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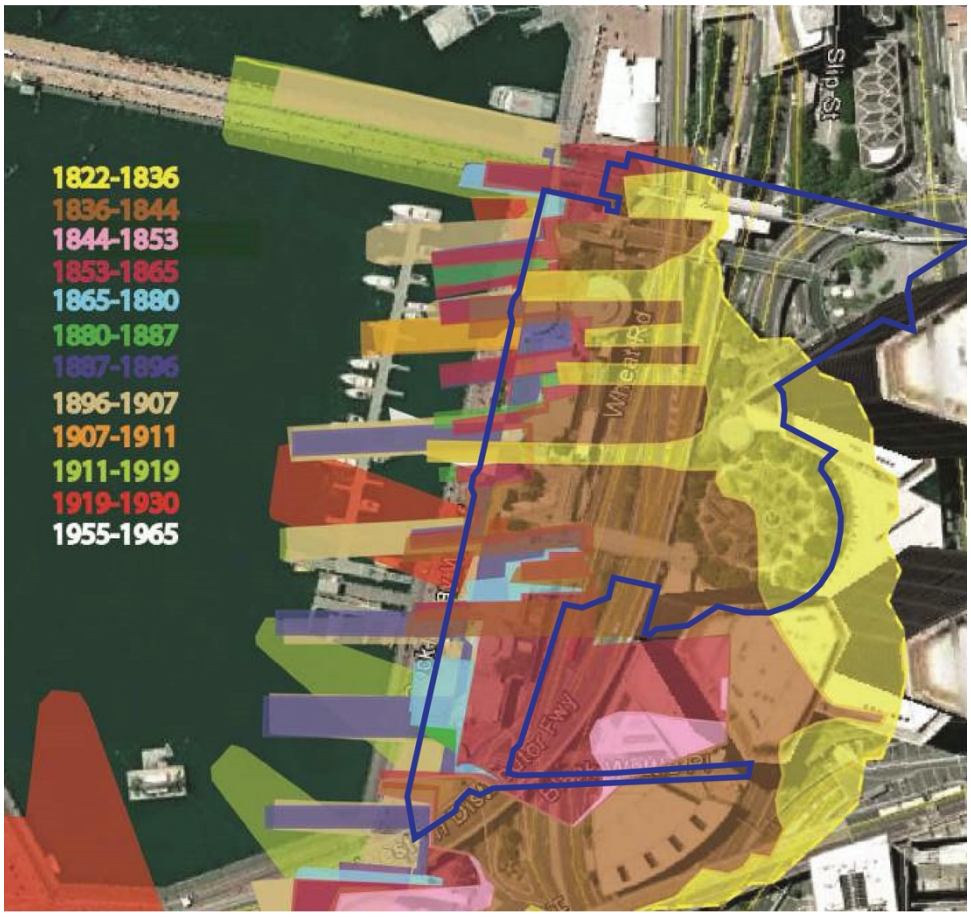
Cockle Bay Park Redevelopment



Maritime Archaeology

Statement of Heritage Impact

Darling Harbour

Sydney

NSW

October 2021

Cockle Bay Park Redevelopment
Maritime Archaeology
Statement of Heritage Impact

Prepared for:

Artefact Cultural Heritage Management

By:

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October 2021

Cosmos Archaeology Job Number J21/07

Cover Image: Overlay showing phases of land reclamation and wharf construction around the eastern side of Cockle Bay since the 1820s. Study area shown in blue.

Revision	Description	Date	Originator	Reviewer	Approver
V1	SSD DA Adequacy Review	15/10/2021	CC, JM	CC	CC

EXECUTIVE SUMMARY

This report has been prepared to accompany a detailed State Significant Development (SSD) Development Application (DA) (Stage 2) for a commercial mixed-use development, Cockle Bay Park, which is submitted to the Minister for Planning and Public Spaces pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The report has found that the eastern side of Cockle Bay has been used for maritime purposes since the beginning of the 19th century and continued until the mid-20th century. This included the construction of 24 historic wharves within or adjacent to the study area. There have also been episodes of seawall construction and land reclamation on the eastern side of Cockle Bay throughout the last two centuries.

Maritime archaeological dive surveys were undertaken in August 2017 and July 2021. The surveys identified the current seawall along the entire of the study area as well as steel sheet piling in the northern half of the study area. Remains of timber sheet piling with Monier concrete plating were also identified, being remains of a c.1903-1908 seawall, as well as a number of other piles that may be associated with historic wharves. The 2021 dive survey also constitutes an archival recording of the area to be impacted by the construction of the main tower.

Potential historic sites within the study area include wharves and related material, seawalls, shipwrecks, discard from vessels and discard in and under reclamation fill. A map with likelihood ratings of archaeological potential is provided in Figure 118 which shows the western half of study area is predominantly of High archaeological potential.

Remains of wharves and related material (c.1830 to 1970) were assessed to be of State significance as they represent the earliest private maritime infrastructure development in Sydney Harbour and a finite archaeological resource. The timber sheet piling with Monier concrete plates and potential remains of other seawalls were assessed to be of State significance as the archaeological remains may yield information on the adaption of seawalls and/or the location, material and form of seawalls which are not available in the historic record. The steel sheet piling was identified as having no heritage significance.

The impact assessment found that potential impacts on remains of wharves, seawalls and related material (c.1830 to 1970) could be satisfactorily mitigated by archaeological excavation in areas of high maritime archaeological potential and establishing archaeological monitoring protocols during the construction phase of the project.

Based on the above finding it is recommended that:

1. *An archaeological investigation in the form of an excavation and/or sampling be undertaken within the areas to be bulk excavation is proposed for the tower core and deluge tank.*
2. *A Maritime Archaeological Management Plan be prepared that would include the following:*
    - *Archaeological Research Design and Excavation Methodology*
    - *Unexpected finds, stop work triggers and notification protocols*
    - *Heritage induction for contractors*
    - *Recording methods and procedures*
    - *Artefact collection and retention policies*

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Abbreviations

The following abbreviations are used throughout this report:

ADAS	Australian Diver Accreditation Scheme	MASoHI	Maritime Archaeological Statement of Heritage Impact
AHIMS	Aboriginal Heritage Information Management System	NPW Act	*National Parks and Wildlife Act 1974*
AHD	Australian Height Datum	NSW	New South Wales
MARDEM	Maritime Archaeological Research Design and Excavation Methodology	OEH	Office of Environment and Heritage (NSW)
CBD	Central Business District	OH&S	Occupational Health and Safety
EP&A Act	*Environmental Planning and Assessment Act 1979*	PAD	Potential Archaeological Deposit (type of Aboriginal site feature on AHIMS)
GFA	Gross Floor Area	REP	Regional Environmental Plan
HAA	Historical Archaeological Assessment	Proponent	DPT Operator Pty Ltd and DPPT Operator Pty Ltd
HC	Heritage Council (NSW)	SEPP	State Environment Planning Policy
ICC	International Convention Centre	SHR	State Heritage Register (NSW)
LEP	Local Environment Plan	SICEEP	Sydney International Convention, Exhibition and Entertainment Precinct
LGA	Local Government Area	SREP	Sydney Regional Environmental Plan (Sydney Harbour Catchments 2005)
MAA	Maritime Archaeological Assessment	SSD	State Significant Development
MAMP	Maritime Archaeological Management Plan	SSDA	State Significant Development Application

1 INTRODUCTION

This report has been prepared to accompany a detailed State Significant Development (SSD) Development Application (DA) (Stage 2) for a commercial mixed-use development, Cockle Bay Park, which is submitted to the Minister for Planning and Public Spaces pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The development is being conducted in stages comprising the following planning applications:

- *Stage 1* – Concept Proposal setting the overall 'vision' for the redevelopment of the site including the building envelope and land uses, as well as development consent for the carrying out of early works including demolition of the existing buildings and structures. This stage was determined on 13 May 2019, and is proposed to be modified to align with the Stage 2 SSD DA.
- *Stage 2* – detailed design, construction, and operation of Cockle Bay Park pursuant to the Concept Proposal.

Cosmos Archaeology has been involved in this project since 2017 when it prepared a maritime archaeological assessment (MAA) for DPT Operator Pty Ltd and DPPT Operator Pty Ltd.[1]

1.1 Project Description

The SSD DA (SSD-9978934) Stage 2 Detailed Design will seek consent for the detailed design development, based on the competition-winning scheme by Henning Larsen, comprising:

- Construction of a land bridge across part of the Western Distributor between Darling Harbour and Darling Park.
- The design, construction and use of the new 43-storey mixed-use development, including:
    - Up to 89,000sqm of retail and commercial GFA.
    - At least 6,500sqm of publicly accessible open space.
    - Site works to ensure the provision of appropriate connectivity between the new development and the Pyrmont Bridge and Darling Park towers.
    - Subdivision of current cadastral lots to facilitate development.

1.2 Site Description

The site is located at 241-249 Wheat Road, Sydney to the immediate south of Pyrmont Bridge, within the Sydney CBD, on the eastern side of the Darling Harbour precinct. The site encompasses the Cockle Bay Wharf development, parts of the Eastern Distributor and Wheat Road, Darling Park and Pyrmont Bridge.

The Darling Harbour Precinct is undergoing significant redevelopment as part of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) including Darling Square and the IMAX renewal (W Hotel) projects. More broadly, the western edge of the Sydney CBD has been subject to significant change following the development of the Barangaroo precinct.

[1] **Cosmos Archaeology Pty Ltd September 2017** *Cockle Bay Park Development; Maritime Archaeological Assessment*.

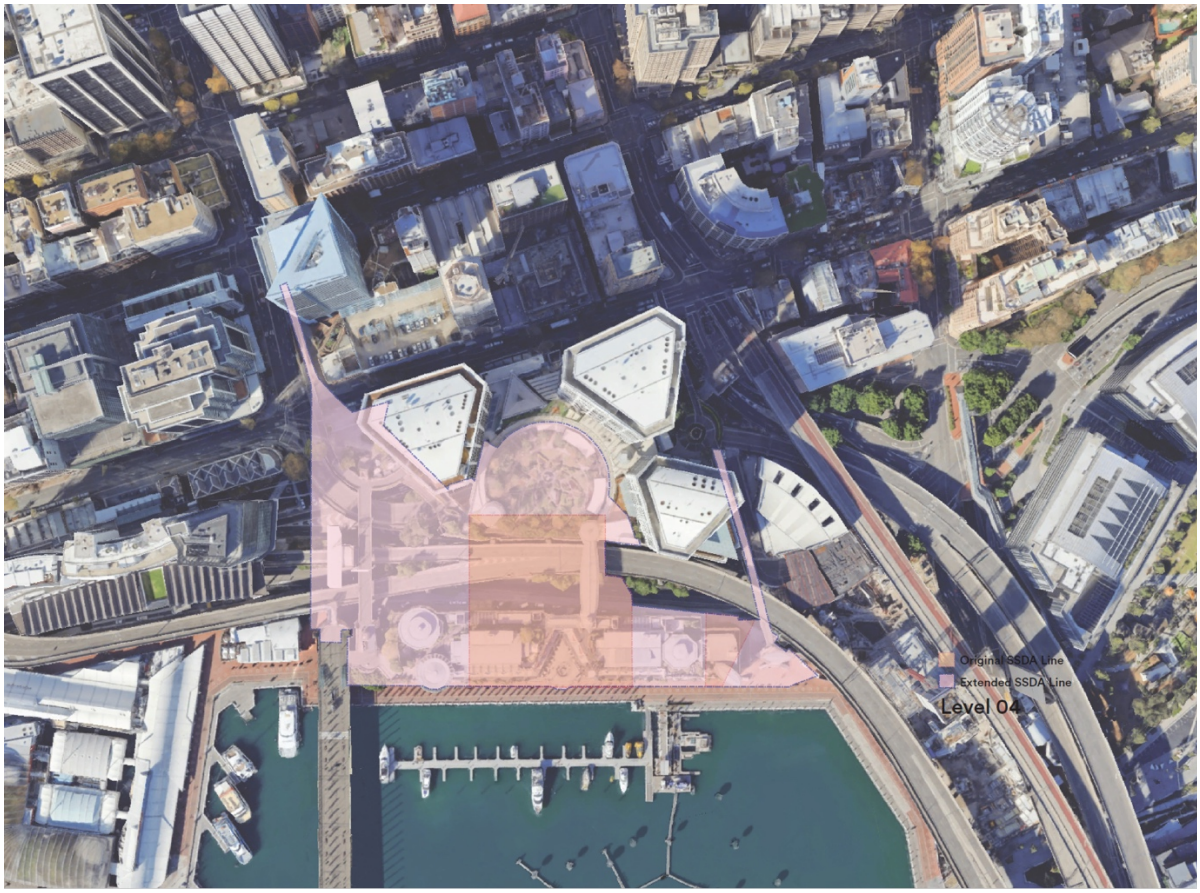


Figure 1: Study Area of Cockle Bay Wharf Redevelopment.

1.3 Background

This report has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARS) dated 12 November 2020 for SSD-9978934. Sear 13 relates to Heritage and this report specifically addresses the maritime heritage and submerged terrestrial components of Sear 13. (Table 1).

Table 1: SEARs Requirements for SSD-9978934.

Sear 13: Heritage		
Item	**Description of Requirement**	**Section Reference**
The EIS must include:	A statement of Heritage Impact (SoHI), prepared in accordance with relevant guidelines, assessing potential impacts on State and local heritage items (including conservation areas, natural heritage areas, heritage fabric, relics, gardens, landscapes and trees) and historical archaeology.	This report addresses the maritime archaeology statement of heritage impact.
	Recommending mitigation and management measures where required	Sections 7.4 and 8.0

The redevelopment of Cockle Bay Park achieved Stage 1 planning consent through the NSW Government, as a State Significant Development (No. SSD 7684) in May 2019. Cosmos Archaeology prepared a maritime archaeology assessment for the Stage 1

application which addressed the recommendations of the then Heritage Division, Office of Environment and Heritage, as a delegate of the Heritage Council of NSW (HC).[2] This report is in essence an update of the 2017 Cosmos Archaeology MAA where new information is provided from geotechnical investigations and a pre-disturbance dive survey undertaken in July/August 2021 appended with maritime archaeology impact assessment based on the Stage 2 detailed design. Removed from this report are sections on submerged terrestrial sites and S.S. *Steyne* which are addressed by other heritage consultants working on this Stage 2 SSDA.

1.4 Objective

The objective of this report is to:

> *prepare a Maritime Archaeological MASoHI for the proposed Cockle Bay Park Redevelopment which addresses Secretary's Environmental Assessment Requirements dated 12 November 2020 for SSD-9978934.*

The scope of the MASoHI is confined to the water-front occupation layers under reclamation and underwater for the whole of the site of 241-249 Wheat Road, Cockle Bay (Darling Harbour Precinct).

This report does not assess the impacts to:

- Aboriginal submerged terrestrial sites
- S.S. *Steyne* (addressed in previous MAA 2017) [3]

1.5 Approach

This report expands on the 2017 Maritime Archaeology Assessment and addresses the objective in the following way:

Section 2 **Statutory Issues** has been reviewed.

Section 3 **Historical Background** has remained unchanged with the exception of Section 3.4 which reviews the geotechnical data obtained in August 2021.

Section 4 **Underwater Pre disturbance Survey** incorporates the findings of the 2017 dive inspection with the July 2021 dive survey.

Section 5 **Known and Potential Sites** has been reviewed taking into consideration the findings of the recent geotechnical and underwater pre disturbance surveys.

Section 6 **Assessment of Significance** has been reviewed taking into consideration the findings of Sections 3 to 5.

Section 7 **Impact Assessment** examines the detailed construction designs relevant to the maritime archaeology on the site.

Section 8 **Recommendations** with reference to the test excavation.

[2] **Cosmos Archaeology Pty Ltd September 2017** *Cockle Bay Park Development; Maritime Archaeological Assessment*
[3] *Op. Cit.,* **Cosmos Archaeology September 2017**.

2 STATUTORY ISSUES

2.1 Cultural Heritage Statutory Protection – Introduction

Cultural heritage in New South Wales (NSW) is protected and managed under a hierarchy of legislation. The following section provides a brief summary of the relevant statutory regulations relating to the current project area.

2.1.1 NSW *Heritage Act 1977* (amended 1999)

The NSW *Heritage Act 1977* is the primary piece of State legislation affording protection to all items of non-indigenous environmental heritage (natural and cultural) in NSW. Under the Act, "items of environmental heritage" include places, buildings, works, relics, moveable objects and precincts identified as significant based on historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. Items of heritage identified as having State significance are listed on the NSW State Heritage Register (SHR) and are afforded automatic protection against any activities that may damage the item or affect its heritage significance under the Act.

Under Section 89J(c) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), a developer would not be required to apply for approvals or excavation permits under the Heritage Act for State Significant Development. However, under Schedule 2, Part 2(4) of the Environmental Planning and Assessment Regulation 2000 the Director General is required to:

> *Consult with the relevant public authorities and have regard to the need for the requirements to assess any key issues raised by those public authorities.*

Under Section 146 of the Heritage Act, the discovery of a relic also requires that:

> *A person who is aware or believes that he or she has discovered or located a relic (in any circumstances, and whether or not the person has been issued with a permit) must: (a) within a reasonable time after he or she first becomes aware or believes that he or she has discovered or located that relic, notify the Heritage Council of the location of the relic, unless he or she believes on reasonable grounds that the Heritage Council is aware of the location of the relic, and (b) within the period required by the Heritage Council, furnish the Heritage Council with such information concerning the relic as the Heritage Council may reasonably require.*

Relic provision and protection

In addition to buildings and items listed on the SHR, various cultural heritage sites, items, archaeological features and deposits are afforded automatic statutory protection by the relic provisions of the NSW *Heritage Act 1977*. The Act defines a 'relic' as something that:

a) *Relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*

b) *Is of State or local heritage significance.*

Sections 139 to 145 of the Act prevent the disturbance or excavation of any land if there is a reasonable cause to suspect that a relic will be discovered, exposed, moved, damaged or destroyed, unless an excavation permit has been issued by the Heritage Council of NSW. The type of permit that is required depends on whether the relic or relics have been listed on the State Heritage Register.

There is also an obligation under the Heritage Act to stop work and contact the Heritage Office if relics are unexpectedly disturbed or uncovered. Any relics located are required to be reported under the *NSW Heritage Act 1977*, Section 145.

Infrastructure still in use today that has been identified as a heritage item is known as a 'work'. These items are not defined as a relic, and development affecting them can be carried out under a list of Standard Exceptions for State significant items published by the Heritage

Council.[4] The significance of the item and the level of impact determine the requirement to undertake a heritage assessment and proposed suitable mitigation works; however, a permit application is not required. Impacts to the cultural significance of relics assessed to be minor can qualify for an exception from the requirement for a permit.[5]

For the purposes of this Act, the State of NSW includes the seabed and the water column up to 3 nautical miles (nm) from the coast. The NSW *Heritage Act 1977* therefore, within 3 nm of the NSW coast, can protect shipwrecks. Shipwrecks currently under the jurisdiction of the NSW *Heritage Act* are identified in the Historic Shipwrecks Register, maintained by the NSW Heritage Council.

Part 3C of the Act contains provisions for the protection of shipwrecks over 75 years old. This section is included in the Act to provide a link to and consistency with the (Commonwealth) *Historic Shipwrecks Act 1976*. In NSW the 'relics' provision takes precedence over Part 3C when it comes to determining the legal and protected status of a wreck and associated artefacts.

Management of heritage assets by NSW Government agencies

The NSW Heritage Act 1977 also requires all government agencies to identify and manage heritage assets in their ownership and control. Under Section 170 of the Act, government instrumentalities must establish and keep a register entitled the "Heritage & Conservation Register" which includes all items of environmental heritage listed on the State Heritage Register, an environmental planning instrument or that may be subject to an interim heritage order, which are owned, occupied or managed by that government instrumentality.

Under Section 170A of the Heritage Act 1977, each government agency must also ensure that all items entered on its Heritage and Conservation Register are maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the NSW Minister for Infrastructure & Planning on advice of the NSW Heritage Council.[6] These principles serve to protect and conserve the heritage significance of identified sites, items and objects, and are based on relevant NSW heritage legislation and statutory guidelines.

2.1.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) established the framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The *Act* requires that environmental impacts are considered prior to land development; this includes impacts to cultural heritage items and places as well as archaeological sites and deposits. The *Act* also requires that Local Government agencies prepare planning instruments (such as Local Environmental Plans, Development Control Plans) in accordance with the *Act* to provide guidance on the level of environmental assessment required.

The EP&A Act is the main act regulating land use planning and development in NSW. Part 5.1 Division 115Y of the Act provides a process for the assessment and approval of State Significant Development (SSD).

Applications made under Part 5.1 of the EP&A Act are subject to environmental assessment requirements, prepared by the Director General of Planning and Infrastructure. Under Schedule 2(3)(4) of the Environmental Planning and Assessment Regulation 2000 the Director-General is required to:

> *Consult relevant public authorities and have regard to the need for the requirements to assess any key issues raised by those public authorities.*

[4] **NSW Heritage Branch, 2000,** Schedule of General Exceptions; **NSW Heritage Branch, 2006,** Standard Exceptions for Works Requiring Heritage Council Approval.
[5] **NSW Heritage Branch, 2006,** Schedule of Additional Exceptions.
[6] NSW Heritage Office, 2005.

This should include consultation with Heritage Division regarding items, places and archaeological sites that have heritage significance.

Sydney Regional Environmental Plan – Sydney Harbour Catchment (2005)

NSW Regional Environmental Plans (REPs) are plans drafted by the Department of Planning and apply to a nominated "region," covering broad issues such as urban growth, commercial centres, extractive industries, recreational needs, rural lands and heritage and conservation. They provide the framework for detailed local planning by councils. The local council of the area in which development is proposed to be carried out is usually the consent authority for that development for the purposes of the REP, unless the Department of Planning selects to substitute the Minister or Director General of Planning as the consent authority in respect to particular forms of development.

The stated objections of the *Sydney Regional Environmental Plan (SREP) – Sydney Harbour Catchment (2005)* with regards to foreshores and waterways areas are as follows (Section 53);

(a) To conserve the environmental heritage of the land to which this Part applies, and

(b) To conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items, and

(c) To ensure that archaeological sites and places of Aboriginal heritage significance are conserved, and

(d) To allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.

***Note:** Attention is drawn to the provisions of the Heritage Act 1977 and the National Parks and Wildlife Act 1974 under which an approval or permit under either or both of those Acts may be required for certain activities, whether or not development consent is required by this clause.*

Part 5 of the *SREP – Sydney Harbour Catchment (2005)* contains provisions for the protection and conservation of cultural heritage sites, items and values – both Aboriginal and non-Aboriginal.

Under the REP, a "heritage item" is defined as:

(a) A building, work, archaeological site or place:

(i) That is specified in an inventory of heritage items prepared for the purposes of this plan, being an inventory that is available at the head office of the Department, and

(ii) That is situated on a site described in Schedule 4 and identified on the Heritage Map, or

(b) A place:

(i) That is specified in an inventory of heritage items prepared for the purposes of this plan, being an inventory that is available at the head office of the Department, and

(ii) That is described in the inventory as a place of Aboriginal heritage significance.

Clause 55 of the REP provides protection for heritage items. Under this clause, the following development may be carried out only with development consent:

(a) Demolishing or moving a heritage item,

(b) Altering a heritage item by making structural or non-structural changes to its exterior, including changes to its detail, fabric, finish or appearance,

(c) Altering a heritage item by making structural changes to its interior,

(d) Disturbing or damaging a place of Aboriginal heritage significance or an Aboriginal object,

(e) Erecting a building on, or subdividing, land on which a heritage item is located.

(2) Development consent is not required by this clause if:

(a) In the opinion of the consent authority:

(i) The proposed development is of a minor nature or consists of maintenance of the heritage item, and

(ii) The proposed development would not adversely affect the significance of the heritage item, and

(iii) The proponent has notified the consent authority in writing of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development will comply with this subclause and that development consent is not otherwise required by this plan.

(4) Before granting development consent as required by this clause, the consent authority must assess the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item concerned.

(5) The assessment must include consideration of a heritage impact statement that addresses at least the following issues (but is not to be limited to assessment of those issues, if the heritage significance concerned involves other issues):

(a) The heritage significance of the item as part of the environmental heritage of the land to which this Part applies, and

(b) The impact that the proposed development will have on the heritage significance of the item and its setting, including any landscape or horticultural features, and

(c) The measures proposed to conserve the heritage significance of the item and its setting, and

(d) Whether any archaeological site or potential archaeological site would be adversely affected by the proposed development, and

(e) The extent to which the carrying out of the proposed development would affect the form of any historic subdivision.

(6) The consent authority may also decline to grant development consent until it has considered a conservation management plan, if it considers the development proposed should be assessed with regard to such a plan.

Clause 59 – Development in Vicinity of Heritage Items:

1) Before granting development consent to development in the vicinity of a heritage item, the consent authority must assess the impact of the proposed development on the heritage significance of the heritage item.
2) This clause extends to development:
   (a) That may have an impact on the setting of a heritage item, for example, by affecting a significant view to or from the item or by overshadowing, or
   (b) That may undermine or otherwise cause physical damage to a heritage item, or
   (c) That will otherwise have any adverse impact on the heritage significance of a heritage item.
3) The consent authority may refuse to grant development consent unless it has considered a heritage impact statement that will help it assess the impact of the proposed development on the heritage significance, visual curtilage and setting of the heritage item.
4) The heritage impact statement should include details of the size, shape and scale of, setbacks for, and the materials to be used in, any proposed buildings or works and details of any modification that would reduce the impact of the proposed development on the heritage significance of the heritage item.

Cockle Bay falls under the *Darling Harbour Development Plan No. 1,* which means that the 'consent authority' is the Minister for Planning.

Darling Harbour Development Plan No 1

The Darling Harbour Development Plan No 1 is made under the *Environmental Planning Assessment Act* 1979 and from 2009 is taken to be a State Environment Planning Policy (SEPP). The plan encourages the development of a variety of tourist, educational, recreational, entertainment, cultural and commercial facilities within Darling Harbour and makes provisions with respect to controlling development. Clause 6 details that a permit is required for certain development including:

(a) For the purposes of tourist, educational, recreational, entertainment, cultural or commercial facilities (other than facilities used for pawn broking or other forms of moneylending),

(b) For the purposes of transport facilities,

(c) For the purposes of beautifying the landscape,

(d) For any purpose specified in Schedule 1, or

(e) For any purpose incidental or subsidiary to a purpose referred to in paragraph (a), (b), (c) or (d).

Schedule 1 includes the following list of developments that may be carried out under a permit: Amusement parks; art galleries; child care centres; commercial premises (other than premises used for pawn broking or other forms of moneylending); car parking stations; charter boat facilities; convention centres; entertainment centres; exhibition centres; film, television and radio studios; hotels; light industries; markets; motels; museums; parks and gardens; places of assembly; places of public worship; professional consulting rooms; public buildings; public utility undertakings; recording studios; recreation facilities; refreshment rooms; residential buildings; serviced apartments; shops; theatre restaurants; utility installations.

Clause 7 of the plan prohibits all other development not referred to in clause 6, and Clause 8 explains that permits are also required for renovation or demolition of a building or work.

2.2 Statutory Heritage Register Search

In NSW there are four types of statutory listings for non-indigenous cultural heritage sites, objects and places:

- National Heritage List;
- NSW State Heritage Register;
- *Regional Environmental Plan* (REP);
- *Local Environmental Plan* (LEP); and,
- Section 170 Heritage and Conservation Register;

Heritage register searches were undertaken for the project area with the following results.

2.2.1 National Heritage List

The National Heritage List is a register of natural and cultural places with outstanding heritage significance to the Australian nation. Each entry to the National Heritage List is assessed by the Australian Heritage Council as having exceptional heritage value and is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The Act requires that approval is obtained from the Australian Government Minister for the Environment Protection, Heritage and the Arts before any action takes place that has, will have, or is likely to have, a significant impact on the national heritage values of a listed place.

There are no sites listed on the National Heritage List located within the study area.

2.2.2 NSW State Heritage Register

The *State Heritage Register* is a statutory list of places and items of State heritage significance made by the Minister for Planning. The Register lists a diverse range of places, including archaeological sites, that are particularly important to the State and which enrich our understanding of the history of NSW.

Places and items listed on the Register are legally protected under the NSW *Heritage Act 1977* and approval is required from the Heritage Council of NSW prior to undertaking work that results in their alteration or modification.

S.S. South Steyne *is listed on the State Heritage Register as a moveable Item of State Significance (Item Number 00755). S.S.* South Steyne *is currently moored against Harbourside Wharf in Cockle Bay.*

The Pyrmont Bridge is listed on the State Heritage Register as an Item of State Significance (Item Number 01618). The listing includes a heritage curtilage area that extends to either side of the bridge (Figure 2).

The assessment of the potential impact to the heritage values of these listings are not within the scope of this study. They are being assessed separately in the Heritage Interpretation Strategy that has been prepared for the project EIS by Weir Phillips (2021).[7]

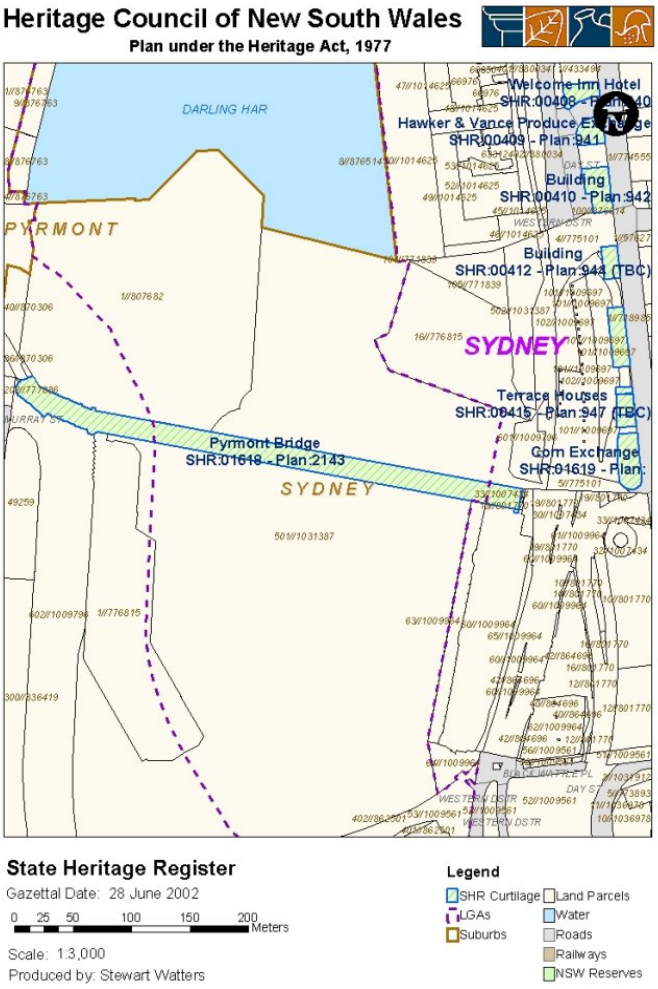


Figure 2: Curtilage for Pyrmont Bridge.[8]

[7] **Weir Phillips 2021**. Cockle Bay Redevelopment Heritage Interpretation Strategy.
[8] **NSW Environment and Heritage, 2002, "Pyrmont Bridge"**, available http://www.environment.nsw.gov.au/heritageapp/HeritageItemImage.aspx?ID=5053337#ad-image-8, accessed 26 February 2015.

2.2.3 NSW Historic Shipwreck Register

The NSW Historic Shipwreck Register is a database maintained by the NSW Heritage Division and contains upwards of 1,800 wrecks.[9] This database has been built up around historical accounts of the loss of vessels, mainly through the systematic examination of newspapers from the 1790s to the present day. The database has been augmented by other sources such as archival information from the Australian Hydrographic Office.

The database has been searched to locate any known or potential shipwrecks that have occurred specifically in Darling Harbour / Cockle Bay and greater in Sydney Cove. There are 112 registered vessels that are listed as wrecked in "Sydney Harbour" that have not been located. This description includes vessels that were reported lost within "Sydney Harbour Heads", or general locations such as "just outside Circular Quay" whereby the location may be further afield than the location described.

Refining the search to closer to the study area, there were four shipwrecks that have occurred in Darling Harbour. These were:

> *William Woolley – 201-ton wooden hulled brig that was lost in 1854 when it caught fire and was scuttled while bring timber into Sydney Harbour. The location of the wreck is unknown.*
>
> *Sterling – an iron hulled single screw steamer lost in 1919 when it collided with another vessel at Federal Wharf. The vessel was later refloated and removed from the site.*
>
> *Orphan Girl – a woodern hulled lighter that collided with another vessel in 1880. The vessel was travelling from Pennant Hills to Darling Harbour. The vessel was wrecked and its location is unknown.*
>
> *Omeo – 16-ton wooden screw steamer harbour tug. The vessel's boiler expolded while it was at Bathurst Street Wharf.*

There is the potential for archaeological remains associated with the shipwreck of *Sterling* to be present within the project area. While the vessel was refloated, there is the potential for remains associated with the collision to still be on the seabed.

The vessels *William Woolley* and *Orphan Girl* have Darling Harbour included in their shipwreck register listings as this was their destination. It is possible that both of these wrecks are within the greater Darling Harbour area, however, they are unlikely to be within the study area of the report.

The vessel *Omeo* was lost at the Bathurst Street Wharf. These wharves are now covered over by reclamation works and are located behind the current seawall. Therefore, the wreck is likely to be to the south and outside of the study area of this report.

2.2.4 Sydney Local Environmental Plan 2012

Identified items of cultural heritage significance within the project area are listed on Schedule 5 of the *Sydney Local Environmental Plan 2012.* Each item listed on Schedule 5 is subject to protection under the planning and development controls of the LEP.

There are no listings on the Sydney LEP that are located close to the study area and would be impacted by the proposed works.

[9] **NSW Heritage Office, 2007** 'Maritime Heritage Online', NSW, available http://www.environment.nsw.gov.au/maritimeheritage/index.htm

2.2.5 NSW Section 170 Heritage and Conservation Register

All NSW State Government Agencies are required to keep an up-to-date record to assist in total asset management by providing information on their assets which have identified heritage significance. The Register has been prepared in accordance with the NSW Heritage Office guidelines and corresponds with information in the State Heritage Inventory, as managed by the NSW Heritage Office.

Pyrmont Bridge is listed on the Sydney Harbour Foreshore Authority's Section 170 Heritage and Conservation Register.

2.3 Summary of Statutory Provisions

There are no heritage listed items, within the scope of this assessment, within or near the study area. There are two sites listed however - Pyrmont Bridge and S.S. *South Steyne* – where any impacts to their heritage significance have been assessed in separate documents and are hence not discussed in this report.[10] The table and figure below provids a summary of the that are located (Table 2 and Figure 3).

Table 2: Summary of heritage listed sites.

