Archaeological Investigation Report

Sydney Metro City and Southwest TSE Works

Barangaroo Station

JUNE 2022

VOLUME 3: SPECIALIST REPORTS

A selection of artefacts from Barangaroo Station. Left: Stoneware Selter bottle (DSC_3865). Top right: Child's leather ankle strap shoe (DSC_2311). Bottom right: Personalised pewter mug (DSC_3804).

VOLUME 3: SPECIALIST REPORTS

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

CERAMIC REPORT

MARCH 2022

VOLUME 3, SECTION 3.1

Spout with a face from the cistern fill (215). IMG_3904.

FINAL REPORT | Report to **Sydney Metro**

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

CERAMIC REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

Ceramic artefacts were recovered as part of the historical archaeological investigation at the Barangaroo Station site, Sydney (Figure 1.1). The archaeological investigation was conducted by Casey & Lowe for AMBS Ecology and Heritage between July and December 2018. The site consisted of six defined areas (Area R, Area T, Area W, Area X, Area Y and Area Z).

Figure 1.1: Location plan showing the Barangaroo Station site outlined in red and the excavation areas are shaded. Google Maps.

1.2 ARCHAEOLOGICAL PHASES

Seven phases of site development were identified based on archaeological stratigraphy, delineation of specific structures and historical research (Table 1.1). Temporal analysis of ceramic artefacts serve to verify the phases as assigned by Casey & Lowe.

Table 1.1: Barangaroo Site Archaeological Phases.

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 AIMS OF REPORT

This report analyses ceramic artefacts to provide temporal and functional data to contribute to the interpretation of the area and context from which they were recovered. The report is organised by area and phase of site development (Section 1.2).

Furthermore, Area X contains contexts associated with the remains of a timber boat (140 – UDHB1) and associated contexts that surround it. Analysis results for these contexts are discussed separately in an overview.

1.4 METHODOLOGY

Standard typologies were established for artefacts as a prelude to chronological reconstruction. Artefacts were then assigned dates based on use-popularity date ranges (merchant records, advertisements and manufacturers' records) and technological advancements (patents and manufacturers' records) (Table 1.2).

Dates for ceramic artefacts are derived primarily from researched use-popularity patterns. Ceramic use-popularity patterns for tableware reflect times when ceramic wares, types, and/or decorative designs accomplished peak popularity in the consumer market. These patterns are expressed as date ranges and are established through research of merchants' and manufacturers' records. Documented manufacturer's marks evident on ceramic vessels further serve to establish date ranges (Table 1.2). Finally, trademarks for product manufacturers also aid in establishment of data-specific information for archaeological materials (Table 1.3).

Identification/dating of 19th-century ceramics is also based on identifying gradual changes in paste (the body material) and glaze to accommodate shifting trends in the ceramic market. The value of this analytical approach is the dating of ceramic artefacts, in particular refined white-bodied earthenware, in the absence of datable decorative design techniques.

Gradual changes occurred in decorative designs, and design techniques on differing 19th-century ware types provide a chronology for dating decorated wares. Changes in ware type and decorative designs did not necessarily coincide. Therefore, separate chronologies for wares and decorative technologies were established for this study. During analysis, a combined date range was established that considered all of these variables.

In this manner, ceramic artefacts provided a wealth of chronological information. Establishing 'standard typologies' relies upon familiarity with the range of material found on many Australian archaeological sites of the past 200 years, most of which are not adequately documented or described; identifying the frequency of different sorts of material that come out of them; and then researching all these different varieties. Artefact type series for ceramic decorations, developed at Casey & Lowe, include types identified in the collections of numerous excavated sites to assist future research into artefacts. This information contributes data with the potential to further our understanding of their production, market access, the affordability of different items, who was likely to use them, and ultimately how they were used in different time periods and localities. Only then is it possible to work backwards from the artefactual evidence to demonstrate what actually took place in the past.

Table 1.2: Chronological and Locational Data for Documented Manufacturers.

Manufacturer	Country of Manufacture	*TPQ*	*TAQ*	MIC
William Adams & Sons	England	1819	1864	5
Josephe Bourne & Sons	England	1809	1860	3
Copeland & Garrett	England	1833	1847	1
Copeland Late Spode	England	-	-	2
Thomas Dimmock	England	1828	1859	1
Port Dundas Pottery Co. Ltd	Scotland	1850	1932	4
E. Fowler	Australia	1837	1863	2
Herzogthum	Germany	1845	1866	1
H. Kennedy	Scotland	1866	1929	3
Mellor, Venables & Co	England	1834	1851	1
Francis Morley (Co)	England	1845	1858	1
E & G Phillips	England	1822	1834	1
F & R Pratt	England	1850	1855	1
Price's Pottery	England	1865	1930	2

1.5 REPORT AUTHORSHIP

The ceramic artefacts were catalogued by Kylie McDonald. E. Jeanne Harris conducted the analysis results reported in this document. Dr Mary Casey and Holly Winter reviewed the report.

1.6 OVERVIEW OF ASSEMBLAGE

A total of 3430 ceramic (1643MIC) artefacts were subject to cataloguing and analysis. Minimum item counts (MIC) were calculated for fragmented items during cataloguing, and MICs are used throughout this analysis so that counts used in the following discussion represent whole, partial and fragmented items. The methodology used by E. Jeanne Harris

and Kylie McDonald to catalogue artefacts was designed by Dr Mary Casey.[1] Information in the catalogue for these artefacts provided data on shape, function (general and specific), material, description, completeness, joins, producer/distributor, manufacturer, reuse, and date range. Statistical data entered into the database consisted of fragment count, minimum item count (MIC), dimensions and weight.

It is noted that the Barangaroo Station site is not a residential site although partial remains of Langford's House (107) in Area X and the back yards of two houses on Clyde Street in Area Y were delineated. It is proposed that many deposits were brought into the site as fills rather than as purposeful deposits of artefacts directly associated with residents, such as at a house. Many of the artefacts come from fills imported onto the site in deposits for land-forming, and rarely are they the result of deliberate disposal at the study site:

- Reclamation fills to make more land
- Levelling fills to assist with establishing new levels for wharves and infrastructure.
- Backfills of a well/cistern.

Further, some of the artefacts probably came from upslope, Clyde Street which early on was located on the edge of the site, before further quarrying. Also, artefacts associated with deposits relating to the boat were a mix of the deliberate activity or washed in from the harbour:

- Bilge deposits.
- Artefacts in deposits burying the boat (132, 133)
- Artefacts in the sand underneath (249) and surrounding (149) the boat prior to its burial between c.1840s to c.1860s
- Artefacts found inside the boat, including loose timbers (148) stored there from Langford's boatyard.

An overview of functional groups for the site is shown in Figure 1.2. Table 1.3 shows that food-related ceramic artefacts are consistently the highest relative frequencies of functionally identified artefacts. Figure 1.3 is an overview of the specific-use categories of food-related ceramic artefacts, which indicates that nearly half of food-related items are tableware, such as plates, bowls, egg cups and cans. Typically, functional analysis results are only considered reliable for context assemblages of 50 artefacts or greater; however, from the Barangaroo Station site, there are only 17 contexts that meet this criterion, and of this number, only 10 have sufficient ceramics for a reliable analysis. Two of these contexts (164, 165) represent clean-up contexts in Area Y. Four of the largest artefact assemblages are from sedimentary deposits (132, 133, 149, 249) that accumulated under, over and within the timber boat located in Area X.

[1] Casey 2004

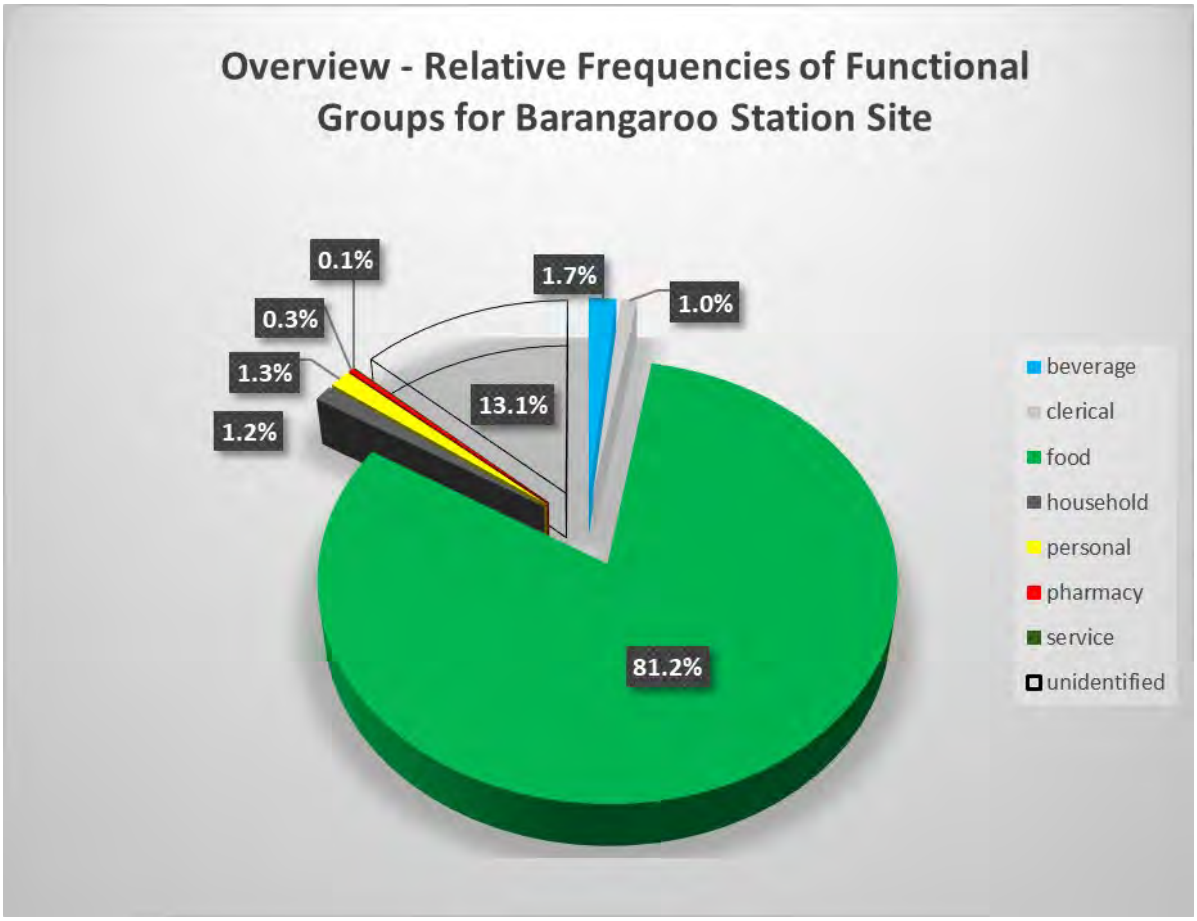

Figure 1.2: Overview of functional groups for ceramic artefacts from Barangaroo Station Site.

Table 1.3: Relative frequencies of functional groups by area.

