: Air quality safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------|--|----------------|---------------------------------|
| AQ1 | Air quality | <p>Air quality during construction will be considered and addressed within the CEMP and will include methods to manage work during strong winds or other adverse weather conditions as required. As a minimum, the following measures will be included:</p> <ul style="list-style-type: none"> • Covering all loaded trucks and vessels • Machinery to be turned off rather than left to idle when 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 legislation • Maintenance of all plant and equipment to ensure good operating conditions and exhaust emissions comply with the PoEO Act • Maintaining the work site in a condition that minimises fugitive emissions such as minor dust • Appropriate sediment and erosion controls for any exposed earth or stockpiled waste. | Contractor | Pre-construction / Construction |
| AQ2 | Sustainability | During construction, the Contractor is to monitor performance of their non-road diesel plant and equipment against US EPA, EU or equivalent emissions standards using Transport for NSW <i>Air Emissions Workbook - DMS-FT-439</i> . | Contractor | Construction |

6.11 Waste management

This section describes existing waste management and describes the potential impacts associated with the proposal.

6.11.1 Methodology

The assessment considered the impacts associated with:

- Resource use and materials management during construction
- Waste generation, management and disposal during construction
- The proposal's ability to respond to waste management and resource conservation plans, policies and guidelines.

The basis of assessment was to consider the hierarchy of avoiding waste generation and primary resource use in favour of reduction, reuse and recycling, consistent with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act).

6.11.2 Existing environment

Public waste bins are provided at the existing wharf and are managed as part of the existing wharf operations. There is the potential for litter to enter Sydney Harbour from existing wharf activities.

Recreational fishing is undertaken from the existing wharf which may generate waste such as hooks, bait and fishing line.

In terms of resource use, the wharf has required ongoing maintenance, repairs and upgrade over time. This has required the use of small quantities of replacement materials such as timber and metal.

6.11.3 Potential impacts

Construction

Waste management

Construction activities would generate various waste streams that would need to be managed and disposed of, including:

- Existing timber wharf and associated furniture
- Waste fuels, oils, liquids and chemicals
- Packaging wastes such as cardboard, timber, paper and plastic
- General garbage and sewage from the temporary compound
- Potential for ASS (refer section 6.1.2)
- Potential for contaminated soils and sediment (refer section 6.1.2)
- Various building material wastes (including metals, timbers, plastics and concrete)
- Earthworks spoil
- Asphalt and concrete
- General waste, including food, litter and other wastes generated by the construction workers.

Ancillary facilities would be contained within the site compound(s), and include a portable toilet and small shipping container/shed. Minimal storage of materials is anticipated, but may include precast materials and some plant and equipment. Where feasible, materials would be barged, including fuels, oils and other required liquids which would be stored in bunded containers. All waste removed from the site would be transferred by a licenced contractor to a licenced receiving facility.

Any excavated material would be reused where suitable or classified before being disposed to an appropriately licenced facility in accordance with *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA, 2014). Where necessary, this would include sampling and analysis.

Resource use

Transport for NSW adopts a resource reduction strategy based on using:

- Alternative low-energy, high recycled content materials where they are cost and performance competitive and comparable in environmental performance
- Locally sourced materials, noting that most of the materials needed to build the proposal are widely available and typically in abundant supply in the local market
- Alternative forms of material sourcing to reduce the distances or methods travelled to supply materials.

Operation

One of the objectives of the FWUP is to increase patronage of the Sydney Harbour ferry network. The proposal would lead to an increase in patronage as a result of improved access and generally improving the wharf facility. As a result, increased waste may be generated but incidences of littering are not expected to increase given that waste management is likely to improve with the installation of new garbage receptacles and improved facilities.

6.11.4 Safeguards and management measures

Table 6-35 lists the waste management safeguards and management measures that would be implemented to account for the impacts identified in section 6.11.3.

Table 6-35: Waste management safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------|--|----------------|---------------------------------|
| WM1 | Waste | <p>A Waste Management Plan (WMP) will be prepared in accordance with the WARR Act. A WMP is to be prepared as part of the CEMP and would include measures to minimise waste, outline methods of disposal, reuse and recycling and monitoring, as appropriate. This is to include the following:</p> <ul style="list-style-type: none"> • Appropriate measures to avoid and minimise waste associated with the proposal should be investigated and implemented where possible • Waste management, littering and general tidiness will be monitored during routine site inspections. | Contractor | Pre-construction / Construction |
| LS2 | Waste | Any excavated sediments or soil that require disposal will be sampled, tested and classified in accordance with the EPA's <i>Waste Classification Guidelines: Part 1 Classifying Waste</i> (EPA, 2014) prior to being disposed of at a waste facility licensed to accept the relevant class of waste. Any materials classified as Hazardous Waste may require treatment or an immobilisation approach in accordance with Part 10 of the Protection of the Environment Operations (Waste) Regulation 2014 prior to off-site disposal. | Contractor | Construction |
| WM2 | Resource use | Recycled, durable, and low embodied energy products will be considered to reduce primary resource demand in instances where the materials are cost and performance competitive and comparable in environmental performance (e.g. where quality control specifications allow). | Contractor | Detailed design |
| WM3 | Sustainability | During construction, the Contractor is to monitor waste and recycling quantities using Transport for NSW <i>Waste Data Collection Workbook – DMS-FT-436</i> to support compulsory requirement 4 of the Transport for NSW <i>Sustainable Design Guidelines version 4.0</i> (TfNSW, 2017a). | Contractor | Construction |

6.12 Hazards and utilities

This section describes the existing hazards and utilities at the wharf and describes the potential impacts associated with the proposal.

6.12.1 Methodology

The assessment considered the impacts associated with potential hazards and risks, and utilities during construction and operation of the proposal.

6.12.2 Existing environment

The existing wharf currently has no wheelchair accessibility as the only access to the wharf is via a pedestrian footpath and sandstone steps from Darling Point Road through McKell Park. Embarking and disembarking the ferry also requires the use of the tidal steps which are not DDA compliant.

The existing features of the proposal area indicate there is a high probability of occurrence for ASS and a high residual risk for potential contaminants in the sediments (refer section 6.1.2).

No flooding issues, or other hazards and risks are expected at the proposal area.

The preliminary assessment identified that the following services are present in the vicinity of Darling Point Wharf (Aurecon, 2019a):

- Submarine cable
- Optic fibre/cable (NBN)
- Underground communication cable (Telstra)
- Sewer main, water main and maintenance hole
- Electrical LV cables (Ausgrid)
- Gas services (Jemena).

There is potential for unknown services to exist within the proposal footprint.

6.12.3 Potential impacts

Construction

The following hazards and risks would be associated with the proposal during construction:

- Construction materials, waste and/or other objects have the potential to fall from the land based construction area, the construction barge or other construction vessels into the harbour causing water pollution and risk to human health
- Physical injury to construction workers due to various hazards and risks associated with the construction activities (e.g. piling or underwater construction activities)
- Physical injury to public due to various hazards and risks associated with the construction activities
- Risk to human health or the environment from spillage of materials and/or wastes into the water or on land
- Risk to human health or the environment from the dispersion of potentially ASS and/or contaminated sediments

- Risk to human health or the environment from air quality related impacts from dust generated during construction activities
- Potential impacts to known and unknown utilities.

Operation

The new wharf has been designed to comply with relevant standards, minimising risk to passenger welfare during operation of the wharf, and improving accessibility.

The installation of protection piles adjacent to the wharf would assist ferries berthing and disembarking at the wharf.

Vessel movements to the wharf would continue to be managed through standard maritime procedures.

6.12.4 Safeguards and management measures

It is expected that hazard safeguards and management measures will be identified and appropriately managed in the design and construction risk management documentation for the project. Hazard safeguards and management measures would include but not be limited to those identified in Table 6-36.

Table 6-36: Hazards safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|-------------------|--|----------------|------------------|
| HR1 | Hazards and risks | Weather forecasts will be monitored during construction. In the unlikely event of a major weather event or strong marine winds/waves, equipment and materials will be temporarily removed from the site, where possible. | Contractor | Construction |
| HR2 | Hazards and risks | Further investigations and assessment of impacts to local utilities will be undertaken. | Contractor | Detailed design |
| HR3 | Hazards and risks | Onsite service location will be carried out prior to undertaking any excavation or piling works to identify any additional cables not identified during design. | Contractor | Pre-construction |

6.13 Climate change and greenhouse gas

6.13.1 Climate change strategic framework

The Intergovernmental Panel on Climate Change has produced climate change projections. In Australia, both the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the BoM have produced regional downscaled projections for Australia from these projections.

