Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP)

Non-Indigenous Archaeological Assessment and Impact Statement for SSDA1

Report to

Darling Harbour Live

March 2013

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ARCHAEOLOGY & HERITAGE

Executive Summary

RESULTS

The SICEEP Central and North areas have the potential to contain archaeological remains of State and local significance:

State

- Dickson's (c1815) and Barker's (c1825) jetties.
- 1850s Darling Harbour goods line.
- Dismantled remains of 1874 Iron Wharf demolished into the harbour in the 1920s.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

Local

- c1865 seawall, drains and reclamation.
- 1876 seawall and reclamation associated with the Iron Wharf.
- Limited likelihood for pre-1850 archaeology in the western foreshore.

IMPACTS

The proposed redevelopment of the ICC Convention Centre, Exhibition Centre and Theatre involves the reuse of existing ground slabs with additional piling. One section of the Convention Centre is not being demolished and there will be no additional piling. These proposed piling impacts will typically involve a second stage of 20th-century piling across the western half of the study area. In terms of a redevelopment of Darling Harbour the proposed strategy will lead to the survival of most of the potential archaeological remains in the SICEEP precinct.

The potential archaeological resource in this area is mostly in the western half beneath the Convention Centre, the Exhibition Centre and Theatre. The proposed piling is likely to impact on the dismantled pieces of the Iron Wharf, the 1865 and 1876 stone seawalls and associated reclamation. There will be impacts on these remains from piling but the extent of impact should allow for the survival of considerable archaeological remains.

Landscaping within the public realm involves some limited reduction and filling of existing ground levels throughout the eastern area. Based on current designs there should be no impact on the potential archaeological resource in this area: Barker's and Dickson's jetties, edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell foundry.

MITIGATION

Where new piling is undertaken it is recommended that some testing and/or monitoring of piling in the area to determine:

- If remains survive of the Iron Wharf.
- Collection of information on reclamation fills.
- Where piling meets obstacles the archaeologist should be involved in determining adjusted direction of piling and the items being impacted.

Specific Piling Mitigation Strategy

Site operations during construction or demolition that may potentially directly or indirectly impact on items of heritage or archaeological significance are identified as minor excavation works, location of piles, site levelling, and service trench excavations.

Although not anticipated, it is possible that items or discoveries of heritage/archaeological significance could be encountered during the site works mainly during pile location activities. All newly discovered heritage/archaeological items are to be managed in an appropriate manner and the following measures will be followed:

- Prepare a Protocol detailing procedures to be followed in the event that heritage/archaeological significant items are discovered during the construction or demolition works, in consultation with heritage/archaeological Consultant prior to commencing works.
- A Heritage & Archaeological Diagram will be prepared for the site that details the designated area of interest or significance on the site. The diagram will also include key buildings or structures that are of interest or significant.
- Construction activities shall cease temporarily while the site/issues are assessed. Mitigation measures will be approved by the nominated Heritage & Archaeological Consultant.
- Communication and education material on heritage management and conservation will be part of the Site Environmental Awareness Program that will be incorporated into the site induction program.

Public Domain

- Where possible the reduction of levels in the public domain should be kept above RL 2m. If they need to go below this level the archaeologist will need to monitor the works. If any major archaeological components are exposed they should need to be retained *in situ* where possible.
- Remains of Barker's (c.1826) and Dickson's (c.1815) jetties should be retained *in situ.*
- If they cannot be retained *in situ* they will need to be assessed and an appropriate strategy for their recording identified and implemented.
- All impacts in this area to significant archaeology should be minimised.

RECOMMENDATIONS

General Recommendations

1. The absence of basements from the design means that any archaeological program needs to be targeted and strategic. When dealing with extensive deposits across the site, i.e. reclamation fills, only limited recording may be necessary. Where the archaeology is more concentrated and impacts may be more extensive, then detailed archaeological excavation and recording may be required.
2. Write a Research Design and Management Strategy which draws on the design details, works program and identifies detailed archaeological investigation and recording strategies in accordance with best practice archaeological methodologies.
3. A public interpretation plan needs to be prepared outlining key themes for interpretation of Darling Harbour and surrounds as part of this redevelopment.
4. SHFA, as the owner of the SICEEP area will need to provide storage in perpetuity for artefacts recovered from the site. SHFA has an artefact repository.
5. Any archaeological program needs to be reported on in accordance with Heritage Council guidelines. This is to include:

- catalogue of artefacts and reporting.
- conservation of important artefacts.
- detailed trench or area reports.
- overall excavation report, including a response to research questions.
- photo archive.

Specific Recommendations

ICC Exhibition Centre, Convention Centre and Theatre

1. Avoid impacts where possible on the dismantled remains of the Iron Wharf, which is of State significance.
2. Avoid impacts where possible on the surviving inlet and outlet piles/conduits associated with the Ultimo Power House. These are likely to be of State significance.
3. Avoid/reduce impacts where possible on the 1865 and 1876 seawalls.
4. Once piling design is refined the above archaeological remains should be avoided or impacts reduced.
5. Develop and implement a Piling Mitigation Protocol as outlined below.
6. Some testing and/or monitoring of piling in significant area may be required to determine:
    - If remains of the Iron Wharf survive.
    - Further information on reclamation fills.
    - Where piling meets obstacles the archaeologist should be involved in examining the items being impacted and determining the adjusted direction of piling.

Specific Piling Mitigation Strategy

Site operations during construction or demolition that may potentially directly or indirectly impact on items of heritage or archaeological significance are identified as minor excavation works, location of piles, site levelling, and service trench excavations.

It is possible that items or discoveries of heritage/archaeological significance could be encountered during the site works mainly during pile location activities. All newly discovered heritage/archaeological items are to be managed in an appropriate manner and the following measures will be followed:

- Prepare a Protocol detailing procedures to be followed in the event that heritage/archaeological significant items are discovered during the construction or demolition works, in consultation with heritage/archaeological consultant prior to commencing works.
- A Heritage & Archaeological Diagram will be prepared for the site that details the designated area of interest or significant on the site. The diagram will also include key buildings or structures that are of interest or significant.
- Construction activities shall cease temporarily while the site/issues are assessed. Mitigation measures will be approved by the nominated Heritage & Archaeological Consultant.
- Communication and education material on heritage management and conservation will be part of the Site Environmental Awareness Program that will be incorporated into the site induction program.

Public Realm

1. Reduced ground levels should be maintained above RL 2m.

2. If the area is reduced below this an archaeologist will need to monitor the works.
3. Any major archaeological components exposed, such as Barker's and Dickson's jetties, should be retained *in situ* where possible.
4. If they cannot be retained they will need to be assessed and an appropriate strategy for their recording identified.

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APPENDICES

Document Status

Name	Date	Purpose	Author	Approved
Draft 1	12/2/2013	Draft review	Mary Casey, Caroline Plim	Tony Lowe
Draft 2	14/2/2013	Comments INSW		Mary Casey
Final	5/3/2013			Mary Casey

Archaeological Assessment& Impact Statement
SICEEP Bayside and Darling Central,
Darling Harbour, Sydney

1.0 Introduction

1.1 Introduction

This report supports a State Significant Development Application (SSD 12_5752) submitted to the Minister for Planning and Infrastructure pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Application seeks approval for construction of the Public Private Partnership (PPP) component of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Project at Darling Harbour.

The SICEEP Project will deliver Australia's global city with world class convention, exhibition and entertainment facilities that can compete effectively in the national and international events markets. The SICEEP Project importantly forms a critical element of the NSW Government's aspiration to "make NSW number one again". The SICEEP Project also involves the creation of a new neighbourhood and a community hub.

1.2 Background

The existing convention, exhibition and entertainment centre facilities at Darling Harbour were constructed in the 1980s and have provided an excellent service for Sydney and NSW. The facilities, however, have limitations in their ability to service the contemporary exhibition and convention industry which has led to a loss in events being held in Sydney.

The NSW Government considers that a precinct-wide renewal and expansion is necessary and is accordingly committed to Sydney reclaiming its position on centre stage for hosting world-class events with the creation of the SICEEP Project.

Following an extensive and rigorous Expressions of Interest and Request for Proposals process, Darling Harbour Live (formerly known as 'Destination Sydney' - a consortium comprising AEG Ogden, Lend Lease, Capella Capital and Spotless) was announced by the NSW Government in December 2012 as the preferred proponent to transform Darling Harbour and create the new Sydney International Convention, Exhibition and Entertainment Precinct.

Key features of the Darling Harbour Live Preferred Master Plan include:

- Delivering world-class convention, exhibition and entertainment facilities, including:
  - Up to 40,000m^2 exhibition space;
  - Over 8,000m^2 of meeting rooms space, across 40 rooms;
  - Overall convention space capacity for more than 12,000 people;
  - A ballroom capable of accommodating 2,000 people; and
  - A premium, red-carpet entertainment facility with a capacity of 8,000 persons.
- Providing up to 900 hotel rooms in a hotel complex at the northern end of the Precinct.

- A vibrant and authentic new neighbourhood at the southern end of the precinct, called 'The Haymarket', home to an IQ Hub focused on the creative industries and high-tech businesses, apartments, student accommodation, shops, cafes and restaurants.
- Renewed and upgraded public domain, including an outdoor event space for up to 25,000 people at an expanded Tumbalong Park.
- Improved pedestrian connections linking to the proposed Ultimo Pedestrian Network drawing people between Central, Chinatown and Cockle Bay Wharf as well as east-west between Ultimo/Pyrmont and the City.

1.3 Overview of Proposed Development

The proposed development involves construction of the PPP component of the SICEEP Project, comprising new, integrated and world-class convention, exhibition and entertainment facilities with associated retail and public domain upgrades.

The application more specifically seeks approval for the following development:

- Demolition of existing improvements on the site, including existing Sydney Convention Centre (part) and Sydney Exhibition Centre;
- Associated tree removal and replanting;
- Construction of a new, integrated and world-class Convention, Exhibition and Entertainment Centre;
- Public domain improvements, including:
  - reinvigorating and expanding Tumbalong Park;
  - provision (part) of a new active north-south pedestrian connection (known as the Boulevard);
  - provision of new east-west connections, including Harbourside Place and Tumbalong Place;
  - Provision of a pedestrian bridge link from Quarry Street;
  - Retention of the tidal cascade water feature;
  - Reconfiguration and upgrade of Darling Drive (part);
  - Provision of a new square adjoining the Chinese Garden;
  - Provision of a new open space 'event deck' (connected with the Exhibition Centre);
  - Integrated art, play zones, water play and recreation areas;
  - Provision of retail kiosks;
- Provision of ground level parking within the Exhibition and Entertainment Centre facilities;
- Ground and elevated loading docks (accessed off Darling Drive) for Convention, Exhibition and Entertainment Centre facilities;
- Two vehicle drop off points off Darling Drive;
- Provision of signage; and
- Extension and augmentation of physical infrastructure / utilities as required.

1.4 Site Description

The SICEEP Site is located within the Darling Harbour precinct. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, the Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south.

The SICEEP Site has been divided into three distinct redevelopment areas (from north to south) – Bayside, Darling Central and The Haymarket. The PPP Application Site area is located within Bayside and Darling Central as shown in Figure 1.1.

The study area is located in the southern section of Darling Harbour, Sydney. It is bounded by Darling Drive in the west, Darling Walk and the Chinese Garden of Friendship to the east, Cockle Bay and the Harbourside Shopping Centre to the north, and Pier Street to the south. The western boundary is formed by the Darling Harbour Goods line and includes Darling Drive (Figure 1.1, Figure 1.2).

Figure 1.1: The current study area is highlighted in yellow.

1.5 Planning Approvals Strategy

In response to separate contractual agreements with the NSW Government and staging requirements, Darling Harbour Live is proposing to submit a number of separate development applications for key elements of the overall Project.

This Application involves the PPP component of the SICEEP Project, comprising the convention centre, exhibition centre, entertainment facility, and associated public domain upgrades.

Development of The Haymarket is to be staged and accordingly a staged development application is to be lodged. Detailed development applications will follow seeking approval for specific aspects of The Haymarket. A separate development application will also be submitted for the Hotel Complex.

Figure 1.2: Plan of various stages of development and planning approvals.

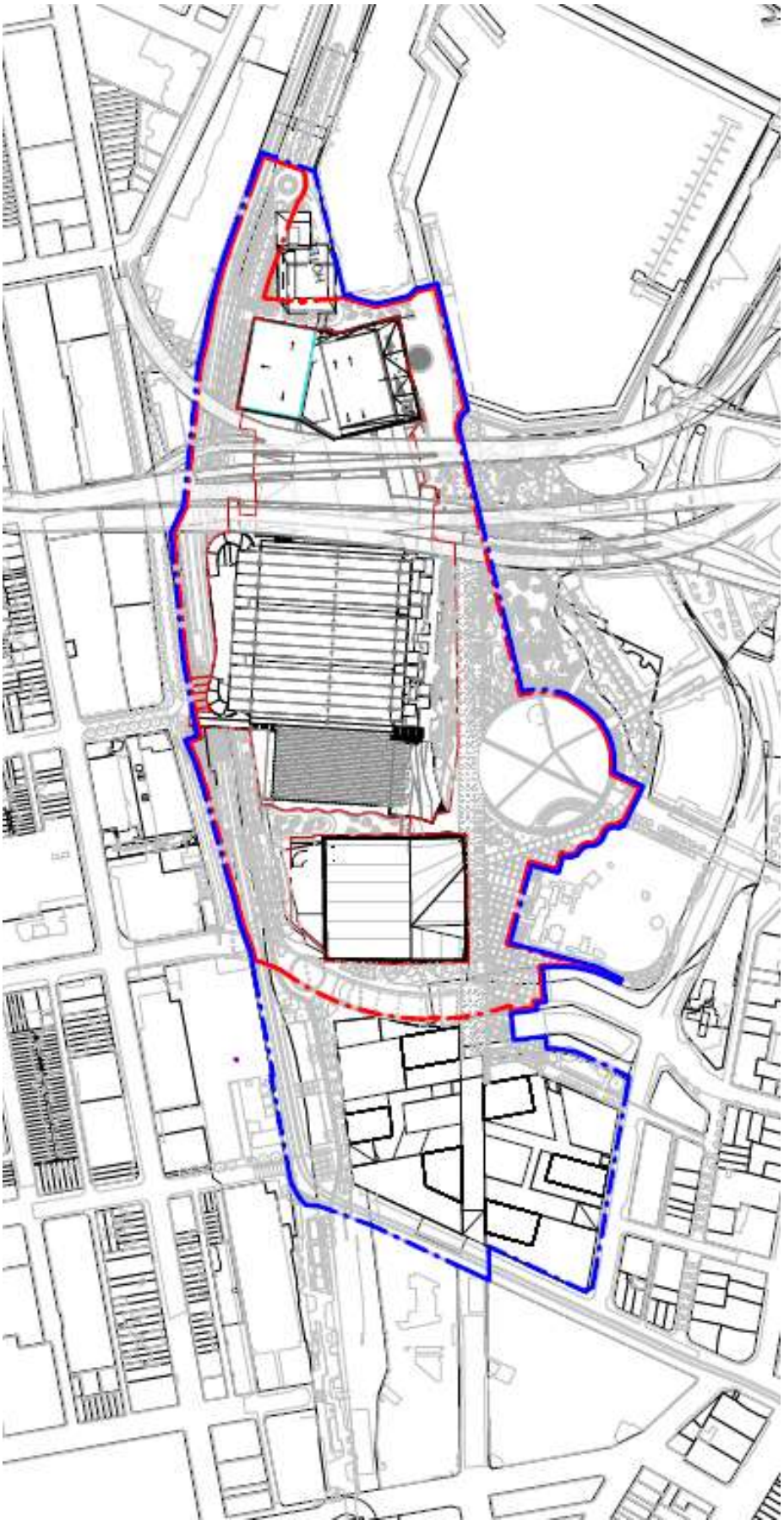

Figure 1.3: SICEEP Central and North are outlined in red. Lend Lease February 2013

1.6 Statutory Constraints

1.6.1 Legislation under Part 4, Division 4.1

Environmental Planning & Assessment Act Part 4, Division 4.1

The current project is being undertaken as a State significant development under Part 4, Division 4.1. The Director General Requirements for this project were updated and reissued on 21 January 2013.

Director-General's Requirements

The specific issues identified in the DGR's include:

- (2) Policies and Guidelines to be addressed: *Heritage Council Guidelines Assessing the Significance of Archaeological Sites and Relics.*
- (10) Heritage
    - Address the impacts of the proposal on heritage significance of the site and adjacent area including any built and landscape heritage items including places, items or relics of significance to Aboriginal people; and
- Consultation with Office of Environment and Heritage.
- Deliverables Table:
    - Heritage Impact Assessment for SSDA2.
    - Development specific heritage/archaeological reports for SSDA2, SSDA3, SSDA4, SSDA5, SSDA6.

Casey & Lowe are writing a Non-Indigenous Archaeological Assessment for that fulfils the guidelines of the NSW Heritage Council and addresses Assessing the Significance of Archaeological Sites and Relics. Comber Consultants are writing a separate report that addresses the significance of the place to Aboriginal people. These assessments will also include an updated Heritage Impact Statement. Therefore this report has addressed the DGRs.

89J Approvals etc legislation that does not apply

As stated in 89J:

1. The following authorisations are not required for State significant development that is authorised by a development consent granted after the commencement of this Division (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):
   (c) an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*,
   (d) an Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*.
2. Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of State significant development that is authorised by a development consent granted after the commencement of this Division.

In effect, the Department of Planning and Infrastructure provides consent to impact on relics under 89J. Therefore no approvals are required under S139 or S57 of the *Heritage Act 1977* or S90 of the *National Parks and Wildlife Act 1974*. The Department of Planning and Infrastructure will of course consult with the Office of Environment and Planning, both the Heritage Branch and the Aboriginal Heritage Section, and the proposed work needs to conform with Heritage Branch and Aboriginal Heritage Branch guidelines. This section does not exempt requirements under S170 of the Heritage Act.

1.6.2 Relics Provisions, *NSW Heritage Act*, 1977

Division 9: Section 139, 140–146 – Relics Provisions – Excavation Permit
When a site is not being assessed under the EP&A Act, Part 4.1 the main legislative constraint on archaeological remains is the relics provisions of the *Heritage Act* 1977. Provisions relating to S139 of the *Heritage Act 1977* are suspended by Part 4.1, Division 4.1, S89J.

According to Section 139:

(1) A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.
(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

(b) The Heritage Council may by order published in the Gazette create exceptions to this section, either unconditionally or subject to conditions, in respect of any of the following:

a. any relic of a specified kind or description,
b. any disturbance or excavation of a specified kind or description,
c. any disturbance or excavation of land in a specified location or having specified features or attributes,
d. any disturbance or excavation of land in respect of which an archaeological assessment approved by the Heritage Council indicates that there is little likelihood of there being any relics in the land.

A 'relic' is an item of 'environmental heritage' defined by the *Heritage Act 1977* (amended) as:

> those places, buildings, works, relics, moveable objects, and precincts of State or local heritage significance.

It was more recently further defined as:

> Relevant case law and the general principles of statutory interpretation strongly indicate that a 'relic' is properly regarded as an object or chattel. A relic can, in some circumstances, become part of the land and be regarded as a fixture (a chattel that becomes permanently affixed to land).

A relic as further defined by the Act is:

> *..any deposit, object or material evidence –*
> (b) *which 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.*

1.6.3 Heritage Lists- S 170 Register
We have also reviewed the SHFA S170 register and the State Heritage Inventory (SHI) (Table 1.1) for the entire SICEEP area (although only the northern and central areas will be analysed in detail in this document). It is noted that the SHFA S170 register items have point data only and have not provided a mapped curtilage for its various precincts. While general descriptions have been provided our understanding of the location of these precincts is based on our best guess. The requirements of a statutory authority under S170 of the *Heritage Act* are:

(3) A government instrumentality shall establish and keep a register entitled the 'Heritage and Conservation Register'.

(4) A government instrumentality shall enter in the register details of each item of the environmental heritage which is subject to an interim heritage order or listing on the State Heritage Register; or is listed in an environmental planning instrument under the *Environmental Planning and Assessment Act 1979* as an item of environmental heritage, or could, in accordance with guidelines issued from time to time by the Heritage Council, be subject to an interim heritage order or listing on the State Heritage Register; and which in the case of a statutory body, is owned or occupied by the statutory body; or in the case of a Department head, is vested in or owned or occupied by, or subject to the control of, the appropriate minister or the Department.

The study area contains a known item on SHFA's Section 170 (S170) register. A state government agency has approval over any impacts on these items but they are required to inform the Heritage Branch of any changes to significant items, and provide 14 days notice of any proposed impacts.

Table 1.1: List of S170 register items within the study area.[1]

Site/Structure	S170	SHR	Significance	Location	Impact
Exhibition Centre Precinct, Archaeological Remains – Iron Wharf (Directly east of the Exhibition Centre, Darling Harbour)	SHFA		State/local	Tumbalong Park Central	Yes
Cockle Bay Precinct, Archaeological Remains (East Side of Darling Harbour, West of Sussex Street, North of Pier Street, Darling Harbour, NSW)	SHFA		State/Local	Central	Yes
Darling Harbour Rail Corridor West side of Darling Harbour to Pyrmont, Darling Harbour	SHFA		State?	Western boundary of the site, North/Central	Adjacent
Chinese Garden of Friendship (includes buried archaeology) (Day Street / Pier Street, Darling Harbour)	SHFA		State?	Adjacent to Central	Adjacent
Pier Street Precinct Archaeological Remains (Bounded By Hay, Harbour, Pier Streets and Merino Boulevard (Darling Drive)	SHFA		State/local	Haymarket	No
Hydraulic Pumping Station archaeology	SHFA	yes	State	Adjacent	No
Water Cooling System and Manifold (Powerhouse to Murray Street to waters edge, Darling Harbour)	SHFA		State?	North/Hotel	No
Hay Street Stormwater Channel No.30P12 (Hay Street , see curtilage plan)	Sydney Water		Local	Haymarket	No

1.7 Previous Reports

There have been a number of archaeological reports written which address part or all of the SICEEP study area:

- *Baseline Archaeological Assessment of Darling Harbour South; Block bounded by Pier, Harbour and Hay Streets and former Railway Corridor*, Wayne Johnson, Sydney Harbour Foreshore Authority, April 2011.
- *Sydney International Convention Exhibition and Entertainment Precinct, Darling Harbour, Historical Archaeological Assessment*, City Plan Heritage, for Infrastructure NSW, May 2012.
- *Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP), Baseline Heritage Impact Assessment*, City Plan for Infrastructure NSW, May 2012.

[1] http://www.shfa.nsw.gov.au/sydney-About_us-Our_heritage_role-Heritage_and_Conservation_Register.htm

[2] Incorrectly identified as being of State significance in May 2012 assessment. Endorsed significance on Sydney Water S170 register is local.

- *Archaeology Heritage Impact Statement, Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP),* Casey & Lowe for Lend Lease August, 2012.

In addition we have drawn on the archaeological work, reports and draft reports written by Casey & Lowe for Lend Lease for Darling Quarter (Walk) and Barangaroo South which we finished excavating in August 2012:

- *Non-Indigenous Archaeological Assessment, Barangaroo Stage 1 (Barangaroo South),* for Lend Lease (Millers Point) Pty Ltd, July 2010, Casey & Lowe.
- *Archaeological Research Design & Management Strategy, Barangaroo Stage 1,* for Lend Lease (Millers Point) Pty Ltd, May 2010, Casey & Lowe.
- *Archaeological Management Strategy & Research Design, Darling Walk, Darling Harbour, Sydney*, for Lend Lease Development, August 2008
- *Non-Indigenous Archaeological Assessment, Darling Walk, Darling Harbour, for Lend Lease Development,* Casey & Lowe June 2008.
- *Darling Walk, Archaeological Excavation 2008/2009, Preliminary Results, for Lend Lease Development*, Casey & Lowe, June 2009.
- *Draft Archaeological Investigation Report, Darling Quarter (Darling Walk),* for Lend Lease, Casey & Lowe in prep.
- *SICEEP, Archaeology, Heritage Impact Statement*, for Lend lease, August 2012.

In addition, other nearby projects includes Paddys Markets which was excavated in 1990 and more recent work at the UTS Dr Chau site, Ultimo Road and Mary Ann Street.

- *Archaeological Assessment & Research Design, Dr Chau Chak Wing Building, 14-28 Ultimo Road, Ultimo*, for University of Technology, Casey & Lowe, February 2011.

1.7.1 Recommendations from City Plan reports

The City Plan Archaeological Assessment (May 2012) identified the following recommendations: Heritage Items/Archaeological Sites or relics to be retained *in situ*:

- Archaeology of Dickson's Mill - should include wharf but not identified in report
- Dickson's mill dam wall.
- Hay Street Stormwater.
- Remains of the Iron Wharf (Tumbalong Park).

1.7.2 Recommendations from Casey & Lowe, August 2012

Other archaeological remains (relics) identified in Casey & Lowe (August 2012) which should be conserved *in situ*:

- Barker's Jetty (1820s)
- Hydraulic Pumping station archaeology outside the SHR site, mostly outside the Haymarket study area.

All other archaeological remains were not required to be retained *in situ* but need to be subject to archaeological testing, excavation and recording prior to removal. This current report and the recommended research design will provide the basis for managing the archaeological resource in light of the proposed development.

1.8 Report methodology

This report methodology conforms to the Heritage Branch, Office of Environment & Heritage guidelines for Archaeological Assessments. It addresses the impacts of the proposed design on the potential archaeology resource within the SICEEP Central and Northern study area. The specific details of the design will be addressed. There is a separate report for Aboriginal Cultural Heritage by Comber Consultants:

1.9 Authorship

This report was written by Dr Mary Casey and Jenny Winnett, Casey & Lowe. The history chapter was written by Caroline Plim. The report was reviewed by Tony Lowe, Director, Casey & Lowe. Nick Pitt did the overlays of historic plans and modern buildings.

1.10 Acknowledgements

Ron Meyer, Project Management & Construction, Lend Lease

1.11 Limitations

The study area has a long and complex history. Due to the tight time frame for research and writing of the history and the complexity of the subject area, it has been necessary to prioritise the areas of focus. Research has revealed some new information about the history of early nineteenth-century wharves, reclamation of Darling Harbour, the Iron Wharf and Ultimo Power House water cooling system conduits, as well as bringing together information from previous histories on these subjects. Research has also revealed that many potentially useful primary source documents have not been located in state archives. Some no longer survive but some unprocessed records, or those yet to be indexed, are not easily located. If further research is required it is strongly recommended that a land titles search be undertaken.

Overlay maps are a standard tool for archaeologists but we are always dependent on the accuracy of the original maps. The larger the study area, and this is a very large study area, the less accurate the plans are. Typically we consider that most overlay plans will have an error of 1 to 2m when relating to the ground. With the plans used in this assessment, the error could be as large as 10m. In addition to the size of the study area, other contributory factors to possible errors include the lack of fit between the eastern and western side of the harbour. We have tended to link the overlays in with the streets on the eastern side of the harbour as there are many more to connect into. Therefore it is likely that the inaccuracies are larger on the western side than the eastern side. In addition there are concerns about how the western side of the plans fit with the position of the Darling Harbour railway line. This also illustrates the poor fit on the western edge of the study area.

Other than the above there were no particular constraints to producing this report. There was sufficient time and funding to complete the report to a quality standard. Casey & Lowe have undertaken considerable archaeological research and fieldwork on nearby sites and this has provided considerable additional information on which to base our assumptions, analysis and recommendations.

1.12 Glossary

Historical Archaeology (Non-Indigenous/European)

Historical Archaeology (in NSW) is the study of the physical remains of the past, in association with historical documents, since the British occupation of NSW in 1788. As well as identifying these remains the study of this material can help elucidate the processes, historical and otherwise, which have created our present surroundings. Historical archaeology includes an examination of how the late 18th and 19th-century arrivals lived and coped with a new and alien environment, what they ate, where and how they lived, the consumer items they used and their trade relations, and how gender and cultural groups interacted. The material remains studied include:

- Archaeological Sites:

below ground: these contains relics which include building foundations, occupation deposits, rubbish pits, cesspits, wells, other features, and artefacts.
above ground: buildings, works, industrial structures and relics that are intact or ruined.

- cultural landscapes: major foreshore reclamation
- structures associated with maritime activities.

Archaeological Potential
Archaeological potential is here used and defined as a site's potential to contain archaeological relics which fall under the provisions of the *Heritage Act* 1977 (amended). This potential is identified through historical research and by judging whether current building or other activities have removed all evidence of known previous land use.

Archaeological Site
A place that contains evidence of past human activity. Below ground sites include building foundations, occupation deposits, features and artefacts. Above ground archaeological sites include buildings, works, industrial structures and relics that are intact or ruined.

Archaeological Investigation or Excavation
The manual excavation of an archaeological site. This type of excavation on historic sites usually involves the stratigraphic excavation of open areas.

Archaeological Monitoring
Archaeological monitoring is recommended for those areas where the impact of the works is not considered to mean the destruction of significant archaeological fabric. Nevertheless the disturbance of features both suspected and unsuspected is possible. In order to provide for the proper assessment and recording of these features an archaeologist should inspect the works site at intervals they consider to be adequate and to be 'at call' in case the contractor uncovers remains that should be assessed by the archaeologist.

Monitoring is a regular archaeological practice used on many building and development sites.

Research Design
A set of questions which can be investigated using archaeological evidence and a methodology for addressing them. A research design is intended to ensure that archaeological investigations focus on genuine research needs. It is an important tool that ensures that when archaeological resources are destroyed by excavation, their information content can be preserved and can contribute to current and relevant knowledge.

Research Potential
The ability of archaeological evidence, through analysis and interpretation, to provide information about a site that could not be derived from any other source and which contributes to the archaeological significance of that site and its 'relics'.[3]

Relic
Means any deposit, artefact, object or material evidence 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.
(NSW *Heritage Act 1977*, Definitions, Part 1.4)

[3] Taken from the *Assessing Significance for Historical Archaeological Sites and 'Relics'*, 2009:11.

It was more recently further defined as:

> Relevant case law and the general principles of statutory interpretation strongly indicate that a 'relic' is properly regarded as an object or chattel. A relic can, in some circumstances, become part of the land and be regarded as a fixture (a chattel that becomes permanently affixed to land).[4]

1.13 Abbreviations

AO	Archives Office
EIS	Environmental Impact Statement
HRNSW	Historic Records of NSW
ML, SLNSW	Mitchell Library, State Library of New South Wales
PHALMS	Parramatta Historical Archaeological Landscape Management Study
SHFA	Sydney Harbour Foreshore Authority
SHI	State Heritage Inventory
SICEEP	Sydney International Convention, Exhibition and Entertainment Precinct
SHR	State Heritage Register
SRNSW	State Records, New South Wales

[4] *Assessing Significance for Historical Archaeological Sites and 'Relics'*, 2009:7.

2.0 Historical Background

2.1 Background

A number of heritage reports have been written addressing the history of Darling Harbour, including part or all of the study area. This chapter provides a background for this Archaeological Assessment of the North and Central area and any subsequent investigation of the Darling Harbour SICEEP study area with the main focus on items of significance identified in Casey & Lowe's *Sydney International Convention, exhibition and Entertainment Precinct (SICEEP) Archaeology: Heritage Impact Statement* (August 2012).

2.2 Early British Settlement (1788-1837) including main grants associated with the study area, City, Haymarket, Ultimo and Pyrmont

Darling Harbour appears in colonial government records as early as 1788 under the name of 'Long Cove'.[5] Later the inlet to the west of Sydney Cove was known as Cockle Bay until its official naming as Darling Harbour in 1826. At this time the rocky shores were covered in scrub and the wetlands at the head of the tidal inlet were fed by a number of small streams. An 1802 plan by Charles Leseur illustrates the general nature of the landscape at this time. The watercourses and wetlands at the head of the inlet influenced the development and management of the study area from the earliest days of settlement (Figure 2.1). Prior to settlement the environment provided a rich source of food and other natural resources for Aboriginal communities and it did later, for a short while, for colonists. Characteristics of the environment are detailed in James Broadbent's *Transformations: Ecology of the Pyrmont Peninsula 1788-2008*.[6]

Land bordering on the west and southern parts of the Darling Harbour foreshore was granted from 1794. Eighteen acres (7.28 ha) on the Pyrmont peninsula in the northern part of the study area (no. 2) was granted to William Mitchell on 10 December 1794.[7] Surgeon John Harris's (1754-1838) Ultimo Farm comprised several portions of land on the western and southern shore of Darling Harbour - 34 acres (13.76 ha) granted on 31 December 1803, 135 acres (54.63 ha) granted on 1 January 1806 and 12 ¾ acres granted on 8 May 1818 (Figure 2.2).[8] A small area of the 135 acre (54.63 ha) grant on the eastern side of the peninsula is linked to the SICEEP North or Bayside study area. Reclamation took place in the 19th and 20th centuries along the western shores of Darling Harbour adjacent to both Mitchell and Harris' grants.

[5] Public Works Department NSW (PWD), *Darling Harbour Bi-Centennial Development Project: Conservation Study*, [Sydney], [1984]: 2.
[6] J Broadbent, *Transformations: Ecology of the Pyrmont Peninsula 1788-2008*, 2010.
[7] S. Fitzgerald & H. Golder, *Pyrmont & Ultimo: Under Siege*, Ultimo, NSW, Halstead Press, 2007: 16.
[8] Casey & Lowe Pty Ltd, *Final Archaeological Assessment & Research Design: Dr Chau Chak Wing Building, 14-28 Ultimo Road, Ultimo*, February 2011.

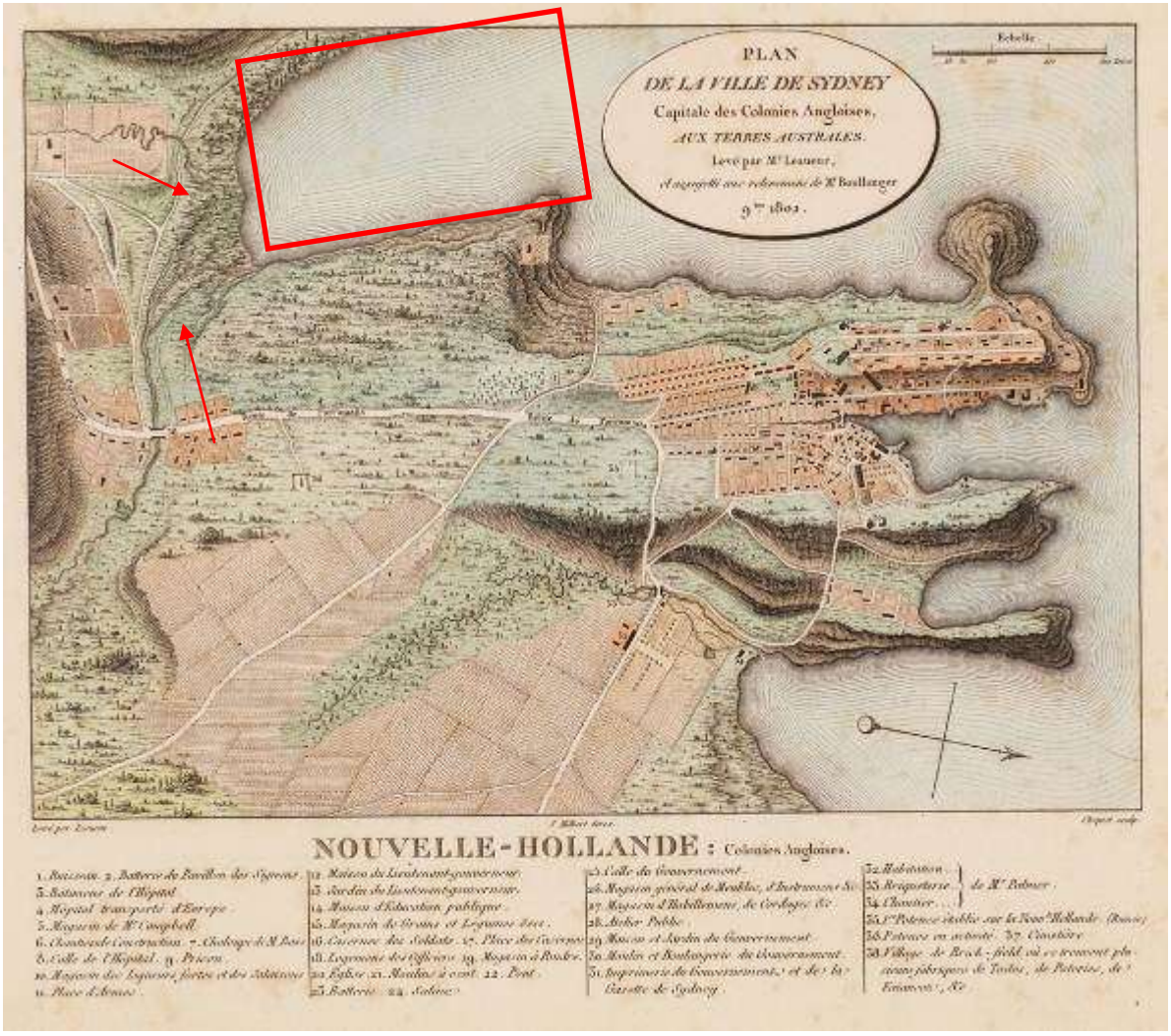

Figure 2.1: ***Plan de la Ville de Sydney by Charles Leseur*** **(published 1802) showing creeks and other watercourses feeding into the wetlands (red arrow) and then into Darling Harbour. The red box indicates the general location of the study area. This is not an accurate plan. Leseur 1802, ML SLNSW.**

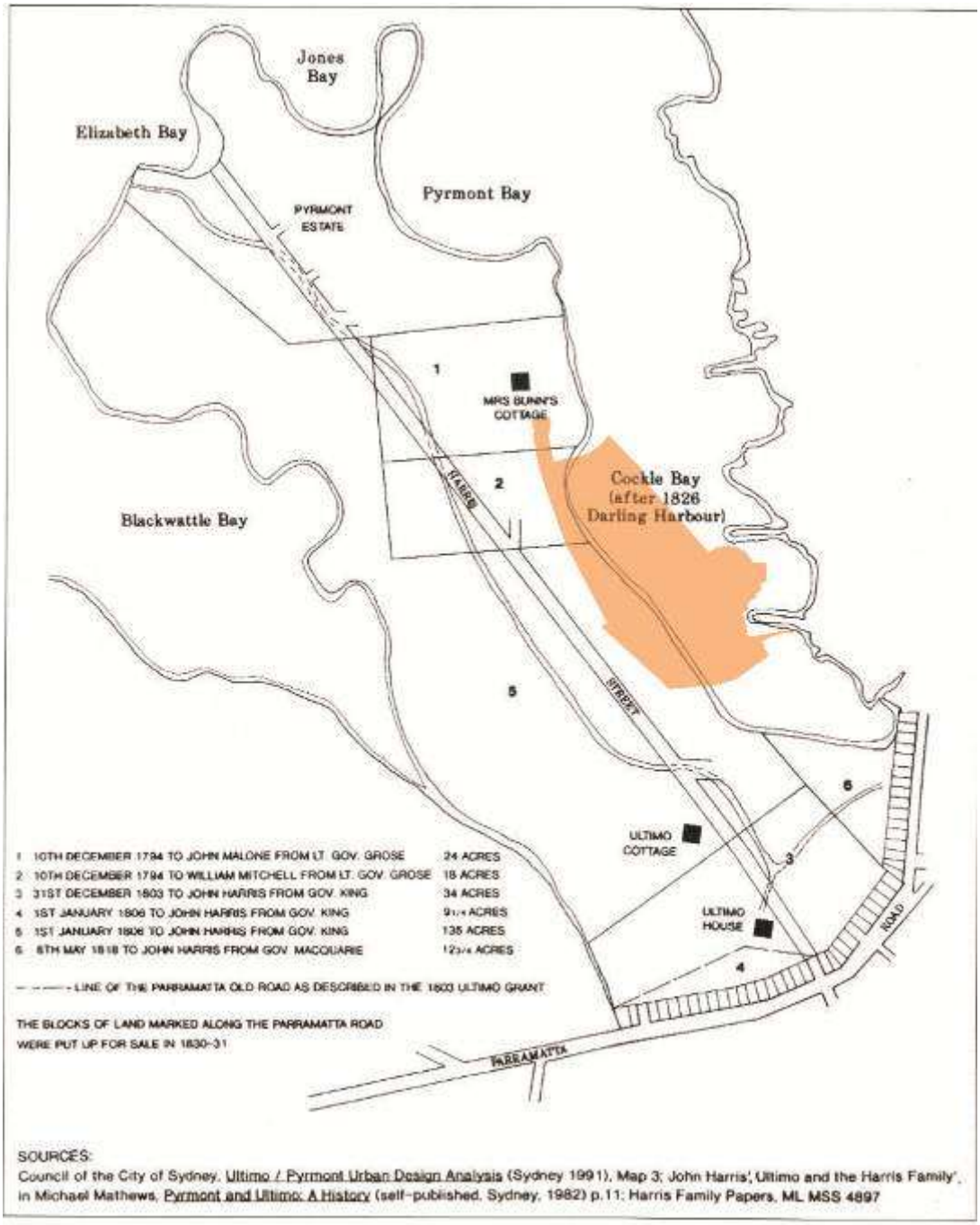

Figure 2.2: Plan showing 18th and 19th-century grants in Ultimo and Pyrmont linked to the study area. As the overlay shows this is not a very accurate plan for the overlay of the site. Fitzgerald & Golder, *Pyrmont & Ultimo,* 2007: 16.

In 1804 Harris built a house on his 'rural retreat' at Ultimo. By this time 18 houses were recorded at Cockle Bay, with most likely to have been on the eastern shore opposite Ultimo Farm.[9] The sites of Harris' Ultimo House and Ultimo Cottage are outside the study area. An 1837 plan of Ultimo Estate shows the location of Ultimo Farm buildings, the wetland and creek at the head of the bay, as well as land use in and adjacent to the study area (Figure 2.3). Harris sold (or leased) portions of land on the western shore of Darling Harbour to William Shepherd and Mr Thompson; both sites are labelled as 'gardens'.[10] It is unclear if these allotments are linked to the study area and the accuracy of the maps does not allow for accurate overlays.

[9] 'Return of Houses', *Sydney Gazette* 15 Apr 1804.
[10] Harris Family Papers, MSS 4897, Mitchell Library, MSS 4897.

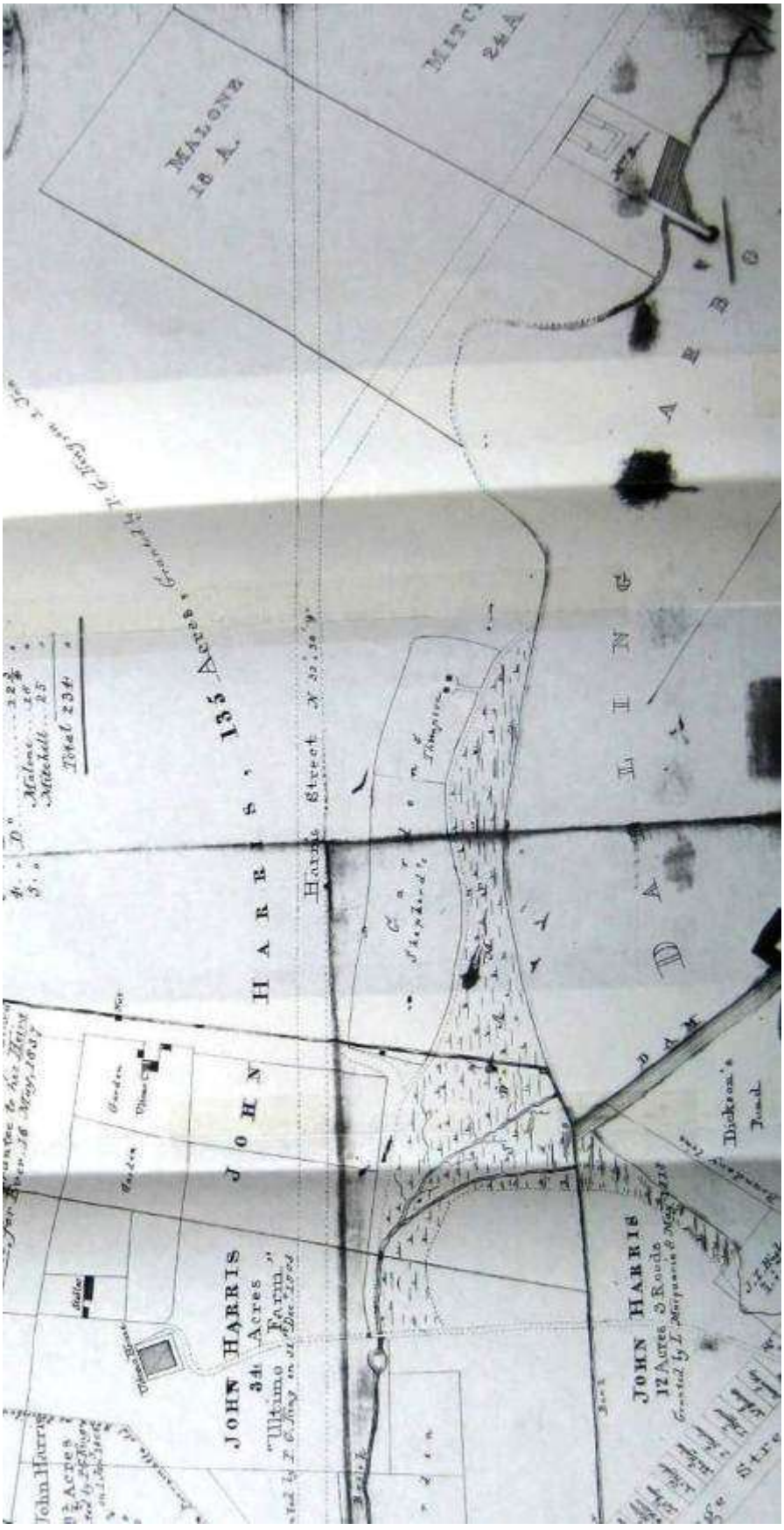

Figure 2.3: Copy of a plan of Harris' Ultimo Estate prepared in 1837 showing Shepherd's and Thompson's allotments to the north. The plan is diagrammatic, and incorrectly shows Malone as the owner of Mitchell's grant to the north. Harris Family - Papers concerning John Harris ML MSS 4897.