Area	Beverage %	Clerical	Food	Household	Personal	Pharmacy	Services	Unidentified	TOTAL MIC
R	16.7	-	50.0	4.2	-	-	-	29.2	24
T	0.5	0.5	77.2	1.6	-	1.1	-	19.0	189
W	14.3	-	57.1	-	-	-	-	28.6	7
X	1.6	1.1	84.5	1.3	1.6	-	0.1	9.9	1004
Y	0.9	0.4	76.8	0.9	2.2	1.3	-	17.4	224
Z	2.1	2.1	77.9	0.5	0.5	-	-	16.9	195

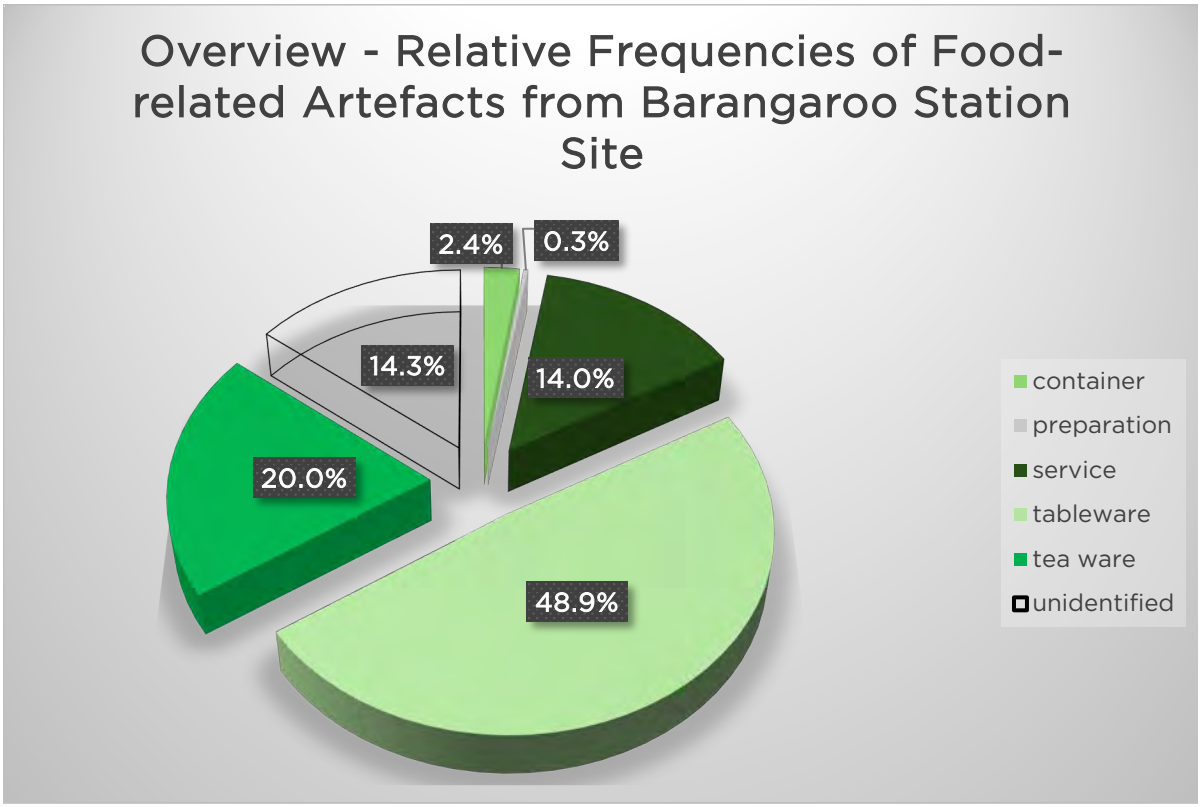

Figure 1.3: Overview – Relative Frequencies of Food-related Artefacts from Barangaroo Station.

2.0 CONTEXT ANALYSIS

2.1 CONTEXTS

FORMATTING AND CONVENTIONS

Standard context analysis generally involves examining contexts for both functional and temporal data that contribute to the interpretation of the site. For clarity of presentation, the following conventions have been observed while writing analysis results:

- Artefact quantities represent minimum item counts (MIC).
- All artefact quantities are represented as numerals.
- All relative frequencies are designated by "%".
- Context numbers are represented in brackets "( )".
- Throughout this report, the term "artefacts" refers to ceramic artefacts only.
- Phases are identified by the archaeological team in the archaeological report.

For this study, a principal focus of these analyses is to assess the temporal data to determine the consistency of deposits with site development phases. The contexts represent a range of deposits associated with structures, such as wharves and seawalls, to work surfaces and potential levelling fills. Area, phase and context organise the following discussion. Minimum item counts (MIC) for the ceramic artefacts are shown in tables grouped by each Area.

2.2 AREA R

Area R was located in the eastern part of the site (Figure 1.1). Beneath numerous fill episodes associated with the construction of the 1960s container wharf, eight deposits in Area R contained ceramic artefacts (Table 2.3). The deposits represent three phases of site development.

PHASE 4 – SHIPBUILDING AND WHARFAGE, CUTHBERT & OSBORNE'S WHARF (1855-1876)

Context (075) was naturally occurring harbour sands that accumulated against the new seawall's eastern face (041). Temporal data for sherds from a Bristol-glazed bottle (1835 *TPQ*) and a purple transfer-printed fine earthenware vessel (1840–1930) are consistent with Phase 4 site development. Artefacts in (075) were probably washed in or thrown from the new seawall.

PHASE 5.1 – DIBB'S REDEVELOPMENT OF THE WHARF, 1875-1890

Two fill deposits (012, 029), located behind the eastern side of a seawall (011), contained ceramic artefacts (Table 2.3). Context (012) was a black industrial fill/boiler ash wharf surface and (029) was a sandstone rubble reclamation fill. The black surface (012) contained one blue transfer-printed bowl (1830 *TPQ*). The artefact assemblage from the sandstone rubble (029) consisted mainly of ceramic tableware/service items, and all datable artefacts had a wide range of dates, 1830–1920. The results of the temporal analysis are consistent with Phase 5 site development.

Bluestone setts (016) were located at the termination of the paving for Clyde Street. There were three deposits associated with the setts and the terminus of Clyde Street, which contained artefacts (023, 024, 052) (Table 2.3):

- Context (023) was packing for the bluestone setts (016) that formed an extension of the Clyde Street surface. The fill contained remnants of a Bristol-glazed

stoneware stout bottle (1835 *TPQ*) and a fine earthenware saucer decorated with stand-alone annular banding on the rim (1860 *TPQ*).

- Context (024) was bedding fill for bluestone paving (016) and consisted of sandstone rubble infill/rubble wharf platform (028); however, no ceramic artefacts were recovered from this deposit.
- Context (052) was an early reclamation fill deposit used to infill between seawalls (011, 041) to create the foot of Clyde Street. All artefacts from this deposit provided temporal information. A key temporal indicator: a marked Port Dundas stoneware bottle (1870–1900).

Context (020) was the fill of a post pipe within posthole (019) (Table 2.3). The one ceramic artefact from this deposit is a blue transfer-printed plate (1830 *TPQ*).

PHASE 6 – GOVERNMENT RESUMPTION OF LAND (1900-1950)

Context (013) was reclamation fill on the western side of seawall (021) (Table 2.1). The key temporal indicator from the ceramic sub-assemblage is a fine earthenware saucer with stand-alone annular banding (1860 *TPQ*).

Table 2.1: Quantitative data for deposits in Area R.

Area	Phase	Trench	Context	Brief Description	MIC
R	4	-	075	Harbour sands	3
	5.1	-	012	Wharf surface	1
		-	020	Pipe fill	1
		-	023	Packing for setts (016)	2
		-	029	Reclamation fill	7
		-	052	Reclamation fill	4
	6	-	005	Working surface	2
		-	013	Reclamation fill	4
				TOTAL	24

2.3 AREA T

Area T was located in the west corner of the site, just west of Area R, with Clyde Street serving as the boundary between the two areas (Figure 1.1). There were 17 deposits in Area T that yielded ceramic artefacts. These deposits represent three phases of site development (Table 2.2).

PHASE 4 – SHIPBUILDING AND WHARFAGE, CUTHBERT, AND OSBORNE'S WHARF (1855-1876)

There are artefacts from three deposits associated with the wharf surface in Area T:

- Abutting walls (041, 042) was a compact black ash wharf surface (031) found across Area T and in Test Trenches 1–4. Based on the ceramic tableware, an 1800–1860 date range is indicated and consistent with Phase 3.2 site development.
- Fill (094) within cut (093) was a loose black cinder coke/ash, and was very similar to (031). However, temporal data for the ceramics suggest an 1850–1870s date range consistent with Phase 4 site development.
- Light brown/grey sand fill (063) was located below crushed sandstone fill over the wharf surface. A key temporal indicator is a ceramic cup/bowl made by *Samuel Alcock* (1830-1859), consistent with Phase 4 site development.

Context (064) was a thin black organic layer that possibly represents a work surface; however, no ceramic artefacts were recovered. Beneath the work surface (064) were several deposits. Test Trenches 1 –4 were cut into sandstone rubble reclamation fill (070), which contained a Rockingham-glazed hollow ware vessel (1780 *TPQ*). Deposit (066) was a weakly compacted, light grey to yellow sandy fill, and while temporal data for most ceramic items are limited to an 1830 *TPQ*, there are flow-blue (1845 *TPQ*) and green transfer-printed items (1840 *TPQ*) which are consistent with Phase 3.2–Phase 4 of site development. In Test Trench 1 was a soft black to light grey sandy fill deposit (068), and while temporal data for most ceramic items is limited to a 1830 *TPQ*, there is flow-black decorated vessel (1845 *TPQ*) which is consistent with Phase 3.2–Phase 4 of site development.

Other Phase 4 deposits in Area T include (047, 053). Sherds of two transfer-printed tableware vessels (1840 *TPQ*) were found in association with two parallel flat long pieces of timber (047), southeast of notched log-like timber (048). Brown sand fill (053) was located southwest of seawall (042). Ceramic artefacts have date ranges spanning from the early-19th century to the early-20th century and serve only to suggest the deposit pre-dates the Phase 6 government resumption of land.

PHASE 5.1 – DIBB'S REDEVELOPMENT OF THE WHARF, 1875-1890

Several deposits are associated with the wharf surface in Area T that are identified as associated with Phase 5 site development (Table 2.2). A wood chip deposit (073), beneath fill (072), was excavated at the northern end of Area T. The calculated 1845–1930 date range that was achieved for ceramic artefacts from (073) is consistent with Phases 4–5 site development.

Above the wood chip fill (073) and timber beams (078) located north of the wharf surface were two deposits: sandy fill (072) and industrial fill (079), which were later combined and subsequently identified as Context (072/079). Date ranges for artefacts from the sandy fill (072) are consistent with Phases 4-5 of site development, while the industrial fill (079) date ranges are consistent with Phase 4 site development (Figure 2.1).

Deposit (082) was a mixed sand fill to the west of sandstone wall (081) and north of the blocking wall (089), used to infill the slipway (083). The majority of ceramics have wide 1830–1930 date ranges; however, there are two pearlware vessels (1780–1870) and one flow-blue transfer printed vessel (1845–1930). These dates suggest an association with Phase 4–5 site development.

Table 2.2: Quantitative data for deposits in Area T.

Area	Phase	Trench	Context	Brief Description	MIC
T	4	-	031	Wharf surface	3
			032	Reclamation fill	2
		-	047	Flat-lying timbers	2
		-	053	Reclamation fill	1
		-	073	Wood chip deposit	28
			094	Fill of construction cut	11
		TT1	063	Reclamation fill	21
			066	Reclamation fill	8
			068	Reclamation fill	13
		TT1, TT2, TT3, TT4	070	Reclamation fill	1
		TT2	031	Wharf surface	4
			069	Reclamation fill	8
			070	Reclamation fill	1
		TT3	031	Wharf surface	1

Area	Phase	Trench	Context	Brief Description	MIC
			063	Reclamation fill	1
			066	Reclamation fill	5
		TT4	096	Reclamation fill	7
		-	078	Collection of timbers	19
	5.1	-	072	Levelling fill	22
		-	079	Levelling fill	37
		-	082	Backfill of slipway	10
				TOTAL	202

Figure 2.1: Ceramic finds from context (079) (l-r). Pharmaceutical patent pot lid #6363, green tp plate #6361. 100mm scale. IMG_3900. R. Workman.

2.4 AREA W

Area W was located south of Area R and was bordered on the east by Hickson Road (Figure 1.1). One fill deposit (103) contained ceramic (7 MIC) artefacts. The ceramic artefacts consisted of food-related artefacts, including a porcelain teacup, two transfer-printed fine earthenware tableware (1840–1930), a stoneware food-storage lid and a Bristol-glaze stout bottle (1835 *TPQ*). These artefacts have wide 19th-century to early 20th-century date ranges, consistent with Phase 3–4 of site development.

2.5 AREA X

Area X is located north of Area W, northeast of Area R and south of Area Y (Figure 1.1). Given the steep downward slope from east to west across the site and drainage and tidal activities, it is highly probable that artefacts in many Area X deposits are either tossed as rubbish from the foot of Clyde Street or deposited by the tide onto the sandy beach before it was buried in the 1860s. The remains of a wrecked timber boat (140) were recovered in Area X. Analysis results for deposits associated with the boat are discussed separately (Section 2.6). The majority of ceramic artefacts from Area X are associated with Phase 3 site development (Table 2.3).

Table 2.3: Quantitative data for deposits in Area X.