Item	NSW *Heritage Act (1977)*		*Environmental Planning and Assessment Act (1979)*	
	SHR	*S170*	*REP*	*LEP*
S.S. South Steyne – movable heritage item	00755			
Pyrmont Bridge – Sydney, Part of Lot 501, DP 1031387 and part of Lot 1010, DP 1147364	01618	Sydney Harbour Foreshore Authority		

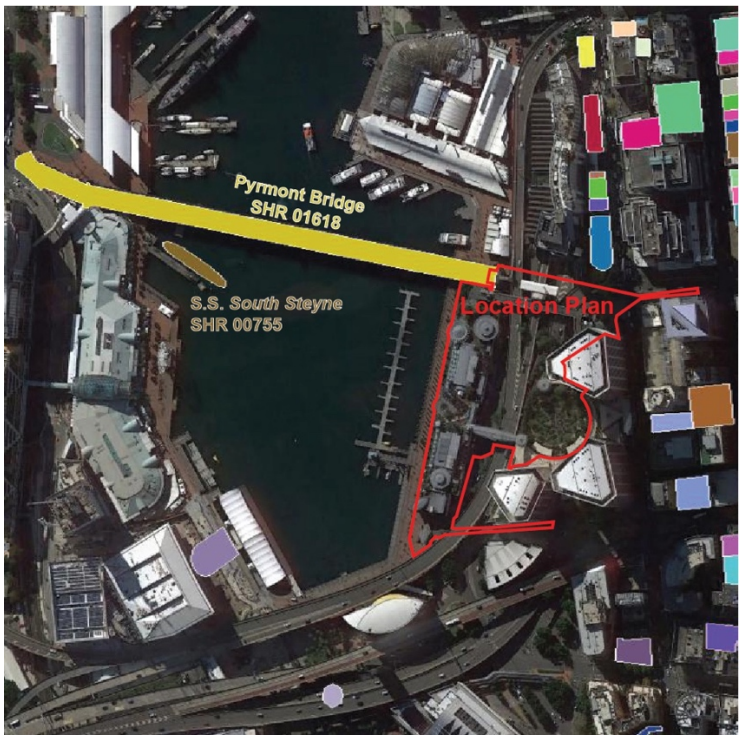


Figure 3: Curtilages of nearby heritage listed sites. These sites are not assessed in this report.

[10] **Weir Phillips Heritage, August 2017**, *Heritage Impact Statement: Cockle Bay Park Redevelopment: 241-249 Wheat Road, Cockle Bay*

3 HISTORICAL BACKGROUND

The following historical summary, unless otherwise referenced, is taken from a previous report based on the Cockle Bay area.[11] This section presents a summary of the development of maritime industry and infrastructure on the eastern side of Cockle Bay. It also includes identification of historic maritime infrastructure likely to have been situated within the study area based on numerous archival charts and plans.

3.1 Historical Summary

Following the arrival of the First Fleet in 1788, the NSW colony was initially centred around Sydney Cove, with all shipping activity conducted from landings within the cove itself. Settlement was largely dictated by topography and the availability of fresh water, and land and along Darling Harbour and Cockle Bay – both originally known as "Long Cove" – saw little occupation for the following two decades due to the rugged terrain separating the area from Sydney Cove.

3.1.1 The First Wharf and the First Half of 19th century

In 1811, Governor Macquarie ordered the construction of the first wharf in Cockle Bay; Market Wharf, established to receive produce from outlying settlements and serve the Sydney marketplace. In conjunction with the new wharf, a new access road – Market Street – was laid out and the market itself was moved from Sydney Cove to the site of the present Queen Victoria Building.

Maritime activity began to expand from Sydney Cove around Miller's Point into the northern end of Cockle Bay; the southern portion of the bay, however, remained largely undeveloped due to a combination of relatively shallow waters and limited access between the shoreline and the town grid. In 1815, Mr. John Dickson opened a steam powered mill near the base of current Goulburn Street, utilising the freshwater streams at the head of Cockle Bay; and for the following decade, Dickson's wharf and mill complex comprised the only maritime structures south of Market Wharf (Figure 4). In 1826, Governor Darling renamed Cockle Bay "Darling Harbour" in honour of himself.

[11] **Cosmos Archaeology, May 2015**, Cockle Bay Marine Structures Redevelopment: Maritime Archaeological Survey and Statement of Heritage Impact, report for Sydney Harbour Foreshore Authority.

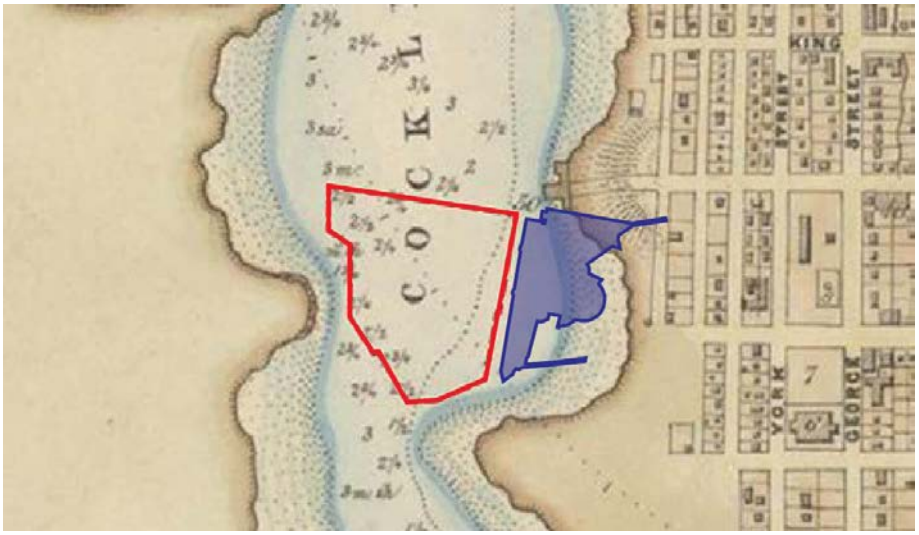


Figure 4: 1822 map of Cockle Bay showing Market Wharf above study area. An indicative outline of the current extent of Cockle Bay, south of Pyrmont Bridge, is marked in red, and the study area marked in blue. Note this plan is not accurate in regard to the align alignment of the Sydney town grid and orientation of Cockle Bay.[12]

During the late 1820s-early 1830s, the NSW colony saw a period of rapid expansion, economic growth and increasing transition towards free settlement and private enterprise. Shipping activities expanded further south into Darling Harbour and numerous water frontages along the eastern shore were taken up and private commercial wharves with associated warehouses constructed. The first episodes of land reclamation began to be undertaken by private settlers, particularly towards the shallower head of the harbour in order to facilitate construction and gain access to deeper water.

It is during the mid-1830s that the first documentary evidence of maritime development within the proximity of the current study area occurs; “Streets Wharf” situated on the southern side of Market Street was constructed during the early to mid-1830s by timber merchant Mr. Thomas Street (Figure 5). In the 1840s the trade of agricultural produce and other bulk materials through Sydney continued to expand, creating a boom in the coastal shipping industry and providing impetus for the increased establishment of wharf and warehouse facilities. The eastern shore of Darling Harbour saw rapid development, with large expanses of land reclamation and wharf construction conducted by private shipping companies and professional wharf owners who let the berths and provided storage and handling facilities. By the mid-1840s, the rapid growth in wholesaling activity firmly established the warehousing sector along the western side of Sydney township.

[12] **Anon, 1822**, *Plan of the town and suburbs of Sydney, August, 1822,* Ferguson Collection, Map 107, State Library of New South Wales.

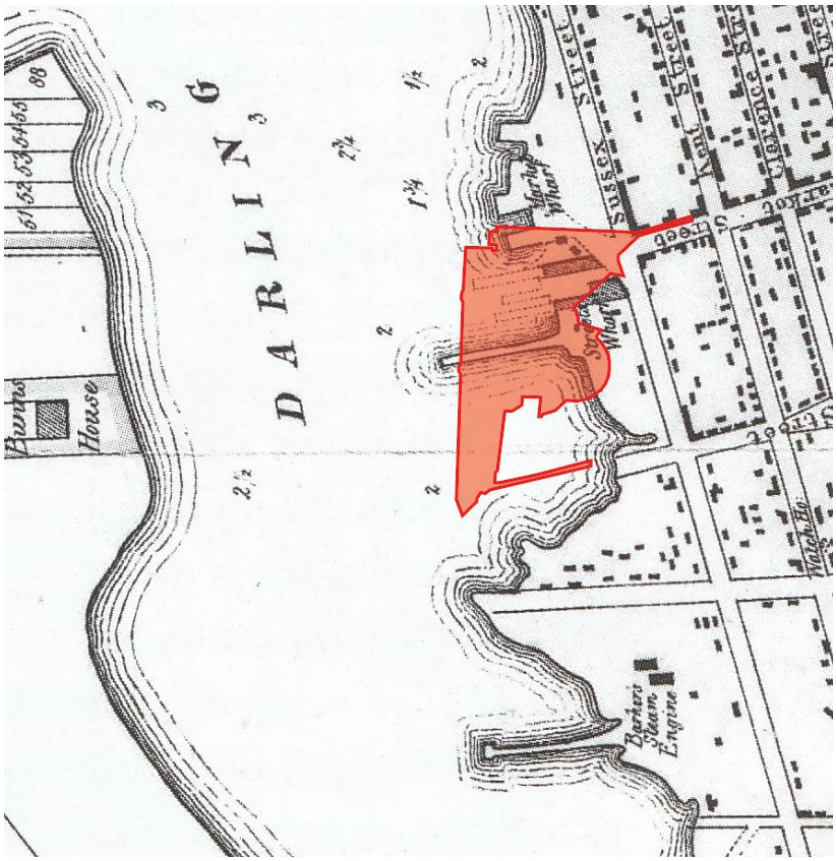


Figure 5: 1836 map of Darling Harbour showing "Streets Wharf" to immediate north of study area. Study area of Cockle Bay Park shown in red. [13]

Several episodes of private land reclamation occurred along the eastern side of Darling Harbour within the current study area during the early to mid-1840s, followed by the construction of four new wharves; including Albion Wharf just to the south of Market Street, associated with Messrs. Hughes and Hosking's Albion Mills; a new Streets Wharf, situated between Market and Druitt Streets and seemingly replacing the previous Streets Wharf; Mr. Jaques Wharf just south of Streets Wharf, and Mr. Thomas Hyndes Wharf at the end of Druitt Street – the latter three all offering rent of wharfage and storage to coastal shipping businesses (Figure 6 and Figure 7).

[13] **Great Britain Parliament, House of Commons, Select Committee on Transportation, 1836,** *Plan of Sydney with Pyrmont, New South Wales: the latter the property of Edwn Macarthur Esqre, divided into allotments for building, 1836.* National Library of Australia, Map T 1551.

Figure 6: 1844 map of Darling Harbour showing wharves within the study area. Study area of Cockle Bay Park shown in red. [14]

Figure 7: ca. early 1840s painting of Albion Mills with associated timber wharf visible in foreground on left-hand-side.[15]

3.1.2 The Gold Rush and Second Half of the 19th Century

The discovery of large gold deposits in rural NSW in 1851 and the subsequent gold rushes led to a proliferation of industrial enterprises and warehouse facilities soon sprang up along the eastern shore of Darling Harbour, coinciding with a boom in the coastal shipping industry and intensification in maritime trade. More and more sections of the foreshore were

[14] **Sheilds, F. W., 1844,** *Map of the City of Sydney, New South Wales.* "Historical Atlas of Sydney." City of Sydney Archives – Digital Information http://www.photosau.com.au/CoSMaps/scripts/home.asp
[15] **Anon., c.1840**, "Albion Mills (Darling Harbour) c.1840", archival print, State Library of New South Wales, available https://shop.sl.nsw.gov.au/albion-mills-darling-harbour-c-1840/, accessed 10 August 2017.

reclaimed as maritime infrastructure was upgraded and expanded, and wharves were pushed out further into the harbour to accommodate larger ships needing deeper berths.

By 1853, almost the entirety of the eastern shore of Darling Harbour had been taken up. Land within the vicinity of the study area was more intensively occupied and the beginnings of additional land reclamation were being undertaken; however, no new wharves were constructed during this time (Figure 8).

Figure 8: 1853 map of Darling Harbour showing wharves within the study area (shown in red). [16]

The wealth generated by the gold rush also reinvigorated the broader economy and provided venture capital for large scale development. Two significant features were completed at Darling Harbour during the mid-late 1850s; the Darling Harbour branch railway line on the western side of the harbour and the Pyrmont Bridge.

In 1853, the Pyrmont Bridge Company was formed to erect a bridge across Darling Harbour, connected to the existing Market and Union Streets. Completed in 1857, the bridge, designed by Edward Orpen Moriarty, NSW Department of Public Works Engineer-in-Chief, included an opening bascule span to allow passage of ships to the wharves at the southern end of the harbour.

Construction of extended and additional wharves and warehousing facilities along the eastern shore continued at a constant pace. By the late 1860s, a substantial amount of additional land reclamation had been undertaken and seven new wharves had been constructed within the current study area; including Corporation Wharf just to the south of the Pyrmont Bridge; Baltic Wharves, a pair of narrow wharves between Corporation Wharf and

[16] **Mitchell, Sir. T., Lt. Coll.; Surveyor General, 1853,**Trigonometrical survey of Port Jackson: commenced as a military survey by order of General Darling and continued as civil duties permitted or required. Engraved by J. W. Lowry. T. & W. Boone, New Bond Street, London. National Library of Australia MAP RM 1267; Tile C1.

the existing Albion Wharf; a second Albion Wharf to the south of the original; Fagan Bros pair of wharves just to the north of Jaques Wharf, and the Jones Bros coaling wharf at the end of Bathurst Street. The original (northern) Albion Wharf had also been extended by this time (Figure 9 and Figure 10). By the mid-1860s, this collection of wharves and associated warehouses and shipping facilities on the eastern side of Darling Harbour between the Pyrmont Bridge and Bathurst Street catered almost exclusively to timber and coal industries.

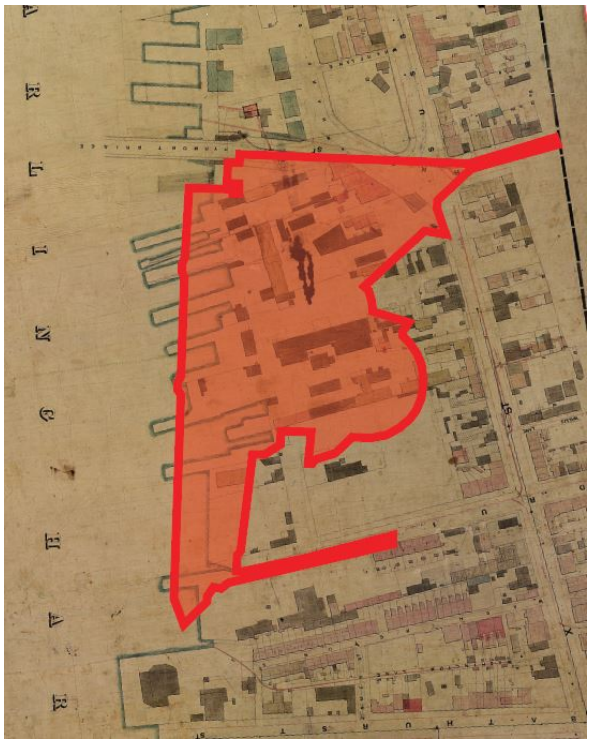


Figure 9: 1865 surveyors plans of Darling Harbour showing detail of wharves on the eastern shore. Study area of Cockle Bay Park shown in red. [17]

Figure 10: 1866 photograph of Darling Harbour showing wharves along the eastern shore within the study area.[18]

The sustained economic growth of the 1860s and early 1870s led to increased prosperity in the NSW colony, culminating in an era of building boom and substantial port expansion. In

[17] **City of Sydney Council, Surveyor's Department, 1865,** *Trigonometrical Survey of Sydney; Sections E & W, 1865.* City of Sydney Archives – Digital Information http://www.photosau.com.au/CoSMaps/scripts/home.asp

[18] **Anon, 1866,** "Views of Sydney and N.S.W. No. 58. Darling Harbour, East Side, 1866." Dixson Library, State Library of New South Wales, Image No. DL PX 148.

1872, the NSW Legislative Assembly made the decision to redevelop port facilities in Darling Harbour to cater for the overseas cargo trade and improve the railway freight and cargo shipping network. The shorter jetties and wharves serving the coastal shipping industry in the northern portion of Darling Harbour began to be replaced with longer wharves to meet the needs of larger steam vessels. The shallow head of the harbour, roughly from Campbell Street to Liverpool Street, was reclaimed to provide for the construction of a railway goods yard with extensive sidings.

The substantial changes to Darling Harbour during the 1870s and early 1880s were limited to the south-west section and the eastern shore north of Pyrmont Bridge. The private wharves on the south eastern side of the Harbour continued to serve the interstate coastal trade and remained largely unchanged. The only documented maritime development within the current study area during this period was the expansion of the Streets Wharf facilities, and construction of a second wharf at the former Jaques Wharf allotment; now known as Wentworth Wharf (Figure 11).

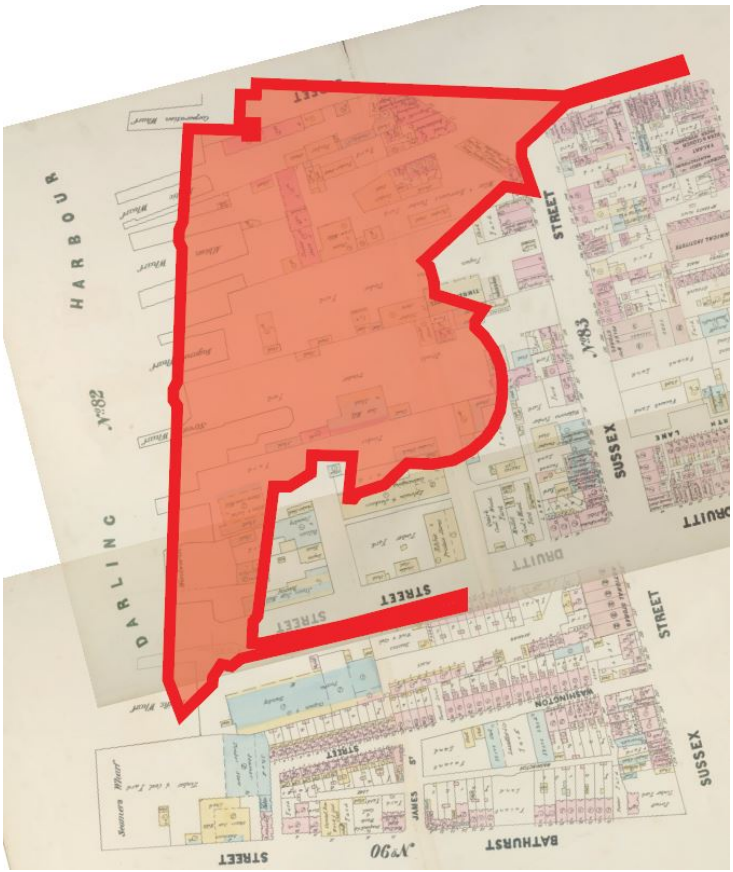


Figure 11: 1880 surveyors plan of Darling harbour showing detail of wharves within study area; the study area is outlined in red.

While areas north of Pyrmont Bridge were redeveloped to serve larger ocean-going vessels, the interstate coastal shipping industry was progressively confined to the shallower southern end of the harbour as it declined with the increased transportation of goods by rail. The collection of private wharves and associated infrastructure along the south-eastern shore of Darling Harbour within the current study area subsequently saw a resurgence of expansion and development to cater for the concentration of the coastal trade (Figure 12). During the period between the mid-1880s to late 1890s, the twin Baltic Wharves were reconstructed into a single larger wharf; the Fagan Bros pair of wharves were demolished and a much longer single wharf (shortly thereafter known as Federal Wharf North) constructed; Streets Wharf was demolished and a second long wharf (later known as Federal Wharf South) built in its place; Wentworth Wharves were directly taken over by the Union Steam Ship Company (New

Zealand) with the existing structures demolished and a pair of two long much longer wharves built (Figure 13); Hyndes Wharf was demolished and replaced by a new long wharf for Pacific foundry; and an additional wharf was constructed along the northern side of the Jones Bros. coal wharf.

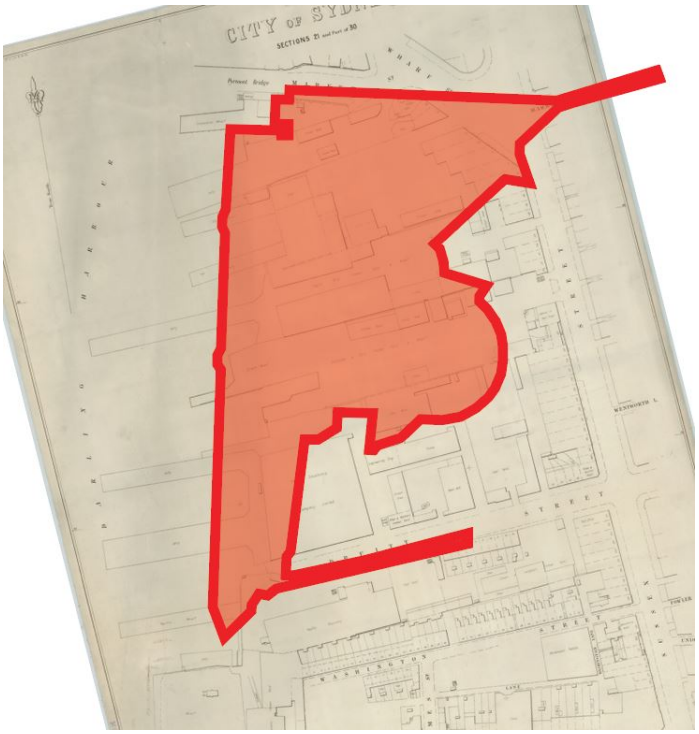


Figure 12: 1895 surveyors plan of Darling Harbour showing detail of wharves within the study area. Study area of Cockle Bay Park shown in red. [19]

Figure 13: ca. 1890s photograph of ships at Union Wharves, Darling Harbour.[20]

A final substantial development in the southern end of Darling Harbour commenced in the late 1890s; the construction of a new Pyrmont Bridge. The original bridge had been

[19] **NSW Department of Lands, 1895,** *City of Sydney, Sections 21 & part of 30, 2nd ed., 1895 (Sydney Metropolitan Detail Series).* Lithographed & printed at the Surveyor General's Office Sydney N.S.W. State Library NSW, Digital Order No. a1367424

[20] **Bayliss, C., ca. 1890s,** "Union Wharf, Darling Harbour, New South Wales." Collection of photographs of New South Wales, ca. 1876-1897, National Library of Australia, Image pic-vn4193945-v.

purchased by the NSW Government in 1884 and inspections soon revealed that many timber elements were badly deteriorating and the bridge was reaching the end of its operational lifespan. A public competition for a design of a new bridge was announced in 1891, however, in 1894, it was decided that a design for a higher level steel bridge with bascule swing span prepared by Percy Allen, NSW Department of Public Works Engineer-in-Chief, would be adopted. Construction commenced in late 1899, with the new bridge erected just to the south of the original and completed in 1902 (Figure 14 and Figure 15). The construction of the eastern approach necessitated the resumption of the waterfront allotment immediately to the south of the original bridge and the subsequent demolition of Corporation Wharf.

Figure 14: Pyrmont Bridge just after completion, with remnants of original bridge in foreground, 1902.[21]

Figure 15: Pyrmont Bridge, facing east, 1907.[22]

An outbreak of bubonic plague in Sydney in January 1900, commencing in the waterfront areas and spreading throughout large portions of the city, was the catalyst for the NSW Government to improve building and planning controls, sanitation and general public health issues. In May 1900, the Government commenced the resumption of large tracts of private property and associated wharves along the eastern side of Darling Harbour – areas deemed particularly susceptible to disease and most in need of cleansing and redevelopment – as the first step in the "Darling Harbour Improvement Scheme" (Figure 16.

Federal Wharf, and additional wharfage alongside the Jones Bros coal wharf; known as Chapmans Wharf. The establishment of a rat proof sea wall within the vicinity of the current study area was first conducted along the eastern shore of the harbour, largely completed by 1907; with the southern and western shorelines rat-proofed by 1911 (Figure 17 and Figure 18).

[21] **Anon, 1902,** "Views of Sydney and N.S.W. No. 46. Pyrmont Bridge." Dixson Library, State Library of New South Wales, Image No. DL PX 146.
[22] **Anon, 1907,** "Pyrmont Bridge." Geoff Ward collection, NSW Transport - Roads and Maritime Services archives, Image No. H032110.

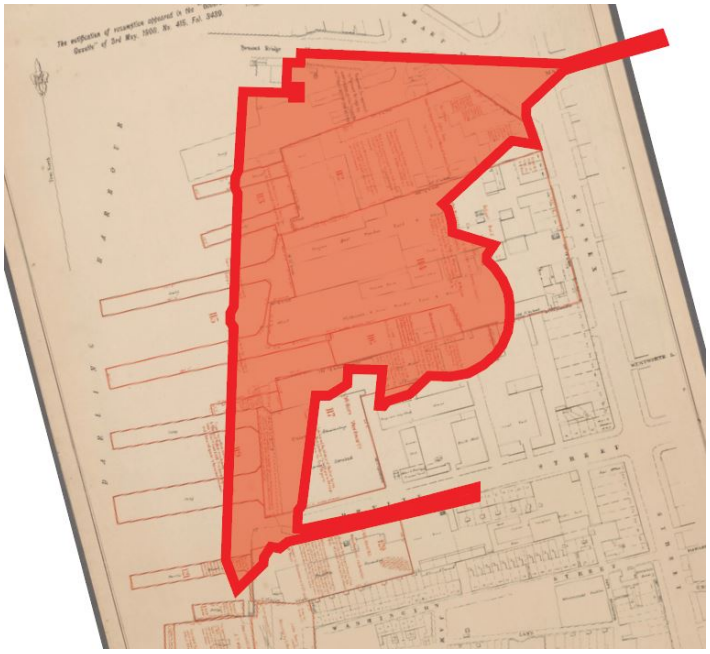


Figure 16: 1900 surveyors plan showing allotments and wharves on the eastern side of Darling Harbour within the study area resumed by the NSW Government (outlined in red). Study area of Cockle Bay Park shown in red.[23]

Figure 17: 1907 plan of Darling Harbour showing improvements carried out by Sydney Harbour Trust; blue-green shading denotes wharves or jetties erected, green marks the length of rat proof retaining wall erected, and orange shading signifies buildings erected / altered. The study area is outlined in red.[24]

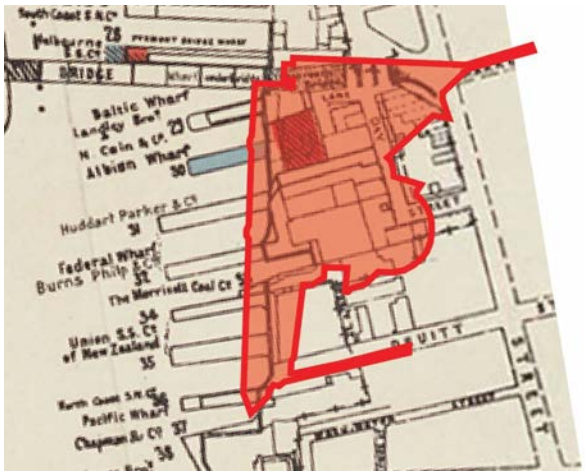


Figure 18: 1911 plan of Darling Harbour showing improvements carried out by Sydney Harbour Trust; blue shading denotes wharves or jetties erected, green marks the length of rat proof retaining wall erected, and orange shading signifies buildings erected / altered. The study area is outlined in red.[25]

[23] **NSW Roads and Bridges Branch, 1900,** Darling Harbour Resumptions, Showing by red tint part of land resumed in connection with the Darling Harbour Improvement Scheme, City of Sydney, Within Section 21 and part of Section 30 (Plan K). City of Sydney Archives – Digital Information http://www.photosau.com.au/CoSMaps/scripts/home.asp

[24] **Walsh, H. D and S. E. Perdriau / Sydney Harbour Trust, 1907,** Map of part of the water frontage of the City of Sydney showing parts of the land and wharfage vested in the Sydney Harbour Trust Commissioners. State Library of New South Wales, Image No. Z/M3 811.15/1907/1.

[25] **Walsh, H. D and S. E. Perdriau / Sydney Harbour Trust, 1911,** *Map of part of the water frontage of the Port of Sydney showing parts of the land and wharfage vested in the Sydney Harbour Trust Commissioners.* State Library of New South Wales, Image No. Z/M3 811.15/1911/1.

3.1.3 "Rat Proofing" and the First Half of the 20th Century

In 1901, the NSW Parliament formed the first port authority, the Sydney Harbour Trust, to oversee the redevelopment of wharves and adjacent areas. This major port improvement scheme involved extensive demolition of existing maritime infrastructure – particularly clusters of small, private jetties and wharves, construction of larger finger wharves and the establishment of a "rat proof" seawall around the entire length of the Sydney port waterfront.

In the southern end of Darling Harbour, rat proofing and redevelopment of existing wharves was largely carried out between 1903 and 1911. The advent of World War I brought a halt to much of the work, with further phases of wharf improvement delayed until late 1918. Along the eastern shoreline within the current study area, various stages of wharf demolition and reconstruction were carried out during this period including: the construction of Wharf 28 / Melbourne Steam Ship Co. Wharf, underneath the Pyrmont Bridge; demolition of Baltic Wharf and construction of a longer wharf in its place, known also as Baltic Wharf or Wharf 29; demolition of the pair of Albion Wharves and construction of a larger and longer single wharf, also known as Albion Wharf or Wharf 30, repairs and extensions to the northern By the early 1910s, goods traffic on the railway branch line to Darling Harbour and adjacent suburban lines had become excessive, with over one thousand wagons using the network every day. The NSW Railway Department proposed to construct additional goods lines to Darling Harbour and substantially extend the Darling Harbour goods yards. In 1917, via extensive conference with the Sydney Harbour Trust Commissioners, a scheme was adopted whereby the southern portion of Darling Harbour from the head to Bathurst Street, would be reclaimed using spoil from the excavation of the Sydney City Railway underground tunnels (a scheme proposed by the NSW Public Works Department in 1915 to improve the passenger railway system), providing land for the expansion of the goods yards.

In the meantime, the Sydney Harbour Trust continued redevelopment of the wharfage on the eastern side of Darling Harbour within the current study area, including the demolition of two Union Steam Ship Co. Wharves and Pacific Wharf, strips of infill land reclamation and subsequent construction of the much larger Wharves 35 and 36 (Figure 19 to Figure 21).

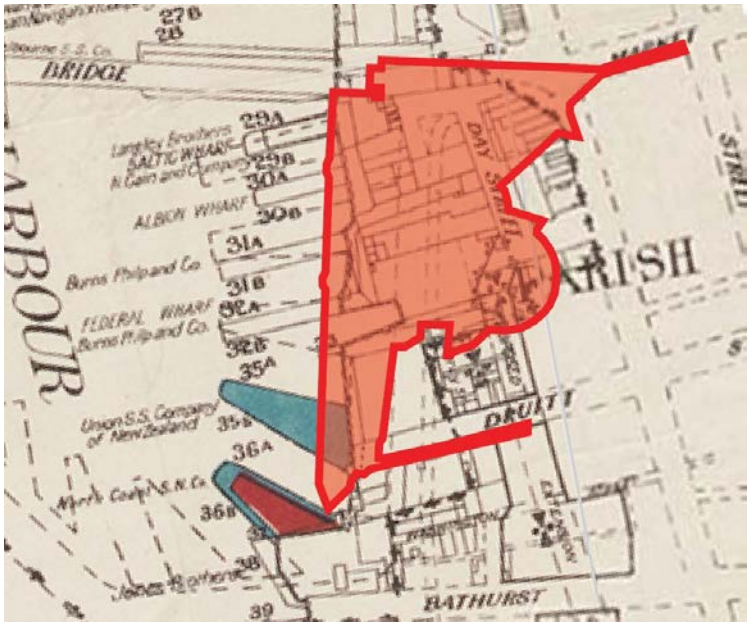


Figure 19: 1919 plan of Darling Harbour showing improvements carried out by Sydney Harbour Trust; blue shading denotes wharves or jetties erected and red shading signifies buildings erected / altered. The study area is outlined in red. [26]

[26] **Walsh, H. D and S. E. Perdriau / Sydney Harbour Trust, 1919,** *Map of part of the water frontage of the Port of Sydney showing parts of the land and wharfage vested in the Sydney Harbour Trust Commissioners.* State Library of New South Wales, Image No. Z/M3 811.15/1919/1.

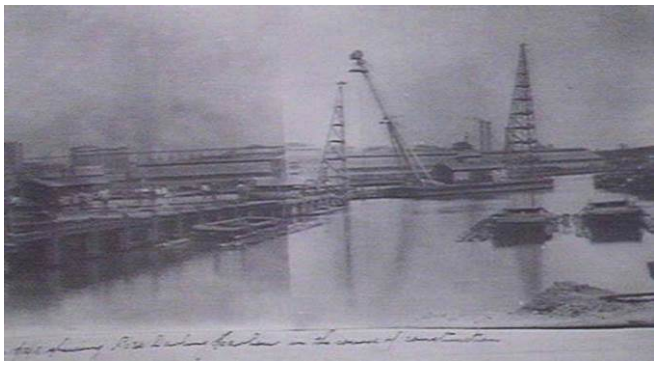


Figure 20: Wharf 36 under construction, December 1918.[27]

Figure 21: Wharf 35 under construction, September 1918.[28]

Construction of the underground Sydney City Railway scheme finally commenced in 1923, allowing the reclamation of the head of Darling Harbour to be undertaken using the excavated spoil (Figure 22 and Figure 23). These works were completed in 1926 and over the course of the following two years, the Sydney Harbour Trust undertook the final stages of the Darling Harbour port improvement scheme; including works on the eastern side of Cockle Bay such as the extension of Wharf 36 and the demolition of the pair of Federal Wharves on the eastern shoreline to allow for the construction of Wharves 31 and 34 (Figure 22 and Figure 25).

Figure 22: 1923 panorama showing commencement of reclamation works at the head of Darling Harbour.[29]

[27] **Anon, 18th December 1918,** "No. 36 Darling Harbour under construction." Government Printing Office Collection, State Library of NSW, Image No. GPO/1-21062.

[28] **Anon, 13th September 1918**, "Construction of new No. 35 Darling Harbour." Government Printing Office Collection, State Library of NSW, Image No. GPO/1-21067.

[29] **Foster, A. E., 1923,** "Panorama of Darling Harbour and Pyrmont Bridge from Pyrmont, 1923." Box 32, No. 357, Series 06; Sydney views, ca. 1916-1947, State Library of New South Wales.

Figure 23: Continuation of 1923 panorama showing Darling Harbour railway goods yard in foreground and wharves along eastern shore in background.[30]

Figure 24: 1943 aerial photograph of Darling Harbour with the study area in red. [31]

[30] *Op. Cit.* Foster, A. E., 1923

[31] **Adastra Aerial Survey, May-June 1943,** Commissioned by NSW Main Roads Department; available from NSW Land and Property Information, SIX viewer http://maps.six.nsw.gov.au/

Figure 25: 1930s photograph of the head of Darling Harbour showing Wharves 34-37.[32]

All of the new wharves erected as part of the improvement scheme were owned and administered by the Sydney Harbour Trust and operated as a co-ordinated set of commercial wharves. Much of the surviving wharfage resumed in 1900 had been gradually leased back to the private sector, in many cases the original owners. In 1936, the Maritime Services Board was established to coordinate all port and navigation services for NSW, subsequently taking over administration and control of Darling Harbour. Throughout the following few years, further improvements to the wharfage were undertaken, including the construction of substantial cargo sheds and facilities on Wharves 35-38.

In the years following World War II, Sydney enjoyed an economic boom due to international demand for raw materials such as wool and wheat and the Darling Harbour railway goods yards and large cargo wharves north of the Pyrmont Bridge consequently saw increasing trade. The domestic coastal shipping traffic that occupied the southern end of Darling Harbour, however, began to decrease due to the rise of motor vehicles and road cargo transport networks.