2.3 Industrial Development and Key Industrialists at Darling Harbour in the first half of the 19th century, 1807-60s

By 1807 the Sydney colony's trade had increased and it was a regular port for shipping from Europe, China and India, as well as a refitting port for American and British whalers. Cockle Bay was used to accommodate the overflow of shipping from Sydney Cove.[11] At this time the tidal mudflats extended almost to George Street and Ultimo Road (Figure 2.3).

The industrial use of Cockle Bay had begun by 1811 when the ships, the *Hawkesbury Packet* and the *Governor Macquarie*, were launched there. The Market Wharf, further north on the eastern side of the harbour, was established in 1811 and is thought to be the stimulus for the expansion of Cockle Bay. A pottery and glassworks was established by 1812 or 1813 at unknown locations in the bay and operated for less than a year. A slaughterhouse, again at an unrecorded location, operated between 1814 and 1820.[12] The nature of the landscape c1821 is depicted in a somewhat idealised manner in Figure 2.4.

Figure 2.4: View of Sydney looking south from Flagstaff Hill, ca. 1821 by James Taylor illustrating the nature of the landscape on the southern and western shore of Darling Harbour visible on the right hand side of the image. A building is visible on the eastern shore (Taylor c1821).

John Dickson's mill and wharf and Thomas Barker's mill and wharf at Darling Harbour are associated with the SICEEP study area. Parts of Dickson's and Barker's earliest wharves have been identified as likely to extend into it.[13] To provide context for these structures a history of the development of both mill sites will be examined.

[11] PWD, Darling Harbour: Conservation Study, [1984]: 2.
[12] Godden Mackay Pty Ltd, 'Little Pier Street Precinct: Archaeological Excavation: Vol 2 Main Report', prepared for the Darling Harbour Authority, Oct 1992: 19.
[13] Casey & Lowe Pty Ltd, *Sydney International Convention, exhibition and Entertainment Precinct (SICEEP) Archaeology: Heritage Impact Statement*, Aug 2012.

A plan dated 1836 overlaid with the boundaries of the study area is a useful reference for understanding the relevance of the two mill sites as well as its proximity to Harris' Ultimo Farm (Figure 2.5).

Figure 2.5: Plan of Sydney with Pyrmont in 1836 overlaid by the approximate location of the SICEEP North and Central study area (orange). Dickson's and Barker's piers are visible at the southern end of Darling harbour on the eastern shore. J. Basire Lith, Sydney, 1836, Map T1551 NLA.

2.3.1 John Dickson's Mill - Grant and Development

John Dickson (1774-1843), a free settler and business entrepreneur, arrived in Sydney in October 1813 with £10,000 of goods and machinery to establish a steam mill. The entrepreneurial Dickson was recommended to Governor Lachlan Macquarie in March 1813 as 'an excellent Engineer and Millwright' and to be granted land in Sydney 'and the interior proportionate to his capital'. Arriving with a steam engine, tools and turning lathes worth £5200 Dickson established himself on a 15 acre grant (6.07 ha) selected in Cockle Bay (Darling Harbour).[14] Thomas Barker who was apprenticed to

[14] *Sydney Gazette* 17 Jun 1815: 2; GP Walsh, 'Dickson, John (1774-1843)', *Australian Dictionary of Biography*, http://adb.anu.edu.au; Particulars of property brought by John Dickson to New South Wales, Letter 26 Oct 1813, Reel

Dickson accompanied him to the colony and is also a key figure in the early industrial development in Darling Harbour.[15]

Dickson's grant between Brickfield Hill and John Harris' Ultimo Farm was selected for its proximity to the harbour for conveyance of grain, timber and firewood, as well as to small streams at the head of the bay providing fresh water for the steam engines. The freshwater was dammed forming a reservoir separate from the salt water of the bay. Channels or races formed through the swamp funnelled fresh water into the reservoir and pumps delivered it to the steam engine. Grain-milling operations (wheat and corn) started in 1815. The steam engine was intended for diverse uses including milling of timber and tanner's bark.[16]

Governor Macquarie attended the opening of Dickson's three-storey mill building on 29 May 1815. Mr Griffiths who planned Dickson's mill died shortly before the opening. It was estimated that 'with one set of stones it appears that this mill can grind on average ten bushels of wheat an hour'. The output and reliability of Dickson's steam mill compared favourably to windmills of the era, and therefore was indispensible to a colony reliant on bread.[17]

Obediah West recalled Dickson's pond c1810-20 as close to George Street, commencing at a 'large creek, which ran along the present Hay Street, entering it at about the corner of George and Hay Streets. The pond was extensive, spreading over part of the Ultimo Estate, and…a noted place for all sorts of game, ducks and teal'.[18] Dickson operated a general store in conjunction with the steam mill. He brought sale goods with him in 1813 and advertising a variety of goods including ham, tobacco, china and fabric in 1821.[19]

By 1821 Dickson employed agents to procure wheat at colonial settlements and ship it to Sydney to be ground.[20] Dickson's Pier, or Dickson's Wharf as it is sometimes referred to, is shown in plans as early as 1822 (Figure 2.6) and was integral to the operation of John Dickson's business enterprises. The pier was narrow and elongated, extending approximately northwest into deep and navigable waters where sailing ships could safely berth. A variety of raw materials and goods were imported to sell in Dickson's store, while products from the mill, soap manufactory and brewery, as well as salted beef, were exported. Dickson traded with China, Mauritius and Van Diemen's Land.[21]

Dickson's Cockle Bay establishment was referred to in newspapers of the day as the 'Steam Engine.' Dickson carried out alterations at the site in 1825 and it was described in the *Sydney Gazette* on 6 October as a 'ponderous pile of structures'. With the need for economy there were likely to have been utilitarian buildings with little thought to their outward appearance and haphazardly arranged around the foreshore.[22] Dickson's establishment was clearly more than a centre for flour production and was a growing hub of commerce and trade. By 1825 Cockle Bay's port and trade facilities increased and improved, and it was thought that the area warranted a 'less antiquated' name. It was promoted for its 'excellence' as a harbour, and in terms of security, extent, depth of water and good anchorage, surpassing that of Sydney Cove.[23]

6043, 4/1728, p257, SRNSW; Free settlers to receive grants of land, Fiche 3266; 9/2652 p14, SRNSW. Note: The name 'Dickson' sometimes recorded in sources as 'Dixon.'

[15] Godden Mackay Pty Ltd, Oct 1992: 24.

[16] *Sydney Gazette* 17 Jun 1815: 2; GP Walsh, 'Dickson, John (1774-1843)', *Australian Dictionary of Biography*, http://adb.anu.edu.au.

[17] *Sydney Gazette* 3 Jun 1815: 2.

[18] E Marriott (Ed), The Memoirs of Obediah West, cited in Godden Mackay Sep 1993: 41

[19] *Sydney Gazette* 14 Jul 1821: 4.

[20] *Hobart Town Gazette* 10 Mar 1821: 1.

[21] Walsh, http://adb.anu.edu.au.

[22] *Sydney Gazette* 6 Oct 1825:2.

[23] *Sydney Gazette* 6 Oct 1825:2.

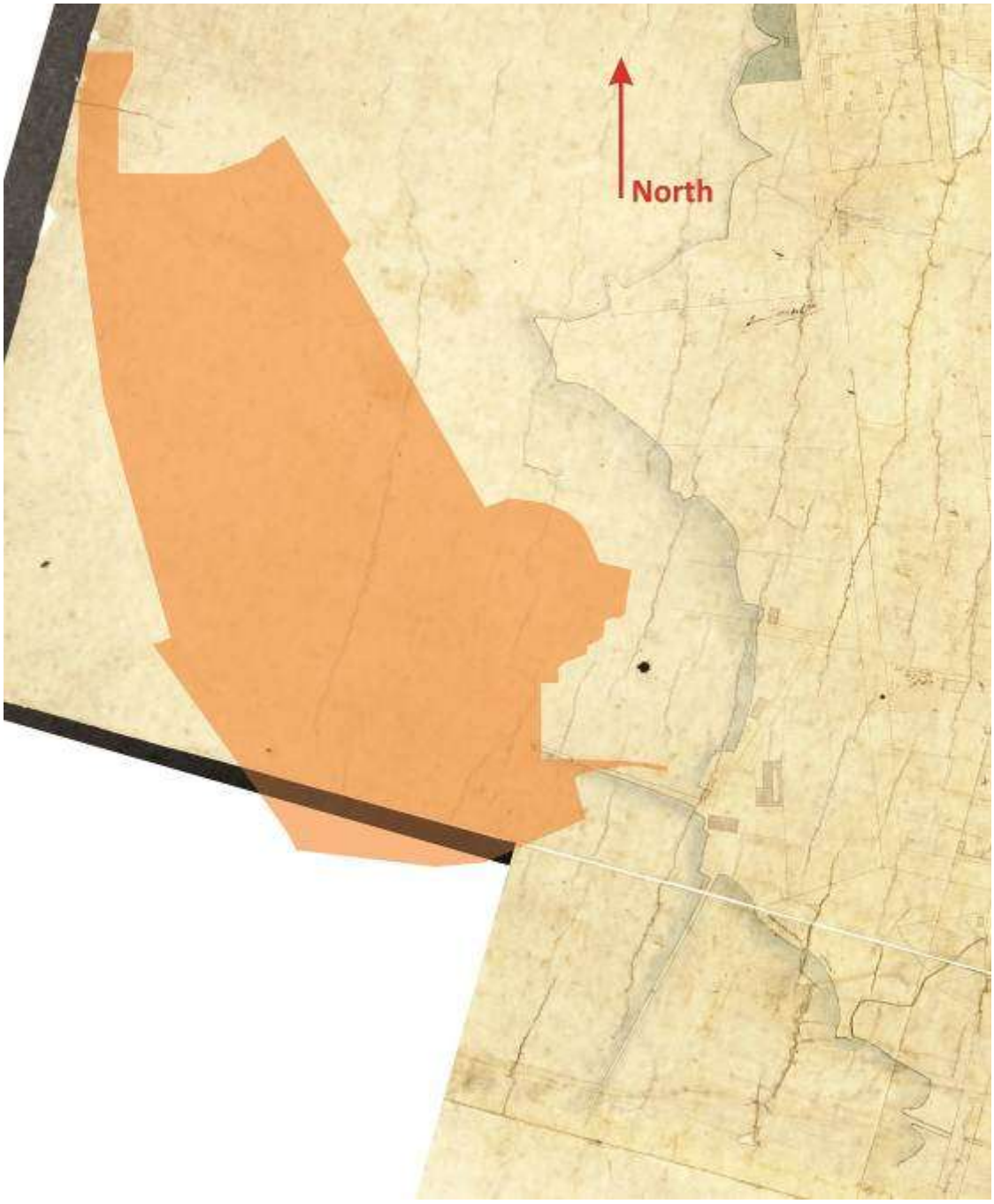

Figure 2.6: Harper's 1822 plan shows Dickson's pier protruding into the study area (orange) and the dam wall to the south. Harper 1822 AO Map No SZ435, SZ 436 SRNSW.

In 1827 John Dickson diversified the business in partnership with Mr Mackie from the Cape who had experience in brewing and soap manufacture. By 4 January 1827 Dickson & Co were advertising for sale 'Yellow Soap, of very superior quality' from the Steam Engine Soap Manufactory. The brewery venture required a new steam engine and by 14 February 1827 a building for the brewery was under construction on the 'adjacent ground'.[24] Brewery operations commenced 'in fine style' and the extent of Dickson's Mill and wharf in 1828 is illustrated in Figure 2.7.[25]

[24] *Monitor* 6 Oct 1826: 2; *Sydney Gazette* 4 Jan 1827: 4; *The Australian* 14 Feb 1827: 4.
[25] *Sydney Gazette* 10 Dec 1827: 2.

Figure 2.7: An 1828 plan showing the development of "Dixon's" mill at Darling Harbour. Features include the pier extending into navigable water, and the wall retaining freshwater in the millpond and separating it from the harbour's salt water. The dark blue line on the western foreshore (arrowed) illustrates the edge of the shoreline in 1854, from Woolcott & Clarke's map. Therefore the area to the east of the dark blue line is probably mud flats. SR Item No: SZ467 SRNSW, accessed at acl.arts.usyd.edu.au.

Harper's 1822 plan (Figure 2.6) above can be compared with the 1828 plan in Figure 2.7 that shows soundings taken in the harbour that was prone to silting, a factor affecting its navigability for ships berthing at Dickson's Wharf at the head of the harbour.[26] Dickson and Mackie dissolved their partnership on 22 October 1829.[27] Identifying new commercial opportunities, in October 1829

[26] 'Plan of Pyrmont Estate as divided into Building Allotments…', Barton Lithog, Sydney, 1839, M2 811.173/1839/1, ML SLNSW.
[27] *Sydney Gazette* 24 Oct: 2.

Dickson was advertising prime salted beef from his own herds for sale at the 'Steam Engine'.[28] Around this time some allotments surrounding the mill south of Dickson's Wharf were sold.[29] Circa 1829-31 Dickson is thought to have reclaimed a small part of the cove on which he built new buildings c1831 (Figure 2.8). The structures could have originally been built up on timber piles above the water and the land below later reclaimed. The building or buildings are thought to be the ones uncovered in archaeological investigation of the Little Pier Street Precinct by Godden Mackay Pty Ltd in 1991-92.[30]

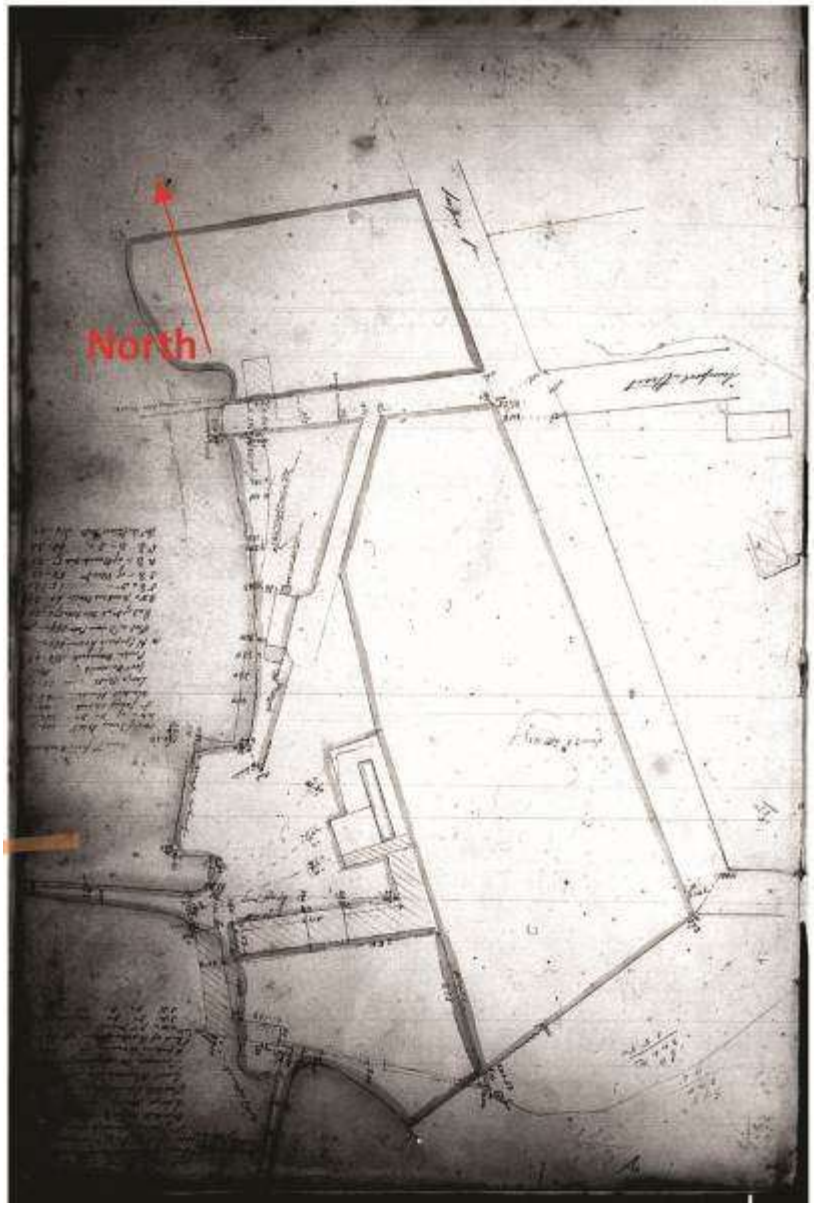

Figure 2.8: Plan in Surveyor Hallen's Fieldbook (c1831) showing a building just beyond the shore and shown on Knapp's 1844 plan as the 'Salting Company' and within the shoreline. The SICEEP study area is located to the west and partly includes Dickson's wharf. Compare Figure 2.6. FB No 347 p 2, Reel 2628 SRNSW.

Dickson added another boiler, manufactured on site in 1831.[31] An 1833 plan of Sydney shows the extent of development on Dickson's 'Steam Engine' site. Additions and alterations to the site, as well as the 1849 reclamation of the foreshore by later owners, H Mace, G T Pickering and C Newnham, is shown in red (Figure 2.9). Mace, Pickering and Newnham purchased the lots in

[28] *Sydney Gazette* 29 Oct 1929: 4.
[29] PWD, [1984]: 22.
[30] Godden Mackay Pty Ltd, Oct 1992: 23.
[31] *Sydney Herald* 19 Dec 1831: 4.

August 1833. Grants for reclaimed land took place at later dates.[32] The shore end of the wharf is shown and its configuration differs little from earlier plans.

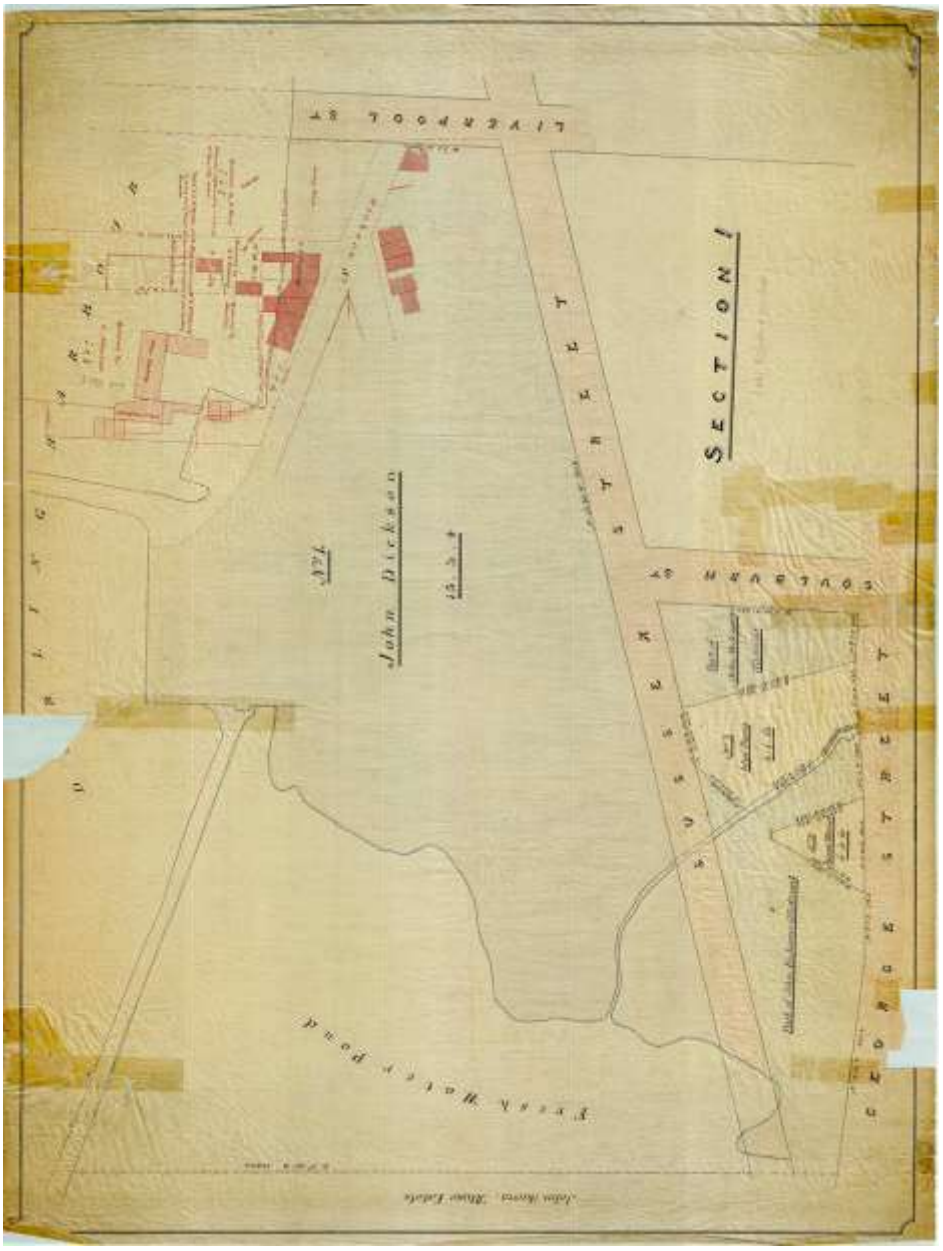

Figure 2.9: Plan showing Dickson's Mill site in 1833 with later development (1833-1849) indicated in red. The north and central SICEEP areas are outside this area. Features include subdivided allotments east and Dickson's Pier and Fresh Water Pond. The SICEEP Central and North study area is located to the immediate west of this plan. City Section Survey Plan, Section 1, 1833, City of Sydney Archives.

Without mention of Dickson's wharf facilities, the Colonial Returns for 'Manufactories, Mills and other Machinery Works' in the years 1832, 1833 and 1834 list the business as:

> John Dickson, at the Head of Darling Harbour. A Steam Engine of Eight Horse Power with necessary Machinery for making Flour; also Machinery for manufacturing Soap.

[32] City Section Survey Plan, Section 1, 1833, http://cityofsydney.nsw.gov.au.

Dickson is thought to have installed a horse-wheel for use when the steam engine was out of service.[33] The business including an operating brewery, Bonded Store and associated machinery and goods were offered for sale in July 1833. While the mill did not change hands, some waterside and town allotments and goods were sold. The auction advertisement confirms Dickson's diverse business interests and the sawmilling machinery for sale and quantities of timber suggests that Dickson could have been operating a steam sawmill.[34]

Dickson returned to England in 1834, leaving the company's management to Thomas Barker, his former protégé. In 1841 he was sending out a new steam engine and planning further 'fills and extensions'. Dickson died in 1843 at the age of 69 years.[35] The estate was left to his sons, John, James and David Dickson, and managed in their absence by trustees Thomas Barker, Alexander Berry and George Muckle.[36] A plan drawn by EJH Knapp in 1844 illustrates the extent of land sold by the Dickson Estate, and buildings and land use. The 'Old' and 'New' steam engines, pier, dam wall, salting company, three store buildings or rooms, a dwelling and gardens are indicated (Figure 2.10). The location of Dickson's soap factory and brewery are not shown.

After 1834, Dickson's mill and other buildings were leased to tenants or managers employed to operate them. It is not known if the wharf was leased or retained with the estate and land titles might reveal how it was used. The first lessees of the mill may have been Dodds and Davies, while in 1834 Thomas Wilson, Joseph Williams and Alexander Knox were associated with the site. In 1844 a salting company operated in the building adjacent to the harbour immediately south of Dickson's Wharf. This part of the site's history including details about various tenants is discussed in Godden Mackay Pty Ltd's 'Little Pier Street Precinct Archaeological Excavation Report' (Vol 2, Oct 1992).[37]

[33] Godden Mackay Pty Ltd, Oct 1992: 23.
[34] *Sydney Herald* 29 Jul 1833:2.
[35] Godden Mackay Pty Ltd, Oct 1992: 24.
[36] *Empire* 26 Jun 1852: 2; *Sydney Gazette* 22 Apr 1837: 3.
[37] Godden Mackay Pty Ltd, Oct 1992: 24-25.

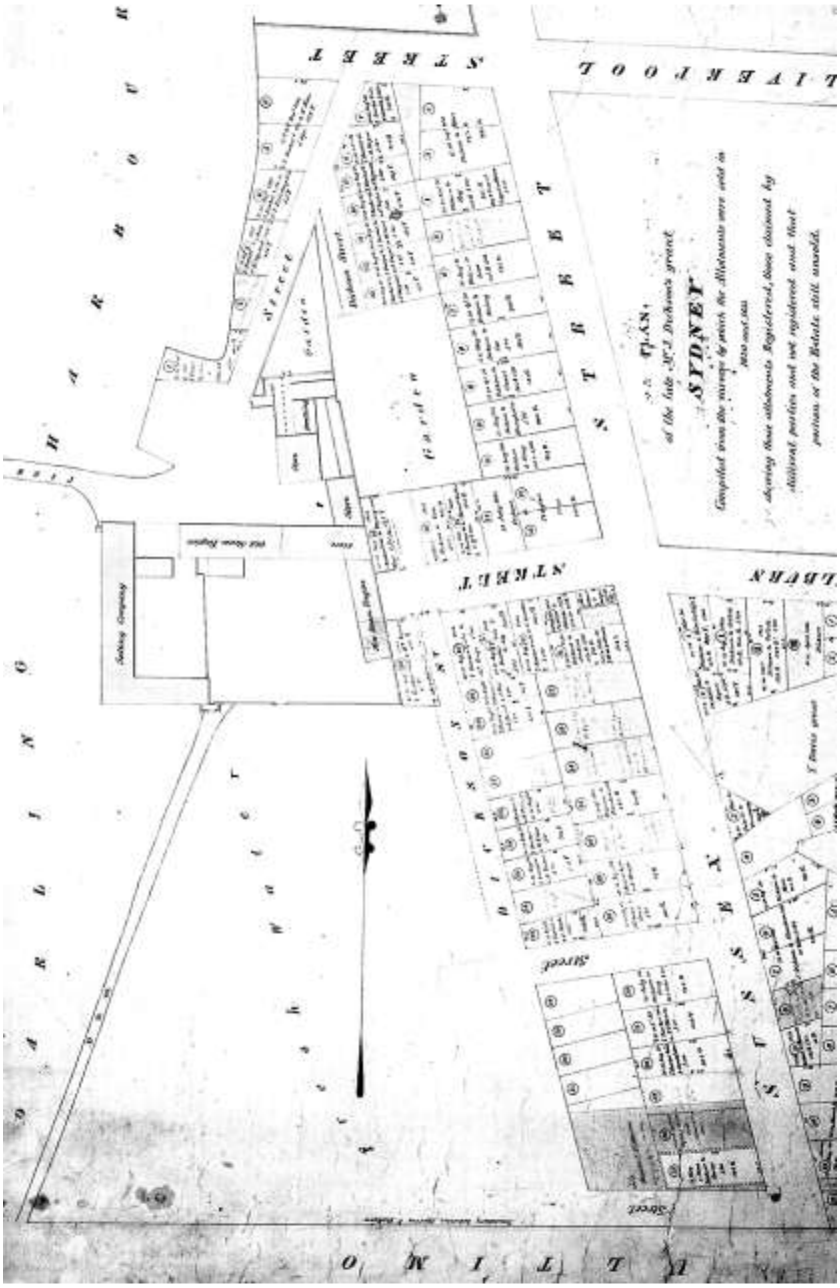

Figure 2.10: Plan of the late Mr J Dickson's Grant prepared by Surveyor Knapp, showing allotments sold in 1831 and 1833. The Central SICEEP study area is located to the immediate west. Knapp 1844, M2 811.1733/1844/1 ML SLNSW.

From 1853 plans show that the pier had been altered, or more likely rebuilt due to its age and changing vessel and loading requirements. It not only jutted out from a broader piece of land at the shoreline, but its mid-section was broader. It culminated in a square platform at its west end in the deeper part of the harbour (Figure 2.11). It is not known whether the structure was built on fill in the style of a breakwater or a timber jetty built on piles over the water.

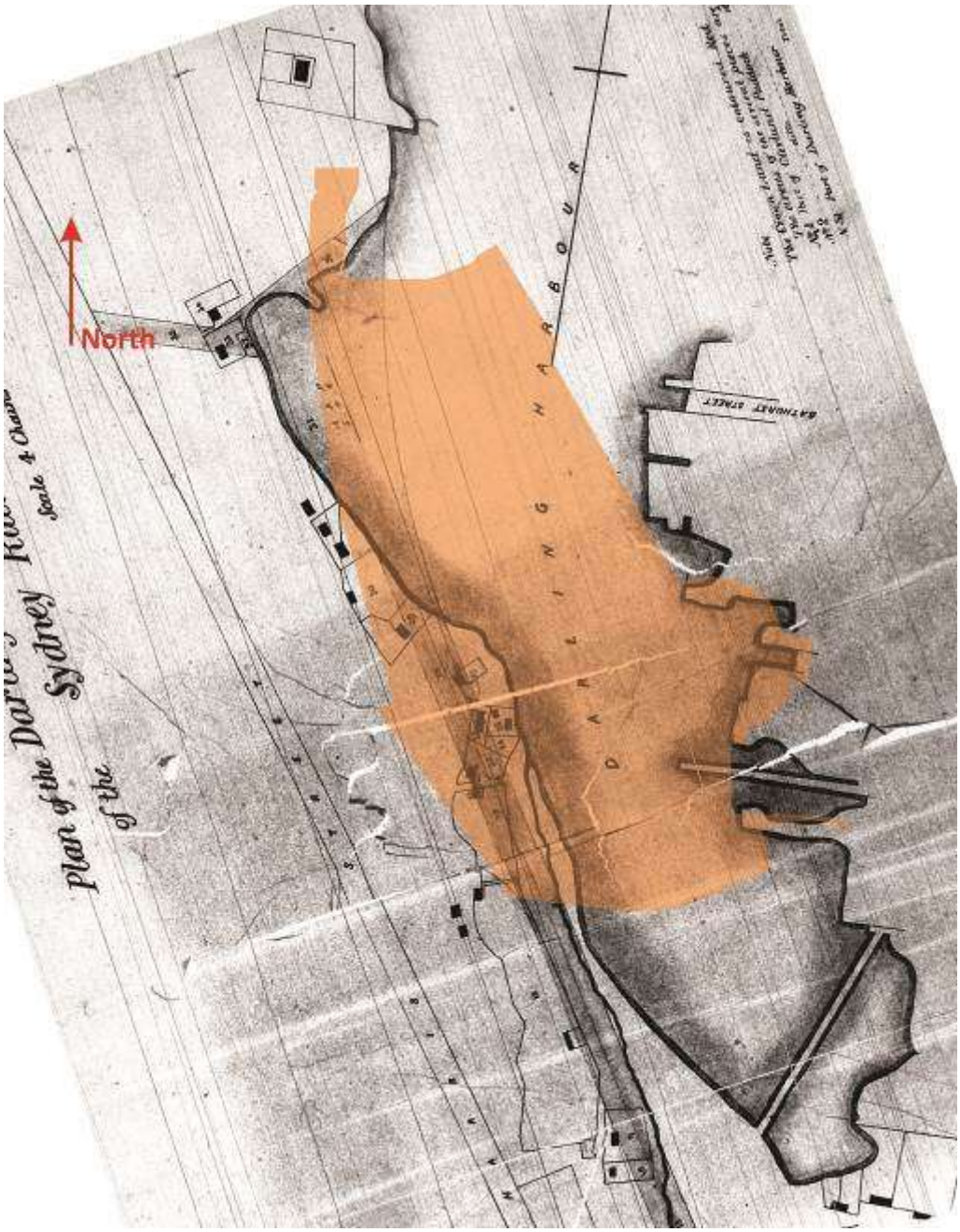

Figure 2.11: Part of a plan in the Surveyor General's Sketchbook prepared for the proposed Darling Harbour Branch of the Sydney Railway. The approximate location of the study area is highlighted in orange. Undated notes on the plan cite correspondence dated 1853. Vol 6 Fol 70.71 Surveyor General's Sketchbooks SRNSW.

By 1855, plans had been made for the filling in of Dickson's millpond and by 1857 it was almost complete. Reticulated water from the city water supply was now available to supply the steam engine making the millpond redundant for this purpose. Darling Harbour land values had increased due to the proposed railway and it would have been sought after for development. Reclamation had the potential to improve access from Parramatta Road and George Street to the wharves of Darling Harbour. A plan shows proposed roadways joining the Ultimo and Dickson Estates (Figure 2.12).[38]

[38] Plan No AO X 1053 SRNSW.

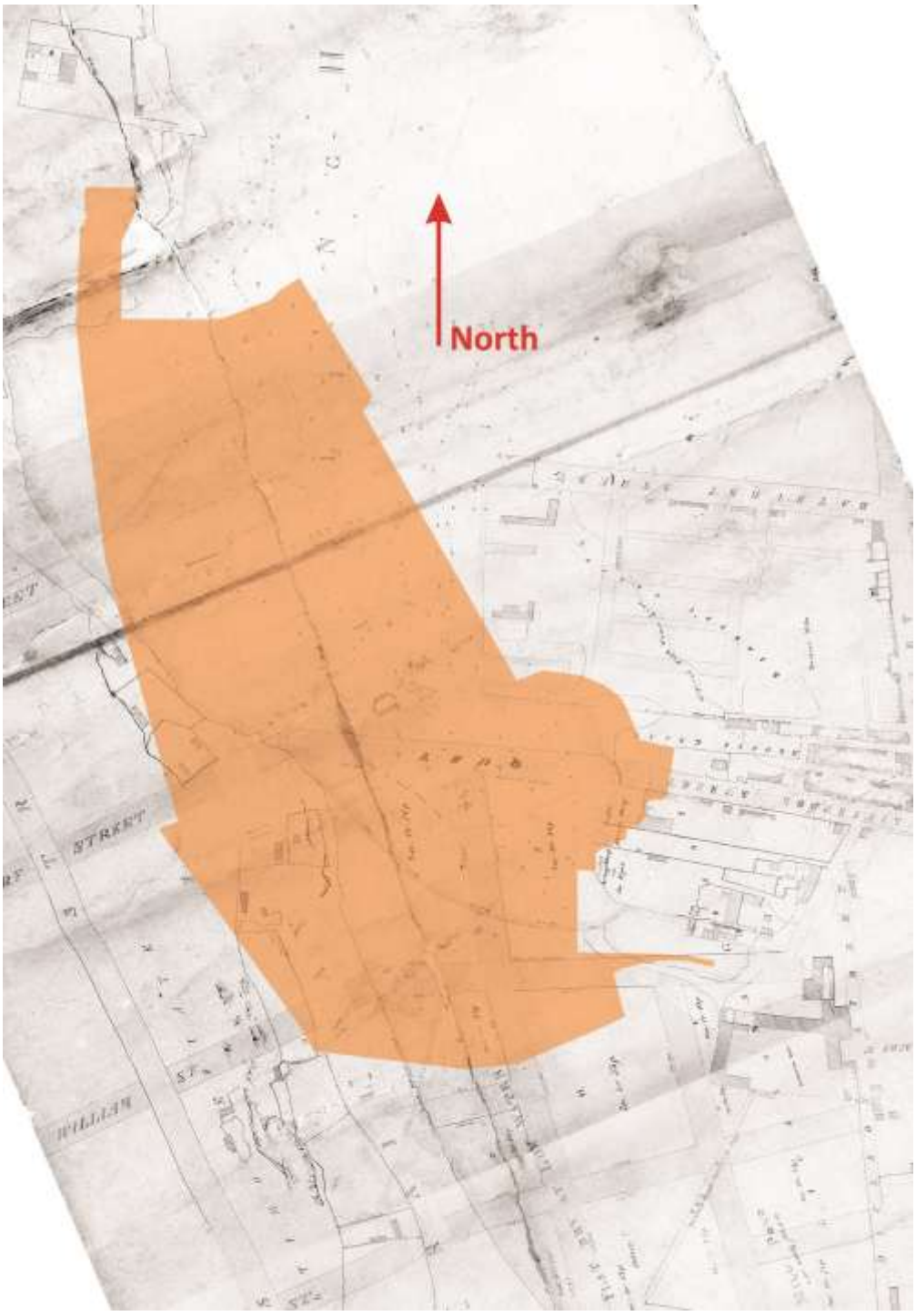

Figure 2.12: Part of a plan titled 'Head of Darling Harbour Port Jackson' submitted in 1855 and altered in 1857. The study area is highlighted in orange, north at the top. AO X1053 Part 2 of 3 SRNSW.

In the wake of the construction of a railway spur line from the new rail terminus at Redfern to Darling Harbour the government agreed with the city council that the mudflats at the head of the harbour should be reclaimed. A contract was let in 1864 for the spoil excavated from the railway yard terminus to be deposited in Darling Harbour.[39] A City of Sydney trigonometrical survey dated 1865 shows that the reclamation had subsumed Dickson's Wharf and millpond site (Figure 2.13). It

[39] SRNSW Rec Series 16348 Item 1864/39.

is not known whether the wharf was demolished earlier or simply buried under the earth works acting as shoring as the area was filled.[40] Narrow channels cross the area providing drainage for the creeks that once fed the wetland. A channel follows the approximate line of the former Dickson's Wharf.

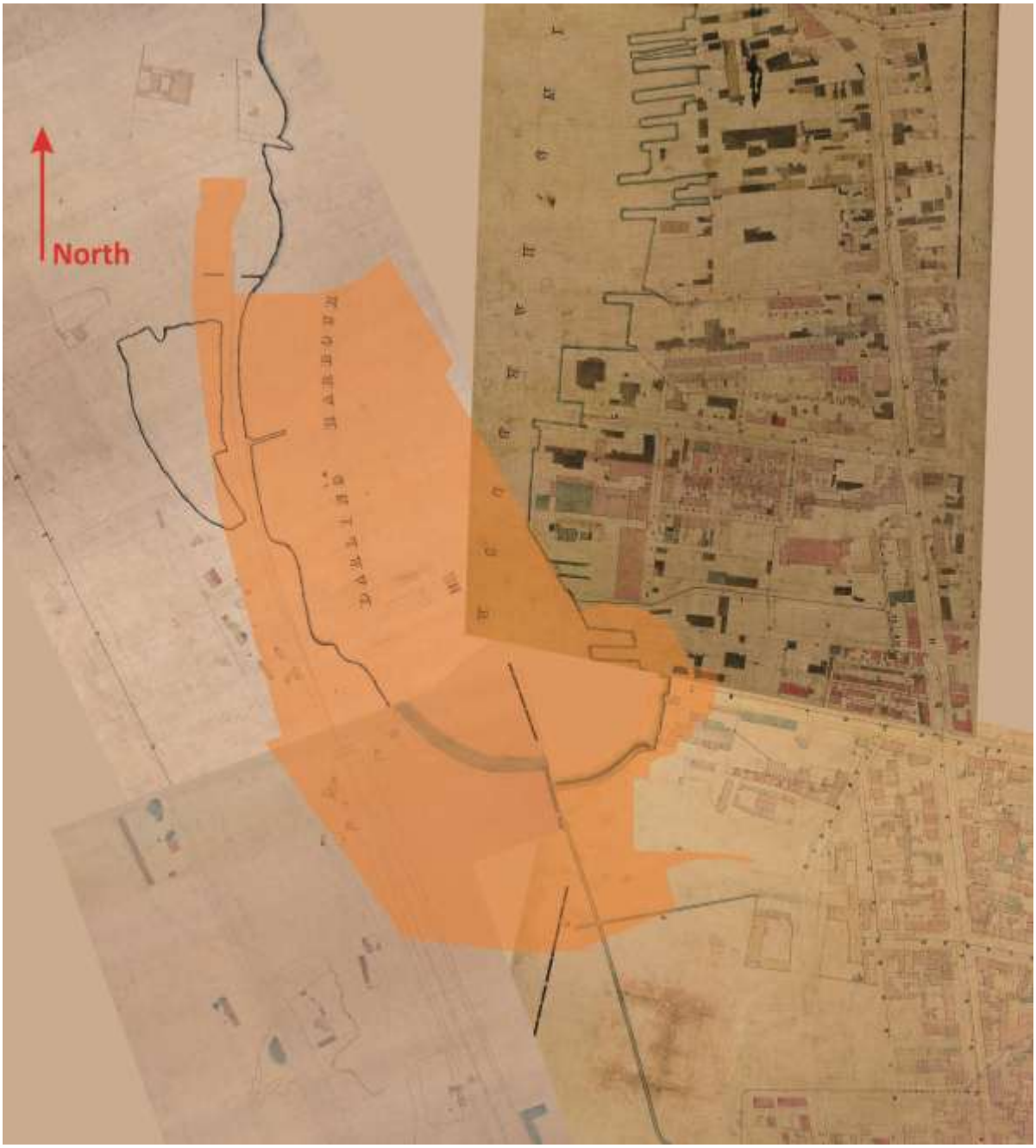

Figure 2.13: Survey showing the reclamation of land at the southern end of Darling Harbour. The fit between the four plans is not very good, notably in the middle of the seawall. Trig Survey, Section T, 1865, Historical Atlas of Sydney, City of Sydney Archives.

[40] Trig Survey, Section T, 1865, City of Sydney Archives.

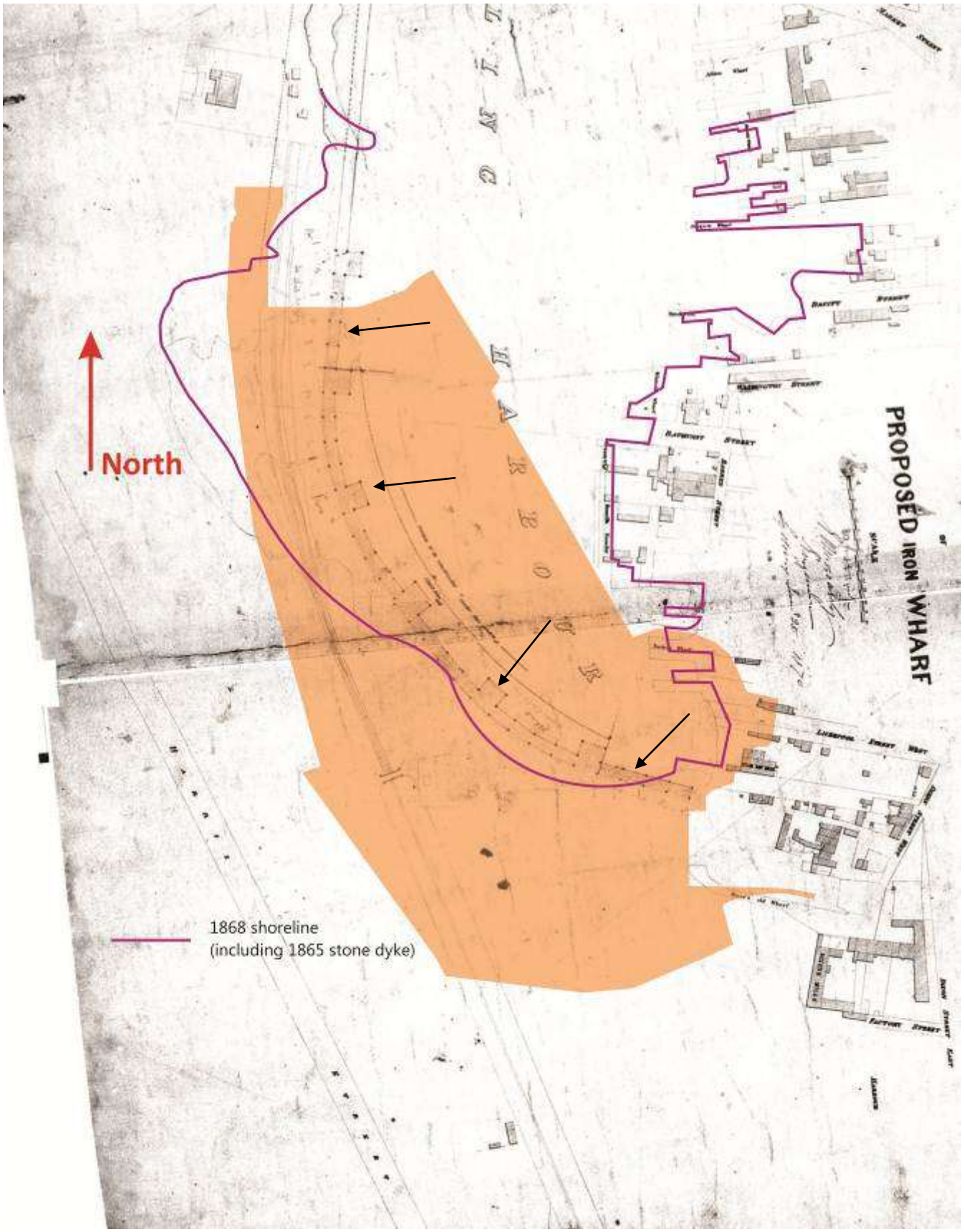

Figure 2.14: Portion of a plan of the proposed Iron Wharf (arrowed) at Darling Harbour showing 'Dixon's Old Wharf,' 5 July 1870. AO 455 Part 2 of 2, SRNSW.

The Dickson brothers sold the New Steam Engine building in the 1860s. The dilapidated building was demolished c1900 during the plague clearances. The site was built over when Goulburn Street was extended to Pier Street.[41] In February 1866 the final portions of Dickson's Mill Estate were offered at an unreserved sale. A selling point was the proximity of a wharf soon to be built from the foot of Liverpool Street. The original wharf was no longer in existence due to land reclamation.[42] Allotments were still being sold in 1869.[43] Although the spelling differs, Dixon Street takes its name from Dickson's Grant, and Pier Street was the roadway to Dickson's wharf or pier. An earlier alignment of Dixon Street led to Dickson's Wharf.

Although the area of Darling Harbour around Dickson's Wharf was reclaimed more than five years earlier, it appears on plans for the proposed Iron Wharf dated 1870. The record assists in locating both structures in terms of the study area boundaries (Figure 2.14). Further information on the Iron wharf is included in Section 2.7.

2.3.2 Thomas Barker's Mill and Wharf - Earlier Lessees and Owners, Acquisition by Barker and Later Development

Casey & Lowe has investigated Barker's Mill during research into the Darling Quarter (formerly Darling Walk) site. The focus of this investigation is the early 19th-century wharf associated with the site (and the SICEEP North study area), however, an outline of the site's history is included to provide a context for the wharf. For a chronology of events linked to Barker's Mill see Appendix A.