Area	Phase	Trench	Context	Brief Description	MIC
X	3	-TT6	109	Occupation deposit	2
		-	119	Levelling fill	1
		-	124	Occupation deposit	10
		-	126	Levelling fill	3
		-	147	Clean-up	12
		-	163	Clean-up	4
	4	-	143	Fill	5
	5.1	-	106	Clean-up	20
		-	108	Demolition fill	10
				TOTAL	307

PHASE 3 – EARLY EUROPEAN OCCUPATION (1788-1855)

One context represents a clean-up activity across the area (147). Dates for artefacts from the clean-up context are consistent with Phase 3 site development. However, there are a few later dated artefacts that most likely represent Phase 4 site development. From the clean-up/fill deposit (147) included two *Port Dundas* stoneware bottles (1850–1932), a *H. Kennedy Pottery* Bristol-glazed stoneware stout bottle (1855–1929) and a stoneware seltzer bottle made by the German *Herzogthum Pottery* (1845–1866) (Figure 2.2, Figure 2.3).

Figure 2.2: Stoneware Selter bottle showing manufacturers marks 147/#5735. 100mm scale. Img_3865. Russell Workman.

Figure 2.3: Stoneware Selter bottle showing handle 147/#5735. 100mm scale. Img_3866. Russell Workman.

Found between bedrock and the southern sandstone wall (162) was a compact brown sand occupation/underfloor deposit (124) that contained 16 ceramic artefacts, including a stencilled cup (1815–1860), a Bristol-glazed stout bottle (1835 *TPQ*) and a cut-sponge decorated vessel (1835 *TPQ*). Dates for these artefacts are consistent with Phase 3.2 site development.

Also found in Area X are small deposits of ceramics (109, 119, 126). There is a paucity of date-specific information for artefacts from these deposits; however, available temporal information is consistent with Phase 3 site development.

PHASE 4 – SHIPBUILDING AND WHARFAGE, CUTHBERT & OSBORNE'S WHARF (1855-1876)

A fill deposit (143) within a service trench for a stormwater drain is associated with Phase 4 site development. All datable ceramics from this deposit have wide 1830–1930 date ranges, which could be associated with Phase 3.2–Phase 6 site development.

PHASE 5.1 – DIBB'S REDEVELOPMENT OF THE WHARF, 1875-1890

One context represents a clean-up activity across the area (106). From this fill was a Bristol-glazed *Price Pottery* bottle (1865 –1930).

Demolition fill deposit (108) was a brownish-yellow coarse silty sand with whole and broken sandstock bricks, sandstone fragments and fine shell lime mortar fragments. A maker's mark on a stoneware bottle from H. Kennedy Potteries (1866–1929) was key to establishing this deposits association with Phase 5 site development.

2.6 AREA X – UNIDENTIFIED DARLING HARBOUR BARANGAROO NO.1 (UDHB1)

As part of the archaeological excavations at Sydney Metro's Barangaroo Station, remains of a boat (140) were uncovered in Area X. The boat (140) was uncovered in September 2018 at the foot of Clyde Street and west of Langford's 1850s wharf wall. Hereafter the boat (140) is referred to as Unidentified Darling Harbour Barangaroo No. 1 (UDHB1) or the boat. A vital component of the research design is to establish a timeline for the deposition of the boat. Therefore, the focus of analysis for contexts associated with this boat is to provide temporal data on ceramic artefacts that contribute to interpreting the surrounding sand and sediment deposits. Establishing date ranges for ceramics from each context is a combination of use-popularity date ranges, established in Section 1.4, and documented date ranges for identified potteries (Table 2.4). The resulting data serve to further define the timeline for the burial of the boat and the construction of Cuthbert's sawshed (Table 2.5).

Table 2.4: Chronological and locational data for documented potteries from boat contexts.

Manufacturer	Country of Manufacture	TPQ	TAQ	MIC
William Adams & Sons	England	1819	1864	5
Josephe Bourne & Sons	England	1809	1860	3
Copeland Late Spode	England	-	-	2
E. Fowler	Australia	1837	1863	2
Mellor, Venables & Co	England	1834	1851	1
E & G Phillips	England	1822	1834	1

Table 2.5: Chronological data for deposits associated with the boat.

Context	MIC	Dated artefacts	From	To
132	56	53	1835	1860
133	240	222	1840	1860
142	25	25	1810	1840
149	206	194	1830	1890
150	22	20	1830	1870
151	17	17	1830	1860
152	17	17	1830	1860
154	5	5	1830	1860
156	5	5	1830	1860
158	7	7	1830	-
159	2	2	1800	-
246	10	10	1790	1830
248	9	9	1830	1870
249	300	295	1830	1875
TOTAL	890	852	N/A	N/A

These deposits were found beneath, above, around and within the ruins of the wrecked boat (140). Discussion of these deposits is grouped by their physical relationship to the boat. All deposits associated with the boat were associated with Phase 3 site development. The discussion of these deposits is grouped by their physical relationship to the boat and consisted of:

- sediments pre-dating the boat
- sediments outside the boat
- sediments inside the boat
- sediments covering the boat as part of its burial from 1840s to c.1860s

There are 14 contexts associated with deposits surrounding the boat. Collectively there are 2327 ceramic artefacts, representing 926 minimum items (MIC). Quantitative data for ceramics from the boat deposits are shown in Table 2.6. An overview of the collection of ceramic artefacts from boat contexts indicates a dominance of food-related artefacts (Figure 2.4). Table 2.7 shows relative frequencies of functional groups for ceramic artefacts from all contexts associated with the boat. Beyond food-related artefacts, there are stoneware bottles, including types for stout, ink and blacking. Also, there are chamber pots decorated in various coloured transfer-print patterns.

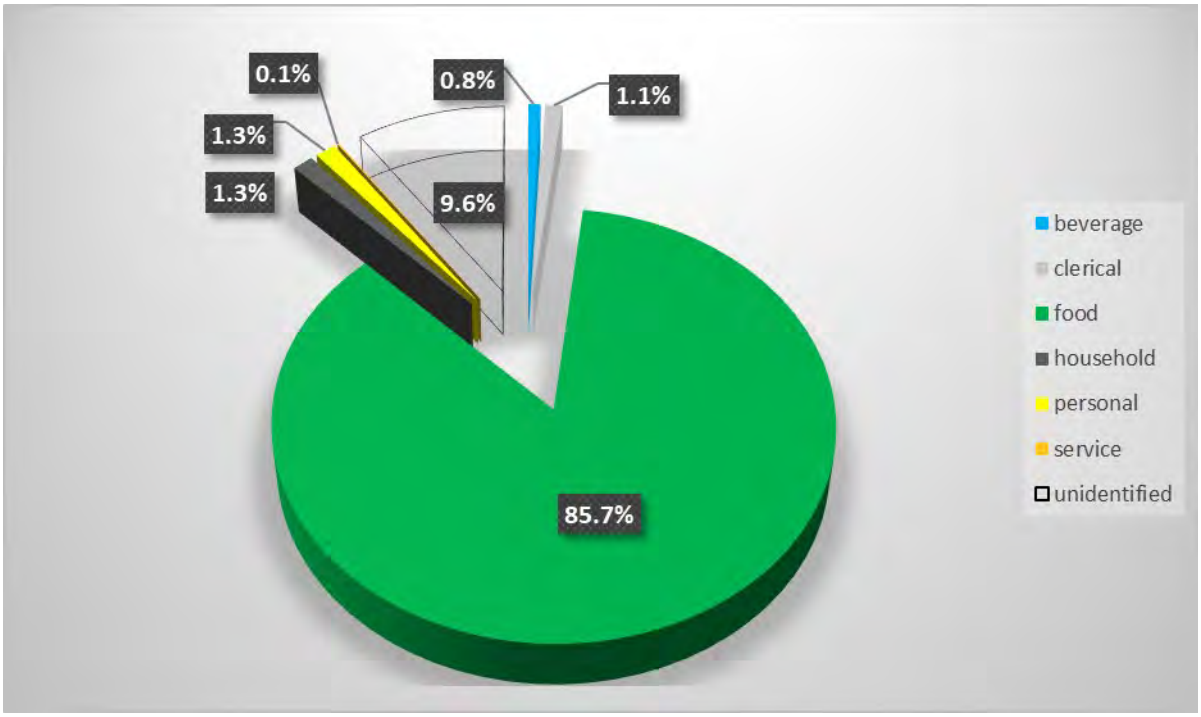

Figure 2.4: Overview of Relative Frequencies of Functional Groups for the Ceramic Artefacts from boat Contexts.

Table 2.6: Quantitative data for boat deposits.

Area	Phase	Context	Brief Description	MIC
X	3.2	132	Intertidal Deposit	56
		133	Intertidal Deposit	240
		141	Deposit within upper part of UDHB1	3
		142	Deposit washed in above and around the loose timbers (148)	25
		149	Deposit associated with runoff from historic termination of Clyde Street and tidal activity – same as 249	206
		150	Clean-up	13
		151	Disturbed/contaminated occupation deposit, below ceiling planks	17
		152	Deposit overlying ceiling planks in UDHB1.	17
		153	Deposit above ceiling planks near bow.	6
		154	Disturbed/contaminated occupation deposit, below ceiling planks	5
		155	Bilge deposit below ceiling planks at bow.	1
		156	Deposit overlying ceiling planks in UDHB1.	5
		157	Bilge deposit beneath ceiling	4
		158	Secure occupation deposit, below ceiling planks.	7
		159	Secure occupation deposit, below ceiling planks.	2
		246	Deposit observed beneath frames, above hull in UDHB1	10
		247	Wood pulp fill	-
		248	Clean-up	9
		249	Same as 149. Sieved – (149) deposit associated with runoff from historic termination of Clyde Street and tidal activity.	300
TOTAL				926

Table 2.7: Relative frequencies of functional groups for context associated with the boat (UDHB1).

Context	Beverage	Clerical	Food	Household	Personal	Service	Unidentified	TOTAL MIC
132	-	-	87.5%	-	-	-	12.5%	56
133	0.8%	-	85.4%	0.4%	1.3%	-	12.1%	240
142	-	-	64.0%	8.0%	-	4.0%	24.0%	25
149	-	-	88.8%	1.5%	1.5%	-	8.3%	206
151	5.9%	-	76.5%	-	-	-	17.6%	17
152	-	5.9%	88.2%	5.9%	-	-	-	17
154	-	-	80.0%	20.0%	-	-	-	5
156	-	-	80.0%	-	20.0%	-	-	5
158		-	71.4%	-	28.6%	-	-	7
159	-	-	100.0%	-	-	-	-	2
246	-	-	80.0%	-	-	-	20.0%	10
249	1.3%	3.0%	86.3%	1.3%	1.0%	-	7.0%	300
							TOTAL	890

SEDIMENTS PRE-DATING THE BOAT

One of the largest assemblages of ceramic artefacts was recovered from a deposit (249), which was accumulated sands that pre-dated UDHB1 (Table 2.6). As shown in Figure 2.5, deposit (249) contained a wide variety of ceramic ware and decorations. While this deposit was exposed to tidal activity along the shoreline, it is thought to result mainly from runoff from the terminus of Clyde Street located above the site and therefore an accumulation of materials over time. Temporal data contributed to an 1830–1875 date range for the deposit, which was derived from dated use-popularity patterns for wares and decorative techniques and vessels with printed pottery marks (E & G Phillips, 1822–1834 and Copeland Late Spode, 1847–1867).

The majority of ceramic artefacts are tableware (61%), and decorative types include transfer-print, dipped, edge decorated and hand-painted vessels (Table 2.8, Figure 2.5, Figure 2.6). Identified transfer-printed patterns include Willow, Sea Leaf, Forest, Fibre and Albion; all common patterns identified in Australian artefact collections. Foodservice/preparation vessels included plain and decorated yellow ware and redware vessels. Also, there are a variety of stoneware bottles, some of which have a Bristol-type glaze.

Table 2.8: Relative frequencies of food-related ceramic artefacts from contexts associated with the boat (UDHB1).

Context	Preparation	Service	Tableware	Tea ware	Unidentified	TOTAL MIC
132	-	17.4%	50.0%	17.4%	15.2%	46
133	-	17.0%	57.5%	15.0%	10.5%	200
142	-	-	69.2%	7.7%	23.1%	13
149	0.6%	17.2%	43.3%	30.0%	8.9%	180
151	-	-	83.3%	16.7%	-	12
152	-	-	58.3%	33.3%	8.3%	12
154	-	-	33.3%	-	66.7%	3
156	-	-	25.0%	50.0%	25.0%	4
158	-	-	80.0%	20.0%	-	5
159	-	-	-	-	100.0%	2
246	-	12.5%	37.5%	37.5%	12.5%	8
249	0.4%	6.2%	61.5%	18.7%	13.2%	257

Figure 2.5: There are various ceramic wares and decorative techniques from context (249), as evidenced by the rough sort of ceramics prior to cataloguing: (top L-R) dipped (mocha) cable pattern bowls, applied sprig on plates, edge-decorated plates; (bottom L-R) Chinese-export porcelain plates, copper lustre and slipped redware holloware vessels, a blue dyed-bodied semi-vitreous saucer (#5081). 100mm scale. DSCN_0205.