3.1.4 Decline of Coastal Trade and the Second Half of the 20th Century

In the late 1940s to 1950s, the Maritime Services Board commenced an extensive remodelling scheme throughout Sydney Harbour, directed towards the removal of ageing infrastructure, alteration and expansion of wharfage to serve the larger international cargo and container ships, and the overall improvement of cargo handling facilities. The maritime infrastructure at the head of Darling Harbour, however, received little attention as the shallow waters and confined space prevented the establishment of large shipping facilities and the continued decline of the coastal trade made upgrading wharfage largely unnecessary. The only development that occurred within the study area during the 1940s to mid-1950s was the reconstruction of Wharf 31 on the eastern shoreline (Figure 26).

In the late 1950s to early 1960s, the Maritime Services Board embarked on further redevelopment at the southern end of Darling Harbour, including improvement of road access via establishment of the Port Roadway between Market and Bathurst Streets, and an upgrade of wharfage through the demolition of Wharves 29-31 and the construction of a longshore berth – Wharf 33 – stretching from the Pyrmont Bridge to Wharf 34, in order to provide access for larger vessels and easier cargo handling (Figure 27 and Figure 28) late 1960s, however, the continued growth of container trade making increasing demands on wharf space and facilities in Sydney ports led to the construction of a custom-built container terminal at Port Botany and the ultimate demise of the commercial shipping and railway freight industry in Darling Harbour.

[32] **Anon, 1930s, "**The coastal cargo ship *Craigend* departing wharf 37B, Darling Harbour, during the 1930s." Sam Hood Collection, Australian National Maritime Museum.

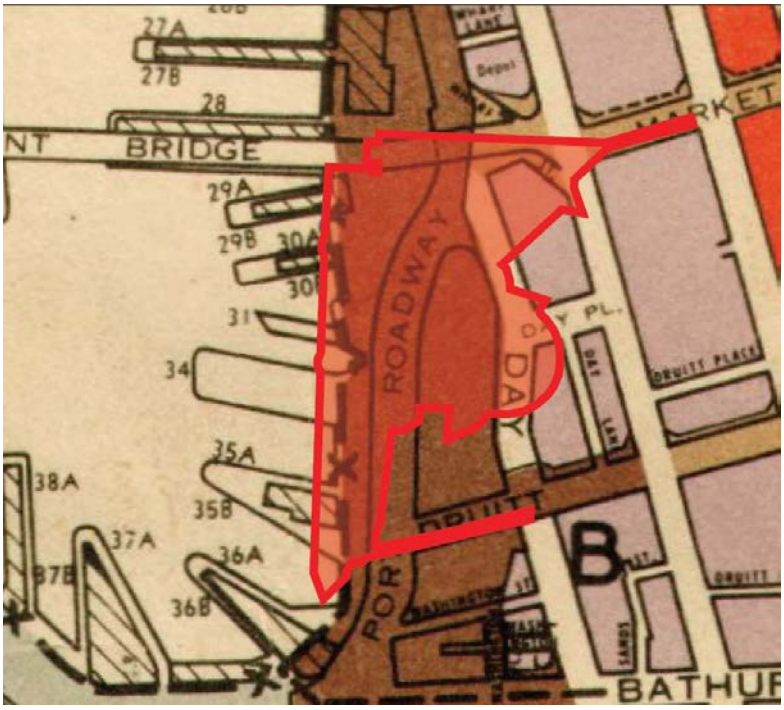


Figure 26: 1958 plan of Darling harbour showing reconstructed Wharf 31 with study area in red. [33]

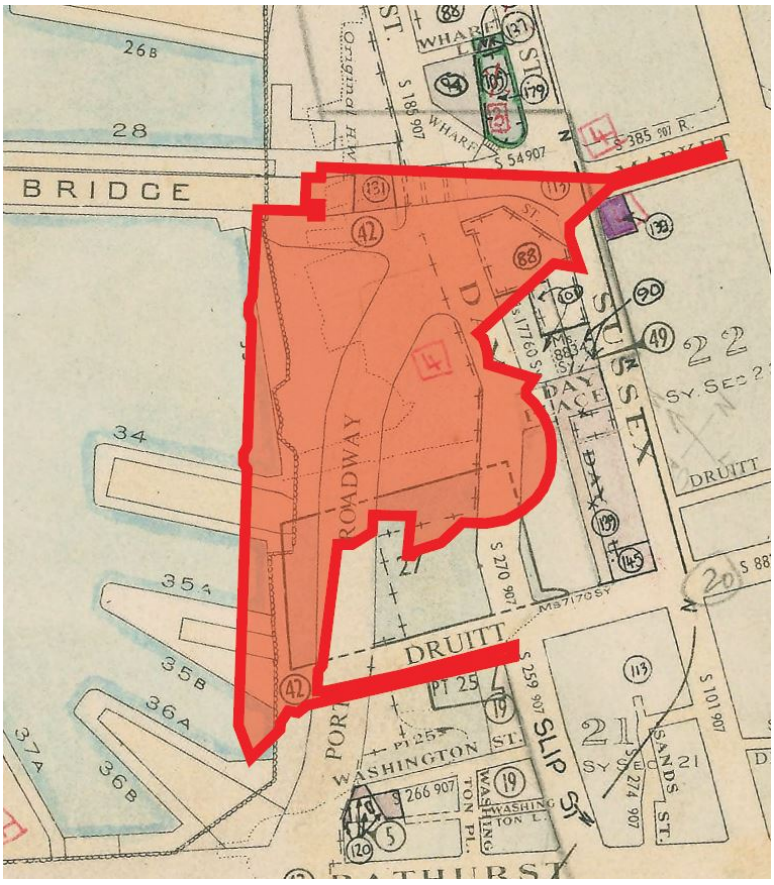


Figure 27: 1970 parish map showing longshore wharf 33 with study area in red. [34]

[33] **City of Sydney, 1958,** *City of Sydney Planning Scheme.* "Historical Atlas of Sydney." City of Sydney Archives – Digital Information http://www.photosau.com.au/CoSMaps/scripts/home.asp

Figure 28: 1969 aerial photograph.[35]

In the early 1970s, the Sydney City Council began considering options for remodelling parts of Darling Harbour for recreational and / or residential purposes. By the early 1980s, both the NSW State and Federal Governments began to see wider opportunities to convert much of the southern extent of Darling Harbour to a public recreation precinct, particularly in light of the approaching NSW bicentenary and the opportunity for international exposure during celebrations.

In 1982-1984, a development design plan was prepared by the NSW Department of Planning and Public Works Department, with the major components being a new exhibition centre, convention centre, market building and maritime museum on the western side of Darling Harbour, with landscaped gardens and a harbour promenade on the eastern side. A new government agency, the Darling Harbour Authority, was subsequently formed in 1984 to manage and deliver the redevelopment project. Over the course of the following four years, the Darling Harbour railway goods yards and wharves, and all wharves, warehouses and associated facilities along the southern and eastern shores of Darling Harbour south of Pyrmont Bridge, were demolished to make way for the construction of the proposed new recreational waterfront facilities. The Darling Harbour redevelopment project was completed in 1988 and officially opened during bicentenary celebrations; with the head of the harbour and associated entertainment precinct renamed “Cockle Bay”. The works continued in the 1990s as part of Stage 2 of the Darling Park Development (Figure 29 and Figure 30).

Figure 29: 1984 aerial photograph showing early stages of demolition of railway yards and wharves.[36]

Figure 30: 1988 aerial photograph showing complete Cockle Bay precinct.[37]

[34] **NSW Department of Lands, 1970,** *Parish of St Andrew, County of Cumberland.* 2nd Edition. NSW Land & Property Information.
[35] **Putnam, C., 1969,** “Darling Harbour, 1969.” Contributed by G. Putnam, *Dictionary of Sydney.* http://dictionaryofsydney.org/item/20947
[36] **Anon, 1984,** “Darling Harbour.” Sydney Reference Collection, City of Sydney Archives, Image No. 071490.
[37] **Anon, 1988,** “Aerial view of Darling Harbour.” Sydney Reference Collection, City of Sydney Archives, Image No. 031482.

3.2 Wharves

A total of twenty-four (24) historic wharves have been identified that are likely to have been situated within, or very close to, the current Cockle Bay Park study area. Figure 31 shows a full overlay of all these structures, as depicted on charts and plans from the 1830s to 1970s, on a current aerial photograph of Cockle Bay. Table 3 below provides a brief summary description of each wharf.

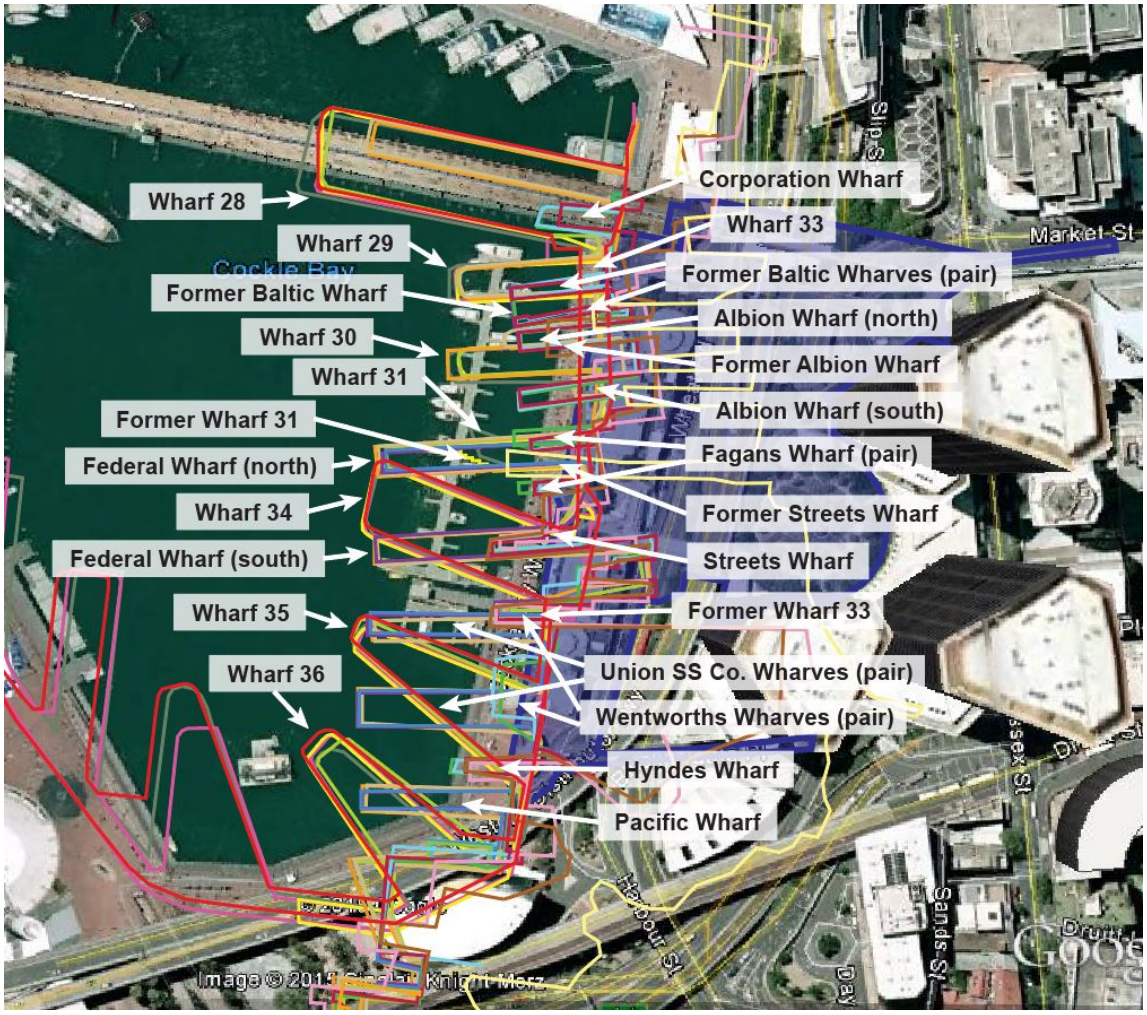
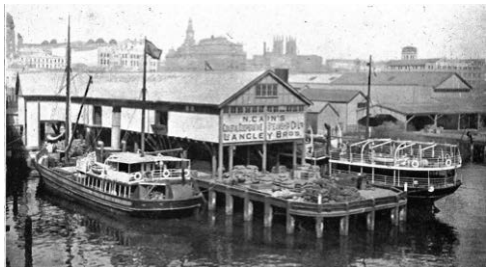
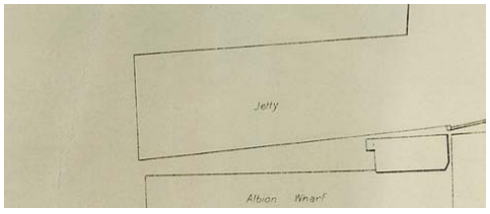
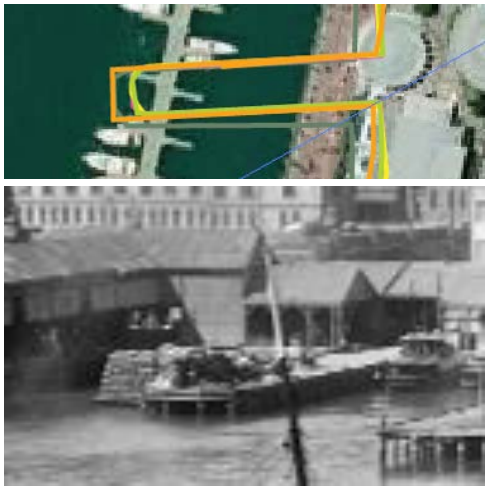
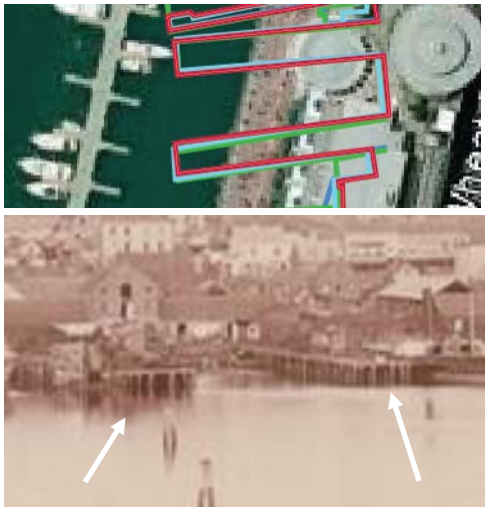


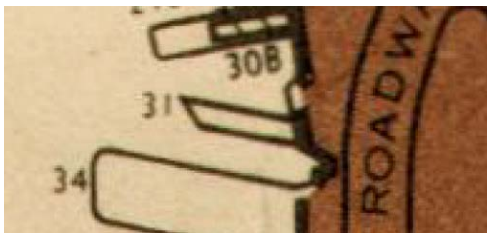
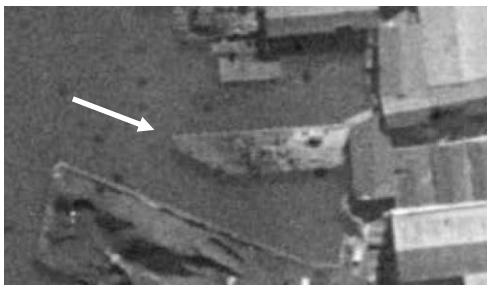
Figure 31: Full overlay of all identified historic wharves potentially within the Cockle Bay Park study area (shown in dark blue).

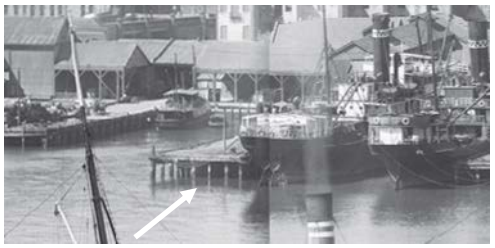
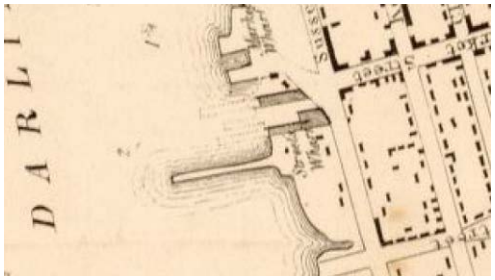
Table 3: Summary description of identified historic wharves potentially within Cockle Bay (described clockwise from north-east corner).

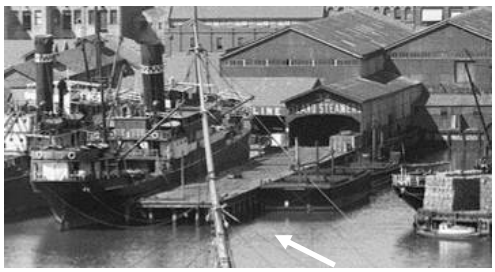
Wharf No.	History and Description	Outline Overlay and Historic Images
Wharf 28 **ca. 1906/1907 – mid 1980s** Also "Melbourne Steam Ship Co. Ltd. Wharf" or "Pyrmont Bridge Wharf"	Wharf 28 was initially constructed by the Sydney Harbour Trust ca. 1906-1907 on the northern side of Pyrmont Bridge. The wharf was lengthened and widened to extend south underneath the bridge in ca. 1908-1911; and further widened to extend beyond the southern side of the bridge by 1919. The wharf was constructed of timber piles, with a timber deck that was later resurfaced with concrete. A galvanised iron shed sat atop the wharf on the northern side of the bridge. Wharf 28 was demolished during the mid-1980s redevelopment of Cockle Bay by the Darling Harbour Authority. Previous structures within the footprint of Wharf 28 include Corporation Wharf.	 
Corporation Wharf **ca. late 1860s – 1899/1900**	Corporation Wharf was constructed on the frontage of reclamation sometime in the late 1860s. Corporation Wharf was an open wharf, constructed of timber piles and timber decking. The outline of Corporation Wharf changes slightly between an 1865 (burgundy on the overlay) and 1880 plan (light blue). It is possible that the wharf was extended sometime during this period, however, it is sketched in as a later addition to the 1865 plan and the differing outline is perhaps just a result of this wharf not being properly surveyed on the 1865 plan. The wharf was resumed for the construction of the second Pyrmont Bridge and demolished ca. 1899-1900. No previous structures are location within the footprint of Corporation Wharf.	 

Wharf No.	History and Description	Outline Overlay and Historic Images
Wharf 33 **ca. 1961/1962 – mid 1980s**	Wharf 33 was a longshore wharf built ca. 1961-1962 as part of port improvements conducted by the Maritime Services Board. These works included the demolition of Wharfs 29-31 and associated warehouses, the construction of Wharf 33 in their place, and the establishment of the Port Roadway along the eastern shore of Darling Harbour between Market and Bathurst Streets. Wharf 33 was built out from the existing ca. 1908-1911 seawall and is likely to have been constructed with a combination of timber and concrete piles, with concrete decking. Wharf 33 was demolished and / or buried under reclamation during the mid-1980s redevelopment of Cockle Bay by the Darling Harbour Authority. Previous structures within the footprint of Wharf 33 include sections of Wharves 29-31, the former Wharf 31, the former Baltic Wharf and earlier pair of Baltic Wharves, the former pair of Albion Wharves and earlier Albion Wharf, Fagans Wharves, the northern Federal Wharf and the former Streets Wharf.	 
Wharf 29 **ca. 1905/1907 – 1959/1962** Also "Baltic Wharf", "Langley Bros. Wharf", "Cains Coastal Co-op SS Co. Wharf" or "N. Cain & Co Wharf"	Wharf 29 was constructed in ca. 1905-1907 as part of the Sydney Harbour Trust improvements of Darling Harbour. The wharf was constructed of timber piles and timber decking, with a long galvanised iron shed erected on top. Wharf 29 was demolished between 1959-1962 during the development of the Port Roadway, constructed along the eastern shore of Darling Harbour between Market and Bathurst Streets and involving extensive resumptions. Previous structures within the footprint of Wharf 29 include part of the former Baltic Wharf and the northern wharf in the pair of even earlier Baltic Wharves.	 
Former Baltic Wharf **ca. mid 1880s – 1903/1905**	The former Baltic Wharf consisted of a single open wharf, with timber piles and decking, constructed in the mid-1880s. The footprint of this wharf overlies a pair of earlier wharves, also known as Baltic Wharves, and it is possible that the 1880s structure represents a reconstruction involving joining the two former wharves, rather than an entirely new construction. This Baltic Wharf was demolished in ca. 1903-1905 as part of the Sydney Harbour Trust improvements of Darling Harbour. Previous structures within the footprint of Baltic Wharf include the earlier pair of Baltic Wharves.	 

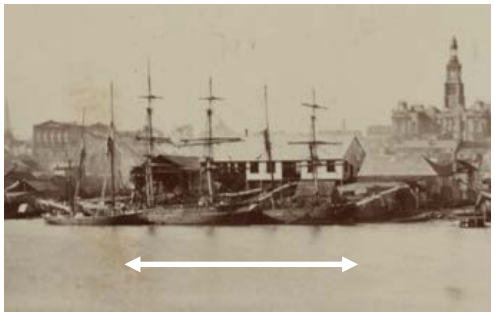
Wharf No.	History and Description	Outline Overlay and Historic Images
Former Baltic Wharves (pair) **ca. early 1860s – mid 1880s**	The original Baltic Wharves were constructed as a pair in ca. early 1860s as an extension on an earlier 1840s structure (outside study area). Both wharves were quite narrow, open wharves, built of timber piles and decking. The southern of the pair had a narrow gauge rail / trolley track running along its length. These wharves were either demolished or converted into the larger single Baltic Wharf (see above) in ca. mid 1880s. No previous structures occur in the footprint of this pair of Baltic Wharves.	
Wharf 30 **ca. 1910 – 1959/1962** Also "Albion Wharf"	Wharf 30 was constructed on the frontage of reclamation in ca. 1910 as part of the Sydney Harbour Trust improvements of Darling Harbour. Wharf 30 was originally an open wharf, built of timber piles and decking, however, an open sided shed was added sometime during the 1920s. Wharf 30 was demolished between 1959-1962 during the development of the Port Roadway, constructed along the eastern shore of Darling Harbour between Market and Bathurst Streets and involving extensive resumptions. Previous structures within the footprint of Wharf 30 include the northern wharf in the former pair of Albion Wharves and possibly an even earlier alignment of Albion Wharf (single wharf).	
Former Albion Wharves (pair) **ca. late 1850s/early 1860s – 1905/1910** Also "Lysaghts Wharf" "North Albion" & "South Albion"	The pair of Albion Wharves were constructed sometime in the late 1850s – early 1860s; with the northern one of the pair appearing to be an extension and / or reconstruction of an earlier structure (see below). Both Albion Wharves were open wharves, built of timber piles and decking. The northern one also having a narrow gauge rail / trolley track running along its length. Both wharves were demolished in ca. 1905-1910 as part of the Sydney Harbour Trust improvements of Darling Harbour (the southern one was demolished ca. 1905-1907; the northern one demolished ca. 1908-1910. Previous structures in the footprint of Albion Wharves include an earlier alignment of Albion Wharf (single).	

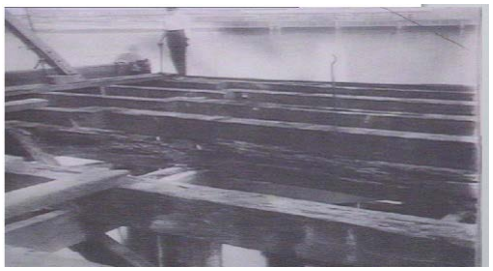
Wharf No.	History and Description	Outline Overlay and Historic Images
Former Albion Wharf **ca. early 1840s – late 1850s/early 1860s**	Albion Wharf, associated with the Albion Mills, was originally constructed in the mid to late 1830s; however, the original structure (yellow outline) is likely to be just beyond the current study area. Albion Mills (shown in sketch) were destroyed by fire in 1841 and the wharf was rebuilt and lengthened shortly thereafter (brown outline); consisting of an open wharf constructed of timber piles and decking. The wharf was either demolished or extended to form the northern pair of the later Albion Wharves (see above) in the late 1850s early 1860s. The outlines of the 1840s wharf and the 1850s/1860s northern wharf are slightly different, with the earlier wharf being slightly wider; however, this is likely to be due to inaccuracies in the 1840s plan. No earlier structures have been identified in the footprint of Albion Wharf.	 
Wharf 31 **ca. 1956/1958 – 1963**	Wharf 31 was constructed ca. 1956-1958 by the Maritime Services Board as part of improvement works to Darling Harbour. The wharf either replaced or involved the reconstruction of an earlier Wharf 31, and seems to represent a short lived attempt to improve wharfage by changing the alignment of Wharf 31 to match that of the larger Wharf 34 to the south. Wharf 31 is likely to have been built of timber piles and decking, and was demolished altogether by 1963. Previous structures in the footprint of Wharf 31 include part of the former Wharf 31, the northern wharf of Federal Wharves, the earlier pair of Fagans Wharves and the former Streets Wharf.	 
Former Wharf 31 **ca. late 1920s – late 1940s/early 1950s**	Wharf 31 was constructed in this configuration in the late 1920s as part of the Sydney Harbour Trust improvements to Darling Harbour. The alignment of Wharf 31 perfectly matches that of the previous Wharf 31 / northern of the former pair of Federal Wharves, and it is most likely that this Wharf 31 was a reconstructed / cut-down version of the former structure rather than an entirely new wharf. Wharf 31 was an open wharf, constructed of timber piles and decking. It was demolished by the Maritime Services Board sometime in the late 1940s – early 1950s. Previous structures identified within the footprint of Wharf 31 include the former Wharf 31 / northern of pair of Federal Wharves, the pair of earlier Fagans Wharves and the former Streets Wharf.	 

Wharf No.	History and Description	Outline Overlay and Historic Images
Federal Wharf (north) **ca. late 1880s/early 1890s – late 1920s** Also "Wharf 31," "Fagans Bros Wharf", Huddart Parker & Co. Wharf", "Burns Philp & Co. Wharf."	The northern Federal Wharf was constructed ca. late 1880s to early 1890s; consisting of an open wharf built of timber piles and decking. The northern side of this Federal Wharf was repaired or rebuilt in ca. 1907 as part of the Sydney Harbour Trust improvements of Darling Harbour and was later rebuilt or cut-down by the Trust in the late 1920s to form the former Wharf 31 (see above). Previous structures within the footprint of the northern Federal Wharf include Fagans Wharves and the former Streets Wharf.	 
Fagans Wharves (pair) **ca. late 1850s/early 1860s – late 1880s/early 1890s**	Fagans Wharves were constructed ca. late 1850s – early 1860s; comprising a pair of open wharves with timber piles and decking. There is a slight change in alignment and length of the wharves between and plans from 1865-1880 (light blue and burgundy outline) and an 1887 plan (green outline); possibly indicating that the wharves were partially rebuilt and lengthened during the early to mid-1880s. However, it is also quite likely just a case of the plans not quite matching up. Fagans Wharves were demolished ca. late 1880s-early 1890s. Previous structures in the footprint of Fagans Wharves include the former Streets Wharf.	 
Former Streets Wharf **ca. mid 1830s – late 1850s**	During the late 1820s-1830s, Thomas Street had two properties on Sussex Street fronting the eastern side of Darling Harbour between Market Street and Druitt Street; and had constructed wharves on both (both of which are outside the current study area). By 1836, plans indicate that at least one of these wharves (seemingly the northern one) had been significantly extended (to within the current study area); likely to have been an open wharf with timber piles and decking. However, this 1836 plan does not appear to be particularly accurate and it is possible that Streets extended wharf was slightly further to the south (i.e. in the position of the later Streets Wharf) and not quite as long. By the mid-1840s, this wharf is no longer depicted on plans and a structure slightly further south (presumably on Streets second property) is labelled "Streets Wharf." It would appear that the original Streets Wharf was either demolished by this time or the 1836 plans is inaccurate and the original wharf was incorporated into the later Fagans Wharves or (the slightly further south) later Streets Wharf.	 

Wharf No.	History and Description	Outline Overlay and Historic Images
Wharf 34 **ca. 1927/1928 – mid 1980s**	Wharf 34 was constructed on the frontage of reclamation in 1927-1928 as part of the Sydney Harbour Trust improvements of Darling Harbour. The wharf was constructed of timber piles with partial concrete sleeves, a timber deck that was later resurfaced with concrete, and a galvanised iron shed. Wharf 34 was demolished during the mid-1980s redevelopment of Cockle Bay by the Darling Harbour Authority, with the landward end of the wharf buried in reclamation. Previous structures within the footprint of Wharf 34 include Federal Wharves, Streets Wharf and Former Wharf 33.	 
Federal Wharf (south) **ca. late 1890s – mid 1920s** Also "Wharf 32," "Burns Philp & Co. Wharf."	The southern Federal Wharf was constructed ca. late 1890s; consisting of an open wharf built of timber piles and decking. This wharf was demolished ca. mid 1920s as part of the Sydney Harbour Trust improvements of Darling Harbour. Previous structures within the footprint of the southern Federal Wharf include Streets Wharf.	 
Streets Wharf **ca. late 1830s/early 1840s – late 1890s** Also "Taylors Wharf"	This Streets Wharf was constructed on the frontage of reclamation in the late 1830s-early 1840s. It appears to correspond with the second, southernmost property of Thomas Street on Sussex Street between Market and Druitt Streets. Streets Wharf comprised an open wharf built of timber piles and decking with a narrow gauge rail / trolley track situated along the northern edge. This wharf was either demolished or rebuilt and extended in the late 1890s to form the southern Federal Wharf. No previous structures have been identified within the footprint of Streets Wharf.	 

Wharf No.	History and Description	Outline Overlay and Historic Images
Former Wharf 33 **ca. late 1830s/early 1840s – 1927/1928** Also "Morrissett Coal Co. Wharf", "Wentworth Wharves (northern wharf) and "Jaques Wharf"	There has been a wharf in the position and alignment of the former Wharf 33 since the late 1830s-early 1840s. The original wharf – known as Wentworth Wharf (comprising the northern wharf of the later pair of Wentworth Wharves) – was constructed on the frontage of reclamation, consisting of an open wharf with timber piles and decking. In the late 1880s-early 1890s, the southern portion of the former Wharf 33 was either demolished or rebuilt and incorporated into the construction of a new wharf; the former Wharf 34 / northern of the Union SS Co. pair of Wharves (see below). Once the former Wharf 34 was completed, the northern portion of the former Wharf 33 survived, directly abutting the northern edge of the former Wharf 34. The former Wharf 34 was demolished in 1917-1918, however, the former Wharf 33 remained. It was finally demolished altogether in 1927-1928 as part of the Sydney Harbour Trust improvements to Darling Harbour.	 
Wharf 35 **ca. 1918-1919 – mid 1980s**	Wharf 35 was constructed in 1918-1919 as part of the Sydney Harbour Trust improvements of Darling Harbour. Wharf 35 was an open wharf, comprising timber piles and decking. It was demolished during the mid-1980s redevelopment of Cockle Bay by the Darling Harbour Authority, with the landward end of the wharf buried in reclamation. Previous structures identified within the footprint of Wharf 35 include the pair of Union SS Co. Wharves (former Wharves 34 and 35) and the earlier Hyndes Wharf and Wentworth Wharves.	 
Union SS Co. (of NZ) Wharves (pair) **ca. late 1890s – 1917-1918** Also former "Wharf 34" (northern wharf) & "Wharf 35 (southern wharf)	The Union SS Co. Wharves were constructed in the late 1890s; both comprising open wharves with timber piling and decking. A 1908 Sydney Harbour Trust plan indicates that some reconstruction or upgrading of these wharves was undertaken in ca. 1906-1907; however, the outline of the wharves remains the same. Both Union SS Co. Wharves were demolished in 1917-1918 as part of the Sydney Harbour Trust improvements to Darling Harbour. Previous structures within the footprint of Union SS Co. Wharves includes Wentworth Wharf; within the footprint of the southern Union SS Co. Wharf.	 

Wharf No.	History and Description	Outline Overlay and Historic Images
Wentworth Wharves (pair) **ca. late 1830s/early 1840s – late 1880s/early 1890s (south) and 1927/1928 (north)** Also "Morrissett Coal Co. Wharf", and "Jaques Wharf" (the northern wharf) and ""Burns Wharf" (the southern wharf).	The northern Wentworth Wharf was constructed in the late 1830s to early 1840s, forming the earliest version of the former Wharf 33 (see above). The southern Wentworth Wharf was constructed ca. late 1860s to 1870s on the frontage of late 1850s-early 1860s reclamation. The wharf was a wide, open wharf, built of timber piles and decking. The southern wharf was demolished in the late 1880s – early 1890s during the construction of the southern Union SS Co. Wharf; the northern one remained until 1927/1928 (see former Wharf 33 above). No earlier structures were identified in the footprint of either of the Wentworth Wharves.	 
Hyndes Wharf **ca. late 1830s/early 1840s – late 1880s** Also "Dearins Wharf."	Hyndes Wharf was constructed on the frontage of reclamation ca. late 1830s-early 1840s. Hyndes Wharf was an open wharf, built of timber piles and decking. It was demolished ca. late 1880s – early 1890s. It appears that the earlier reclamation was determined to be unauthorised and a Department of Lands inquiry was made into the matter of illegal occupation of the site in the late 1880s; it is possible that the demolition of the wharf was associated with this inquiry. No earlier structures have been identified within the footprint of Hyndes Wharf.	 

Wharf No.	History and Description	Outline Overlay and Historic Images
Wharf 36 **ca. 1918-1919 – mid 1980s** Also "North Coast S.N.Co Wharf."	Wharf 36 was constructed in 1918-1919 as part of the Sydney Harbour Trust improvements of Darling Harbour. The wharf was initially built as an extension to the existing Jones Bros. Wharf (see below), however, reclamation and wharf remodelling by the Sydney Harbour Trust in 1928 saw the Jones Bros. Wharf resumed and incorporated into Wharf 36. Wharf 36 was constructed of timber piles; some appearing to have concrete collars or sleeves, with a concrete deck and concrete "curtain" on the seaward end of the wharf, and a large galvanised iron shed on top. The landward end of Wharf 36 incorporated the previous Jones Bros. Wharf and possibly also the seawall previously surrounding the earlier wharf. A connecting section of wharf, parallel to the shoreline, was also constructed between Wharf 36 and Wharf 37 in 1927-1928; consisting of timber piles with a concrete deck and galvanised iron shed on top – part of this wharf may be just within the current study area. Wharf 36 was demolished during the mid-1980s redevelopment of Cockle Bay by the Darling Harbour Authority, with the landward end of the wharf buried in reclamation. Previous structures identified within the footprint of Wharf 36 include Pacific Wharf.	 
Pacific Wharf **ca. late 1880s/1890s – late 1880s/early 1890s** Also former "Wharf 36" & "North Coast S.N. Co. Wharf."	Pacific Wharf was constructed ca. late 1880s-early 1890s on the frontage of late 1850s – early 1860s reclamation. Pacific Wharf consisted of an open wharf with timber piles and decking. It was demolished in 1918 as part of the Sydney Harbour Trust improvements to Darling Harbour. No previous structures have been identified within the footprint of Pacific Wharf.	 

3.3 Reclamation and Seawalls

During the early years of European colonisation, the head of Darling Harbour extended as far south as Haymarket; reaching almost to Harbour Street and Sussex Street in the east and Pyrmont Street and Murray Street in the west (Figure 32).

Figure 32: Indicative outline of the extent of Darling Harbour south of the Pyrmont Bridge in the 1820s.

Since that time, numerous episodes of land reclamation have occurred; ranging from small reclamations conducted by waterfront residents and leaseholders in an attempt to acquire larger properties and extend shipping facilities into deeper waters, to large-scale reclamation of the head of Darling Harbour undertaken by the NSW Railway Department in the late 1860s-1870s and 1920s.