Thomas Barker is associated with the industrial history of a site on the east shore of Darling Harbour bounded on the north by Bathurst Street and on the east by Sussex Street. Industry was originally established on this site by the partnership of Daniel Cooper & Solomon Levey. In 1813 Thomas Barker (1799-1875) arrived in Sydney apprenticed to John Dickson, an experienced engineer and millwright. He worked for Dickson until at least May 1825 when he established his own business. Barker went on to make a significant contribution to the colony's industrial and civic development in the 19th century. He was a respected engineer, manufacturer, grazier and philanthropist.[44]

The site of Barker's Mill at Darling Harbour is associated with earlier owners including David Ramsay and Thomas Raine, of Raine & Ramsay (2 acres 3 roods and 34 perches adjacent to Bathurst St); and Daniel Cooper of Cooper & Levey (3 acres 2 perches between Darling Harbour and Sussex St). Barker received a town lease on the corner of Bathurst and Sussex Street in 1824 and it was granted formally in 1827 (1 rood 36 perches). The grant was adjacent to those just mentioned. It is thought that James Smith occupied the land later granted to Cooper & Levey. In 1822 Smith offered for sale the 3-acre fenced allotment complete with a stone building and fresh water, pointing out its waterfrontage having the potential for a wharf and other improvements.[45] The building is shown in Harper's plan of 1822 (Figure 2.6). Remaining unsold, the land was offered again in April 1825 and the entrepreneurial Cooper & Levy are thought to have been the successful bidders.[46]

Although in business with others in the early 1820s, by mid-1825 Solomon Levey and Daniel Cooper, ship owners, millers and merchants, were the sole remaining partners of the Lachlan and Waterloo Mills and Waterloo Company.[47] The purchase of land in Cockle Bay represented a new phase in the

[41] Godden Mackay Pty Ltd, Oct 1992: 24.
[42] *SMH* 10 Feb 1866: 11.
[43] *SMH* 27 Feb 1869: 7.
[44] *Sydney Gazette* 28 May 1825: 1; GP Walsh, 'Barker, Thomas (1799-1875)', *Australian Dictionary of Biography*, http://adb.anu.edu.au.
[45] *Sydney Gazette* 21 Jun 1822:2.
[46] *Sydney Gazette* 28 Apr 1825:1.
[47] *Sydney Gazette* 24 Feb 1825: 4.

development of their business interests and Cooper & Levey built the wharf later associated with Barker's Mill.

Cooper arranged for a steam engine and qualified operator to be brought out to the colony on the Lalla Rookh and he took possession of it in July 1825, making it the third in the colony. It was in operation in December 1825. The 14 horse power engine and the 'stupendous pile of building' it occupied (built following the engine's arrival) were established on land immediately north of John Dickson's mill and wharf at Cockle Bay.[48] Daniel Cooper (1785-1853) and Solomon Levey (1794-1833) had a 'commodious wharf' under construction in September 1826. An article published in the *Monitor* provides a detailed description of the other developments including a 5-storey stone building and newly cut reservoir on their Cockle Bay site at this time.[49]

Access to a private wharf would have increased the company's profitability, providing unrestricted, deepwater access for the import and export of raw materials and goods from their own ships and those of their clients. The wharf contributed to the partnership's ability to compete with John Dickson who operated his wharf to the south. By May 1827 Thomas Barker had purchased Cooper & Levey's steam engine and mill for £5000.[50] Barker had been granted a lease on the corner of Bathurst and Sussex Street in 1824 and left John Dickson's employment at some stage after 1825.[51] In 1826 he briefly went into partnership with John Smith to build a windmill at Darlinghurst but soon acquired Smith's share.[52]

By September 1826 Barker was advertising under the name of the Hope Windmill and selling flour and bran from his residence in Sussex Street next to Cooper & Levey's Steam Engine.[53] After purchasing Cooper & Levey's Darling Harbour engine and milling operations Barker began advertising flour, pollard and bran for sale at the 'Steam Engine Warehouse', as well as inviting growers to sell their grain for milling.[54] A map of Darling Harbour in 1828 shows the wharf extending from Barker's new business establishment (Figure 2.7). It is not known if the wharf was modified or altered by Barker after his purchase of the site. With 'wear and tear' on structures of this type it is likely that it was repaired or modified many times and rebuilt to suit changes in ship design and loading requirements.

[48] *Sydney Gazette* 7 Jul 1825: 2; *Australian* 7 Jul 1825: 4; *Australian* 29 Dec 1825: 3; *Sydney Gazette* 29 Sep 1826: 8; *Sydney Gazette* 27 Jun 1827: 1; Casey & Lowe 2002:3.
[49] *Monitor* 15 Sep 1826: 6.
[50] *Australian* 16 May 1827: 3.
[51] Surveyor General's Sketchbook Vol 1 Fol 27, Reel 2778 No 750A SRNSW, cited in Casey & Lowe Pty Ltd Sep 2002: 40; Col Secretary's Papers Fiche 3076 Item 4/1836A No 32 p151-2 & Reel 6012 Item 4/3510 p656 SRNSW; A K Weatherburn, *Thomas Barker Pioneer Australian Industrialist (1799 to 1875),* Privately published, 1985: Map No. 1.
[52] *Sydney Gazette* 2 Jun 1825: 3 & 1 Nov 1826: 3b.
[53] *Sydney Gazette* 2 Jun 1825: 3 & 1 Nov 1826: 3b; *Australian* 16 May 1827: 3.
[54] *Sydney Gazette* 29 Sep 1826: 8; *Sydney Gazette* 27 Jun 1827: 1; *Australian* 16 May 1827: 3; Godden Mackay Pty Ltd, Oct 1992: 26.

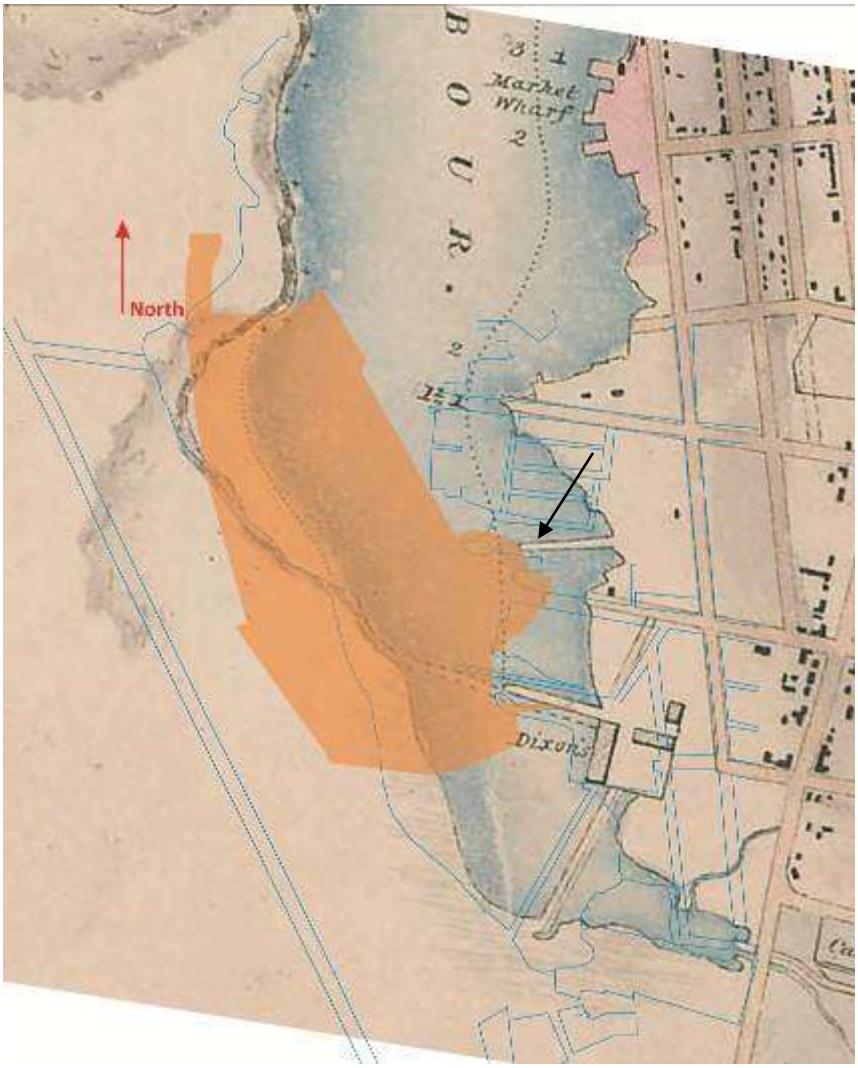

Figure 2.15: Portion of a map showing Darling Harbour in 1828 with the portion of land and wharf acquired by Thomas Barker. Barker's Wharf (black arrow) is shown between "Dixon's" Wharf and Market Wharf. The blue lines are information from the Woolcott & Clark 1854 map to assist with interpretation of the study area. 'Map of that Part of the North Shore of Port Jackson which is opposite Sydney', 1828, Item No SZ467, SRNSW, acl.arts.usyd.edu.au.

The formalisation and registration of land purchases and transfers in Sydney often post-dated the agreement to purchase or financial transactions, and it was not until 1 June 1827 that a '482 rod' grant of land at Cockle Bay was formally made to Daniel Cooper.[55] The sale to Barker of machinery and buildings was financed through a £5000 loan from Cooper & Levey.[56]

Safeguarding his interests in the increasingly valuable harbourside location, Barker formalised his ownership of the land through the Court of Claims, before going on to acquire Raine & Ramsay's land to the north. On 19 October 1831 Barker secured his ownership through a conditional Crown grant of 6 acres 1 rood and 32 perches.[57] Barker's business expanded quickly and large quantities of

[55] NRS 13836 Item 7/482: Reel 2704, p32, SRNSW.
[56] Bk 11 No 420 LPI; Casey & Lowe 2002:3.
[57] Attested copy of 1831 land grant, in Barker papers A 5398/3, No. 29, Abstract of title of Thomas Barker Esq to Land in Bathurst and other Streets Sydney (1847). (Mitchell Library); Register of Land Grants and Leases, SRNSW NRS 13836, Item 7-473, reel 2700.

grain were secured for milling from incoming ships. In 1829 a considerable addition was made to the already extensive stores. An additional boiler was installed in 1831, ensuring the steam engine was kept running during repairs.[58]

A survey of the City of Sydney made by Ambrose Hallen c1831 documents the Barker's Mill site and wharf at this time (Figure 2.16).

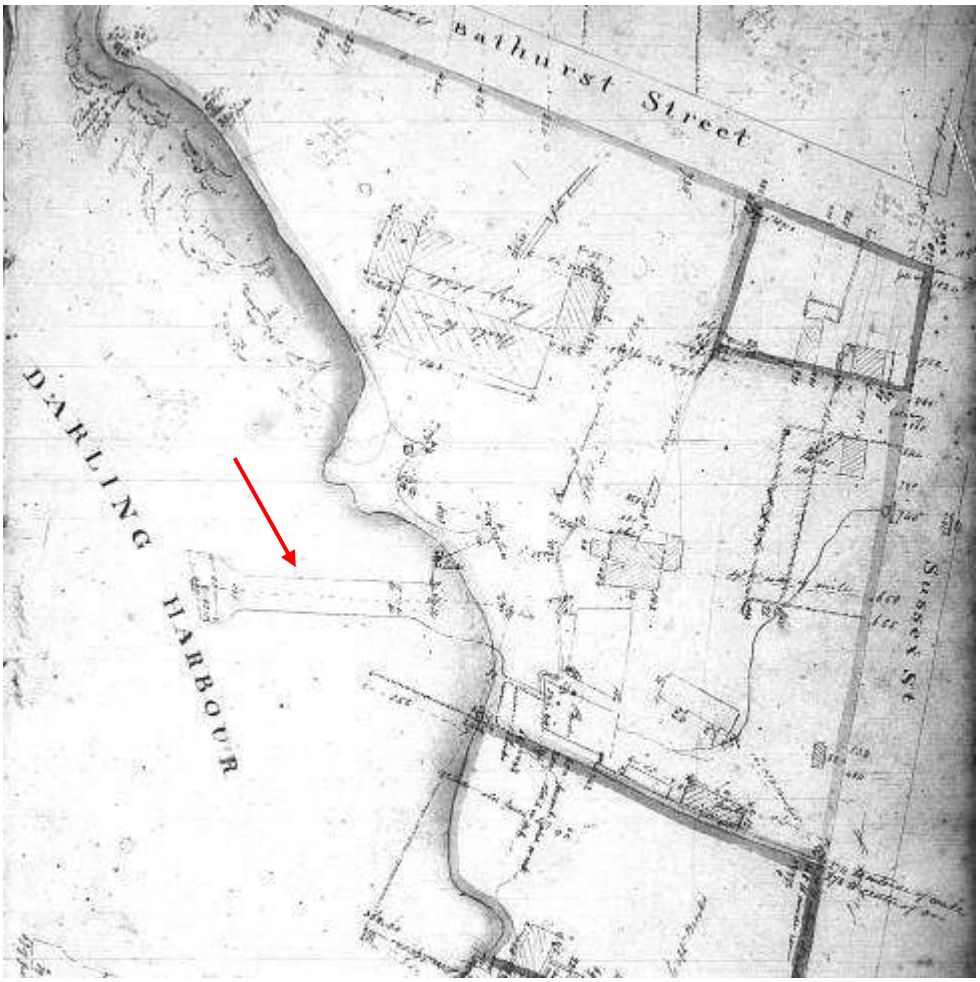

Figure 2.16: Survey of Barker's mill and wharf c1831 show the site's development and the wharf (red arrow). The measurements are in links. NSW Surveyor General's Fieldbook No 347 p4 Reel 2628 SRNSW.

With increasing land values around Darling Harbour, Thomas Barker sold some unused areas of waterfront, some of which included reclaimed land. By 1833 over 7 acres (2.83 ha) had been sold.[59] The mill was leased to his brother James Barker in 1834 and later James went into partnership with Ambrose Hallen, the author of the c1831 survey. Thomas Barker conveyed the mill 'in trust' to Barker & Hallen to manage during his trip to England in 1837. The extent of Barker's land and business holdings in Darling Harbour is illustrated in the 1842 plan (Figure 2.18). The property of his former mentor, and business competitor, John Dickson is to the south (Figure 2.19).

[58] *Australian* 16 May 1827: 3; *Sydney Gazette* 17 Oct 1829: 2; *Sydney Herald* 19 Dec 1831: 4.
[59] Casey & Lowe Pty Ltd, 'History of Barker's Mill Darling Harbour', from Report to CW-DC Pty Ltd, Sep 2002: 6; http://www.caseyandlowe.com.au/reptcct.htm

An illustration depicting the mill site c1837 under the management of Barker and Hallen includes the wharf in the background and is one of few images of the wharf (Figure 2.17).[60]

Figure 2.17: Enngraving used on Barker and Hallen's stationery in 1837. It provides a view of the mill site looking southwest, with the wharf and a ship in the background. Gother Kerr Mann Papers: Hely Papers, ML A2496 Item 26, cited in PWD 1984: 23, 191.

At the time of the mill's conveyance in trust to Barker & Hallen, the substantial mill consisted of three storeys above a ground floor and a cellar. In 1842 Thomas Barker regained control of the Darling Harbour property after its failure under Barker & Hallen's management.[61] Offsetting some of the losses, more land around the mill was subdivided and sold (Figure 2.18). A subdivision plan prepared in 1842 indicates the approximate location of the shore end of the wharf in relation to the site offered for sale. Further subdivision and development of the site occurred in 1844 and in the 1850s and 1860s.

Thomas Barker, in partnership with John Walker established a tweed mill on the site, making alterations to and adding to the building stock to accommodate new equipment. Barker's Mill ceased trading for a period of time in the 1850s. At various times the mills were leased to, or managed by others, and it is not known who retained control of the wharf or to what use it was put.[62] Land titles, including leases that might pertain to the wharf, warrant investigation.

[60] Gother Kerr Mann Hely Papers ML A 2496 -2 Item 26, reproduced and cited in PWD 1984: 23, 191.
[61] *Sydney Monitor* 11 Nov 1840: 2.
[62] Casey & Lowe Sep 2002: 32.

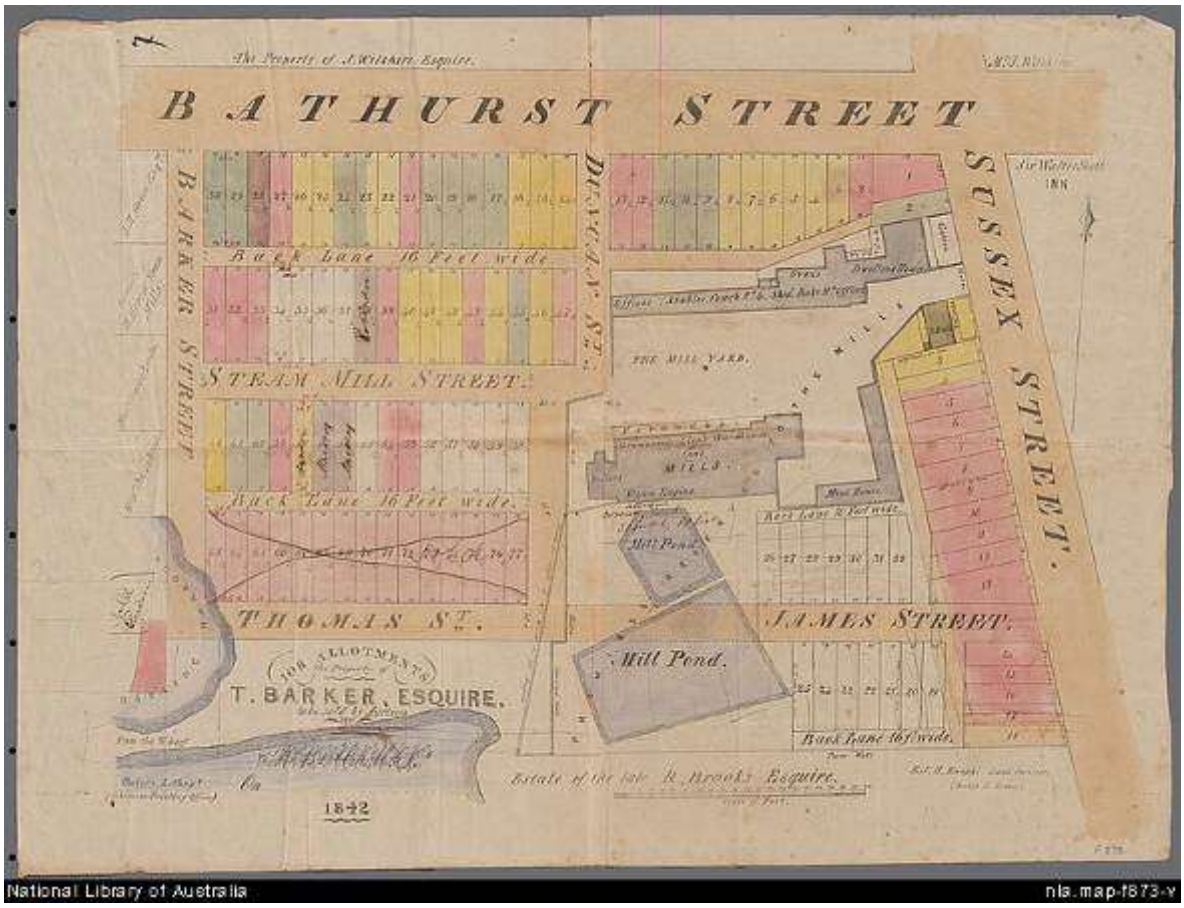

Figure 2.18: Subdivision plan showing portions of Barker's land offered for sale in 1842. Clear access between the mill, the wharf and Sussex Street was retained as integral to the profitability of the business. Map F 873 NLA.

Subsequent to the sale of subdivided allotments purchasers reclaimed tidal land along the shore of Darling Harbour. A plan of the head of the harbour prepared by Surveyor Bunn in 1855 shows the original high water line, the shoreline during Barker's occupation of the site, and what appears to be the post-reclamation shoreline at the time of the survey (the plan cannot be securely dated and notes suggest amendments in 1857). The position of Barker's Wharf is indicated in Figure 2.19. Possibly in anticipation of further reclamation, the configuration of the new shoreline is a dock-like formation in the vicinity of the former wharf.[63] Comparison with the 1836 plan indicates a shorter and broader structure (Figure 2.5). Changes in the wharf or dock might reflect changes to vessel design or docking and loading requirements.

By the early 1860s the head and shoreline of Darling Harbour had changed dramatically and a plan dated 1863 shows the wharf subsumed by the surrounding reclaimed land (Figure 2.20).[64] Details in the original plan are shown within the boundary of the 1863 shoreline with sections of it denoted as "Barker's Pier" and 'Old Jetty.' The term 'pier' is thought to refer to a solid stone or masonry part of the structure, while 'jetty' is likely to relate to a timbered area extending into the harbour. Definitions of the terms 'wharf', 'pier' and 'jetty' are often similar and non-specific making it difficult to interpret their usage on this and other plans. The form of this structure differs from the wharf at this location in the 1820s.

[63] Plan of the Head of Darling Harbour, Port Jackson, 1855 (alts 1857) Svyr Bunn, AO X1053, SRNSW.
[64] Untitled plan [Plan for office use…of Darling harbour taken from Plan of Chief Engineer], WG Bennett, Sep 1863, AO2630, SRNSW.

Figure 2.19: Part of the 'Plan of the Head of Darling Harbour, Port Jackson' showing Barker's grant and wharf in 1855. The original high water mark, former shoreline and new shoreline after reclamation are also shown. AO X1053 part 2 of 3 SRNSW.

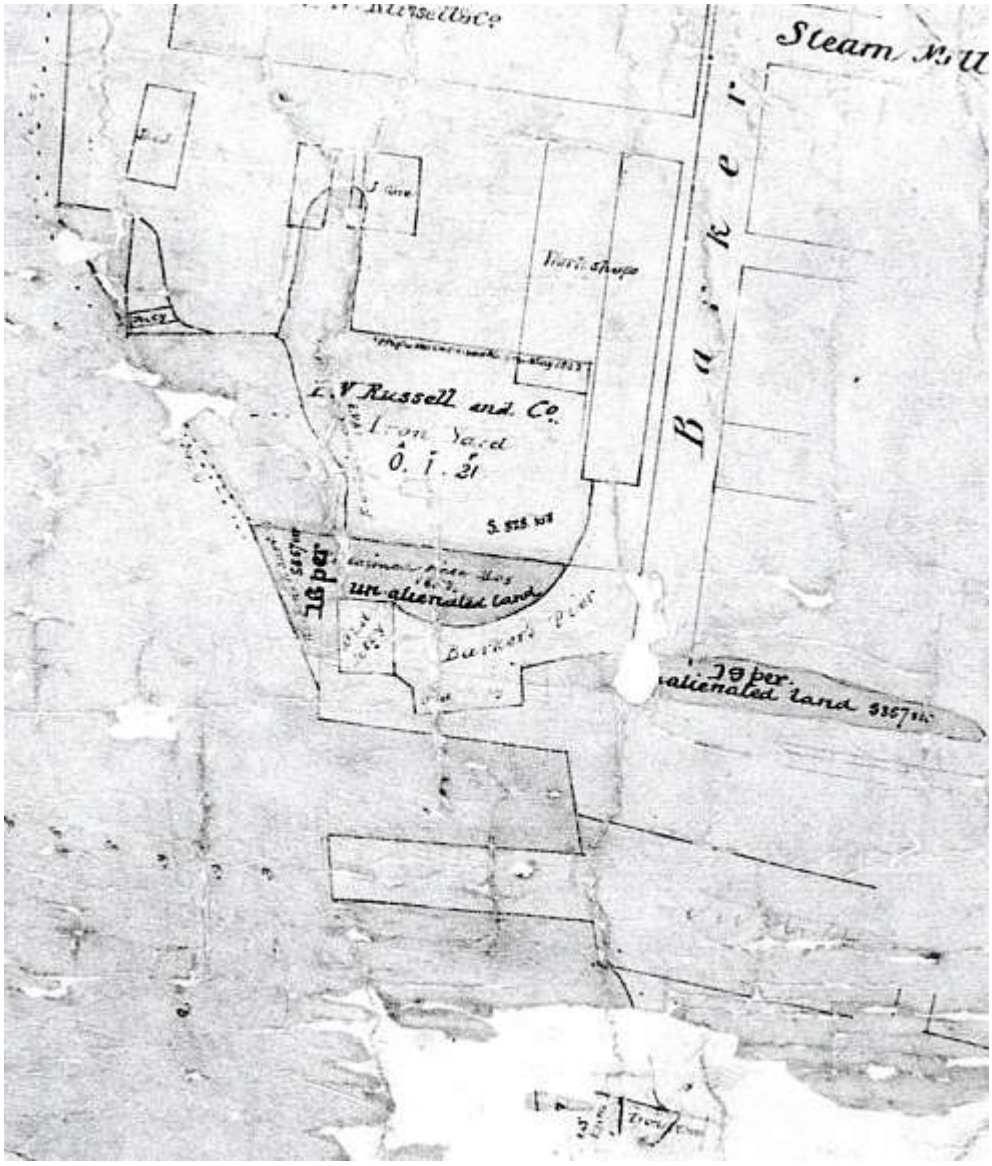

Figure 2.20: Part of a working plan of Darling Harbour dated Sep 1863 showing the extent of reclamation around Barker's 'Pier' and 'Jetty' at this time. The study area is immediately to the west, mostly in the water. AO 2630 SRNSW.

A wharf linked to Thomas Barker was identified in archaeological excavations carried out by Casey & Lowe in 2008-09. The excavated part of the eastern end of the wharf near the shoreline consisted of dressed and rubble sandstone blocks within a 'timber post and pile formwork'. The northern face was dressed, the southern face of the wall was corbelled and the infill was of compacted sand and stony material.[65]

2.3.3 Dickson's and Barker's Wharves

John Dickson died in 1843 and Thomas Barker in 1875. Dickson and Barker both made significant contributions to the industrial development of the area and growth of the economy of the Sydney colony. The wharves built by both men played integral roles in the running and development of their Darling harbour business enterprises and the colony's economy. They allowed access to deep

[65] Casey & Lowe Pty Ltd, *Darling Walk Archaeological Excavation 2008/9: Preliminary Results*, report to Lend Lease, June 2009, http://www.caseyandlowe.com.au/sitedw.htm

water suitable for a variety of shipping taking raw materials and manufactured goods in and out of the colony. As the harbour and shipping requirements changed, the wharves were altered and at times replaced by different structures. Other than maps and plans shown above no detailed evidence has been located about their construction.

2.4 Land Reclamation at Darling Harbour (1815 to early 1900s)

The history of reclamation of the Darling Harbour landscape is long and complex. It involves private and government reclamation of the bay and is documented in maps and plans, land titles, and the records of government authorities and trusts. An understanding of reclamation in Darling Harbour generally provides a context for reclamation of land within the study areas.

Private reclamations occurred in a frequently piecemeal manner and are difficult to document. The granting of reclaimed land often occurred a long time after it had taken place. As discussed in above, by 1815 John Dickson had formed a millpond at the head of the harbour to dam the fresh water for use in his steam engine. Over the subsequent decades business owners like Dickson and Thomas Barker carried out land reclamation along the shores of their holdings. Work was carried out in conjunction with construction of wharves and mill and warehousing infrastructure linked to their businesses. At times due to economic imperatives, and at other times with profit in mind, portions of their grants were subdivided and sold and new owners along the shoreline also reclaimed land on which to expand their interests. Owners later formally acquired the title as new government grants.

The availability of reticulated water in the city from 1844 and the expansion of the water supply system between 1854-58 led to the redundancy of Dickson and Barker's millponds and they were filled.[66] The reclamation of Dickson's millpond between 1855 and 1857 allowed for the release of land for development (Figure 2.19).[67] Henry Lloyd's painting from this 1853 illustrates the eastern and western foreshore at this time (Figure 2.21). From 1857 the Sydney City Council treated the discussion of reclamation as an urgent public matter due to the health and safety issues surrounding pollution, sewerage and drainage problems being experienced around the foreshore.[68] Reclamation at the head of Darling Harbour was proposed in the findings of the 1857 *Report of the City of Sydney Council's Special Committee for the Reclamation of Land in Darling Harbour and Woolloomooloo*. The proposals sought to form new streets and wharves and provide the opportunity to install an effective sewerage system to deal with the escalating pollution problem. The report was presented to the Legislative Assembly but the government did not take any action.[69]

In February 1864 a Select Committee of the Legislative Council was appointed to investigate and report on the reclamation and improvement of Darling Harbour and Blackwattle Bay. The Chief for Harbours and Rivers, Edward Orpen Moriarty, and the City Council's Engineer, Edward Bell, gave evidence. Two reclamation proposals were presented, with one extending to Bathurst Street and the other to Liverpool Street. Proposals for landuse by businesses and the general public were presented. The problems identified at Darling Harbour included changes in the channel due to successive reclamation, diminished tidal flow and ongoing silting. Increasing problems were experienced with sewage, drainage and pollution at the head of the bay. Outflow from the Hay Street sewer was identified as the cause of health problems in the community. Among a number of advantages it was thought that reclamation would contribute to the city's and the state's economy.

[66] WV Aird, *The Water Supply, Sewerage and Drainage of Sydney*, MWS & DB, Sydney, 1961: 5-6.
[67] Plan No AO X 1053 SRNSW.
[68] *SMH*, 22 Dec 1857: 4; *SMH* 16 Mar 1858: 4.
[69] *SMH* 22 Dec 1857: 4; *SMH* 16 Mar 1858: 4; *SMH* 30 Apr 1858: 3.

The increased wharfage was seen as advantageous with the potential for better coordination of ships and railway for the transportation of goods and produce.[70]

Figure 2.21: View looking northwest from the western edge of Darling Harbour, south of the Darling Harbour goods line railway. This appears to be taken from higher ground and the harbour in this area has not been reclaimed. The construction of the railway causeway has started but it is not completed. Henry Grant Lloyd 1853 "Darling Harbour Sydney, from Ultimo, 11 Dec. 1853", Sketches of N. S. [New South] Wales, 1857-1888, State Library NSW, DL PX 42.

Reclamation at the head of Darling Harbour was set to proceed in August 1864 with plans to reclaim about 18 acres (7.28 ha) with the boundary line to curve round from the foot of Liverpool Street to a point near the end of the Darling Harbour Branch Line (See Section 2.6). A contract was let to Martin Gibbens to transfer spoil excavated from the railway terminus yard to be transported down the branch line and tipped into the harbour. Two shillings and two pence was paid per cubic yard for the laborious work and the engine drivers wages came out of the contractor's fee.[71] A thousand yards of soil and debris were deposited a day in the reclamation process. By February 1865 the stone dyke, built by 'Mr Mayes' (Robert Maze) to contain the fill was completed at a cost of £1526. The retaining wall was 750 feet (228.6 m) long and averaged 9 feet (2.74 m) in height, 3 ½ feet (1.07 m) above the high water mark.[72] Reducing the quantity of fill to be transported, it is likely that old wharf and pier structures in the reclamation area were incorporated in the fill. An 1865 City of Sydney Trig Survey indicating the reclamation at the head of the harbour in the vicinity of Dickson's land is reproduced in Figure 2.13.

[70] 'Progress Report from the Select Committee on Darling Harbour & Blackwattle Bay: Minutes of Evidence, 1863-4,' NSW V & PLA, Sydney, 1864: 1089-1099.
[71] *SMH* 20 Aug 1864: 8; NRS 16348 Item 1864/39 SRNSW.
[72] *SMH* 18 Feb 1865: 8; *SMH* 21 Mar 1865: 10; NRS 12419 No 2/896A (part), SRNSW; NSW Statistical Register 1865 cited in PWD [1984]: 65.

Reclamation also took place on the western shore of Darling Harbour and by 1865 an embankment was formed east of Pyrmont Street, extending between Allen Street and a point just south of Fig Street. It is not known when the remaining 'pond' was filled (Figure 2.22). The Darling Harbour Railway goods line is shown running along the embankment and an unnamed wharf, associated with the goods line, extends into the harbour opposite Fig Street.[73]

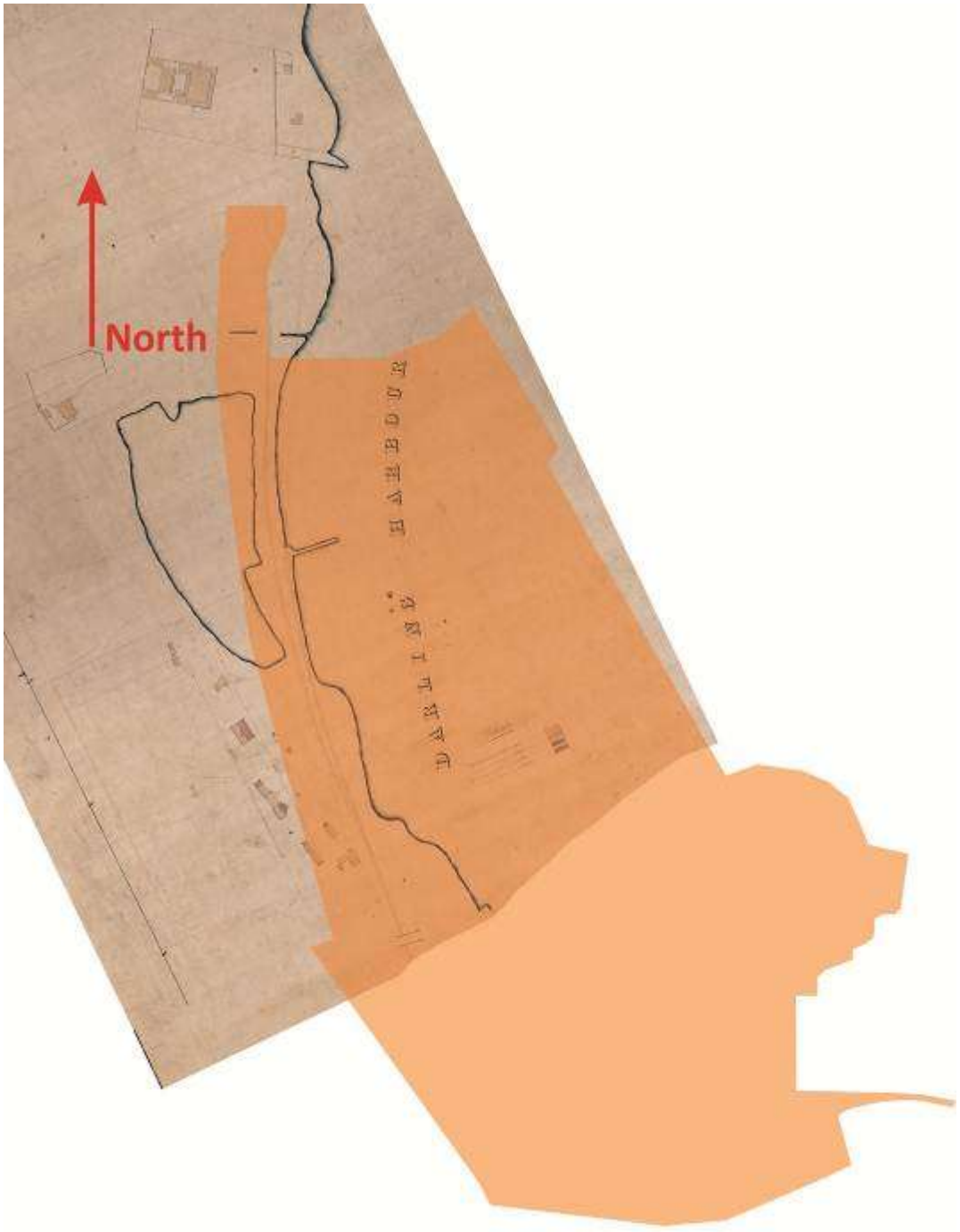

Figure 2.22: Trigonometrically survey showing Pyrmont in 1865. The planned alignments of Pyrmont Street, Fig Street and Allen Street are shown pencilled. The area was sparsely settled around the shores. Trig Survey, Section W, 1865, Historical Atlas of Sydney, City of Sydney Archives.

[73] Survey, Section W, 1865, City of Sydney Archives.

A plan of Darling Harbour prepared for the Harbour Commissioners in 1866 records the extent of the reclamation ultimately carried out at his time, and the position of the stone wall in relation to landmarks such as Dickson's dam wall and pier and Barker's wharf (Figure 2.23). Using data from as early as 1825, the low water lines at various times, as well as contemporary depth soundings, were recorded. The area with diagonal hatching represents 'encroachment' on the area of water by 'reclamation or otherwise'.[74]

Figure 2.23: This fiugre shows all of the SICEEP Bayside and Darling Central study area on four joined trignometrical survey sheets (1865). The joins are somewhat problamatic and therefore this overlay is approximate only.

[74] 'Plan of Darling Harbour made by order of the Harbour Commissioners,' Surveyor General's Office, Sydney, Jun 1866, ML Q912.9441/11.

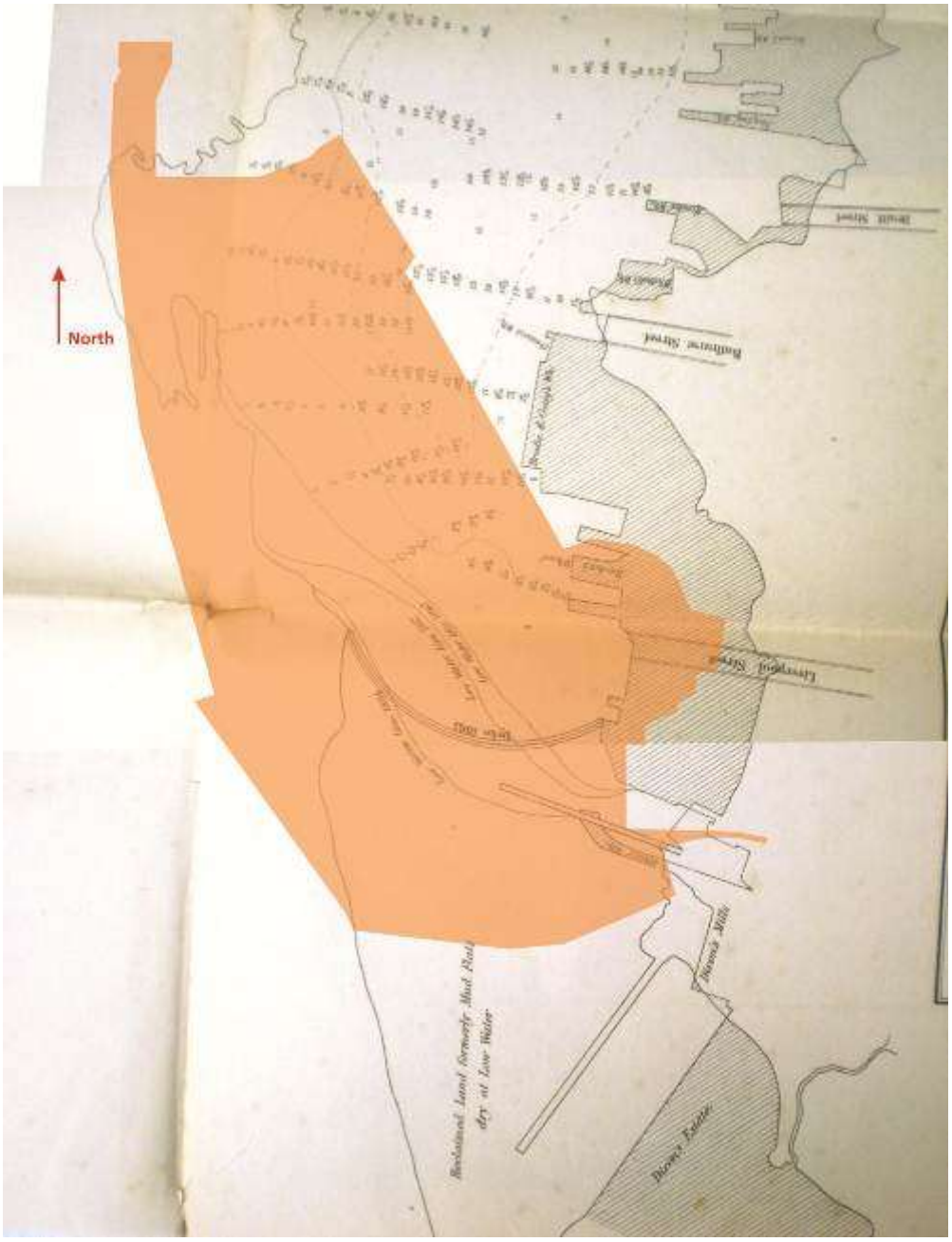

Figure 2.24: Portion of the Sydney Harbour Commissioner's plan of Darling Harbour dated 1866. Surveyor General, Sydney, June 1866, ML.

A report by the Harbour Commissioners in April 1866 concluded that rapid and serious shoaling or silting was still taking place. It was agreed that it was largely due to silt and rubbish washed down from the streets, either directly or from the sewers. The City Council was criticised for using the harbour as an easy and cheap method of rubbish disposal at the expense of the community and environment.[75] As pointed out in John Broadbent's *Ecology of Pyrmont 1788-2008*, a watercolour of Darling Harbour attributed to Samuel Elyard dating to the mid to late 1860s depicts the altered harbour landscape (Figure 2.25). Looking north, a building thought to be Dickson's mill building is visible on the right hand side opposite the rocky outcrops of Pyrmont which are almost clear of native vegetation. The timber Pyrmont Bridge completed in 1857 connects the two shores and the reclaimed land at the head of the harbour is depicted in the foreground.

[75] J Broadbent, *Ecology of Pyrmont Peninsula 1788-2008,* 2010 (5): 506, City of Sydney Archives.

Figure 2.25: Watercolour of Darling Harbour attributed to Samuel Elyard (1860s), looking north. The reclaimed sections of Darling Harbour are in the foreground with Pyrmont Bridge in the background. Compare with Figure 2.21. ML DG XV*/ Sp Coll/Elyard/3.

JW Deering's 'Plan of Blackwattle Swamp and Surrounding Grants' prepared in 1871 provides a record of Darling Harbour at this time and location of the area proposed for new wharf and the almost completed reclamation (Figure 2.26). The plan includes post-1871 notations (up to 1914) as well as documenting some aspects of the historical development of Darling Harbour.

A small amount of reclamation in Darling Harbour is associated with the construction of the Iron Wharf from 1874-76, a substantial iron structure on the western shore (Section 2.7). The wharf extended approximately from Liverpool Street, extending northwest towards the Pyrmont Bridge. Abutting the wharf was a new stone retaining wall with fill packed behind. The wall is visible at the northern end of the wharf shown in Figure 2.27.

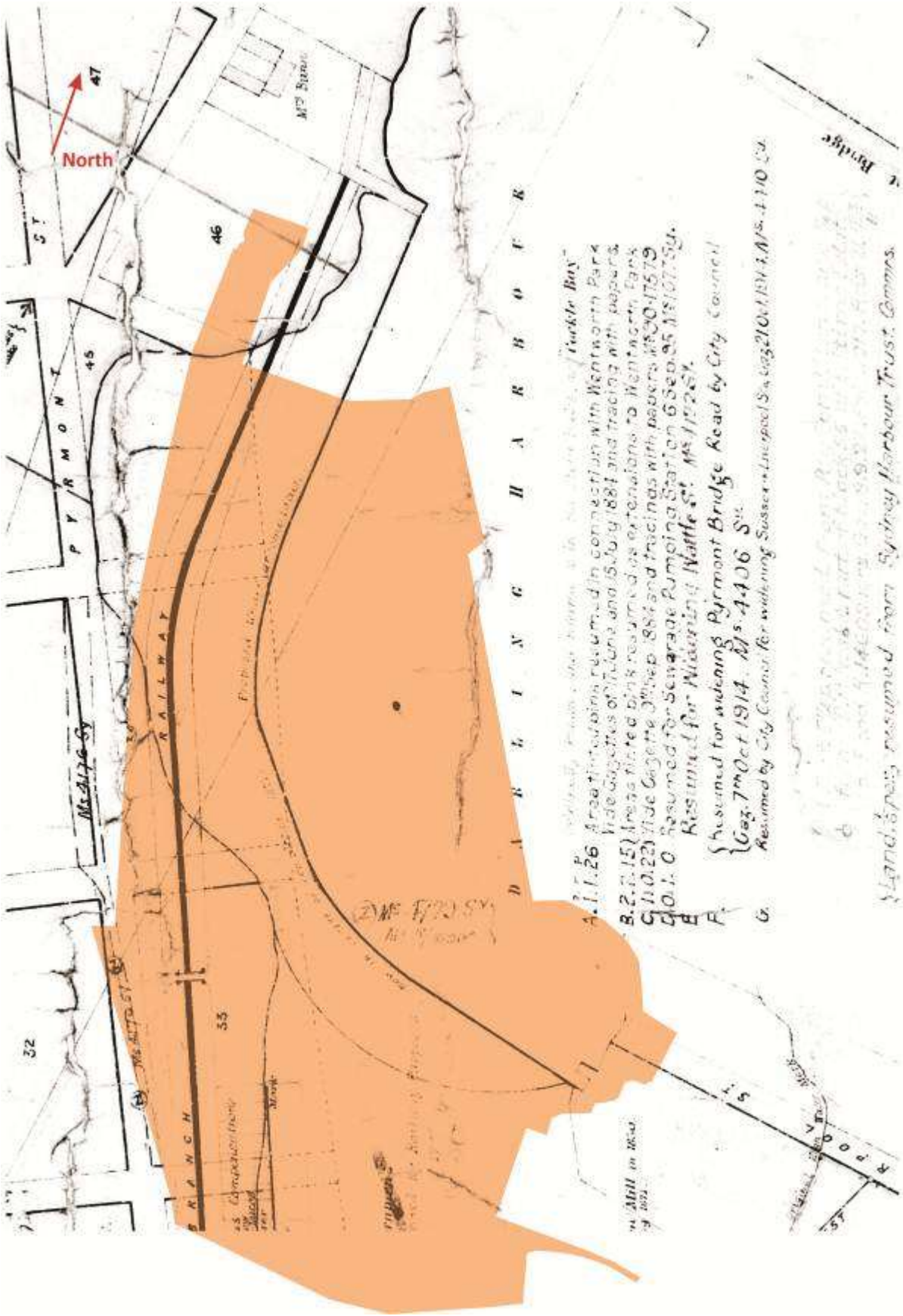

Figure 2.26: Part of JW Deering's 1871 plan showing the development of Darling Harbour by this date and the extent of reclamation adjacent to the proposed new wharf accommodation. AO No 1624 part 3 of 3, SRNSW.