Figure 2.6: Selected ceramic finds from context (249) (l-r). Top row: hollow pearl #5886, dip annular bowl #5909, blue tp plate #5862, willow #5845. Bottom row: yellow ware dipped dendritic bowl #5922, blue tp flate tableware #5890, blue pearl plate #5878. 100mm scale. IMG_3902. R. Workman.

OUTSIDE THE BOAT

The accumulation of sediment (149) that built up between the wharf and the boat contained 204 MIC. Much like the accumulated sands (249), and while this deposit is thought to result mainly from runoff from the terminus of Clyde Street located above the site, it was also affected by tidal activities – both of which resulted in an artefacts accumulation over time. Temporal data contributed to an 1830–1890 date range for the deposit, which was derived from dated use-popularity patterns for wares and decorative techniques, as well as from vessels with printed pottery marks (Mellor, Venables & Co, 1834–1851, Josephe Bourne & Sons, 1809–1860 and E. Fowler, 1837–1864). Most ceramic dates range between 1830 and 1860s, which is consistent with Phase 3.2 site development; however, there are two decalcomania decorated vessels (1890 *TPQ*) which are consistent with Phases 5-6 of site development.

Food-related items represent 88% of ceramic artefacts from (149). Within this group the majority of artefacts are either tableware or tea ware items (Table 2.8). The majority of tableware is transfer-printed vessels (73), including plates and bowls, as well as 28 vessels identified only as flat that could be plates, platters or saucers. There are 12 identified transfer-printed patterns, including Albion, Burmese, Forest, Gem, Genevese, Indian Tomb, Palestine, Two Temples II and Willow. Most patterns are blue in colour, but there are also black, brown, green, purple and red patterns. There is also one painted Chinese porcelain bowl fragment classified as tableware (Figure 2.7). One hard-paste porcelain saucer is grouped with tea wares, and the remaining tea ware (53) are fine earthenware cups and saucers.

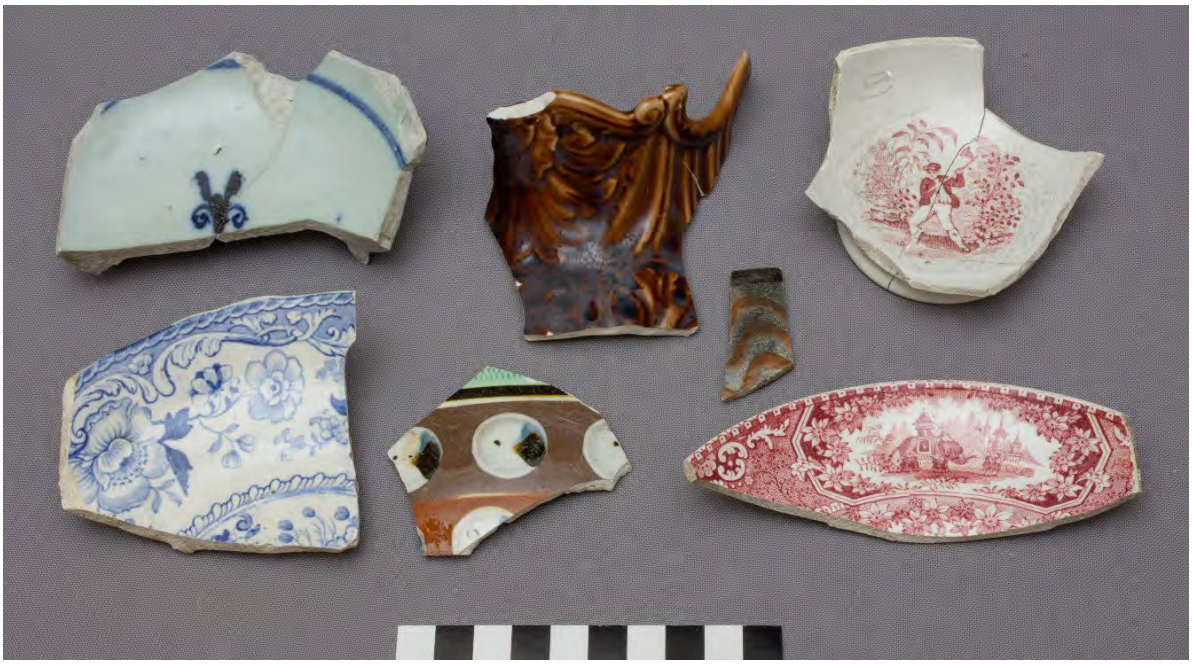

Figure 2.7: Selected ceramic finds from context (149) (l-r). Top row: Chinese porcelain bowl #5573, serving jug #5574, hollow unidentified #5586, red tp cup #5620. Bottom row: blue tp saucer #5545, dip engine bowl #5583, Burmese saucer #5621. 100mm scale. IMG_3908. R. Workman.

INSIDE THE BOAT

Seven sediment deposits recovered from inside the boat contained ceramic artefacts (142, 151, 152, 154, 156, 158, 159). There is a total of 78 ceramic artefacts from these contexts

(Table 2.6). Temporal data were derived exclusively from use-popularity date ranges and contribute to calculated date ranges spanning the first half of the 19th century (Table 2.5). Dates for all deposits from inside the boat are consistent with Phase 3.2 site development; however, ceramics from (142) have date ranges that span Phases 3.1 and 3.2.

As Table 2.6 shows, the ceramic assemblages from deposits inside the boat are considerably smaller than from those deposits under, around and covering the boat. The analysis also looked for similarities between the contexts within the boat. Food-related artefacts represent the highest relative frequency each context's ceramic sub-assemblage (Table 2.7), and within this functional group, tableware items represent the highest relative frequency of specific use types (Table 2.8). Approximately 49% of ceramic items are decorated in transfer-print patterns (Figure 2.8). There are seven identified pattern names, including Willow, Two Temples, Seal Leaf, Royal Star Florentine, Palestine, Guitar and Grecian Vase. Willow is the most abundant pattern and was recovered from six contexts (142, 151, 152, 154, 156, 158). Sea Leaf is the only other pattern identified in more than one context (142, 151).

Some differences were noted between the deposits. The only Chinese export porcelain vessel was recovered from (151) (Figure 2.9). Also, the only stoneware beverage bottle was recovered from (151). The paucity of stoneware beverage bottles is consistent with the history of bottling practices in NSW. The local manufacture of stoneware beverage bottles corresponded with the 1820s introduction and instant popularity of locally manufactured ginger beer and spruce beer, which led to a great demand for bottles.[2]
There is a paucity of date-specific information for artefacts from contexts (141, 153, 155, 157); however, available temporal information is consistent with Phase 3 site development.

Figure 2.8: Ceramics from contexts (155) and (158) (l-r). Top row: personal hygiene poe 155/#5157, tableware bowl 158/#5167, hygiene poe 158/#5163. Bottom row: plate 158/#5166, tea cup 158/#5164, plate 158/#5165. 100mm scale. IMG_3907. R. Workman.

[2] Harris 2021:51

Figure 2.9: Selected ceramic finds from context (151) (l-r). Stoneware salt glazed bottle #5133, Chinese porcelain bowl/food container #5117. 100mm scale. IMG_3893. R. Workman.

SEDIMENTS COVERING THE BOAT

Two sandy deposits covered two sections of UDHB1. The bow and middle were covered by (132) and the stern was covered by (133). While deposit (132) contained only about one fourth the number of ceramics found in (133) (Table 2.6) analysis produced similar results for both. Temporal data were derived principally from use-popularity date ranges and for both (132, 133) contributed to calculated date ranges that are consistent with the proposed Phase 4 burial of UDHB1 (Table 2.5).

Functional analysis classified over 85% of ceramic forms as food-related (Table 2.7), and for each context over 50% of food-related items are classified as tableware (Table 2.8). Other functionally classified ceramic artefacts include commercial containers from (133), including a stoneware ginger beer bottle, Bristol-glaze stout bottle and a generic pot lid for grooming or medicinal products. Greater than 50% of the ceramic items in each deposit are decorated with transfer-print designs. There are ten identified patterns, including Willow, Fibre, Palestine, Flora, Canton View, Gem, Two Temples, and Forest. Vessels decorated in Willow and Fibre patterns were recovered from both (132, 133).

2.7 AREA Y

Area Y is north of Area X and south of Area Z (Figure 1.1). There are six contexts in Area Y, of which three deposits (174, 184, 234) were thought to be associated with Phase 4 of site development, two clean-up deposits (192, 164) are assigned to Phase 6, and clean-up deposit (165) was assigned to Phase 5.1. The latter two contexts represent clean-up contexts from areas in the south end (164) beneath Hickson Road and the north end (165) beneath sandstone rubble (Table 2.9). While ceramic artefacts date from the late-18th century to the late-19th century, documented dates for manufacturers serve to narrow the date range to be consistent with Phase 3.2 site development.

(164)	1	*E.Fowler* stoneware bottle	1837-1863
(165)	1	*Adams & Sons* tureen	1819-1864

(165)	1	*Francis Morley* saucer	1845-1858
(165)	1	*F & R Pratt* fish paste jar	1816-1860

Examples of these can be seen in Figure 2.10 and Figure 2.11 below.

Figure 2.10: Clean-up deposit (165) in Area Y contained a rare F & R Pratt polychrome transfer-printed fish paste jar. 100mm scale. IMG_3888. R. Workman.

Figure 2.11: Clean-up deposit (165) in Area Y also contained a common stoneware cannister jar. 100mm scale. IMG_3868. R. Workman.

Three fill deposits in Area Y contained ceramic artefacts (Table 2.9). There are seven ceramic artefacts from fill (174) of channel (173). The majority of artefacts (4) are fine earthenware vessels that have a wide 1830–1930 date range; however, there is also a tin-glazed apothecary pot that has an 1830 *TAQ*.

Between channel (173) and wall (175) was a levelling fill (184) that contained 21 ceramic artefacts (Table 2.9). Temporal data was derived from use-popularity date ranges for fine earthenware types, including pearlware and whiteware, resulting in a calculated 1840–1870 date range, consistent with Phase 4 site development. All identified ceramic vessels are food-related items; however, unlike other deposits in Area Y, most functionally classified artefacts are food-related service vessels (9), including bowls, jugs and a teapot lid.

A reclamation fill (234) as part of the infill for the Cuthbert wharf construction contained 64 ceramic artefacts. Temporal data was derived from use-popularity date ranges for fine earthenware types, including pearlware and whiteware, resulting in a calculated 1840–1870 date range, consistent with Phase 4 site development. The majority of ceramic artefacts (77.6%) are classified as food-related items (52). The only other functionally classified artefact is a chamber pot in the personal hygiene group.

Transfer-printed designs represent 64% of recovered ceramic vessels (41). The majority of transfer-print patterns (63%) are blue in colour. Other colours include black, brown, green, grey and purple. There are four identified transfer-print patterns, including Willow, Fibre, Bamboo and Two Temples II.

Table 2.9:Quantitative data for deposits in Area Y.

Area	Phase	Trench	Context	Brief Description	MIC
Y	4	-	174	Fill of channel (173)	7
		-	184	Levelling Fill	20
		-	192	Clean-up	2
		-	234	Reclamation fill	64
	5.1	-	165	Clean up	40
	6	-	164	Clean up	82
				TOTAL	215

2.8 AREA Z

Context (206) was a roughly circular cut, thought to be a cistern, into bedrock (199), with pick marks along the sides, which contained three distinct deposits. The top deposit of fill (207) was industrial boiler ash, with a sandy-silt layer with lots of small stones and some ceramics. Context (208) was a loose to moderately compact fill of orange, sandy silt with sandstone inclusions. Context (215) was a fill deposit at the base of the cistern (206). Discussion of the ceramic artefacts from these deposits in cut (206) are outlined below.