In 2014 the NSW Government published climate change 'snapshots' for each region in NSW, including the Sydney region. The climate change predictions for Sydney can be summarised as (OEH, 2014b):

- Higher than average temperatures (maximum and minimum temperatures)
- The number of hot days will increase and the number of cold nights will decrease
- Rainfall is projected to decrease in spring and winter, and increase in summer and autumn
- Average fire weather is projected to increase in spring, and severe fire weather days are projected to increase in spring and summer.

The NSW Coastal Planning Guideline: *Adapting to Sea Level Rise* (DoP, 2010) applies to the proposal. This guideline requires that the following eight criteria be considered when designing development proposals:

- Development avoids or minimises exposure to immediate coastal risks (seaward of the immediate hazard line)
- Development provides for the safety of residents, workers or other occupants on-site from risks associated with coastal processes
- Development does not adversely affect the safety of the public off-site from a change in coastal risks as a result of the development
- Development does not increase coastal risks to properties adjoining or within the locality of the site
- Infrastructure, services and utilities on-site maintain their function and achieve their intended design performance
- Development accommodates natural coastal processes
- Coastal ecosystems are protected from development impacts
- Existing public beach, foreshore or waterfront access and amenity is maintained.

In October 2009 the NSW government released its *NSW Sea Level Rise Policy* (DECCW, 2009). The policy provided sea level rise planning benchmarks as follows:

- 40 centimetres by 2050
- 90 centimetres by 2100.

On 8 September 2012, the State government withdrew these benchmarks in order to provide more flexibility in considering local conditions when determining future hazards. Responsibility for adopting sea level rise projections for use in planning was transferred back to local government.

Climate change risk assessment

A Climate Change Risk Assessment was completed at Concept Design Phase (Aurecon, 2019c). The assessment identifies climate variables that are a risk to the proposal including:

- Sea level rise – sea level rise would increase the potential for inundation of fixed marine structures such as jetties, saltwater intrusion onto marine structures and coastal erosion. Inundation could result in the failure of floating pontoons and gangways. Increased coastal erosion could affect the foundations of landside structures and compromise their integrity. Sea level rise could also inundate landside stormwater and drainage infrastructure, resulting in increased localised flooding at and near the landside approaches to the wharves
- Increased mean annual temperature – higher temperatures have the potential to compromise the integrity of external facades and road surfaces leading to quicker deterioration and cracking, which would increase maintenance costs
- Increased number of hot days and heatwave events – extreme heat has the potential to cause heat stress in customers, especially at wharves that do not provide shelter from sunlight
- More frequent and intense fire weather – more frequent or intense fire events could result in direct loss of wharf property or assets and lives of passengers and staff
- Mean rainfall – extreme rainfall events could create water flows that exceed the drainage and stormwater systems resulting in localised flooding. It could also result in damage to aboveground structures
- Drought – extended periods of drought conditions can cause decrease in soil moisture resulting in ground shrinkage and soil movements. This has the potential to damage underground infrastructure which could compromise serviceability.

6.13.2 Potential impacts

Construction

Climatic factors would not constrain construction of the proposal except during adverse weather conditions such as prolonged heavy rain or high winds which may occur during the construction period. These may delay the completion of construction.

Construction would contribute to climate change through the generation of greenhouse gases from construction activities. A temporary increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the proposal due to exhaust emissions from construction machinery and vehicles transporting materials and personnel to and from the site.

The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool Manual* (TfNSW, 2019) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the proposal and the short-term temporary nature of the individual construction work, it is considered that greenhouse gas emissions resulting from the construction would be kept to a minimum through the implementation of the standard mitigation measures.

Operation

Projections for various climate variables which have the potential to impact the wharf were considered in the Climate Risk Assessment (Aurecon, 2019c) completed during the

concept design phase in line with Transport for NSW's *Climate Risk Assessment Guidelines*.

The proposal has minimised its exposure to climate change risks by including a fixed gangway and hydraulic platform which have been designed to provide appropriate clearances of existing tides, storm surge, sea and wave action whilst also considering projected sea level rise over the next 50 years. The design of the platform, waiting area and gangway was designed to account for 2070 projections of sea level rise. The proposal includes the construction of a new fixed structure within the water.

More extreme and more frequent heat events as a result of climate change may lead to more rapid degradation of the wharf structures. This may result in additional maintenance requirements.

Shading is provided on the waiting area to protect passengers during extreme weather events.

Any climate change impacts of constructing, operating and maintaining the proposal are considered minor.

There would be some greenhouse gas emissions during maintenance of the wharf, although maintenance requirements have been considered in the materials used for the proposal and are considered minor.

It is anticipated that, once operational, the proposal may result in an increase in use of Darling Point Wharf and a relative decrease in use of private motor vehicles by commuters to travel to and from Darling Point. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

6.13.3 Safeguards and management measures

Table 6-37 lists the climate change and greenhouse gas safeguards and management measures that would be implemented to account for the impacts identified in section 6.13.2.

Table 6-37: Climate change and greenhouse gas safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------|---|----------------|--------------------------------|
| CC1 | Climate change | During detailed design undertake a compliant carbon footprinting exercise in accordance with the Transport for NSW <i>Carbon Estimate and Reporting Tool Manual</i> (TfNSW, 2019). The carbon footprint will be used to inform decision making in design and construction. | Contractor | Detailed design / Construction |
| CC2 | Climate change | During detailed design undertake a compliant climate risk assessment in accordance with the Transport for NSW <i>Climate Risk Assessment Guidelines – DMS-SD-081</i> . | Contractor | Detailed design |
| CC3 | Climate change | <p>The detailed design process will consider adaptation measures for climate change, including the following:</p> <ul style="list-style-type: none"> • Design of pontoons, waiting areas and gangways • Integrate coastal erosion control techniques around landside infrastructure • Drainage and storm water infrastructure • Specifications of materials in design • Weather protection features. | Contractor | Detailed design |

6.14 Sustainability

6.14.1 Sustainability in design

Transport for NSW is committed to minimising the impact on the natural environment using the Transport for NSW *Sustainable Design Guidelines (SDG) v4.0 rating tool* (TfNSW, 2017a) to measure and drive sustainability performance. The SDG rating tool was developed to support Transport for NSW's ongoing commitment to sustainability to deliver environmental and social benefits as outlined in Transport for NSW's *Environment and Sustainability Policy* (TfNSW, 2020c) and *Future Transport Strategy 2056* (TfNSW, 2018).

The SDG rating tool sets targets across the following key areas:

- Climate change adaptation and resilience
- Energy management
- Waste and recycling
- Materials
- Water conservation
- Supply chain management
- Community benefit.

Key design elements and strategies developed during concept design will be used to further develop the design and construction of the proposal.

6.14.2 Potential impacts

The design of the proposal has been based on the principles of sustainability, including aiming for a 'Silver' rating under the Transport for NSW *Sustainability Design Guidelines v4.0* (TfNSW, 2017a) and the Transport for NSW Environmental Management System (EMS). These guidelines require a number of mandatory and discretionary initiatives to be applied.

Further positive impacts in relation to climate change and sustainability associated with the proposal include encouraging a reduction in private vehicle use and increase the accessibility of public transport services.

6.14.3 Safeguards and management measures

Table 6-38 lists the sustainability safeguards and management measures that would be implemented to account for the impacts identified in section 6.14.2.

Table 6-38: Sustainability safeguards and management measures

| ID | Impact | Environmental safeguards | Responsibility | Timing |
|----|----------------|---|----------------|------------------------------------|
| S1 | Sustainability | The Contractor shall propose a suitably qualified and experienced sustainability officer at a minimum 14 days prior to site establishment to be endorsed by Transport for NSW. The sustainability officer will be responsible for implementing the sustainability objectives for the project. Details of the sustainability officer, including defined responsibilities, duration and resource allocation throughout the appointment are to be submitted to Transport for NSW prior to the preparation of the Sustainability Management Plan (SMP). | Contractor | Detailed design / Construction |
| S2 | Sustainability | <p>Prior to commencement of construction, a SMP shall be endorsed by Transport for NSW. The SMP will be provided prior to construction and include the following minimum components:</p> <ul style="list-style-type: none"> • A completed electronic checklist demonstrating compliance with Transport for NSW's <i>NSW Sustainable Design Guidelines Version 4.0</i> (7TP-ST-114) • The Contractors sustainability goals and targets, internal procedures, and implementation strategy. | Contractor | Detailed design / Pre-construction |
| S3 | Sustainability | The Contractor must comply with the Transport for NSW <i>Sustainable Design Guidelines version 4.0</i> (TfNSW, 2017a). | Contractor | Detailed design / Construction |

Other safeguards and management measures that address sustainability are identified in section 6.9.4 (socio-economic), section 6.10.3 (air quality), section 6.11.4 (waste management) and section 6.13.3 (climate change).

6.15 Cumulative impacts

Cumulative impacts relates to any combined impact resulting from multiple individual sources. These sources can occur in the past, present or future in comparison to the construction and operation of the proposal. The consideration of cumulative impacts is required to assess this combined impact in the context of the region.