Figure 2.27: Undated photograph of the Iron Wharf, looking southeast. The stone seawall is visible behind the wharf and the fill almost complete suggesting a date of c1876. SPF 944 ML, SLNSW.

Silting remained a problem and it was reported that between 1874 and 1876, 7000-8000 tons of silt had been dredged from Darling Harbour. In early 1876 two large dredges were used to deepen the harbour near the wharves.[76] A plan of Darling Harbour dated 1878 records Darling Harbour's western shoreline, goods line and the Iron Wharf in the vicinity of the study area (Figure 2.28).

By 1900 the condition of Darling Harbour again came under the scrutiny of the Government and the city council. A plague scare and the proliferation of obsolete industrial structures signalled plans for resumption and redevelopment. Members of a Royal Commission for the Improvement of the City of Sydney and its Suburbs were appointed on 14 May 1908. Investigations were made into transport, slum removal and housing, future city growth (including the expansion of wharves, improvement of transportation hubs for economic development), and beautification. The commissioners accepted the Department of Public Works scheme for Darling Harbour, similar to one submitted to the Parliamentary Standing Committee in 1894. It provided for the reclamation of 14.5 acres exclusive of wharfage from the end of Bathurst Street to a point on the Pyrmont side near the meat market. It also included the construction of an overbridge to connect Bathurst Street to Pyrmont and connection of the current goods line to the deep sea wharves at Pyrmont.[77]

[76] *SMH* 5 Jul 1876: 6.

[77] Royal Commission for the Improvement of the City of Sydney, Final Report and Plan No 37, 1909, Historical Atlas of Sydney, City of Sydney Archives.

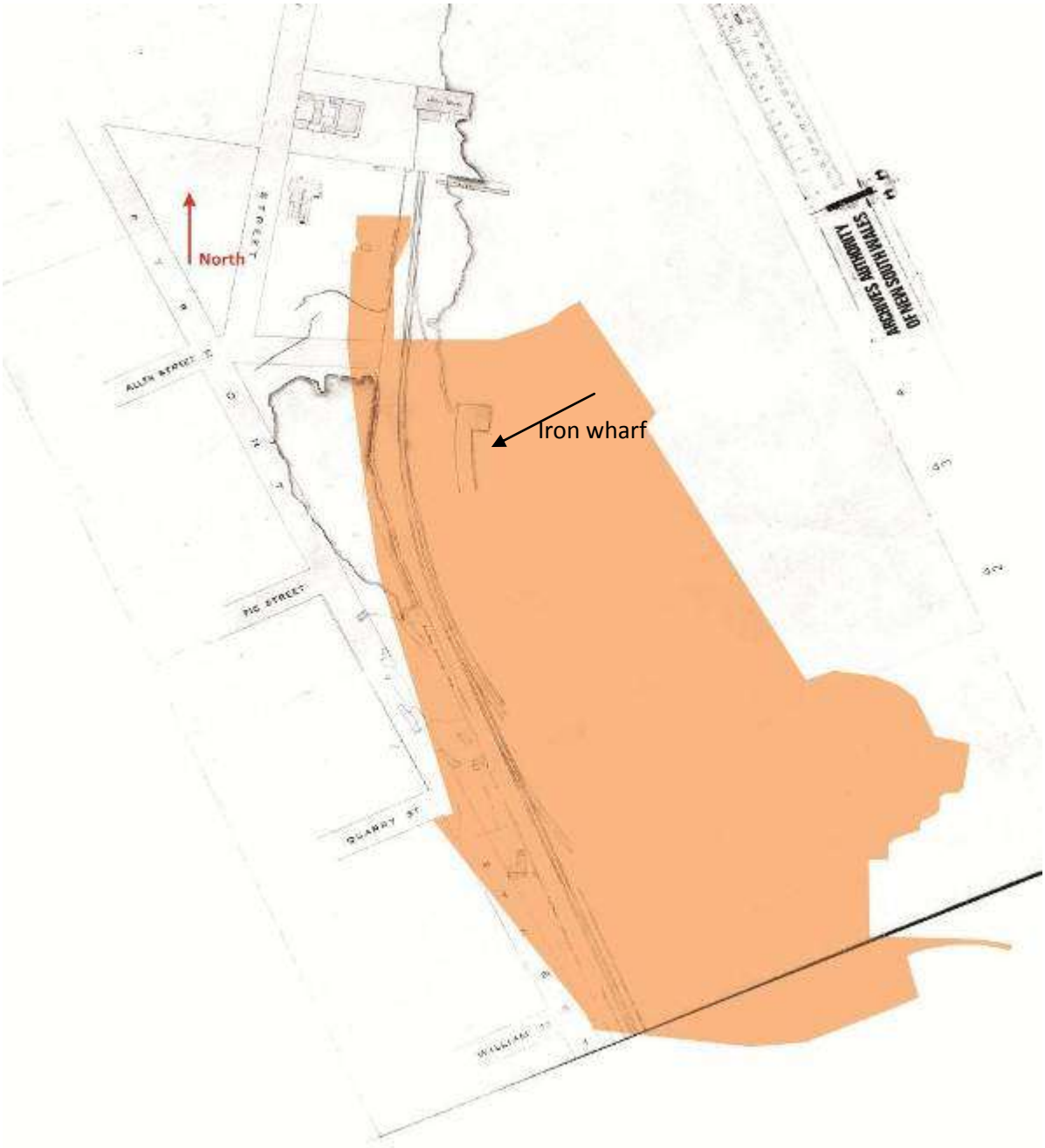

Figure 2.28: Part of a plan of the head of Darling Harbour showing development in the study area in 1878. The goods line and Iron Wharf are shown, as is a still unreclaimed area to the west near Pyrmont Street at the northern end of the study area. AO Map No 464 part 1 of 2, SRNSW.

The recommendations of the 1909 Royal Commission included the reclamation of Darling Harbour up to Bathurst Street to Pyrmont as presented in a Public Works Department scheme. Fourteen and a half acres (5.87 ha) exclusive of wharfage was to be reclaimed. The total cost of the scheme including reclamation, construction of stormwater sewers, timber wharf, stone dyke and overbridge excluding land resumptions was estimated at £178,000.[78]

[78] Royal Commission for the Improvement of the City of Sydney and its Suburbs: Final Report, 1909: xxiv, xii, City of Sydney Archives.

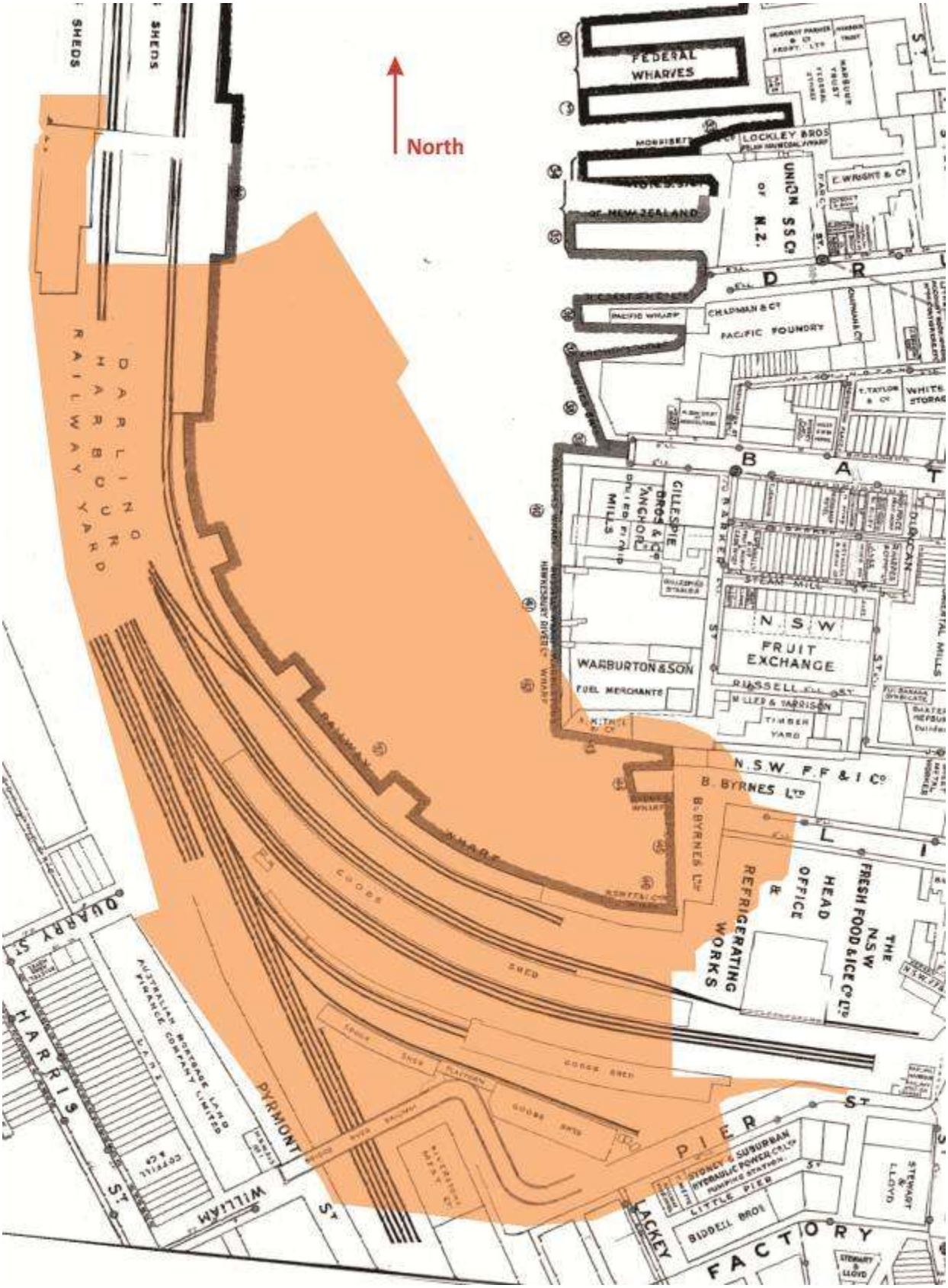

Figure 2.29: Plan of the City of Sydney dated 1910 and showing the head of Darling Harbour ending at a point not far from the western end of Liverpool Street. Roberts & Moffat, City of Sydney Archives.

The reclamation did not extend to Bathurst Street at this time, with work terminating just south of Liverpool Street (Figure 2.29). The expense of further reclamation as well as EO Moriarty's warnings about its impact on scouring of the tide at the entrance to Port Jackson might have influenced the decision to limit the work done.[79]

With an increasing volume of trade and larger vessels, in 1913 the Sydney Harbour Trust Commissioners pursued new schemes to meet the pressing need for wharf space and modern cargo facilities. The government began resuming properties in Pyrmont and Ultimo in preparation for work on the west side of Darling Harbour. Despite material shortages experienced during the First World War the project continued at various sites, including Darling Harbour.[80] In April 1917 the construction of a new goods shed, and other alterations and additions, were underway. Reclamation extending to Bathurst Street using surplus material from the city railway was also in progress and one span of the Iron Wharf had been removed and tipping of spoil commenced.[81] Work continued slowly. Photographs of Darling Harbour at this time document the reclamation process (Figure 2.30, Figure 2.31, Figure 2.32, Figure 2.33).

Figure 2.30: Fill from the Sydney railway construction dumped on the east shore of Darling harbour. NRS 17420 Item 848/15 SRNSW.

Figure 2.31: Fill extending along the east and southern shore of Darling Harbour and a wall of timber shoring built to temporarily retain the fill. NRS 17420 Item 848/16 SRNSW.

[79] PWD [1984]: 66.
[80] Fitzgerald & Golder 2007: 87.
[81] *SMH* 25 Apr 1917: 12.

Figure 2.32: View looking northwest toward Pyrmont showing what appear to be remnants of the wharf. NRS 17420 Item 848/18 SRNSW.

Figure 2.33 View of Darling Harbour showing the reclamation nearing completion mid-1920s. NRS 17420 Item 848/20 SRNSW.

In 1923 four acres (1.62 ha) of land had been filled, with a revised estimate of 23 acres (9.31 ha) in total to be reclaimed. The government saw the increased reclamation of land for the wharves and goods yard as a cheaper option than the resumption of properties.[82] Delays were experienced due to the need to coordinate it with the construction of new conduits for the Ultimo Power House's water cooling system, as well as the extension of the city's stormwater and sewer; both required access to the harbour for their pipelines (See Section 2.8). Newspaper reports suggested in 1927 that in the early stages of reclamation second-hand building materials had been used as fill, including stone from demolitions on the Sydney Harbour Bridge construction site. The practice was discontinued due to the authority's preference for stone from the city railway site.[83]

[82] *SMH* 20 Mar 1923: 8.
[83] *SMH* 26 Jan 1927: 8.

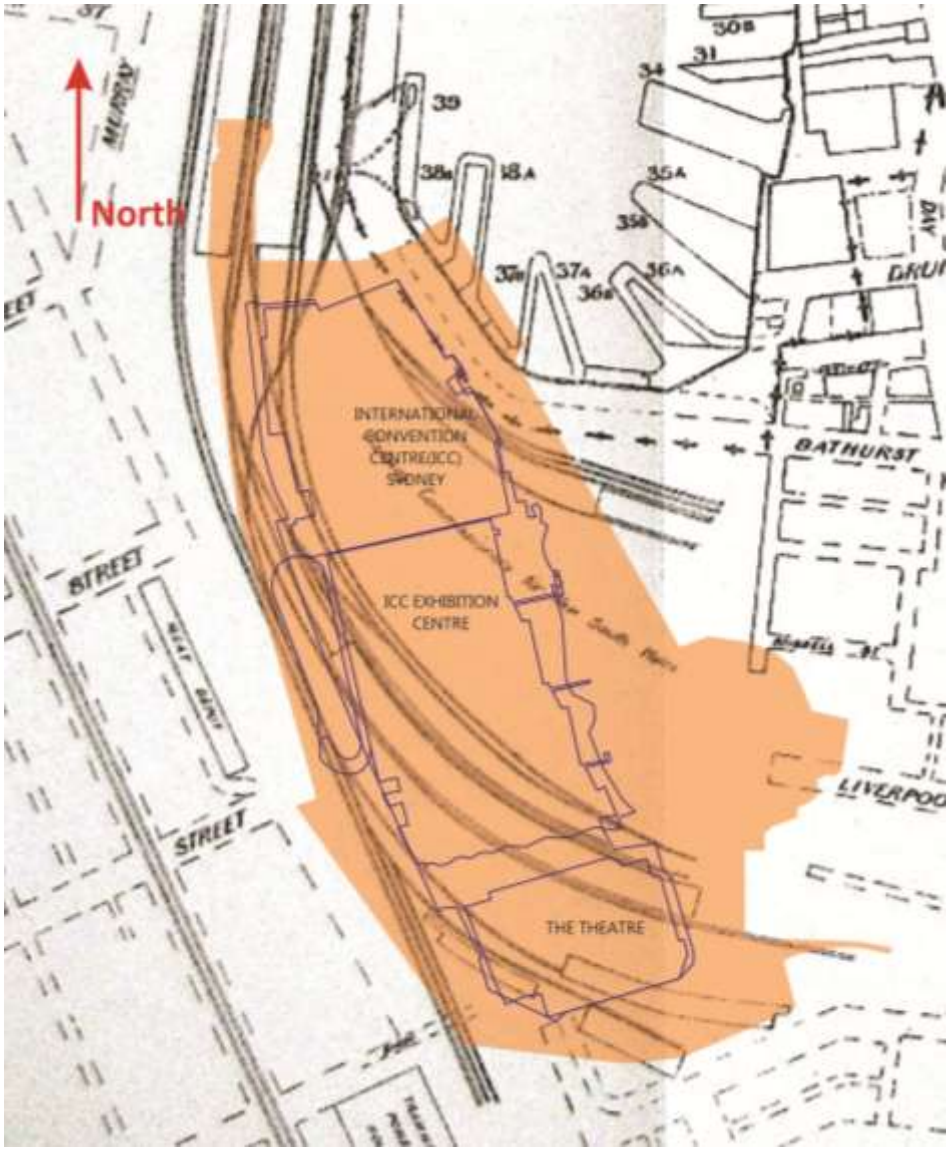

Figure 2.34: Map showing Darling Harbour wharfage facilities in 1929 (*Sydney Harbour Trust Commissioners Report*, year ending 30 Jun 1929).

In January 1928 a number of jetties were complete but Wharf No 39 was delayed due to continuing work on the Ultimo Power House's water intake conduits. Progress was being made, however, on the construction of the seawall behind Wharf Nos 37 and 39.[84] Work was completed by 1929 and the new facilities at Darling Harbour are shown in the map and aerial photograph in Figure 2.34, Figure 2.35.

[84] *SMH* 4 Jan 1928: 9.

Figure 2.35: Aerial photograph of Darling Harbour showing the extent of reclamation and new wharfage, 1949. Sydney Aerial Survey: AO037, Historical Atlas of Sydney, City of Sydney Archives.

2.5 Industrial and Commercial Development of Darling Harbour, from 1850s

The Sydney Harbour Trust, later renamed the Maritime Services Board, was established by the NSW Government in 1901. The Trust resumed land for the wharf facilities, oversaw the redevelopment of the wharves and later managed them. The Railways Department managed the goods line, yards and sheds as well as the adjacent Ultimo Power House and associated infrastructure such as the water cooling system conduits and screens.

2.6 Overview of History of Darling Harbour Railway Goods Line and Goods Yards

In the first half of the 19th century, goods were transported to and from the Darling Harbour wharves on bullock carts. The construction of the railways, however, brought great changes to communications, agriculture and industry. The former railway goods line and part of the site of the goods sheds is associated with the study area. A brief summary of their history is provided below to provide context for significant items identified in Casey & Lowe previous Archaeological Heritage Impact Statement of the study area (August 2012).

The economic growth of the colony and development of industries outside of Sydney led to demand for better access to ports such as Darling Harbour. In 1853, with a proposal to connect Darling Harbour to the main western railway line, the Sydney Railway Company (formed in 1849) resumed a 7-acre strip of land (2.83ha) from the trustees of the Harris Estate. The strip of land connected Cleveland Paddocks, the site of the Sydney Railway Terminus (Central Station), to proposed wharves on the western shore of Darling Harbour. An additional 7½ acres (3.04 ha) was resumed for a goods terminus at Pyrmont.[85] In 1863-64 a Government investigation exposed the difficulties in formally acquiring the land in *fee simple* due to a complex inheritance arrangement entailing the land.[86]

A portion of a c1853 plan showing the line of the proposed rail corridor in relation to the study area is shown below (Figure 2.36). By 1854 the NSW Government had taken over the financially troubled Sydney Railway Company acknowledging the potential of the railway project to stimulate development in Pyrmont and Ultimo, adding value to and businesses in the locality.[87] The Darling Harbour Branch Line opened c1859.[88]

The first phase of construction of the Darling Harbour Goods Yard spanned 1874 to c1888 and second phase saw it expand to Darling Island wharves at Pyrmont Point in 1891. Further development took place in association with wharf expansion from the 1920s. These periods of development are expanded upon in the NSW Public Works Department's Darling Harbour Conservation Study.[89] A timeline of key events is reproduced in Appendix C.

[85] 'Darling Harbour Rail Corridor,' SHFA Heritage Register, Last update: Monday 31 May 2010; 'Plan of Darling Harbour Branch of the Sydney Railway,' c.1853, SRNSW, AO Map No 6381; Fitzgerald & Golder, *Pyrmont & Ultimo Under Siege*, Halstead Press, Ultimo, 2007: 45.

[86] 'Progress Report from the Select Committee on the Railway through the Ultimo Estate,' NSW Legislative Assembly, 1863-4, Government Printer, Sydney, 1864[4]: 233.

[87] 'Darling Harbour Rail Corridor,' SHFA Heritage Register, Last update: Monday 31 May 2010.

[88] *SMH* 27 Sep 1855: 4. 'Four-fifths' of the branch line was completed by November 1859. *SMH* 27 Sep 1859: 4. *SMH* 27 Dec 1859: 6.

[89] PWD [1984]: 80.

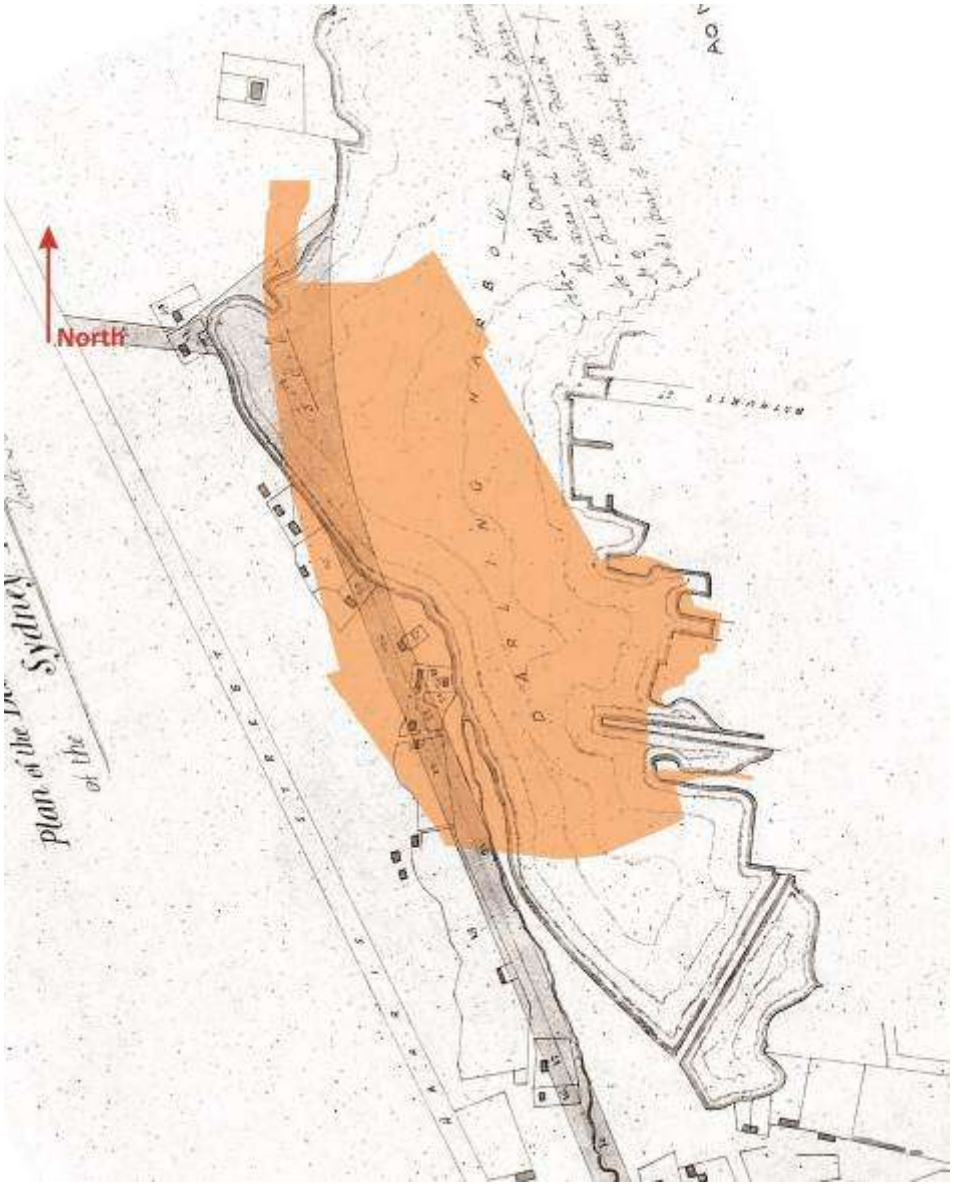

Figure 2.36: Part of the 'Plan of the Darling Harbour Branch of the Sydney Railway', dated c.1853. The approximate location of the study area is indicated. AO No 6381 SRNSW.

2.7 The Iron Wharf, 1869-1876

The rapid extension of the NSW railway network and steep increase in goods traffic influenced the government's decision to proceed with the development of Darling Harbour as a goods terminal. The Redfern railway terminus and Sydney Goods Yard were overcrowded and additional space was urgently needed, as well as a modern efficient place to load and unload shipping freight. By 1869 £35,000 was voted for the construction of the Iron Wharf.[90] Some of the design drawings for the proposed wharves are reproduced in Appendix B.

The position of the public wharf followed a gentle curve from Liverpool Street up the western side of Darling Harbour toward Pyrmont (Figure 2.37). It closely followed the Engineer in Chief of the Harbour and Rivers Branch, EO Moriarty's recommendations to the Select Committee on Darling

[90] PWD [1984]: 65.

Harbour's reclamation in 1863-64.[91] As described in the NSW State Heritage Inventory, the Iron Wharf consisted of:

> Large tubular cast iron columns, 5 feet in diameter at the top with 5 feet 6 inches lower sections were sunk into the harbour floor and then filled with concrete. They supported iron lattice work trusses, spanning 60 feet between centrelines of the piers at the front of the wharf, transverse iron girders 29 feet 6 inches, and along the back of the wharf further iron girders, 62 feet 7 inches on the curved sections. Four bays and fives jetties were built which projected 38 feet from the front of the wharf and were 60 feet wide. Each bay consisted of four spans of lattice work girder, measuring 60 feet between piers for a total length of 240 feet for each bay.[92]

The wharf deck was made of hardwood planks. The ironwork was completed in early 1874 and the stone retaining wall, to which the wharf was anchored, and infill behind were completed by 1876. The total built length of the Iron Wharf was 1,260 feet (approx. 384m).[93] The original design included six bays with projecting jetties but only four bays and five jetties were built. The jetties projected 38 feet (11.58m) from the face of the wharf and were 60 feet (18.29m) wide. Open sheds with ornate ironwork in the plans are thought not to have been constructed.[94] An illustration of the wharf published in 1874 (Figure 2.37) shows the stone retaining wall had not been built but reclamation between the 1865 seawall and the Iron Wharf seawall had commenced; compare Figure 2.27. The Iron Wharf dominated the western Darling Harbour foreshore (Figure 2.40, Figure 2.41).

Figure 2.37: Illustration of the Iron Wharf, Darling Harbour published in the *Illustrated Sydney News* on 30 January 1874. SRC 1819, ArchivePix, City of Sydney Archives.

[91] PWD [1984]: 65.
[92] Exhibition Centre Precinct - Archaeological Remains - Iron Wharf, Inventory Sheet, NSW Heritage Register, Database No 4500467.
[93] NSW Heritage Inventory, Database No 4500467.
[94] PWD [1984]: 71.

The estimated expenditure for the construction of the Iron Wharf was raised in 1872 to £35,000 to £50,000 to include the stone retaining wall and infill (Figure 2.27**Error! Reference source not found.**). It is unclear if the final expenditure included the steam cranes installed on the wharves by 1880 (Figure 2.38, Figure 2.39). The steam-powered cranes associated with the wharf were installed between 1878 and 1885.[95]

Figure 2.38: The Iron Wharf with overhead crane, nd, c1880. GPO 1 - 07062, SLNSW.

Figure 2.39: The Iron Wharf with overhead travelling crane, nd, c1880. GPO 1 - 07061, SLNSW.

The Iron Wharf was considered to be a 'contemporary marvel of engineering' eclipsed to some degree 15 years later by the Hawkesbury River Railway Bridge. The form and style of the wharf bears similarities to English pier construction, however the engineering and scale of the supporting piles differs. The very substantial cylindrical piles are similar in type to those used in bridge construction in NSW. Moriarty's proposals in 1872-73 for the construction of iron wharves at other locations were unsuccessful. Norman Selfe, another prominent engineer of the era, opposed the use of iron for wharf piles, preferring instead timbers such as ironbark or turpentine.[96]

With the expansion of the railway goods line and construction of the goods yard, the construction of the Iron Wharf paved the way for the establishment of Darling Harbour as the major goods handling hub for Sydney. The configuration of the wharf influenced the design of the adjacent railway sidings and goods yard, and the location of sheds.[97] The amount of traffic on the wharves resulted in the renewal of the planking in 1891.[98] By 1911 the quantity and type of goods, especially timber, being offloaded had outgrown the public wharf. The curve of the wharf also presented difficulties for ships in docking.[99]

By April 1917 improvements to Darling Harbour were underway to accommodate increased goods traffic. Reclamation was to be extended to Bathurst Street and one span of the Iron Wharf had already been removed. Sections of the wharf were cut and dropped into the harbour and subsequently buried.[100] A panorama of Darling Harbour in 1919 provides a record of the western shore at this time, and another c1920 photograph provides more details of the work being undertaken to expand and improve the outgrown goods facilities (Figure 2.42, Figure 2.43).

[95] PWD [1984]: 74, 80.
[96] NSW Heritage Inventory, Database No 4500467; PWD [1984]: 74.
[97] NSW Heritage Inventory, Database No 4500467. The impact of the curved design of the wharf had an enduring impact on goods and fruit sheds built in c1957 and c1960 respectively, both following the curve of the former wharf long after it had been demolished.
[98] *SMH* 8 Oct 1891: 3.
[99] *Clarence & Richmond Examiner* 24 Oct 1911: 6.
[100] *SMH* 25 Apr 1917: 12; NSW Heritage Inventory, Database No 4500467.

Figure 2.40: Panorama from Town Hall, 1870s, looking west over the reclaimed land at the southern end of Darling Harbour with the Iron Wharf along the western foreshore. A number of railway buildings are in the left middle ground. The Darling Quarter (Walk) site is in the middle ground. The part of the study area to the west of Darling Quarter was still harbour. There are a number of houses along the western foreshore of Ultimo and Pyrmont, some of which may be within the study area. City of Sydney.

Figure 2.41: Panorama from Town Hall, 1870s, looking west with the Iron Wharf along the western foreshore. There are only a few bulidings along this part of the foreshore possibly within the study area. In the middle ground, behind the Iron Wharf is the embankment built for the Darling Harbour goods line which leaves a body of water (red arrow) behind it which is yet to be reclaimed. There is boathouse on the foreshore. City of Sydney.

Parts of the wharf were uncovered during construction in Darling Harbour in 1985. A section of ironwork was given to the Powerhouse Museum but subsequently scrapped. Other parts of the Iron Wharf were reburied in situ.[101]

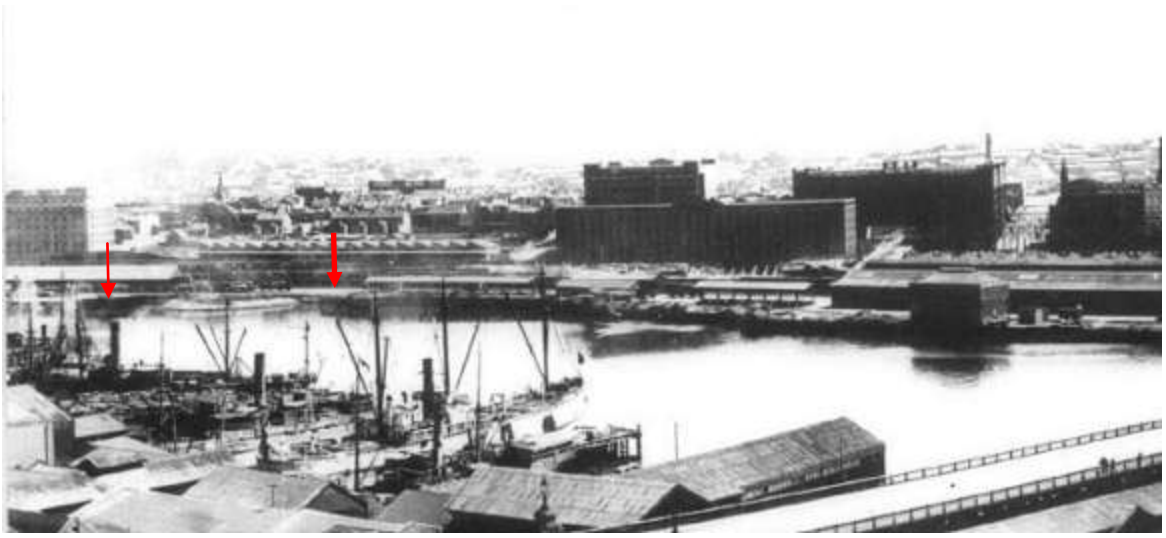

Figure 2.42: A photograph looking southwest in 1919 records the Iron Wharf, background (red arrow), prior to the next stage of reclamation work in Darling Harbour. 'Moore Photo 1919' ML, reproduced in PWD [1984]: 111.

Figure 2.43: A photograph looking northwest at the Iron Wharf, Darling Harbour, c1920, at the beginning of demolition work. NRS 17420 Item 848/18 SRNSW.

[101] Database No 4500467, NSW Heritage Inventory.

2.8 Ultimo Power House Cooling System

The Ultimo Power House is considered one of the oldest and most important industrial buildings in Sydney. It is historically significant as the original generating station for the supply of electricity for the Sydney electric tramway network and for the general reticulation of electrical power. It opened in 1899 and for many years was the largest and most important power generating station in NSW. Now housing the Powerhouse Museum, these buildings lie to the southwest, outside the SICEEP study area. Water conduits associated with water cooling system run between the power house and Darling Harbour, once supplying salt water for the condensers, and are within the study area. Water inlet and outlet conduits dating from 1899 to the 1920s follow different routes through the study area. The main focus here is the cooling system and its infrastructure in the vicinity of the study area. A brief timeline for the Ultimo Power House is provided in Appendix D.

The location selected for the Ultimo Power House in 1896 was based on multiple factors including the distribution of electrical current, coal supply and disposal of ashes, water supply, room for future expansion, cost of land, the foundations, and availability of a labour force. The Ultimo site near Darling Harbour met these criteria, with close proximity to a supply of salt water for the condensers.[102]

An Act of Parliament on 8 May 1896 allowed for the construction of a power house for the George Street and Harris Street Electric Tramway. By June 1897 many of the tenders had been let and a short time later Contract No 18, for the conduit from the boiler house to Darling Harbour supplying seawater for condensing, was awarded to Justin McSweeny. By mid-1898 good progress had been made in the sinking of the shafts and by mid 1899 the water conduits were complete. The inlet conduit was estimated at 950 feet (289.5m) long although a later report describes it as 1,000 feet (304.8m) in length and 3 feet 3 inches (1.01m) in diameter.[103] The heated condenser water was discharged back into the Harbour not far from the intake.[104] The 1899 outlet and inlet conduits are shown in a diagram produced in 1933 (Figure 2.44). The material used for the conduits is not known and plans and specifications for this work have not been located. Precast concrete pipes were used in Public Works Department projects in the 1890s and it is possible that they were specified for this project.

The water cooling system consisted of three electrically driven centrifugal circulating pumps for the Wheeler-type surface condensers, each capable of delivering 2,000 gallons per minute (150 litres/sec) against a head of 36 feet (11m). Each pump was directly coupled to 50 horse power motor with two pumps run in parallel, the third being a reserve. Water was discharged from the pumps through a Reeves filter before passing into the boilers.[105]

Extensions to the Ultimo Power House by the Railway Department, including new equipment, were carried out from 1902 to 1905.[106] In 1907-8 a new conduit was constructed, and additional pumps installed in anticipation of the installation of new generating units taking the rated capacity of the Ultimo Power House to 19,400 kW. Details of the construction of the new length of conduit are not known. The Railway Commissioners documentation of post-1898 alterations and additions to the Ultimo Power House was less detailed than work documented by the 1890s Public Works

[102] DM Godden et al, *History and Technology of the Ultimo Power House, Sydney*, NSW PWD, nd [1982]: 27.
[103] *Department of Public Works Report,* y.e 30 Jun 1897, 1898: 26; *Department of Public Works Report,* y.e. 30 Jun 1898, 1899: 23-24; *Department of Public Works Report,* y.e. 30 Jun 1899, 1900: 21; *Department of Public Works Report,* y.e. 30 Jun 1900, 1901: 22, 23.
[104] JW Thomson, L Glendenning & W Upton, *The Power House Ultimo: The Tram Depot Ultimo History*, report to Public Works Department of New South Wales, Sydney, 1982: 22.
[105] *Public Works Report,* y.e. 30 Jun 1900, 1901: 23.
[106] Godden et al [1982]: 59.

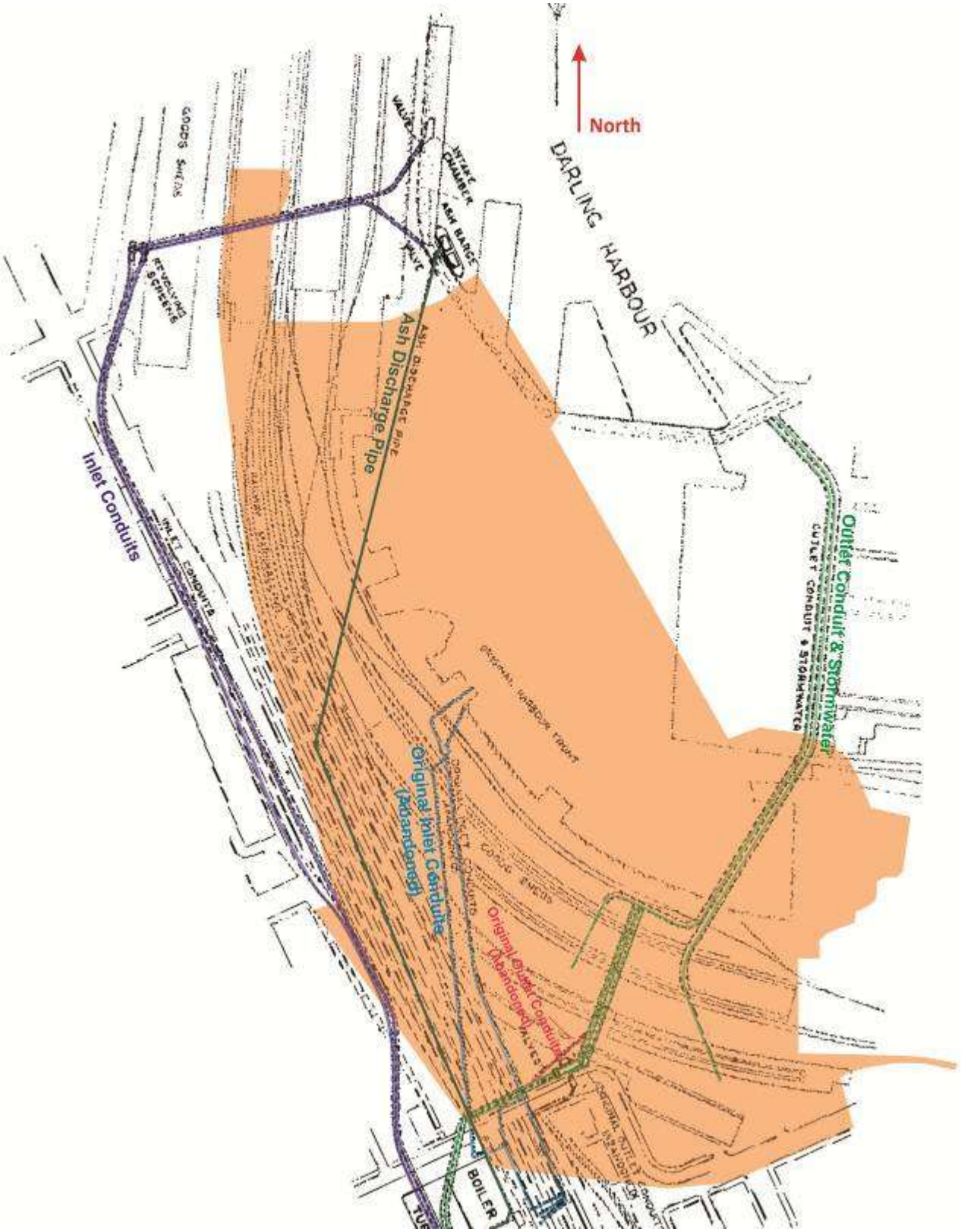

Figure 2.44: Plan showing the shoreline in relation to circulating water ducts and conduits inlets and outlet used in 1899 and those constructed in the mid 1920s. The location of intake sumps, valves and screens is also shown. Myers 1933: 255.

Department. Scientific and engineering journals provide many of the accounts of the site under Railway Department management.[107]

Plans for the reclamation of Darling Harbour commencing in the 1920s resulted in the installation of new and considerably longer intake and outlet conduits for the Ultimo Power House. The Railway Commissioners started the project in c1923-24, running the conduit to the point where the parallel pipelines diverged. The Sydney Harbour Trust completed the lines from this point into the harbour. This work was of considerable magnitude, requiring the Harbour Trust to sink a shaft down to the lengths of conduit already installed by the Railway Department and extending it by means of two lines of precast Monier concrete pipes with screening chambers at the end. The lines extended beyond the reclamation and out into the deep water of Darling Harbour. Each 25 ft (7.62m) long section of pipe was 6 ft (1.83m) in diameter weighing approximately 30 tons (30.481 tonnes). The conduits were laid on concrete piers at a maximum depth of 47 feet (14.33m) underwater. The 'faulty' nature of the foundations for the pipes resulted in extensive underwater concrete work done by divers, who also constructed the timberwork of the coffer dam. Wharf No. 39 was later constructed above the conduit.[108]

The construction work for the conduits was described in a later engineering journal as:

> tunnelled through solid sandstone rock, a single tunnel being formed, and the Monier pipes laid side by side with the spaces around and between filled in with rubble.[109]

Photographs showing the installation of the intake conduits are reproduced below (Figure 2.45, Figure 2.46, Figure 2.47, Figure 2.48, Figure 2.49, Figure 2.50, Figure 2.51 and Figure 2.52).

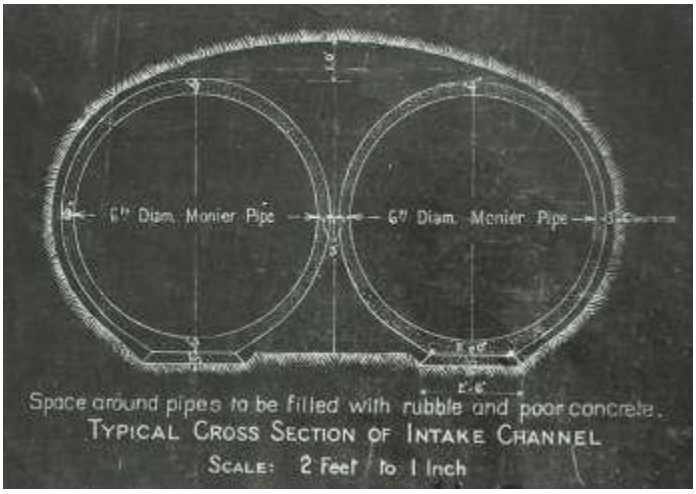

Figure 2.45: Typical cross section of Intake channels for Ultimo Power House. State Rail Photos Series: 17420 Item: 364/49 SRNSW.

[107] Godden *et al* [1982]: 54, 62.
[108] *Sydney Harbour Commissioners Report*, NSW Legislative Assembly, Sydney, 1927: 3 & 1928: 3; WH Myers, 'Reconstruction of Ultimo Power Station, Sydney, *Journal of the Institution of Engineers Australia*, Sydney, 1933: 262.
[109] Myers 1933: 262.

Figure 2.46: Excavation under Darling Harbour for the installation of water conduits for Ultimo Power House. State Rail Photos Series: 17420 Item: 364/44 SRNSW.

Figure 2.47: Pair of RC Monier conduits being installed in the sandstone tunnel under Darling Harbour. Rubble is stacked ready for packing around the 6 ft diameter pipes. State Rail Photos Series: 17420 Item: 364/45 SRNSW.

Figure 2.48: Rails in the foreground were used to cart rubble fill to the pipes. State Rail Photos Series: 17420 Item: 364/46 SRNSW.

Figure 2.49: Joints between the sections of conduit are visible along the length of the water supply pipe. State Rail Photos Series: 17420 Item: 364/47 SRNSW.

Figure 2.50: Coffer dam and formwork for the installation of conduits. State Rail Photos Series: 17420 Item: 364/48A SRNSW.

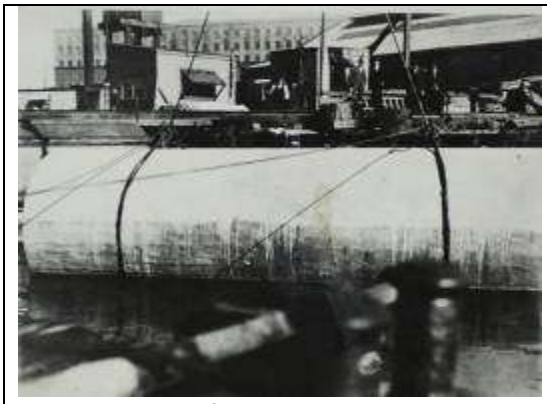

Figure 2.51: Reinforced concrete Monier pipe being lowered into position. State Rail Photo Series: 17420 Item: 364/48B SRNSW.

Figure 2.52: Work undertaken at the water's edge for installation of the inlet conduits for the Ultimo Power House. State Rail Photo Series: 17420 Item: 364/48C SRNSW.

Work on the outlet conduit for the power house is poorly documented. A newspaper report in May 1924 reveals that it was to be constructed in a 34 ft (10.36m) wide open-cut trench but that work had not yet commenced.[110] Figure 2.42 above shows the outlet conduit running parallel with a stormwater line and might have been laid in conjunction with work done by the Metropolitan Sewerage and Drainage Board. The reclamation of Darling Harbour resulted in extensions to the sewerage and stormwater lines in the area and it would have been economical to run the lines in a single trench.

The new inlet conduits, and presumably the outlets also, were completed in 1928.[111] As shown in Figure 42 above, two inlet conduits drew water from the west side of Darling Harbour under Wharf No 37, converging at a point west of the jetty in the vicinity of the former shoreline. They then ran in parallel to the screening chambers on the east side of Murray Street, Pyrmont. From this point the conduits followed a line along Pyrmont Street to the power house. The outlet conduit followed a similar route to the 1899 outlet conduit up to the former shoreline. It then followed a new line to the east side of the harbour where it was paired with a stormwater line.