There are five ceramic artefacts from the industrial boiler ash deposit (207). Based on field assessment, this deposit layer was associated with Phase 5.1 site development; however, temporal data suggests a Phase 4 association. The middle deposit (208) in cut (206) contained no ceramic artefacts. The lower deposit (215) produced one of the largest assemblages of ceramic artefacts (134). Approximately 21% of ceramics are plain or decorated pearlware tableware (1780–1870). There were nine identified transfer-print patterns in the deposit. While the most abundant of these patterns was Willow (14MIC), there were single-vessel examples of Bamboo, Botanical, Fibre, Foliage, Gem, Medici, Rhine, Two Temples and Windsor patterns (Figure 2.12).

Figure 2.12: Ceramic finds from context (215) (l-r). Top row: blue svfew plate #6071, Chinese porcelain plate #6066, edge pearl plate #6083, dip cable unidentified function #6069, salt glazed ink bottle #6058. Second row: pearl plate #6074 above #6072, green svfew with foot #6067, pearl plate #6083, #5957. Bottom row: hollow redware #6062, hollow yellow ware #6068, sprigg egg cup #6075, #5979, green tp bowl #5980. 100mm scale. IMG_3897. Russell Workman.

There is also a variety of other wares and decorative techniques from this deposit (Figure 2.13). Further temporal data came from three ceramic vessels with manufacturers' marks (William Adams & Sons (1819–1864), Thomas Dimmock (1828–1859) and Copeland & Garrett (1833–1847). Results of temporal analysis in association with Phase 3.2 site development is suggested.

This lower fill deposit (215) has a functional-group representation that suggests the deposit originated from a residential setting (Figure 2.13). Besides high relative frequencies of food-related artefacts, it has a personal grooming item - a soap dish. The presence of stoneware penny ink bottles also suggests a residential setting, as households were more likely to purchase ink in smaller quantities than commercial uses.

Figure 2.13: Selected ceramic finds from context (215) (l-r). Top row: blue plate #6071, pearl plate #6083. Bottom row: blue sprig #6076, salt glazed ink bottle #6058, dip cable #6069. 100mm scale. IMG_4366. Russell Workman.

Covering all of the cellar structure (196) – The City of Sydney Consumers Co-operative Ice Company Ltd – was a mixed rubbly brown sand (243) that was used as a bedding fill to level the area, and contained a few ceramic artefacts (Table 2.10). Datable ceramics include a Bristol-glazed stoneware stout bottle (1835 *TPQ*) and a moulded semi-vitreous (graniteware) vessel (1845–1890).

Water closets (218) were located within cellar (196) that contained remnants of industrial porcelain toilets. These artefacts were not retained for the artefact collection, but both were photographed in situ. Each toilet has datable transfer-printed manufacturers' marks – Johnson Brothers (Hanley) Limited Sanitary Works (1893–2004) and Royal Doulton (1884–1902) (Figure 2.14). These dates suggest installation of toilets during the last 20 years of the 19th century.

Figure 2.14: Remnants of two toilets from water closet (218), in The City Ice Co & Beer cellar context (196) (l-r). Johnson Brothers (Hanley) Limited Sanitary Works (1893–2004), Royal Doulton (1884–1902). DSC_3968.

Phase 6 artefacts (5MIC) are limited to clean-up activities (194) and datable artefacts range from pearlware (1780–1870), to a Bristol-glazed stout bottle (1835 *TPQ*) and brown transfer-printed tableware (1840–1930).

Table 2.10: Quantitative data for deposits in Area Z.

Area	Phase	Trench	Context	Brief Description	MIC
Z	4	-	215	Base fill in cistern (206)	134
	5.1	-	205	Drain fill of (203)	30
	5.1	-	207	Fill layer in cistern (206)	5
	5.1	-	208	Fill layer in cistern (206)	12
	5.1	TT5	243	Bedding fill	5
	6	-	194	Clean-up	5
				TOTAL	191

3.0 REPORT SUMMARY &RESULTS

For most contexts, site phasing's field assessment is consistent with the ceramic artefacts temporal data. However, for nine contexts in four areas (Areas T, X, Y and Z), temporal analysis results indicate ceramic artefacts temporal data are consistent with different phasing than that assigned during post excavation evaluations (Table 3.1).

Table 3.1: Contexts that contain temporal data that differs from assigned phasing.

Area	Context	Field Phase	Artefact Phase
T	031	4	3.2
	066		3.2–4
	068		3.2–4
	072	5.1	4–5
	079		4
Area X (boat)	142	3.2	3.1–3.2
Area Y	165	5.1	3.2
Z	207	5.1	5.1
	215		3.2

Functional analysis results indicate that for all contexts, food-related artefacts represent the majority of ceramic artefacts recovered from each context. This is a typical result for ceramic artefacts resulting from residential settings. However, a deposit of levelling fill (184) in Area Y contained a high relative frequency of food service items (bowls and jugs), suggesting this deposit may have resulted from a commercial setting (inn, hotel or pub) or a boarding house.

Approximately 60% of ceramics were decorated with transfer-printed (916MIC) or flow blue/black transfer-printed patterns (72MIC). Of this number, pattern names have been identified for 26.3% (260MIC). There are 40 identified patterns, and Willow pattern represents approximately 48% of identified patterns (124MIC). Willow was recovered from 26 contexts in four areas (Area T, Area X, Area Y and Area Z). Willow pattern is most commonly identified on plates; however, it is identified on platters, dish covers, serving bowls and tureens.

Fibre patterned vessels were also recovered from these areas, but unlike blue Willow patterned prints, the Fibre pattern is in various colours, including black, grey, green and brown. The pale blue Two Temples II pattern (19MIC) was recovered from six contexts in Areas X, Y and Z and is only identified on tea ware vessels (cups and saucers).

Analysis of stoneware bottles from the site produced some expected and some unexpected results. There are 82 stoneware bottles in the site's ceramic sub-assemblage. Twenty-five bottles are imported Bristol-glazed stout bottles. Other probable imported bottles are blacking bottles (10MIC) and ink bottles (2MIC) which would have been imported as commercial containers with product. There are 25 salt-glazed stoneware bottles that may have been locally manufactured. Most of these bottles were not functionally classified; however, one ginger beer bottle was recovered (151).

It is generally considered that Jonathan Leak (1822–1830) started a stoneware bottle tradition that was followed by other Sydney potters, including Thomas Field (1846-1880) and Enoch Fowler (1847–1854). During the 1820s the introduction and instant popularity

of locally manufactured ginger beer and spruce beer led to a great demand for bottles. Until the late 1800s, there was no glassworks in operation in Australia and the success of stoneware ginger beer bottles by local manufacturers such as Jonathan Leak (1822–1830), Thomas Field (1846-1880) and Enoch Fowler (1847–1854) corresponded with this demand.[3] The paucity of stoneware ginger beer bottles in the site's collections is noted here because it has the potential to contribute to studies of bottle reuse practice and beverage consumption patterns during the different phases of site occupation.

Good personal hygiene and grooming were indicators of respectability as part of adherence to middle-class values. Personal hygiene artefacts are limited to a soap dish, Area Z (215), a basin, Area X (142) and chamber pots from eight deposits in Area X and three deposits in Area Y.

[3] Harris 2021:51

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

LOCALLY-MADE POTTERY REPORT

MARCH 2022

VOLUME 3, SECTION 3.2

Examples of locally-made pottery and glazed Chinese provincial ware from Area Z. R. Workman, IMG_4148.

FINAL REPORT | Report to **Sydney Metro**

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Draft Version 1	10.03.21	Internal Review	Dr Bernadette McCall	Holly Winter
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Final Report	02.03.22	Final Report	Dr Bernadette McCall	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

LOCALLY-MADE POTTERY REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

During cataloguing of ceramic artefacts any artefacts that were potentially the products of the first wave of early local potters were set aside for closer examination. As a result, a small group of 73 sherds representing a minimum of at least 34 different items (MIC) were recorded for this section of the ceramic report. During the analysis several of the items were identified as the output of early Sydney potters such as Thomas Ball (operating from c.1801–1823), Jonathan Leak (operating from c.1819–1839) rather than other early potters such as Skinner, Moreton or Hayes who operated prior to the 1840s. Within this subset of ceramics were also numerous dark red earthenware sherds that formed a consistent group of utilitarian vessel types that were examined to determine whether they were local or imported products.

1.2 ARCHAEOLOGICAL PHASES

Phasing for the archaeological remains was developed following the main excavation program of the Sydney Metro Barangaroo Station site (Table 1.1). Contexts were assigned to relevant chronological phases based on stratigraphy and historical data. The local pottery discussion is organised with reference to the site areas defined for the excavation and by context within each phase.

Table 1.1: Chronological phasing for alteration and development of the study area.

Phase	Date	Description
1	-	Formation of the Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early grant holders
3.2	1833-1855	Langford's house and wharf
4	1855-1876	Shipbuilding and Wharfage, Cuthbert and Osborne's Wharf
5	1876-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' redevelopment of the wharf, 1875-1890
5.2	1890-1900	Structural modifications and Government involvement, 1890-1900
6	1900-1960	Government Resumption of Land - Hickson Road, 20th Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 AIMS OF REPORT

The report aims to present specialist interpretation into the use and distribution of locally-made earthenware and stoneware vessels, building on Casey & Lowe's expertise in this local industry, and to determine the provenance of the utilitarian red earthenware artefacts that are poorly represented in local archaeological assemblages. Although the less

common coarse red earthenware artefacts are likely to represent imported vessels from the United Kingdom rather than a previously unknown early local product, they are discussed here as they represent a small but varied collection of utilitarian vessel types that display distinctive surface treatments based on a similar technology to the early colonial potters. Red wares of this type have been found in very limited numbers at other sites excavated by Casey & Lowe and the Barangaroo finds provide a useful resource to help interpret more isolated redware examples from sites across Sydney.

1.4 METHODOLOGY

The local pottery was recorded using conventions developed by Casey & Lowe to understand the function and chronology of all artefact types but with additional data recording designed to investigate early pottery manufacturing in Australia. This detailed recording methodology was devised specifically for the analysis of a large quantity of manufacturing waste identified at Thomas Ball's pottery production site in the former Brickfields, during excavations at 710–722 George Street, Haymarket in 2009.[1] In addition to vessel shape and size, aspects such as surface finishes, colour and the presence or absence of manufacturing faults provide information about overall vessel quality, the skills of local makers and local demand for pottery vessels. All other ceramics were catalogued in accordance with criteria developed by Casey & Lowe to interpret excavated assemblages using standardised fields and terminology that provide information about vessel shapes, decoration, function, country of origin and chronological range for their production and use.

Fragment counts are included in the data set however identifiable artefacts are discussed in terms of the minimum number of different vessels or items (MIC) that they represent. Minimum numbers were allocated on the basis of fragments that constituted a unique item across the assemblage, rather than within a context. Any joining sherds or similarity of wares between contexts was also noted to help interpret the archaeological remains. This quantification method was implemented independently of artefact size or the proportion of an item that is present. Archaeological material was fragmentary and this method ensures that each original vessel that different fragments came from is included in the site data without over-estimating artefact counts.

1.5 REPORT AUTHORSHIP

Dr Bernadette McCall catalogued the artefacts discussed in this report and prepared the overview. Additional information was provided by Kylie Seretis and Dr Mary Casey. The report was reviewed by Holly Winter, senior archaeologist, and Dr Mary Casey, Director, Casey & Lowe.

[1] Casey & Lowe 2011, Vol. 4.

2.0 OVERVIEW OF ASSEMBLAGE

The assemblage of potentially locally-made pottery discussed in this brief report consists of 73 fragments representing a minimum number of 34 vessels, roughly two per cent of the total ceramic assemblage. These ceramics were recovered in small numbers from four of the six excavation areas, Areas T, X, Y and Z, found in contexts from Phases 3 to 6 and their sub-phases (Table 2.1). Area X contained the highest concentration of these ceramics representing a total of 18 (MIC) vessels, all found in Phase 3.2 contexts associated with the abandoned boat, UDHB1.

Table 2.1: Summary of locally-made and other unusual finds by area and context.