The eastern side of Cockle Bay has been subject to many staggered stages of reclamation and associated waterfront construction by occupants and leaseholders – both authorised and unauthorised – from the 1820s to the 1890s. Following resumption of the foreshore by the Sydney Harbour Trust at the turn of the century, reclamation along the eastern shore ceased save for some small infilling and straightening undertaken by the Trust in the 1900s to 1910s. The current southern extent of Cockle Bay was largely established in the 1920s when the head of Darling Harbour was resumed by the NSW Railway Department to a point

in alignment with Bathurst Street. Large wharves were subsequently constructed on the frontage of the reclamation by the Sydney Harbour Trust.

Limited alterations to Cockle Bay were conducted in the 1940s-1960s, as part of the improvements to wharfage by the Maritime Services Board and the construction of the Port Roadway along the eastern shore of the bay, however, no new reclamation was undertaken. Finally, major redevelopment of Cockle Bay by the Darling Harbour Authority in the mid-1980s saw the extent of the bay slightly reduced again through the construction of Cockle Bay Wharf, Convention Wharf and Harbourside Promenade.

Figure 33 below depicts the broad phases of land reclamation and construction around Cockle Bay from the 1820s to the 1960s, overlain on a current aerial photograph of Cockle Bay.

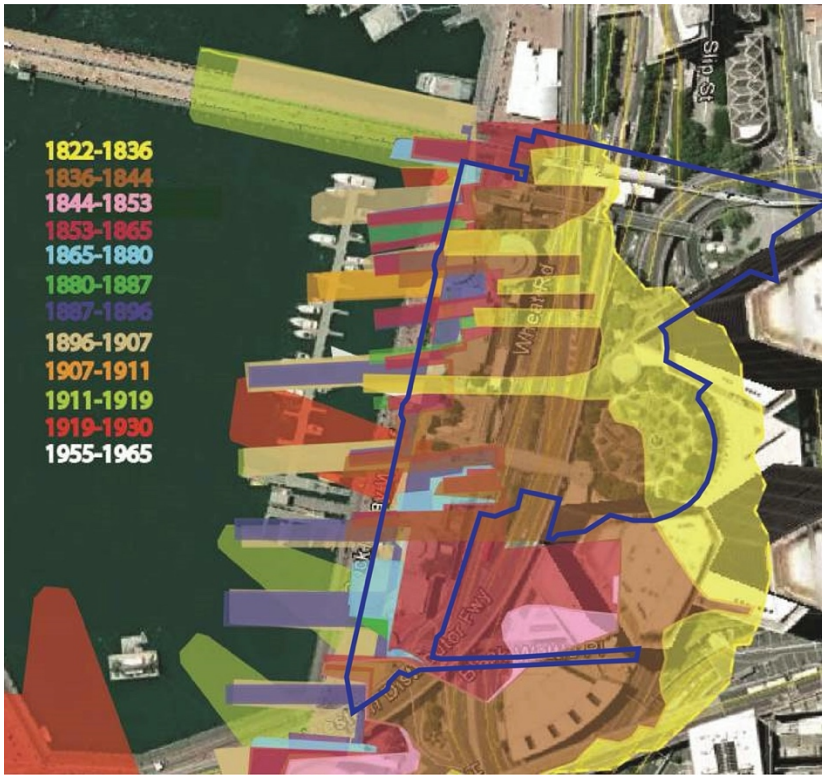


Figure 33: Overlay showing phases of land reclamation and wharf construction around the eastern side of Cockle Bay since the 1820s. Study area shown in blue.

An examination of the same set of historical overlays, minus the outlines of wharves and jetties constructed, gives a clearer indication of the phases and extent of actual land reclamation on the eastern side of Cockle Bay since the 1820s (Figure 34). This image shows that the most substantial phases of reclamation on the eastern side of the bay occurred during the 1820s to the mid-1860s. By the late 1860s, the eastern shoreline had neared its current extent, reaching almost to the landward edge of Cockle Bay Wharf. The 1870s to late 1890s saw only relatively small patches of reclamation on the eastern shore; predominantly focussed at the base of expansion and reconstruction of certain wharves, followed by further limited infilling and straightening by the Sydney Harbour Trust in the 1900s-1910s.

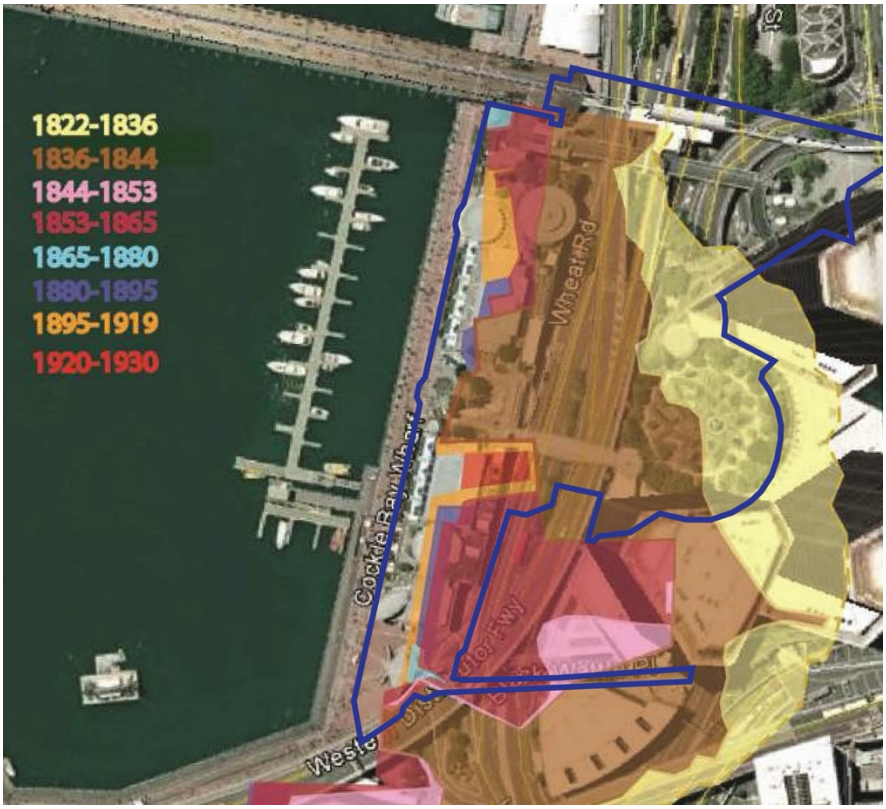


Figure 34:Overlay showing phases of land reclamation around the eastern side of Cockle Bay from the 1820s to 1930s. Study area shown in blue.

Mapping areas of reclamation based on changes in the shoreline shown on historic plans provides a basic indication of the potential locations of seawalls. However, such features are commonly not specifically marked or identified on historic plans, and it is often difficult to ascertain whether a straight section of shoreline depicts a seawall or the edge of a wharf. Additional information regarding the seawalls close to the current extent of Cockle Bay is not available, however, Sydney Harbour Trust records detail the rat-proofing of Darling Harbour in the 1900s-1920s.

Following the formation of the Sydney Harbour Trust in 1901, a series of maps of the Sydney waterfront outlining the areas vested in the Trust were prepared. These maps were updated every couple of years to depict the improvements effected by the Trust, including alterations, demolitions and construction of wharves, buildings and streets. These maps also detailed the length and locations of "rat-proof retaining walls" erected.

It should be clarified at this point that the erection of "rat-proof retaining walls" by the Trust did not necessarily involve the construction of entirely new seawalls. The "rat-proofing" programme was directed towards ensuring the sides of the harbour were faced with smooth "rat-proof" surfaces, and it seems that in cases where an existing seawall was deemed to be sound – such as cut stone walls built on solid stone ballast foundations – no physical "rat-proofing" was conducted. Seawalls constructed of timber sheet piling filled with rubble and soil, on the other hand, were modified. These types of seawalls, quite common in Darling Harbour during the 19th century, had proved to be large contributors to the rat problem as the spaces between the piles allowed the fill to settle and wash out, thus creating hollows behind the piles that were perfect for rat warrens. In most cases, the timber sheet piling itself was sound and "rat-proofing" of these walls involved only the installation of Monier concrete plates across the front of the piling, extending to a foot (0.3 m) below low water mark (Figure 35 and Figure 36). It was generally

only in locations of new reclamation that actual "rat-proof retaining walls," consisting of Monier concrete trestles faced with Monier concrete plates, were erected (Figure 37 to Figure 39).[38]

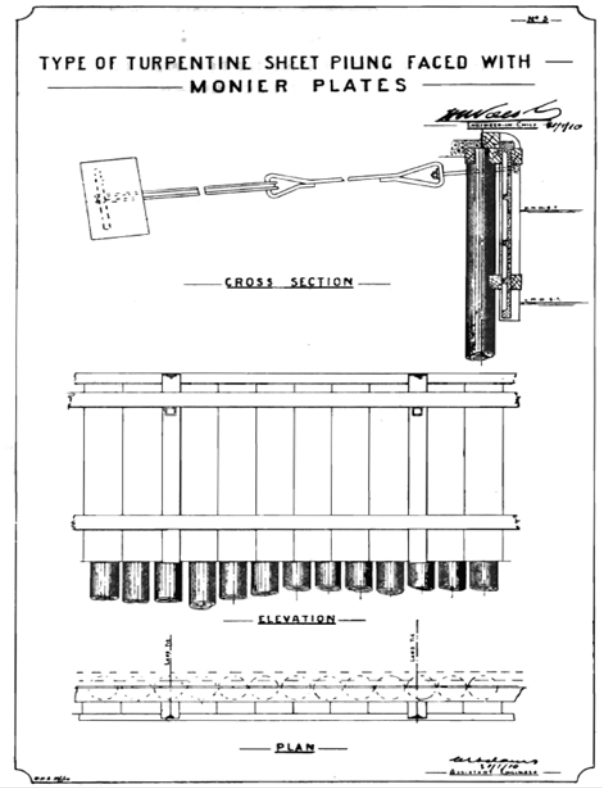


Figure 35: Design of timber sheet piling seawall faced with Monier concrete plates.[39]

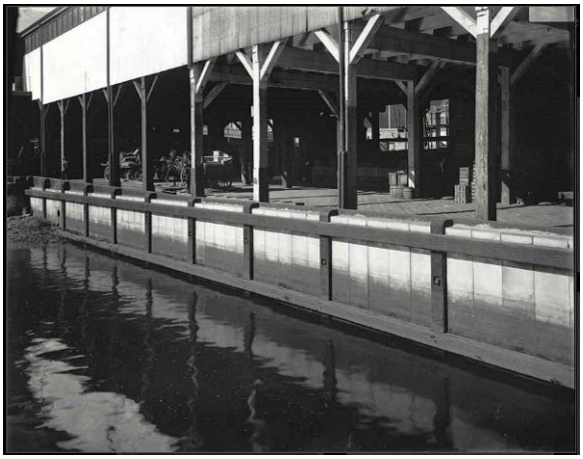


Figure 36: Example of completed Monier faced seawall.[40]

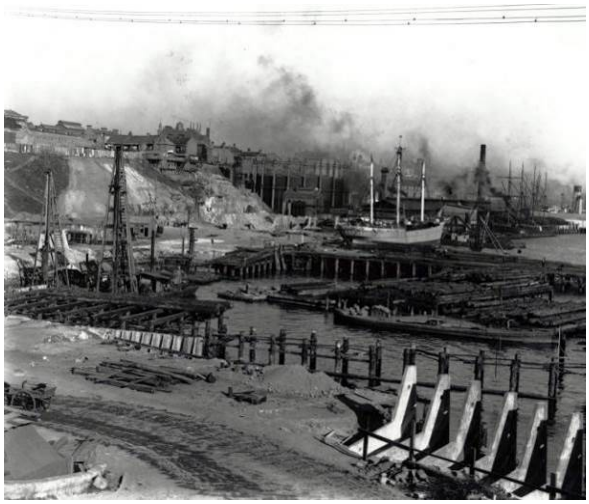


Figure 37: Example of Monier trestle seawall being constructed, Darling Harbour, 1909.[41]

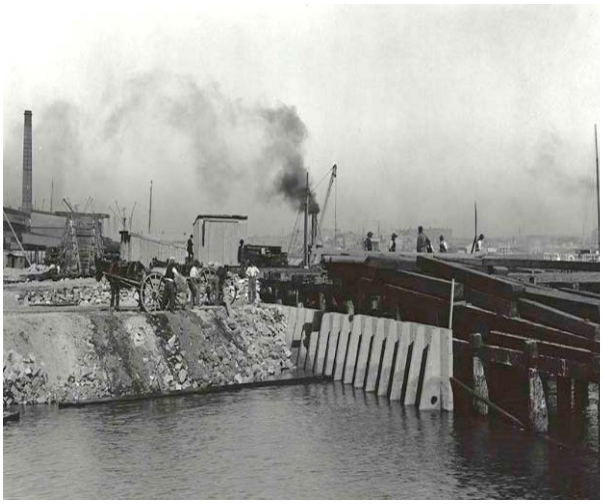


Figure 38: Example of Monier trestle seawall being constructed, Darling Harbour (n.d.).[42]

[38] **Walsh, H.D., 1911,** *Notes on Harbour Engineering.* A Paper read before the Sydney University Engineering Society on 8th November 1911.
[39] *Op. Cit.* Walsh, H.D., 1911
[40] **Anon, n.d.,** "View of a rat-proofed wall." NSW State Records, Digital ID: 9856_a017_A017000018.
[41] **Anon, 1909,** "Darling Harbour, 1909." City of Sydney Archives, Graeme Andrews "Working Harbour" Collection; 79983. MSBK 451.
[42] **Anon, n.d.,** "Construction of a "rat proof" wall at Darling Harbour, NSW." NSW State Records, Digital ID: 9856_a017_A017000009.

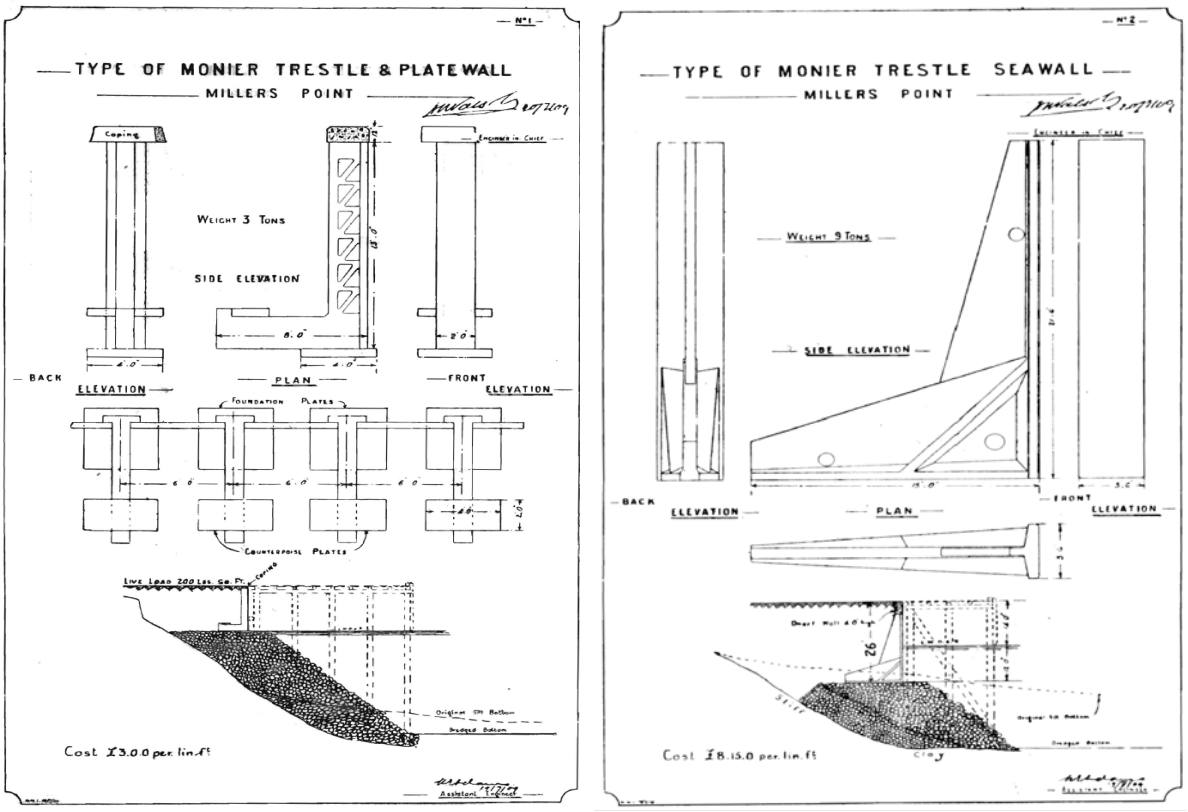


Figure 39: The two standard designs of Monier trestle and plate walls.[43]

That being said, the lines marked on the Sydney Harbour Trust plans depicting the locations of "rat-proof retaining walls" may be taken to indicate existing seawalls that were either determined to be sound or were partially modified, as well as the location of newly constructed walls. Either way, these outlines are very good indicators of the positions of seawalls existing in the 1900s to 1920s.

Figure 40 below provides an overlay of "rat-proofing" conducted by the Trust from ca. 1903-1930, with segments of the lines colour coded according to the general period of "rat-proofing."

The line of wall marked as "rat proofed" in the 1920s (red line) crosses over several sections of pre-existing walls, most marked as "rat proofed" between 1903 and 1911. When viewed in comparison to historic overlays showing the wharves and reclamation in this area (Figure 41 and Figure 42), it is clear that the red line of wall runs along the base of Wharves 34 to 36 and the associated small strips of reclamation constructed by the Sydney Harbour Trust in 1918-1919 (Wharves 35 and 36) and 1927-1928 (Wharf 34). Photographs taken in 1919 during the construction of Wharves 35 and 36 indicate that this section of wall comprised timber sheet piling faced with Monier concrete plates (Figure 41 and Figure 42).

The form and fabric of the pre-existing seawalls behind the red line of wall is largely unknown. These walls front various pockets or stages of reclamation from the 1850s -1890s and could range from cut stone seawalls, rubble seawalls, timber piling seawalls, or a combination thereof. The corner section of seawall situated near the south-eastern extent of Cockle Bay, cut off by the late 1920s seawall, appears to have consisted of timber sheet piling, faced with Monier concrete plates in ca. 1903-1907. This wall corresponds to the outline of the former ca. late 1850s – early 1860s Whittles Wharf / later Jones Bros. Wharf and is likely to have been erected along the edges of the wharf, which was still in operation

[43] *Op Cit.* **Walsh, H.D., 1911**

until the late 1920s. Part of this wall formed the base of Wharf 36, constructed by the Sydney Harbour Trust in 1918-1919 (Figure 43).

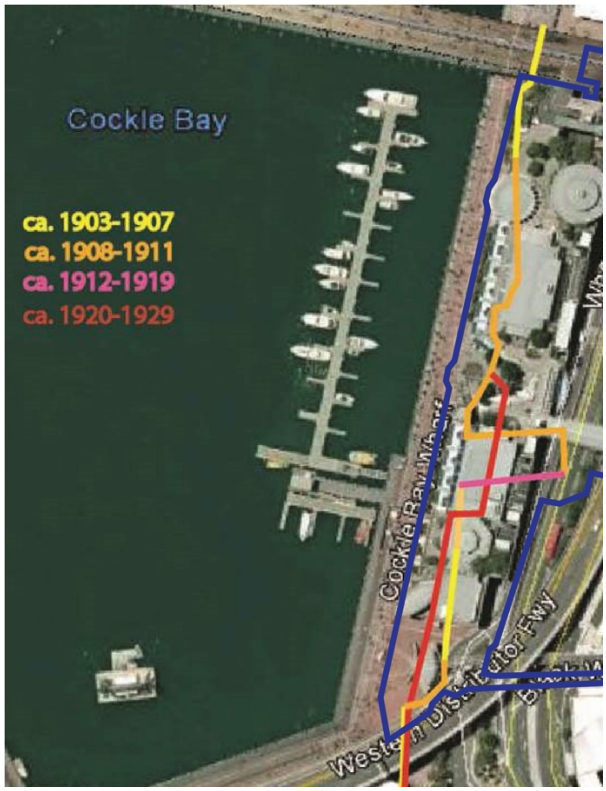


Figure 40: Overlay showing lines of "rat-proof retaining walls" established by the Sydney Harbour Trust in the 1900s-1920s. Study area shown with blue outline.

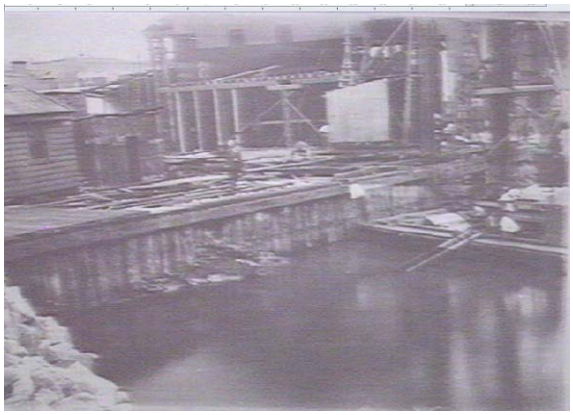


Figure 41 : Timber sheet piling between Wharves 35 and 36, Darling Harbour, 1919.[44]

Figure 42 : Completed Monier plate facing of seawall between Wharves 35 and 36, Darling Harbour, 1919.[45]

[44] **Anon, 24th February 1919,** "Cross Wharf, No. 35-36, Darling Harbour." NSW State Library, NSW Government Printing Office Series, Image MSBL907, Digital # d1_25064.
[45] **Anon, 5th June 1919,** "Seawall between No.35 & 36, Darling Harbour." NSW State Library, NSW Government Printing Office Series, Image MSBL908, Digital # d1_25066.

Figure 43 : Construction of Wharf 36, Darling Harbour, 1918, showing what appears to be a Monier plate faced seawall at the base of the wharf, fronting the northern edge of the Jones Bros. Wharf.[46]

The Jones Bros. Wharf was resumed during the reclamation of the head of Darling Harbour in the 1920s and Wharf 36 was expanded southwards, backed by the newly erected Monier trestle and plate seawall fronting the reclamation. It is quite possible, however, that sections of the earlier Monier plate faced timber piling wall were actually incorporated into the expanded Wharf 36 rather than demolished altogether.

Finally, the line of seawall marked along the north-eastern shore of Cockle Bay is identified as being "rat proofed" in two stages between 1903-1907 and 1908-1911. This wall runs along the frontage of various stages of reclamation from the 1860s-1910s and could comprise a combination of cut stone seawalls, rubble seawalls and / or timber sheet piling; the latter two types, if they occurred, would have been faced with Monier concrete plates. Figure 44 below provides a summary identification of the seawalls in close proximity to the eastern side of Cockle Bay.

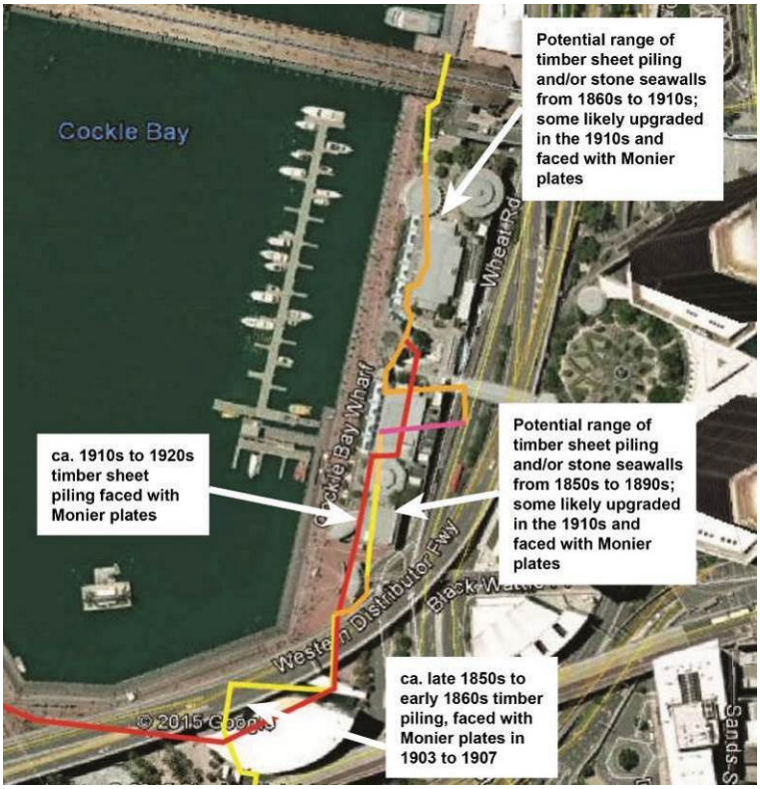


Figure 44 : Identified seawalls within the vicinity of the current extent of the Cockle Bay Park study area.

[46] **Anon, 13th September 1918,** "Construction No. 36, Darling Harbour." NSW State Library, NSW Government Printing Office Series, Image MSBL810, Digital # d1_21066.

The line of seawalls established around Cockle Bay by the end of the 1920s reclamation, consisting of a combination of sandstone seawall, Monier trestle and plate seawall, and timber sheet piling faced with Monier plates, remained operational until the mid-1980s redevelopment. Minor modification and repairs may have been conducted between the 1920s and 1980s; however, no alteration of alignment appears to have occurred.

The 1980s redevelopment of Cockle Bay involved the retention of a portion of the sandstone seawall in the north-west and the burial, and possibly partial demolition in places, of the remainder of seawalls along the south-west, south and eastern sides of Cockle Bay. A plan produced for the 1980s development shows the existing structures and outfalls (Figure 45, on following page). This shows that at this time the seawall consisted of sections of steel sheet piling, precast concrete sheet piling and close drive timber piles with concrete facing panels. The rest of the harbour was faced with precast concrete plate and trestles

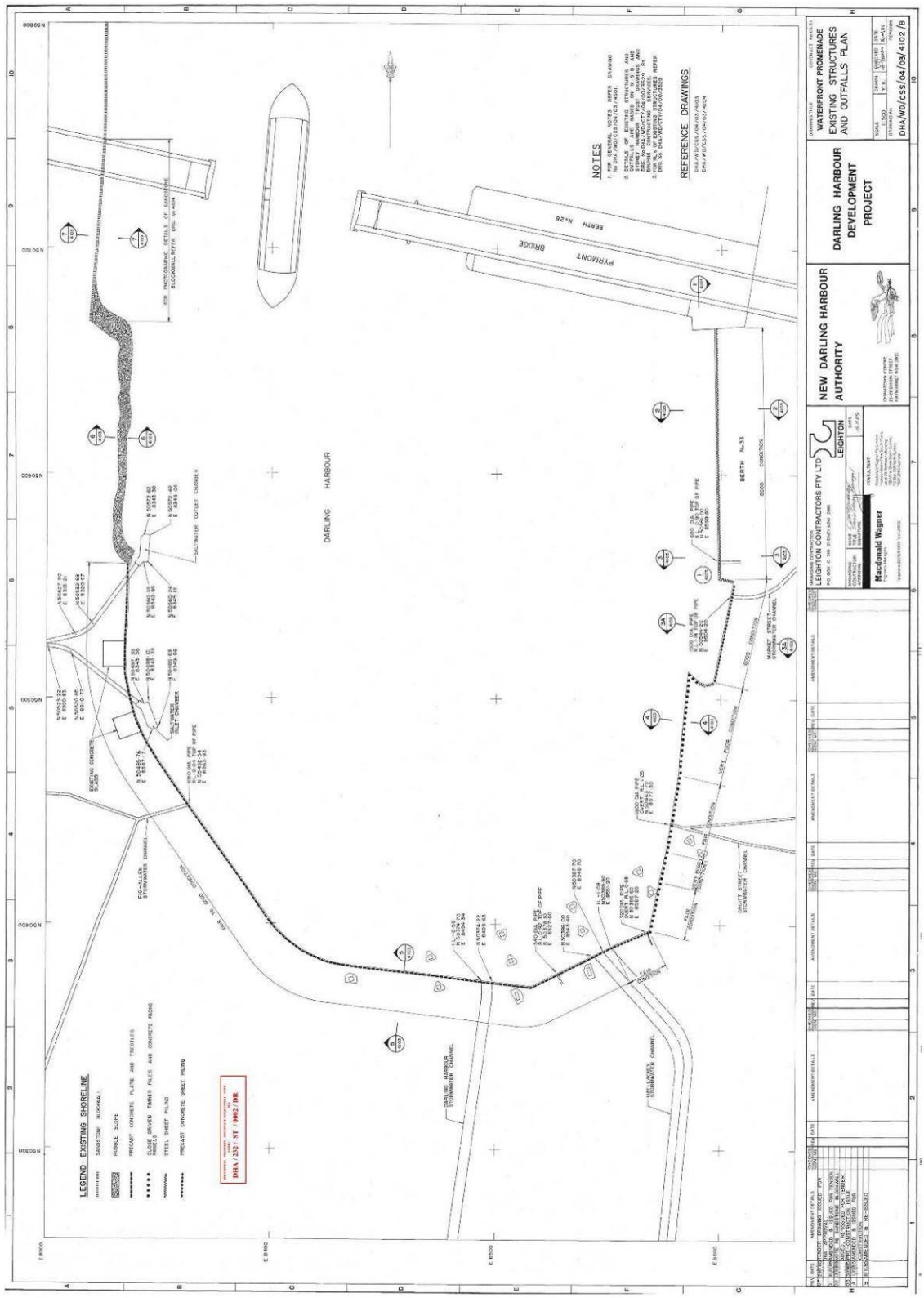


Figure 45: Existing Structures and Outfalls Plan of Waterfront Promenade, for the Darling Harbour Development Project, 1985.[47]

[47] **Macdonald Wagner, 1985**, "Darling Harbour Development Project: Waterfront Promenade: Existing Structures and Outfalls Plan", for Leighton Contractors Pty Ltd on behalf of New Darling harbour Authority, as found in **Enstruct Group Pty Ltd, August 2017**, *Cockle Bay Park Structural Engineering Report*, prepared for DPT Operator Pty Ltd & DPPT Operator Pty Ltd: 14.

3.4 Geotechnical Profile and Recent Disturbance

A geotechnical investigation for this project was undertaken in July/ August 2021 by Douglas Partners.[48] The investigation identified a number of strata which are summarised in the table below:[49]

Table 4 : General sub-surface profile derived from 2021 geotechnical investigations.

Type	Description
Fill	Strata of variable thickness composed of road base, sands, gravelly, silty and clayey sands as well as sandy gravels and clay mixed with construction debris such as bricks, concrete, timber and metal. Sandstone gravel and cobbles are also present. This fill stratum was typically encountered between RL 1.3 m and RL -6.5 m AHD landward of the current seawall. At two locations (CW1 and W1) beyond the seawall fill was encountered on the seabed at RL 7 m and RL -7.2 m AHD. The thickness of the fill retained by the existing seawall is appears to decrease towards the eastern end of the site and that some fill is found on the western side of the current seawall. The Douglas Partners report suggests that this fill was tipped over the current seawall but it most likely is associated with the fill deposited behind the early 20th century seawalls which ran north-south to the west of the current seawall or the observed rock armour protecting the current seawall.
Alluvial / Estuarine Sediments	The former seabed and accumulated sediments deposited during rising sea levels in the late Pleistocene are generally composed of very soft to firm clays, silty clays and sandy clays interbedded with very loose to loose sands, silty sand and clayey sands in bands ranging from firm to stiff and medium dense to dense. This stratum was encountered from between RL -6.5 m and RL -18.2 m AHD. As expected the thickness of these sediments is greatest towards the western edge of the site, tapering away towards the east. Of interest was the identification of timbers at the interface of the former seabed and reclamation fill for CW2 and CW 4. The Douglas Partners report describes them as 'sleepers' however they are more likely associated with the former wharf structures or possibly with wreckage. A thin layer of residual soil was observed immediately above the bedrock in places. The consistency of these soils is not dissimilar to the overlaying sediments.
Sandstone bedrock	The top of the sandstone was encountered at between RL 1.3 m toward the north eastern corner of the study area and at RL -18.2 m AHD over the water at the western extremity of the site. The depth of the top of the rock generally falls towards the centre of the site along a north south alignment. This may indicate the presence of a Pleistocene watercourse. It is expected that the changes in the rock head elevation would not be gradual and that sudden changes over relatively short distances are most likely due to buried cliff lines.

46 shows the location of borelogs from 1971, 1985 and from the July/August 2021 investigation.

[48] **Douglas Partners September 2021** *Interim Report on Geotechnical Investigation, Cockle Bay Park Redevelopment 241 – 249 Wheat Road, Sydney*. DRAFT
[49] Op. Cit., **Douglas Partners September 2021** : 6 and 8

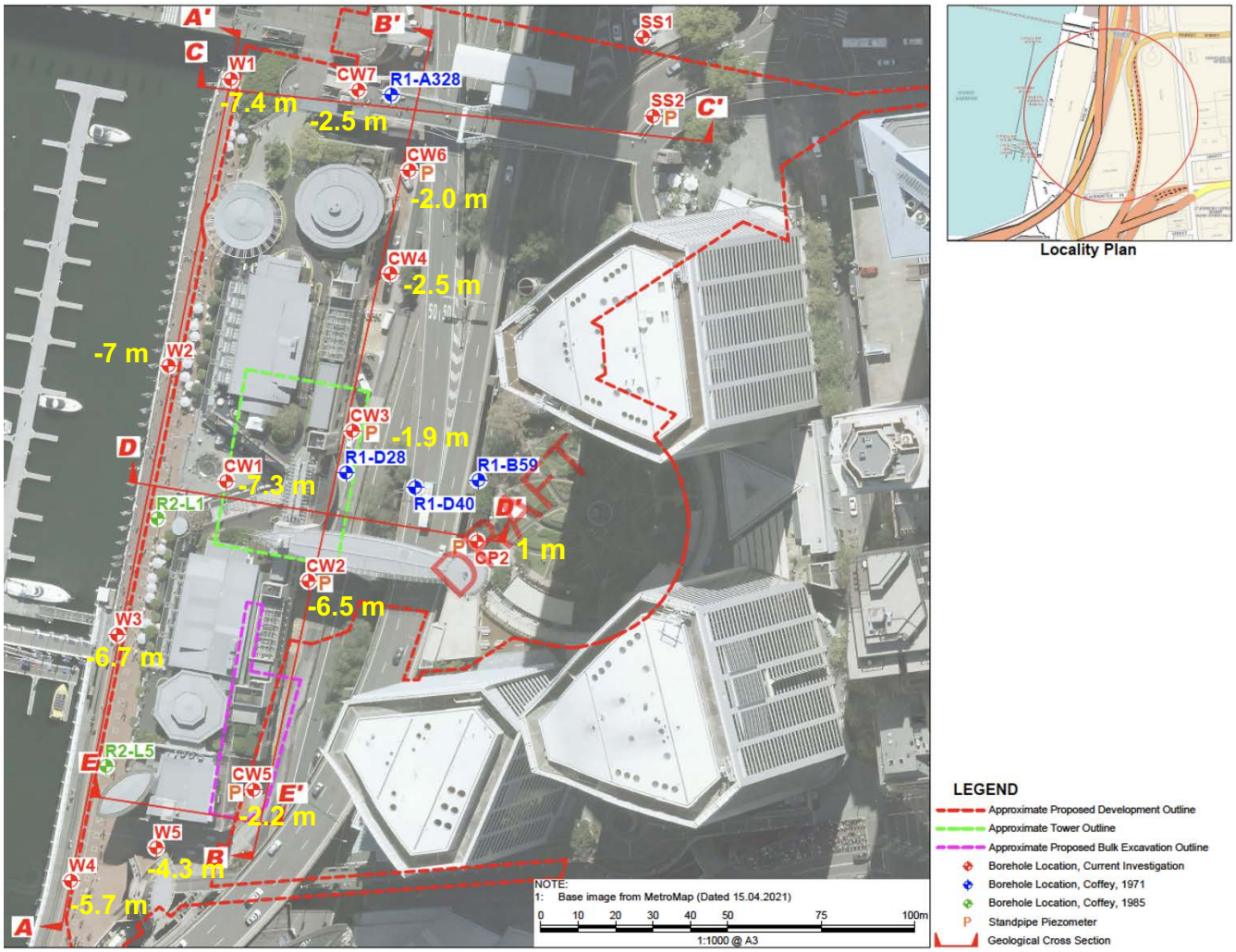


Figure 46 : Excerpt of Test Location plan showing position of bore holes.[50] Depth annotations (in yellow) signify the interface between the fill reclamation and the former seabed relative to AHD. Boreholes W1, W2, W3, W4 are where there is existing seabed.