6.15.1 Proposal area

Darling Point Wharf is located in the Woollahra LGA. Projects within the Woollahra LGA and the Sydney Ferries Network have been considered for the purposes of this cumulative impact assessment.

A search of the following databases was completed on 22 March 2022 to identify any projects which might result in cumulative impact with the proposal:

- DPE – major projects
- Sydney Eastern City Planning Panel Register
- Woollahra Municipal Council Development Application Register.

Projects identified on the above registers that were most likely to contribute to cumulative impacts, due to their timing, scale and/or proximity to the proposal have been identified in Table 6-39.

6.15.2 Broader program of work

The proposal is part of a broader program of work, called FWUP, to upgrade the commuter ferry wharves in Sydney. The proposal is located on the F7 Double Bay Loop, which provides connections between Circular Quay, Double Bay and Darling Harbour.

The FWUP includes planned upgrades to multiple wharves in the Sydney Ferries Network including Double Bay Wharf.

During construction the Darling Point Wharf would be closed.

6.15.3 Other projects and developments

Potential impacts from the construction and operation of present and future projects identified as the most likely to contribute to cumulative impacts, due to their timing, scale and/or proximity to the proposal are summarised in Table 6-39.

In addition a number of small-scale local development projects (such as minor residential alterations and development applications) within the broader proposal area were identified, however, it is anticipated these small-scale local developments would not significantly impact the proposal.

Table 6-39: Past, present and future projects

| Project | Construction impacts | Operational impacts |
|---|--|--|
| FWUP, including the upgrade of Double Bay Wharf | Upgrade of Darling Point Wharf would require additional boat movements within Sydney Harbour for the | The FWUP would have a beneficial cumulative impact through improved passenger amenity and consistent ferry wharf |

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| Project | Construction impacts | Operational impacts |
|--|---|--|
| | <p>delivery of materials to the site and may conflict with other wharf upgrades.</p> <p>There would be a potential minor short term cumulative increase in exhaust emissions from construction projects within the region.</p> <p>Developments within the region would contribute to climate change through the generation of greenhouse gases from construction activities. Greenhouse gases would be generated through the use of fossil fuels by construction plant and equipment, transportation of personnel and materials and the embodied carbon in the materials used such as concrete and steel. These impacts are considered to be minor.</p> | <p>design across the network. It would result in improvements to:</p> <ul style="list-style-type: none"> • Safety for commuters • Recreational facilities • Improved travel times • Improved customer experience due to upgraded facilities • The public domain and quality of customer experience. |
| <p>Weigall Sports Complex, Sydney Grammar School</p> <p>Location: Rushcutters bay</p> <p>Status: Approved 05/11/2021</p> <p>SSD No: SSD-10421</p> | <p>Potential impacts to traffic, noise, visual amenity and air quality.</p> <p>Reduced visual amenity during construction.</p> | <p>No operational impacts are anticipated.</p> |
| <p>Ascham School (building demolition and building construction)</p> <p>Location: New South Head Road, Edgecliff / Darling Point Road, Darling Point</p> <p>Status: Under assessment (referral date 13 Oct 2021)</p> <p>Planning Panel Reference Number: PPSSEC-155</p> <p>DA number: DA433/21</p> | <p>Potential impacts to traffic, noise and air quality.</p> <p>Reduced visual amenity during construction.</p> | <p>No operational impacts are anticipated.</p> |

6.15.4 Potential impacts

The potential cumulative impacts are listed in Table 6-40.

Table 6-40: Potential cumulative impacts

| Environmental factor | Construction | Operation |
|-------------------------------|---|---|
| Socio-economic | Cumulative impacts to patrons of the ferry network due to closure of Darling Point Wharf. | No operational impacts are anticipated. |
| Transport, traffic and access | Double Bay Wharf has been identified as an alternative transport option whilst Darling Point Wharf is closed for construction. There may be a period of overlap between the closure of both the Double Bay wharf and Darling Point Wharf in order to complete works in the off-peak periods of winter. | No operational impacts are anticipated. |
| Traffic and transport | Minor increase in marine traffic. | No operational impacts are anticipated. |

6.15.5 Safeguards and management measures

Table 6-41 lists the cumulative impacts safeguards and management measures that would be implemented to account for the impacts identified in section 6.15.4.

Table 6-41: Cumulative impacts safeguards and management measures

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------------------|--|--------------------------------|---------------------------------|
| C1 | Cumulative construction impacts | Consultation will include notification prior to the start of the works Updates on any delays or changes to the construction period will also be communicated. | Transport for NSW / Contractor | Pre-construction / Construction |
| C2 | Cumulative construction impacts | Alternative transport options to be investigated should the Darling Point and Double Bay Wharf construction programs overlap. | Transport for NSW | Pre-construction |

7 Environmental management

This chapter describes how the proposal would 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 (or system)

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 will be incorporated into the detailed design and applied during the construction and operation of the proposal.

A CEMP would be prepared to describe the safeguards and management measures identified. The CEMP would provide a framework for establishing how these measures would be implemented and who would be responsible for their implementation.

The CEMP would be prepared prior to construction of the proposal and must be reviewed and certified by the Transport for NSW Environment Officer prior to the commencement of any on-site work. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF would 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 would minimise any potential adverse impacts arising from the proposed work on the surrounding environment. The safeguards and management measures are summarised in Table 7-1.

Table 7-1: Summary of safeguards and management measures

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|------|--|--|--------------------------------|------------------------------------|
| GEN1 | General - minimise environmental impacts during construction | <p>A CEMP will be prepared and submitted for review and endorsement of the Transport for NSW Environment Manager prior to commencement of the activity.</p> <p>As 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 identified safeguards outlined in the REF 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> | Transport for NSW / Contractor | Pre-construction |
| GEN2 | General - notification | All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least seven calendar days prior to commencement of the activity. | Transport for NSW / Contractor | Pre-construction |
| GEN3 | General – environmental awareness | 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. | Transport for NSW / Contractor | Pre-construction / Detailed design |