Area	Contexts	Phase	Frags	%	MIC	%
T	068	4	1	1.4	1	3.2
	079	5.1	1	1.4	1	3.2
	094	4	1	1.4	1	3.2
X	132	3.2	2	2.9	0	0.0
	133	3.2	**12**	**17.1**	**4**	**12.9**
	149	3.2	**10**	**14.3**	**5**	**16.1**
	150	3.2	1	1.4	0	0.0
	249	3.2	**20**	**27.1**	**10**	**29.0**
Y	164	6	1	2.9	2	3.2
	165	5.1	4	5.7	1	3.2
	174	4	1	1.4	0	0.0
	184	4	5	7.1	1	3.2
	234	4	2	2.9	2	6.5
Z	205	5.1	1	1.4	1	3.2
	215	4	7	8.6	4	9.7
	245	5.1	2	2.9	1	3.2
	TOTAL		**73**	**100.0**	**34**	**100.0**

The two main ceramic types identified during cataloguing consisted of early locally-made lead glazed or slipped earthenware or stoneware (25 fragments, 17 MIC) made by one of several potters operating in the first few decades of the 19th century (Thomas Ball, Jonathan Leak or their contemporaries such as John Moreton or David Hayes) along with a group of ceramics of uncertain provenance (48 fragments, 17 MIC) including several dark red earthenware vessels with slipped and glazed surfaces (33 fragments, 9 MIC). Although the main focus is the discussion of early local wares, both ceramic groups are discussed together. The wares are noteworthy as they provide information about the distribution and use of early local and other less common products and provide additional temporal or functional information to help interpret the archaeological remains.

Early locally-made pottery is dominated by lead-glazed earthenware vessels made in a wide range of shapes. Limited forms were also produced with a higher fired stoneware body. The products of Thomas Ball, c.1801–1823, are the best known of the early colonial potters due to the excavation of part of his workshop by Casey & Lowe in 2007 which recovered a substantial quantity of ceramic vessel wasters in a range of shapes, fabrics and surface treatments.[2] More recent excavation carried out by Casey & Lowe on the site of Jonathan Leak's kiln has provided a representative sample of his earthenware and

[2] Casey & Lowe 2011.

stoneware vessels adding significantly to our knowledge of the range of shapes made by local potters into the 1840s.[3]

Among the ceramic artefacts that were flagged as having the potential to be locally-made were several examples of dark red earthenware vessels that represented various forms. Along with shared fabric characteristics, the redwares display a distinctive interior surface treatment marking them as a homogenous ceramic group regardless of some variation exterior surface treatments (both glazed and unglazed). Although the redware items were identified as imported wares during cataloguing they are discussed here due to the variety of forms that were recovered and to help differentiate from local ceramics. Similar items have been found at other sites excavated by Casey & Lowe but in minimal quantities only making it difficult to determine the main vessel forms and to assign a secure date range where they do occur.[4] The Barangaroo redware group provides a small but useful sample to characterise these items.

The main functional categories identified among the combined earthenware assemblage were food-related (28 MIC), mainly for preparation, serving or storage in keeping with the utilitarian quality of the vessel fragments (23 MIC). A small proportion of sherds within the food category came from finer earthenware vessels (5 MIC) that were identified as probable tableware or teaware shapes. The remaining vessel fragments assigned an item count were either used for food/household, personal/food or unidentified functions (5 MIC).

[3] Casey & Lowe carried out excavations at Leak's production site in 2019 which has provided additional comparative material of locally-produced pottery; artefact report forthcoming.

[4] For example, at 3 Parramatta Square (3PS), 16318/C41/#48342 with mottled brown decoration on the slipped and clear lead glazed interior surface.

3.0 CONTEXT ANALYSIS

3.1 AREA T

3.1.1 PHASES 4 AND 5

Fragmentary finds from Area T represented three individual vessels and were recovered from contexts in Phases 4 and 5.1 (Figure 3.1, Figure 3.2). They included two examples of local lead-glazed wares in Phase 4 contexts, a small body sherd typical of Ball's wares due to fabric colour and glaze combination (068/#6500) and a partial flat lid with pale yellow glaze that could have been made by either Ball or Leak yet the hard white fabric and better glaze quality supports the latter, extending the date range into the late 1830s (094/#6502). Both examples are utilitarian and the lid would have been used for the storage of food.

The remaining rim sherd (Phase 5.1, 079/#6501) came from a medium size red earthenware bowl (rim diameter 180mm) with interior white slip under clear lead glaze (appearing yellowish) and olive glazed exterior. The rim belongs to the group of hard-fired dark red earthenware vessels and was probably an imported utilitarian vessel. Unstratified coarse red earthenware sherds collected from the remains of the demolished Portobello potteries site in Edinburgh, c.1765–1970, display a visually identical fabric and surface finish colour combination indicating a Scottish origin.[5] Similar Scottish redwares with the interior slip/glaze surface finish could have been made as early as the late 18th century due to the similarity of other slipped coarse redwares from several Scottish pottery sites.[6] The rim shape of #6501 was a common form among unstratified slipped domestic redware vessels salvaged during redevelopment of a former pottery site at Cupar in Scotland dated c.1830 to 1847.[7]

Figure 3.1: Ceramics from Area T. Interior view (l-r) of 079/#6501, 068/#6500, 094/#6502. 100mm scale. Russell Workman. IMG_4124

Figure 3.2: Ceramics from Area T. Exterior view (l-r) of 079/#6501, 068/#6500, 094/#6502. 100mm scale. Russell Workman. IMG_4127

[5] Haggarty 2007, 'Earthenware Red: Coarse Wares (Box 15)', National Museums of Scotland collections, FD 2006.1.210.

[6] Kelly 1999:80, Drongan Pottery, for example.

[7] Martin & Martin 1996:37, Illus. 6, 7 Type II bowls.

3.2 AREA X

3.2.1 PHASE 3

As noted above, Area X contained the highest number of potentially locally-made pottery and other unusual earthenware vessels (45 frags, 19 MIC). All were represented by fragmentary sherds representing less than ten per cent of the original vessel and all were found in Phase 3.2 contexts associated with the abandoned boat (140 – UDHB1). Nine (MIC) of these vessels were identified as locally-made lead-glazed or slipped wares, seven of which were probably made by Thomas Ball sometime between 1801 and 1823 (Figure 3.3). There were also at least five (MIC) different examples of the imported utilitarian red earthenware vessels with a slipped and glazed interior (Figure 3.4).

Contexts (132, 133) (Phase 3.2) contained mainly body sherds identified as locally-made lead-glazed or slipped earthenware, examples of the slipped redware group and a yellow ware vessel. The few diagnostic sherds represent four (MIC) different vessels. The yellow ware bowl/pan rim (133/#6512) is likely to have been an import dating from after c.1830. The other three vessels were from locally-made earthenware and display characteristic shapes, fabric, glaze colour and faults found on ceramics made by Thomas Ball (c.18011823). They include a discoloured white earthenware base with olive-yellow lead glaze (133/#6507) probably from a large bowl, a crudely made brown glazed lid shaped like a small inverted pan (133/#6511) missing a horizontal handle,[8] and an unglazed crock or jar rim (133/#6505) made of white earthenware with an orange slipped surface. Redware body sherds from these contexts display the white slipped and clear glazed interior with brown glazed, olive glazed or slipped exteriors. The redwares likely come from diagnostic vessel sherds assigned an item count in other Area X contexts. Almost all finds were worn and rounded by deposition in the intertidal zone.

Five vessels were identified in sediment accumulation (Phase 3.2, context 149) between the boat (140 - UDHB1) and Langford's wharf (145). The fragments were small but could be identified as locally-made vessels: a thick high-fired olive glazed body sherd (149/#6522), a thin yellowish-green glazed sherd with traces of hand painted decoration (149/#6523), and an unglazed rim fragment in finer white fabric with orange slipped interior and exterior (140/#6524) belonging to a small bowl. Similar wares and surface colour variations are found in Ball's pottery waste assemblage but other local makers such as Jonathan Leak cannot be ruled out. One rim fragment was found among the several redware sherds that belonged to a large utilitarian bowl with slightly thickened rounded rim and olive glazed exterior (149/#6520). Mottled black marks on the interior slip may be from decoration or the result of discolouration after the item was discarded. A more refined red earthenware base/body sherd with brown slipped interior and thick white slip trailed decoration on the interior (149/#6516) appears to be another example of the Scottish redware tradition. Parallels are found in the small assemblage of slip-decorated sherds from the Portobello and Verreville, Glasgow potteries on similar open forms.[9]

Context (249) (Phase 3.2), the sandy deposit below the boat determined to be the same as (149) around the boat, contained mostly small and well-worn fragments of early local and imported earthenware or stoneware ceramics (9 MIC). Of the fragments of imported slipped redware, three diagnostic fragments were assigned to different vessels. The largest fragment was a flat base with curving body and underglaze mottled brown decoration over white slipped interior (249/#6526). A joining body fragment found in the sediment between the boat and Langford's wharf (149/#6517) suggests a large bowl as the most

[8] Similar shaped lids are known as Type 11.6 in Thomas Ball's vessel type series; Casey & Lowe 2011, App. 4.4.

[9] Haggarty 2007, Portobello potteries, FD.2006.1.642; Verreville pottery, Haggarty 2006, GM:2006.5.790.

likely form. Although the decoration is similar to late 18th-century Tortoiseshell or mottled slip decoration often found on creamware vessels,[10] better parallels are again found on slipped redware vessels from Scotland. Examples include an unstratified find from the Portobello potteries site on a 'dairy bowl' and on redwares from the Drongan Pottery south of Glasgow that made dairy and household vessels from the late 18th century to the 1860s.[11] Two slipped redware rim sherds consisted of another rounded bowl rim with olive green glazed exterior (249/#6540) and a shallow dish or plate rim with thin olive glazed band on the rim edge and unglazed exterior (249/#6539). The *TPQ* dates of other ceramics in context (249) range from c.1790-c.1845 indicating that the production of redwares also falls somewhere within this period.

The locally-made pottery fragments were small, isolated sherds. They included a very worn yellow glazed white chamber pot rim (249/#6527), two pale red earthenware pan/bowl rims with patchy olive lead glaze (249/#6532) or self-slip (249/#6529), and some small stoneware body sherds that are probably early local products (249/#6533). The chamber pot rim is typical of Ball's pottery and the other rims exhibit colour and shape characteristics found on his vessels. The chamber pot rim is very worn and may have been deposited long after it was made.

The remaining vessels in this context were fragments of imported factory-made slipped wares or hand painted lustre earthenwares (249/#6530, 6531 and 6541) that date from c.1780–c.1900 and c.1830 on respectively.

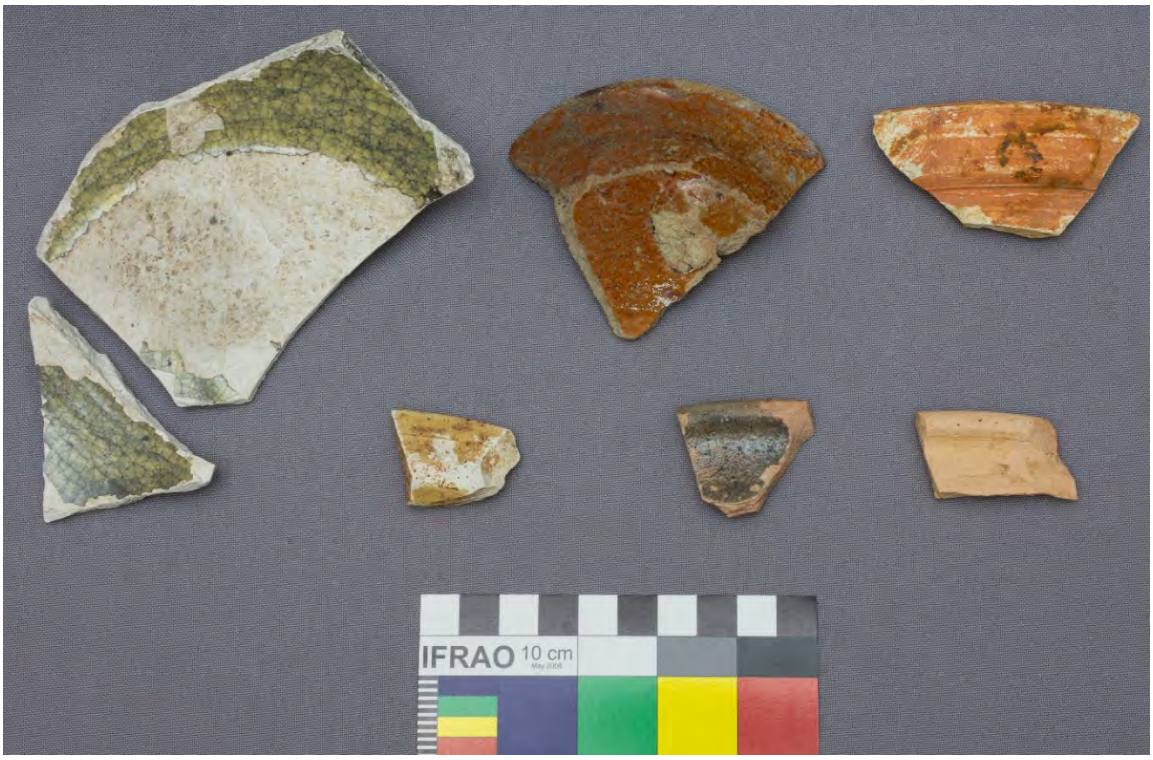

Figure 3.3: Locally-made pottery from Area X. Locally-made pottery from Area X. Top row: discoloured yellow glazed base 133/#6507, exterior brown glazed lid 133/#6511, orange slipped crock/jar rim 133/#6505. Bottom row: chamber pot rim 249/#6527, olive glazed pan rim 249/#6532, self-slipped pan/bowl rim 249/#6529. 100mm scale. Russell Workman, IMG_4133.