With a fill depth of up to 6 m, it is likely that the 1980s and 1990s developments on the eastern side of Cockle Bay have included piling or building foundations that have exceeded this depth and impacted the estuarine and alluvial deposits beneath. It is also likely that, for structural stability, such piles and foundations have penetrated into and been founded in the sandstone bedrock below.

[50] Op. Cit., **Douglas Partners September 2021** : Annex B and C

4 UNDERWATER PREDISTURBANCE SURVEY

4.1 Objectives

The objective of this dive survey was to produce an archival recording of the cultural features exposed under the apron of the Cockle Bay Wharf, including former seawalls, piles and any other cultural heritage features of interest within the primary survey area. The primary survey area was identified as the area underneath the promenade that is likely to be impacted by piling greater than 300 mm in diameter.

Further surveys were undertaken in bents, or bays, that were not covered during the 2017 inspection to ensure a complete picture of the underside of the wharf apron.

Probing was also undertaken throughout the transects and the depth of refusal (if any) was recorded in order to produce a map of depths along the transect runs.

Figure 47: Overlay of transects onto proposed piling plan. Blue indicates transect locations in primary area of survey and green represents transects undertaken to fill in the gaps from the survey from the 2017 site inspection.

4.2 Dates and Personnel

The dive inspection was carried out on the 5th July 2021. Jane Mitchell, from Cosmos Archaeology, was the maritime archaeologist supervising the inspections. Dive support was provided by Subsea Global Services Australia (SGS Sydney) in the form of the supply of three divers, surface supplied breathing apparatus (SSBA) and a dive platform. Diving operations were run and supervised by SGS Sydney. Personnel involved during the inspection are listed in Table 5.

Table 5: Dive inspection personnel

Name	Title	Company
Jane Mitchell	Maritime Archaeologist	Cosmos Archaeology
Steven Topping	Dive Supervisor	SGS Sydney Diving Pty Ltd
Daniel Quilter	Diver	SGS Sydney Diving Pty Ltd
Keagan Le Grange	Diver	SGS Sydney Diving Pty Ltd

4.3 Weather and Tide Conditions

Darling Harbour conditions are not greatly affected by the minimal changes in tide, but prior rainfall can transport silt and debris into the water, which can severely hinder visibility (Table 6). Fortunately, there had been no rainfall and the winds had been relatively light in the days prior to the dive inspection (Table 7).

Table 6: Tides for the days of survey.[51]

05-07-2021	Time	0442	1038	1717	2357
	Height (m LAT)	1.28	0.62	1.59	0.68

Table 7: Rain and wind conditions for the three days previous to the dive inspection and the day of the inspection.[52]

Date	Rain (mm)	Wind 09:00 (km/h)	Wind 15:00 (km/h)
02-07-2021	0.0	15 W	6 E
03-07-2021	0.0	15 W	15 NE
04-07-2021	0.0	19 WNW	13 NW
05-07-2021	0.0	21 WSW	11 WSW

[51] **Bureau of Meteorology, Australian Government, 2021,** *NSW Tide Tables*, available http://www.bom.gov.au/ntc/IDO59001/IDO59001_2021_NSW_TP007.pdf, accessed 02 July, 2021.
[52] **Bureau of Meteorology, Australian Government, 2021,** *Sydney Harbour July 2021 Daily weather observations*, available at http://www.bom.gov.au/climate/dwo/202107/pdf/IDCJDW2163.202107.pdf, accessed 6th July 2021.

4.4 Conduct of Survey

The underwater survey was conducted with the use of the commercial dive crew under the direction of the maritime archaeologist. The inspections were conducted in accordance with AS/NZS 2299.1: 2015 diving operational standards with the use of SSBA, voice communications and helmet-mounted cameras capable of taking high quality video and still images.

The area underneath the promenade to be impacted by piling greater than 300 mm diameter was the primary area for the survey. A total of 7 transects (T1 to T7) were conducted to cover the area, with one transect undertaken for each bent (Figure 48). The transect surveys were undertaken by the diver starting at the designated southern steel pile and then travelling east in a zig zag pattern, following the line of steel piles until they reached the seawall. The diver then moved to the northern line of steel piles and returned in a westerly direction until the edge of the promenade was reached. Video footage was captured throughout the entire survey, as well as additional observations being verbally transmitted through in-water communications to the archaeologist aboard the boat.

Distances from the edge of the wharf were estimated by relative locations to the steel piers supporting the wharf (labelled A, B, C, D consecutively towards the east).

Figure 48: Location of primary transects.

Four further transects (T8 – T11) were conducted to provide a full picture of the archaeological remains underneath the wharf.

Figure 49: Location of T8 and T9 in the northern section of the study area.

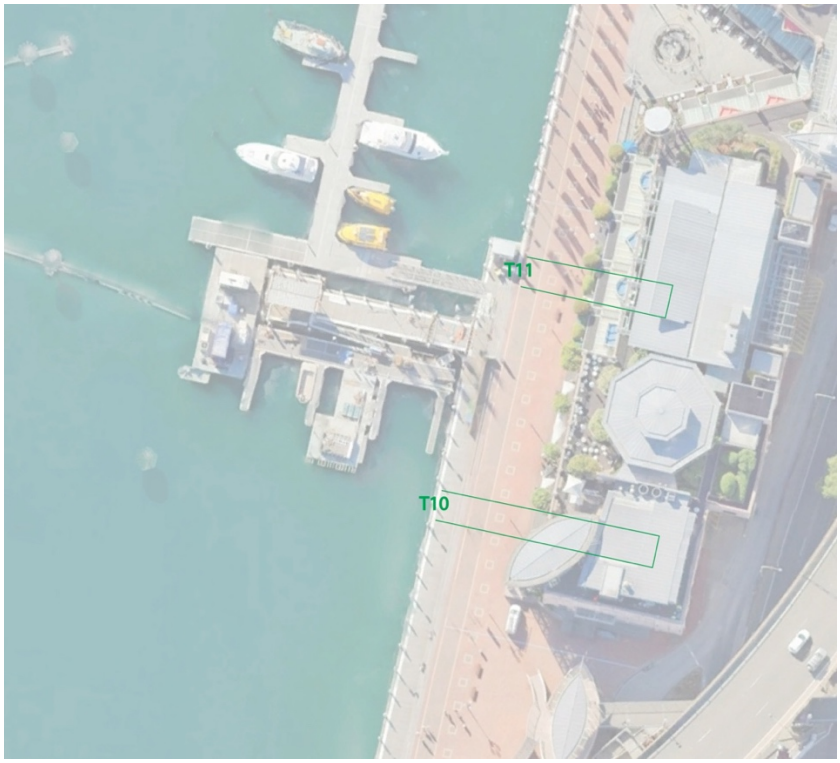


Figure 50: Location of T10 and T11 in the southern section of the study area.

Probing using a 2 m fibreglass rod marked at 100 mm intervals was undertaken for each transect in both the primary and secondary areas and depth of refusal (if any) was recorded.

4.5 Findings of the Diving Survey

Residents of the Greater Sydney Area were under stay-at-home orders due to the June outbreak of COVID-19. One unexpected benefit was the lack of water traffic into and out of Darling Harbour, reducing the turbidity in the water column. On arrival at the site, the seabed was clearly visible at a depth of 6 m. The seabed throughout all areas inspected consisted of a fine soft silt which was easily disturbed resulting in restricted visibility. There was a scatter of litter on top of the sediment in the form of wrappers, paper labels, aluminium cans and other light refuse items. No marine growth was noted which possibly indicates a low oxygen and low turbidity environment.

Transect 1		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Ebbing
Distance and direction: ~ 25 m east / ~ 25 m west		**Diver**: Daniel Quilter
Swim start (min): 0957	**Swim end (min):** 1008	**Total time (min):** 11
Probe start (min): 1017	**Probe end (min):** 1029	**Total time (min):** 12
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started the transect at the western end of the southern line of steel piles. Using the steel piles as reference, the diver zig zagged from the piles to the centre of the bent and back. Once the eastern end was reached, the diver then moved to the northern row of steel piles and zig zagged back to the wharf apron. This ensured full coverage of each bay.

The seabed was relatively flat, silty and featureless (Figure 51). Between, and next to the 'B' and 'C' piles, a modern concrete mooring block was located, measuring 1400 mm long x 800 mm wide x 250 mm high. The block has a ferrous attachment point in the centre (Figure 52).

In front of the 'D' pile, what appears to be a rubbish net was located (Figure 53). This net ended at a depth of 2 m, therefore it is likely to catch floating rubbish from the storm water drains under the promenade. The seabed also began to rise at this point, probably from build-up of sediment due to the net's position. This net was attached in between two drainage pipes floating on the surface and running in an approximate north-south direction (Figure 54).

The base of the rock embankment began just after the 'D' pile, rising to an angle of 45°. The rocks in the embankment averaged 150 mm – 200 mm in size (Figure 55). The diver then travelled north following the rock embankment until the northern steel piles were reached and returned to the wharf apron to the west. No cultural features were located, other than three modern aluminium cans.

Figure 51: Example of silty seabed at western edge of promenade. 'A' steel pile at top of image. (Image from T1 (a) Cockle Bay 210705; 00:38).

Figure 52: Modern concrete mooring block between steel piles 'B' and 'C' on the southern side of T1. (Image from T1 (a) Cockle Bay 210705; 03:38).

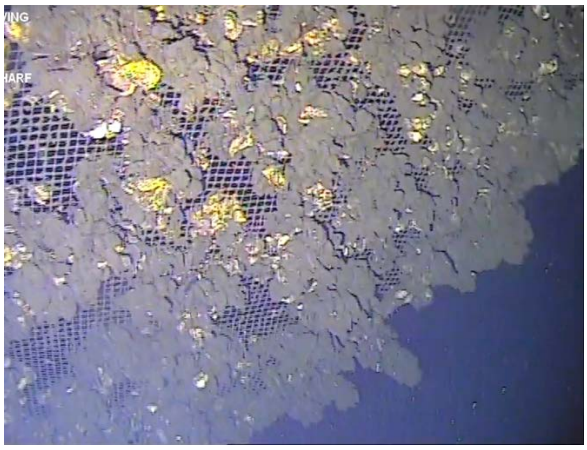


Figure 53: Rubbish net, probably to stop floating rubbish from the stormwater drains. (Image from T1 (a) Cockle Bay 210705; 05:34).

Figure 54: The rubbish net is attached to a floating drainage pipe. (Image from T1 (a) Cockle Bay 210705; 05:38).

Figure 55: Example of rock embankment at western end of T1, slope of 45°. (Image from T1 (a) Cockle Bay 210705; 07:10).

Transect 2		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Ebbing
Distance and direction: ~ 25 m east / ~ 25 m west		**Diver**: Daniel Quilter
Swim start (min): 1031	**Swim end (min):** 1043	**Total time (min):** 12
Probe start (min): 1044	**Probe end (min):** 1058	**Total time (min):** 14
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east (Figure 56). The seabed was a relatively flat, silty bottom, and no cultural material was noted until near the 'D' pile. The rubbish net was visible in this location and just behind the net was a timber stormwater baffle (Figure 57). This structure consisted of two timber piles approximately 360 mm in diameter and 4 m tall (Figure 58). These piles were 3 m apart. Attached crossways to the piles were 8 planks measuring 100 mm thick x 300 mm wide and 3 m long (Figure 59). It appears that there were once 11 planks. This structure is in line with the stormwater drain at the eastern end of the bay. The drain appears to be held up by a concrete plinth that sits in the rock batter. There was a build-up of timber and sediment underneath the rubbish net and surrounding the timber baffle (Figure 60).

The rock batter begins at the base of the 'D' piles and is at a 45° angle, with rock size between 150 mm – 200 mm (Figure 61). The diver then travelled north following the rock embankment until the northern steel piles were reached and returned to the wharf apron to the west. A modern concrete mooring block was located on the southern side of 'B' and 'C' piles. The block was buried in the sediment with one corner exposed. Approximate measurements for the block were 1 m x 1 m and the depth could not be determined. The block had a ferrous attachment point (Figure 62). Just west of the block was a float, however it could not be determined what the float was attached to.

At the end of the transect, on the southern side of the fender pile, there was a menu board buried in the sediment (Figure 63).

Figure 56: Start of T2, note stormwater drain at end of bay. (Image from T2 (a) Cockle Bay 210705, 00:04).

Figure 57: Northern timber upright pile of the stormwater baffle visible through a hole in the rubbish net. (Image from T2 (a) Cockle Bay 210705, 02:48).

Figure 58: Timber stormwater baffle; 'D' pile to the left of image. Note large hole in net and missing timbers from baffle. (Image from T2 (a) Cockle Bay 210705, 03:57).

Figure 59: Example of timber planking for stormwater baffle. (Image from T2 (a) Cockle Bay 210705), 04:37).

Figure 60: Rubbish and sediment build-up behind rubbish net. (Image from T2 (a) Cockle Bay 210705, 05:53).

Figure 61: Rock embankment at eastern end of T2. (Image from T2 (a) Cockle Bay 210705, 06:39).

Figure 62: Mooring block northern side T2. (Image from T2 (a) Cockle Bay 210705, 08:29).

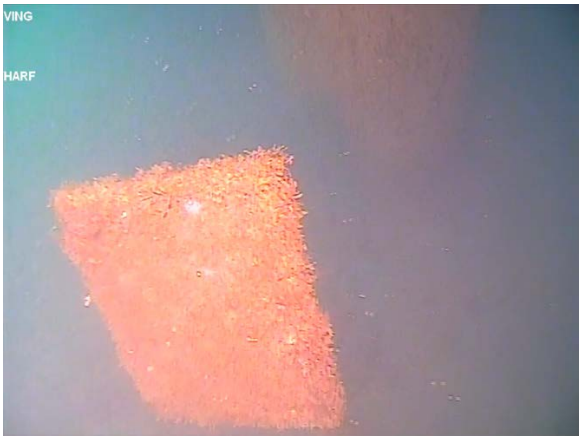


Figure 63: Menu board near northern fender pile of T2. (Image from T2 (b) Cockle Bay 210705, 01:21).

Transect 3		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 25 m east / ~ 25 m west		**Diver**: Daniel Quilter
Swim start (min): 1104	**Swim end (min):** 1115	**Total time (min):** 11
Probe start (min): 1117	**Probe end (min):** 1126	**Total time (min):** 9
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. The seabed was silty and relatively flat. At the southern fender pile, there was a piece of cane outdoor furniture, likely from one of the restaurants that line Darling Harbour. The furniture measured 2 m x 1.5 m x 1 m and was resting on top of the sediment and could be easily moved (Figure 64).

Just after steel pile 'B', in the centre of the bent, there was a heavily encrusted ferrous pipe with approximately 2 m of the pipe visible above the seabed and both ends penetrating the sediment. The pipe had a diameter of 60 mm and ran in a northwest to southeast direction (Figure 65).

As the diver neared pile 'C', the seafloor began to rise and there was a build-up of predominantly plastic rubbish. The rubbish net was directly in front of pile 'D', where the rock batter also began. The batter was still at a 45° angle and many rocks were 150 mm – 200 mm in diameter. There were also some larger pieces of concrete amongst the rock batter (Figure 66).

The rubbish net angled behind the northern 'D' pile and ended at the seawall in the next bent (Figure 67). Sheet piling began in the centre of this bent (Figure 68). At the base of the sheet pile and as the diver moved to the northern 'D' pile, there were pieces of scattered ferrous piping lying loose on top of the rock batter.

No further cultural material was located on the return to the western end of the promenade.

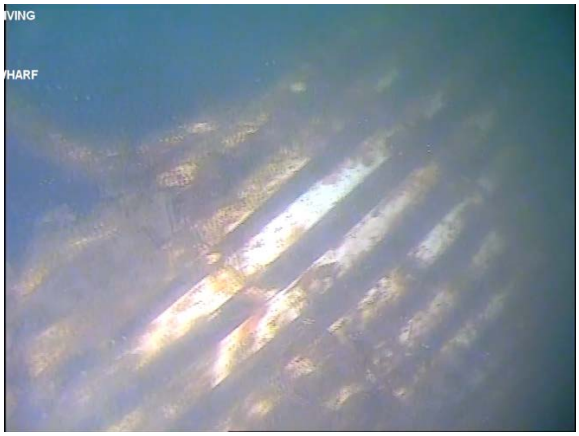


Figure 64: Piece of cane furniture. (Image from T3 (a) Cockle Bay 210705, 01:04).

Figure 65: Ferrous pipe running northwest to southeast across the centre of the bent. (Image from T3 (a) 210705, 03:05).

Figure 66: Large piece of concrete resting on the rock batter. (Image from T3 (a) Cockle Bay 210705, 06:14).

Figure 67: The rubbish net angles behind the northern 'D' pile (left of image) and extends towards the sea wall. (Image from T3 (a) Cockle Bay 210705, 06:45).

Figure 68: Sheet piling appears to start in this bent. (Image from T3 (a) Cockle Bay 210705, 07:49).

Figure 69: Sheet piling in background with loose ferrous piping in the foreground. (Image from T3 (a) Cockle Bay 210705, 07:38).

Transect 4		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 25 m east / ~ 25 m west		**Diver**: Daniel Quilter
Swim start (min): 1133	**Swim end (min):** 1141	**Total time (min):** 8
Probe start (min): 1143	**Probe end (min):** 1152	**Total time (min):** 9
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. Again, the seabed was silty and relatively flat. Just past the 'C' pile the seabed began to rise and a rocky batter was evident building to an angle of 45° (Figure 70). These rocks measured between 150 mm – 500 mm in size. As the diver moved closer to the 'D' pile, the sediment increased, likely due to the outflow from the large stormwater drain at the eastern end of the bent (Figure 71 and Figure 72). There is also a smaller drain in line with the southern steel piles.

Along the rock rubble at the eastern end of the bent in front of the sheet pile wall, there appears to be construction debris and ferrous pipes that could be old services pipes and/or scaffolding (Figure 73). This may have been pushed forward when the sheet pile wall was constructed. The sheet pile wall is 1.5 m to the east of the southern 'D' pile and there is a return where the sheet piling begins (Figure 74). At the 'D' pile on the northern edge, the sheet pile is 1 m to the east.

The diver then moved along the rock batter to the northern 'D' pile and continued the transect to the west, noting that the rock batter ended at the 'C' pile before the seabed returned to the relatively flat silty bottom. No other cultural material was noted.

Figure 70: Rocky batter and sediment past 'C' pile. (Image from T4 (a) Cockle Bay 210705, 04:07).

Figure 71: Increase in sediment build-up on the rock batter likely due to stormwater outflow. (Image from T4 (a) Cockle Bay 210705, 05:03).

Figure 72: Stormwater at eastern end of bent. (Image from T4 (a) Cockle Bay 210705, 05:13).

Figure 73: At the eastern end of the bent, on the rock batter, there is construction debris, consisting of ferrous pipes, possible service pipes and/or scaffolding. (Image from T4 (a) Cockle Bay 210705, 05:46).

Figure 74: Sheet pile wall 1.5 m behind 'D' pile. The sheet pile returns to the east to run into the sea wall at the red arrow. (Image from T4 (a) Cockle Bay 210705, 07:06).

Transect 5		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 20 m east / ~ 20 m west		**Diver**: Daniel Quilter
Swim start (min): 1155	**Swim end (min):** 1203	**Total time (min):** 8
Probe start (min): 1204	**Probe end (min):** 1212	**Total time (min):** 8
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. Again, the seabed was silty and relatively flat. Just to the west of 'C' pile, the rock batter starts at a steep angle of approximately 45°. The rocks are between 100 mm and 200 mm in size (Figure 75). This batter rises for approximately 2 m before levelling out. There is some evidence of construction debris in this area (Figure 76). On the level section, the sediment has built up before the rock batter again rises at a 45° angle just west of the 'D' pile, ending at the sheet pile wall. On top of this second section of rock batter there is further ferrous pipes, possibly construction debris or old service pipes.

The sheet pile wall is 300 mm east of the 'D' pile (Figure 77). On the northern side of the bent, the corresponding 'D' pile is behind the sea wall and out of the water (Figure 78).

The steep rock batter extends down to the 'C' pile on the northern side (Figure 79), before flattening out into a silty seabed. No further cultural material was located on the western run of T5.

Figure 75: Example of rock batter beginning just to the west of 'C' pile. (Image from T5 (a) Cockle By 210705, 03:01).

Figure 76: Where the rock batter flattens out, the seabed becomes siltier and there is scattered ferrous piping. (Image from T5 (a) Cockle Bay 210705, 03:40).

Figure 77: The southern 'D' pile (right of image) is 300 mm to the west of the sheet pile wall. (Image from T5 Cockle Bay 210507, 04:08).

Figure 78: Northern 'D' pile is behind the sheet pile wall. (Image T5 Cockle Bay 210705; 04:59).

Figure 79: Example of rock batter near the 'C' pile on the northern side of the bent. (Image from T5 (a) Cockle Bay 210705; 05:35).

Transect 6		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 20 m east / ~ 20 m west		**Diver**: Daniel Quilter
Swim start (min): 1215	**Swim end (min):** 1225	**Total time (min): 10??**
Probe start (min): 1226	**Probe end (min):** 1232	**Total time (min): 6??**
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. Again, the seabed was silty and relatively flat. Leaning against the southern 'A' pile was what appeared to be a sandwich board or restaurant sign made of aluminium and ply, potentially from one of the restaurants in Cockle Bay (Figure 80). Immediately to the north of the sandwich board was a degraded timber. The timber stood upright 500 mm and was 120 mm in diameter (Figure 81). It did not appear to be a driven pile as the diver was able to push the timber over.

Approximately 1 m west of the southern 'C' pile, the seabed began to rise at an angle, before the rock batter started at the base of the 'C' pile (Figure 82). In the centre of the bent, adjacent to the 'C' pile, there was a 3 m section of 150 mm diameter PVC pipe running east to west. Underneath the pipe there was a 5 m section of encrusted ferrous pipe, like that seen in the previous transects. There was a large bend at one end of the pipe, both pipes were sitting loose on top of the rock batter (Figure 83).

At the base of the sheet pile wall, the steep rock batter consisted of 100 – 200 mm rocks with construction debris lying loose on top (Figure 84). Both the northern and southern 'D' piles were out of the water behind the sheet pile wall.

The diver then moved along the rock batter to the northern 'C' pile and continued the transect to the west, where the seabed returned to the relatively flat silty bottom. No other cultural material was noted, other than a modern umbrella at the northern 'A' pile.

Figure 80: Sandwich or menu board resting against southern 'A' pile. (Image from T6 (a) Cockle Bay 210705; 00:36).

Figure 81: Degraded timber, 500 mm high and 120 mm diameter. (Image from T6 (a) Cockle Bay 210705; 00:43).

Figure 82: The rock batter is exposed at the 'C' pile. (Image from T6 (a) Cockle Bay 210705; 04:10).

Figure 83: Section of PVC pipe with section of ferrous pipe underneath in the centre of the bent. (Image from T6 (a) Cockle Bay 210705; 04:20).

Figure 84: Near the sheet piling there was a number of loose ferrous pipes lying on top of the rock batter. (Image from T6 (a) Cockle Bay 210705; 05:57).

Figure 85: Southern 'D' pile is out of the water behind the sheet piling wall. (Image from T6 (a) Cockle Bay 210705).

Transect 7		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 20 m east / ~ 20 m west		**Diver**: Daniel Quilter
Swim start (min): 1240	**Swim end (min):** 1248	**Total time (min):** 8
Probe start (min): 1249	**Probe end (min):** 1255	**Total time (min):** 6
Depth: 0 m – 6.5 m	**Water visibility:** 2 - 4 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. Again, the seabed was silty and relatively flat. The seabed starts to rise just to the east of 'B' pile and the rock batter starts to emerge from the silty sediment (Figure 86). There were some larger rocks within this batter up to 800 mm and the batter itself was less than 45°. No cultural material was noted other than modern rubbish.

The sheet pile wall at the eastern end of the transect stood proud of the rock batter 800 mm and only just cleared the surface of the water (Figure 87). The diver then moved along the rock batter to the northern 'C' pile, noting some more ferrous pipes and possible construction debris lying on top of the batter (Figure 88).

Just behind the northern 'C' pile, immediately in front of the sheet pile wall, a horizontal and a vertical timber pile were located underneath a section of concrete and other construction debris such as ferrous pipes. The diver could not get underneath the concrete section as it was not stable, so measurements of the piles are approximate. The vertical timber pile is resting directly in front (west) of the upright pile. It is heavily degraded, 700 mm diameter and 4 m long (Figure 89). The upright pile is heavily degraded, hollow in the centre and has a slightly smaller diameter of 500 mm and is standing out of the rock batter 2 m (Figure 90).

The diver then continued the transect to the west. The 'C' pile is in the middle of the rock batter along this transect and the seafloor descends into a silty bottom at the 'B' pile. No cultural features were noted until the northwest fender pile was reached, where a large pile was half buried in the sediment. The pile measured 400 mm diameter and was 4 m long. Just to the west of the pile was a badly deteriorated bicycle.

Figure 86: Rock batter emerging from the sediment to the east of the 'B' pile. (Image from T7 (b) Cockle Bay 210705; 01:12).

Figure 87: Sheet pile wall at eastern end of transect holding up rock batter. (Image from T7 (b) Cockle Bay 210705; 02:17).

Figure 88: Construction debris resting on top of the rock batter at the eastern end of the transect. (Image from T7 (b) Cockle Bay 210705; 02:45).

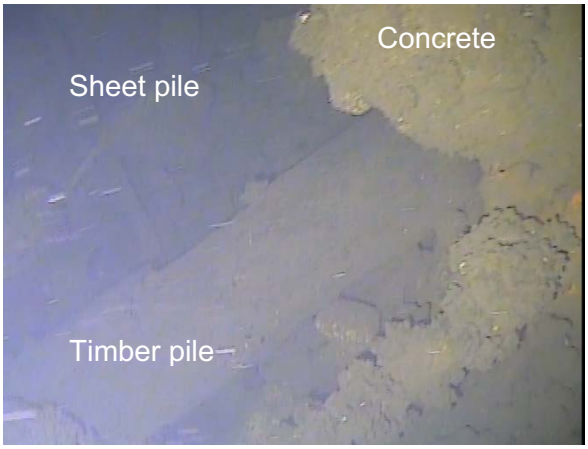


Figure 89: Horizontal timber pile on the northeast end of T7. (Image from T7 (b) Cockle Bay 210705; 03:38).

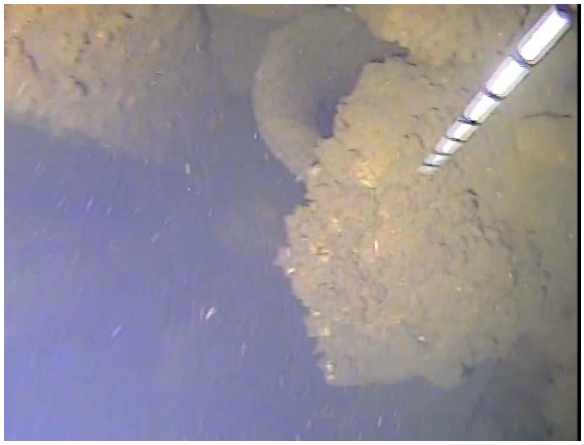


Figure 90: Degraded and hollowed out timber pile northeast end of transect 7. (Image from T7 (b) Cockle Bay 210705; 03:56).

Probing within the primary survey area revealed the sediment was relatively deep towards the western end of the Cockle Bay wharf, but once the rock embankment was reached, the probe would hit refusal at 200 mm – 300 mm (Figure 91).

Figure 91: Overlay of probe results along transects in primary survey area. All depths are in mm.

Transect 8		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 20 m east / ~ 20 m west		**Diver**: Keagan Le Grange
Swim start (min): 1330	**Swim end (min):** 1342	**Total time (min):** 12
Probe start (min): 1343	**Probe end (min):** 1350	**Total time (min):** 7
Depth: 0 m – 6.5 m	**Water visibility:** 0 – 2 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. Again, the seabed was silty and relatively flat. The rock batter began adjacent to the 'B' pile at a 45° angle; however, these rocks were larger, up to 1 m (Figure 92). They did not appear to be squared or shaped. There was a long ferrous pipe beginning from the northern 'B' pile running to the northeast for 5 m, similar to that found in the previous transects. At the base of the sheet pile wall, the rocks within the batter had reduced in size to 100 mm – 200 mm (Figure 93).

The diver then moved along the rock batter to the northern 'C' pile and continued the transect to the west. No significant cultural material was noted until the diver reached the 'A' pile. Approximately 1 m to the south of the pile, there was a timber driven at an angle into the seabed (Figure 94). The timber was 250 mm x 250 mm and there was 2 m exposed out of the seabed. The highest point was to the south at 1.5 m high. The timber could potentially be an old raker or whaler timber. No other cultural material was noted during the transect.

Figure 92: Example of rock batter at southern 'B' pile. (Image from T8 (a) Cockle Bay 210705; 03:44).

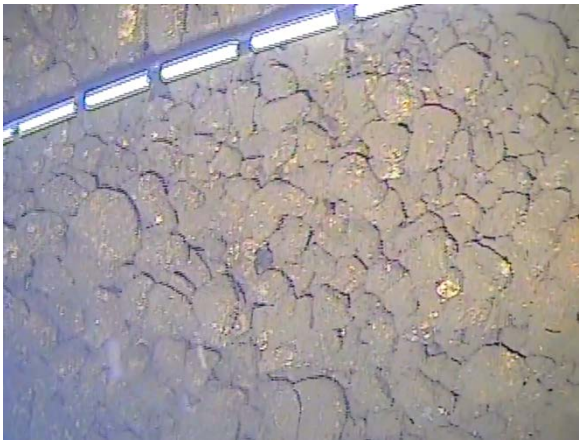


Figure 93: At the base of the sheet pile wall, the rock within the batter was smaller, approximately 100 mm - 200 mm. (Image from T8 (a) Cockle Bay 210705; 06:19).

Figure 94: Rectangular pile on a 45º angle to the south in the centre of the bent adjacent to 'A' pile at the western end of T8. (Image from T8 (d) Cockle Bay 210705; 08:07).

Transect 9		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 15 m east / ~ 15 m west		**Diver**: Keagan Le Grange
Swim start (min): 1354	**Swim end (min):** 1401	**Total time (min):** 7
Probe start (min): 1401	**Probe end (min):** 1407	**Total time (min):** 6
Depth: 0 m – 6.5 m	**Water visibility:** 0 m – 2 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. Again, the seabed was silty and relatively flat but only until just to the east of 'A' pile before the rock batter began (Figure 95). The batter was quite steep, 45° and up to 60° in parts sloping to the west. There were isolated ferrous pipes scattered loosely over the batter (Figure 96). Adjacent to 'B' pile, the ferrous debris increased in volume and one single timber pile was located towards the centre of the bent (Figure 97). The degraded pile protruded 1400 mm high out of the rock batter with a diameter of 300 mm. The pile was approximately 500 mm to the west of the sheet pile wall and 2 m north of the southern 'B' pile.

The diver then moved along the rock batter to the northern 'B' pile and continued the transect to the west. Leaning into the centre of the bent from 'B' pile was a loose, fallen pile. The pile was approximately 1.2 m from the sheet piling wall. The pile was approximately 300 mm in diameter and 2 m long (Figure 98). The rock batter ended 1 m east of the 'A' pile and the remaining transect was a silty seabed.

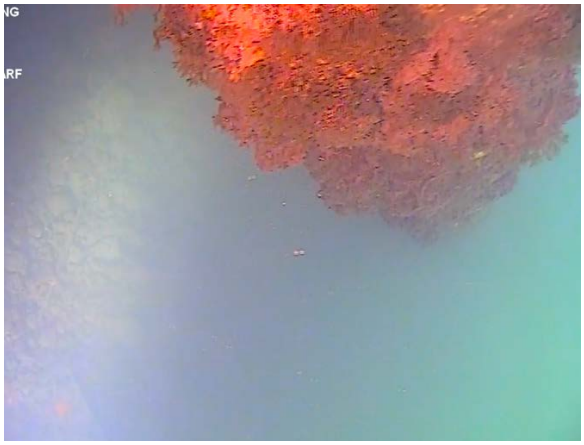


Figure 95: Rock batter to the east of 'A' pile and the silty sediment to the west. Southern 'A' pile at top of image. (Image from T9 (a) Cockle Bay 210705; 00:04).

Figure 96: Scattered ferrous piping lying on top of the rock batter. Rocks measuring 100 - 300 mm in size. (Image from T9 (a) Cockle Bay 210705; 01:45).

Figure 97: Timber pile adjacent to 'B' pile in centre of bent and surrounded by construction debris. (Image from T9 (a) Cockle Bay 210705; 03:06).

Figure 98: Loose fallen pile next to northern 'B' pile. (Image from T9 (a) Cockle Bay 210705; 05:22).

Probing along Transect 8 and Transect 9 revealed the sediment was relatively deep towards the western end of the Cockle Bay wharf, but once the rock embankment was reached, the probe would hit refusal at 200 mm – 300 mm. The rock embankment reaches further west in the northern part of the site (Figure 99).