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| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|------------------------|--|--------------------------------|---|
| | | <p>Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include:</p> <ul style="list-style-type: none"> • Areas of non-Aboriginal heritage sensitivity • Seagrass meadows and threatened species habitat • Areas of moderate/high archaeological potential • Adjoining residential areas requiring particular noise management measures. | | |
| LS1 | Soil and water | A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the 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 | Pre-construction |
| LS2 | Soil and water / Waste | Any excavated sediments or soil that require disposal will be sampled, tested and classified in accordance with the EPA's <i>Waste Classification Guidelines: Part 1 Classifying Waste</i> (EPA, 2014) prior to being disposed of at a waste facility licensed to accept the relevant class of waste. Any materials classified as Hazardous Waste may require treatment or an immobilisation approach in accordance with Part 10 of the Protection of the Environment Operations (Waste) Regulation 2014 prior to off-site disposal. | Contractor | Construction |
| LS3 | Soil and water | Clean and suitable topsoil will be stockpiled and reused on site where appropriate. | Contractor | Construction |
| LS4 | Contaminated land | Landside soils will be analysed for ASS for waste classification. This can be undertaken in-situ prior to excavation to inform any design implications or following excavation if the materials are stockpiled on-site. If in-situ sampling is undertaken, samples must be taken to the depth of excavation. All sampling should be conducted by a suitably qualified contaminated land specialist. | Transport for NSW / Contractor | Detailed design / Pre-construction / Construction |
| LS5 | Contaminated land | If unexpected contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Transport for NSW Environment Manager and/or EPA. | Contractor | Construction |
| LS6 | Contaminated land | The piling activity shall mitigate the risk of sediment dispersal by applying industry best practice of minimising sediment disturbance during construction using pilling methods or any other seabed interference. | Contractor | Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|------|---|--|----------------|------------------|
| LS7 | Erosion and sedimentation | <p>Site specific Erosion and Sediment Control Plan/s will be prepared and implemented as part of the SWMP. Control measures are to be implemented and maintained (in accordance with the Landcom/Department of <i>Housing Managing Urban Stormwater, Soils and Construction Guidelines</i>, 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 | Pre-construction |
| LS8 | Erosion and sedimentation / Aquatic impacts | <p>Prior to commencement of construction activities, sediment control device (such as sediment boom and curtain) will be installed around the site to contain disturbed sediment from the water surface by allowing suspended sediments to settle back on the bottom of the seabed overtime. The silt boom and curtain should extend from a minimum of 100 millimetres above the water line to a minimum of 2.5 metres below the water line before starting work.</p> <p>Installation should be undertaken during high tide periods from a boat. The device should be designed to rise and fall with the tide to prevent disturbance. Inspection of the device should be undertaken on a daily basis after ebbing tides, with additional inspection carried out following storm events. Prior to removing the sediment control device, conditions within the curtain should be assessed visually and with a field instrument to verify that sediment has settled resulting in similar water turbidity to that outside the curtain.</p> | Contractor | Construction |
| LS9 | Erosion and sedimentation | <p>Visual monitoring of local water quality (i.e. turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.</p> <p>Results of the observations are required to be recorded. Records are required to be kept on the site and to be made available for inspection by persons authorised by Transport for NSW.</p> | Contractor | Construction |
| LS10 | Erosion and scour / Removal of | The number of barge anchor points will be minimised where possible. Anchoring locations should be selected to avoid areas of sensitive habitat and moderate/high archaeological potential. | Contractor | Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|------|--|--|----------------|---------------------------------|
| | marine vegetation and habitat / Maritime archaeology - Anchoring | | | |
| LS11 | Erosion and scour / Aquatic impacts | Works associated with positioning barges, drilling and pile driving will occur during calm conditions to prevent excessive scouring and other impacts. | Contractor | Construction |
| LS12 | Design changes | If there are significant changes to the design or layout of piles then further delineation assessment of the known contamination should be undertaken to evaluate the vertical and lateral extent of sediment impact prior to work commencement. | Contractor | Detailed design |
| WQ1 | Accidental spill / Aquatic impacts | <ul style="list-style-type: none"> A spill management plan will be developed as part of the CEMP and communicated to all staff working on site. Appropriate land and aquatic spill kits are to be maintained on site and on barges. Aquatic spill kits must be specific for working within the marine environment. The spill kit must be appropriately sized for the volume of potentially polluting liquids stored at the site. All workers will be advised of the location of the spill kit and trained in its use. | Contractor | Pre-construction / Construction |
| WQ2 | Accidental spill | If an incident (e.g. spill) occurs, the Transport for NSW <i>Environmental Incident Classification and Reporting Procedure</i> is to be followed and the Transport for NSW Contract Manager notified as soon as practicable. | Contractor | Construction |
| WQ3 | Accidental spill | In the event of a maritime spill, the incident emergency plan will be implemented in accordance with Port Authority of NSW's response to shipping incidents and emergencies outlined in the <i>NSW State Waters Marine Oil and Chemical Spill Contingency Plan</i> (RMS, 2016c). | Contractor | Construction |
| WQ4 | Accidental spill | Emergency contacts will be kept in an easily accessible location on vehicles, vessels, plant and site office. All workers will be advised of these contact details and procedures. | Contractor | Pre-construction / Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--|---|----------------|------------------|
| WQ5 | Accidental spill | Vehicles, vessels and plant must be properly maintained and regularly inspected for fluid leaks. | Contractor | Construction |
| WQ6 | Accidental spill | No vehicle or vessel wash-down or re-fuelling will occur on site. | Contractor | Construction |
| WQ7 | Accidental spill | Any chemicals or fuels stored at the site or equipment barges will be stored in a bunded area. | Contractor | Construction |
| WQ8 | Pollution | An environmental work method statement (EWMS) will be developed for the removal of the existing wharf elements (e.g. jetty, piles and pontoon) to minimise the risk of pollutants and debris entering the waterway and/or disturbing the seabed. The EWMS must be approved by Transport for NSW prior to the demolition works. | Contractor | Pre-construction |
| B1 | All project impacts | <p>Integrate the management of flora and fauna into the construction environmental management plan (either as a standalone flora and fauna management plan or a subplan). This is to include all terrestrial and marine flora and fauna and include but not be limited to such measures as:</p> <ul style="list-style-type: none"> • Documenting and establishing site clearing limits and including on the sensitive area plans • Establishing no go zones (including the artificial pond and no anchoring in seagrass) and including on the sensitive area plans • Implementing tree protection measures in accordance with Eco Logical (2019) • Pre-clearing surveys, vegetation removal, weed management and unexpected finds measures in line with the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Pre-construction |
| B2 | Removal of threatened species habitat and habitat features | Pre-clearing surveys will be undertaken by a suitably qualified ecologist / fauna spotter/catcher in accordance with Guide 1: Pre-clearing process of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). Any roosting microbats in the wharf structures to be removed and the seawall to be impacted/disturbed will be captured and relocated to similar or higher condition habitat. Release will only be done at dusk and roosting individuals should be kept in a secure, dark and warm location until then. Injured individuals or unfurred juveniles are to be transported to a veterinarian. Seawalls will also be inspected for Little Penguins. | Contractor | Pre-construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--|---|----------------------------------|-------------------|
| B3 | Disturbance of threatened species habitat and habitat features | The unexpected species finds procedure is to be followed under <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified on site. | Contractor | Construction |
| B4 | Removal of marine vegetation and habitat | Considerations during detailed design to promote colonisation of habitat-forming species could include the installation of structures (e.g. piles and pontoons) which provide habitat complexity (e.g. designs available as part of the Living Seawalls Project). Consideration to the use of perforated materials for the gangway and waiting area to minimise shading impacts on marine vegetation and habitat. | Transport for NSW and Contractor | Detailed design |