[10] Barker 1991:82.

[11] Haggarty 2007, 'Earthenware Red: Coarse Wares (Box 15)', National Museums of Scotland collections FD. 2006.1.646. For Drongan, Kelly 1999:80-81.

Figure 3.4: Redware ceramics from Area X. Slipped and glazed redware ceramics from Area X. Top row: Olive glazed exterior bowl rim 149/#6520, slip decorated base/body 149/#6516. Bottom row: exterior bowl rim 249/#6540, interior dish/plate rim with olive band on rim edge 249/#6539. interior flat base/body joining sherds with mottled brown decoration 249/#6526, 149/#6517. 100mm scale. Russell Workman, IMG_4135.

3.3 AREA Y

Phases 4, 5 and 6 contexts in Area Y contained the remains of six (MIC) different lead-glazed or slipped vessels, only one of which was identified as an early locally-made earthenware (234/#6549) recovered from a Phase 4 deposit. This yellow glazed white earthenware base/body (234/#6549) was made by either Ball or Leak and came from a large bowl or similar vessel. A single yellow glazed body sherd from context 174 (174/#6546, 0 MIC) was the only other locally-made fragment from Phase 4. An imported yellow ware (164/#6542) dating from c.1830 was also present (Figure 3.5).

Body sherds from another globular vessel with slipped/glazed interior and olive glaze on the exterior were also recovered in Area Y (184/#6548, Figure 3.5). A plain rim from a shallower vessel, possibly a dish or low pan (184/#6547) is another shape in the slightly coarser redware similar to base 164/#6543 (see below). Only the interior is glazed and the rim has the olive band around the edge that is a common feature of these vessels. The remaining Phase 4 item in Area Y is a body sherd made of fine dark reddish-brown earthenware with glossy orange-brown glazed exterior surface with an applied white sprig or trail (234/#6550, Figure 3.5). The interior of the vessel has a white slip and clear glaze but unlike the other redwares the glaze has a pale blue tint that is more like pearlware.

Slight variation in the exterior colour suggests this was possibly an attempt to produce a variegated 'agate ware' and the slip/sprig indicate it belonged to a more decorative item and would date broadly from the late 18th to early 19th century.[12] It is similar to the other redwares and was probably made somewhere in the United Kingdom.

Further variety in redware forms was found in Area Y Phase 5.1 and 6 deposits. Context (165) (Phase 5.1) contained a probable chamber pot or jar (165/#6545) with outcurving rim and globular body shape. The vessel was well made and finished with glossy even glazes on both interior and exterior yet there are still very minor firing and glaze faults (bloating, bittiness) that highlight the practical domestic nature of the vessel. An everted rim of the dense redware fabric group appears to be from a large pan with a diameter of c.280–300mm (Phase 6, 164/#6544). It has a narrow olive-brown glazed band around the rim similar to other redwares and the exterior is unglazed. The pan-like shape was a common form on vessels salvaged from the Cupar pottery site, Scotland that operated between c.1830 to 1847.[13] The dates here relate to the individual pottery site only and cannot provide an end date for production but the assemblage is useful for understanding the specific vessel forms that were made. A flat base (164/#6543) in a lighter and coarser redware was also recovered and may have belonged to a pan or bowl.

The redwares are likely to have continued in use in the second half of the 19th century but their presence in Phase 5.1 or 6 deposits may also result from the redevelopment and disturbances during the latter phases of activity on the site.

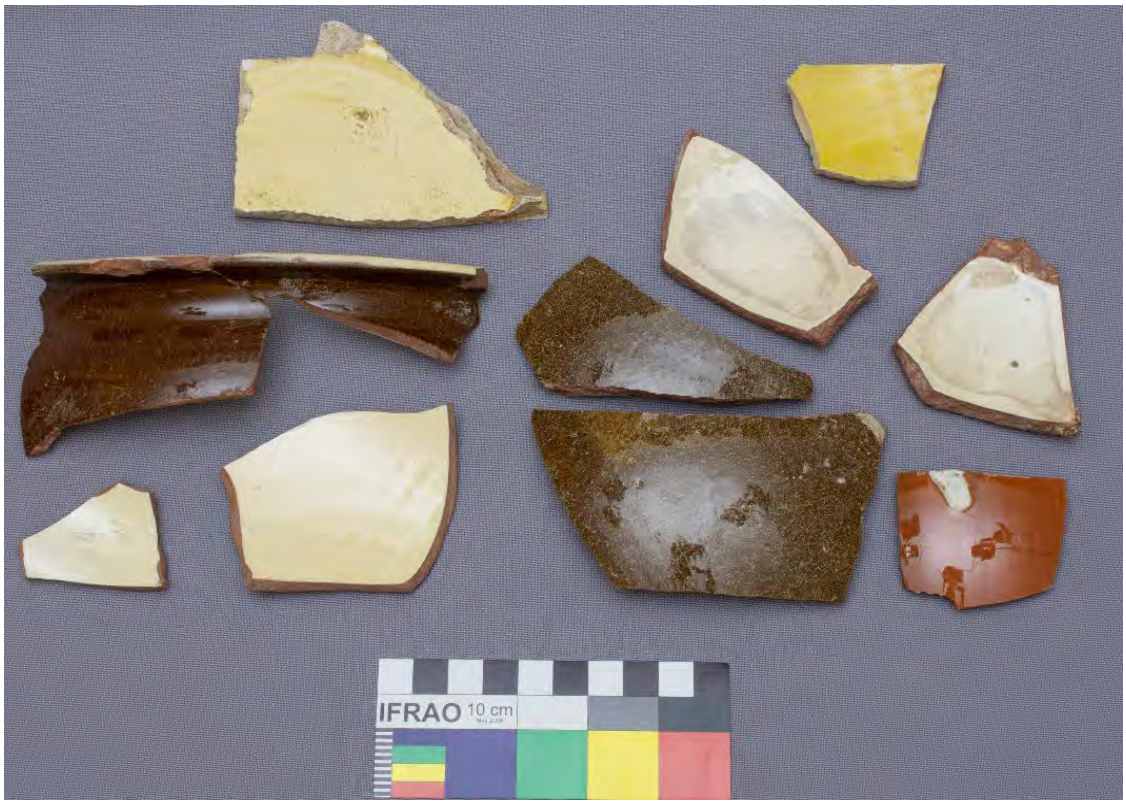

Figure 3.5: Ceramics from Area Y. Top row: locally-made yellow-glazed base 234/#6549 and body sherd 174/#6546. Bottom, l-r rim sherds, exterior above interior body sherds 165/#6545, interior and exterior 184/#6548 body sherds, and sprigged body sherd234/#6550. 100mm scale. Russell Workman, IMG_4145.

[12] Rickard 2006:24.

[13] Martin and Martin 1996:29, Illus. 4, 5.

3.4 AREA Z

3.4.1 PHASES 4 AND 5

Area Z contained the remains of at least four locally-made lead-glazed vessels, in Phase 4 context (215) (3 MIC), the lower fill of a roughly circular cistern cut (206) into bedrock and Phase 5.1 context (245) (1 MIC), a sandy reclamation fill also sitting above bedrock. A single jug or bowl rim from Phase 5.1 context (205) (205/#6557) was catalogued with the locally-made wares but is not discussed further as it was identified as an imported lustre-glazed ware. Context (215) contained several examples of Thomas Ball's work, c.1801-1823, identifiable by the characteristic glaze colours, manufacturing faults and vessel forms (Figure 3.6). A complete slightly concave large base/body sherd from a large jar or crock was made of cream earthenware with yellow-brown glaze on the interior and exterior surfaces (215/#6554). The underside of the base was marked by extensive streaks of heavily blistered glaze that would have been caused from glaze splashes during firing. The presence of clearly visible faults on a vessel outside of a pottery workshop indicates a market for functional vessels regardless of appearance.

Joining rim and body sherds from a pan (215/#6553) also showed traits typical of Ball's pottery. The yellow lead-glazed interior has small dark speckling marks from impurities in the glaze and the vessel exterior was covered with a dark red/mulberry slip, a common combination on Ball's pottery as was the rim shape.[14] A partial hollow handle or spout may also have been locally-made (215/#6552). Earthenware vessels with similar pale red body and clear honey brown glossy glaze are found in Thomas Ball's local wares but this specific shape has not been recovered to date. A hollow pipkin or frypan handle identified in Ball's kiln wasters was more irregularly shaped using a knife and not as well made as this example. A closer match for the shape is a spout on an unglazed wine cooler made by John Moreton, a form described also as a water jug in contemporary accounts.[15] It is possible that Moreton or other early potters made these shapes in glazed versions as well. Context (215) also contained the flaring rim/body from a shallow crudely made coarse stoneware vessel with interior brown glaze (215/#6551) identified as Chinese provincial ware dating from at least c.1790 onwards. Brown-glazed stoneware was produced in a variety of shapes that changed little over a long period, including flared-rim bottles and jars with shallow lids containing alcohol, condiments and preserved foods. Traces of hard white plaster around the rim of this vessel suggest it could also be a bowl-shaped lid from a wide-mouthed transport jar.[16]

Only two examples of local pottery were found in Phase 5.1, context (245), both lead glazed and probably made by either Ball or Leak. A white earthenware base fragment (243/#6559) with yellow glaze on the interior and exterior was likely to have been part of a chamber pot and was probably made at Ball's pottery between c.1801–1823 (Figure 3.6). The yellow glazed body sherd is also typical of local manufacturers but was not assigned a vessel count (245/#6558).

[14] Type 1.3.4 pans; see Casey & Lowe. 2011, Vol. 4, App. 4.4:4.

[15] Ford and Ford 2016:22, No. 23, and see excerpt from de Bougainville dated 1825 describing the form as well (Ford and Ford 2016:19).

[16] Wegars 1988:445.

Figure 3.6: Examples of locally-made ceramics and other wares from Area Z. Top row: pan 215/#6553 and jar/crock base 215/#6554. Bottom row: handle/spout 215/#6552, body sherd 245/#6558, base/body 245/#6559, and interior/exterior Chinese provincial ware rim sherds 215/#6551. 100mm scale. Russell Workman, IMG_4150.

4.0 SUMMARY AND DISCUSSION

The quantity of locally-made lead-glazed and slipped pottery from the first few decades of the 19th century was limited. The fragmentary and worn condition of much of the local wares indicates they were likely to be residual items that had accumulated earlier as general rubbish on or close to the site. The larger fragments from context (215) in Area Z provide an exception to this. The broken sherds were not worn by sand or water and appear to have been discarded within the circular bedrock cut (206) soon after breaking. Heavy vessels such as this could have been used for a long period after production, however they provide further potentially early dates for artefacts within this fill.

The group of dark red earthenware items with interior slip and lead glaze represent imported ceramics rather than locally-made pottery. Archaeological and documentary sources indicate they were made in Scotland from as early as the late 18th century and probably into the first half of the 19th century however most examples of the redwares that have been documented were not found in stratified contexts. [17] Although the forms were common throughout Britain, the slipped and glazed redware vessels were made at several locations where suitable clays were available and they appear to have been made following local vernacular traditions to supply utilitarian products to a domestic market.[18]

However, by the late-18th century Scottish potteries such as Verreville in Edinburgh were producing large quantities of ceramics including delftware, creamware, white and brown stoneware for export markets in North America and Australia.[19] Although mostly produced by smaller potteries for local consumption it is not surprising that more utilitarian domestic slipped redwares were also included in these shipments. The varied selection of redware forms in this location is likely due to proximity to maritime infrastructure, and possibly the same can be said for the presence of the Chinese transport vessel.