The power house upgrade work resulted in a sufficient condensing capacity for the new 20,000 kW turbines. Although the construction of new water supply conduits were partly influenced by the Darling Harbour reclamation work, the replacement of much of the power house equipment in the 1920s was timely, resulting in substantial improvements in efficiency and economy.[112]

The new circulating water system was far more extensive than the original ones, with the new inlet conduits measuring 2770 feet (845m). The conduits were constructed with bypasses so that either inlet conduit could be used temporarily, and for the purposes of scouring after heating, as a discharge conduit.[113]

New equipment installed in conjunction with the water supply system included 'trash racks', a water jet cleaning system, revolving screens capable of being raised for maintenance, and a dewatering system. The revolving screens and screening well or cistern for the new circulating water system were located to the east of Murray Street, Pyrmont outside of the study area. Fouling of the conduits by marine growth was a constant problem and methods of killing the growth or

[110] *SMH* 22 May 1924: 10.
[111] *Sydney Harbour Commissioners Report*, NSW Legislative Assembly, Sydney, 1928: 3.
[112] Myers 1933: 262; Godden *et al* [1982]: 35.
[113] Myers 1933: 262.

scouring it out were tried. If left uncleaned for 12 months the conduit head loss increased from 24 kpa (3.5 ft) to 50 kpa (7.2 ft). The fouling problem was compounded by low tide when the head loss increased and air was drawn into the circulating water pump suction. Air intake contributed to corrosion of the condenser and a major failure of the second large turbo-alternator (installed 1931). Curved cones ('hydraucones') fitted to the pump suction pipe to reduce velocity losses solved the air intake problem. Further technical details about the makers and functions of the water circulating system equipment are detailed in Walter Myers' 1933 report, 'The Construction of Ultimo Power Station, Sydney'.[114]

The 'Water Cooling System and Manifold' of the former Ultimo Power House are included in the Sydney Harbour Foreshore Authority's Heritage and Conservation Register. It is described as:

> Underground conduits possibly built of sandstone taking cool water to the Powerhouse from Darling Harbour waters edge and hot water from the Powerhouse to the waters edge. The remains of the engineering equipment/manifold of this cooling system are located in the carpark of the Novotel accessed from Murray Street.

The Police utilised the water-cooling system conduits between the disused power station and Darling Harbour in Police Rescue Squad training until c1991.

[114] Myers 1933: 262-3.

3.0 Archaeological Potential

3.1 Archaeological Potential of the Study Area

There is potential for archaeological remains in the Central and Northern SICEEP study area. This analysis is based on the above historical research, the study area plan, plan of proposed buildings, the overlays produced for this report which have been checked against a Rygate overlay onto the 1854 plan. In addition there is a 2012 report by CityPlan which has been used as well as Casey & Lowe August 2012 Archaeological Impact Statement. Casey & Lowe have also completed two extensive archaeological programs at Darling Quarter (Walk) (2008-2009) and Barangaroo South which have provided us with a clear understanding of the nature of the archaeological resource within the study area. The phased potential archaeological resource within the study area is discussed below. The phasing from earlier reports has been adjusted to conform more closely to a chronological development for ease of analysis (Table 3.2).

3.2 Impacts from existing buildings and services

Our understanding of the proposed buildings is that they are all built on slabs with approximate RL 2.5m with piles into bedrock. Archaeological excavation at Darling Walk/Quarter identified that two sets of piles can have impacts but still leave a considerable amount of archaeology surviving (Figure 3.1, Figure 3.2). Except for where there is a concentration of piles in any single area which can make recovery of archaeological information in the future very difficult (Figure 3.1, Figure 3.2). It is considered likely that a third set of piles would mean that the archaeology would be too impacted and that prior open area excavation would be required prior to development.

The relative levels for archaeology along the foreshore at Darling Quarter (Walk) (2008-2009), and borne out by the results at Barangaroo South, is that the upper RLs for historical archaeology on reclaimed land is likely to be RL 2m with natural landscapes and intertidal zone levels being RL -0.5 to RL 1 to 1.4m. Understanding the RLs is important for predicting the level at which archaeology will be present, and how much fill is likely to be burying it throughout the study area. One of the most surprising examples was when the large pond associated with the Sega building was removed, which preceded Darling Quarter and the creation of the children's park, is that the floor of the State significant Peter Nichol Russell foundry survived immediately beneath the pond. In addition, extensive phases of 1820s to 1900 archaeology survived across the whole of the site, much of it buried beneath 2m of fill. As this site is immediately to the west of the Darling Central it is a strong predictor of the nature and levels at which archaeology is likely to survive within the SICEEP site.

As part of the 1980s redevelopment of Darling Harbour a series of very large stormwater culverts were installed throughout the earlier reclaimed land (Figure 3.4). These are quite deep and have had substantial impacts on the potential archaeological resource within the study area. These pass beneath the proposed footprint of the ICC Exhibition Centre, Theatre and the public realm (Figure 3.4).

Table 3.1: Identified RLs for archaeology at the Darling Quarter/Walk site. Casey & Lowe

Area	Natural landscape RL	1800s to 1840s RL	1840s to 1900 RL
7	-0.5m to 0.2m	-0.5m to 0.5m	1.2m to 1.8m
6	-0.3m to 0.5m	0.2m to 0.9m	0.9m to 1.8m
5	0.5m to 1m	0.5m to 1.2m	1.2m to 1.8m
8	0.4m to 0.7m	0.5m to 1.4m	1.4m to 1.8m
8 CT	0.6m	0.6m to 1.2m	1.2m to 1.6m top of archaeology removed by modern activity
9	0.4m to 1.4m	1.4m to 1.6m	1.6m to 1.9m

Table 3.2: Historical archaeological remains within specific areas of the project.

Archaeological Phases	NORTH/BAYSIDE Convention Centre, public realm, Darling Drive	CENTRAL north of Pier Street Exhibition Centre, Theatre, public realm
Phase 1: 1788-1813	▪ Foreshore in western part, later quarried in Study Area.	▪ Foreshore in western half but no known uses. ▪ Some ephemeral remains possible but unlikely to survive.
1813-1850s		
Phase 2: **Dickson's mill and mill pond, 1813-1850s** **Barker's Mill**	▪ Foreshore in western part, mostly quarried in Study Area.	▪ Barker's Jetty (1820s) projects into this area beneath Tumbalong Park. ▪ Foreshore in western half but no known uses. ▪ Some ephemeral remains possible but unlikely to survive. ▪ Two houses on Pyrmont foreshore at this time to the east of the Darling Harbour good line and beneath it. ▪ Dickson's Jetty extends into the public domain area.
1850s-1880s		
Railways 1850s-1880	▪ Impacted foreshore, mostly quarried in northern edge of Study Area. ▪ Some reclamation in the western section for the Darling Harbour good line (1855). ▪ No reclamation east of the goods line until 20th century.	▪ Darling Harbour goods line (1855) western edge. ▪ Reclamation by 1865 with stone sea wall. ▪ Railway lines and variety of railway and goods buildings. ▪ Edge of archaeology identified at Darling Quarter (Walk) may extend into this area, from PN Russell Foundry.
Iron wharf 1874-	▪ Iron Wharf and extends in the central part of this area. Iron wharf. Unclear where *in situ* or *ex situ* remains survived 1985 works. Iron wharf incudes the associated seawall.	▪ Iron Wharf and new sea wall located within this area. Unclear where *in situ* or *ex situ* remains survived 1985 works. It is likely that parts of the seawall survive.
Resumptions, 1850s-1880s **Housing subdivision** **Sewers** **Industrial**		▪ Elements of Peter Nichol Russell foundry and eastern foreshore in area of Tumbalong Park. ▪ Lackey Street stormwater extends into this area. ▪ No housing extends into this area.
1880s-1920s		
	▪ 3rd phase of reclamation, north of Bathurst Street and extension of railway areas over new reclamation. ▪ Removal of Iron Wharf and dumping into reclamation. ▪ Powerhouse cooling system (1923-24) relocated to new edge of reclamation, crosses through northern section.	▪ Removal of Iron Wharf and dumping into reclamation, presumed the associated seawall survives. ▪ Two stages of cooling systems installed for the Powerhouse, mix of inlets and outlets (1899, 1907-08) to the edge of the iron wharf.
1930s-1980s		
	▪ Continued use as goods yard.	▪ Continued use as goods yard.
1980s – Darling Harbour Redevelopment		
	▪ Removal of railway infrastructure and construction of 1980s buildings. ▪ Stormwater culverts crisscrossing the area.	

Figure 3.1: Piles in the area of Barker's Jetty (c1826) and the early timber slip (1810s), Darling Quarter (Walk). This area was a focus of many piles. If there had been many more then the archaeology in this area would have been destroyed or become inacessible. Looking west. Casey & Lowe 2009

Figure 3.2: View to south with the stone walling of Barker's Jetty (c1826) in the middle ground, Darling Quarter (Walk). There were many piles in this area from the two sets of building making access to the surviving remains quite difficult. Casey & Lowe 2009

Figure 3.3: Overlay of the Darling Quarter (Walk) Site with elements of the SICEEP public domain and existing stormwater culverts. This plan shows that archaeology from Area 7 extends into the public domain (beneath Tumbalong Park) area as well as part of Area 6. Area 6 includes the remains of Barker's Jetty. It also shows the impacts from major culverts (blue lines) running through this area. North is at the left. Rygates for Casey & Lowe 2008b.

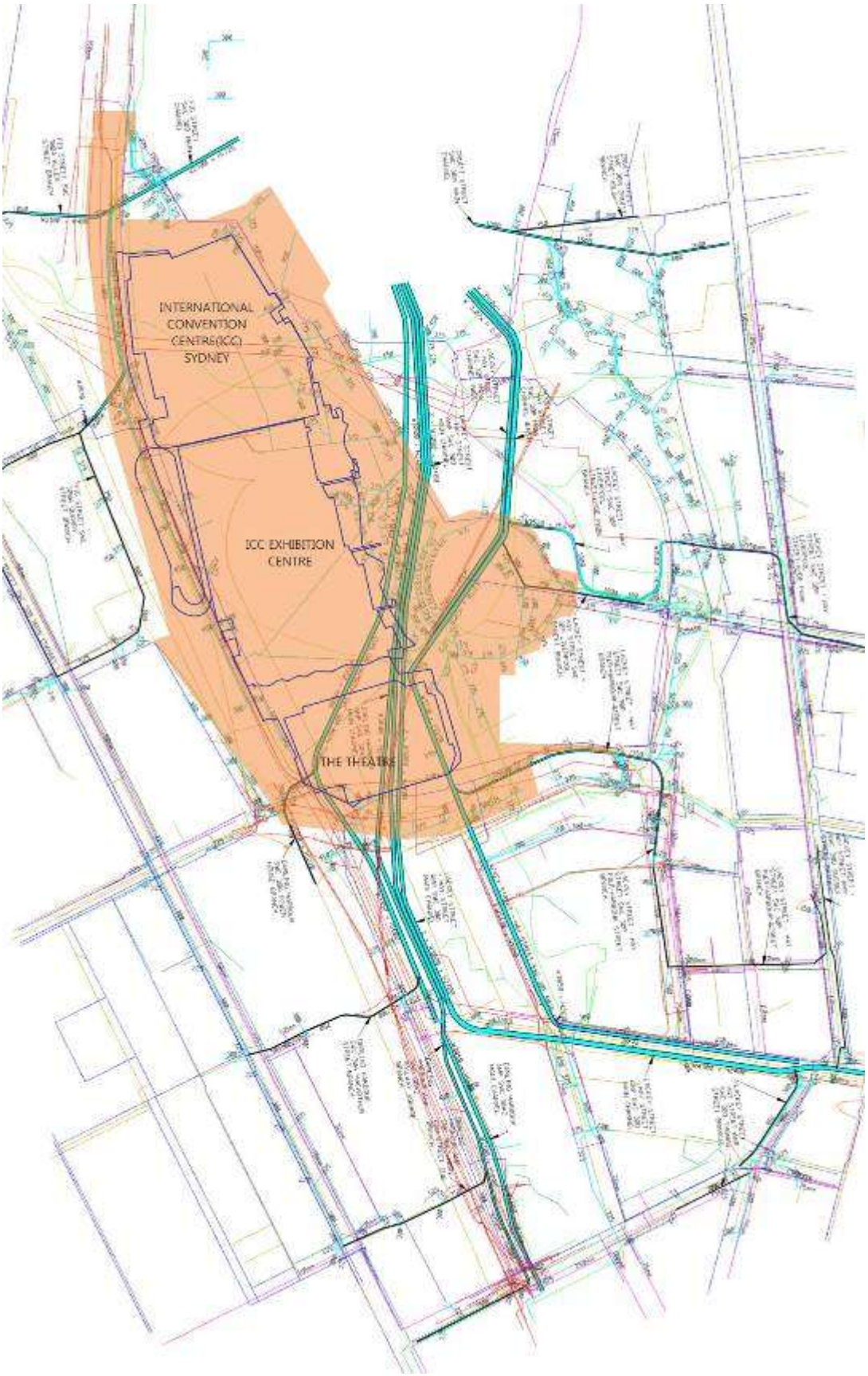

Figure 3.4: Plan of stormwater culverts within the Darling Harbour precinct, many of which were installed in the 1980s redevelopment. These have had extensive impacts in the southwestern part of the study area beneath the Theatre and some of the Exhibition Centre. Rygates February 2013

3.3 Site Specific Archaeological Potential

3.3.1 International Convention Centre

Most of the site of the proposed International Convention Centre (ICC) is located within the former waters of Cockle Bay until resumption in the 1870s (Figure 3.5, Figure 3.6, Figure 3.7). A small section within the northwest corner is within the foreshore but this was quarried for the railway lines, probably as early as the 1860s. The new c1865 seawall and western foreshore did not extend into the footprint of the proposed Convention Centre until the construction of the Iron Wharf (1874-76) and the slightly later new seawall and infilling north of the c1865 foreshore (Figure 3.7, Figure 3.8, Figure 3.9, Figure 3.11). The construction of the Ultimo Power house in the 1890s required the installation of inlet and outlet pipes (c1899) which emptied or collected water beneath the Iron Wharf (Figure 3.10). None of the inlets and outlets pipes are within the proposed Convention Centre but there is an Ash Discharge Pipeline running diagonally across this footprint (Figure 3.10). During the 1920s the shape of the foreshore changed again with further reclamation, removing the iron wharf and more resumption running alongside the foreshore, which led to the installation of another set of outlets and inlets for the Ultimo Powerhouse (Figure 3.10). The railway goods yard was extended to cover the whole of the newly reclaimed land. The Ultimo Powerhouse conduits are outside the footprint of the Convention Centre but the later ones cross through the study are to the north, beneath Darling Drive. The new alignment of the seawall established in the 1920s is basically the same as it is today. The former railway goods yard was removed in the 1980s to make way for the Darling Harbour redevelopment.

3.3.2 Exhibition Hall and Loading Bay

Between 1788 and the 1840s there is little use of the western foreshore of Darling Harbour, which is partly within the western part of the footprint of the proposed Exhibition Hall (Figure 3.5, Figure 3.6). By the 1850s the western foreshore was beginning to be subdivided and there were some structures erected in these areas (Figure 3.6, Figure 3.7, Figure 3.15). A plan from the Surveyor General's Sketchbook dated to c1853 indicates that possibly four structures were located within the proposed footprint of the Exhibition Centre and another one or two within the footprint of the loading bay (Figure 3.15).[115]

The western side of the new c1865 seawall and western foreshore extends into the footprint of the proposed Exhibition Centre which will mostly consist of a seawall and reclamation fills (Figure 3.7). The construction of the Iron Wharf (1874-76) involved reclaiming more land and the erection of a new seawall with north of the c1865 foreshore (Figure 3.8, Figure 3.9, Figure 3.11). The construction of the Ultimo Power house in the 1890s required the installation of inlet and outlet pipes (c1899) to the edge of the Iron Wharf (Figure 3.10). All of the original inlet and outlet pipes are within the proposed footprint of the Exhibition Centre (Figure 3.10).

During the 1920s the shape of the foreshore changed again with further reclamation, removing the Iron Wharf but probably not the seawall and involving further resumption running alongside the foreshore, which led to the installation of another set of outlets and inlets for the Ultimo Powerhouse (Figure 3.10, Figure 3.11, Figure 3.12). The railway goods yard was extended to cover the whole of the newly reclaimed land (Figure 3.13, Figure 3.14). The new alignment of the seawall established at this time is basically the same as it is today. The former railway goods yard was removed in the 1980s to make way for the Darling Harbour redevelopment.

[115] It is noted that the accuracy of the overlays for the western foreshore is problematic as the location of the proposed Darling Harbour railway on the 1853 plans never coincides with the surviving section of the line. This inaccuracy suggests that there is a poor fit for the western foreshore. As discussed in the Limitations section (1.11) of this report there is a presumption of a larger error than normal in overlays of the historic plans onto the study area and proposed building footprints.

3.3.3 Theatre

Between 1788 and the 1840s there is little use of the western foreshore of Darling Harbour, which is partly within the western edge of the footprint of the proposed Theatre (Figure 3.5, Figure 3.6). By the 1850s the western foreshore was beginning to be subdivided and there were some structures erected nearby but not within the study area. It is noted that there was a drainage channel to the west (Figure 3.6, Figure 3.7,Figure 3.15 Figure 3.15).

The Theatre is built above the c1865 reclamation but probably to the south of the seawall (Figure 3.7). It is possible that the original stormwater open stormwater drain which emptied into the harbour is along the eastern edge of the Theatre (Figure 3.7). This may have been destroyed by the construction of the Lackey Street drain but some elements of it may survive. The newly reclaimed land and the Iron Wharf (1874-76) was located to the north and is therefore not within the proposed footprint of the Theatre (Figure 3.8, Figure 3.9, Figure 3.11). The construction of the Ultimo Power house in the 1890s required the installation of inlet and outlet pipes (c1899) to the edge of the Iron Wharf (Figure 3.10). These conduits pass through the proposed footprint of the Theatre (Figure 3.10). There are no further substantial changes to this area until the construction of the 1980s Darling Harbour.

3.3.4 Public Realm – Tumbalong Green and The Boulevard

This is the land to the east of the proposed buildings (Figure 1.1, Figure 1.2). Most of this area was originally with Darling Harbour but the edges of it probably reach into various developments along the eastern foreshore. These include:

- Part of Dickson's early jetty (Figure 3.5, Figure 2.7)
- Barker's c1825 jetty (Figure 3.5, Figure 3.7, Figure 3.8, Figure 3.9, Figure 2.12)
- c1865 reclamation and seawall (Figure 3.7)
- Iron Wharf (1874-76) and associated seawall (Figure 3.8, Figure 3.9)
- Late 19th and early 20th-century railway goods yard and reclamations

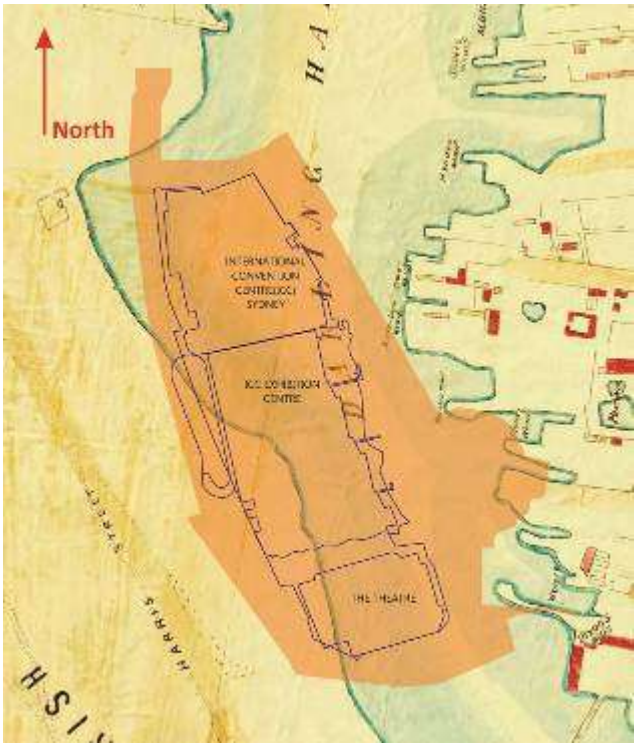

Figure 3.5: Overlay of the proposed buildings in the central and northern areas. Shields 1842, Historical Atlas of Sydney, City of Sydney Archives.

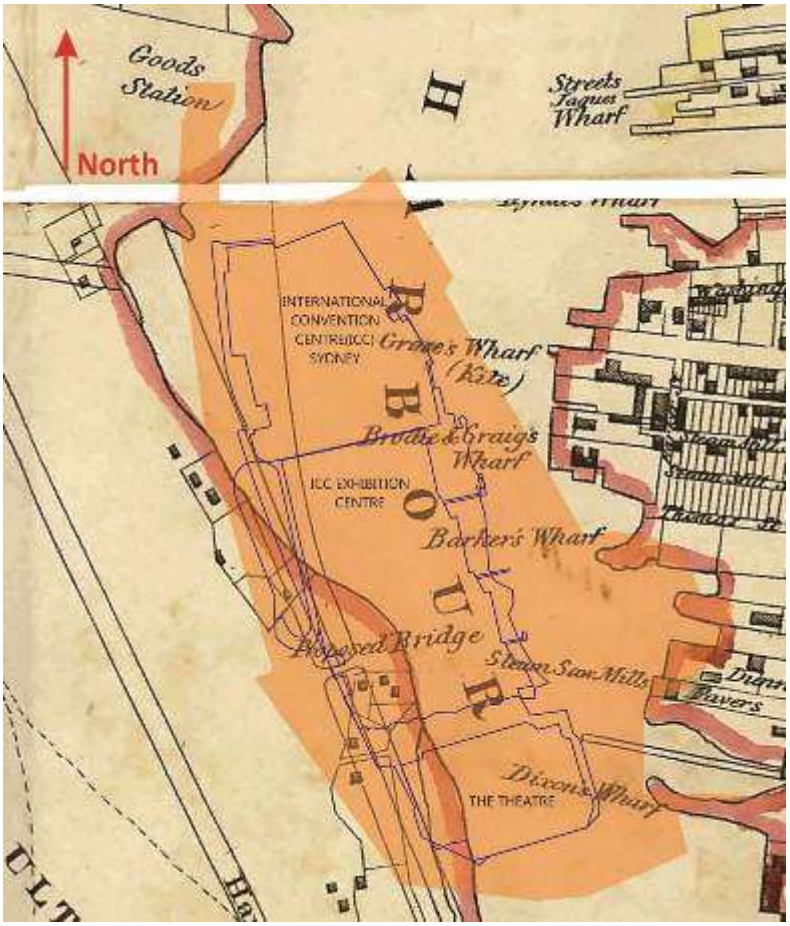

Figure 3.6: By 1854 the Darling Harbour goods line had been built to the west, partly within the harbour. The site of the Convention centre was partially within the waters of Darling Harbour, with the railway wharf to the west. The western side of the Exhibition Centre touches on the western foreshore but the degree it extends to the west is unclear due to problems with the accuracy of the overlays. Woolcott & Clark, Historical Atlas of Sydney, City of Sydney Archives.

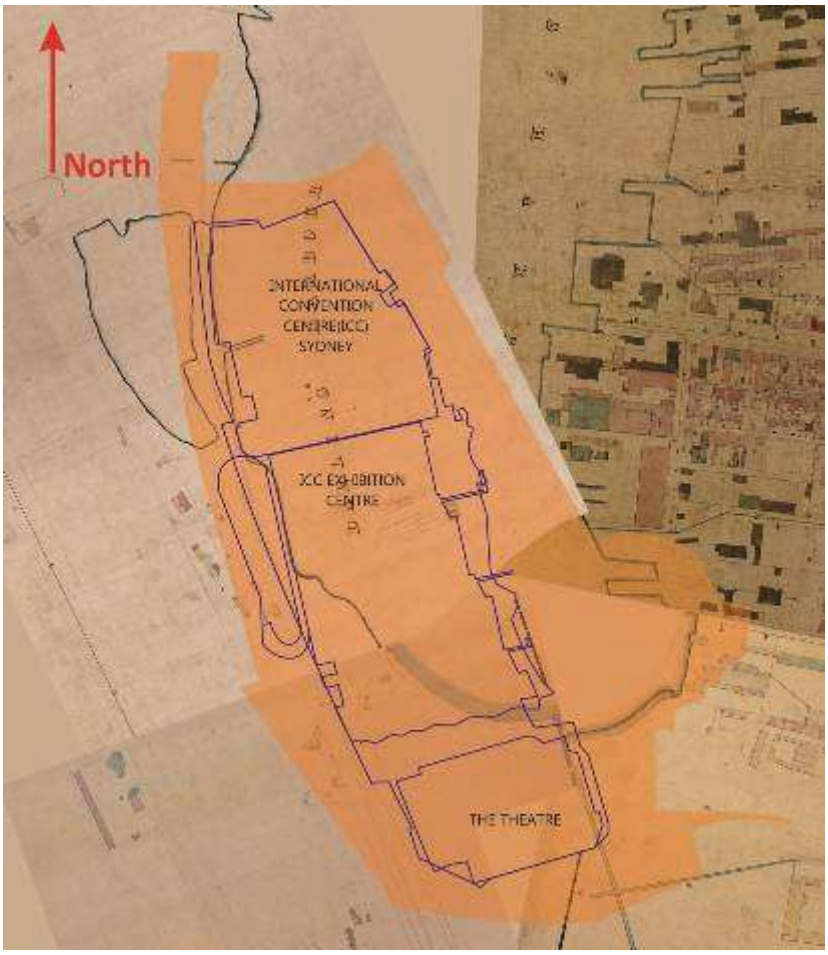

Figure 3.7: Overlay of the proposed buildings in the central and northern areas. Land beneath the Exhibition Centre and Theatre has been reclaimed and a seawall built. Trigonometrical Survey 1865, Historical Atlas of Sydney, City of Sydney Archives.

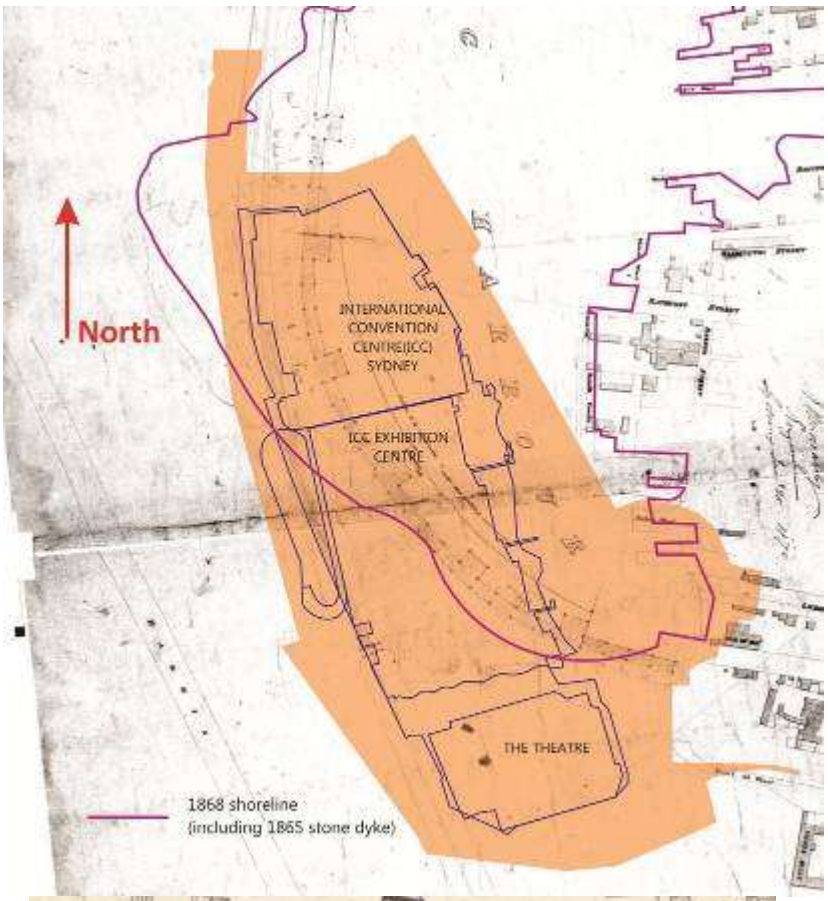

Figure 3.8: Overlay of the proposed buildings in the central and northern areas 1870. The construction of the Iron Wharf involved further reclamation along the southern and western foreshore. 'Darling Harbour Wharf, General Plan No 2', [signed] EO Moriarty, Engineer, 25 Jan 1870, SRNSW AO Map No 455, Parts 1 and 2.

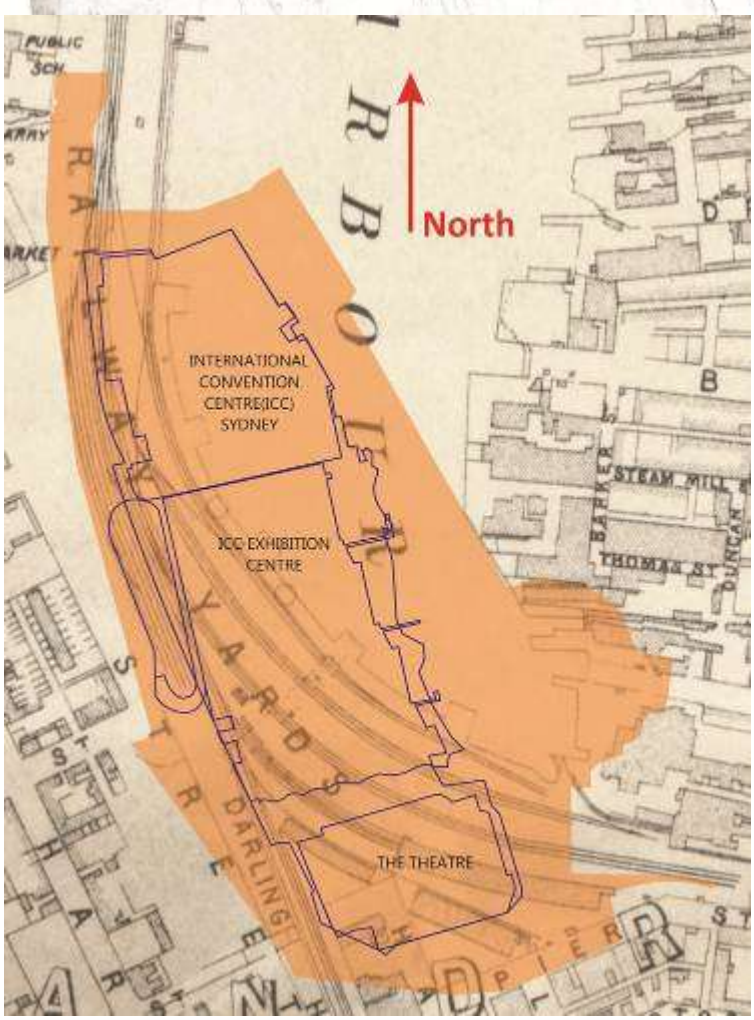

Figure 3.9: Overly onto the 1888 plan of the proposed buildings within the central and northern area. Surveyor General's Office of NSW 1888. 'Map of the city of Sydney, New South Wales, 2nd edition'. NLA MAP RM 3448. Available at http://nla.gov.au/nla.map-rm3448

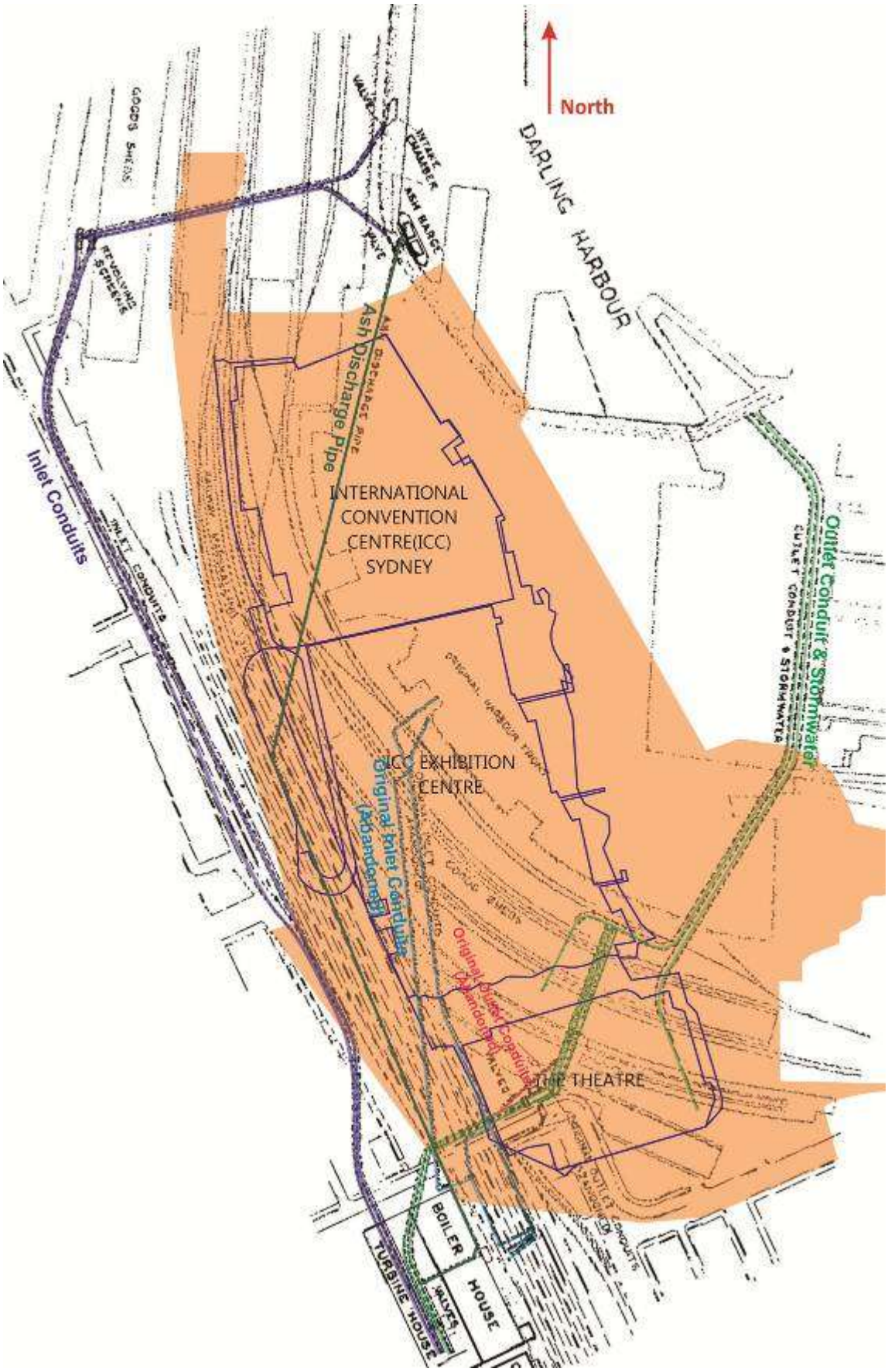

Figure 3.10: Overlay of proposed buildngs onto the staged Powerhouse inlet and outlets plan. This indicates there are outlets beneath the proposed footprint of the Exhibition Centre and Theatre, and to the north of the Convention Centre. Myers 1933

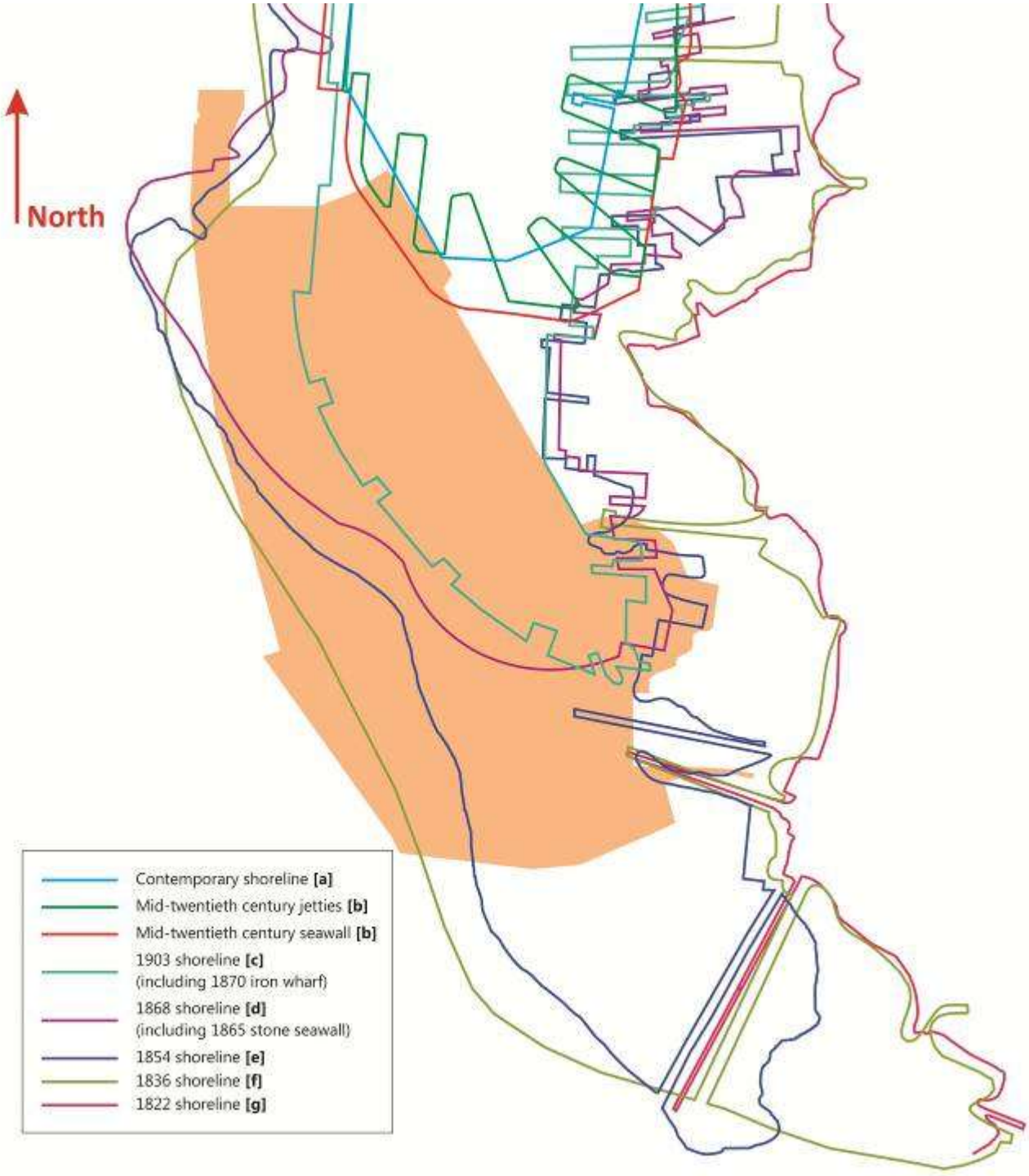

Figure 3.11: Drawing of the various foreshores and their relationship to the proposed footprints of the Convention Centre, Exhibition Centre and Theatre. [a] SICEEP, Darling Harbour, Location Plan (PP_AR_L0_0009); [b] Parish of St Andrew, County of Cumberland, 2nd edition (22 May 1970), Status Branch Charting Copy, HLRV [Historic Land Records Viewer], NSW LPI; [c] 1903 Map of the City of Sydney, New South Wales, 3rd edition (12 January 1903), Historic Atlas of Sydney; [d] 1868 Hunt & Steven's Map of the City of Sydney, compiled & drawn by C. Mayes. NLA Map RM 1613. Available at http://nla.gov.au/nla.map-rm1613; [e] 1854 Woolcott & Clarke's *Map of the City of Sydney*. Historic Atlas of Sydney; [f] 1836 Plan of Sydney with Pyrmont, New South Wales (lithograph by J Basire). NLA Map T 1551. Available at http://nla.gov.au/nla.map-t1551; [g] Harper, W [c1822] [Plan of Sydney]. SRNSW Item SZ435.

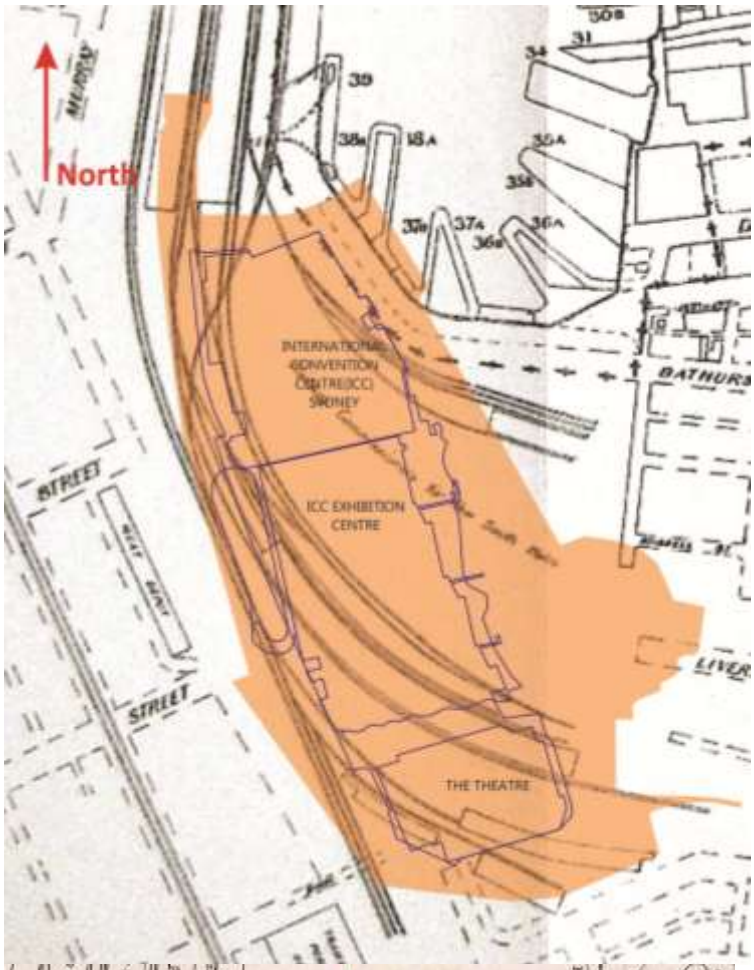

Figure 3.12: The final stage (1923-1927) of foreshore changes due to reclamation and wharf construction between 1822 and 1903. Sydney Harbour Trust map, facilities in 1929. *Sydney Harbour Trust Commissioners Report*, year ending 30 Jun 1929.

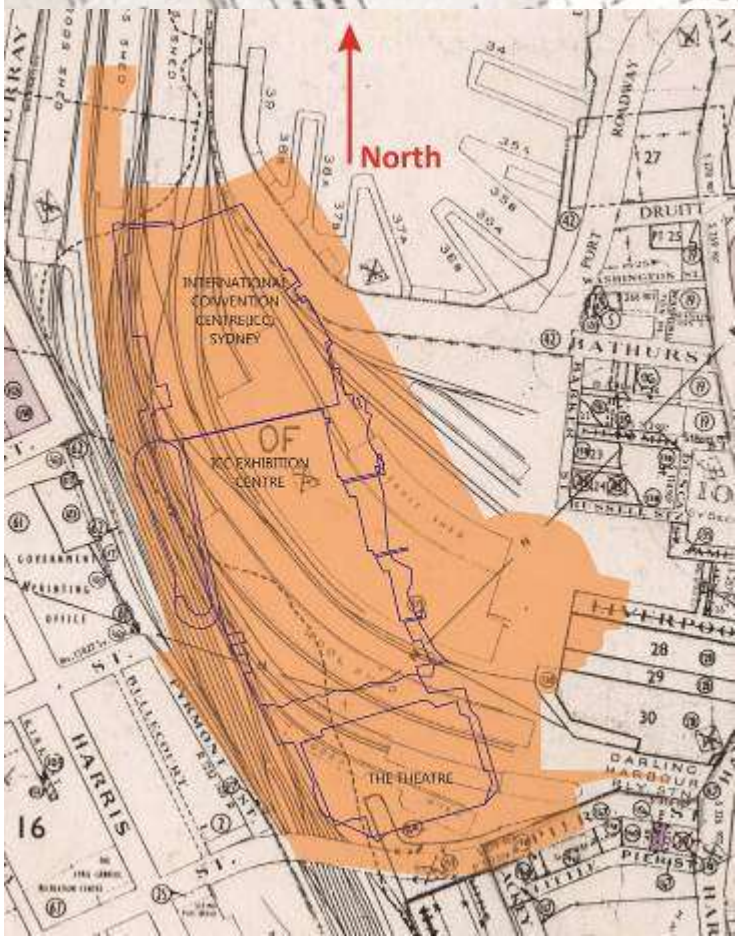

Figure 3.13: Overlay of proposed buildings on the 1970s parish map showing the extent of the railway goods yard. Parish Map of St Andrews, LTO.