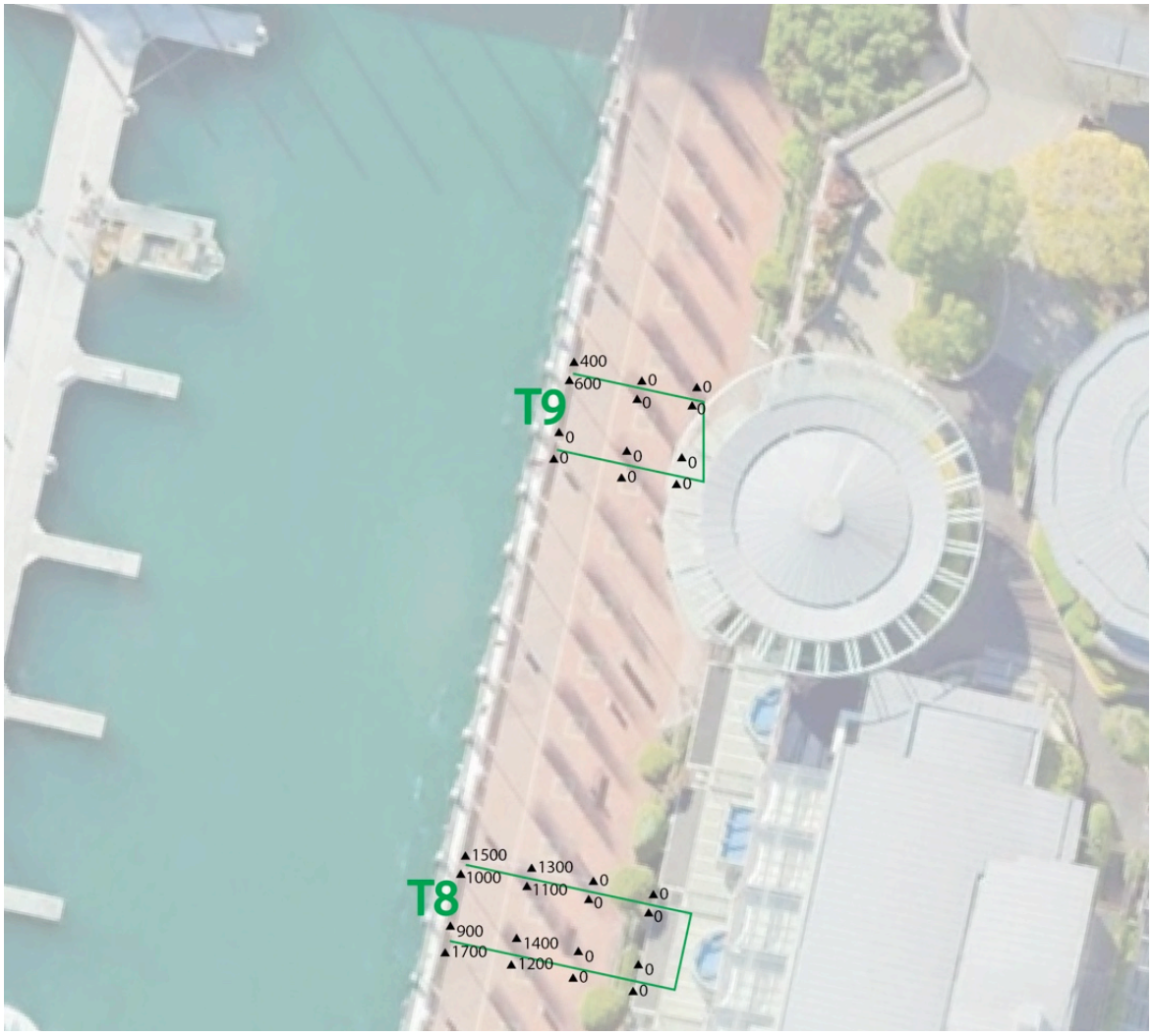


Figure 99: Overlay of probe results along Transect 8 and Transect 9. All depths are in mm.

Transect 10		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 25 m east / ~ 25 m west		**Diver**: Keagan Le Grange
Swim start (min): 1503	**Swim end (min):** 1522	**Total time (min):** 19
Probe start (min): 1523	**Probe end (min):** 1536	**Total time (min):** 13
Depth: 0 m – 6.5 m	**Water visibility:** 0 m – 2 m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east where the seabed was silty and relatively flat. The rock batter began between 'D' and 'E' piles.

At the 'E' pile, there was a row of three cut off timber piles running in a north to south direction. The southern pile was 1 m from 'E' pile. This pile was 1 m high out of the rock batter with a diameter of 350 mm. The second pile was also 1.25 m out of the rock with a diameter of 300 mm. There is a square section at the top of the pile that may indicate where the pile was checked. The third pile was 1.8 m out of the rock with a diameter of 350 mm. Pile 2 was 400 mm to the north of Pile 1, and Pile 3 was 550 mm to the north of Pile 2 (Figure 100 and Figure 101).

Butted against the southern 'E' pile was a large piece of possible concrete overpour approximately 1 m x 1 m. Underneath, there was a fallen timber pile, the exposed section was 1.3 m before being covered by rock batter (Figure 102).

The diver then moved along the rock batter to the northern 'E' pile and continued the transect to the west. Adjacent to the northern 'E' pile there was another two cut off timber piles. The first was heavily degraded with only the outside still present. The pile was 1.5 m high with an estimated diameter of 300 mm. The next pile was 1.5 m to the south of the first and measured 2 m high out of the rock batter and was also heavily degraded (Figure 103 and Figure 104). Immediately next to the second pile there was another short pile that was 600 mm high out of the rock batter and heavily degraded.

No other cultural material was located for the rest of the transect.

Figure 100: Two of the cut off timber piles near the southern 'E' steel pile. (Image from T10 (a) Cockle Bay 210705; 07:39).

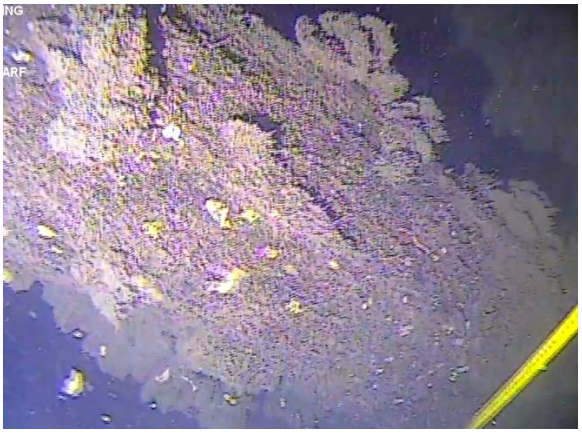


Figure 101: Third cut off timber pile near the southern 'E' pile. This pile was the tallest of the three standing 1.8 m high from the rock embankment; 05:36).

Figure 102: Rectangular piece of concrete leaning against southern 'E' pile. Timber pile underneath indicated by red arrow. (Image from T10 (a) Cockle Bay 210705; 09:01).

Figure 103: Top of the northern cut off timber pile closest to the northern 'E' steel pile. Note heavy deterioration. (Image from T10 (b) Cockle Bay 210705; 02:52).

Figure 104: Heavily deteriorated cut off timber pile 1500 mm to the south of the northern 'E' pile. (Image from T10 (b) Cockle Bay 210705; 05:00).

Transect 11		
Date: 05th July 2021	**Method:** SSBA	**Tide:** Flooding
Distance and direction: ~ 20 m east / ~ 20 m west		**Diver**: Keagan Le Grange
Swim start (min): 1418	**Swim end (min):** 1422	**Total time (min):** 4
Probe start (min): 1423	**Probe end (min):** 1450	**Total time (min):** 27
Depth: 0 m – 6.5 m	**Water visibility:** 0 m – 2m	**Seabed visibility:** Good

The diver started on the southern side of the bent working towards the east. The Seabed was silty and relatively flat up until the east of 'B' pile where the rock batter began (Figure 105). The rock batter continued on a 45º angle past 'C' pile. Halfway between 'C' and 'D' pile, the rock embankment becomes dry (Figure 106).

The diver then moved along the rock batter to the northern 'C' pile and continued the transect to the west. There was plenty of ferrous piping and conduit scattered near the 'C' pile but as the diver headed west, the debris thinned out. The rock batter ended just east of the northern 'B' pile and the remainder of the transect was a silty sediment with no obvious cultural material present.

Figure 105: Example of rock batter at 'C' pile. (Image from T11 (a) Cockle Bay 210705; 02:42).

Figure 106: Rock embankment at eastern end of T11. (Image from T11 (a) Cockle Bay 210705; 03:11).

Probing along Transect 10 and Transect 11 revealed the sediment was relatively deep towards the western end of the Cockle Bay wharf but once the rock embankment was reached, the probe would hit refusal at 200 mm – 300 mm (Figure 107).

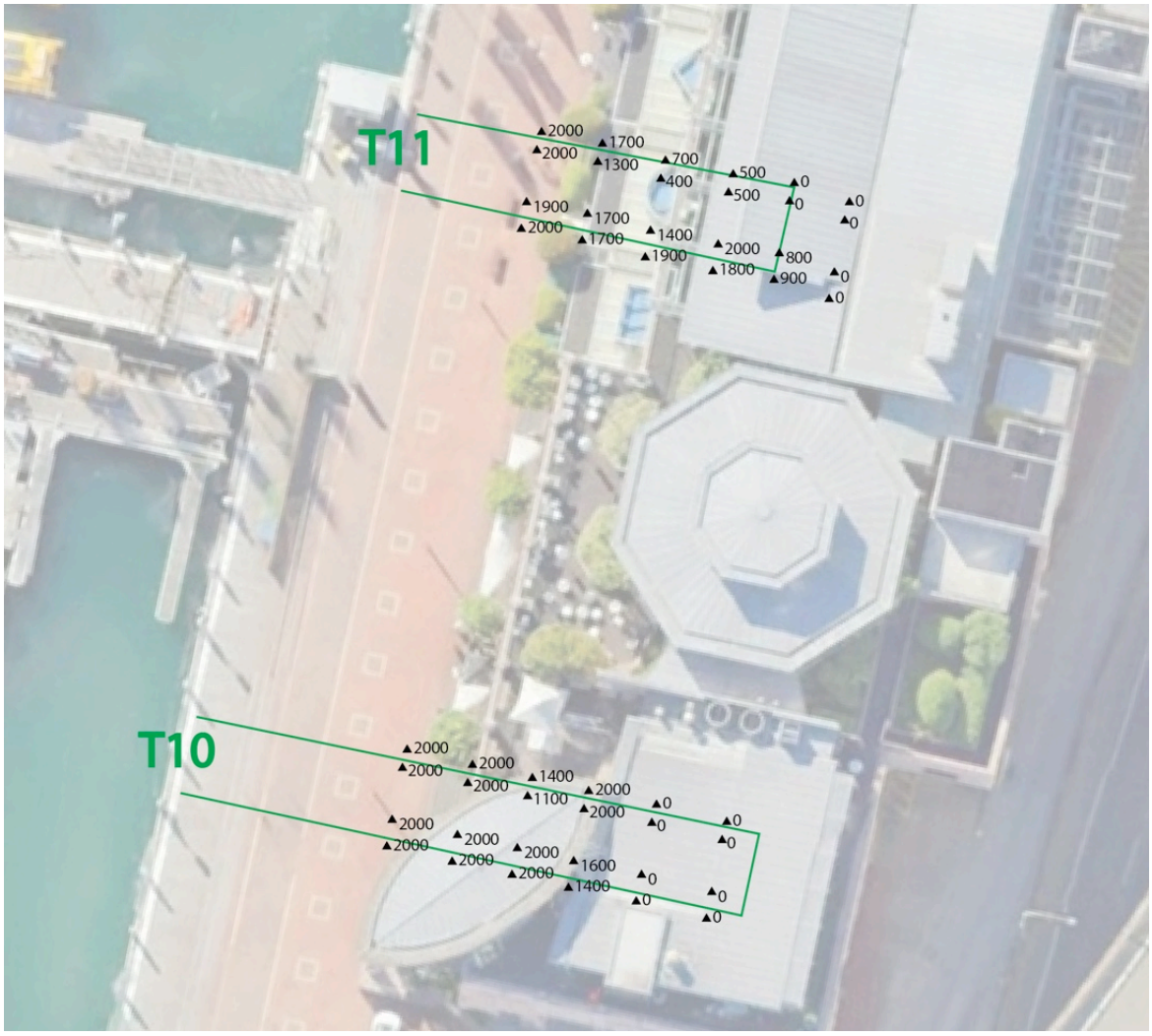


Figure 107: Overlay of probe results along Transect 10 and Transect 11. All depths are in mm.

4.6 Summary of Results

The following overlay images represent the findings of the site inspection for this project (Figure 108 to Figure 110). The modern concrete seawall and rock embankment is consistent throughout the length of the study area.

Most of the features identified on the seabed are of modern origin from within the last 50 years including restaurant furniture, steel structural items, concrete mooring blocks, drainage pipes and diffusers or barriers for the stormwater outlets.

There is one collection of potentially earlier remains (prior to the major works undertaken in the 1980s), consisting of 6 fixed and one loose pile arranged in a row oriented roughly north-south at the eastern end of Transect 10. The loose pile appeared to be associated with a piece of rectangular concrete that may be concrete plating. Three other isolated timber piles that may be earlier (prior to the 1980s) are located at the western end of Transect 8 and the eastern ends of Transect 7 and Transect 9.

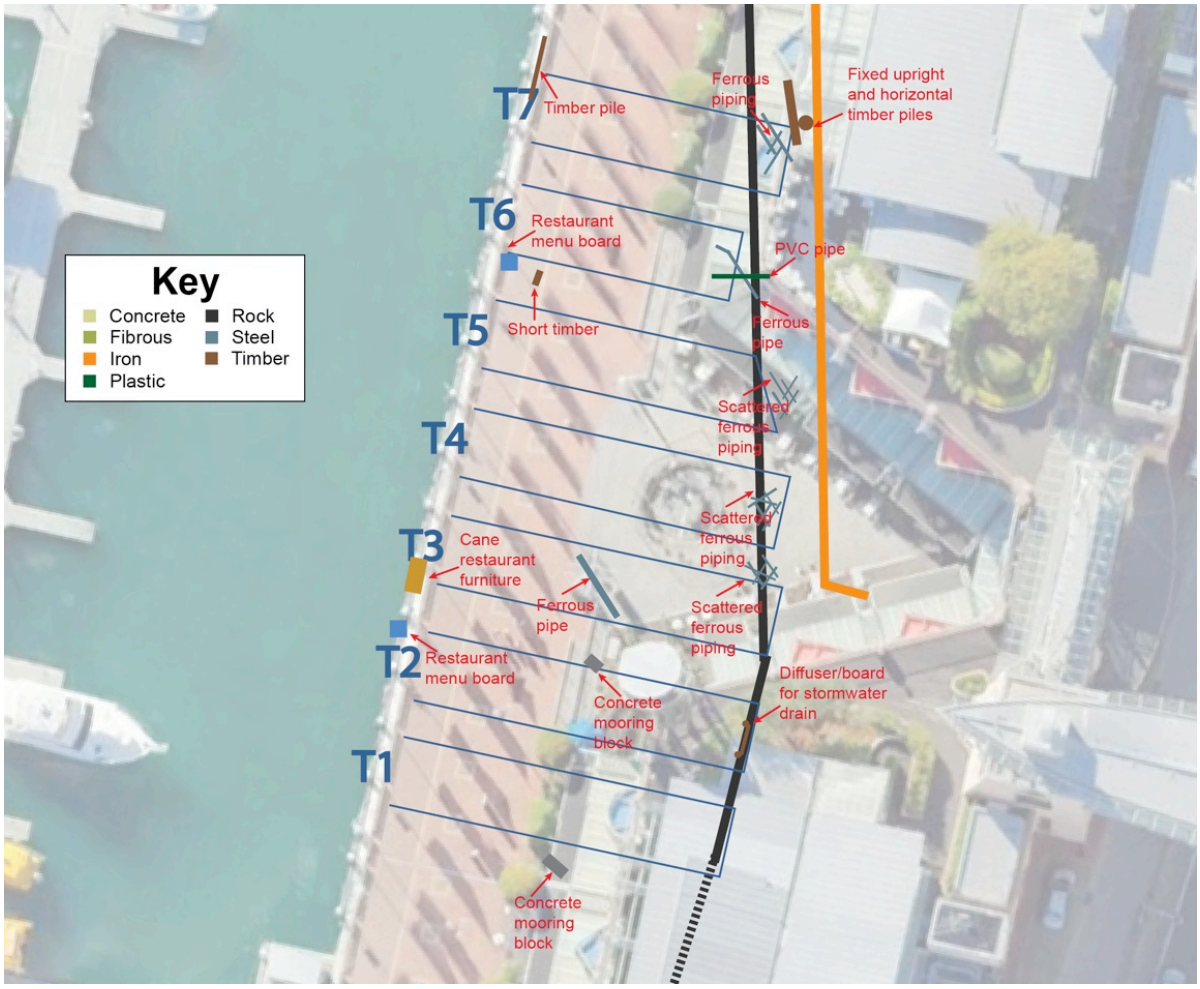


Figure 108: Overlay of site inspection results for Transect 1 to Transect 7.

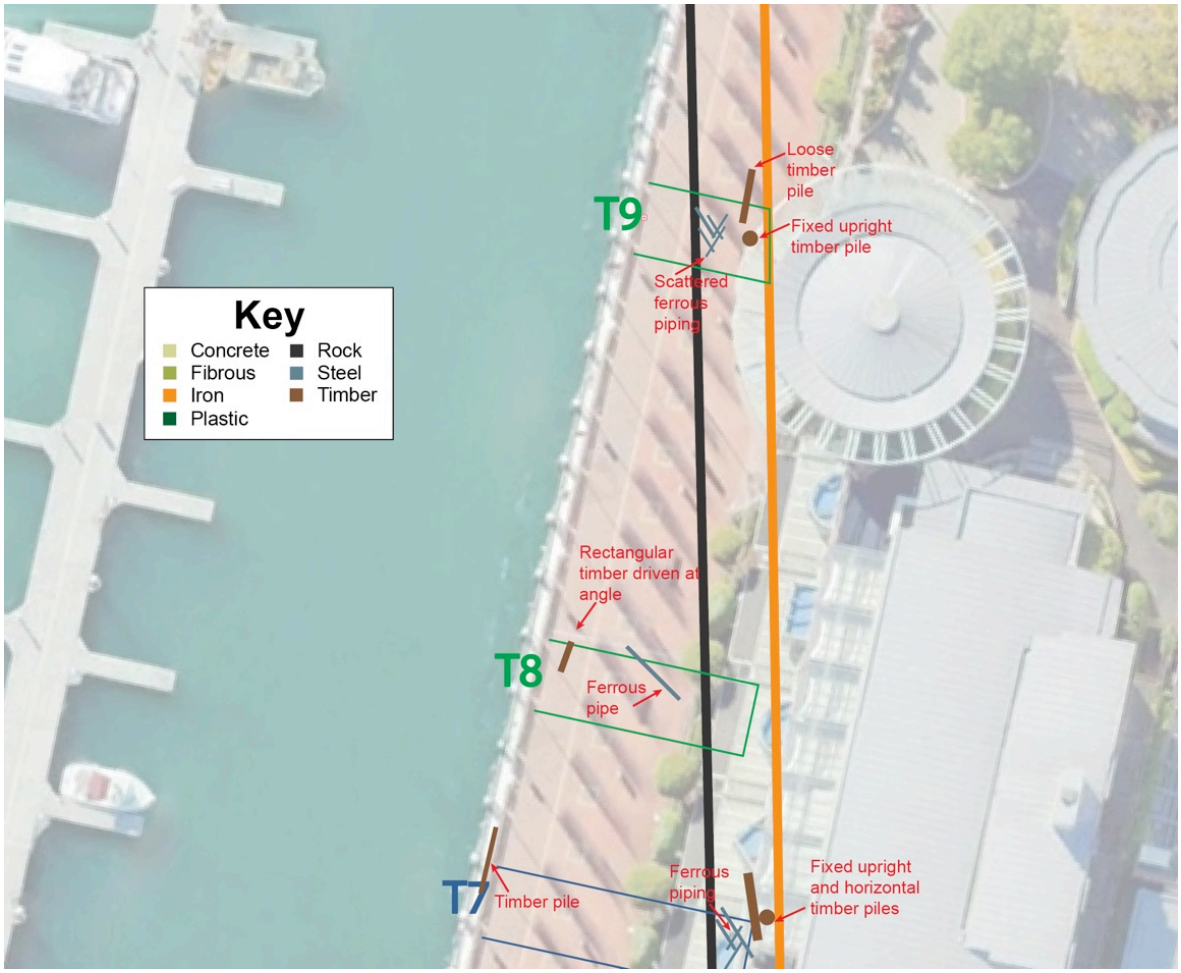


Figure 109: Overlay of site inspection results for the northern part of the site (Transect 8 and Transect 9).

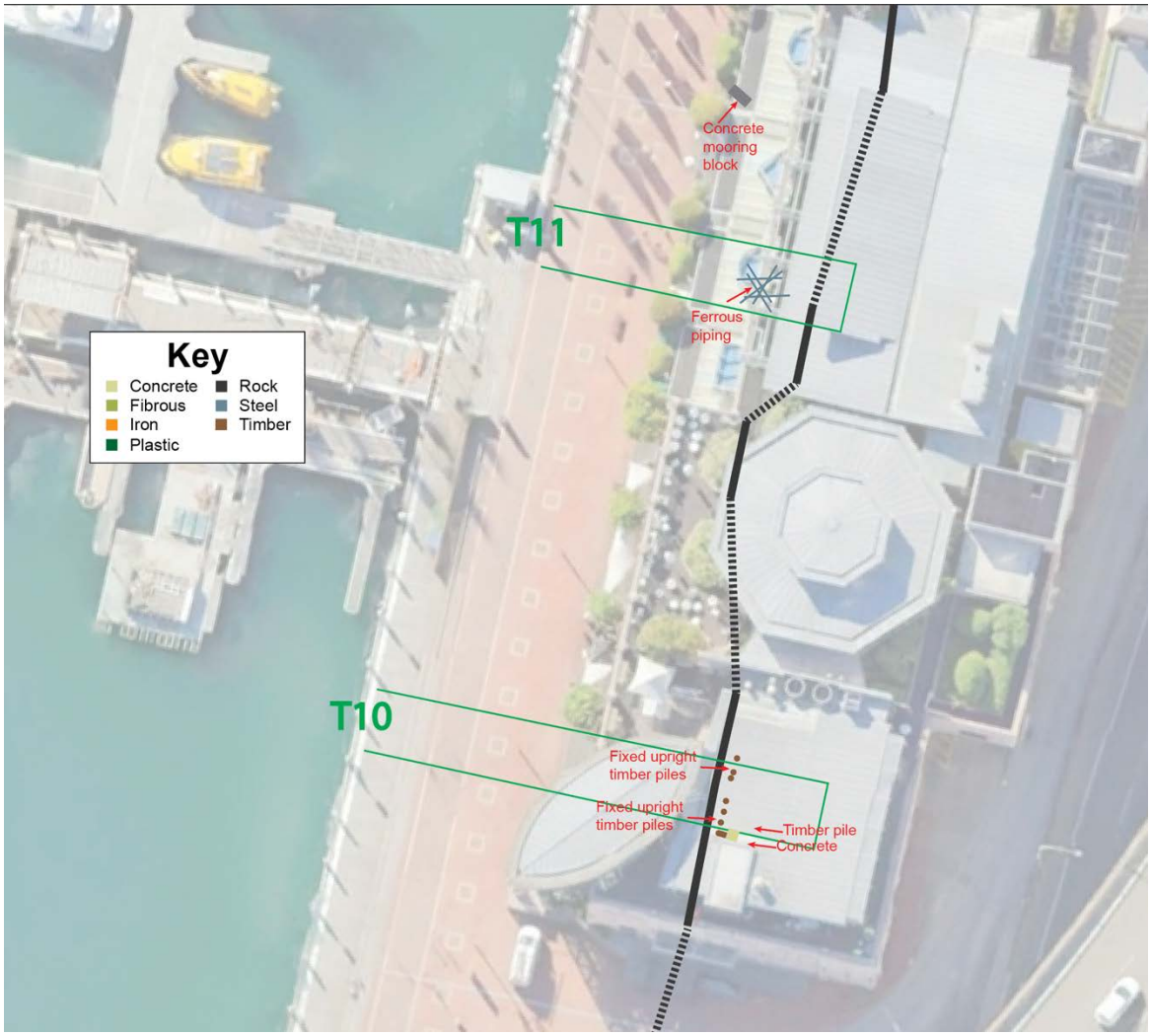


Figure 110: Overlay of site inspection results for the northern part of the site (Transect 10 and Transect 11).

4.7 Interpretation of Results

The findings of the 2021 dive survey mirror the results of the earlier dive survey conducted in 2017.

The large upright, but heavily deteriorated timber pile with a horizontal pile to its west at the eastern end of T7 does not appear to be associated with any seawalls. However, in comparison with an overlay of historic wharves, the timbers appear to be in the wharf outlines of Wharf 34 (Figure 33 and Figure 111).

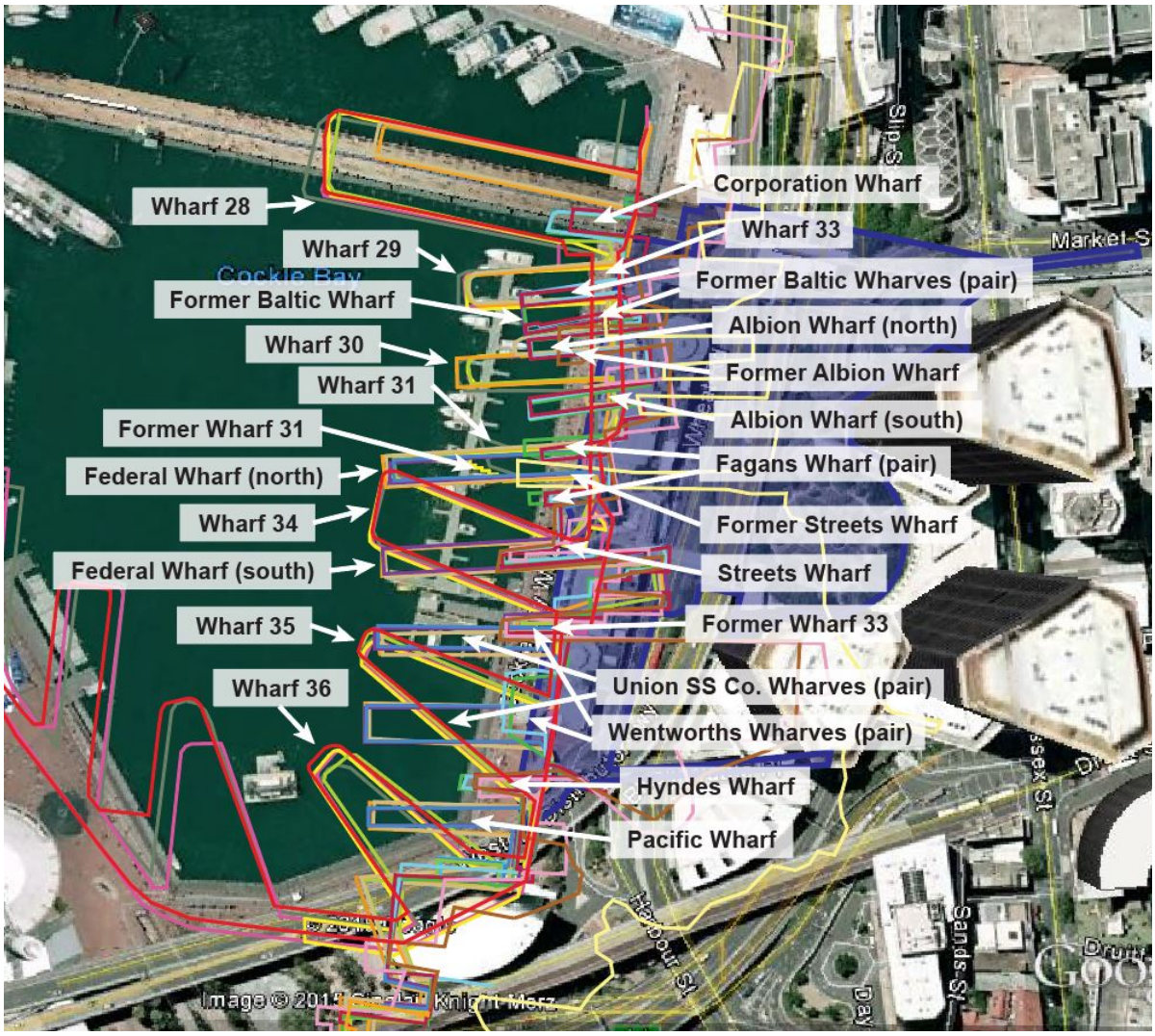


Figure 111: Overlay of historical wharves within the study area. [53]

Wharf 34 was constructed on the frontage of reclamation in 1927-1928 as part of the Sydney Harbour Trust improvements of Darling Harbour. The wharf was constructed of timber piles with partial concrete sleeves, a timber deck that was later resurfaced with concrete, and a galvanised iron shed. Wharf 34 was demolished during the mid-1980s redevelopment of Cockle Bay by the Darling Harbour Authority, with the landward end of the wharf buried in reclamation. Previous structures within the footprint of Wharf 34 include Federal Wharves, Streets Wharf and Former Wharf 33.

The upright cut off timber pile at the eastern end of T9 could also be from this period as the timbers appear to be on the same alignment (Figure 113).

[53] *Op. Cit.*, **Cosmos Archaeology Pty Ltd**, p. 36.

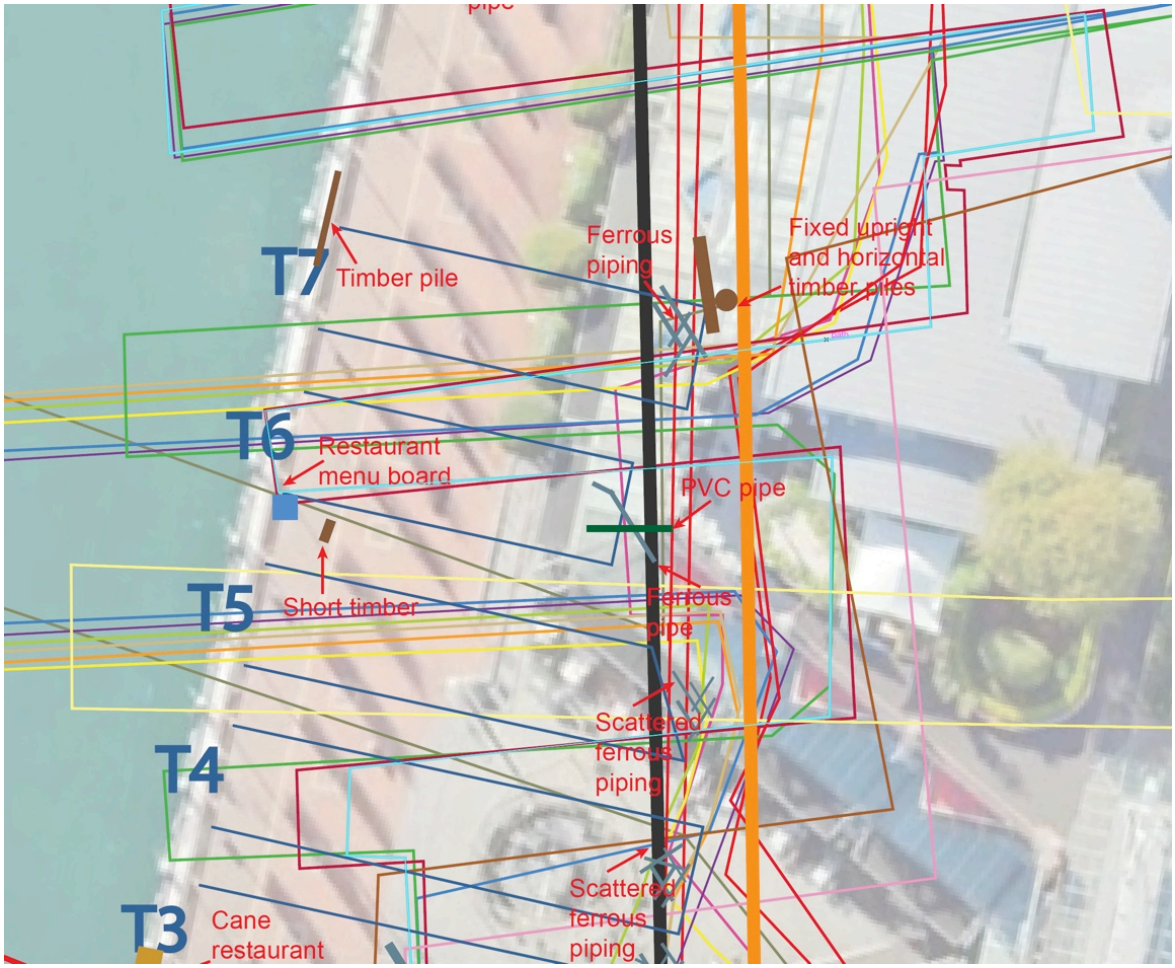


Figure 112: Location of piles along Transect 7 with overlay of historic wharves. Loose timber pile at the western end of T7 is likely modern.

The rectangular timber located at the western end of T8 could potentially be part of Wharf 30 (Figure 113).

Wharf 30 was constructed on the frontage of reclamation in ca. 1910 as part of the Sydney Harbour Trust improvements of Darling Harbour. Wharf 30 was originally an open wharf, built of timber piles and decking, however, an open sided shed was added sometime during the 1920s. Wharf 30 was demolished between 1959-1962 during the development of the Port Roadway, constructed along the eastern shore of Darling Harbour between Market and Bathurst Streets and involving extensive resumptions. Previous structures within the footprint of Wharf 30 include the northern wharf in the former pair of Albion Wharves and possibly an even earlier alignment of Albion Wharf (single wharf).

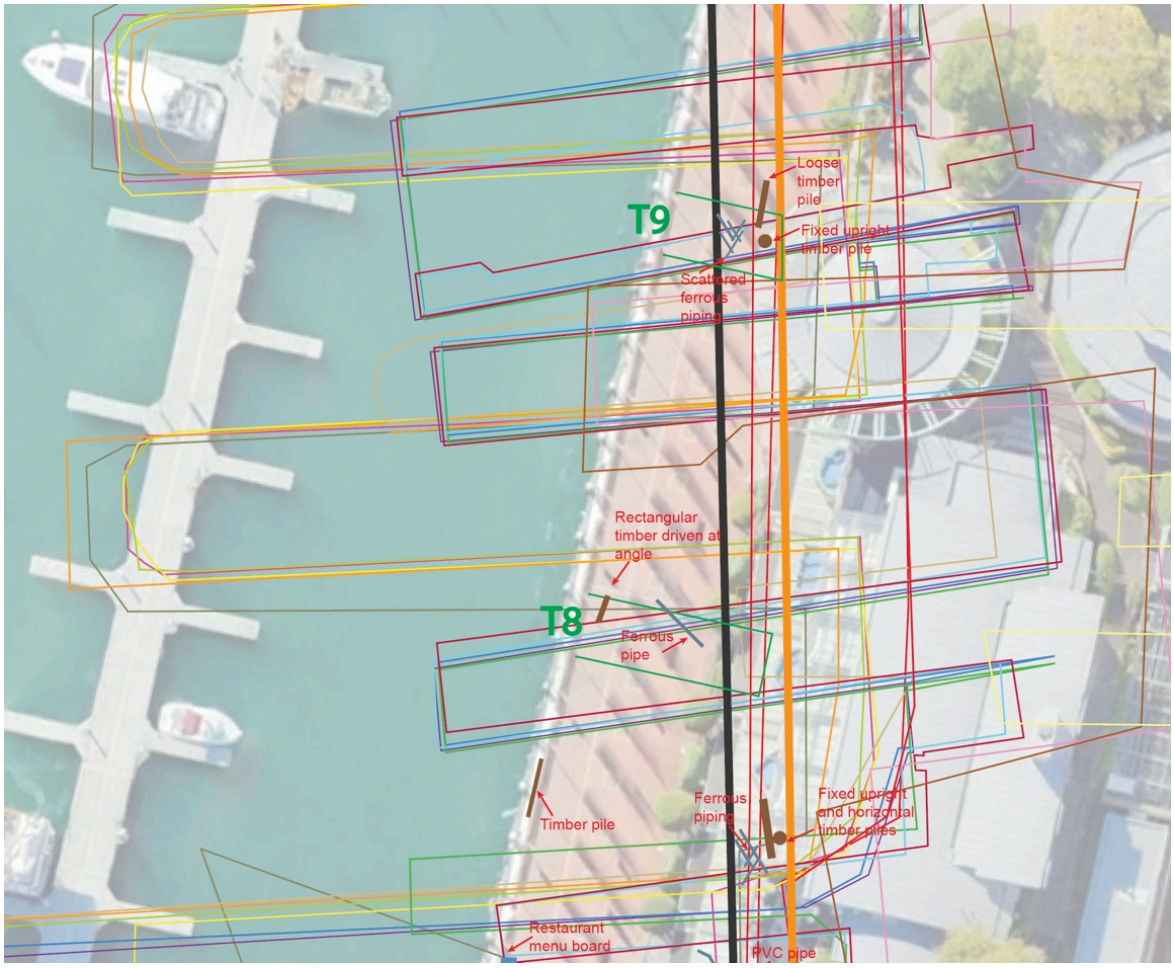


Figure 113: Overlay of historic wharves and timber features for T7, T8 and T9.