| B6 | Removal of marine vegetation and habitat | Complete a targeted survey for Black Rockcod and White's Seahorse within 24 hours prior to the commencement of water-based construction activities. Black Rockcod individuals will be encouraged to move away from the study area prior to silt curtain installation and White's Seahorse will be captured and relocated to nearby similar habitat using methods approved by DPI Fisheries. A White's Seahorse relocation plan will be developed in consultation with DPI Fisheries to dictate this activity. These activities are to be completed by a qualified marine ecologist. | Contractor | Pre- construction |
| B7 | Removal of marine vegetation and habitat | A Section 37 permit under the FM Act to relocate Syngnathids collected during the targeted pre-clearance survey will be required as part of the White's Seahorse relocation. Relocation may be undertaken by a pre-qualified permit holder. | Contractor | Pre-construction |
| B8 | Aquatic impacts | Aquatic habitat will be protected in accordance with Guide 10: Aquatic habitats and riparian zones of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011) and Section 3.3.2 Standard precautions and mitigation measures of the <i>Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013). | Contractor | Construction |
| B9 | Aquatic impacts | Piling to stop if marine mammals, reptiles or Little Penguin are observed within approximately 100 metres of the site and only to recommence once they have moved beyond 100 metres of the site or are not seen for at least 20 minutes. | Contractor | Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--|--|-------------------|------------------|
| B10 | Changes to coastal processes | The detailed design will aim to avoid/minimise any impact to coastal processes and hydrology. | Contractor | Detailed design |
| B11 | Injury and mortality of fauna | Fauna will be managed in accordance with Guide 9: Fauna handling of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Construction |
| B12 | Invasion and spread of weeds, pests and diseases | Weed species will be managed in accordance with Guide 6: Weed management of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Construction |
| B13 | Invasion and spread of weeds, pests and diseases | Pathogens will be managed in accordance with Guide 2: Exclusion zones of the <i>Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects</i> (RTA, 2011). | Contractor | Construction |
| B14 | Invasion and spread of weeds, pests and diseases | Water-based equipment and vessels to be sourced from local suppliers where possible. Equipment and vessels must be cleaned and inspected prior to entering the site. | Contractor | Construction |
| B15 | Invasion and spread of weeds, pests and diseases | Occurrence of any marine pests must be reported to DPI Fisheries. | Contractor | Construction |
| B16 | Noise, light and vibration | Shading and artificial light impacts will be minimised through detailed design. | Contractor | Detailed design |
| B17 | Tree protection | An Arboricultural impact assessment will be prepared to ensure trees on site are not adversely impacted and to outline tree protection measures to be implemented during construction. | Transport for NSW | Detailed design |
| NV1 | Noise and vibration | Preparation of a Construction Noise and Vibration Management Plan (CNVMP) based on recommendations provided within the ICNG and <i>Australian Standard AS</i> | Contractor | Pre-construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--------|--|----------------|--------|
| | | <p><i>2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites.</i> This is to include, but not be limited to:</p> <ul style="list-style-type: none"> Plant controls: <ul style="list-style-type: none"> Use of noise attenuating controls at the source, such as mufflers, acoustic screens, etc. Maintain plant and equipment in good working order to prevent excess noise generation. Locate static sources of noise such as the generators as remotely as possible from noise sensitive receivers Use of broadband reversing alarms, or 'quackers' (instead of standard tonal alarms), on mobile equipment in accordance with the relevant health and safety regulations Use of temporary noise barriers where practical. The height and location of these barriers will be determined during preparation of the CNVMP when more information regarding the proposed plant to be used for each construction scenario is available Investigate whether 'at plant' mitigation or muffled plant is available for plant with high source noise levels such as rock hammers and piling rigs, and plant emitting continuous noise such as generators Acoustic curtains will be investigated for stationery plant within the site once a detailed schedule of works and plant is available. Management and behavioural controls: <ul style="list-style-type: none"> Ensure that managers effectively communicate acceptable and unacceptable work practices for the site, through staff site inductions, notice boards, and prestart meetings Avoid the need for reversing in the construction area by creating a loop road or similar Avoid dropping materials from height Workers should avoid shouting, minimise talking loudly, and avoid slamming vehicle doors. Conducting noise monitoring during landside, piling and out of hours construction scenarios considering the potential exceedances for the purposes | | |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------|--|--------------------------------|------------------|
| | | <p>of assisting in noise mitigation and to verify the findings of this noise assessment.</p> <ul style="list-style-type: none"> Implementing a procedure for dealing with complaints to ensure that all complaints are registered and dealt with appropriately. Conducting additional monitoring if complaints are received or proposed activities and number of plants exceed those assumed in this assessment Modifying work activities where noise or vibration is found to cause unacceptable impact. Implementation of additional mitigation measures in accordance with the CNVG as reasonable and feasible. | | |
| NV2 | Noise and vibration | <ul style="list-style-type: none"> Carrying out works within standard daytime hours as follows: <ul style="list-style-type: none"> 7:00 am to 6:00 pm Monday to Friday 8:00 am to 1:00 pm Saturdays, no work on Sundays or public holidays. Do not carry out operations during evening or night-time hours, unless required for safety reasons when the water is calmer during the night period. Should operations be required outside standard hours, an Out of Hours procedure detailing works schedule, approval process, communications requirements and management measure will be prepared. All reasonable and feasible efforts will be undertaken to ensure noise levels will not exceed the ICNG noise management levels by carrying out night-works with reduced numbers of plant for example. | Contractor | Construction |
| NV3 | Noise and vibration | <ul style="list-style-type: none"> Notification of potentially affected receivers detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the work (where applicable) and contact telephone number. Notification will be a minimum of seven calendar days prior to the start of work. A contact telephone number and email address will be available for community feedback. | Transport for NSW / Contractor | Pre-construction |
| NV4 | Noise and vibration | Conduct short term background noise monitoring prior to construction to confirm the ambient noise levels presented in this report, which were carried out during COVID 19 and may not be representative of typical levels. | Contractor | Pre-construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---|--|-------------------|---|
| NV5 | Vibration impact to heritage structures | <ul style="list-style-type: none"> Determine safe working distances based on proposed plant and where possible, smallest plant able to carry out required work should be utilised to minimise potential impacts. Where works are proposed within the safe working distances, for the heritage structures, specialist advice will be sought from an appropriately qualified structural engineer who is familiar with heritage structures to assess if vibrations associated with the proposed works will potentially result in impacts to heritage structures. A vibration monitoring plan will be prepared as part of the CNVMP (where works are proposed within safe working distances) and implemented to confirm vibration levels prior to construction commencement. Where exceedances are recorded, works will be modified in consultation with the identified specialist to reduce vibration levels. | Contractor | Pre-construction |
| NV6 | Vibration impact to heritage structures | <p>Assessment and monitoring of vibration impacts to heritage items within the safe working distances will adhere to:</p> <ul style="list-style-type: none"> British Standard BS 7385: <i>Part 2: Evaluation and Measurement for Vibrations in Buildings –Part 2 Guide to Damage Levels from Ground-Borne Vibration</i> German Standard DIN 4150, <i>Part 3: Structural Vibration in Buildings: Effects on Structures</i>. | Contractor | Construction |
| NV7 | Vibration impact to heritage structures | Where heritage structures are located within the safe working distance, pre and post construction dilapidation surveys will be carried out. | Contractor | Pre-construction / Construction / Post-construction |
| NV8 | Vibration | Where structures are located within the safe work distance (non heritage structure), pre-construction sampling vibration monitoring will be carried out to ensure compliance with the required criteria. If exceedances are recorded, works will be modified accordingly to reduce vibration levels. | Contractor | Pre-construction / Construction |
| NV9 | Vibration impact to heritage structures | Where structures are located within the safe work distance (heritage structure), pre-construction sampling vibration monitoring will be carried out to ensure compliance with the required criteria. If exceedances are recorded, alternative construction methodology may be required, and/or restrictions applied on the type of plant that can be used. | Contractor | Pre-construction / Construction |
| LV1 | Landscape and visual | Urban design principles will be integrated throughout the detailed design and construction of the proposal and include: | Transport for NSW | Detailed design |