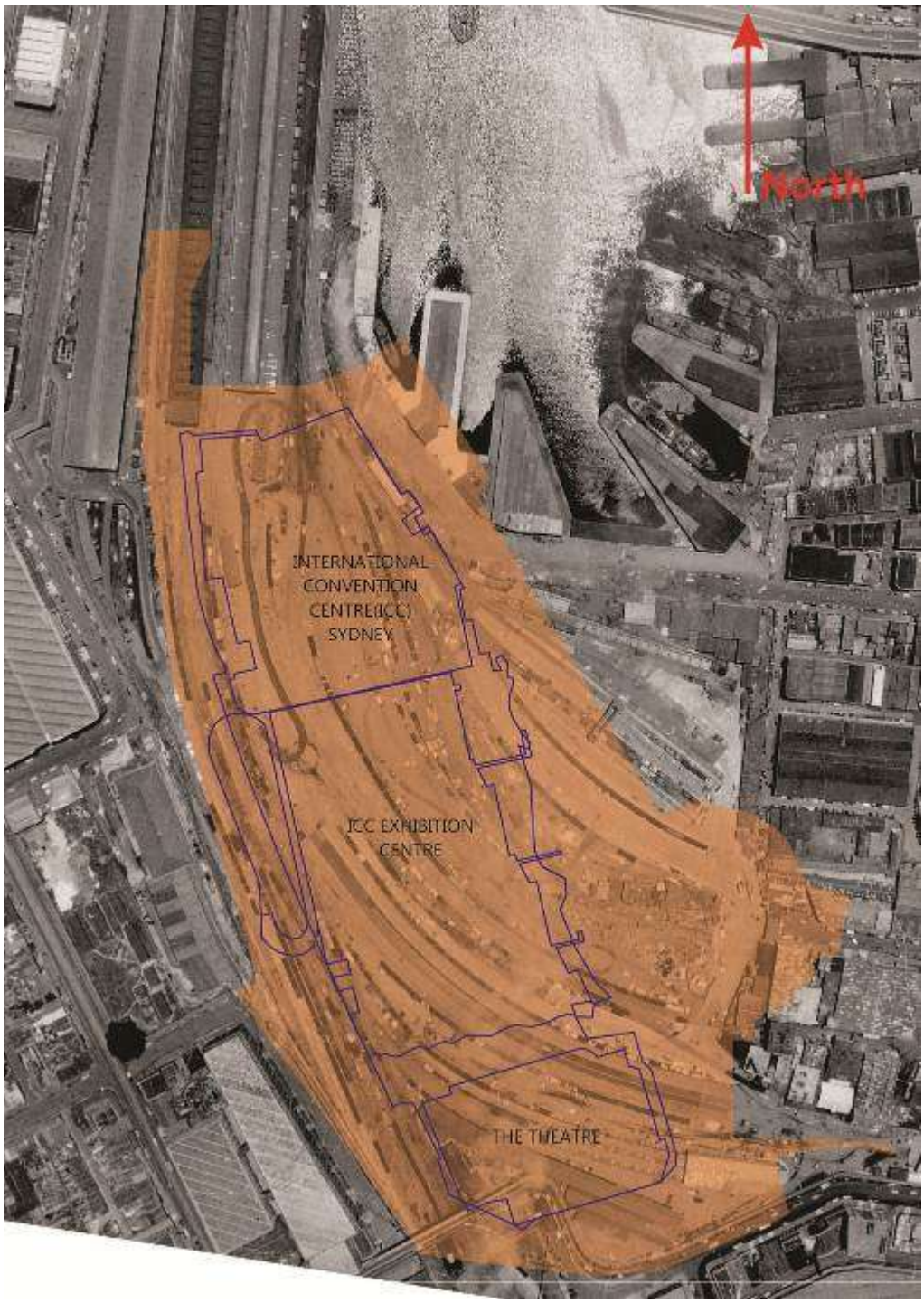

Figure 3.14: Overlay of proposed buildings on the 1949 aerial photo. Historical Atlas of Sydney, City of Sydney Archives.

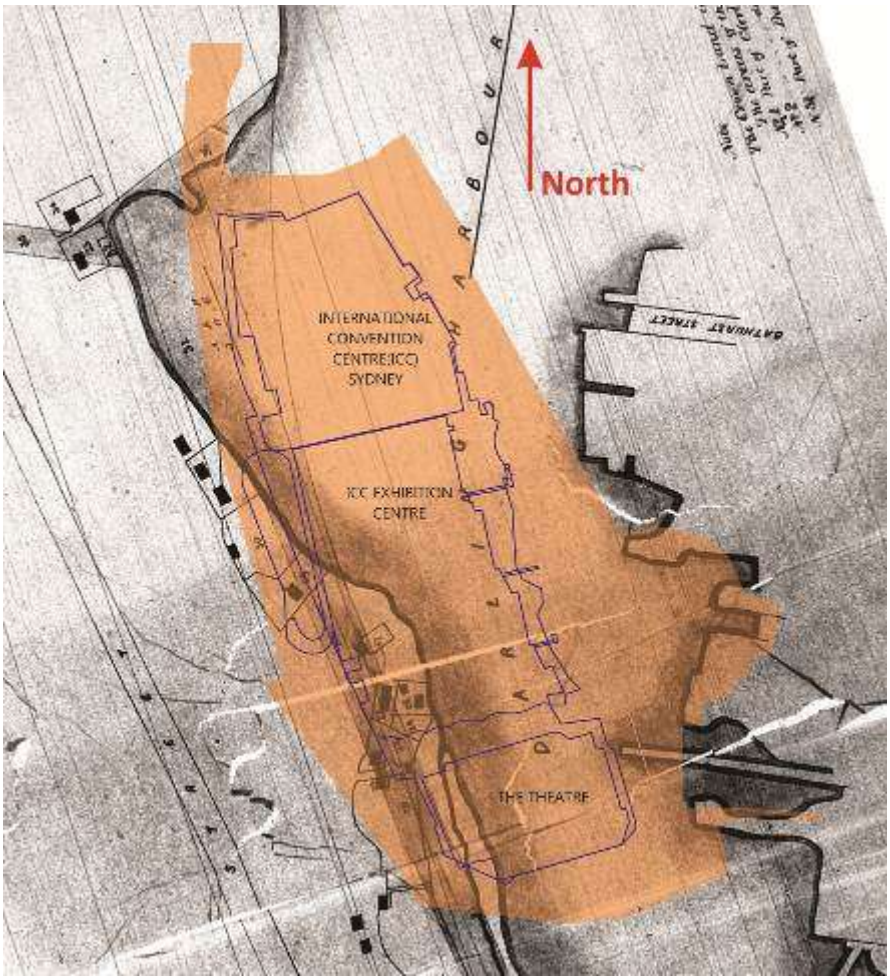

Figure 3.15: Overlay of the proposed Exhibition Centre on to part of a plan of Darling Harbour and the Sydney Railway in the Surveyor General's Sketchbook. Surveyor General's Sketchbooks c1853 vol 6, folio 70-71, SRNSW.

4.0 Archaeological Context & Research Questions

4.1 Archaeological Context

4.1.1 Archaeological Sites[116]

There have been a number of archaeological projects in the western and southern parts of the CBD, in the vicinity of the study area which would relate to the potential archaeological resource within the study area.

Sites in **Pyrmont and Ultimo** have has been the subject of a number of archaeological projects, including the following:

1991	Paddy's Market Site[117]
1994	Bowman Street, Pyrmont Point[118]
1994	Paragon Iron foundry, Bulwara Rd, Pyrmont[119]
1996	CSR site, Pyrmont[120]
1996	Grace Bros., Broadway[121]
2001-02	Quadrant site, Broadway[122]
2002	Bullecourt Place, Ultimo[123]
2005	Union & Edward Street, Pyrmont[124]

The reports from the Quadrant Site is currently being written up and the Union and Edward Street Site has been completed and should be released on Casey & Lowe's webpage within the next month. The remains at these sites were associated with mid-19th-century housing as well as industrial and commercial remains which were an integral part of 19th- and 20th-century life on the peninsula. Sites with similar period remains would include those at the Quadrant site. Some of the remains from Union and Edward Street are fairly early, dating from from the 1850s. This range of later house sites is similar to those found at most of the above archaeological sites. This was also the site of the later Gillespie flour mill, when it moved from the Anchor flour mill buildings in Darling Harbour. The Paddy's Market site contained a mix of residential and commercial buildings built on the site of extensive reclamation on the shores of Darling Harbour. The Grace Bros site, like the Quadrant site, had the remains of various mid to late 19th-century housing as well as some evidence of commercial activities, such as slaughter houses.

Darling Harbour & Walsh Bay Sites

1992	Little Pier Street Precinct (Dickson's Mill)[125]
2003	30-34 and 38 Hickson Rd (The Bond)[126]
2003/04	Towns Wharf, Walsh Bay[127]

[116] Please note this is not an exhaustive list of sites in these places. Further research into other archaeological projects would be undertaken as part of the next stages of the archaeological program.
[117] Godden Mackay with Wendy Thorp. Tony Lowe and Mary Casey worked on this site.
[118] Higginbotham 1995 *Report on the archaeological excavation of the site of proposed community and public housing*, Bowman & Harris Streets, Pyrmont, NSW.
[119] Casey & Lowe 1995.
[120] Casey & Lowe 2000.
[121] Damaris Bairstow and Dana Mider.
[122] Quadrant web page: www.australand.com.au/apart/syd/broadway/thequadrant/archaeology.cfm.
[123] Conference paper given at combined ASHA/AIMA/AAA conference, Townsville, 2002.
[124] Casey & Lowe, excavation in 2005 and report currently in preparation.
[125] Godden Mackay 1992
[126] Archaeology & Heritage Pty Ltd 2004 *Archaeological recording of annulus of 1882 gasholder and details of 19th century gasmaing, part of former AGL site 30-34 Hickson Road*, for Bovis Lend Lease; Archaeology & Heritage Pty Ltd 2003 *Archaeological recording and excavation, former AGL site 38 Hickson Road, Sydney, rock shelf at rear*, for Bovis Lend Lease.

2005	KENS Site, Darling Harbour[128]
2008/2009	Darling Walk, Darling Harbour[129]
2010-2012	Barangaroo South, States 1, 2, 3

The **Little Pier Site** contains the remains of Dickson's later mill (1833), rather than the original mill. His original mill was the first steam mill in the colony of NSW and ground wheat for flour and opened in May 1815.[130] In the 1820s Dickson opened a candle and soap factory and a brewery on the site to diversify his interests. This site has been retained *in situ*.

The **Towns Wharf Site** at Walsh Bay appears to have similarities to the Darling Walk site in that it is wharfage located on the waterfront. While there appears to be no excavation report there is some information available on the internet. There was major filling over substantial remains of buildings (Figure 4.1). There was up to 3.5 m of fill within this site above the archaeology.

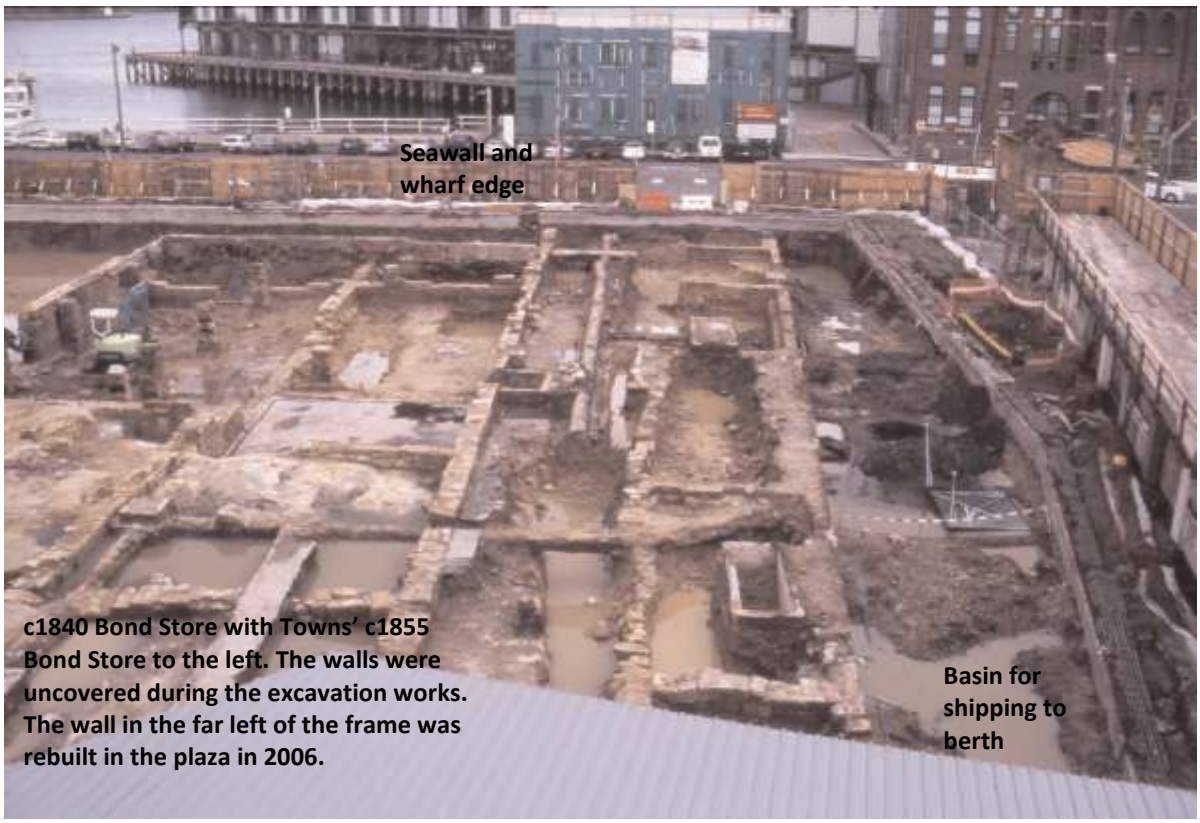

Figure 4.1: This photograph was taken as the excavation works progressed. You can see the cellar levels of the former bond stores that existed on the site, as well as the seawall and the later MSB overlay. These wall alignments are represented by the lines in the paving you can see in the plaza today.[131]

The **KENS Site** was excavated over six months in 2005. According to an interview given by Wendy Thorp:

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[127] Austral Archaeology & Mirvac. http://www.mirvac.com.au/forsale/NSW/walshbay/about_heritage_history.htm.
[128] Wendy Thorp; talk at Sydney Practitioners Workshop, November 2004; http://www.aacai.com.au/newsletter/101.html#summary
[129] http://www.caseyandlowe.com.au/sitedw.htm
[130] Godden Mackay 1992, Vol. 1: 7.
[131] http://www.mirvac.com.au/forsale/NSW/walshbay/pdf/tp.All.pdf

"We excavated the best part of the city block minus the terraces at the southern end of the site," archaeological director Wendy Thorp explains. "It was an extraordinary site as it had some unusual circumstances that led to the depth of preservation. We were excavating down on an average of 5m and in places up to 12m and all of that was European occupation. It was like city on city on city, so we excavated through 20th century levels right through to the various early years of the settlement.

"One of the most interesting finds was that in one part of the site along Sussex Street which was originally part of Darling Harbour, we found remnants of private dockyards, there was an area for boats to come in, seawalls all around it, steps leading down and part of the beach was intact. Along the rest of that frontage we also found other docks, slips and landing places.

"Higher above that, after the reclamation, we found essentially quite a rural landscape. On the newly formed land they had extended the boundaries of the land property out with fences. The fences had been buried in the fill and were still standing, and that was from about 1839. We found evidence of small wooden, stone and brick cottages and a lot of animal pens and paddocks."

It wasn't just pieces of rubble that were uncovered, Thorp says. "We found the foundations, then in places as we got further up the hill the buildings were up to shoulder height - you could walk into them. In Kent Street there were buildings of that height and they were a mixture of 1830s, 1840s and later – you could walk in the back door, you could see where the window ledges were."

The earliest evidence of European settlement was located on the corner of Kent and Napoleon Streets, according to Thorp. "We found the remains of a building that certainly went back to the very settlement of Sydney around the 1790s and early 1800s, and that lay under another house and that in turn was expanded and became a hotel and the hotel remained up till the 1950s."
Although the archaeological team had an idea of what they would find, they were surprised by just how much original material remained. Thorp says the reasons for this are twofold. "Firstly, there was the unusual circumstances of the site that allowed preservation: topography – there was a slight slope in places, then it jumped over a rock cliff which we also found had come to Kent Street, so people had built up the slope but instead of knocking things down they simply knocked them to a certain level and then filled over the top to level the slope out. Secondly because the site hasn't really been touched - all the later 19th century material was demolished in about 1913, so this combination of circumstances led to an extraordinary state of preservation."

The original profile has changed in that most of Sussex Street up to 1839 was part of the bay, Thorp says. "We found that shoreline, then the bay was reclaimed, then Sussex Street was extended, so we went from the shoreline to a street frontage, then a topographic change from going from a fairly gentle slope with one rock face to what it is now."

Although none of the remnants have been kept physically on the site, Thorp says the artifacts recovered have been catalogued and will be accommodated in the completed development and the information retrieved from them will become part of a prepared interpretation package that will be incorporated into the development so there is a link between the new and the old. "There are lots of ways to do this," she says. "It's not been firmly decided on what shape it will take, but there's the potential for signage or for some of the objects to be displayed. Some of the public art may reflect some of the older occupation on the site."

In addition to the wealth of evidence of European occupation, Aboriginal archaeology was also found on the site. "In a couple of places there were tool-making areas where Aboriginal people had sat upon the cove and made tools," says Thorp. While the exact dates of this pre-European settlement have not been finalised, they go back at least a few thousand years.[132]

The KENS site is also similar to Darling Walk as it was the subject of major reclamation after 1839 when Sussex Street was extended northwards into that area. This reclamation phase is generally later than that undertaken at Darling Walk where major sections of it appears to have been

[132] http://www.infolink.com.au/articles/Digging-up-the-past_z159548.htm

reclaimed by Thomas Barker in the early 1830s. The KENS site indicates that reclamation can be much more extensive than perhaps previously understood. Notably there was up to 1 m of fill within this site and remains of buildings were occasionally up to shoulder height.

The **Darling Walk Site** was an extensive remnant industrial landscape associated with important industrial precincts:

- Barker's Mill – remains of the millpond and early jetty.
- Workers' housing.
- PN Russell Foundry and Carriage Works.
- Small foundries and soap factories.
- Extensive incremental reclamation and pre-reclamation use of the foreshore, including timber fences and environmental archaeology associated with the reclamation fills.
- Aboriginal archaeology – remains of a midden.
- Evidence of the original foreshore, rocky outcrops and sandy beaches with remnant cockle beds beneath the sandy beach.

A preliminary results report is found at: http://www.caseyandlowe.com.au/sitedw.htm

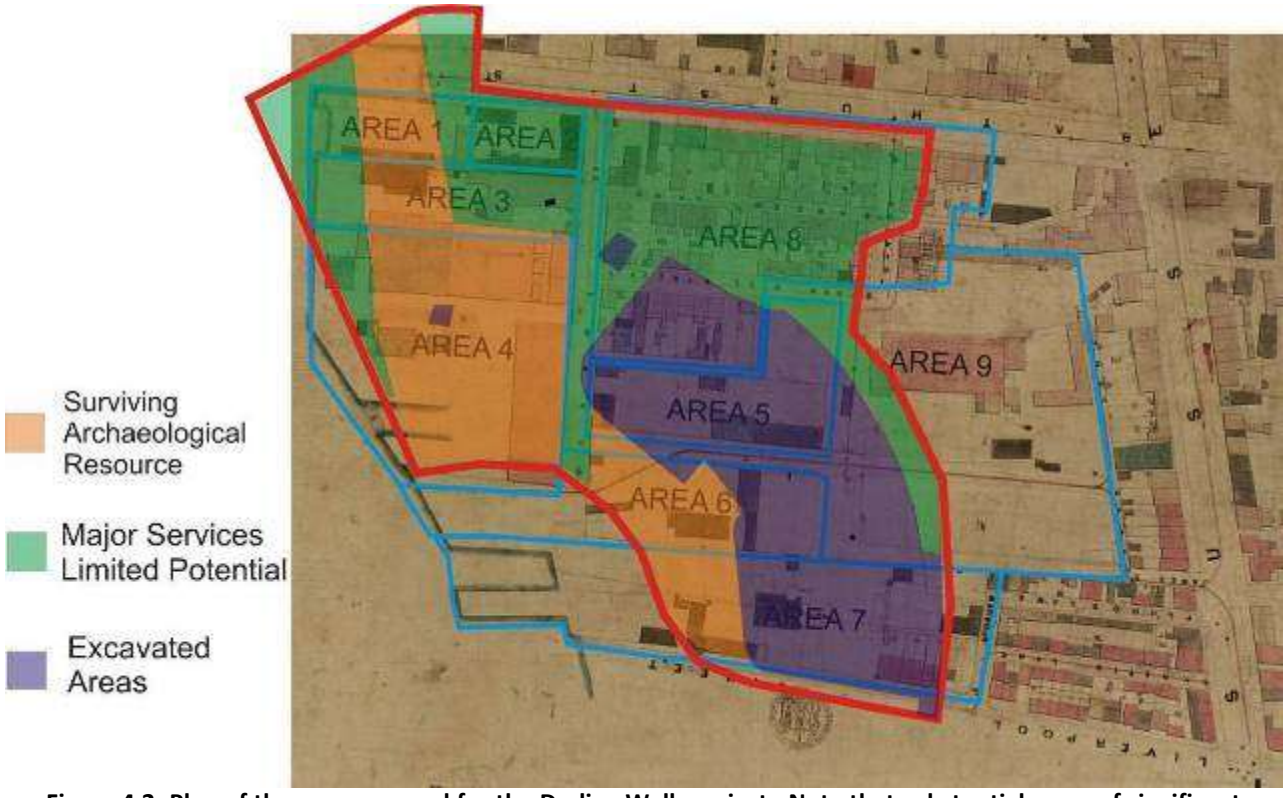


Figure 4.2: Plan of the area assessed for the Darling Walk project. Note that substantial areas of significant archaeology still survive within this area.

The **Barangaroo South** archaeological program undertaken by Casey & Lowe for Lend Lease recovered considerable information associated with the development of the Darling Harbour foreshore.[133] The man remains found were the result of reclamation where the eastern foreshore of Darling Harbour was extended into the harbour. The reclamation fills mostly consisted of stone

[133] http://www.caseyandlowe.com.au/sitebarangaroosouth.htm

rubble and levelling layers. In some cases the reclamation was bulk fills of sandstone rubble followed by clay-rich fills to raise the new ground above the high water mark (Area C4). Initially, bulk rubble fill was deposited into the harbour to create a platform within the tidal zone. In Area K bulk fills were introduced and compacted to create stable and level ground. Roughly-made sandstone walls were built to assist in retaining the fills during this process. The sandstone walls were built on the initial bulk rubble fill and were later sealed by more rubble stone fill and the first surfacing over the new land. The main archaeological features and findings were as follows:

Natural Environment and Aboriginal Archaeology

- Evidence for the original rocky shoreline.
- There was no Aboriginal archaeological evidence

Henry Bass' shipyard 1830s-1850s

- Sandstone seawall and reclaimed land that formed wharf facilities for Henry bass' shipyard in the 1830s.
- Informal boat ramp and structure made from sandstone pavers, brick piers and timber, which was used during the 1830s but buried by reclamation by the 1840s.
- Cottage built on a rocky outcrop and partially on the reclaimed land and seawall. Likely constructed by the 1840s. Evidence for some period of domestic occupation. Survives until the 1880s.

Francis Girard's reclaimed land 1830s-1840s

- Two phase of reclamation. Reclaimed land using rubble sandstone and layers of crushed sandstone and clays. There was no formal retaining structure on the western edge. Some rough sandstone walling at the northeast and southeast.

Hunter River (later Australasian) Steam Navigation Company 1840s-1880s

- Occupies southern half of Francis Girard's reclaimed land from 1840s.
- Remains of the timber wharf constructed by the 1850s consisting of timber piles and headstocks.
- Remains of a large warehouse structure included sandstone pads to support a timber superstructure, and a substantial sandstone wall on the western harbour frontage that connected the building to the wharf structure.
- Within the warehouse was an extensive *in situ* deposit of charred grains and corn, indicating that there was a fire in the later 19th century.

Breillat's Wharf 1840s-1880s

- A substantial sandstone seawall retained the reclaimed land. It was constructed in the 1840s and was at least 45m in length. The base of the wall was constructed on rubble fills that were located at least 1m below low tide level.
- At the southern end of the wall were the remains of a timber jetty.
- At the northern end of this property were the remains of a structure with timber and sandstone footings. Extensive deposits of slag within the structure indicated that it may have functioned as a blacksmith's workshop.
- Evidence for levelling and wharf redevelopment, including additional courses to the seawall, between the 1860s and 1870s.
- Remains of a warehouse or store building dated to the 1870s with an occupation deposit containing artefacts associated with the men who worked at the wharf.

Grafton Wharf and Early 20th Century

- Evidence for wharf and jetty improvements such as dead man anchors.
- Evidence for levelling and resurfacing with roughly made concrete.
- Remains of two brick weighing stations.

Only a very small section of the original foreshore extended into Barangaroo South. Some of this was quarried sandstone. Most of Barangaroo South was land reclaimed by the 1850s, approximately the eastern 40 metres or so. The remaining western area was reclaimed during the 1960s and 1970s.

Surry Hills and Haymarket

Casey & Lowe have excavated remains of the Haymarket brickfield on three separate sites between Elizabeth, Albion and Reservoir Streets in Surry Hills and part of an early pottery manufacturing site, Thomas Ball Pottery (c1801-1823).[134] The remains of the brickfield were quite extensive, with the base of a clamp kiln as well as cart tracks. There was limited evidence for additional activities areas other than the clamp kiln remains. Casey & Lowe have also excavated the remains of houses on the 19-41 Reservoir Street site. There was also an excavation at Cunningham Street, Haymarket by Austral Archaeology in 2009 which found remains of early industrial/commercial enterprises as well as residential housing.

4.2 Research Questions

This section provides a preliminary indication of the type of research questions that might be pursued to investigate the archaeological remains at the site so as to inform the assessment of heritage significance. Additional ones will be developed for the recommended Research Design & Management Strategy.

4.2.1 Maritime infrastructure[135]

Prior to Federation the overwhelming majority of maritime infrastructure in Darling Harbour was in private hands. They were built to suit the individual requirements of the private firms that owned them 'without system and without regard to future expansion'.[136] This cacophony of odd shapes and sizes led to congestion and inefficiencies on the waterfront. Though some individual larger firms may have fared well in this system, the economic benefits of the seaborne trade to the wider society were not fully exploited. With the rapidly increasing dimensions of vessels, the capital needed to construct larger jetties with deeper berths was beyond the means of most of the jetty owners. The required sizes of these new jetties were such that a number of earlier ones would need to be demolished before being replaced by a single jetty and the necessary cooperation between jetty owners was not automatic. The inability to react quickly to changes in shipping technology would eventually see Sydney become a less competitive port of trade.

The opportunity for change and direct government takeover of the waterfront came with the appearance of the bubonic plague in 1900 (Section 2.7). The porous state of the seawalls and fences along the water front created a portal for plague carrying rats to enter the city. The traditional design of seawalls in Sydney in the 19th century was the laying of ballast (rock fill) up to the low water mark, which formed a foundation. Upon this foundation the seawall was constructed either from masonry or hand-packed rubble. In some locations of Darling Harbour where the silt was soft and deep, sheet piling composed of turpentine was employed instead of ballast and masonry. Piles were driven deep into the silt, tied back at the top with timber beams and filled in with rubble and soil to wharf level. The piles however were not sided as it was believed that the bark and sapwood provided good protection against marine borers. This method of construction however meant that there were gaps between the piles. With the sea washing in amongst the piles there was continuous subsidence as the reclamation fill was washed out. Furthermore 'the wide interstices and the hollows that formed behind the piles became rat warrens'.[137]

[134] Casey & Lowe 20113 see http://www.caseyandlowe.com.au/site710.htm
[135] This section provided by Cos Coroneos.
[136] Walsh 1911:79.
[137] Walsh 1911:87.

The government believed that individual firms that owned the jetties and seawalls were unable or unwilling to expend the capital to rat-proof their structures and that facilities which were run down were a public health risk. With the resumptions of the waterfront the government moved quickly. The Sydney Harbour Trust, established in 1901, decided 'to seal the front to a foot below low water mark with Monier plates to prevent the passage of rats…the result was entirely successful, and the water front was vastly improved in appearance'.[138]

The resumption of the Sydney waterfront in 1900 was a momentous event, which defined the character of shipping, commerce, the lives of those who worked on the waterfront and of Sydney Harbour itself for the new century. The catalyst for this change was the poor condition of the waterfront and the health risk it posed for the city's inhabitants.

Specific Research Questions

This site provides some limited opportunity to explore the transformation of a section of the Darling Harbour waterfront from the early 19th century to the government takeover in 1900 and then into the 20th century, allowing exploration of questions relating to:

- the comparison between the quality of public versus private infrastructure, quality both in materials and construction. For example was turpentine, an excellent hardwood resistant to marine borers, consistently used? If lesser quality timbers such as ironbark were used as piles, were they copper sheathed (a protection against marine borers)?
    - Documenting the quality of the jetties, seawalls and other maritime infrastructure constructed by private firms would provide insight into the attitudes of those firms.
    - Did high quality structures indicate confidence and a willingness to invest for the long term?
    - Did poor quality and poorly maintained structures reflect a struggling owner or one that did not see it economically beneficial to build durable infrastructure on their property or lease? Did the maintenance and condition of the waterfront infrastructure drop off towards the start of the 20th century?
    - If so, how much was this due to the 1890s depression and/or to owners realising that the government was looking at resumptions cause them to reduce expenditures in maintaining their structures; thereby providing the government more justification for taking over.
- Nature of evidence for the Iron Wharf and various seawalls, their use and construction.

4.2.2 Landscape Archaeology

The exploration of how the landform of Darling Harbour was altered between c.1810 and 1980s is fascinating as it testifies to the need for more land in specific locations and to provide adequate draughts for shipping. This represents the development of urban pressures as early as the 1830s to concentrate local industry around the main transport network, shipping, so as to aid distribution of their products and the importation of the goods as needed. The ability of entrepreneurs to transform mud flats into useful land build wharfage far enough into the harbour to provide safe mooring for ships bringing in cargo and taking away goods. The alteration and manipulation of the landform of Darling Harbour has been part of its story for the last 212 years. The methods and means by which the landform was altered can tell us much about attitudes to waste and rubbish disposal, particularly the deposition of waste from other construction projects, such as the reclamation of nearby areas in the 1920s and of the study area in the 1950s and 1960s with material excavated from elsewhere and dredged from the harbour.

[138] *Sydney Harbour Trust Annual Report*, 1903 and 1904.

Specific Research Questions

- What was the nature of the original landform?
- Evidence for shells, such as cockles and oysters, and what plant species were found in this area?
- How has this part of Darling Harbour evolved over time?
- How many times was the landform remade within the study area?
- What different materials and means were used, and what was the depth of the reclamation at each stage? How different were these practices compared to Darling Walk, Barangaroo South and KENS sites.
- Were the phases of reclamation successful or not?
- Were the different properties reclaimed at different times?
- Where did the reclamation fill come from?
- How was the new landform used?
- What was the relationship between the reclaimed land and the wharfage?
- Other relevant questions will be addressed as they arise.

5.0 Heritage Significance

5.1 Heritage Significance

This section has been updated to be in accordance with the Heritage Branch 2009 guidelines: *Assessing significance for historical archaeological site*.

Apart from NSW State guidelines, the nationally recognised Australia ICOMOS Charter for the Conservation of Places of Significance (*The Burra Charter*) also defines 'cultural significance' as meaning:

> '*aesthetic, historic, scientific and social value for past, present and future generations.'*

Significance is therefore an expression of the cultural value afforded a place, site or item.

Understanding what is meant by value in a heritage sense is fundamental, since any society will only make an effort to conserve things it values. In terms of built heritage, what we have inherited from the past is usually places that have been continuously cared for. Conversely, many archaeological sites will comprise places which, for whatever reason, have not been cared for until the relatively recent period.

Our society considers that many places and items we have inherited from the past have heritage significance because they embody, demonstrate, represent or are tangible expressions of values society recognises and supports. Our future heritage will be what we keep from our inheritance to pass on to the following generations.[139]

5.2 Previous Statement of Significance[140]

The City Plan Archaeological Assessment provided a Statement of Significance for the SICEEP site:[141]

> The subject site is considered to contain a high level of archaeological potential in some areas of the site that relate to an identified number of different significant development phases. There are certain aspects of the site that meet the State significant criteria, other identified parts meet the local significance criteria with other section of the site that do not meet the significance criteria.
>
> The subject site was originally part of the swampy headwater of Darling Harbour and part of the archaeological potential considered significant is the ability to trance an original shoreline in the western (less intensively developed) part of the site. Historically, John Dickson's sea wall and mill pond were located on the south eastern part of the site and are considered as State significant for the contribution they made historically, associationally and technically.
>
> Later 19th century development within the site area saw the 1853 establishment of the Darling Harbour railways and later goods yard which is historically significant for the site at State level. From the 1870s, the area became one of the most important goods handling places in the colony and saw the first inwards goods shed as rail transport became used to access country areas. In addition the first Iron wharf was constructed on the subject site in 1874 and this item is also of State significance for the historical and technical associations.
>
> The subject site saw some of the first industry and technology of the new colony including drainage systems, which were not entirely successful and the Hydraulic Pumping Station which was highly successful. There are individual areas within the site that will retain archaeological

[139] This section is an extract based on the Heritage Office *Assessing significance for historical archaeological site*, 2009:1

[140] There are a number of issues with the Discussion of Significance and the Statement of Significance, notably they do not adequately address archaeological significance or research potential and research questions. While there are some elements that are adequate, others are not sufficient. The result is that in some cases it has over assessed the significance of the archaeological resource or buried heritage while in others it has not really been able to engage with them due to the inadequacy of the historical research.

[141] City Plan May 2012:101-102.

resources relating to small scale 19th century industrial practices such as blacksmiths, farriers, timber yards, stone cutters, confectionary makers, etc and commercial enterprises, including the Railway Pier and later Central Markets Hotel. In addition, there are at least two different stage of 19th century residential development documented across the southern and eastern sides of the site.

The 20th century development of the site included the resumption of the area for the Sydney Municipal Markets in 1931. This has meant that the site is a time capsule of an earlier, generally 19th century urban precinct, including streets and the streetscapes which have now disappeared. This aspect of the site is considered to have local significance.

5.3 Individual Statements of Significance

It is noted that the following SHFA s170 register precincts are not mapped and that there is not always a clear understanding of the location of potential items. Also there is no indication of their level of significance, whether they are of local or State significance. Many of these S170 areas include archaeological remains which are potentially of State significance. We have identified a preliminary level of significance against each item.

5.3.1 SHFA s170 Register Items

- **Exhibition Centre Precinct – Archaeological Remains – Iron Wharf** **STATE**

(Directly east of the Exhibition Centre, Darling Harbour 2000)

The Iron Wharf was considered to be an engineering masterpiece at the time of its construction. Parts of the wharf still remain buried at the site and are significant archaeological remains. They have the potential to inform about early large scale iron construction. The Iron Wharf is significant as it was one of the first large scale iron constructions in the world. The construction of the wharf lead to the development of Darling Harbour as the major goods centre in Sydney.

- **Chinese Garden of Friendship (incudes buried remains)** **STATE**

(Day Street / Pier Street, Darling Harbour)

The Chinese Garden of Friendship celebrates the sister state relationship between the people of Guangdong province and the people of NSW. It was a gift for the celebrations of Australia's Bicentennial and maintains a cultural and visual link with Chinatown. As such it is an important cultural site for the Chinese community, whose association with the area extends until before the 1870s. It is also an important cultural and leisure site for the wider community and international visitors. The Chinese Garden has landmark qualities as an authentic Chinese Garden which was a co-operative effort between the Guangdong Province of the People's Republic of China and the New South Wales Government. Archaeological deposits from the former Freezing and Refrigeration works may be undisturbed under the garden. Historically this site is significant as the development of refrigeration and freezing occurred here. This had a profound effect on the eating habits and health of the city and the nation. Large quantities of frozen meat were shipped from the site to Britain, an important export industry. The site had an effect on the development of the pastoral industry, especially the dairy and meat industry. The Chinese Garden has been constructed over the site of the NSW Fresh Food and Ice Co, but as the disturbance to the ground is minimal there may be large archaeological deposits still extant. The site offers research potential into the invention and development of refrigeration and freezing technology in Australia.

- **Pier Street Precinct Archaeological Remains (s170) STATE/LOCAL**

(Bounded By Hay, Harbour, Pier Streets and Merino Boulevard (Darling Drive)

> Little Pier Street precinct displays historical significance, firstly, due to being part of Dickson's Steam Mill Complex, which included Australia's fist Steam Engine and marked the arrival of industrial technology. Little Pier Street Precinct also was the establishment of Australia's first salting works, which introduced innovative industrial and commercial enterprise. Aesthetically, the site contains sub-surface structural features such as; walls, floors and boiler foundations. Socially, Little Pier Street Precinct has become a place of high social value as an archaeological site, which contains physical evidence directly related to well-known events in Australia's history. The presence of actual relics has increased the interpretative potential of the site.[142]

According to the AHMS (2009) *CMP Hydraulic Pumping Station*, this precinct also includes the Hydraulic Pumping Station archaeology although it does not mention that archaeology from this site survives outside the standing building. The CMP does not address the potential archaeological resources outside the footprint of the surviving building (see below) nor does the history for this S170 listing mention the pumping station archaeology. This heritage item is located to the immediate south of the north and central SICEEP study area.

- **Cockle Bay Precinct, Archaeological Remains STATE/LOCAL**

(East Side of Darling Harbour, West of Sussex Street, North of Pier Street, Darling Harbour, NSW)

Statement of Significance

> The site is significant for the archaeological potential still extant, this is important for the information it may reveal about industrial and technological advances over almost a two hundred year period. This area was where beginnings of industry, the development of technologies and significant transportation facilities in Australia occurred. Some of these developments such as freezing and refrigeration had important implications both in Australia and internationally. Part of the area includes Chinatown and thus has cultural significance for the Chinese community whose association with the area extends to c.1870s. It is a large site with a diverse history stretching back to pre-European settlement. It includes Cockle Bay which was named for the large middens and thus may have indigenous archaeological significance.[143]

- **Hydraulic Pumping Station STATE**

This statement relates to the standing building but the identified level of significance is likely to relate to the sub-surface remains to the east.

Statement of Significance

> Hydraulic Pumping Station No.1 played a pivotal role in the industrial, commercial and architectural development of Sydney. As the city's first and major public provider of hydraulic power, it has strong historical associations with many prominent buildings and firms. The elegant structure of the remaining building is one of the very few industrial landmarks remaining in this part of the city.
>
> It is noted that this Statement of Significance is purely for the extant building which is listed on the SHR, not for the archaeological remains of the rest of the pumping station which extend to the east of the building. There has been some misunderstanding about the archaeological potential of this area. The core site is currently just outside the SICEEP study area but there may be subsurface tunnels etc associated with this site.

[142] S170 register, State Heritage Inventory.
[143] S170 register, State Heritage Inventory. This item was not identified in the Archaeological Assessment.

- **Water Cooling System and Manifold** **STATE?**

Statement of Significance

The water cooling system and manifold was an integral component of the operating system of the Power Station. The former Ultimo Power Station, (now the Powerhouse Museum) dating from 1899, is historically significant for being the original generating station for the supply of electricity to power the electric tramway network throughout Sydney. It was also one of the largest and most important generating stations in NSW for many years and has associations with the electrification of the suburban railway system and with the general reticulation of electrical power. The station also played a major part in the development of the Ultimo/Pyrmont area.

Description

Underground conduits possibly built of sandstone taking cool water to the Powerhouse from Darling Harbour waters edge and hot water from the Powerhouse to the waters edge. The remains of the engineering equipment/manifold of this cooling system are located in the carpark of the Novotel accessed from Murray Street.

Address

Powerhouse to Murray Street to waters edge, Darling Harbour.

- **Darling Harbour Rail Corridor**

(West side of Darling Harbour to Pyrmont, Darling Harbour)

The Darling Harbour goods line was part of the first railway opened in New South Wales in 1855, the current corridor corresponds with that purchased from the Harris family in 1853 for this purpose. It therefore has a high degree of significance as a place. The Ultimo Road Bridge is believed to be constructed in the 1850s, and is therefore one of the only remaining features of the original railway which joined Darling Harbour and Granville (Parramatta Junction) in 1855. The siting of the railway along what was the edge of Darling Harbour strongly influenced the development of Pyrmont and Ultimo. Because of it, wool stores, engineering works and other industries were built here after the 1870s, giving this part of Ultimo its industrial, rather than residential, flavour. The site also contains two railway bridges. The Railway Square road overbridge (outside the curtilage of this listing) built in 1855 is historically significant as the oldest railway bridge to be constructed and still in use in New South Wales. It is a strong connection to the first railway construction and the original Redfern (Sydney) Station. The Ultimo railway underbridge is a mid 19th century construction with classic revival inspired cast iron columns and mid 19th century sandstock brick abutments. Both items are assessed individually as historically rare, scientifically rare, archaeologically rare and socially rare.

5.4 Basis of Assessment of Heritage Significance

To identify the heritage significance of an archaeological site it is necessary to discuss and assess the significance of the study area. This process allowed for the analysis of the site's manifold values. These criteria are part of the system of assessment which is centred on the *Burra Charter* of Australia ICOMOS. The Burra Charter principles are important to the assessment, conservation and management of sites and relics. The assessment of heritage significance is enshrined through legislation in the NSW *Heritage Act* 1977 and implemented through the *NSW Heritage Manual* and the *Archaeological Assessment Guidelines* and *Assessing significance for historical archaeological sites*.[144]

[144] NSW Heritage Office 1996:25-27; 'Assessing Heritage Significance', a NSW Heritage Manual update from the Heritage Office website (July 2001); Heritage Branch 2009 *Assessing Significance for Historical Archaeological Sites and Relics*.

The nature of heritage values and the degree of this value will be appraised according to the following criteria:[145]

5.4.1 Nature of Significance Criteria:

Criterion (a): *Historic Significance - (evolution)*

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);

Criterion (b): *Associative Significance* – (*association*)

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

Criterion (c): *Aesthetic Significance - (scenic qualities / creative accomplishments)*

an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the cultural or natural history of the local area);

Criterion (d): *Social Significance - (contemporary community esteem)*

an item has a strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the cultural or natural history of the local area);

Criterion (e): *Technical/Research Significance - (archaeological, educational, research potential and scientific values)*

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);

Criterion (f): *Rarity*

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);

Criterion (g): *Representativeness*

an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).

<u>To be assessed as having heritage significance an item must:</u>

- meet at least one of the one of the seven significance criteria
- retain the integrity of its key attributes

If an item is to be considered to be of State significance it should meet more than one criterion, namely in the case of relics, its research potential.[146] Archaeological Significance:

> may be linked to other significance categories especially where sites were created as a result of a specific historic event or decision, or when sites have been the actual location of particular incidents, events or occupancies.

[145] NSW Heritage Office 2001, NSW Heritage Office 2009.
[146] Heritage Branch, *Assessing Significance for Historical Archaeological Sites and Relics* 2009:9

> Other relevant factors may be comparative values related to the intactness and rarity of individual items. The rarity of individual site types is an important factor, which should inform management decisions.

Relics must also be ranked according to their heritage significance as having:

- Local Significance
- State Significance

If a potential relic is not considered to reach the local or State significance threshold then it is not a relic under the NSW Heritage Act.

State heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

'local heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.[147]

5.4.2 Research Potential

> *Research potential is the most relevant criterion for assessing archaeological sites. However, assessing research potential for archaeological sites can be difficult as the nature or extent of features is sometimes unknown, therefore judgements must be formed on the basis of expected or potential attributes. One benefit of a detailed archaeological assessment is that the element of judgement can be made more rigorous by historical or other research.*[148]

Assessment of Research Potential

Once the archaeological potential of a site has been determined, research themes and likely research questions identified, as addressed through archaeological investigation and analysis, the following inclusion guidelines should be applied:

Does the site:

(a) *contribute knowledge which no other resource can?*
(b) *contribute knowledge which no other site can?*
(c) *is the knowledge relevant to general questions about human history or other substantive problems relating to Australian History, or does it contribute to other major research questions?*[149]

If the answer to these questions is yes then the site will have archaeological research potential. The new significance guidelines have taken a broader approach

5.4.3 Level of Heritage Significance

New criteria were developed in 2009 to identify whether the archaeological resource is of Local or State significance.[150] The following four criteria were identified in the 2009 guidelines and are considered to be relevant to SICEEP North and Central:

[147] This section is an extract based on the Heritage Office *Assessing Significance for Historical Archaeological Sites and Relics* 2009:6
[148] NSW Heritage Office 1996:26.
[149] Bickford, A. & S. Sullivan 1984:23.
[150] Heritage Branch, Dept of Planning 2009.

- *Archaeological Research Potential (current NSW Heritage Criterion E).*
- *Associations with individuals, events or groups of historical importance (NSW Heritage Criteria A, B & D).*
- *Aesthetic or technical significance (NSW Heritage Criterion C).*
- *Ability to demonstrate the past through archaeological remains (NSW Heritage Criteria A, C, F & G).*

The new significance guidelines were designed to assess significance in light of the amendments to the definition of relics needing to be of either local or State significance. The examples provided were fairly obvious ones but do not help us work out how a less obvious site has State rather than local significance. This means that it is basically down to the skill and expertise of the archaeologist assessing the site.

5.5 Discussion of Heritage Significance

This discussion of heritage significance specifically relates to the potential archaeological remains within the North and Central SICEEP.

Criterion (a): *Historic Significance - (evolution)*

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 SICEEP study area as a whole illustrates many aspects of the evolution of Darling Harbour's history and archaeology from the 1810s into the early 20th century. The land within the North and Central SICEEP study area has archaeological potential to demonstrate the development and expansion of Darling Harbour throughout the 19th century when it was a centre for industry and maritime and railway trade. Remains from the study area have the ability to represent the changing nature of Darling Harbour's occupation throughout the 19th century. Among the potential important remains within the North and Central SICEEP areas are:

- Dickson's (c1815) and Barker's (c1825) jetties.
- 1850s Darling Harbour goods line.
- c1865 seawall, drains and reclamation.
- Dismantled remains of Iron Wharf 1874 demolished into the harbour in the 1920s.
- 1876 seawall and reclamation associated with the Iron Wharf.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

The developments that occurred within the study area are typical of the maritime and industrial development of early Sydney and Darling Harbour. Although the western side of Darling Harbour underwent less development than the eastern side, these developments all involved reclamation to expand the land into the harbour for more secure wharfage and to increase the amount of useable land.

While there were a number of jetties within the study area they were typically rebuilt and demolished through time. The surviving archaeological resource associated with these jetties is likely to consist of pile stumps on the floor of the harbour and artefacts that may have collected within the shadow of the jetties during their operation. Remains were found of Barker's 1825 jetty at Darling Quarter where it keyed into the land.

Criterion (b): *Associative Significance* – (*association*)

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

The potential archaeological remains within the study area are associated with a number of significant persons and industrial manufactories: John Dickson's mill and jetty, and Thomas Barker's mill and jetty and their association with the first and second steam mills in Australia. The Peter Nichol Russell Foundry was a highly important later 19th-century foundry responsible for producing many railway cars.[151] It is noted that the potential archaeological remains of Darling Harbour represents key phases in the economic development of NSW and therefore they have importance to NSW cultural history.