Historic research conducted during the 2017 Cockle Bay Maritime Archaeological assessment found that the rat proofing of seawalls extended to the south of the study area beginning in 1903 – 1908.[54] The six cut off timber piles and concrete feature at the western end of Transect 10, appear to align with the ca. 1920 – 1929 rat proof walls installed by the Sydney Harbour Trust (Figure 114). Figure 115 overlays the 2017 and 2021 surveys and appears to show similar features on the same alignment.

[54] *Op. Cit.*, **Cosmos Archaeology 2017,** p. 49.

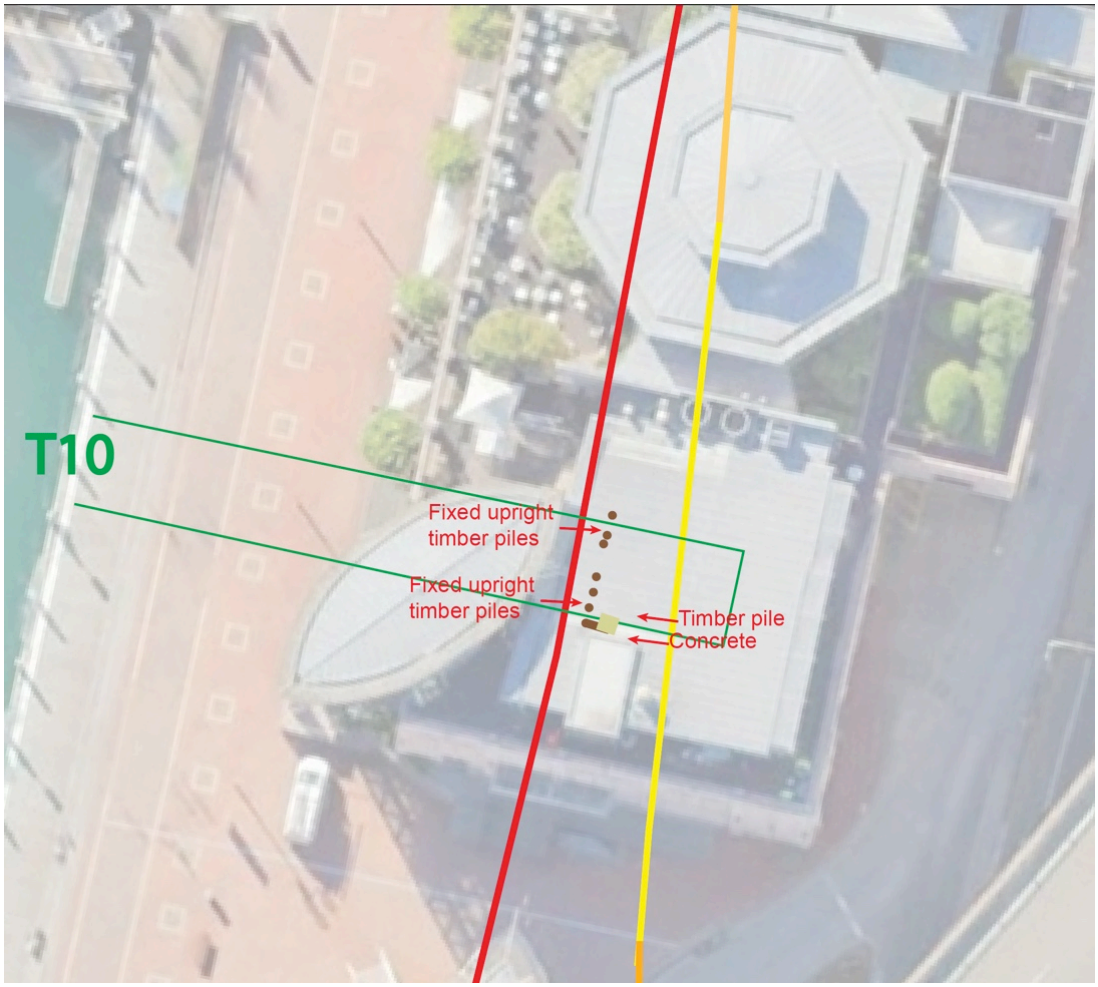


Figure 114: Overlay of cut off piles and concrete features at eastern end of Transect 10. The rat proof sea walls are indicated by yellow = ca. 1903-1907 seawall, orange = ca. 1908-1911 and red – ca. 1920-1929.

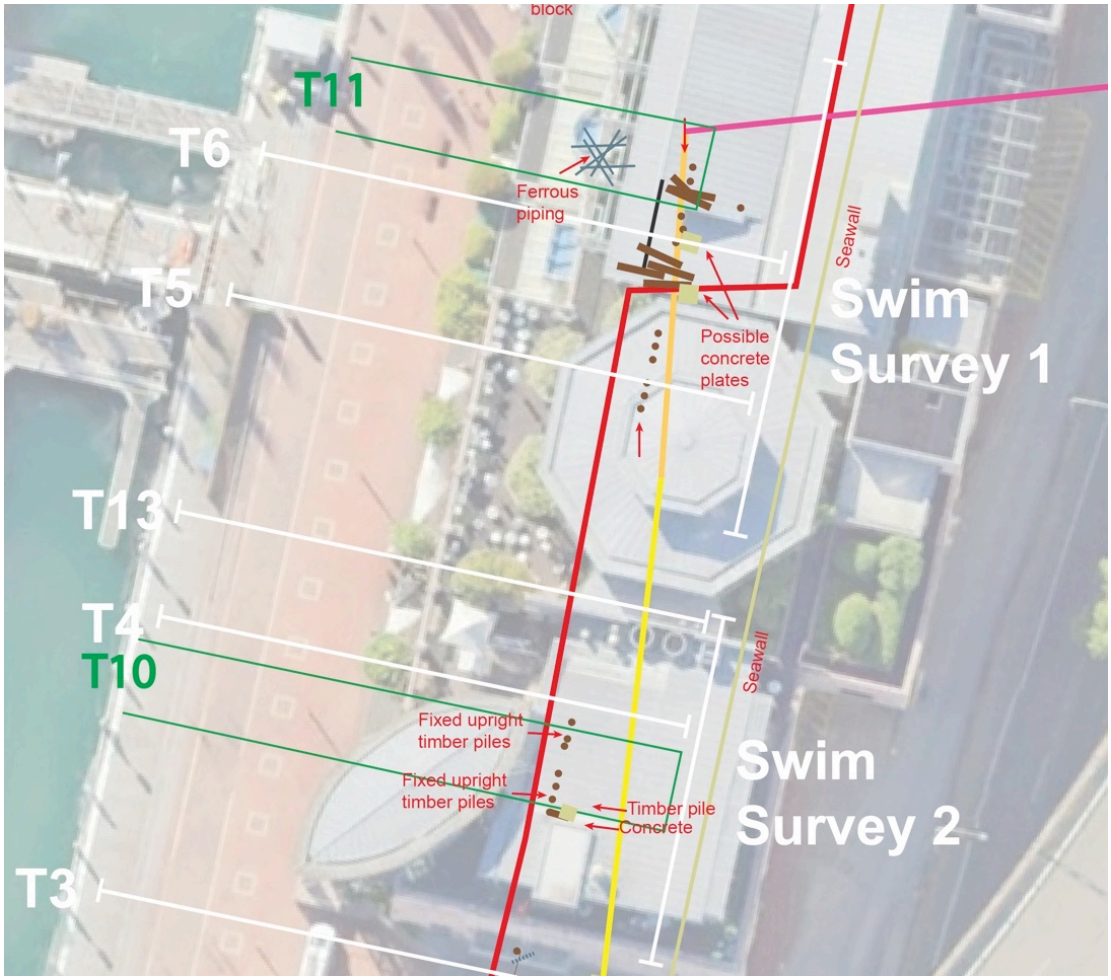


Figure 115: Overlay of results from 2017 and 2021 showing line of cut off piles and concrete plates. 2017 piles are to the north. The rat proof sea walls are indicated by yellow = ca. 1903-1907 seawall, orange = ca. 1908-1911, pink ca. 1912-1919 and red – ca. 1920-1929.

5 KNOWN AND POTENTIAL SITES

5.1 Known Maritime Heritage Sites

5.1.1 Remains of Wharves from the Late 19th Century

A number of piles have been identified as potentially relating to previous wharf structures (Figure 116 and Figure 117). They may be related to:

- Former Streets Wharf (ca. mid-1830s to late-1850s)
- Former Wharf 31 (ca. late-1920s to early-1950s) or Wharf 31 (1956 to 1963)
- Hyndes Wharf (ca late-1930s to late-1880s)
- Wharf 35 (ca1918 to mid-1980s)
- Wharf 34 (1927-1928 to 1959-1962)
- Wharf 30 (ca 1910 to 1959-1962)

Based on the condition of the piles and the fact that they are both protruding at odd angles from the seabed, it is more likely that the piles are related to the later wharves in the sequence of development.

5.1.2 Remains of Timber Sheet Piling with Monier Concrete Plates from the Early 20th Century

A number of piles were identified during the site inspection that are possible remains of timber sheet piling along the eastern side of Cockle Bay, as well as pieces of possible concrete plates that may be remains of Monier plates used to face the timber sheet piling during rat proofing upgrades to the seawalls. All of these features have been identified in the southern half of the site (Figure 117).

5.1.3 Steel Sheet Piling Retaining Wall from the Mid-20th Century

The steel sheet piling that was identified during the 2017 inspection and 2021 pre-disturbance dive inspection was likely placed between the last recorded rat proofing upgrade in 1920-1929 and the 1985 plan of seawalls prior to development in the 1980s-1990s (Figure 116 and Figure 117).

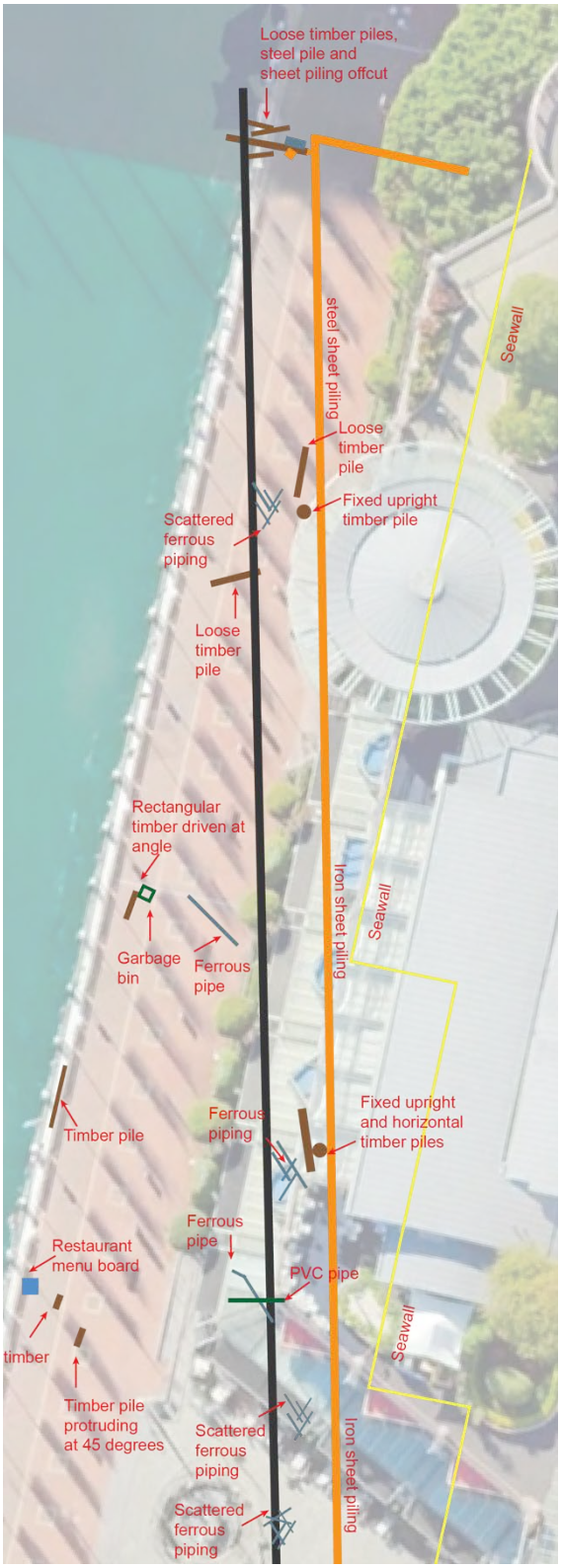


Figure 116: Known timber sheet piling and potential wharf remains – north.

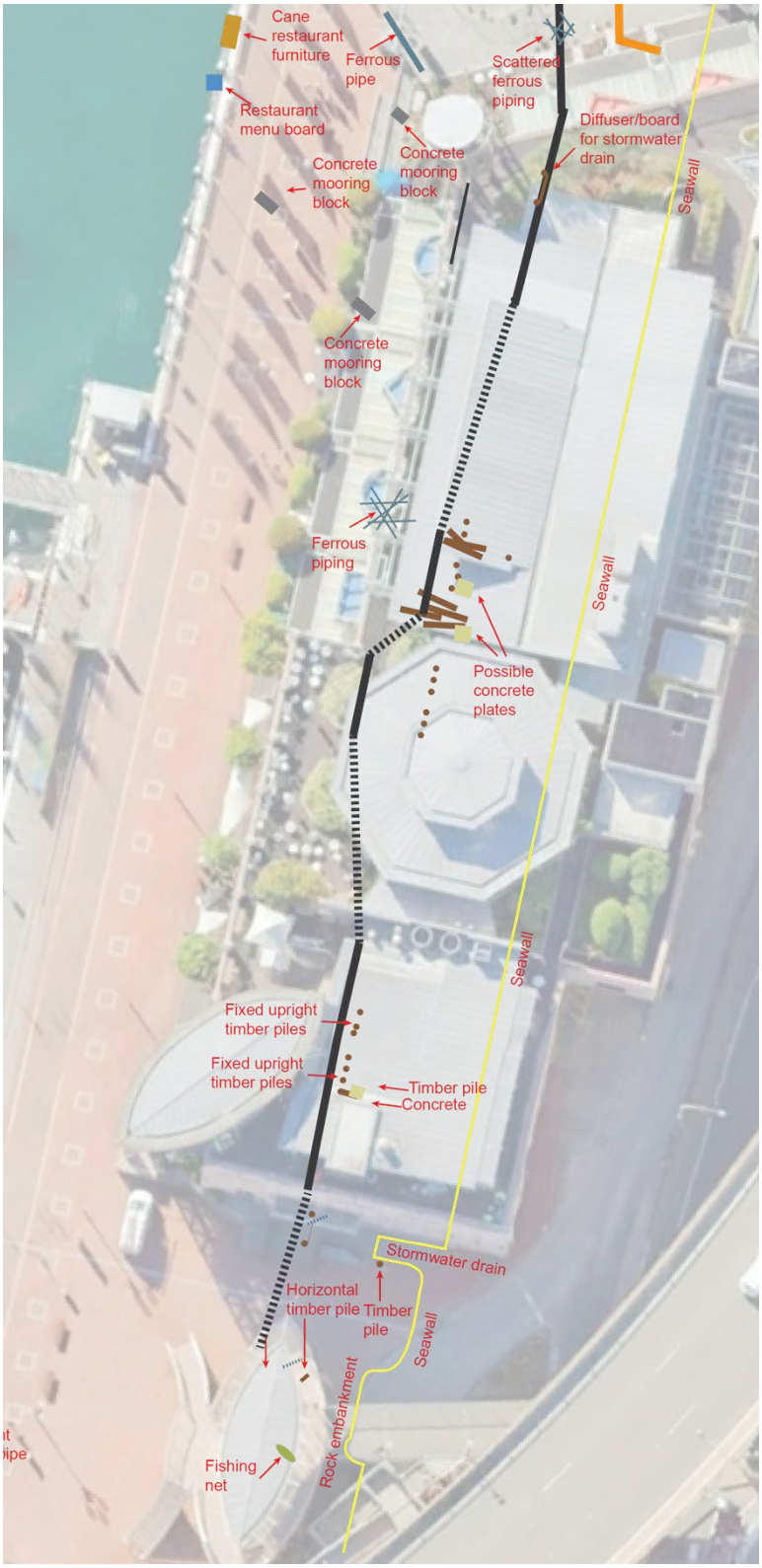


Figure 117: Known timber sheet piling and potential wharf remains – south.

5.2 Potential Maritime Heritage Sites

5.2.1 Physical Setting

Reclamation and seabed type within the study area all have an effect on the preservation of potential maritime heritage sites. Wharves, seawalls or other forms of infrastructure are not likely to be removed in their entirety for reclamation to take place as remains can easily be buried and added to the reclamation fill. The construction of seawalls has the same effect, as the new seawall is typically constructed on the outside of older seawalls, effectively burying the old seawall within fill. Burial within reclamation, behind a seawall or simply by accumulated sediments can improve the survival rate of remains as it creates and anaerobic environment that is beneficial for the preservation of organic materials. The seabed within the study area is a soft silt of over 500 mm depth other than in proximity to the rock embankment. It is likely that metres of silt have accumulated over time within Cockle Bay and the western edge of the study area, burying potential wharf, seawall and artefact remains that are not already buried behind the seawall and reclamation. The apparent low oxygen environment and low-turbidity under the current wharf creates conditions that reduces damaging impacts by biological agents, such as marine borers, on timber material.

5.2.2 Historical Sites

Wharves and Related Material

The potential for archaeological deposits associated with the shipping and transportation immediately around each wharf is affected by site formation processes that have occurred during and after the lifespan of the wharf. This includes shipping movements, but also the demolition and removal of one wharf and the construction of another in the same area. Any deposits within the footprint of current building structural supports or piers would also have been removed.

Typically, archaeological deposits associated with vessels berthed at a wharf are located immediately between the wharf and the vessel or on the opposite side of the vessel away from the berth. The limit of these deposits is based on the width of the vessels berthed at the wharf. Relics associated with the working life of the wharf can potentially be deposited immediately below the footprint of the former wharf, particularly material that has fallen between deck planking. This material would relate directly to the working life of the wharf.

Given the number and scale of the wharves constructed on the eastern side of Cockle Bay, and the 150-year continuous maritime activity at Cockle Bay, the archaeological potential located within the seabed within this area is considered to be high.

It is likely that dredging has occurred on the eastern side of Cockle Bay including smaller-scale private dredging around particular wharves as well as larger scale dredging by the later Sydney Harbour Trust. Dredging has the potential to remove surface archaeological remains and expose remains of piles from previous structures which may then be cut or removed. Dredging in this area has the effect of reducing the archaeological potential to moderate.

Seawalls

It has been established that a number of seawalls extend across the western half of the study area, consisting of a combination of forms and materials, built between the 1860s and 1910s. The 1980s to 1990s development of Cockle Bay wharf included construction of the current promenade wharf and concrete seawall observed in the site inspection. However, based on the identification of remains of the timber sheet piling seawall, it is highly likely that other sections of these seawalls still survive within the study area both beneath the wharf and behind the current concrete seawall. The archaeological potential is considered to be very high.

Shipwrecks

There are four shipwrecks known to have occurred in Darling Harbour, as detailed in **Section 2.2.3**. There is the potential for archaeological remains associated with the shipwreck of *Sterling* to be present within the project area. While the vessel was refloated, there is the potential for remains associated with the collision to still be on the seabed. However, the archaeological potential of remains is considered very low.

The vessels *William Woolley* and *Orphan Girl* have Darling Harbour included in their shipwreck register listings as this was their destination, however, they are unlikely to be within the study area.

The vessel of *Omeo* was lost at the Bathurst Street Wharf. These wreck sites are now covered over by reclamation works and are located behind the current seawall. Therefore, the wreck is likely to be to the south and outside of the study area of this report.

It should also be noted that remains of abandoned vessels could be found within reclamation fill as has been recently found during works for the Sydney Metro site at Barangaroo.

Discard from Vessels

Vessel movement and mooring in the eastern side of Cockle Bay inevitably coincides with discard from industrial vessels. Discard can take the form of accidental or deliberate discard of items such as personal objects, food and drink containers, ships fittings and equipment, fishing and boating equipment as well as cargo and shipping materials being loaded or offloaded at the wharves on the eastern side of Cockle Bay.

Discard In and Under Reclamation Fill

The eastern side of Cockle Bay has been gradually reclaimed throughout the 19th and 20th centuries. This reclamation would have the effect of burying and preserving any potential archaeological remains on and under the seabed, such as wharf remains described above, as well as possibly containing items within the fill from the original source of the material. There may have also been opportunistic discard within the fill as locals, workers or even the local council took advantage of the operation to bury unwanted refuse. The type, material kind, size and extent of these remains cannot be predicted. Regardless, the process of burial generally conserves material and it is likely that these items are relatively intact. The archaeological potential of discard within reclamation fill is considered moderate, other than within the footprint of the current building structural supports or piers where the archaeological potential would be nil.

5.2.3 Summary

Based on the findings of the historical information presented in **Section 3** and observations made during the pre-disturbance survey presented in **Section 4,** the following map of maritime archaeological potential has been produced (Figure 118).

Zones of high potential indicate areas where there were maritime structures, including wharves and seawalls, which are likely to remain buried within the seabed or beneath reclamation. Zones of low potential are areas where there are no built structures but maritime activities took place that may have left artefacts which are now buried within the seabed or beneath reclamation. The zones marked as not applicable are areas where there was no maritime archaeological development or there are no proposed ground disturbances and hence are outside the scope of this assessment.

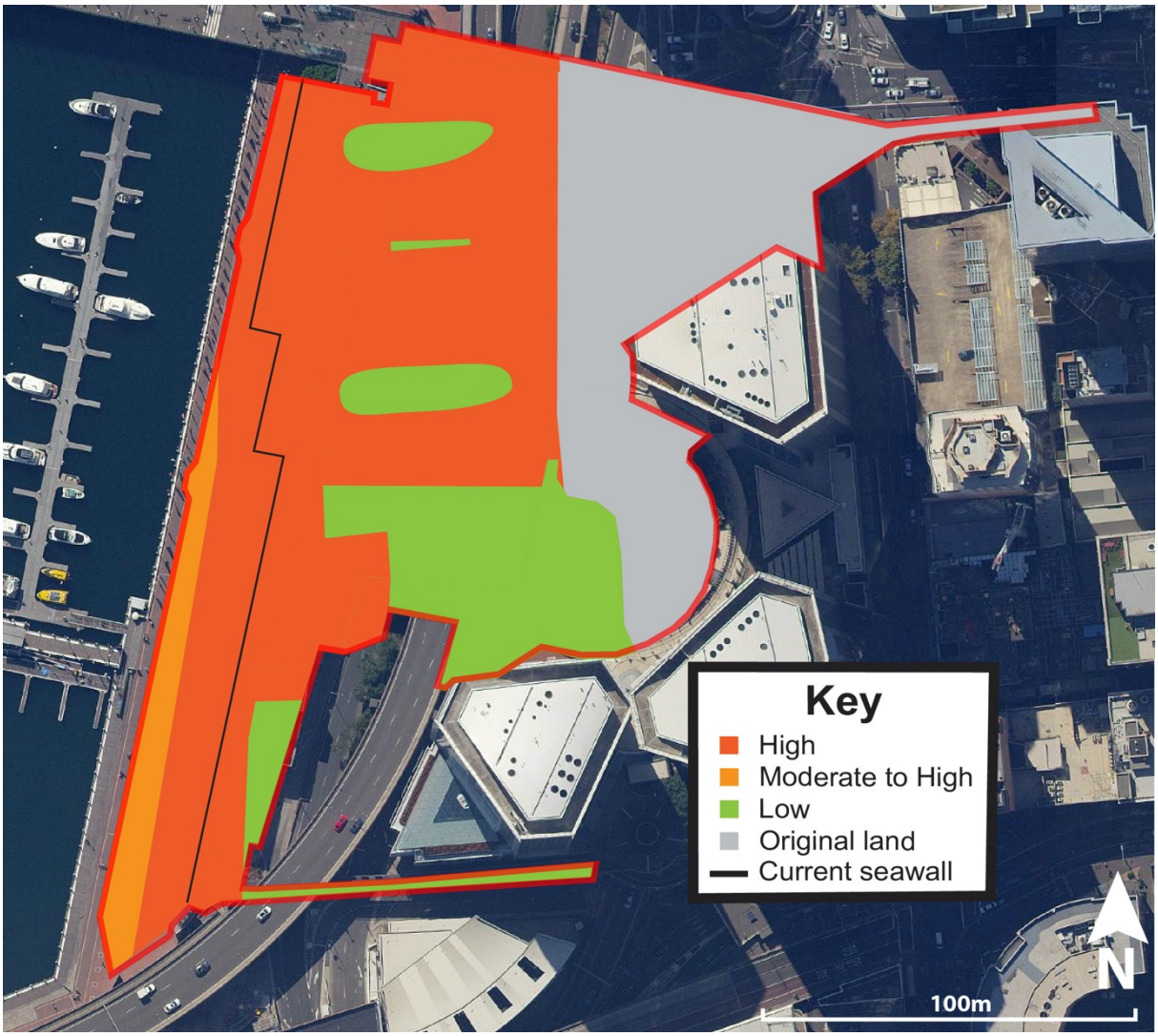


Figure 118: Likelihood of maritime archaeological potential for the study area.

6 ASSESSMENT OF SIGNIFICANCE

6.1 Significance Criteria

An assessment of cultural significance or heritage significance seeks to understand and establish the importance or value that a place, site or item may have to select communities and the general community. The Australian ICOMOS *Charter for the Conservation of Places of Cultural Significance*[55] (the *Burra Charter 1979,* most recently revised in 1999) is the standard adopted by most heritage practitioners in Australia when assessing significance. It defines cultural significance as "aesthetic, historic, scientific or social value for past, present or future generations".

This value may be contained in the fabric of the item, its setting and relationship to other items, the response that the item stimulates in those who value it now, or the meaning of that item to contemporary society.

Accurate assessment of the cultural significance of sites, places and items is an essential component of the NSW heritage assessment and planning process. A clear determination of a site's significance allows informed planning decisions to be made for place, in addition to ensuring that their heritage values are maintained, enhanced, or at least minimally affected by development.

Assessments of significance are made by applying the following standard evaluation criteria provided by the NSW Office of Environment and Heritage[56] in order to establish a statement of significance:

a. An item is important in the **course or pattern** of NSW's **cultural or natural history** (or the cultural or natural history of the local area);

b. An item has strong or special **associations with** the life or works of **a person, or group of persons, of importance in NSW' cultural or natural history** (or the cultural or natural history of the local area);

c. An item is important in demonstrating **aesthetic characteristics** and/or a high degree of **creative or technical achievement** in NSW (or the local area);

d. An item has strong or special **associations with a particular community or cultural group** in NSW (or the local area) for **social, cultural or spiritual reasons**;

e. An item has **potential to yield information** that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);

f. An item possesses **uncommon, rare or endangered** aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);

g. An item is important in **demonstrating the principal characteristics of a class of NSW's cultural or natural places**; or cultural and natural environments.

6.2 Assessment of Historic Significance

The cultural heritage significance of known archaeological sites within the study area are assessed below using the criteria presented in **Section 6.1**. It should be stated that these statements below are for the resource as a whole within the footprint of the proposed development. The cultural heritage significance of an artefact, archaeological deposit or structure is dependant largely on its condition and to an extent its context. This cannot be determined until such remains are exposed and examined. Preliminary statements of cultural significance have also been provided for other potential site types. A full significance assessment for these would only be possible once a site has been identified.

[55] **The Australia ICOMOS, 1999,** Charter for the conservation of places of cultural significance.
[56] **NSW Heritage Office, 2001,** *Assessing Heritage Significance.*

6.2.1 Remains of Wharves and Related Material (c.1830 to 1970)

Criterion a) *An item is important in the **course or pattern** of NSW's **cultural or natural history** (or the cultural or natural history of the local area)*

The southern section of Darling Harbour, now known as Cockle Bay, has served as a trade hub for Sydney from the 1830s when the first private wharves were built along the eastern and southern sides of the harbour. The early development of this section of Darling Harbour was done so under private ownership with extensive development and redevelopment occurring that included reclamation and construction of new wharves and associated infrastructure up until 1900. The number of wharves and maritime infrastructure that was stacked on the eastern side of Cockle Bay, largely under private development, shows the value of this waterfront area, as well as the importance to commerce and trade in and out of Sydney. The known and potential archaeological resource that is present on the eastern side of Cockle Bay is likely to show the strategic building and operational activity that was occurring in this section of Darling Harbour in between each private wharf and private lease.

The resumption of the waterfront area along Darling Harbour in 1900, which included Cockle Bay, saw a change in governance and control of the wharves and associated infrastructure, including seawalls. This shift was an integral part of the change of design and thinking that allowed for a holistic approach to the design of wharves in Darling Harbour, particularly at the southern end in Cockle Bay. This is clearly seen in the longevity of wharves built from the 1920s onwards and their continued use until the 1970s.

The archaeological remains of the former wharves and associated maritime archaeological deposits on the eastern side of Cockle Bay are of ***State significance*** under this criterion.

Criterion b) *An item has strong or special **associations with** the life or works of **a person, or group of persons, of importance in NSW's cultural or natural history** (or the cultural or natural history of the local area);*

The site is likely to have associations with many early Sydney people, given the large number of private holdings along the eastern and southern side of Cockle Bay. The rat proofing and future design of wharves in Cockle Bay were managed by Henry Walsh, engineer-in-chief of the Sydney Harbour Trust, whose designs were implemented throughout Sydney Harbour. Specifications created by Walsh were certainly implemented on the eastern side of Cockle Bay, however, they were not considered to be individual or independent from the designs that were implemented elsewhere around the harbour.

The archaeological remains of the former wharves and associated maritime archaeological deposits on the eastern side of Cockle Bay are of ***local significance*** under this criterion.

Criterion c) *An item is important in demonstrating aesthetic **characteristics** and/or a high degree of **creative or technical achievement** in NSW (or the local area);*

The known and potential maritime archaeological remains present on the eastern side of Cockle Bay associated with the c.1830s to 1900s wharves could demonstrate creative and/or technical achievement relating to the construction and maintenance of those wharves. They were built at a time when wharf construction was undertaken via private contracts and did not follow any one standard.

The post 1900s resumption and the construction of the 1930s wharves in Cockle Bay were based on a design standard created for the redevelopment works of Sydney Harbor. Archaeological remains of these wharves would not be unique to these wharves built after the 1930s.

The archaeological remains of the former wharves and associated maritime archaeological deposits on the eastern side of Cockle Bay are of ***local significance*** under this criterion.

Criterion d) *An item has strong or special **associations with a particular community or cultural group** in NSW (or the local area) for **social, cultural or spiritual reasons**;*

The wharves and associated maritime infrastructure present in the eastern side of Cockle Bay up until the 1900s were private holdings that worked independently of each other. The 1930s wharf redevelopment under the Sydney Harbour Trust integrated the wharves at Cockle Bay into the larger wharf system in operation in Sydney Harbour. While these wharves at Cockle Bay were an integral part of the goods transportation and waterside warehousing needs from the turn of the century onwards, there were no single particular community or cultural groups who were associated with the wharf.

The wharves built on the eastern side of Cockle Bay from the 1830s through to the 1970s **do not** meet the requirements of this criterion.

Criterion e) *An item has **potential to yield information** that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);*

There is a high potential for archaeological remains associated with the chronology of wharves built on the eastern side of Cockle Bay dating from the 1830s through to the 1970s to be present within the seabed and immediately behind the seawall at Cockle Bay. The historical information regarding the construction of wharves along the eastern side dating from the 1830s is limited with only primary sources, mostly photographs and maps, revealing the location and likely construction type of each wharf. Any archaeological remains present on the eastern side of Cockle Bay will likely contribute to our understanding of materials and construction methods used as well as how wharves were removed and new wharves constructed over the top of the previous.

Artefacts discarded, accidentally or deliberately, from the wharves present in the study area and from vessels moored alongside can contribute towards knowledge of the variety of traffic and goods that passed between Sydney and the rest of the world from the early 19th century through to the 20th century. Through 150 years of maritime operations on the eastern side of Cockle Bay, these relics have the potential to contribute to our understanding of the working operation of the wharves.

Archaeological sites associated with the former wharves built on the eastern side of Cockle Bay have the potential to contribute to a greater understanding of wharf construction that has rarely been documented in the archaeological record previously.

The archaeological remains of former wharves and associated maritime archaeological deposits on the eastern side of Cockle Bay are of ***State Significance*** under this criterion.

Criterion f) *An item possesses **uncommon, rare or endangered** aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);*

The archaeological resource that is present underneath the seabed and behind the seawall in the eastern side of Cockle Bay can be considered a finite resource relating to a specific industry in Sydney. The maritime archaeological site is likely to include remains of early harbour development dating from the 1830s and continuing through an intense private construction history up until 1900. Archaeological remains under the seabed are likely to relate to the physical structures of the wharves as well as relics relating to 150 years of maritime activity.

Archaeological remains associated with the post-resumption development of the harbour can still be seen in the harbour today. Wharves such as Woolloomooloo, Walsh Bay and Jones Bay wharves all relate to the post 1900 resumption redevelopment. While many wharves have been removed from the harbour there are surviving examples today that are considered to be common.

The archaeological remains of the former wharves and associated maritime archaeological deposits on the eastern side of Cockle Bay relating to pre-1900 construction activity are of ***State Significance*** under this criterion.

Criterion g) *An item is important in **demonstrating** the **principal characteristics of a class of NSW's cultural or natural** places; or cultural and natural environments.*

The maritime archaeological infrastructure constructed in Cockle Bay, namely the series of wharves, are likely to be represented by maritime archaeological remains present below the seabed and/or behind the seawall. These remains will not be intact or complete given the extensive amount of redevelopment that has occurred before and after the resumption of wharves in 1900. As such, the site is not likely to retain the principal characteristics of its type or design, but a representation.

The archaeological remains of the former wharves and associated maritime archaeological deposits on the eastern side of Cockle Bay **do not** meet the standards of this criterion.

Statement of Cultural Significance

The southern end of Darling Harbour, now known as Cockle Bay, has been associated with maritime transport in Sydney Harbour since c.1830s. From this time up until 1900 the eastern side of the harbour was utilised by wharves constructed on private holdings that dominated the waterfront around Sydney Cove. These early wharves were eventually demolished and replaced by larger wharves over a similar footprint as space along the waterfront was limited. This continued until the resumption of wharves and the creation of the Sydney Harbour Trust in 1900. Immediately after this time the seawalls were improved and rat proofed, and new wharves were built in Cockle Bay in the 1930s.

The wharves present in Cockle Bay represent over 150 years of maritime commerce and trade that functioned with the other wharves located along the eastern side of Darling Harbour. The archaeological resource present on and under the seabed as well as under reclamation behind the seawall is representative of the earliest private maritime infrastructure development in Sydney Harbour. This includes not only the potential for physical remains of these structures but also relics associated with the operation of these wharves. As such, the remains of these wharves and related material are assessed to be of **State Significance**.