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| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------------------------|---|-------------------|-------------------|
| | | <ul style="list-style-type: none"> • Consideration of tinted and less reflective glazing for the lift structure rather than light and highly reflective clear panels • Judicious use of materials and finishes to minimise reflectivity and maximise transparency of the new structures. Consideration of contemporary design practices and lightweight materials and muted finishes • Consideration of colours that blend in to the landscape (as viewed from the Harbour) and that complement the materiality and heritage listing of McKell Park elements (e.g. sandstone etc). In particular the balustrade to the suspended bridge structure and foreshore pathway, and lighting poles. Darker colours would blend into the landscape more than white, light colours and/or or silver/metal materials • Incorporate landscaping elements, such as green walls and suitable shrubs which can also ameliorate impacts of these structures. | | |
| LV2 | Landscape and visual | Hoarding will be erected around the construction compound where possible, to reduce visibility. | Contractor | Construction |
| LV3 | Landscape and visual | Where out of hours work is required, lighting will be directionally controlled to limit potential impacts of light spill on surrounding receivers, including residential properties. | Contractor | Construction |
| LV4 | Landscape and visual | All impacted areas and ground surfaces will be reinstated as near as possible to their original state following the completion of work. | Contractor | Post-construction |
| H1 | Heritage Interpretation Strategy | In accordance with the sustainability requirements for the project, opportunities for the implementation of heritage interpretation will be investigated during detailed design. | Transport for NSW | Detailed design |
| H2 | Photographic Archival Recording | A Photographic Archival Recording will be undertaken of Fence, gates, and foundation remains of former house <i>Canonbury</i> , located within McKell Park (LEP no. 112 and A1) and Remains of bath house and site of jetty (LEP no. 113) to document their current visual setting prior to any impacts and modifications. Recording should be prepared in accordance with the guideline for <i>Photographic Recording of Heritage Items Using Film or Digital Data Capture</i> (Heritage Council, 2006). | Contractor | Pre-construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--|---|--------------------------------|-------------------|
| H3 | Non-Aboriginal heritage | A sensitive area plan (SAP), identifying all heritage items (including maritime archaeology) in close proximity to the works, will be prepared under the CEMP. | Contractor | Pre-construction |
| H4 | Non-Aboriginal heritage (including maritime) | A heritage induction will be provided to workers prior to construction, informing them of the SAP and identifying the location and significance of known heritage items and the implementation of the unexpected finds protocols if unanticipated heritage items or deposits are located during construction. | Contractor | Pre-construction |
| H5 | McKell Park seawall | A work method statement will be prepared to guide the modification of the seawall within McKell Park (LEP no. 112 and A1) for the pathway to the covered waiting area. | Contractor | Pre-construction |
| H6 | McKell Park seawall | Where the sandstone seawall within McKell Park (LEP no. 112 and A1) and Remains of the bath house and site of jetty (LEP no. 113) is modified, then the sandstone blocks to be removed would be salvaged and handed to Woollahra Municipal Council for re-use as appropriate. | Contractor | Pre-construction |
| H7 | Unexpected finds | Terrestrial archaeological remains will be managed under the <i>Unexpected Heritage Items Procedure</i> (RMS, 2015) if unanticipated heritage items or depositions are located during construction. | Contractor | Construction |
| H8 | Archaeological significance | If unexpected 'relics' are encountered during excavation, a section 146 relics notification under the <i>Heritage Act 1977</i> will be forwarded to Heritage NSW, DPC. 'Relics' cannot be impacted without appropriate approvals under the <i>Heritage Act 1977</i> . | Contractor / Transport for NSW | Construction |
| H9 | Archaeological significance | If significant archaeological remains are encountered during excavation, works will cease and design options for avoiding impacts to the significant archaeological remains will be considered where practicable and opportunities will be investigated for the implementation of heritage interpretation. | Contractor | Construction |
| H10 | Non-Aboriginal heritage | Impacts to the sandstone seawall and all impacted road and footpath surfaces must be made good and reinstated as near as possible to their original state following the completion of works. | Contractor | Post-construction |
| H11 | Vibration impact to heritage structures | If vibration monitors are attached to the heritage items, they must not be attached with permanent fixings. They will be removable without causing damage. Bees wax may be a suitable attachment method | Contractor | Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|--|---|-------------------|------------------------------------|
| H12 | Design change | Any project redesign resulting in new ground/seabed disturbance, vegetation removal, or new features must be assessed in an addendum or consistency assessment to the SoHI and/or MASoHI as required. | Transport for NSW | Detailed design / Pre-construction |
| H13 | Maritime archaeology | An application for an exception under section 139(4) of the <i>Heritage Act 1977</i> should be submitted to the Heritage NSW, DPC prior to the works commencing. | Contractor | Pre-construction |
| H14 | Maritime archaeology Unexpected finds | An Unexpected Finds Protocol will be prepared by a suitably qualified maritime archaeologist and implemented for all maritime works. This document will include: <ul style="list-style-type: none"> • Unexpected finds, stop work triggers and notification protocols • Heritage induction for contractors • Recording methods and procedures • Artefact collection and retention policies. | Contractor | Pre-construction |
| AH1 | Aboriginal heritage | Should the scope of the proposed work change, further consultation with Transport for NSW's Aboriginal Cultural Heritage Officer and regional environmental staff must be undertaken to reassess any potential impacts on Aboriginal cultural heritage. | Transport for NSW | Pre-construction |
| AH2 | Unexpected heritage finds | The <i>Unexpected Heritage Items Procedure</i> (RMS, 2015) will be followed in the event that (an) unknown or potential Aboriginal object(s), including skeletal remains, is/are found during construction. This applies where Transport for NSW does not have approval to disturb the object(s) or where a specific safeguard for managing the disturbance (apart from the procedure) is not in place. Work will only restart once the requirements of that procedure have been satisfied. | Contractor | Construction |
| T1 | Land transport and parking | A TMP will be prepared and will include the following: <ul style="list-style-type: none"> • Final access and parking arrangements • Alternate pedestrian and cyclist access around the construction area • Measures to ensure light vehicle parking is strictly in accordance with Woollahra Municipal Council requirements and prevents parking on footpaths and grassed areas adjacent the site • Plans to maintain access to adjoining properties. | Contractor | Pre-construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------------------|--|-------------------|---------------------------------|
| T2 | Land transport and parking | Where possible, the preferred means of transporting equipment and materials to the site will be via boat and barge over land transport so as to limit impacts to the local road network. | Contractor | Construction |
| T3 | Land transport and parking | Public transport passengers will be notified of any impacts to transport services and the alternative transport options prior to the commencement of construction and ancillary facilities on Darling Point Road. This will include updates to the ferry timetable indicating closure during construction at the wharf. | Transport for NSW | Pre-construction / Construction |
| T4 | Water transport | <p>A Maritime TMP will be prepared and implemented during the water based construction work. The Maritime TMP will be prepared consultation with Transport for NSW and approved by the Harbourmaster. In addition, the proposal will:</p> <ul style="list-style-type: none"> • Fit all buoys with lights • Prepare Response Plans for emergencies and spills for all construction vessels • Fit at least one vessel with an Automatic Identification System (AIS) • Retrieve any material associated with the construction of the development that enters the water to prevent the obstruction of vessel movements • Prepare a Communications Plan for implementation during the work which must include 24/7 contact details, protocols for enquiries, complaints and emergencies. <p>Any variation to the above will be agreed in advance with the Harbourmaster.</p> | Contractor | Pre-construction / Construction |
| T5 | Water transport | <ul style="list-style-type: none"> • A maritime navigation exclusion zone will be established during construction to prevent unauthorised vessels entering the area. • This zone will be clearly defined to communicate access for other water users. | Contractor | Pre-construction / Construction |
| T6 | Water transport | Commercial, recreational operators and private services that use the existing wharf will be advised of the wharf closure at least two weeks prior to closure. | Transport for NSW | Pre-construction / Construction |
| SE1 | Socio-economic | A Communications and Stakeholder Engagement Plan will be developed prior to the commencement of construction and will be implemented during construction to provide timely and accurate information to stakeholders during construction. It will include (as a minimum): | Contractor | Pre-construction / Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|----------------------------|--|--------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> Mechanisms to provide details and timing of proposed activities to affected residents and local businesses, including changes to traffic, public transport services and access A contact name and telephone number for complaints. <p>The Plan will be prepared in accordance with the <i>Community Involvement and Communications Resource Manual</i> (RTA, 2008).</p> | | |
| SE2 | Socio-economic | <ul style="list-style-type: none"> A webpage and free-call number will be established for enquiries regarding the project and will remain active for the duration of construction. Contact details will be clearly displayed at the entrance to the site. All enquiries and complaints will be tracked through a tracking system and acknowledged within 24 hours of being received. | Transport for NSW / Contractor | Pre-construction / Construction |
| SE3 | Sustainability | Investigate opportunities to encourage the Contractor to purchase goods and services locally. | Transport for NSW | Pre-construction / Construction |
| SE4 | Sustainability | Investigate opportunities to incorporate community health and wellbeing initiatives in the design and construction of the project. | Transport for NSW | Detailed design / Construction |
| SE5 | Land transport and parking | Explore opportunities to provide alternative transport during construction. | Transport for NSW | Pre-construction |
| SE6 | Local businesses | Discussions will be held with nearby local businesses who may be indirectly impacted by the project, including <i>Canonbury Cottage</i> and <i>Lindesay House</i> to seek opportunities to minimise the impact of the project during the construction phase. | Transport for NSW | Pre-construction |
| AQ1 | Air quality | <p>Air quality during construction will be considered and addressed within the CEMP and will include methods to manage work during strong winds or other adverse weather conditions as required. As a minimum, the following measures will be included:</p> <ul style="list-style-type: none"> Covering all loaded trucks and vessels Machinery to be turned off rather than left to idle when 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 legislation | Contractor | Pre-construction / Construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|-------------------|--|----------------|---------------------------------|
| | | <ul style="list-style-type: none"> • Maintenance of all plant and equipment to ensure good operating conditions and exhaust emissions comply with the PoEO Act • Maintaining the work site in a condition that minimises fugitive emissions such as minor dust • Appropriate sediment and erosion controls for any exposed earth or stockpiled waste. | | |
| AQ2 | Sustainability | During construction, the Contractor is to monitor performance of their non-road diesel plant and equipment against US EPA, EU or equivalent emissions standards using Transport for NSW <i>Air Emissions Workbook - DMS-FT-439</i> . | Contractor | Construction |
| WM1 | Waste | <p>A Waste Management Plan (WMP) will be prepared in accordance with the WARR Act. A WMP is to be prepared as part of the CEMP and would include measures to minimise waste, outline methods of disposal, reuse and recycling and monitoring, as appropriate. This is to include the following:</p> <ul style="list-style-type: none"> • Appropriate measures to avoid and minimise waste associated with the proposal should be investigated and implemented where possible • Waste management, littering and general tidiness will be monitored during routine site inspections. | Contractor | Pre-construction / Construction |
| WM2 | Resource use | Recycled, durable, and low embodied energy products will be considered to reduce primary resource demand in instances where the materials are cost and performance competitive and comparable in environmental performance (e.g. where quality control specifications allow). | Contractor | Detailed design |
| WM3 | Sustainability | During construction, the Contractor is to monitor waste and recycling quantities using Transport for NSW <i>Waste Data Collection Workbook – DMS-FT-436</i> to support compulsory requirement 4 of the Transport for NSW <i>Sustainable Design Guidelines version 4.0</i> (TfNSW, 2017a). | Contractor | Construction |
| HR1 | Hazards and risks | Weather forecasts will be monitored during construction. In the unlikely event of a major weather event or strong marine winds/waves, equipment and materials will be temporarily removed from the site, where possible. | Contractor | Construction |
| HR2 | Hazards and risks | Further investigations and assessment of impacts to local utilities will be undertaken. | Contractor | Detailed design |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|-------------------|---|----------------|------------------------------------|
| HR3 | Hazards and risks | Onsite service location will be carried out prior to undertaking any excavation or piling works to identify any additional cables not identified during design. | Contractor | Pre-construction |
| CC1 | Climate change | During detailed design undertake a compliant carbon footprinting exercise in accordance with the Transport for NSW <i>Carbon Estimate and Reporting Tool Manual</i> (TfNSW, 2019). The carbon footprint will be used to inform decision making in design and construction. | Contractor | Detailed design / Construction |
| CC2 | Climate change | During detailed design undertake a compliant climate risk assessment in accordance with the Transport for NSW <i>Climate Risk Assessment Guidelines – DMS-SD-081</i> . | Contractor | Detailed design |
| CC3 | Climate change | <p>The detailed design process will consider adaptation measures for climate change, including the following:</p> <ul style="list-style-type: none"> • Design of pontoons, waiting areas and gangways • Integrate coastal erosion control techniques around landside infrastructure • Drainage and storm water infrastructure • Specifications of materials in design • Weather protection features. | Contractor | Detailed design |
| S1 | Sustainability | The Contractor shall propose a suitably qualified and experienced sustainability officer at a minimum 14 days prior to site establishment to be endorsed by Transport for NSW. The sustainability officer will be responsible for implementing the sustainability objectives for the project. Details of the sustainability officer, including defined responsibilities, duration and resource allocation throughout the appointment are to be submitted to Transport for NSW prior to the preparation of the Sustainability Management Plan (SMP). | Contractor | Detailed design / Construction |
| S2 | Sustainability | <p>Prior to commencement of construction, a SMP shall be endorsed by Transport for NSW. The SMP will be provided prior to construction and include the following minimum components:</p> <ul style="list-style-type: none"> • A completed electronic checklist demonstrating compliance with Transport for NSW's <i>NSW Sustainable Design Guidelines Version 4.0</i> (7TP-ST-114) • The Contractors sustainability goals and targets, internal procedures, and implementation strategy. | Contractor | Detailed design / Pre-construction |