Criterion (c): Aesthetic Significance - (scenic qualities / creative accomplishments)

> **an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the cultural or natural history of the local area);**

The dismantled remains of the Iron Wharf may survive throughout the 1920s reclaimed land. The remains have the potential to inform about early large-scale iron construction. The Iron Wharf is significant as it was one of the first large-scale iron constructions in the world. The 1899 inlet and outlet pipes is associated with the establishment of the Ultimo Powerhouse, NSW's most important power house, and the replacement 1920s inlet when additional sections of Darling Harbour were reclaimed. These elements and their association are considered to have a high degree of creative achievement. While archaeological remains may have aesthetic value, mostly through their novelty and age, they are not 'important in demonstrating aesthetic characteristics'. Their aesthetic values are more by accident than design.

Criterion (d): *Social Significance - (contemporary community esteem)*

> **an item has a strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the cultural or natural history of the local area);**

While no community consultation has been undertaken for the archaeology, the maritime and industrial archaeology and heritage of NSW have strong community interest and support. These places not only represent the success of the entrepreneur and owner but also the many workers whose skills and labour supported the achievements of these industrial places. The industrial heritage of Darling Harbour occupies a special position in the industrial heritage of NSW as it was the place where so many 'firsts' happened. The current study area is important in its own right as well as representative of the wider maritime infrastructure and industry of Darling Harbour, the remnants of which disappeared 20 years ago when they were demolished for the Darling Harbour Redevelopment. The Open Day for the Barker's Mill held during the Cross City Tunnel works in 2003 saw 300 people visit the site with relatively limited publicity. There were also articles in the newspapers at that time. The historical report on Barker's mill and the archaeological work of the Cross City Tunnel is lodged on the Casey & Lowe webpage and is a popular link.

Criterion (e): *Technical/Research Significance - (archaeological, educational, research potential and scientific values)*

> **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);**

The study area contains a layering of maritime and industrial sites within an intensively modified maritime/urban landscape which was extensively used from the 1850s/60 into the 1920s. Parts of the area were quickly occupied and used while other portions were on the edge of the foreshore and had little use until reclaimed as part of the development of railway services.

[151] Casey & Lowe 2008.

The recording, analysis and interpretation of the potential archaeological remains within the study area has substantial ability to yield information on a range of maritime and industrial activities which were essential to the development of NSW from the 1850s up to the early 20th century.

The nature of the post-1788 archaeological resource will include a range of modifications from extensive manipulation of the landform in the process of reclamation by construction of phases of seawalls, major infilling of land and construction of yard areas for stores, railway and other structures on or near the foreshore. All of these activities and events will have left a range of archaeological evidence surviving within the western side of the study area, and the far eastern side of the study area, beneath Tumbalong Park.

This type of technological and chronological layering is not typical of Sydney sites which often have one or two phases of occupation. It has been found on other sites along the Darling Harbour foreshore where the process of reclamation has built up the landform, such as Darling Walk, KENS site, Towns Place and Barangaroo South. These types of sites have considerable wharfage and stores which have not been found at most of these other sites (except Towns Place), but Barangaroo South had much less industrial archaeology than found at Darling Quarter (Walk) which included parts of Barker's Mill, small foundries, the boiler room of the PN Russell carriage works, elements of the PN Russell foundry, as well as associated workers' housing.

The potential archaeological remains within the SICEEP North and Central includes:

- Dickson's (c1815) and Barker's (c1825) jetties.
- 1850s Darling Harbour goods line.
- c1865 seawall, drains and reclamation.
- Dismantled remains of Iron Wharf 1874 demolished into the harbour in the 1920s.
- 1876 seawall and reclamation associated with the Iron Wharf.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

These potential archaeological remains are considered to have a moderate to high level of potential survival within the SICEEP Central and North areas. The *in situ* survival and archaeological recording of these remains has the ability to yield information that will contribute to an understanding of NSW's cultural and natural history.

One of the surprising elements of the excavation of this type of site is how we respond to the recovery and exposure of large-scale archaeological landscapes, with their seawalls, edges of reclamation fill, buried slips and jetty piles. These present a complex and surprising response to those visiting such as site. The materiality of such a buried landscape is hard to express.

Criterion (f): *Rarity*

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);

Evidence of 19th-century Darling Harbour wharfage and industrial complexes is relatively rare in the context of NSW but also in the context of surviving archaeological resource within Darling Harbour. This area was excluded from the Zoning Plan for the City of Sydney and Pyrmont and Ultimo because it was managed by the Darling Harbour Authority when these plans were produced. Therefore there is no means of having certainty about the potential archaeological resource within the extended area. It is noted that Darling Walk and Barangaroo South have large basements and substantial parts of these sites were subject to bulk excavation and removal of these remains.

The later 19th-century wharfage was replicated around the foreshores of Darling Harbour, Walsh Bay, Pyrmont and Darling Island. There are extant 20th-century wharves in a number of these areas which have been retained and modernised and are now intensively used as part of the life of Sydney. The potential archaeological remains of late 19th-century wharves/jetties can be found under reclamation, in the vicinity of and within the footprint of surviving early 20th-century wharves in Darling Harbour and Walsh Bay. The archaeological evidence associated with the later 19th century would be replicated within these areas.

There is the potential for areas of substantial reclamation beneath the 1980s Darling Harbour redevelopment. Pre-1850s reclamation has been found at Darling Walk, KENS Site and Paddy's Market Site and Barangaroo South. It is likely that other areas of substantial reclamation survive beneath the 1980s Darling Harbour redevelopment, notably the 1860s reclamation and the two seawalls. Many metres of seawalls may survive throughout the study area, notably the c1865 seawall and the 1876 seawall associated with the Iron Wharf. Seawalls were built along many foreshores in Sydney Harbour and Darling Harbour. Both of these seawalls would have been built by government as opposed to private development which was the practice at Barangaroo and privately reclaimed land.

Criterion (g): *Representativeness*

> **an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).**

The archaeological remains of late 19th-century wharves/jetties can be found under reclamation, in the vicinity of and within the footprint of surviving early 20th-century wharves in Darling Harbour and Walsh Bay. This is a diminishing resource and there is likely to be a large difference in quality of construction between these late 19th and early 20th-century structures. The earlier types of sites, such as Dickson's and Barker's wharfs, while representative of the early and mid 19th century, may offer us opportunities which are unlikely to be repeated on other sites as each class or group can further and extend our knowledge of these types of sites and the differences between them.

The reclamation deposits themselves are typically sterile material from the excavation of railways etc. In some areas it may include municipal rubbish collection but most of it is likely to be sterile. Extensive strategies and understanding of reclamation has already been identified and recorded in detail at Barangaroo and Darling Quarter. Therefore any further reclamation will have a limited ability to add new information.

5.5.1 Levels of Significance

The Heritage Branch's 2009 significance guidelines identified a series of questions that could address this level of significance for archaeological sites and relics. Many of these have been addressed within the discussion of significance but are further discussed below:

5.5.1.1 Archaeological Research Potential (Criterion E)

- **To which contexts (historical, archaeological and research-based) is it anticipated that the site will yield important information?**

The study area is considered to have a moderate to high ability to yield archaeological information. This can also be relevant to both historical and research-based contexts.

- **Is the site likely to contain the mixed remains of several occupations and eras, or is it expected that the site has the remains of a single occupation or a short time-period?**

As has been demonstrated, the study area should contain archaeological evidence from a number of distinct phases of occupation dating from the early 19th to the mid 20th century. As has been found on other foreshore sites many of these phases are likely to demonstrate the redevelopment and reconstruction of structures and wharfage. The potential remains relate to different site activities and industrial and maritime activities.

- **Is the site rare or representative in terms of the extent, nature, integrity and preservation of the deposits (if known)?**

The study area has the potential to reveal information regarding reclamation processes, early foreshore development, including wharfage and the construction of the railway goods line and associated structures. Sites where similar archaeology has been found include Barangaroo Stages 1 and 2. The site is therefore not particularly rare in terms of the extent or nature of the archaeological deposits that are likely to be found here. The following remains are thought to be rare:

- Dickson's (c1815) and Barker's (c1825) jetties.
- 1850s Darling Harbour goods line.
- Dismantled remains of the 1874 Iron Wharf demolished into the harbour in the 1920s.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

The following archaeological remains are considered to be representative:

- c1865 seawall, drains and reclamation
- 1876 seawall and reclamation associated with the Iron Wharf.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as the Peter Nichol Russell foundry.

- **Are there a large number of similar sites?**

As discussed in the rarity section there are a number of sites containing similar archaeological remains as within Darling Harbour but these are a diminishing resource.

- **Is this type of site already well-documented in the historical record?**

The detailed historical research in Chapter 2 indicates that there is considerable historical information regarding the study area, although understanding early uses of the western foreshore in particular is limited. Some of the historical resources were investigated for the first time during research for this project and it does illustrate that the historical development of the study area has not necessarily been well researched previously. We consider that there is considerable opportunity for further research.

- **Has this site type already been previously investigated with results available?**

Aspects of this type of site have previously been investigated on sites in Darling Harbour, notably Darling Quarter (Walk) and Barangaroo South. The Little Pier Street project investigated elements of the Dickson's mills site.

- **Is the excavation of this site likely to enhance or duplicate the data set?**

The archaeological recording and excavation of this site would provide considerable new information and in some areas, such as reclamation provide duplicate sets of data which would need to be appropriately sampled to provide an overview of the reclamation but not necessarily detailed recording of all stages of reclamation. It is considered that the 1920s reclamation will not

provide archaeological information. Other sections of the site may also have duplicate data sets, such as drain and seawalls but all should also enhance the data set.

5.5.1.2 Associations with individuals, events or groups of historical importance (Criteria A, B & D)

- **Does the archaeological site link to any NSW Historic Themes? Will the site contain 'relics' and remains which may illustrate a significant pattern in State or local history?**

Yes, the key historic themes relating to the study area are listed below:

Australian Theme	NSW Theme	Notes	Examples
2) Peopling Australia	Aboriginal cultures and interactions with other cultures	Indigenous/Interaction: What evidence is there about the lives of Aboriginal people and the nature of interaction. The site is located in Cockle Bay, and place important to Indigenous people.	Place name, camp site, midden, fish trap, trade route…
3 Developing local, regional and national economies	Commerce	Activities relating to buying, selling and exchanging goods and services	market place, consumer wares, trade routes, etc
3 Developing local, regional and national economies	Environment – cultural landscape	Activities associated with the interactions between humans, human societies and the shaping of their physical surroundings	A landscape type
3 Developing local, regional and national economies	Industry	Activities associated with the manufacture, production and distribution of goods	Industrial machinery, foundry, railway or wharfs
3 Developing local, regional and national economies	Technology	Activities and processes associated with the knowledge or use of mechanical arts and applied sciences	Technology associated with power supply
3 Developing local, regional and national economies	Transport	Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Wharf
4) Building settlements, towns and cities	▪ Towns, suburbs and villages ▪ Land tenure ▪ Utilities	Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages; provision of services.	Railway, housing, reclamation, water & drainage, subdivision, abandoned wharf, seawall, powerhouse,

- **Is the site widely recognised?**

Yes, Darling Harbour is recognised by specialist communities and more generally with the public as a place containing industrial and maritime heritage of the past.

- **Does the site have symbolic value?**

Possibly, but not explicitly.

- **Is there a community of interest (past or present) which identifies with, and values the specific site?**

Yes, there is a community of interest in terms of heritage groups, such as heritage engineers etc who value the remnants of our industrial past as well as members of the public who are also interested.

- **Is the site likely to provide material expression of a particular event or cultural identity?**

It is unlikely the study area will provide material expression of a particular event or cultural identity.

- **Is the site associated with an important person? (the role of the person in State or local history must be demonstrated/known)**

The study area in general is associated with a number of important persons but the archaeology within the study area is not associated with any individual important person.

- **What is the strength of association between the person and the site?**

Not applicable.

- **Did the person live or work at the site? During the phase of their career for which they are most recognised? Is that likely to be evident in the archaeology /physical evidence of the site?**

Not applicable.

- **Did a significant event or discovery take place at the site? Is that evident/or likely to be evident in the archaeology/physical evidence of the site?**

No significant events or discoveries have taken place within the study area.

5.5.1.3 Aesthetic or technical significance (NSW Criterion C):

- **Does the site/is the site likely to have aesthetic value?**

Yes, the technical significance of elements of the Iron Wharf, and the two stages of inlet and outlet pipes for the Ultimo Powerhouse. All archaeological sites can have incidental aesthetic values, notably in relation to the process of ruination but this cannot be determined until a site is excavated. We consider this to be an incidental part of any site, meaning there is no intentionality involved in such an aesthetic outcome.

- **Does the site/is the site likely to embody distinctive characteristic?**

Yes, that or a remnant maritime landscape which would be slowly exposed with the removal of the post-1850s reclamation.

- **Does the site/is the site likely to embody a distinctive architectural or engineering style or pattern/layout?**

Not especially.

- **Does the site demonstrate a technology which is the first or last of its kind?**

The Iron Wharf which is reputedly one of the earliest iron structures in the world and certainly in Australia.

- **Does the site demonstrate a range of, or change in, technology?**

This site has layers of information and therefore has a range of remains from different phases and stages of the development of Darling Harbour. Generally it will demonstrate a range of technology.

5.5.1.4 Ability to demonstrate the past through archaeological remains (NSW Heritage Criteria A, C, F & G).

- **Does the site contain well-preserved or rare examples of technologies or occupations which are typical of particular historic periods or eras of particular significance?**

The SICEEP Central and North site may contain 'well-preserved' examples of seawalls and reclamation fills from the 1850/1860s and 1870s. It is likely to contain rare remnants of the Iron Wharf as well as two stages of the Ultimo Power House inlet and outlet pipes. In addition there is some potential for remnants of Dickson's (c1815) and Barker's (c1825) jetties beneath the eastern side of the study area.

- **Was it a long-term or short-term use?**

Long-term use of a range of elements which may survive at the site. The 1899 Power House inlet/outlet pipes were used for approximately 23 years.

- **Does the site demonstrate a short period of occupation and therefore represents only a limited phase of the operations of a site or technology or site? Or does the site reflect occupation over a long period?**

The study area represents a series of both long-term and short-term activities and occupations.

- **Does the site demonstrate continuity or change?**

The study area is expected to demonstrate a mixture of continuity and change.

- **Are the remains at the site highly intact, legible and readily able to be interpreted?**

This is unclear. It is likely that some of the archaeology within the study area will be intact and legible and readily able to be interpreted. The potential remains that are likely to be relatively intact are:

- 1850s Darling Harbour goods line.
- c1865 seawall, drains and reclamation.
- Dismantled remains of the 1874 Iron Wharf, demolished into the harbour in the 1920s.
- 1876 seawall and reclamation associated with the Iron Wharf.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

Many of these elements would be highly interpretable.

5.6 Statement of Heritage Significance

The SICEEP Central and North study area has the ability to contain potential archaeological remains which demonstrate the development, reclamation and expansion of Darling Harbour throughout the 19th century, when it was a centre for industry and, maritime and railway trade for NSW. Remains from the study area have the ability to represent the changing nature of Darling Harbour's occupation and activities throughout the 19th century. Among the important potential buried remains within the North and Central SICEEP areas are:

- Dickson's (c1815) and Barker's (c1825) jetties.
- 1850s Darling Harbour goods line.
- c1865 seawall, drains and reclamation.
- Dismantled remains of Iron Wharf 1874 demolished into the harbour in the 1920s.
- 1876 seawall and reclamation associated with the Iron Wharf.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

These potential remains are associated with significant persons such as John Dickson who introduced the first steam mill to Australian and Thomas Barker who ran a highly successful milling business nearby. Darling Harbour was a focal hub for maritime and railway infrastructure and trade since the 1810s and the layers of industrial and maritime remains across the study area represent this social and economic significance. These layers of significance are valued by various members of the community. These layers of archaeological remains have the ability to yield new information to this industrial and maritime past. An important element of this type of site is how the materiality of large areas of exposed foreshore, seawalls and wharfage can be quite startling and therefore arouse a strong response to the unexpected nature of the remains. Some of the remains are considered to be rare, as they are early examples of their kind, while other elements are considered to be representative of other remains which may survive in other buried and reclaimed landscape. Potential archaeological remains considered to be of local significance:

- c1865 seawall, drains and reclamation.
- 1876 seawall and reclamation associated with the Iron Wharf.

Potential archaeological remains considered to be of State significance.

- Dickson's (c1815) and Barker's (c1825) jetties.
- 1850s Darling Harbour goods line.
- Dismantled remains of Iron Wharf 1874 demolished into the harbour in the 1920s.
- Edges of industrial establishments along the eastern edge of Darling Harbour, such as Peter Nichol Russell Foundry.
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- 1920s water conduits associated with Ultimo Powerhouse.

6.0 Impacts from the Proposed Development

6.1 Description of the Proposed Works

6.1.1 Proposed Development Impacts

The potential impacts discussed below are based on design information available at the time of writing this report. This information has not been updated as of August 2012 and the writing of the August 2012 Heritage Impact Statement. A general description of the proposed works for the Convention Centre, Exhibition Centre, Theatre and Public Realm in the Northern (Bayside) and Central (Darling Central) in SICEEP site are noted below and the building uses and scope are also outlined as follows:

USE	SCOPE
Convention Centre Public Realm	• Demolish existing building to grade. • Remove existing ground slab, capping beams and in-ground services. • Existing piles to remain in ground • Build new Bayside above ground – new piles. • Complete internal refurbishment of Parkside (under freeway). • Minimal excavation of existing public realm levels – new paving / decking.
Exhibition Halls Theatre Public Realm Darling Drive	• Demolish existing exhibition building structure to existing slab level (RL6.0) • Retain undercroft carparking (RL2.5) • New piles through existing slabs (RL6 & 2.5) to support new exhibition / Theatre buildings above. • Extreme south end of MFEC to be on new foundations / piles • Minimal excavation of existing public realm levels – remove existing raised planters • Realignment of Darling Drive to the west

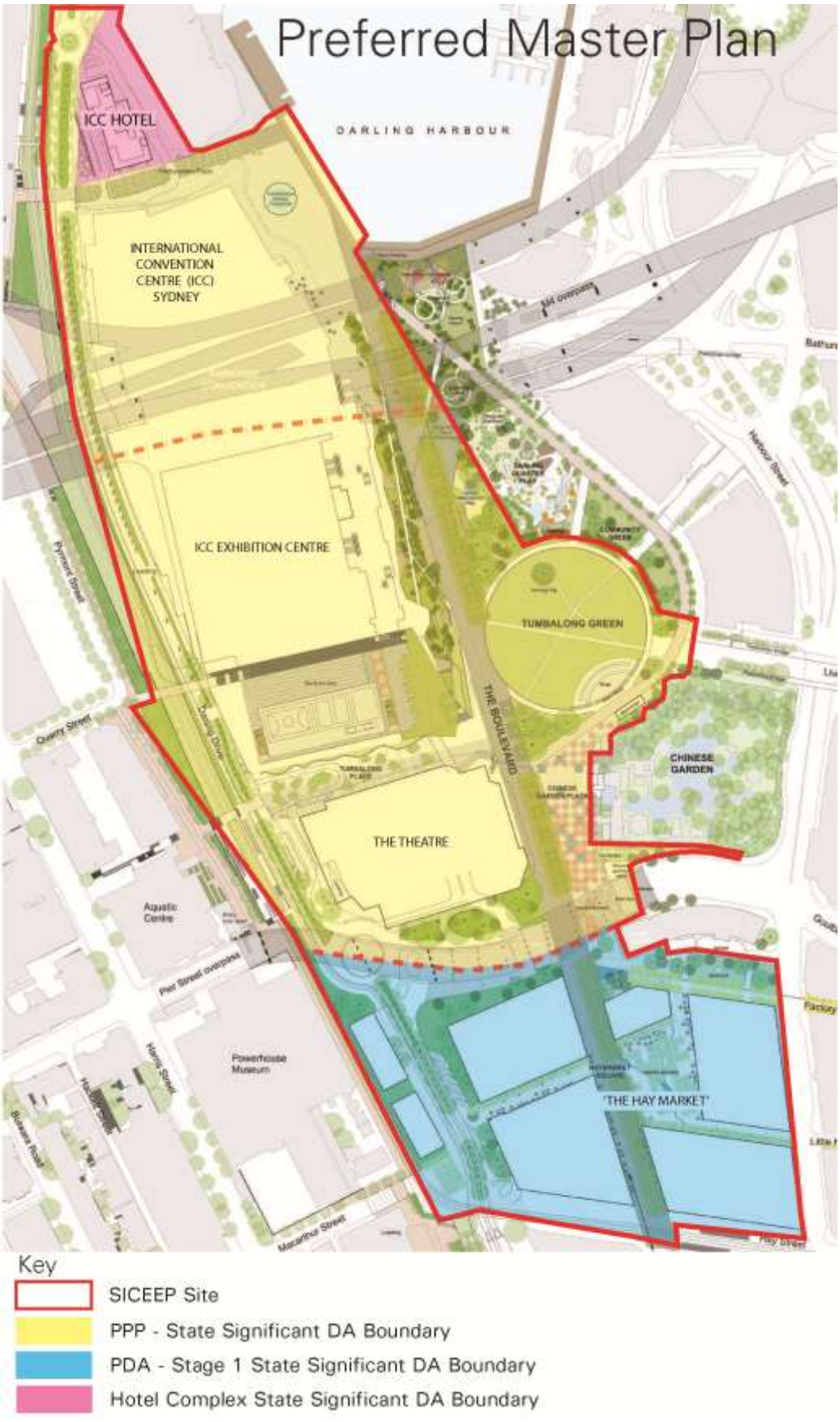


Figure 6.1: Masterplan showing the study area and the proposed location of buildings.

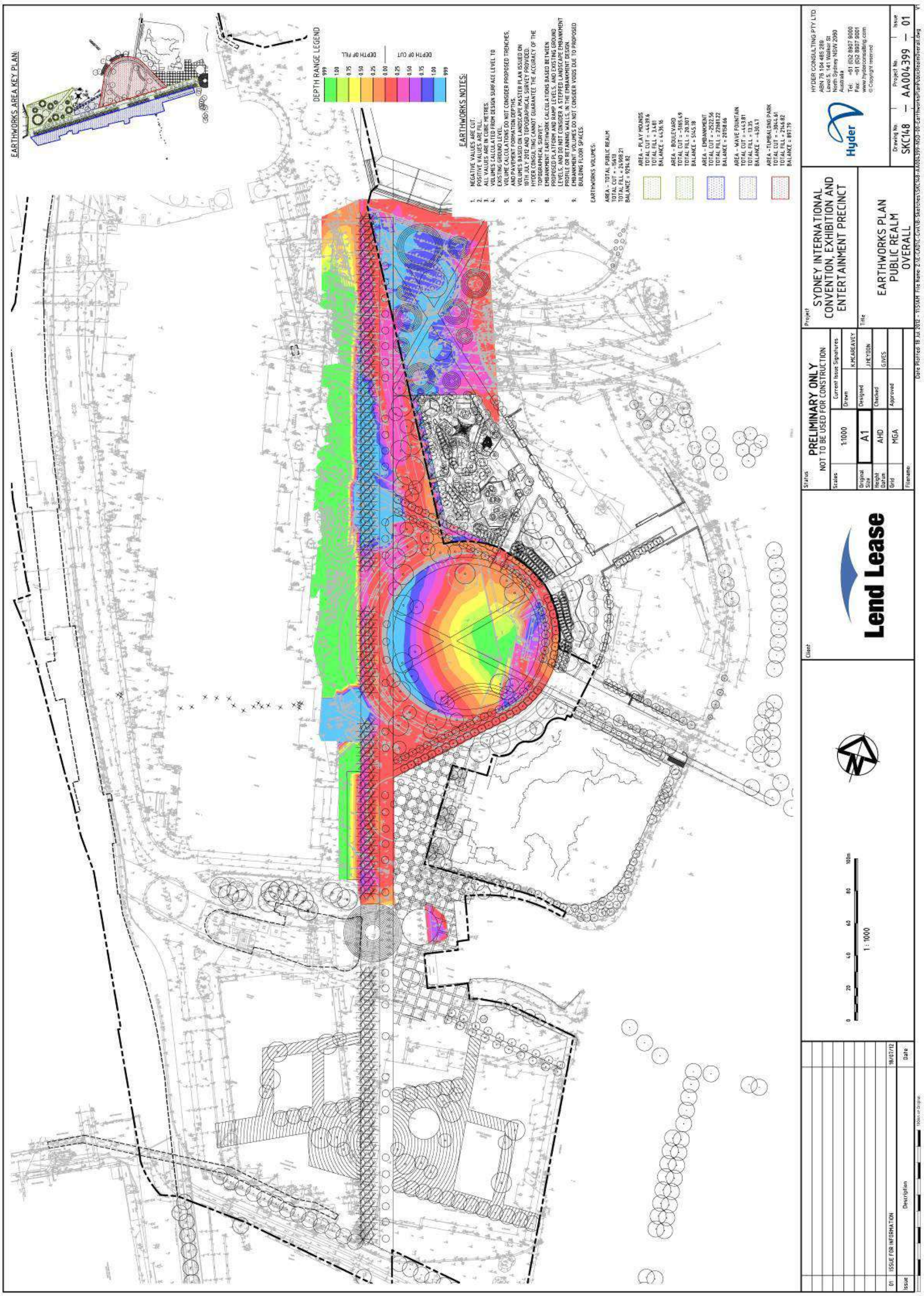


Figure 6.2: Plan of earthwork associated with the north and central public domains.

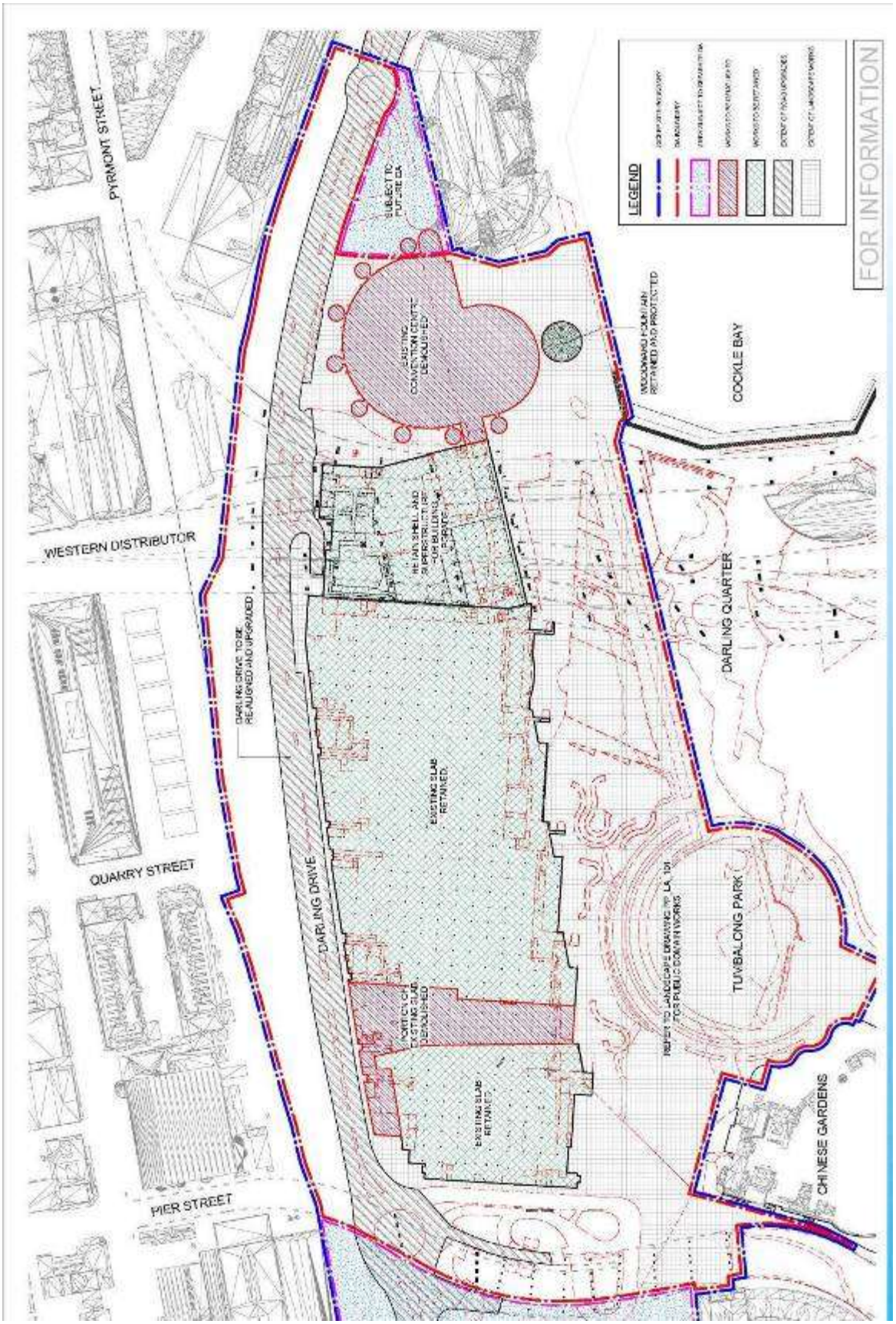


Figure 6.3: Demolition plan indicating areas were existing ground slabs are to be retained. Darling Harbour Live

6.2 Proposed Impacts and Mitigation

6.2.1 International Convention Centre

The footprint of the proposed building is outside the area of the original foreshore (Figure 3.6, Figure 3.7). The main potential archaeological remains within this area is the seawall associated with the construction of the Iron Wharf and the 1920s Ultimo Power House inlet and outlet pipes beneath Darling Drive (Figure 3.8, Figure 3.10). The proposed building has extensive piling and strip footings. One of the existing Convention Centre buildings is to be retained and therefore will not require any further piling (Figure 6.3, Figure 6.4).

The proposed design for the Convention Centre requires strip footings with load-bearing piles beneath (Figure 6.5). As discussed in Section 3.3.1 there is some potential for impacts on the seawalls associated with the Iron Wharf although not within the area of the retained building (Figure 3.8). Current designs have no impacts on the water conduits but the northeast section of the 1920s Ash Discharge Pipeline crosses through the northern footprint which requires additional piling (Figure 3.10). The following dimension tables are taken from the piling plan (Figure 6.5). Therefore there is some potential for impacts on significant relics or works.

The southern section of the Convention Centre, beneath the Western Distributor, is to be retained and there will be no further piling in this area (Figure 6.3).

Schedule details from Technical drawing Figure 6.5.

Mark	Width (mm)	Depth (mm)
SF1	900	600
SF2	1400	1200
SF3	1200	800

Tie beams

Mark	Width (mm)	Depth (mm)
TB1	1200	500
TB2	1400	1500

Piling

Mark	DIA	Socket Depth
P1	600	3000
P2	750	3000
P3	900	3000
P4	900	9000

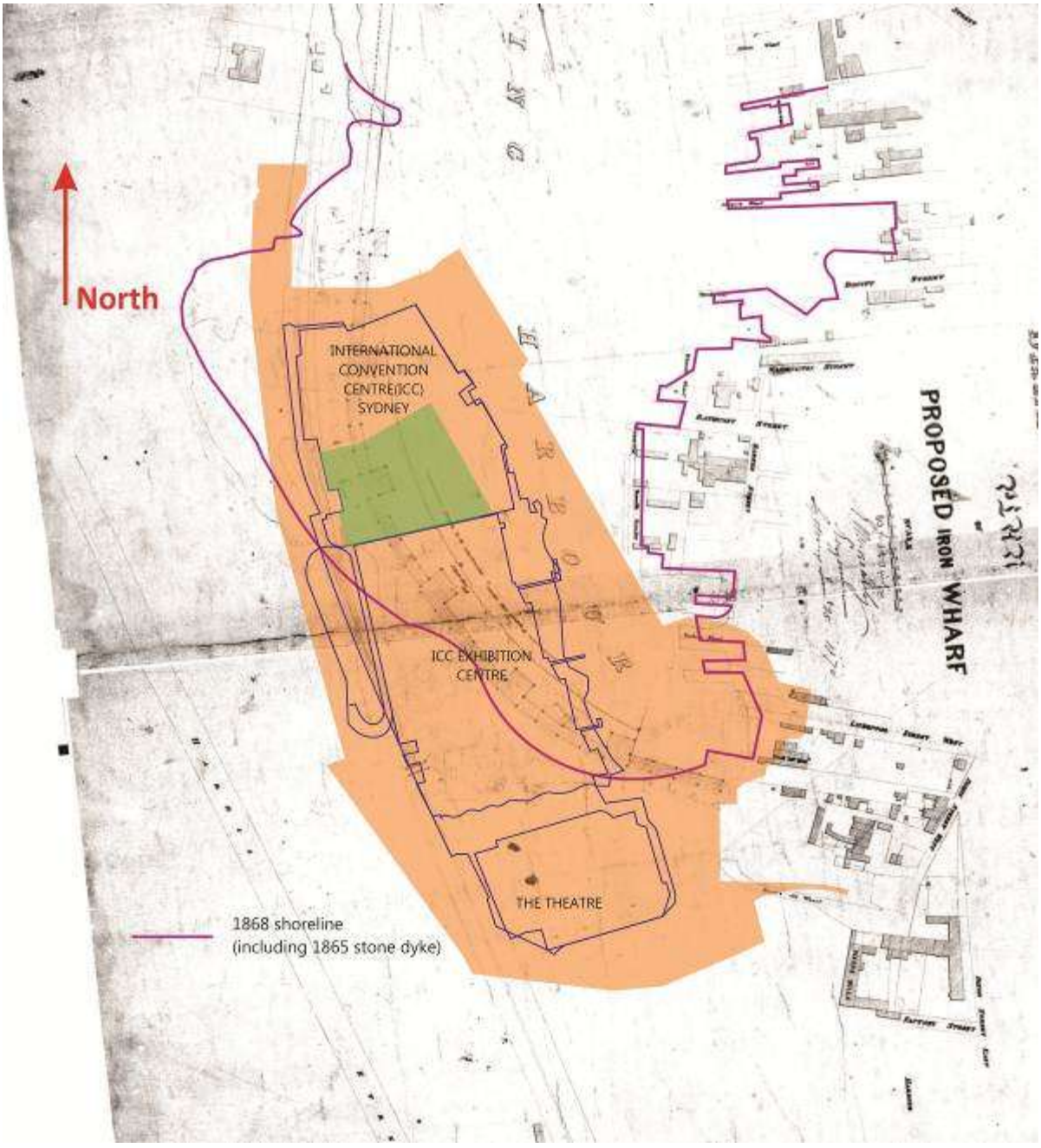
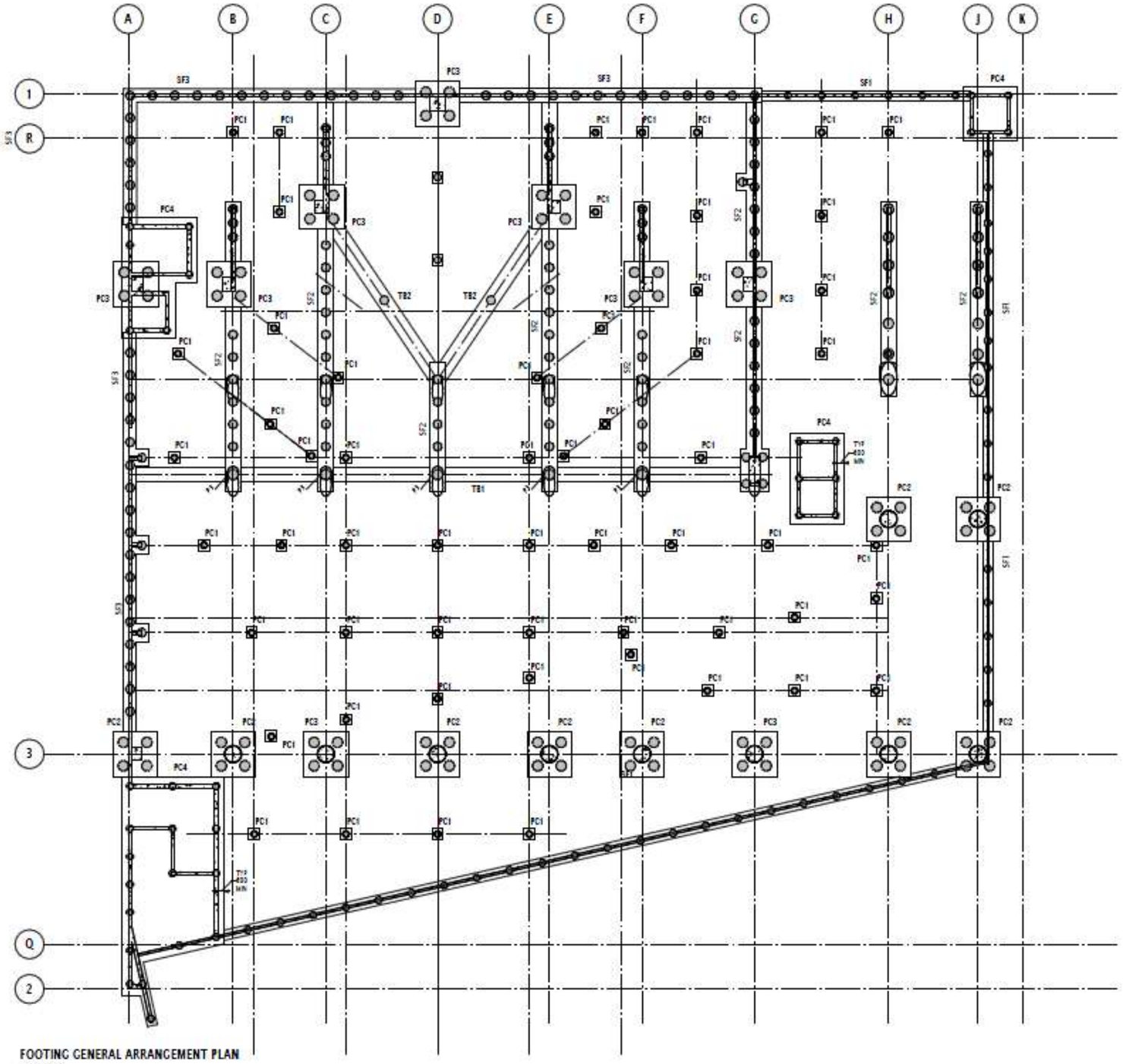


Figure 6.4: Overlay of the proposed buildings in the central and northern areas 1870. The construction of the Iron Wharf involved further reclamation along the southern and western foreshore. The green area shows the location of the existing Convention Centre building to be retained within the proposed redevelopment and will therefore no require any further piling. 'Darling Harbour Wharf, General Plan No 2', [signed] EO Moriarty, Engineer, 25 Jan 1870, SRNSW AO Map No 455, Parts 1 and 2.



CONCRETE NOTES :
-SEE NOTES ON COVER SHEET
-MIN CONC. STRENGTH AT 28 DAYS

LOCATION	f'c
FOOTINGS TYP	40
PC2/PC3	50

GENERAL ARRANGEMENT LEGEND:

- DENOTES IN-SITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND IN-SITU CONCRETE ELEMENT OVER
- DENOTES PENETRATION
- DENOTES SUMP
- DENOTES SLAB STEP
- THK — DENOTES SLAB THICKNESS
- TAC — DENOTES COLUMN NUMBER
- WT — DENOTES WALL TYPE

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS

DESIGN LOADS:
-THESE ARE UNFACTORED LOADS (kPa)

LOCATION	DESIGN VALUE	
	LL	SIDL
PLENARY SEATING	5.0	0.5
PLENARY STAGE	10	7.5
LOADING DOCK & CIRCULATION AREA	10	0.5
EXHIBITION HALLS		
-TYPICAL	20	0.5
-VEHICLE	T44 VEHICLE/A14 AXLE/WT WHEEL LOAD	0.5
-STAGE & DOCK LEVELLER	7.5	0.5
PRE-FUNCTION FOYERS	5.0	0.5
BANQUET & MEETING ROOMS	5.0	0.5
ENTERTAINMENT CENTRE	5.0	0.25
KITCHENS		
-TYPICAL	5.0	0.5
-COLD & FREEZER ROOMS	7.5	0.5
-FOOD PREP AREA	5.0	0.5
-CROCKERY STORAGE	10	0.5
WATER CLOSETS	5.0	0.5
STOREROOMS	10	0.5
CORRIDORS, STAIRS, LANDINGS, CIRCULATION	5.0	0.5
OFFICES	5.0	0.5
CARPARK	2.5	0.5
PODIUM	5.0	10

VIBRATION LIMITATIONS
- EMPLOYEE & MEETING SPACES - 4.5hz & ACCELERATION REQUIREMENTS AS PER BS6897
- EXHIBITION SPACES - 4.5hz & ACCELERATION REQUIREMENTS AS PER BS6897

PILE CAP SCHEDULE					
MARK	LENGTH	WIDTH	DEPTH	PILES	REINF RATE
PC1	1000	1000	800	1xP1	100kg/m3
PC2	4000	4000	1500	4xP3	150kg/m3
PC3	4000	4000	1200	4xP4	150kg/m3
PC4	REFER	PLAN	800	P1 AS SHOWN	100kg/m3

STRIP FOOTING & TIE BEAM SCHEDULE				
MARK	WIDTH	DEPTH	PILES	REINF RATE
SF1	900	600	P1 AT 3000 CRS	100kg/m3
SF2	1400	1200	P2 AT 3000 CRS	250kg/m3
SF3	1200	900	P2 AT 3000 CRS	250kg/m3
TB1	1200	900	-	150kg/m3
TB2	1400	1500	-	150kg/m3

PILE SCHEDULE			
MARK	DIA	SOCKET DEPTH	REINF RATE
P1	600	3000	100kg/m3
P2	750	3000	100kg/m3
P3	900	3000	100kg/m3
P4	900	6000	120kg/m3

Figure 6.5: Technical drawings for the proposed Convention Centre. June 2012

6.2.2 ICC Exhibition Centre

The key elements of the proposal are:

- Reuse of the existing ground slab at RL 2.6.
- Extensive piling through the area, some potential impact from piling within this area.
- Most piles are between 600mm to 900mm in diameter.
- Series of strip footings, 1200 wide and 1200 deep (RL 1.4).
- Pile caps 1.2m deep with four piles with each cap.
- Extensive piling within the rear loading dock which is further to the west of the building and therefore within the foreshore area.

The dimensions of the impacts here consist of strip footings, columns and piles. The schedule for these works is outlined in the tables below (Figure 6.6).

The realignment of Darling Drive to the west of the Exhibition Centre involves some limited impact on sub-surface deposits; approximately 500mm may be disturbed. This material is considered to be fill used to bury the site in the 1980s.

Column schedule

Type	Size
C101	650Ø
C102	750Ø CFT
C103	900Ø
C104	2200 x 830

Pile schedule

Type	Diameter (mm)	Socket depth (mm)
1P1	600	3000
1P2	750	3000
1P3	900	6000

Pile cap and strip footing schedule

Type	Width (mm)	Length (mm)	Depth (mm)	piles
1PC1	3000	3000	1200	4XP1
1PC2	1800	4000	1000	2XP2
1PC3	1500	1500	1200	1XP2
1PC4	3500	3500	1500	4XP3
1SF1	1200		1200	P2 at 3m.

Figure 6.6: Proposed works at ICC Exhibition Centre.

6.2.3 The Theatre

The original Darling Harbour foreshore is only partly within the western footprint of the proposed MFEC. It is proposed that the existing ground slab at RL 2.6 be reused. There is some additional piling proposed at the southern end beyond the ground slab although most of this appears to be to the east of the foreshore. A few piles are proposed for the western foreshore intertidal zone and five to eight piles will possibly be located within the western foreshore. The column and *in situ* wall schedule is outlined below. The key elements of the proposal are:

- Reuse of the existing ground slab at RL 2.6.
- Some additional piling at the southern end beyond the ground slab.
  - Twelve new piles at southern end. Most of these appear to be to the east of the foreshore (ET-2001).
  - A few piles may be within the western foreshore intertidal zone (ET-2002).
  - Five to eight piles possibly within the western foreshore (ET-2003).

Column schedule

Type	Size
C201	600Ø
C202	850Ø
C203	850Ø
C204	450 x 1200
C205	450 x 1200
C206	1200Ø
C207	300 x 600
C208	300 x 1200

***In situ* wall schedule**

Type	Thickness
W201	200 THK
W203	300 THK

6.2.4 Public Realm

Resurfacing of the public domain is likely to have no impact on the archaeology potentially buried in the area, notably the end of the Barkers Jetty, Iron Wharf, Dickson's jetty and seawalls. Finished RLs will typically be maintained above RL 3.4m while most potential historical archaeology is likely to be between RL 2m and RL 0 (Table 6.1).[152] Even if there were preparation up to 400mm beneath RL 3.4m there should still be no impacts on the limited potential archaeological resource adjacent to the Darling Quarter public realm.

In the few cases where the RLs are between RL 2.58m and RL 3m these are located in the western side of Tumbalong Park and the only likely issue of significance is the remains of the Iron Wharf which appears to be have been buried, at least partly, in this location, except for the c1874 seawall. The depth of the remains of the Iron Wharf is unclear but the 1985 photo does indicate that it is not very deep.[153]

As the public realm is completely within reclaimed land, and to the west of the Darling Harbour goods line embankment, there is limited potential for archaeology, other than the railway line,

[152] Based on Casey & Lowe's knowledge of waterfront sites at Darling Walk and Barangaroo South.
[153] City Plan Archaeological Assessment, May 2012:82, fig. 4.6.

reclaimed land and the reclamation processes. The proposed works, which involve limited levelling and in-filling, are not anticipated to have any impacts on heritage significance in this area.

Geotechnical Information
Section C, based on boreholes, indicates that NBH1 and NBH2 may both have between 100mm and 1mm of clayey/sand and sand above bedrock, down to approximately RL 0 to -1.5m (bedrock). Rock then progressively falls away to the east, becoming deeper than RL -10m.

Section B, based on boreholes, indicates that western borehole NBH11 approximately 2.5m of fill straight onto rock at approximately RL 0m. The other three boreholes have fill down below RL 0. Natural silts or bedrock at below RL -10m.

Table 6.1: Level difference from existing finish levels to proposed finished levels in the Tumbalong Park area, Centre Sector.