6.2.2 Remains of Seawalls and Retaining Walls

The following significance assessment of the seawalls and retaining walls is split between the different types of walls and presented together below each criterion.

Criterion a) *An item is important in the **course or pattern** of NSW's **cultural or natural history** (or the cultural or natural history of the local area)*

Timber sheet piling with Monier concrete plates

Timber sheet piling was a common type of seawall in Darling Harbour and Sydney in the 19th century. This method of seawall construction was the predominant form prior to reinforced concrete seawalls.

The introduction of reinforced concrete towards the end of the 19th century provided some solutions to difficult engineering problems. Of relevance is the application of reinforced concrete to the improvement and construction of seawalls for rat-proofing. The Monier plates used for the timber sheet piling seawalls on the eastern side of Cockle Bay likely represents one of the earliest uses of reinforced concrete to update existing infrastructure in Sydney.

*Remains of timber sheet piling and Monier concrete plates are of **Local significance** under this criterion.*

Sheet piling retaining wall

The sheet piling retaining wall was likely installed between the 1930s and 1980s. Steel sheet piling was a standard form of retaining or seawall at this time and is unremarkable due to its commonness in the marine engineering milieu.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

Information regarding any seawalls constructed as part of various stages of reclamation between the 1850s and 1890s is only available from the archaeological record. This includes cut stone walls on solid stone ballast foundations, rubble seawalls and timber piling seawalls. The location of rat-proof seawalls are noted on plans by Sydney Harbour Trust after 1903, however, the specific type of seawall is not distinguished on the plans nor are details whether it was an existing, upgraded or newly constructed seawall. Again, this information is only available in the archaeological record.

*Remains of other seawalls are of **Local significance** under this criterion.*

Criterion b) *An item has strong or special **associations with** the life or works of **a person, or group of persons, of importance in NSW' cultural or natural history** (or the cultural or natural history of the local area);*

Timber sheet piling with Monier concrete plates

The timber sheet piling has no known associations with particular persons or groups. However, the personages of Joseph Monier, who patented the reinforced concrete used in Monier plates, and H.D. Walsh, Engineer in Chief of the Sydney Harbour Trust, could be considered to have derivative associations with the Monier plate seawall on the eastern side of Cockle Bay.

*Remains of timber sheet piling and Monier concrete plates are of **Local significance** under this criterion.*

Sheet piling retaining wall

The sheet piling has no known associations with particular persons or groups.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

The other seawalls have no known associations with particular persons or groups, however, associations may be identified if the provenance of the seawall can be determined.

*Remains of other seawalls **do not currently meet** the standards of this criterion.*

Criterion c) *An item is important in demonstrating aesthetic **characteristics** and / or a high degree of **creative or technical achievement** in NSW (or the local area);*

Timber sheet piling with Monier concrete plates

The timber sheet piling and Monier concrete plates that have been identified are fragmentary. Any additional remains are likely to also be fragmentary and buried within sediment or behind the current seawall. However, the Monier systems were highly innovative and cutting-edge technology when applied to these seawalls.

*Remains of timber sheet piling and Monier concrete plates are of **State significance** under this criterion.*

Sheet piling retaining wall

The sheet piling retaining wall is a common feature in Australian maritime infrastructure. Its concretion and wear as well as its commonness of design minimise its aesthetic values.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

Remains of other seawalls are likely to be fragmentary and buried within sediment or behind the current seawall.

*Remains of other seawalls **do not meet** the standards of this criterion.*

Criterion d) *An item has strong or special **associations with a particular community or cultural group** in NSW (or the local area) for **social, cultural or spiritual reasons**;*

Timber sheet piling with Monier concrete plates

The timber sheet piling and Monier concrete plates have an association with the workers on wharves on the eastern side of Cockle Bay, however, they would not be able to readily identify the remains.

*Remains of timber sheet piling and Monier concrete plates are of **Local significance** under this criterion.*

Sheet piling retaining wall

The sheet piling retaining wall would not have special associations with a particular community or cultural group.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

Remains of other seawalls are likely to have associations with the workers on related wharves on the eastern side of Cockle Bay, however, the remains would no longer be identifiable.

*Remains of other seawalls are of **Local significance** under this criterion.*

Criterion e) *An item has **potential to yield information** that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);*

Timber sheet piling with Monier concrete plates

Remains of timber sheet piling and Monier concrete plates can provide additional information on the adaption of existing seawalls in Sydney Harbour in the early 20th century using a new technology.

*Remains of timber sheet piling and Monier concrete plates are of **State significance** under this criterion.*

Sheet piling retaining wall

Sheet piling is common throughout Australia and is well documented. Little new information can be obtained from further archaeological investigation.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

There is no historic information regarding the other seawalls on the eastern side of Cockle Bay. Any archaeological remains will contribute to our knowledge of materials and construction methods used, as well as to a greater understanding of seawall construction rarely documented in the archaeological record.

*Remains of other seawalls are of **State significance** under this criterion.*

Criterion f) *An item possesses **uncommon, rare or endangered** aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);*

Timber sheet piling with Monier concrete plates

The timber sheet piling with Monier concrete plates was an innovative response to engineering and public health issues using a new technology. Remains of this seawall are rare, if not unique, examples of its type.

*Remains of timber sheet piling and Monier concrete plates are of **State significance** under this criterion.*

Sheet piling retaining wall

Sheet piling is common throughout Australia and is well documented.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

The archaeological resource that is present underneath the seabed and behind the current seawall on the eastern side of Cockle Bay can be considered to be a finite resource relating to a specific form of maritime infrastructure in Sydney.

*Remains of other seawalls are of **State significance** under this criterion.*

Criterion g) *An item is important in **demonstrating** the **principal characteristics of a class of NSW's cultural or natural** places; or cultural and natural environments.*

Timber sheet piling with Monier concrete plates

Remains of timber sheet piling with Monier concrete plates on the eastern side of Cockle Bay, including identified and potential remains, are not a good example of the early application of Monier concrete plates due to their fragmentary nature.

*Remains of timber sheet piling and Monier concrete plates **do not meet** the standards of this criterion.*

Sheet piling retaining wall

The sheet piling retaining wall cannot be considered a good example of its type.

*The sheet piling retaining wall **does not meet** the standards of this criterion.*

Other seawalls

Other seawalls are likely to be represented by maritime archaeological remains present below the seabed and/or behind the seawall. These remains will not be intact or complete and as such will not likely retain the principle characteristics of its type or design.

*Remains of other seawalls **do not meet** the standards of this criterion.*

Statement of Cultural Significance

Timber sheet piling with Monier concrete plates

Timber sheet piling was a common type of seawall used around wharf facilities including along the eastern side of Cockle Bay, which has been associated with maritime transport since the c.1830s. Wharves and seawalls were constructed on private holdings until 1900 when Sydney Harbour Trust undertook improvement and rat-proofing, including upgrading of timber sheet piling with Monier concrete plates. Reinforced concrete was a new technology and provided a solution for engineering and public health problems. Archaeological remains may yield information on the adaption of seawalls which may not be available in the historic record. As such, remains of timber sheet piling with Monier concrete plates is of **State** significance.

Sheet piling retaining wall

Sheet piling is a common technology used throughout Australia and in association with maritime infrastructure. The sheet piling on the eastern side of Cockle Bay has no known associations, potential to reveal information or unique elements, and as such the sheet piling retaining wall has no heritage significance.

Other seawalls

Information regarding seawalls constructed between the 1850s and 1890s on the eastern side of Cockle Bay is only available from the archaeological record. Seawalls may have included cut stone walls, rubble seawalls and timber piling seawalls. Even from the 1900s, plans of the seawalls do not distinguish the type of seawall or whether the rat-proofed seawalls were existing, upgraded, or newly constructed. Any archaeological remains are a finite resource relating to a specific form of maritime infrastructure in Sydney and will contribute to a greater understanding of seawall construction rarely documented in the archaeological record.

6.2.3 Other Site Types

Shipwrecks

There is a low archaeological potential for remains of *Sterling* to be present within the study area, along with remains of other unidentified and unrecorded shipwrecks. These shipwrecks would all have had an industrial purpose for being in Cockle Bay. Any wrecked vessels

would likely have been stripped of cargo, superstructure and/or usable equipment. Industrial vessels may have been personalised for a specific task but generally conformed to certain types. However, they were also likely have more obvious repairs than recreational vessels. Wrecks can demonstrate the sequence of maintenance that the vessel has undergone in its working life. Vessels may also be associated with specific industries or businesses related to the eastern side of Cockle Bay.

Discard In and Under Reclamation Fill

The placement of a large amount of fill in one area has a high opportunity to also accompany discarded items either within or under the reclamation. While these items are largely disassociated from their original context, the act of burial enhances their preservation. These items can reflect a large number of societal themes including diet, trade, socioeconomic patterns and what is considered as 'refuse' over time. The items themselves may also show evidence of modifications, re-use, and damage other than that related to burial.

7 MARITIME ARCHAEOLOGY IMPACT ASSESSMENT

7.1 Proposed works

The current excavation plans that have been made available are considered to be preliminary and subject to change, therefore a broad outline of the proposed works is offered below.

Only the proposed works which may impact the seabed westward of the current seawall and the former seabed under reclamation are assessed in this report. The identified forms of works which could have such an impact are the proposed bulk excavation and piling.

7.1.1 Bulk excavation

The location of the proposed bulk excavation is shown in Figure 119 and Figure 120.[57] These excavations are to be chiefly associated with bulk excavation for foundations, footings, subsurface voids and tanks and also the demolition and ground restitution of the following infrastructure.

- The Cockle Bay Wharf main structure
- The footbridge between the Cockle Bay Wharf main structure and the Crescent Garden, including the escalator to and from this footbridge
- The existing Monorail Station
- Walkways and pedestrian access between the Crescent Garden and the Pyrmont Bridge Overpass
- The current alignment of Wheat Road and all joining kerbs, sidewalks and driveways
- Proposed realignment of a major Sydney Water sewer / watermain pipeline, to run east-west through the project area.

The horizontal extent and depth of the bulk excavations vary across the site from less than one metre to just over six metres. As such not all excavations will reach the former seabed. where these impacts are discussed in Section 7.2.1.

7.1.2 Piling

The proposed piling works involve a piling core float for the footprint of the multistorey tower, entailing some 34 closely spaced driven piles (Figure 121). The remainder of the proposed development will be supported on a combination of footings and close to 200 driven piles at varying spacing. Piling will take place on land and through the deck of the existing wharf deck.

The diameters of the piles are not known but measurements taken off the provided indicate that the piles within the footprint of the multistorey tower would range from 1.5 m to 2 m in diameter. Piles of that size are likely to be hollow and of steel. The piles elsewhere on the site appear to be around 1 $m^{2.}$ Depth of piling is not currently to hand however it can be assumed that piles will reach and penetrate bedrock.

[57] **Henning Larsen, 6 October 2021,** *Bulk Excavation*, Drawing A-DA-301, and **Henning Larsen, 6 October 2021**, *Bulk Excavation Sections,* Drawing A-DA-310.

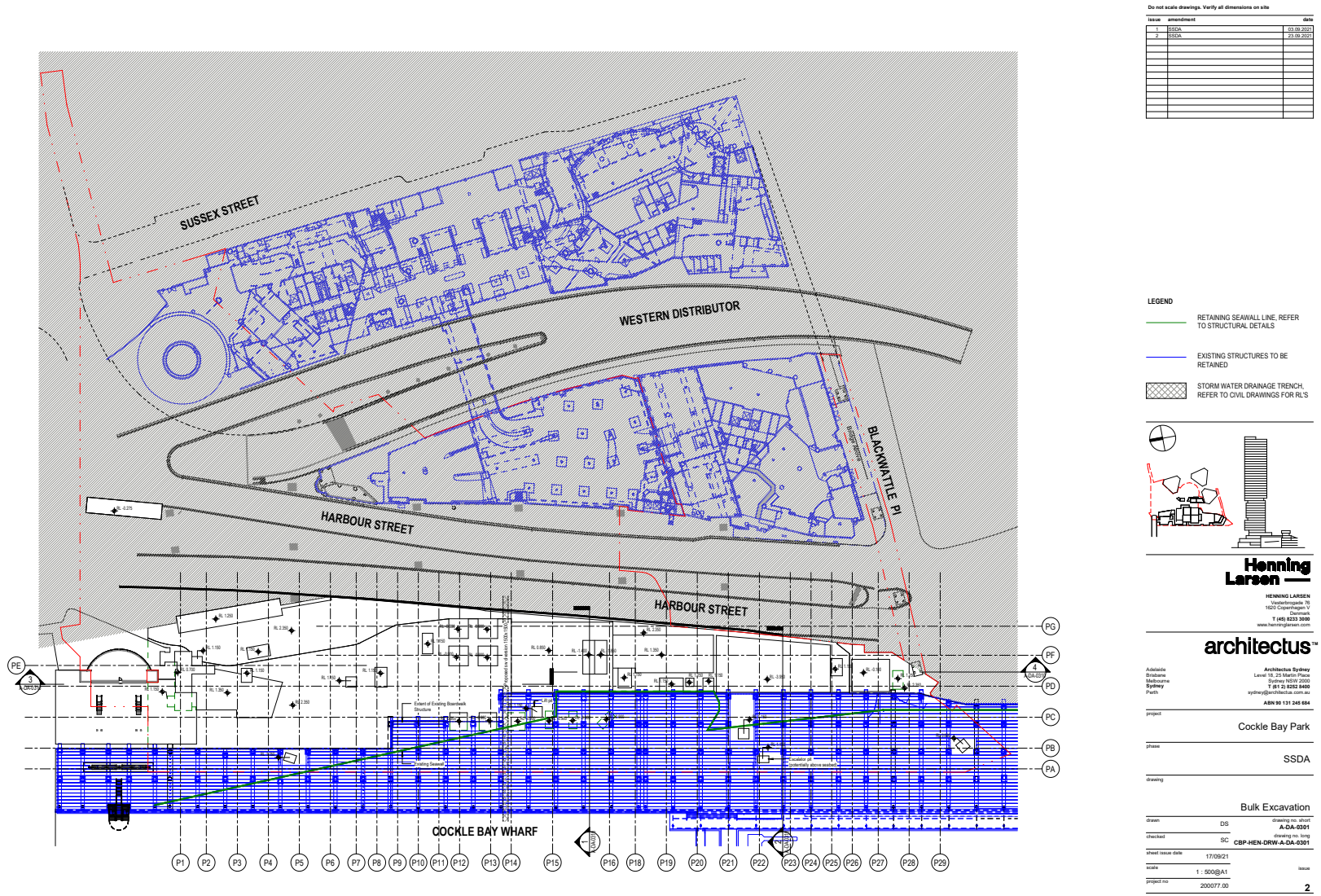


Figure 119: Plan drawing of proposed bulk excavation within the study area. Drawing No. A-DA-0301 dated 17.09.2021.

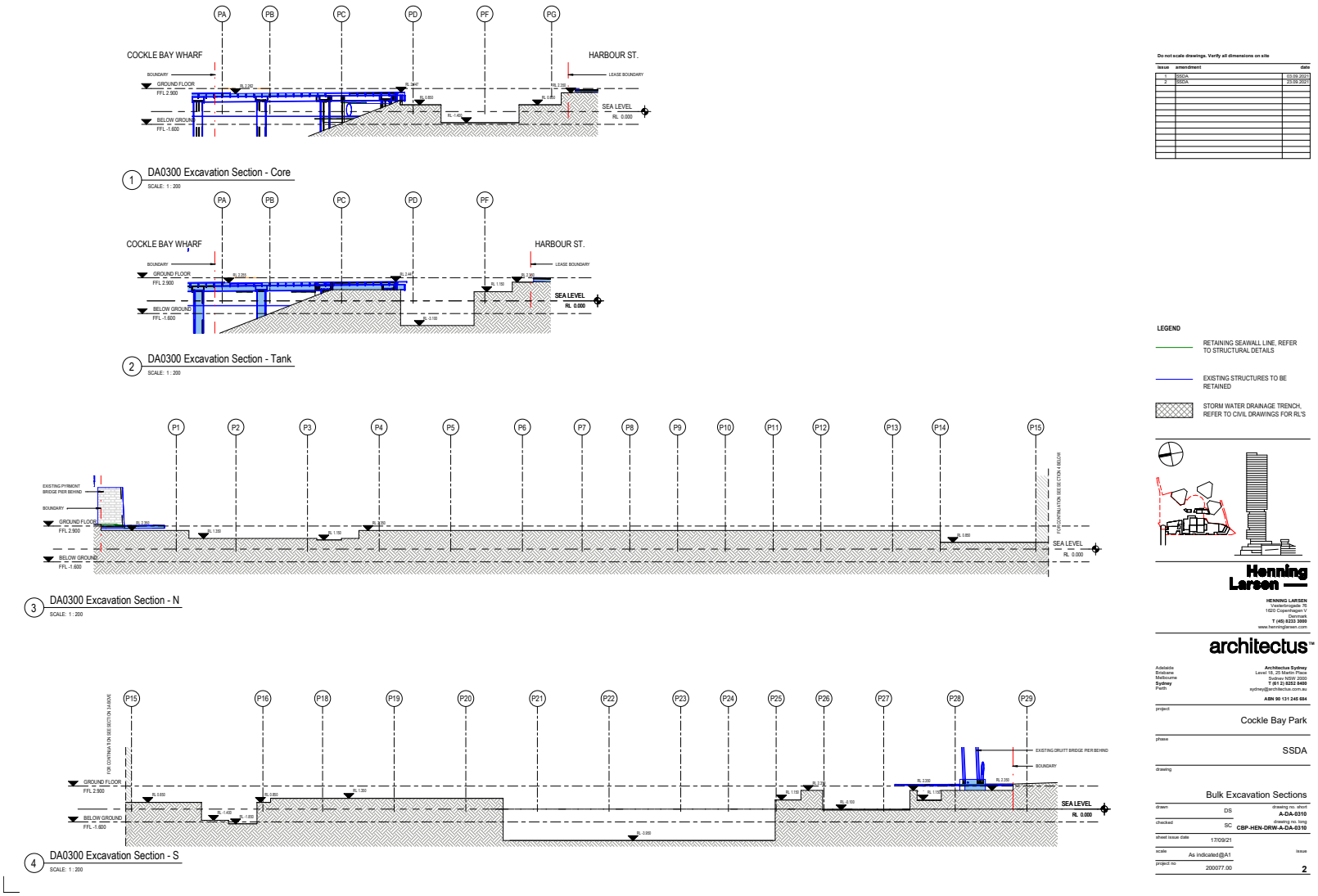


Figure 120: Section drawing of proposed bulk excavation. Drawing No. A-DA-0310 dated 17.09.2021.

Figure 121: Proposed piling plan. Note the excavations noted on this plan are superseded but those shown in Figure 119 and Figure 120. Drawing No. A-DA-1000U dated 11.06.2021.

7.2 Potential Impacts

7.2.1 Bulk Excavation

The areas where bulk excavation is proposed which will intersect the former seabed interface with the fill are what is assessed in this report. The proposed excavations appear will only impact the current and former seabed in an area approximately 30 m x 20 m across towards the southern end of the study area where the deluge tank and pumping station is proposed (Figure 122 shown by light blue shading). Bore holes data from this area (CW5) indicates that the former seabed is around RL -2 .2 m AHD (see Figure 46) and that the limit of excavation at this location is proposed to be at RL -3.95 m AHD.

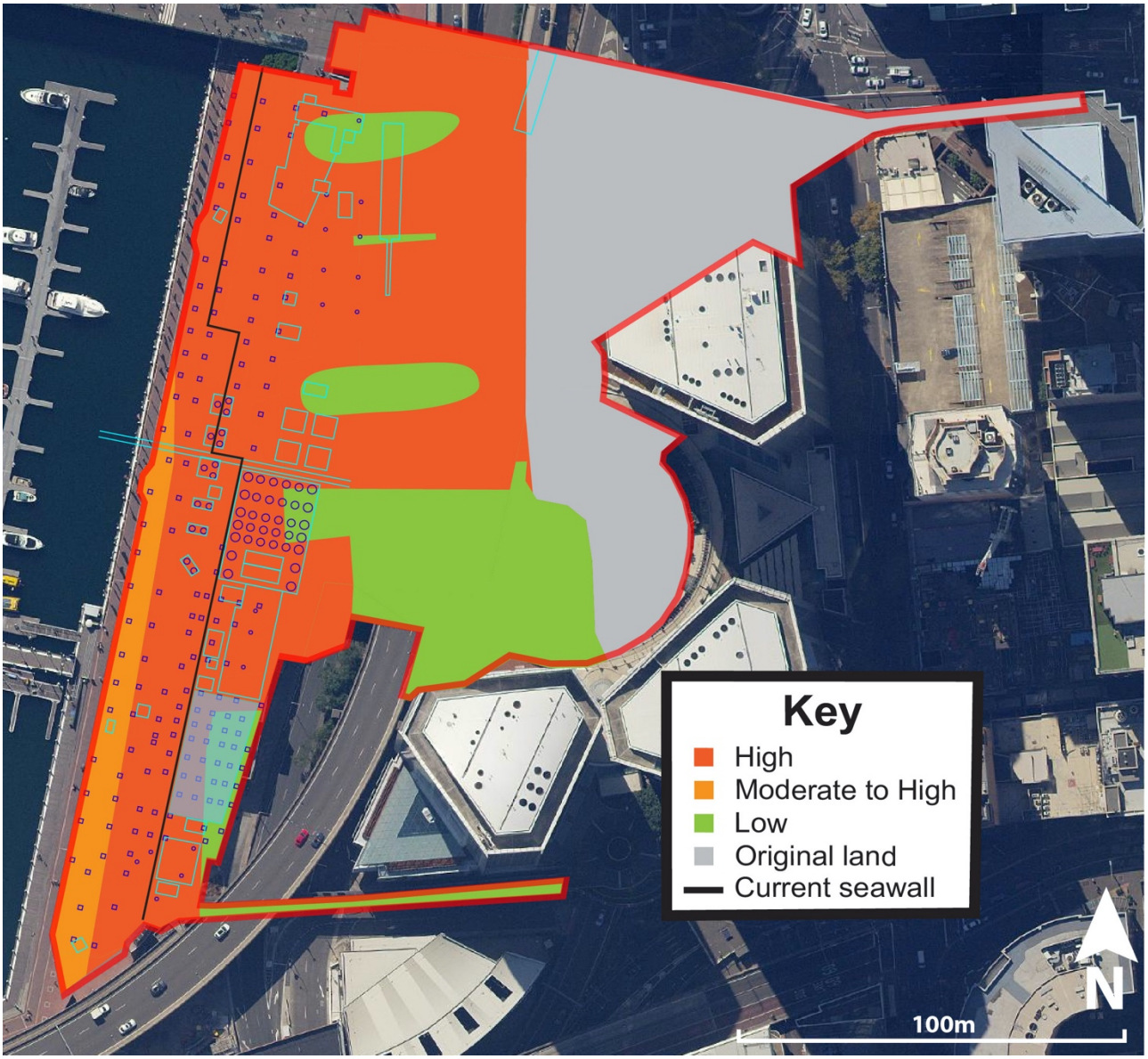


Figure 122 : Impact of the proposed works on areas of maritime archaeological potential. Light blue polygons indicates where bulk excavation proposed. Light blue shading (footprint for deluge tank) indicates where former seabed will likely be impacted. Dark blue shapes indicate where piling is proposed.

The act of bulk excavation will remove all archaeological material from its context. It will also require the removing, breaking and/or truncating of archaeological structures within the excavation envelope which may destroy a substantial part or all of such structures and deposits. Within the study area the bulk excavation for the deluge tank will significantly impact an area assessed to be of High to Low maritime archaeological potential.

7.2.2 Piling

The bulk of the piling will be relatively evenly distributed across the western portion of the study area both landward and seaward of the current seawall with the exceptions of the dense array of piling within the footprints of the tower block and the deluge tank/pumping station (see Figure 122). It is assumed all piling will impact the former seabed and associated archaeological structures and deposits.

Solid piles will destroy any archaeological structure and artefact within its footprint. As it is assumed that the piles be up to 1 m across, an individual pile will not destroy a buried site, such as wreck, or have an appreciable impact an archaeological deposit. The cumulative impact of the approximately 200 evenly distributed 1 m piles over an area approximately 250 m x 50 m to 100 m across assessed as having Moderate to High and High maritime archaeological potential will amount to around 1% of the total area. As these piles are well spaced the impact will not significantly reduce the cultural heritage values of those areas assessed to have Moderate to High and High maritime archaeological potential.

The above discussion does not apply to the relative dense array of piling for the tower core and deluge tank. The proposed extent of both areas are around 30 m x 20 m each. The closeness of the piles to each other increases the likelihood of a structure or archaeological deposit being significantly impacted by the works. Both have been assessed to have High to Low maritime archaeological potential. Both areas will also be bulk excavated however the tower core pit appears will not reach the former seabed. However the piles to be used in this location will be up to 2 m in diameter and may possibly be hollow.

7.3 Statement of Heritage Impact

Based on the NSW Heritage Office Manual 'Statements of Heritage Impact', an impact assessment for an item of heritage significance must address a number of questions relevant to the proposed works.[58] These questions help to ascertain whether all options have been explored prior to the proposed works taking place and whether the proposed option will have an acceptable or unacceptable impact on the heritage significance of the item.

7.3.1 Impact on Remains of Wharves, Seawalls and Related Material (c.1830 to 1970)

What aspects of the proposal respect or enhance the heritage significance of the item/study area?

There are no aspects of the proposed works that enhance the heritage significance of the archaeological remains associated with the former wharves and related material present on the eastern side of Cockle Bay.

What aspects of the proposal could have a detrimental effect on the heritage significance of the item/study area?

The bulk excavation for the deluge tank as well as the piling will have a direct impact on the potential maritime archaeological deposits identified to be present underwater and beneath reclamation on the eastern side of Cockle Bay. With regard to the widely spaced piles of around 1m^2 this impact will be relatively Minor. For the bulk excavation and piling for the tower core and deluge tank this impact is expected to have a Moderate impact to the heritage significance of the potential maritime archaeological remains present in Cockle Bay as these specific works could have a substantial impact on remains of a structure and/or discrete archaeological deposit.

[58] **NSW Heritage Office and Department of Urban Affairs and Planning, 2002**, *Statements of Heritage Impact*

Have more sympathetic options been considered and discounted? Why?

As the detailed design for the project develops opportunities may arise to mitigate piling impacts. Sympathetic construction methodologies should also be explored, such as using hollow piles in preference to solid piles.

Are the proposed changes sympathetic to the heritage item/study area? In what way? (e.g. form, proportions, design)

The extent of impact to potential maritime archaeological remains caused by the piling a relatively small area of impact in relation to the size the potential maritime archaeological resource.

Is the assessed impact acceptable / can it be mitigated?

The impact to areas of High archaeological potential which consequently may contain remains of State significance is assessed as potentially Moderate, and as such unacceptable without mitigation. The mitigation which could reduce the severity of the impact to acceptable could involve, but not limited to, methods such as:

- Archaeological excavation of the former seabed within the area to be bulk excavated for the deluge tank;
- Archaeological excavation of the former seabed within the area to be bulk excavated for the tower core – which would mean continue to the bulk excavation till the former seabed is reached OR remove contents of the hollow steel piles for sieving and artefact recovery.

An extensive and comprehensive excavation methodology would be articulated in an Maritime Archaeological Management Plan (MAMP) which would be prepared when more details on the construction process become available. The implementation of an MAMP during the works will ensure that the impacts to the cultural heritage significance of the maritime archaeological resource are avoided or minimised.

7.3.2 Impact on Sheet Piling (c.1930s to 1980s)

What aspects of the proposal respect or enhance the heritage significance of the item/study area?

The sheet piling present on the eastern side of Cockle Bay as this sheet piling has no heritage significance to enhance.

What aspects of the proposal could have a detrimental effect on the heritage significance of the item/study area?

Some of the proposed piling may impact the sheet piling. However, the sheet piling does not have any heritage significance.

Have more sympathetic options been considered and discounted? Why?

Consideration of more sympathetic options is not required as the sheet piling has no heritage significance.

Are the proposed changes sympathetic to the heritage item/study area? In what way? (e.g. form, proportions, design)

The proposed changes are neither sympathetic nor not sympathetic as the sheet piling has no heritage significance.

Is the assessed impact acceptable / can it be mitigated?

The maritime archaeological dive survey conducted in July 2021 and presented in Section 4 documented the exposed archaeological remains under the wharf apron. This pre-disturbance survey was in effect an archival recording. The impact to the sheet piling is acceptable without requiring further pre-construction mitigation.

7.4 Mitigation Measures

7.4.1 Archaeological excavation

An archaeological excavation should be undertaken on the former seabed within the footprint of the proposed deluge tank. This excavation would very likely be a continuation of the Non-Aboriginal archaeological excavation that would be undertaken in the reclamation fill overlaying it.

An archaeological investigation should also take place within the footprint of the tower core. This could take the form of continuing the bulk excavation down to the former seabed or the removal of the contents of the hollow piles for sieving and retrieval of artefacts.

A Maritime Archaeological Research Design and Excavation Methodology (MARDEM) is to be prepared when further information of the proposed construction works are available which will be provide greater focus on the objectives of the archaeological excavation as well as detail the most efficient way of achieving the objectives. The MARDEM should be included within the Maritime Archaeological Management Plan.

7.4.2 Maritime Archaeological Management Plan

The methodology to be used to manage the maritime archaeology will be provided in a detailed Maritime Archaeological Management Plan. The MAMP will detail archaeological measures that will need to take place before, during and after construction to mitigate any impacts that the development would have on known and potential maritime archaeological sites.

The MAMP would also include protocols for the management of maritime archaeological sites during demolition and excavation stages by a suitably qualified maritime archaeologist. This would involve a procedure for the assessment and management of unexpected finds with a guide of the level of recording, excavation, conservation, preservation and interpretation that should be undertaken for the find. The MAMP will therefore include:

- *Maritime Archaeological Research Design and Excavation Methodology* (see Section 7.4.1)
- *Unexpected finds, stop work triggers and notification protocols*
- *Heritage induction for contractors*
- *Recording methods and procedures*
- *Artefact collection and retention policies*

To ensure that that any impacts to the cultural heritage significance of the maritime archaeological remains are avoided or minimised monitoring during construction will be required. For monitoring to be effective, a comprehensive monitoring protocol is essential along with thorough inductions for work crews. On-site monitoring is effective during any excavation phases of construction to identify and record unexpected sites, both on land and underwater. On-call monitoring takes place when the likelihood of encountering finds of cultural heritage significance is very low. In this case, finds can be transmitted to the on-call archaeologist via text and email and the archaeologist will respond with advice.

Conserving and long-term storage of artefacts from past or current marine environments is a high-cost and demanding process. Because of this, agencies responsible for the management of underwater cultural heritage often consider artefact relocation as a preferable measure.

For artefacts to be reburied successfully they require to be returned to a similar environment from which they were recovered. For example, if an artefact is recovered from a sandy seabed at 10 m depth of water where there is little current, a similar environment should be sought. This usually means they should be re-buried close to where they were found. The artefacts should also be buried at a depth to effect anaerobic conditions, which can dramatically slow down fabric degradation. Wrapping the artefacts in geo-fabric facilitates the creation of an anaerobic environment. The location(s) for the underwater repository should be chosen to ensure accessibility and security. It should be located close to the study area.

8 CONLUSION AND RECOMMENDATIONS

The key findings of this MASoHI are as follows:

- The eastern side of Cockle Bay has been used for maritime purposes since the beginning of the 19th century and continued until the mid-20th century. This included the construction of 24 historic wharves within or adjacent to the study area. There have also been episodes of seawall construction and land reclamation on the eastern side of Cockle Bay throughout the last two centuries.
- Maritime archaeological dive surveys were undertaken in August 2017 and July 2021.
- The inspections identified the current seawall along the entire of the study area as well as steel sheet piling in the northern half of the study area.
- Remains of timber sheet piling with Monier concrete plating was identified, being remains of a c.1903-1908 seawall, as well as two other piles that may be associated with historic wharves.
- The 2021 dive survey also constitutes an archival recording of the area to be impacted by the construction of the main tower.
- Potential historic sites within the study area include wharves and related material, seawalls, shipwrecks, discard from vessels and discard in and under reclamation fill.
- A map with likelihood ratings of archaeological potential is provided in Figure 118 which shows the western half of study area is predominantly of High archaeological potential.
- Remains of wharves and related material (c.1830 to 1970) were assessed to be of State significance as they represent the earliest private maritime infrastructure development in Sydney Harbour and a finite archaeological resource.
- The timber sheet piling with Monier concrete plates and potential remains of other seawalls were assessed to be of State significance as the archaeological remains may yield information on the adaption of seawalls and/or the location, material and form of seawalls which are not available in the historic record.
- The steel sheet piling was identified as having no heritage significance.
- The impact assessment found that potential impacts on remains of wharves, seawalls and related material (c.1830 to 1970) could be satisfactorily mitigated by select archaeological excavation in areas of high maritime archaeological potential and establishing archaeological monitoring protocols during the construction phase of the project.

Based on the above finding it is recommended that:

1. *An archaeological investigation in the form of an excavation and/or sampling be undertaken within the areas to be bulk excavation is proposed for the tower core and deluge tank.*
2. *A Maritime Archaeological Management Plan be prepared that would include the following:*
    - *Maritime Archaeological Research Design and Excavation Methodology*
    - *Unexpected finds, stop work triggers and notification protocols*
    - *Heritage induction for contractors*
    - *Recording methods and procedures*
    - *Artefact collection and retention policies*

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ANNEX A – VIDEO LOG

Name (AVI files)	Size (MB)	Length
T1 (a) Cockle Bay 210705	413.1	10:00
T1 (b) Cockle Bay 210705	413.3	10:00
T1 (c) Cockle Bay 210705	413.2	10:00
T1 (d) Cockle Bay 210705	74.8	01:48
T2 (a) Cockle Bay 210705	413.1	10:00
T2 (b) Cockle Bay 210705	413.3	10:00
T2 (c) Cockle Bay 210705	357.2	08:38
T3 (a) Cockle Bay 210705	413.1	10:00
T3 (b) Cockle Bay 210705	413.2	10:00
T3 (c) Cockle Bay 210705	133.6	03:13
T4 (a) Cockle Bay 210705	413.1	10:00
T4 (b) Cockle Bay 210705	413.2	10:00
T4 (c) Cockle Bay 210705	61	01:28
T5 (a) Cockle Bay 210705	413	10:00
T5 (b) Cockle Bay 210705	308.1	07:27
T6 (a) Cockle Bay 210705	413.2	10:00
T6 (b) Cockle Bay 210705	306.7	07:25
T7 (a) Cockle Bay 210705	158.2	03:49
T7 (b) Cockle Bay 210705	413	10:00
T7 (c) Cockle Bay 210705	222.9	05:23
T8 (a) Cockle Bay 210705	413.1	10:00
T8 (b) Cockle Bay 210705	24.5	00:35
T8 (c) Cockle Bay 210705	5.2	00:07
T8 (d) Cockle Bay 210705	413.1	10:00
T8 (e) Cockle Bay 210705	396.3	09:35
T9 (a) Cockle Bay 210705	413.1	10:00
T9 (b) Cockle Bay 210705	137.4	03:19
T10 (a) Cockle Bay 210705	413.1	10:00
T10 (b) Cockle Bay 210705	413.2	10:00
T10 (c) Cockle Bay 210705	413.2	10:00
T10 (d) Cockle Bay 210705	123.3	02:58
T11 (a) Cockle Bay 210705	413.1	10:00
T11 (b) Cockle Bay 210705	413.3	10:00
T11 (b) Cockle Bay 210705	413.3	10:00
T11 (d) Cockle Bay 210705	119.9	02:53