| No. | Impact | Environmental safeguards | Responsibility | Timing |
|-----|---------------------------------|--|--------------------------------|---------------------------------|
| S3 | Sustainability | The Contractor must comply with the Transport for NSW <i>Sustainable Design Guidelines version 4.0</i> (TfNSW, 2017a). | Contractor | Detailed design / Construction |
| C1 | Cumulative construction impacts | Consultation will include notification prior to the start of the works Updates on any delays or changes to the construction period will also be communicated. | Transport for NSW / Contractor | Pre-construction / Construction |
| C2 | Cumulative construction impacts | Alternative transport options to be investigated should the Darling Point and Double Bay Wharf construction programs overlap. | Transport for NSW | Pre-construction |

7.3 Offsets, licensing and approvals

7.3.1 Offsets

Based on the biodiversity assessment (refer section 6.3) offsets for the residual loss of about 80 square metres of subtidal rocky reef (Type 2 KFH) should be considered in accordance with the *Guideline for Biodiversity Offsets* (RMS, 2016a). DPI (Fisheries) were consulted on 15 March 2022 and advised that offsetting under the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) is not required for this proposal.

7.3.2 Licences and approvals

A summary of the licences and approvals required for the proposal is provided in Table 7-2.

Table 7-2: Summary of licensing and approvals required

| Instrument | Requirement | Timing |
|---|---|-------------------------------------|
| FM Act | Permit under section 37 of the FM Act is required to relocate seahorses. Relocation may be undertaken by a pre-qualified permit holder. | Prior to start of the activity. |
| <i>Roads Act 1993</i> | Consultation with Woollahra Municipal Council is required for works on Darling Point Road. | Prior to start of the activity. |
| <i>Heritage Act 1977</i> | An application for an exception under section 139(4) of the <i>Heritage Act 1977</i> should be submitted to the Heritage NSW, DPC. | Prior to the start of the activity. |
| Ports and Maritime Administration Regulation 2021 | Written permission from the Harbour Master is required to disturb sediment in Sydney Harbour | 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 section 193 of the Environmental Planning and Assessment Regulation 2021.

8.1 Justification

The proposal forms part of the TAP, which is an ongoing 'initiative to deliver modern, safe and accessible transport infrastructure' in NSW (TfNSW, 2015a). As part of the TAP, Transport for NSW assessed the condition of all ferry wharves across the transport network in 2009 in terms of:

- Safety and structural integrity
- Access for less mobile and disabled passengers
- Existing and predicted future patronage and use.

Initial justification for the proposal was provided through an assessment of the existing wharf, which was identified as needing upgrading due to its lack of accessible pathway and non-DDA compliant wharf.

Consideration of alternatives and options was then carried out. The preferred design of the proposal selected to best achieve the objectives outlined in section 2.3, which included meeting the project objectives by providing improvements in access, user experience including passenger comfort and amenity, and safety. The design efficacy was determined by comparison to the option of doing nothing and other options outlined in section 2.4.

Potential environmental and social impacts resulting from construction and operation of the proposal have been minimised through the safeguards and management measures outlined in Chapter 7.

The following sub-headings provide justification through considering the impacts and benefits of the proposal.

8.1.1 Social factors

The proposal would result in temporary social impacts whilst being built such as noise, transport and visual impacts. However, all construction related impacts would be appropriately managed prior to and during construction.

Operation of the proposal provides justification over the above temporary impacts, as it would benefit the community through providing accessible transport, improving passenger amenity, safety and overall user experience. It is anticipated that the proposal would also have indirect wider community benefits, through ensuring continuation of the wharf for its expected lifespan (50 years). This extends to the cultural and amenity benefit of continuing to operate a wharf in this location.

8.1.2 Biophysical factors

As discussed in section 6.3, no significant aquatic or terrestrial biodiversity impacts have been identified. Identified impacts would be managed through the safeguards and management measures outlined in this REF.

The design of the proposal includes tolerances to allow for sea level rise and extreme weather events, which would ensure the wharf continues to be operational throughout its 50 year design life.

8.1.3 Economic factors

Upgrade of the wharf would generate economic benefits over the next 50 years, with the wharf being an attractor for people to live in the area due to the recreational value of the ferry service and ability to access the CBD.

Design of the wharf has also incorporated measures to decrease the maintenance required for operation which are standardised across all newly constructed wharves. The implementation of these measures would result in cost savings for the ongoing operation of the ferry network.

8.2 Objects of the EP&A Act

The objects of the EP&A Act are considered in Table 8-1.

Table 8-1: 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. | Through the assessment in Chapter 6, it has been identified that the proposal would not significantly impact on any natural or artificial resources. The proposal would result in community benefits through facilitation of a safe and reliable ferry service to Darling Point for the next 50 years. |
| 1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment. | The proposal's urban design includes high quality, durable and low impact materials to minimise ongoing maintenance requirements. This provides for a sustainable urban environment over its 50 year design life. |
| 1.3(c) To promote the orderly and economic use and development of land. | The proposal includes continuation of the use of the proposal location as a ferry wharf. |
| 1.3(d) To promote the delivery and maintenance of affordable housing. | Not relevant to the proposal. |
| 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. | A biodiversity assessment concluded that no significant impact to aquatic or terrestrial ecology would result from the proposal. |
| 1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage). | The identified mitigation measures would minimise any potential impacts of the proposal on Aboriginal and non-Aboriginal heritage items. |
| 1.3(g) To promote good design and amenity of the built environment. | The proposal has been designed to be consistent with the urban design objectives identified in section 2.3.2. |
| 1.3(h) To promote the proper construction and maintenance of buildings, including the | The proposal would benefit the community through improving passenger amenity, safety and |

| Object | Comment |
|--|---|
| protection of the health and safety of their occupants. | overall user experience. The proposal aligns with this objective as it involves the maintenance of, and continued safe access to, the wharf. |
| 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. | Stakeholder consultation would continue during the public display of this document to capture feedback. Should the proposal proceed to construction, consultation with the community and stakeholders would continue throughout the work. |

8.2.1 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been an integral consideration throughout the development of the proposal.

ESD requires the effective integration of economic and environmental considerations in decision-making processes. The four main principles supporting the achievement of ESD are discussed below.

The precautionary principle

The precautionary principle deals with reconciling scientific uncertainty about environmental impacts with certainty in decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

Through the assessment of the potential impacts of the proposal in Chapter 6, it has been demonstrated that threats of serious or irreversible environmental damage do not exist for the proposal.

Notwithstanding, to account for the subjectivity of professional judgement applied in environmental assessment and modelling uncertainty, worst-case assumptions have been incorporated into the assessment, including the following:

- Conservative worst case scenarios were considered while assessing environmental impact
- Specialist studies were incorporated to gain a detailed understanding of the existing environment including biodiversity, landscape character and visual amenity, noise and vibration, socio-economic values, non-Aboriginal heritage and contamination
- Undertaking verification monitoring to validate results and allow modification of safeguards and mitigation controls accordingly.

Intergenerational equity

Social equity is concerned with the distribution of economic, social and environmental costs and benefits. Inter-generational equity introduces a temporal element with a focus on minimising the distribution of costs to future generations.

The proposal would result in benefit to the community through improvements to passenger amenity, safety and overall user experience of the ferry wharf for the next 50 years.

No potential impacts to future generations would be generated by the proposal.

Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity has been considered through the assessment of biodiversity provided in section 6.3 and Appendix D.

Providing the safeguard measures are implemented, the proposal would not have a material or significant impact on biological diversity and ecological integrity within the proposal footprint or surrounds.

Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources which may be affected by the carrying out of a project, including air, water, land and living things.

Environmental, economic and social issues were considered in the rationale for the proposal and design options. Construction planning for the proposal would also be progressed in the most cost-effective way.

Safeguards and management measures detailed in Chapter 7, including avoiding, reusing, recycling, managing waste during construction and operation, would be implemented.

8.3 Conclusion

The proposed Darling Point Wharf upgrade 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 (as relevant) of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to MNES 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 process. The proposal as described in the REF best meets the project objectives but would still result in some impacts on water quality, biodiversity, traffic and transport, landscape character and visual amenity, non-Aboriginal heritage, socio-economic values and noise and vibration. Safeguards and management measures as detailed in this REF would ameliorate or minimise these expected impacts.