Existing level	Difference proposed	Proposed levels
3.32m	+0.08m	3.40m
3.95m	-0.35m	3.60m
3.95m	-0.15m	3.80m
4.15m	-0.19m	3.96m
4.67m	-0.29m	4.38m
4.79m	+0.01m	4.80m
3.60m	0m	3.60m
2.99m	+1.21m	4.20m
2.80m	+0.2m	3.00m
4.60m	+1m	3.60m
3.41m	-0.13m	3.28m
2.58m	0m	2.58m
3.78m	-1.18m	2.60m

6.3 Assessment of Impacts

As the proposed design of the new buildings within the subject area does not include bulk excavation, most of the surviving archaeology within the study area will survive the proposed construction. Piling is typically intermittent and will have some limited impacts on potential archaeological resource within the subject areas. In addition, the burial of the potential archaeology under fill will also assist with its survival where there is any reduction of levels. In general the proposed buildings are considered to have limited impact on the potential archaeological resource.

6.3.1 International Convention Centre

As identified in Section 3.3.1 the ICC area has the potential to contain the following remains:

- 1870s seawall and reclamation associated with the Iron Wharf (Local).
- Dismantled remains of Iron Wharf demolished into the harbour in the 1920s (State).
- 1920s water conduits and ash pipeline associated with Ultimo Powerhouse (State)

The piling within the footprint of this new building may impact on sections of the 1876 seawall and reclamation and the northeastern section of the ash pipeline. The existing Convention Centre building beneath the Western Distributor is to be retained within the redevelopment and there will be no piling in this area. It is very difficult to understand if dismantled sections for the Iron Wharf

will be impacted by piling but there is some likelihood for this to happen. There is no impact on the 1920s water conduits.

6.3.2 ICC Exhibition Centre

As identified in Section 3.3.2 the potential archaeological resource within this area is likely to include:

- Limited likelihood for pre-1850 archaeology in the western foreshore.
- c1865 seawall and reclamation (Local).
- 1870s seawall and reclamation associated with the Iron Wharf (Local).
- Dismantled remains of Iron Wharf demolished into the harbour in the 1920s (State).
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf (State).

The penetration of these potential remains by a second set of piles is predicted to have a limited impact on the surviving resource. It is noted that if any of these items are hit during piling that the normal process would see these areas opened up to dig out the item blocking the pile drill. In the case of the seawalls, sections of the Iron Wharf and the inlet and outlet pipes it would be preferable to move the pile to the side rather than have a major impact on these items. We understand that the constraints from the existing carpark design and the location of columns is a real issue in potentially shifting pile locations.

6.3.3 Theatre

As identified in Section 3.3.3 the potential archaeological resource within this area is likely to include:

- Limited likelihood for pre-1850 archaeology in the western foreshore.
- c1865 reclamation but not the seawall, except could be close in one corner (Local).
- c1865 open stormwater drain in the eastern area, location uncertain replaced by Hay/Lackey St drain and it therefore probably mostly disturbed (Local).
- c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf (State).

The penetration of these potential remains by a second set of piles is predicted to have a limited impact on the surviving resource. It is noted that if any of these items are hit during piling that the normal process would see these areas opened up to dig out the item blocking the pile drill. In the case of the inlet and outlet pipes it would be preferable to move the pile to the side rather than have a major impact on these items.

6.3.4 Public Realm

The proposed design of the public realm is not expected to have any impacts on the potential archaeological remains within the subject area.

6.4 Mitigation

Due to the inaccuracies in the historic overlays and the absence of final piling plans it is impossible at this stage to be more specific in the detailed impacts on significance. The following mitigation strategies will assist with minimising impacts.

6.4.1 International Convention Centre

- There is considerable piling within the footprint of the proposed building which may impact on the 1870s seawall and reclamation associated with the Iron Wharf and demolished remains of Iron Wharf dismantled into the harbour in the 1920s.

The penetration of these potential remains by a second set of piles is predicted to have a limited impact on the surviving resource. It is noted that if any of these items are hit during piling that the normal process would see these areas are opened up to dig out the item blocking the pile drill. In the case of the 1870s seawall and dismantled sections of the Iron Wharf and the inlet and outlet pipes it would be preferable to move the pile to the side rather than have a major impact on these items.

Some testing and/or monitoring of piling in the area to determine:

- If remains survive of the Iron Wharf.
- Collection of information on reclamation fills.
- Where piling meets obstacles the archaeologist should be involved in determining adjusted direction of piling and the items being impacted.

6.4.2 Exhibition Centre

- There is considerable piling within the footprint of the proposed building which may impact on the 1860s reclamation and associated seawall, 1870s seawall and reclamation associated with the Iron Wharf as well as dismantled remains of the Iron Wharf and the c1899 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf.
- All impacts in this area to significant archaeology should be minimised.
- Some testing and/or monitoring of piling in the area to determine:
  - If remains survive of the Iron Wharf.
  - Collection of information on reclamation fills.
  - Where piling meets obstacles the archaeologist should be involved in determining adjusted direction of piling and the items being impacted.

6.4.3 The Theatre

- There is considerable piling within the footprint of the proposed building which may impact on the 1860s reclamation, c1865 open stormwater drain in the eastern area and the 1893 Ultimo Power House inlet and outlet pipes which terminated at the edge of the Iron Wharf. The northeast corner of the Theatre is possibly close to the 1865 stone seawall.
- All impacts in this area to significant archaeology should be minimised.
- Some testing and/or monitoring of piling in the area to determine:
  - If remains survive of the Iron Wharf.
  - Collection of information on reclamation fills.
  - Where piling meets obstacles the archaeologist should be involved in determining the items being impacted and the adjusted direction of piling.

6.4.4 Public Domain

- Where possible the reduction of levels in the public domain should be above RL 2m. If they need to go below this level the archaeologist will need to monitor the works. If any major archaeological components are exposed they should be retained *in situ* where possible.
- Remains of Barker's (c1826) and Dickson's (c1815) jetties should be retained *in situ.*
- If they cannot be retained *in situ* they will need to be assessed and an appropriate strategy for their recording identified.
- All impacts in this area to significant archaeology should be minimised.

6.4.5 Specific Piling Mitigation Strategy

Site operations during construction or demolition that may potentially directly or indirectly impact on items of heritage or archaeological significance are identified as minor excavation works, location of piles, site levelling, and service trench excavations.

It is possible that items or discoveries of heritage/archaeological significance could be encountered during the site works mainly during pile location activities. All newly discovered heritage/archaeological items are to be managed in an appropriate manner and the following measures will be followed:

- Prepare a Protocol detailing procedures to be followed in the event that heritage/archaeological significant items are discovered during the construction or demolition works, in consultation with heritage/archaeological consultant prior to commencing works.
- A Heritage & Archaeological Diagram will be prepared for the site that details the designated area of interest or significant on the site. The diagram will also include key buildings or structures that are of interest or significant.
- Construction activities shall cease temporarily while the site/issues are assessed. Mitigation measures will be approved by the nominated Heritage & Archaeological Consultant.
- Communication and education material on heritage management and conservation will be part of the Site Environmental Awareness Program that will be incorporated into the site induction program.

7.0 Results and Recommendations

7.1 Results

1. The study area contains potential archaeological remains of State and local significance.
2. As the proposed design of the new buildings within the subject area does not include bulk excavation most of the surviving archaeology within the study area will survive the proposed redevelopment.
3. The proposed piling is typically intermittent and will have some but limited impact on the potential archaeological resource within the subject areas. In addition, the burial of the potential archaeology under fill will also assist with its survival where there is a proposal for reduction of levels. In general, the proposed buildings and landscaping of the public realm are considered to have limited impact on the predicted archaeological resource.

7.2 General Recommendations

1. The absence of basements from the design means that any archaeological program needs to be targeted and strategic. When dealing with extensive deposits across the site, i.e. reclamation fills, only limited recording may be necessary. Where the archaeology is more concentrated and impacts may be more extensive, then detailed archaeological excavation and recording may be required.
2. Write a Research Design and Management Strategy, including a Piling Mitigation Strategy which draws on the detailed design, works program and identifies detailed archaeological investigation and recording strategies in accordance with best practice archaeological methodologies.
3. A public interpretation plan needs to be prepared outlining key themes for interpretation of Darling Harbour and surrounds as part of this redevelopment.
4. SHFA, as the owner of the SICEEP area will need to provide storage in perpetuity for artefacts recovered from the site. SHFA has an artefact repository.
5. Any archaeological program needs to be reported on in accordance with Heritage Council guidelines. This is to include:
    - catalogue of artefacts and reporting.
    - conservation of important artefacts.
    - detailed trench or area reports.
    - overall excavation report, including a response to research questions.
    - photo archive.

7.3 Specific Recommendations

7.3.1 ICC Exhibition Centre, Convention Centre and Theatre

1. Avoid impacts where possible on the dismantled remains of the Iron Wharf, which is of State significance.
2. Avoid impacts where possible on the surviving inlet and outlet piles/conduits associated with the Ultimo Power House. These are likely to be of State significance.
3. Avoid/reduce impacts where possible on the 1865 and 1876 seawalls.
4. Once piling design is refined the above archaeological remains should be avoided or impacts reduced.
5. Develop and implement a Piling Mitigation Protocol as outlined below.
6. Some testing and/or monitoring of piling in significant area may be required to determine:

- If remains of the Iron Wharf survive.
- Further information on reclamation fills.
- Where piling meets obstacles the archaeologist should be involved in examining the items being impacted and determining the adjusted direction of piling.

7.3.2 Specific Piling Mitigation Strategy

Site operations during construction or demolition that may potentially directly or indirectly impact on items of heritage or archaeological significance are identified as minor excavation works, location of piles, site levelling, and service trench excavations.

It is possible that items or discoveries of heritage/archaeological significance could be encountered during the site works mainly during pile location activities. All newly discovered heritage/archaeological items are to be managed in an appropriate manner and the following measures will be followed:

- Prepare a Protocol detailing procedures to be followed in the event that heritage/archaeological significant items are discovered during the construction or demolition works, in consultation with heritage/archaeological consultant prior to commencing works.
- A Heritage & Archaeological Diagram will be prepared for the site that details the designated area of interest or significant on the site. The diagram will also include key buildings or structures that are of interest or significant.
- Construction activities shall cease temporarily while the site/issues are assessed. Mitigation measures will be approved by the nominated Heritage & Archaeological Consultant.
- Communication and education material on heritage management and conservation will be part of the Site Environmental Awareness Program that will be incorporated into the site induction program.

7.3.3 Public Realm

1. Reduced ground levels should be maintained above RL 2m.
2. If the area is reduced below this an archaeologist will need to monitor the works.
3. Any major archaeological components exposed, such as Barker's and Dickson's jetties, should be retained *in situ* where possible.
4. If they cannot be retained they will need to be assessed and an appropriate strategy for their recording identified.

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APPENDICES

APPENDICES

APPENDIX A
Chronology of Barker's Mill

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1813 John Dickson arrives in Sydney with goods and machinery including a steam engine.

1815 Dickson's steam engine in operation at Cockle Bay to drive a flour mill, the first use of steam power in Australia.

1824 Thomas Barker, Dickson's clerk and former apprentice leases allotment at southwest corner of Bathurst and Sussex Street to build residence. Raine & Ramsay import second steam engine.

1825 Steam engine imported by the firm of Cooper and Levey, with engineer William Lowe. Construction of buildings at Cockle Bay. Cooper & Levey's steam engine in operation in December grinding grain.

1826 Cooper and Levey build grain store and operate their own wharf at Cockle Bay.

1826 Thomas Barker goes into business on his own account and, in partnership with John Smith, builds windmill at Darlinghurst.

June 1827 Thomas Barker purchases Cooper and Levey's steam mill at Cockle Bay for £6,000 – a capital building and steam engine with other machinery and apparatus for the purposes of grinding corn.

1828 Cockle Bay officially renamed Darling Harbour.

1829 Barker purchases Raine & Ramsay's land to the west of his own with frontages to Bathurst Street and Darling Harbour. Possible additions to steam mill.

c.1830 Barker's mill comprised of two large stone buildings, boilers, engine house and chimney, two mill ponds and wharf.

1831 Barker's lease, together with land purchased from Raine & Ramsay and Cooper & Levey consolidated into one grant of over 6 acres at Darling Harbour.

By 1833 Barker sells over seven acres of land with harbour frontage to the west of the mills (including reclaimed land).

1833 Barker buys land at Darling Pont and builds Roslyn Hall.

1834 Sussex Street flour mill and windmill at Woolloomooloo leased by Thomas Barker to his brother James in partnership with Ambrose Hallen for 14 years at £1,200 per annum.

1837 Thomas Barker and family go overseas.

1837 Land around the mill conveyed to James Barker and Ambrose Hallen upon certain trusts to sell.

1837 Sale advertisement for 83 allotments on Bathurst, Sussex and other streets.

c.1837-1840 Substantial addition made to west end of mill comprising a five storey stone building with boiler house, steam engine and chimney.

1840 Thomas Barker and family return to New South Wales.

1840 Barker & Hallen insolvent and affairs put in hands of trustees for creditors Thomas Barker resumes control of the mill.

1842 Donald Larnach purchases all of Barker & Hallen's property and goes into partnership with Thomas Barker as Thomas Barker & Co.

1842 Land around mills formerly leased by Barker & Hallen reconveyed to Thomas Barker.

1842 Subdivision and proposed sale of area around the mills divided into residential allotments.

1844 Further advertisements for sale of allotments.

By 1845 A few houses built along Barker's Lane.

1845-1847 Barker in partnership with John Walker to establish manufactory for colonial tweed

1846 Barker purchases weaving machinery from England and converts south side of old mill into cloth factory. Alterations to flour factory to accommodate tweed mill in part of premises. New flour dressing machinery imported.
1848 Sussex Street premises connected to city water supply.
1847 Partnership of Larnach and Barker dissolved.
1847 Further advertisements for sale of allotments.
1847-1852 John Walker leases wool spinning mill and associated buildings and manages 'Walker's Tweed Cloth manufactory'.
1847-1894 Premises dual occupancy – flour mill and tweed manufactory.
1847-1848 Further buildings constructed for tweed manufactory.
1848-1860 Thomas Barker in partnership with brother James in ownership of the flour mill.
1851 Thomas Barker decides to go into manufacture of colonial tweeds. William Houston, a Scot, engaged to take charge of weaving.
1852 Thomas Barker & Co begin manufacture of colonial tweed.
1853-1854 Tweed mill managed by O.B. Ebsworth.
Early 1850s Depressed market for tweed – some mills close down. Work ceases for a period at Barker's mills.
Mid-1850s-1860s: More houses built in Barker's subdivision.
1855 Opening of the Darling Harbour railway branch line.
1857 Opening of the first Pyrmont Bridge.
1859 Thomas and James Barker prepare to retire from business.
1859-1864 Tweed factory leased to M.M. Campbell and run as 'The Colonial Tweed Manufactory'. Range of products diversified and considerable improvements made but equipment and buildings old fashioned. Locally grown cotton ginned during the late 1850s & 1860s.
1860 Flour mill leased to nephews G.W. Barker & W.C. Barker.
1864 Tweed factory leased to O.B. Ebsworth for 7 years.
By 1865 Mill ponds drained/filled in. Drainage laid along James Lane and across mill grounds.
1868 Thomas and James Barker sell their interests in the Sussex Street mills. Site divided and sold. 'New mill' and one bay of north side of 'old mill' sold as flour mill and rest of premises as tweed manufactory. Tweed mill entrance off Sussex Street and flour mill entrance off Duncan Street.
1868 Flour mill sold to nephews G.W. Barker & W.C. Barker for £6,000. Now completely separate from the tweed manufactory.
1868 Tweed mills sold to O.B. Ebsworth for £15,000. Property mortgaged to Barker and further sub-mortgaged by him.
1868-1870 Plant of tweed mill modernised with new machinery and a horizontal engine. Tweed mill expands into whole of old mill. Considerable improvements and additions.
March 1870 New machinery fully operational.
June-September 1870 O.B. Ebsworth dies and tweed factory put up for sale. Barker & Co resume ownership.
1871 Tweed factory brought back into full production under management of John Vicars
May 1872 Fire at the mill – whole of the tweed mill destroyed but flour mill survives.
1872-1873 Barker's tweed factory rebuilt by Hart Brothers. Old mill replaced by large single storey structure with saw-tooth roof and basement.
1873 Thomas Barker leases Barker's Tweed factory to McArthur & Co and John Vicars trading as J. Vicars & Co.
1873-1894 J. Vicars & Co at Sussex Street mills.
1875 12 March - Death of Thomas Barker.
Late 1870s-1880s Commercial use of the area intensifies. Construction of new stores and workshops and conversion of some houses for commercial uses.
1879 G.W. Barker and W.C. Barker sell flour mill to Robert Harper & Co for £4,000. Harper & Co. construct additional buildings including circular kilns.

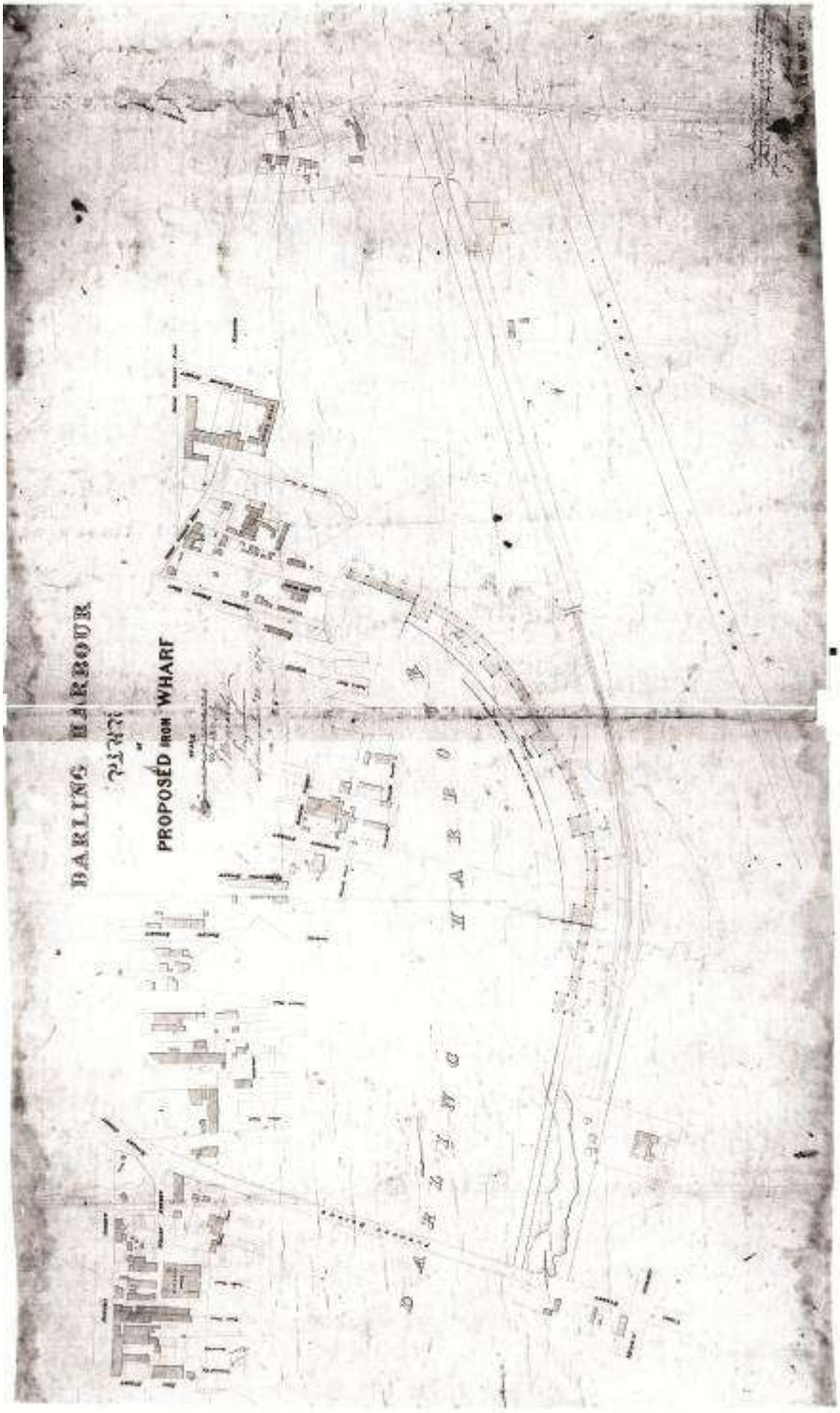
1880 New kilns and other additions for Harper & Co. completed – known as the 'Oriental Mills'.
c. 1887 Harper & Co built bond and free stores on west side of Duncan Street opposite the mill, formerly occupied by the houses known as Golden's Buildings.
1894 J. Vicars & Co move to Marrickville.
1895 Tweed mill leased by trustees of Barker's estate to Robert Harper & Co for 30 years. Harper & Co occupy the whole of the site.
1900 Outbreak of plague in Sydney.
1901 Resumption of private lands and wharves around harbour to be administered by the Sydney Harbour Trust. Waterfront to west of Barker Street resumed.
1901- Beginning of modernisation of harbour facilities by Sydney Harbour Trust.
1915 Resumption of properties for extension of Day Street from Bathurst Street to Liverpool Street including Harper's mills and store.
1917 Part of area resumed from Harper & Co to be conveyed back to the firm. Buildings at east end of site demolished including single-storey 1870s mill. West end of site not required for line of Day Street and survives. Harper & Co retain use of mill buildings on Duncan Street purchased in 1879. Store on west side of Duncan Street demolished for widening and extension of Steam Mill Street. New store built to south of 1830s mill.
1918 Steam Mill Street extended to Day Street through northern end of site.
1920 New building for Robert Harper & Co at Nos 137-147 Day Street completed.
1920-1958 Robert Harper & Co. occupy whole block bounded by Day, James, Duncan and Steam Mill streets.
Late 1920s New wharfage at head of Darling Harbour.
1958 Site divided into three lots for Harper & Co. and sold to the Union Steamship Co of New Zealand. Alterations and additions for new ownership and some demolition.
c. 1959-[1975] Union Steamship Co of New Zealand owners and occupants of premises at 137-147 Day Street & Duncan Street.
1960s Redevelopment of wharfage at Miller's Point and Darling Harbour.
1960 Western Distributor to be built with connection to Harbour Bridge.
1971 Second stage of Western Distributor to be built from Druitt Street to Glebe.
Mid-1970s Resumptions for widening of Day Street in connection with Western Distributor. Demolition of much of the Union Steamship Co site.
Mid 1970s-1980s Part of Duncan Street side of premises still occupied.
1982 State Rail Authority to vacate Darling Harbour railway goods yards.
1984 Darling Harbour goods yards to be redeveloped as 'a place for the people' as

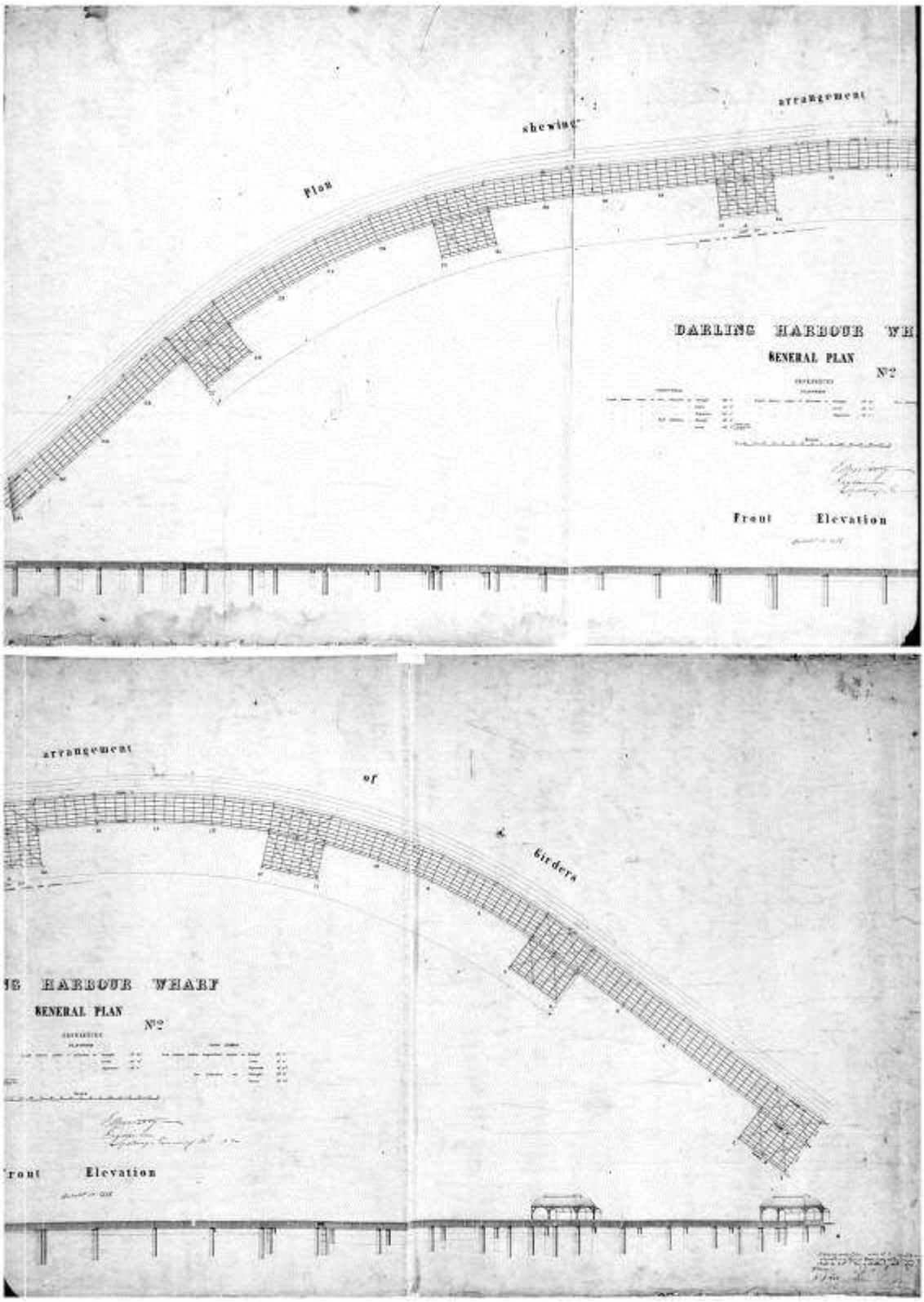
APPENDIX B

Contract plans for the Iron Wharf, Darling Harbour

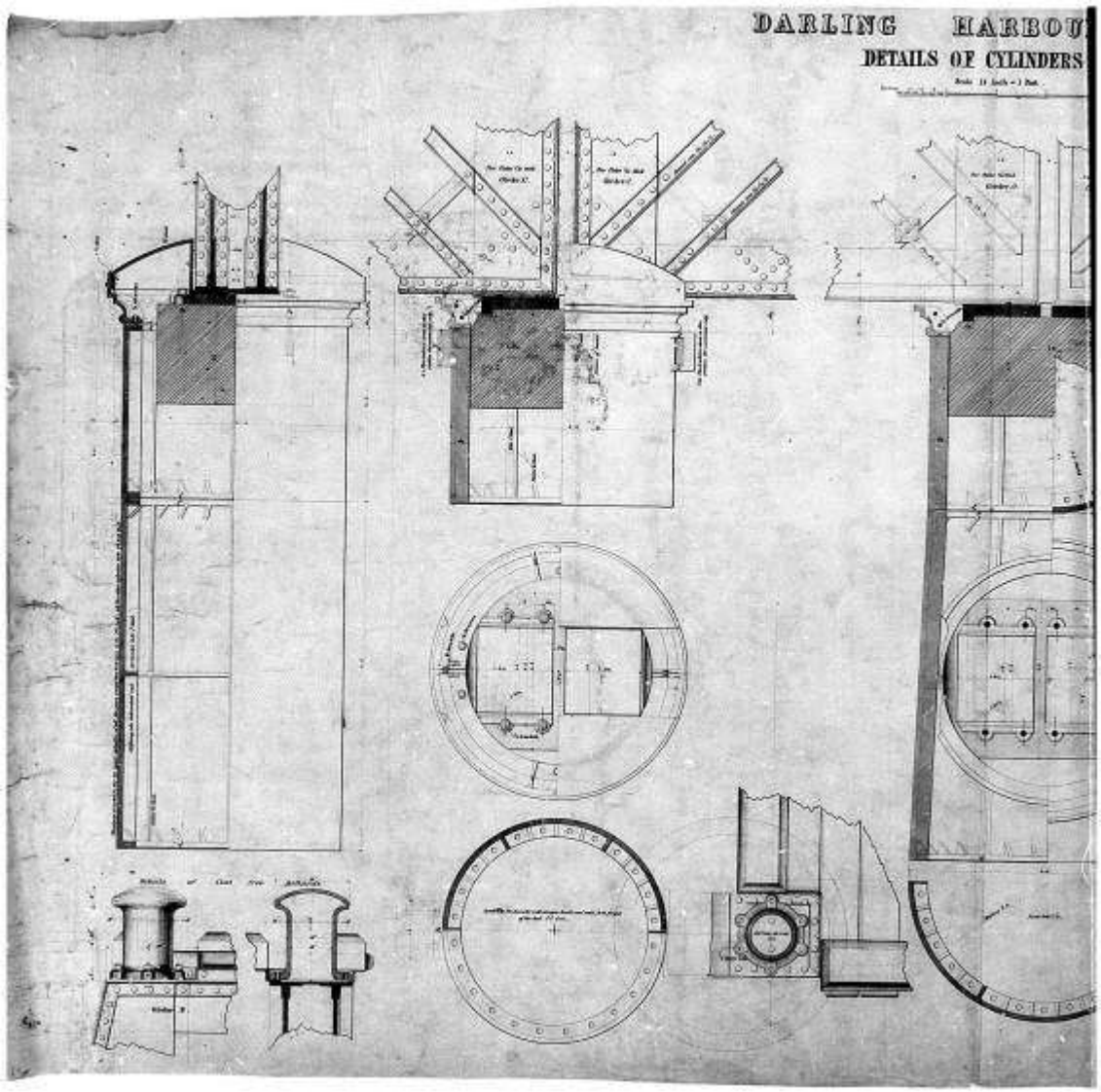
Note: The main wharf plans are reproduced below and others related to the wharf can be viewed at State Records of New South Wales (AO Map Nos 455-462).

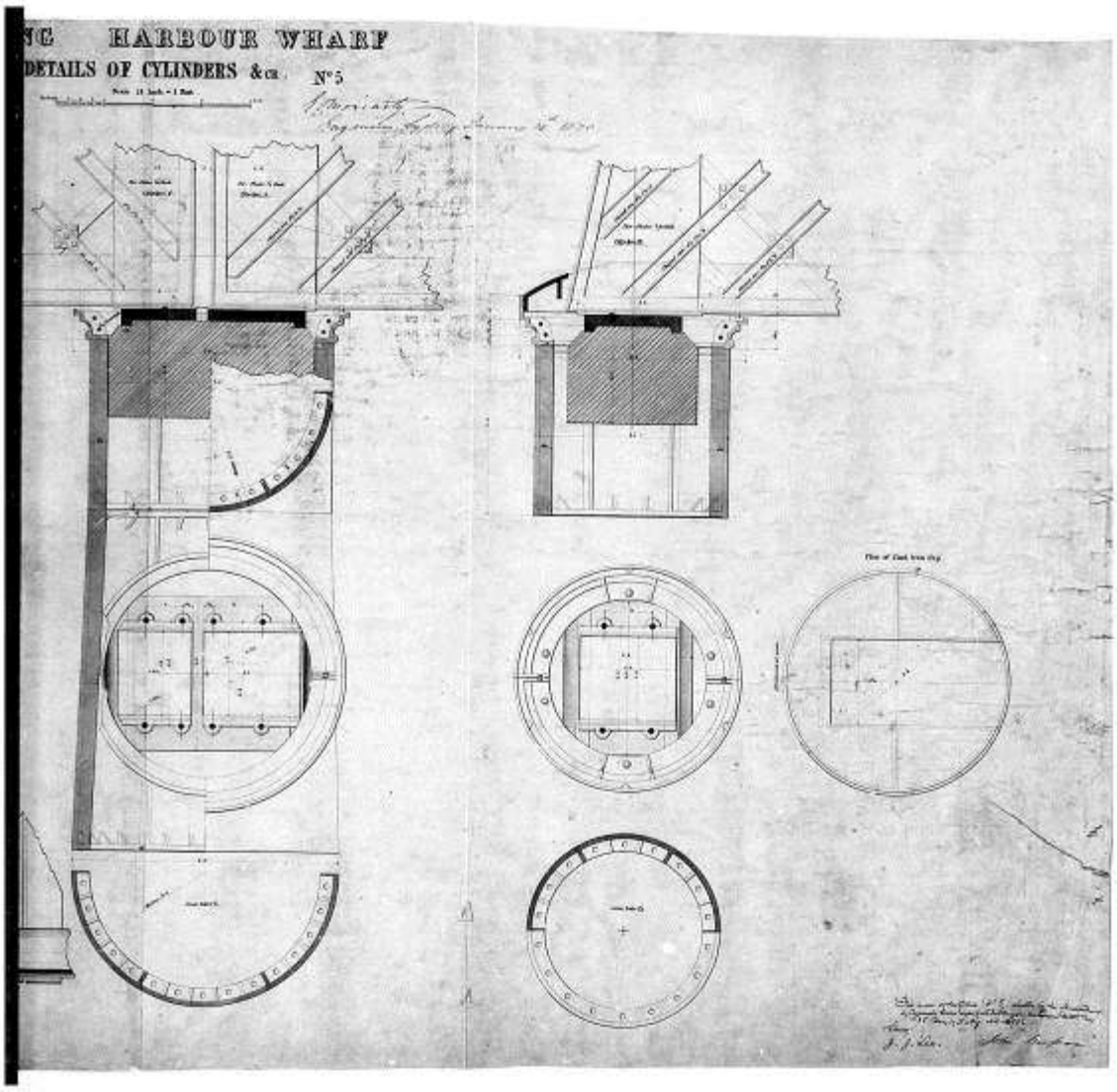
Contract Drawing titled 'Darling Harbour Wharf, General Plan No 2,' [signed] EO Moriarty, Engineer, 25 Jan 1870, SRNSW AO Map No 455.



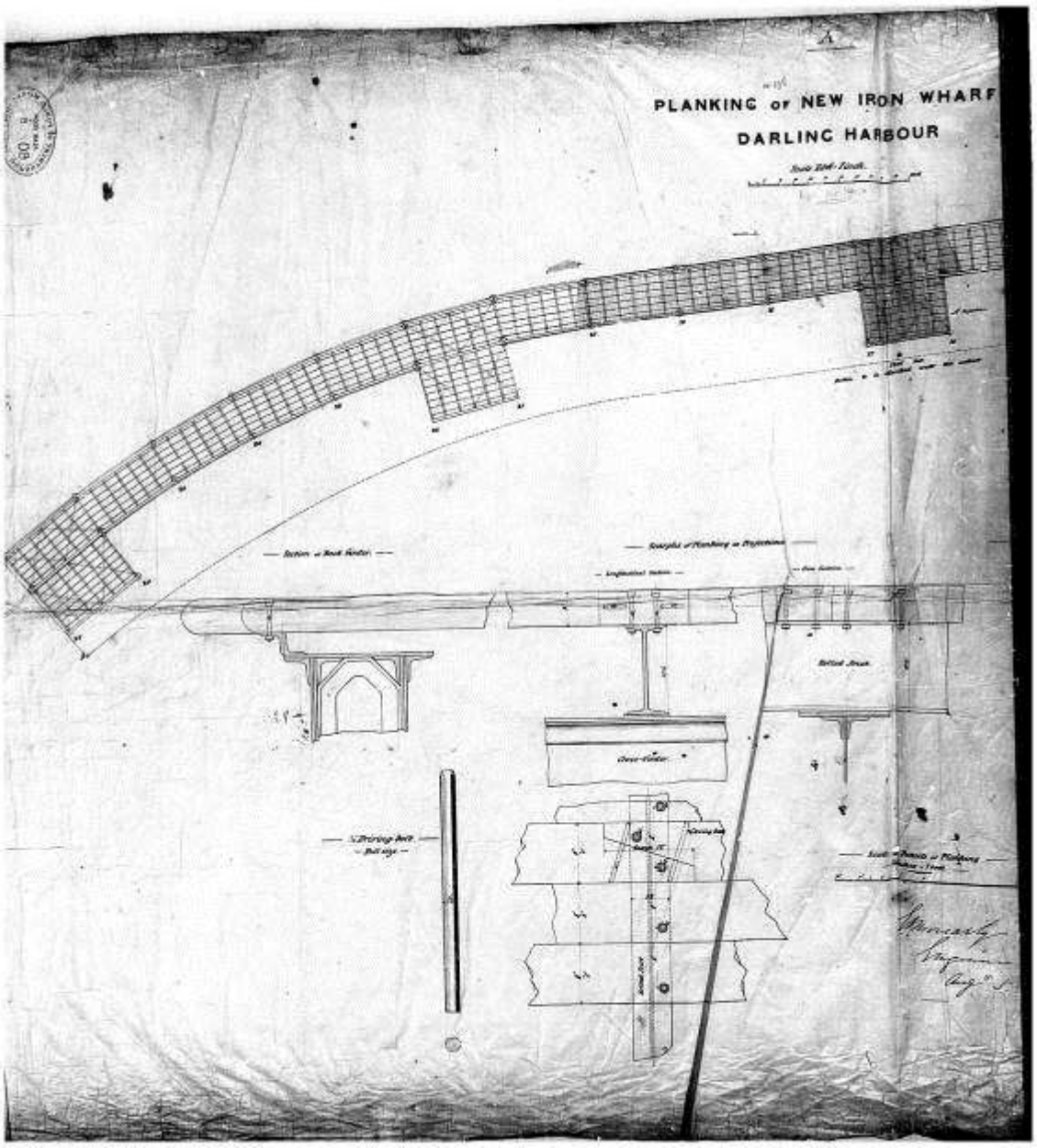


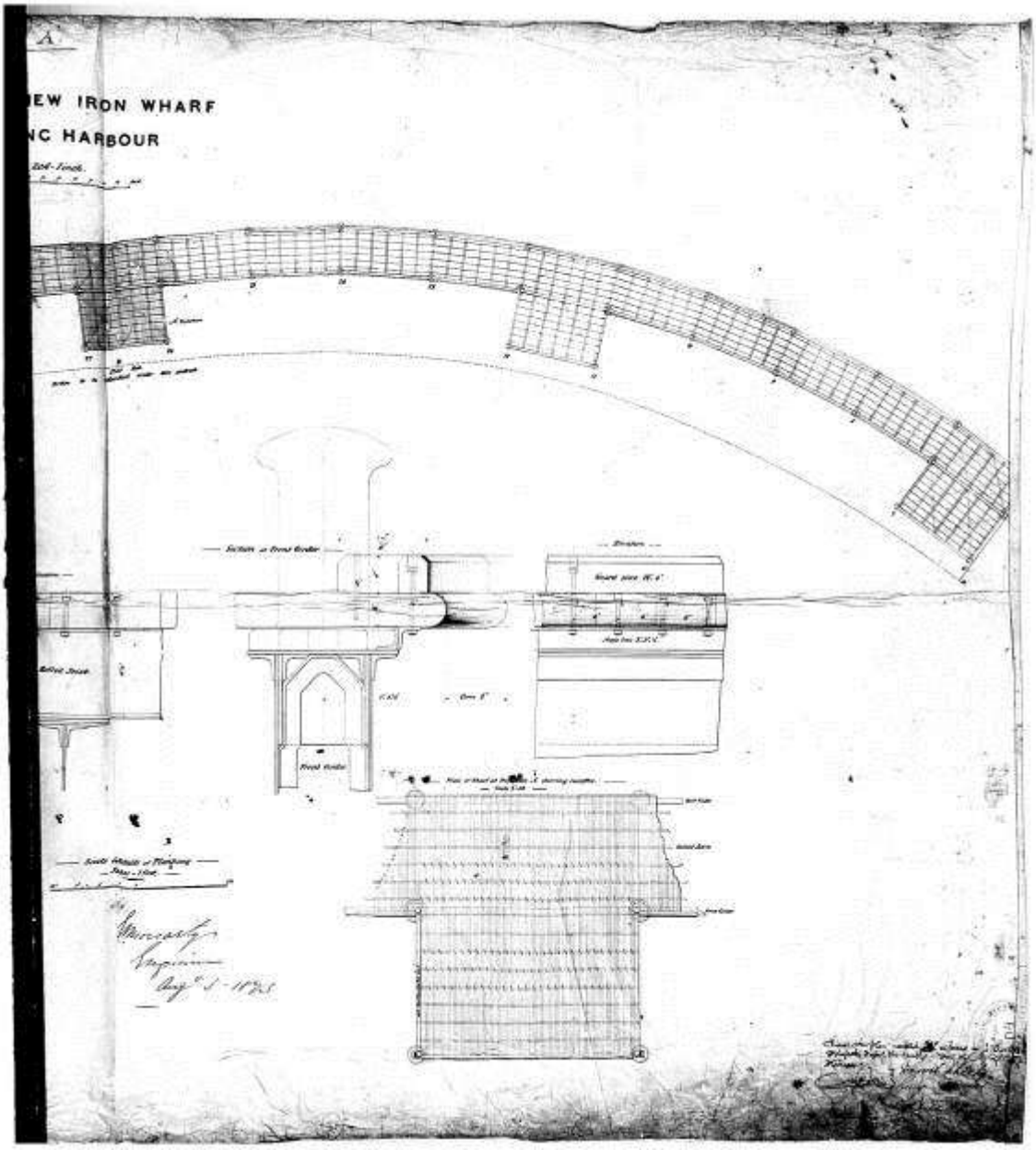
Contract Drawing titled 'Darling Harbour Wharf, Details of Cylinders & CR No 5,' [signed] EO Moriarty, Engineer, 25 Jan 1870, SRNSW AO Map No 459, Parts 1 and 2.


DARLING HARBOU
DETAILS OF CYLINDERS



Contract Drawing titled 'Planking of New Iron Wharf, Darling Harbour,' [signed] EO Moriarty, Engineer, [3?] Aug 1873, SRNSW AO Map No 461, Parts 1 and 2.


PLANKING of NEW IRON WHARF
DARLING HARBOUR


EW IRON WHARF
NC HARBOUR

APPENDIX C

Darling Harbour Goods Yards - Summary of significant events to 1930

Public Works Department NSW (Research and preparation: E Higginbotham & T Kass), Darling Harbour Bi-Centennial Development Project: Conservation Study, [Sydney], [1984]: 112-114.

Date	Details
1874	Completion of Iron Wharf
1876	Completion of reclamation and retaining wall behind the Iron Wharf
1876-1888 Phase 1	Construction of timber and galvanised iron buildings and structures: - • Inward goods shed (1876-1883?) • Covered platform[?] • Sandstone pier linked to overhead travelling crane • First wool handled at Darling Harbour (1878) • Siding on embankment (1886) originally used in conjunction with Meat Market, corner of Murray and Pier Sts
1888-1920s Phase 2	Cast iron and steel construction replaces timber in new building stock
1891	• Outwards goods shed and wool shed (C & D) opened (1891) • Wharves at Pyrmont Point opened for coal handling • Alexandria Goods Yard and first part of Clyde marshalling yards open • All outwards goods handled at Darling Harbour
1892-1900	Resumption of Darling Island in 1892 and opening for general goods in 1900
1902	A and B outward goods shed opened. Goods Shed offices (Forwarding Station) completed c1902
1906-1922	Construction of two-tier outwards goods shed Construction and completion of loop line - Wardell Rd - Rozelle Bay - Darling Island
1917-1929	Reclamation of head of Darling Harbour with fill excavated from the city railway construction. One bay of Iron Wharf removed in April 1917

APPENDIX D

Brief timeline for the Ultimo Power House with emphasis on events related to water supply for cooling

Godden, DM, EAK Higginbotham, E Pinder, W Whittaker, & R Young, *History and Technology of the Ultimo Power House, Sydney*, Government Architects Branch, NSW PWD, nd [1982].

Report of the Public Works Department, Government Printer, Sydney, 1897-1901.

Date	Details
1895, 18 Sep	Proposal to construct an electric tramway referred to PWD Committee.
1896, 8 May	George Street and Harris Street Electric Tramway Act 60 Vic No 10. Assented to 14 Sep 1896.
1898, Jun	Contract No 20 for excavation of power house site completed. Most tenders for other work accepted. Various contractors. Justin McSweeny awarded the contract (No 18) for the conduit from the boiler house to Darling Harbour supplying seawater for condensing purposes.
1898, Jul to 1899, Jun	Contract No 17 for Circulating and feed pumps let to HP Gregory & Co. Contract No 18 completed.
1899, 22 Nov	First electricity supplied to George and Harris Street Tramway. Opened for traffic on 8 Dec 1899.
1899, 29 & 30 Nov	Ultimo Power House completed and opened for inspection. It was built by the Railway Construction Branch of the Public Works Department but handed over to the Railway Commissioners to manage.
1902	Extension of Ultimo Power House - Stage 2.
1905	Completion of Stage 2 of the boiler house.
1907-1908	New conduit and additional pumps installed in anticipation of the installation of new generating units.
1909	Installation of new generating units taking the rated capacity of Ultimo to 19,400 kW.
1924	Ultimo becoming expensive to run than the recently constructed White Bay Power House now supplying 75% of electrical supply. Ultimo to undergo improvements to make it more cost effective.
1927-1932	Remodelling of the Ultimo Power House
1924-26	Construction of new inlet tunnel to take circulating water supply from Darling Harbour to Ultimo. Work by Sydney Harbour Trust.
1928	Screening chambers for the new circulating water conduits completed and now in service.
1932	Work of re-equipping Ultimo with modern boilers and turbo alternators completed. Boilers now burn pulverised coal.
1963	Ultimo Power House finally shut down. Some chimneys demolished 1960.
1965	Tender accepted to demolish and remove Ultimo's equipment. Completed by Sep 1966
1978	Power House reserved for Museum of Applied arts and Sciences
1980	Building Stage 1 Power House Museum and opened 1981
1983	Building Stage 2 Power House Museum