The proposal would provide better commuter experience through improvements to passenger amenity, safety, access for people with a disability and overall user experience of the ferry wharf for the next 50 years, as well as contributing to unifying and standardising wharves in Sydney Harbour and Parramatta River. On balance the proposal is considered justified and the following conclusions are made.

8.3.1 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 BDAR or SIS is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from council is not required.

8.3.2 Significance of impact under Australian legislation

The proposal is not likely to have a significant impact MNES or the environment of Commonwealth land within the meaning of the EPBC Act. A referral to the Australian DAWE is not required.

9 Certification

This REF 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.



Belinda Crichton

Principal - Environment

Cardno, now Stantec

Date: 27 April 2022

I have examined this REF and accept it on behalf of Transport for NSW.



Bob Rimac

Senior Project Manager

Transport for NSW

Date: 5 May 2022

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Terms and acronyms used in this REF

| Term/ Acronym | Description |
|-------------------------|--|
| ABS | Australian Bureau of Statistics |
| AHD | Australian Height Datum |
| AHIMS | Aboriginal Heritage Information Management System |
| AHIP | Aboriginal heritage impact permit |
| AIS | Automatic Identification System |
| AJC | Australian Jockey Club |
| ANZECC | Australian and New Zealand Environment and Conservation Council |
| AoS | assessment of significance |
| AQC | air quality category |
| ARI | average recurrence interval |
| ASMA | Australian Maritime Safety Authority |
| ASRIS | Australian Atlas of Acid Sulfate Soils |
| ASS | acid sulphate soils |
| AUCHD | Australasian Underwater Cultural Heritage Database |
| AV:ATG | <i>Assessing Vibration – Technical Guideline</i> (DEC, 2006) |
| BAM | Biodiversity Assessment Method |
| BAR | Biodiversity Assessment Report |
| BC Act | <i>Biodiversity Conservation Act 2016</i> (NSW) |
| BCA | Building Code of Australia |
| BDAR | Biodiversity Development Assessment Report |
| BoM | Bureau of Meteorology |
| BZ | background zone |
| CBD | central business district |
| CCTV | closed circuit television |
| CD | Chart datum |
| CEMP | Construction Environmental Management Plan |
| CHL | Commonwealth Heritage List |
| Coastal Management SEPP | <i>State Environmental Planning Policy (Coastal Management) 2018</i> (NSW) |
| CNVG | <i>Construction Noise and Vibration Guideline</i> (RMS, 2016b) |
| CNVMP | Construction Noise and Vibration Management Plan |

| Term/ Acronym | Description |
|---------------------------|--|
| Compound area | Temporary facilities required for construction, including for example an office and amenities compound, construction compound and materials storage compound. The compound area for the landside works would likely be located in the cul-de-sac of Darling Point Road and on a barge for the waterside works. The exact location would be determined prior to construction. Compound area is shown on Figure 3-2. |
| CoPCs | contaminants of potential concern |
| COVID-19 | COVID-19 is the infectious disease caused by the most recently discovered coronavirus. COVID-19 is now a pandemic affecting many countries globally. COVID-19 was first confirmed in Australia in late January 2020. |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DAWE | Australian Government Department of Agriculture, Water and Environment |
| dB | Abbreviation for decibel – a scale used in sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure. |
| dB(A) | A value used for ‘A-weighted’ sound pressure levels. ‘A’ frequency weighted is an adjustment made to sound-level measurement to approximate the response of the human ear. |
| DBYD | Dial Before You Dig |
| DDA | <i>Disability Discrimination Act 1992 (Commonwealth)</i> |
| DECC | Former Department of Environment and Climate Change |
| DECCW | Former Department of Environment, Climate Change and Water |
| Disability Standards 2010 | <i>Disability (Access to Premises – Buildings) Standards (2010)</i> |
| DoP | Department of Planning |
| DPC | Department of Premier and Cabinet |
| DPE | Department of Planning and Environment |
| DPE-EES | Department of Industry and Environment – Environment, Energy and Science |
| DPI | Department of Primary Industries |
| DPIE | former Department of Planning, Industry and Environment, now known as Department of Planning and Environment |
| DSAPT | <i>Disability Standards for Accessible Public Transport 2002</i> |
| DUAP | Former Department of Urban Affairs and Planning |
| EIS | environmental impact statement |
| EMS | Environmental Management System |
| EPA | Environment Protection Agency |

| Term/ Acronym | Description |
|---------------|---|
| EP&A Act | <i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process. |
| EPL | environmental protection licence |
| ESD | Ecologically sustainable development. Development which 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 |
| EWMS | environmental work method statement |
| FM Act | <i>Fisheries Management Act 1994</i> (NSW) |
| FZ | foreground zone |
| FWUP | Ferry Wharf Upgrade Program |
| HAT | highest astronomical tide |
| ICNG | <i>Interim Construction Noise Guideline</i> (DECC, 2009) |
| INSW | Infrastructure NSW |
| ISEPP | <i>State Environmental Planning Policy (Infrastructure) 2007</i> (NSW) |
| ISQG | Interim Sediment Quality Guidelines (ANZECC, 2000) |
| KFH | key fish habitat |
| LAT | lowest astronomical tide |
| LCVIA | Landscape and Visual Impact Assessment |
| LCZ | landscape character zone |
| LEP | Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act. |
| LGA | local government area |
| LLS | Local Land Services |
| LP LALC | La Perouse Local Aboriginal Land Council |
| LV | low voltage |
| MASoHI | Maritime Archaeology Statement of Heritage Impact |
| MCA | multi-criterion analysis |
| MHL | Manly Hydraulics Laboratory |
| MNES | Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . |

| Term/ Acronym | Description |
|--------------------|--|
| MZ | middle ground zone |
| NBN | national broadband network |
| NCA | noise catchment area |
| NCC | National Construction Code 2019 Volumes 1, 2 and 3 (Formerly Building Code of Australia) |
| NHL | National Heritage List |
| NML | noise management level |
| NPI | <i>Noise Policy for Industry</i> (EPA, 2017). |
| NPW Act | <i>National Parks and Wildlife Act 1974</i> (NSW) |
| NSW | New South Wales |
| NSW ALC | NSW Aboriginal Land Council |
| OCP/OPP | Organochlorine pesticides/organophosphorus pesticides |
| OEH | Office of Environment and Heritage |
| PACHCI | <i>Procedure for Aboriginal Cultural Heritage Consultation and Investigation</i> |
| PAH | polycyclic aromatic hydrocarbons |
| PCTs | Plant Community Types |
| PMST | Protected Matters Search Tool |
| PoEO Act | <i>Protection of the Environment Operations Act 1997</i> (NSW) |
| Proposal, the | The upgraded wharf proposed to be constructed at Darling Point, and as described in Section 3.1. |
| Proposal area | Area around the proposal footprint required for construction including the compound area. The proposal area is shown on Figure 3-2. |
| Proposal footprint | The area directly impacted by proposed works, including the installation and removal of structures. Proposal footprint is shown on Figure 3-2. |
| PSI | Preliminary Site Investigation |
| RBL | rating background level |
| REF | review of environmental factors |
| RNE | Register of the National Estate |
| RNP | <i>Road Noise Policy</i> (DECCW, 2011) |
| RNTA | Register of the National Trust of Australia (NSW) |
| Roads and Maritime | Former Roads and Maritime Services, now known as Transport for NSW |
| RTA | Former Roads and Traffic Authority |

| Term/ Acronym | Description |
|---------------------|---|
| SAP | sensitive area plan |
| SDG | Sustainability Design Guidelines |
| SEIA | Socio-economic Impact Assessment |
| SEPP | State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act. |
| SHI | NSW State Heritage Inventory |
| SHR | State Heritage Register |
| SIS | Species Impact Statement |
| SMP | Sustainability Management Plan |
| SoHI | Statement of Heritage Impact |
| SPL | Sound power level |
| SRD SEPP | <i>State Environmental Planning Policy (State and Regional Development) 2011 (NSW)</i> |
| SWMP | Soil and Water Management Plan |
| Sydney Harbour SREP | <i>Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (NSW)</i> |
| Sydney LEP | <i>Sydney Local Environmental Plan 2012</i> |
| TAP | Transport Access Program |
| TEC | Threatened Ecological Community |
| TfNSW | Transport for NSW |
| TGSI | tactile ground surface indicators |
| TMP | Traffic Management Plan |
| VIS | vegetation information system |
| WARR Act | <i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i> |
| WHL | World Heritage List |
| WMC | Woollahra Municipal Council |
| WMP | Waste Management Plan |
| Woollahra LEP | <i>Woollahra Local Environmental Plan 2014</i> |