Redwares have been found in low numbers from other sites excavated by Casey & Lowe which has often made them difficult to interpret and date with certainty.[20] The selection from the Barangaroo site has provided more information about the shapes and range of surface treatments in these wares allowing them to be characterised as a distinct group of ceramics. The parallels from Scottish potteries and contextual information from this site will help date the wares more securely, from the late 18th into the first half of the 19th century, and highlight the importation of lesser known domestic pottery from this source.

The presence of imported redware vessels also underlines the importance of the earlier local wares produced for domestic utilitarian functions. Given the location of the site, questions remain regarding the presence of the small locally-made assemblage. It is probable that some vessels were used and discarded on site, such as the larger crock and pan fragments in the lower cistern fill, some vessels may have been used close to the site and were introduced with reclamation fills (such as 245) but it is also possible that some fragments of local pottery were intended for export.

[17] Hughes 1960:205-7; Martin and Martin 1996:35.

[18] Martin and Martin 1996:35, 38–9; Kelly 1999:80; Haggarty 2007.

[19] Initially the main markets were in North America however potteries focussed on Australian markets were established in the early 19th century; see Haggarty 2013; Hughes 1960:210.

[20] Recent examples of slipped redwares have been found at Parramatta Square excavations, e.g., 16318/#48342 from 3PS; 20240/#17074 and 19908/#17131 from 8PS.

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

GLASS REPORT

MARCH 2022

VOLUME 3, SECTION 3.3

Glass patent bottles from context 205. DSC_3861.

FINAL REPORT | Report to **Sydney Metro**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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CONTENTS

Report Status	Date Submitted	Purpose	Author	Reviewed
Draft Version 1	02.05.21	Internal Review	Jeanne Harris	Holly Winter Mary Casey
Draft Version 2	06.08.21	Internal Review	Jeanne Harris	Holly Winter
Draft Version 3	17.12.21	Final Report	Jeanne Harris	Holly Winter
Final Report Version 4	18.03.22	Final Report	Jeanne Harris	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

GLASS REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

Glass artefacts were recovered as part of the historical archaeological investigation at the Barangaroo Station site, Sydney (Figure 1.1). The archaeological investigation was conducted by Casey & Lowe for AMBS Ecology and Heritage between July and December 2018. The site consisted of six defined areas (Area R, Area T, Area W, Area X, Area Y and Area Z).

Figure 1.1: Location plan showing the Barangaroo Station site outlined in red and the excavation areas are shaded. Google Maps.

1.2 ARCHAEOLOGICAL PHASES

Seven phases were identified for the site based on archaeological stratigraphy, identification of specific structures and historical research (Table 1.1). Temporal analysis of glass artefacts serve to verify the phases as assigned by Casey & Lowe.

Table 1.1: Barangaroo site archaeological phases

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 AIMS OF REPORT

This report analyses glass artefacts to provide temporal and functional data with the aim of contributing to the interpretation of the area and context from which they were recovered. The report is organised by area and phase of site development (Section 1.2).

Furthermore, Area X contains contexts associated with the remains of a timber boat (140) and associated contexts that surround it. Analysis results for these contexts are discussed separately.

1.4 METHODOLOGY

Standard typologies were established for artefacts as a prelude to chronological reconstruction. Artefacts were then assigned dates based on use-popularity date ranges (merchant records, advertisements and manufacturers' records) and on technological advancements (patents and manufacturers' records). Since manufacturing techniques differ for specific glass artefact types (window glass, bottles and tableware), the documented date ranges for these types are considered separately. For many bottle forms, the technomorphology for each are distinct and discussed separately. Temporal information for manufacturing techniques is derived, for the most part, from several key references, including Boow's *Early Australian Commercial Glass: Manufacturing Processes*, *The Parks Canada Glass Glossary* and *Cylindrical English Wine & Beer Bottles 1735 –1850*.[1] Documented manufacturer and/or product information also contribute chronological data. The documented temporal data for bottle manufacturers and for product manufacturers serve to narrow the sometimes broad technological date ranges for bottles. Documented manufacturer's marks evident on glass bottles further serve to establish date ranges (Table

[1] Boow 1991; Jones et al. 1985; Jones 1986; Jones 2000

1.2). Finally, trademarks for product manufacturers also aid in establishment of data-specific information for archaeological materials (Table 1.3).

In this manner artefact type, such as glass, provided a wealth of chronological information. Establishing 'standard typologies' relies upon familiarity with the range of material found on many Australian archaeological sites of the past 200 years, most of which are not adequately documented or described; identifying the frequency of different sorts of material that come out of them; and then researching all these different varieties. Artefact type series for bottles developed at Casey & Lowe, include types identified in the collections of numerous excavated sites with a view to assist future research into artefacts. This information contributes data with potential to further our understanding of their production, market access, the affordability of different items, who was likely to use them, and ultimately how they were used in different time periods and localities. Only then is it possible to work backwards from the artefactual evidence to demonstrate what actually took place in the past.

Table 1.2: Chronological and locational data for documented manufacturers

Manufacturer	Country of Manufacture	*TPQ*	*TAQ*	MIC
Bottany Glass Works	Australia	1889	1906	1
Breffit & Co	England	1876	1895	2
Jukes Bros	England	1872	-	1
Lumb & Co.	England	1870	1890	1
H. Rickett's Glass Works	England	1830	1920	1
J Ross	Australia	1867	1893	1
Dan Ryland	England	1868	1913	1
Wood Bottle Works	Scotland	1886	1930	1

Table 1.3: Chronological and locational data for documented products

Product name	Description	Country of Production	*TPQ*	*TAQ*	MIC
James Stewart & Co.	whisky	Scotland	1832	-	1
Barrett & Co.	aerated water	Australia	1876	1895	1
John Starkey	aerated water etc	Australia	1860	1911	1
St Jakobs Oel, The Charles A. Vogeler Co.	patent medicine	USA	1878	1900	1
Vaseline, Chesebrough MFG Co.	ointment	USA	1880	-	1
Holbrook & Co.	club sauce	England	1872	-	1
Dr. J. F. Churchill's Consumption Remedy	Patent medicine	USA	1860	-	1
Barrys Tricopherous for the Skin and Hair	patent medicine	USA	1851	1982	1
Rowlands Macassar Oil	hair dressing	England	1793	1953	1
E Rimmel Perfumer	perfume	France	1850	-	1

1.5 REPORT AUTHORSHIP

The analysis results reported in this document were conducted by E. Jeanne Harris. The report was reviewed by Holly Winter and Dr Mary Casey.

1.6 OVERVIEW OF ASSEMBLAGE

A total of 1585 glass artefacts (431MIC) were catalogued by E. Jeanne Harris. Information in the catalogue for these artefacts provided data on shape, function (general and specific), material, description, completeness, joins, producer/distributor, manufacturer, reuse, and date range. Statistical data entered into the database consisted of fragment count, minimum item count (MIC), dimensions and weight. Minimum item counts (MIC) were calculated for fragmented items during cataloguing, and MICs are used throughout this analysis, so that counts used in the following discussion represent whole, partial and fragmented items. The methodology used to catalogue artefacts was designed by Dr Mary Casey.[2]

It is noted that Barangaroo Station site is not a residential site although we do have part of Langford's House (107) in Area X and the back yards of two houses on Clyde Street in Area Y. This means many of the deposits containing artefacts were bought into the site as fills rather than purposeful deposit of artefacts directly associated with residents, such as at a house. Many of the artefacts come from fills imported onto the site in deposits for land-forming and rarely are they the result of deliberate disposal at the study site:

- Reclamation fills to make more land
- Levelling fills to assist with establishing new levels for wharves and infrastructure.
- Backfills of a well/cistern.

Further, some of the artefacts probably came from upslope Clyde Street which early on was located on the edge of the site, prior to further quarrying. Also, artefacts associated with deposits relating to the boat were a mix of deliberate activity or washed in from the harbour:

- Bilge deposits.
- Artefacts in deposits burying the boat (132, 133).
- Artefacts in the sand underneath (249) and surrounding (149) the boat prior to its burial between c.1840s to c.1860s.
- Artefacts found inside the boat, including loose timbers (148) stored there from Langford's boatyard.

An overview of functional groups for the site is shown in Figure 1.2. Table 1.4 shows that beverage bottles are consistently found across the site's areas and represent the highest relative frequencies of functionally identified artefacts. Typically, functional analysis results are only considered reliable for context assemblages of 50 artefacts or greater; however, from the Barangaroo Station site, there is only one that meets this criterion – (133) an intertidal deposit associated with the boat (UDHB1) that produced 55MIC. Therefore, analysis results are limited to a reporting of statistical data and their consistency with established use patterns of artefactual remains.

[2] Casey 2004

Table 1.4: Relative frequencies of functional groups by area

Area	Architecture	Beverage	Food	Household	Personal	Pharmacy	Unidentified	Total MIC
R	-	50.0%	20.0%	-	-	-	30.0%	20
T	4.5%	53.9%	20.2%	-	-	4.5%	16.9%	89
W	-	60.0%	-	-	-	-	40.0%	5
X	5.6%	47.7%	16.4%	0.5%	0.5%	2.1%	27.2%	195
Y	7.0%	42.3%	19.7%	-	-	4.2%	26.8%	71
Z	3.9%	51.0%	15.7%	2.0%	3.9%	5.9%	17.6%	51

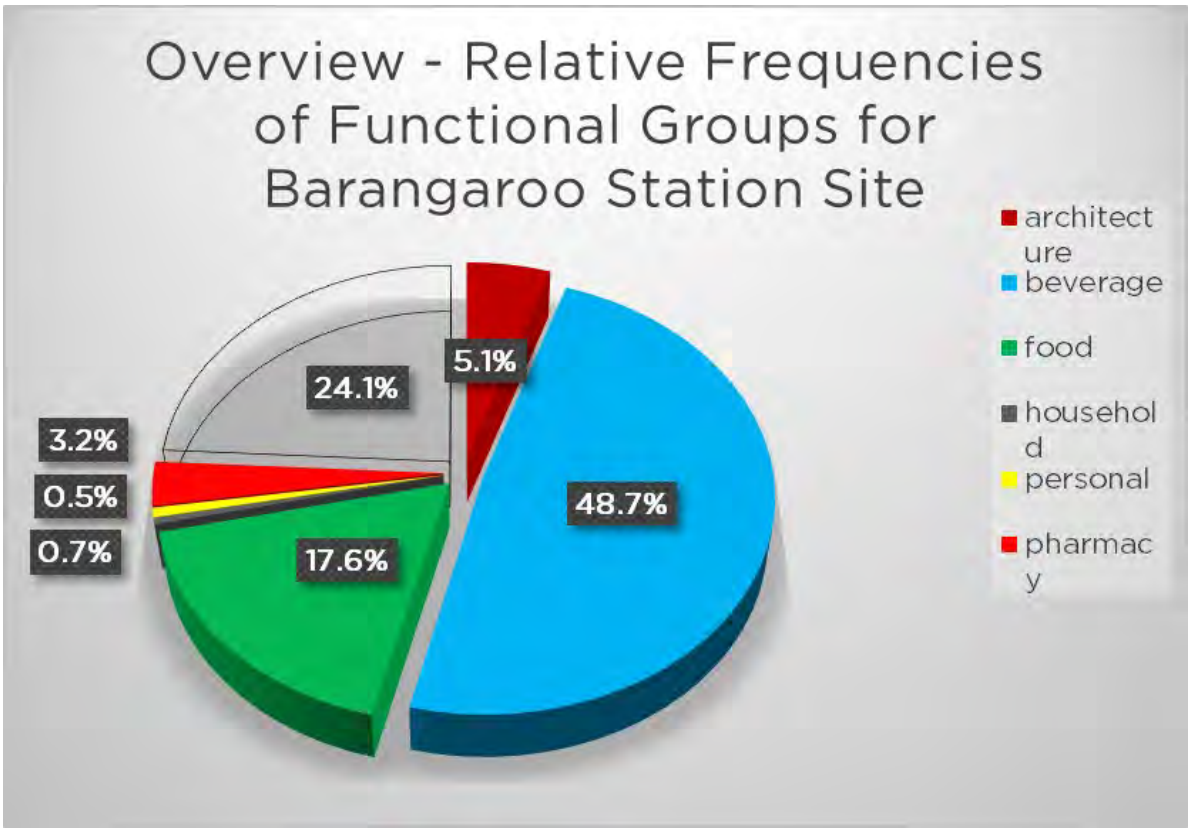

Figure 1.2: Overview of functional groups for glass from Barangaroo Station Site.

2.0 CONTEXT ANALYSIS

2.1 CONTEXTS

FORMATTING AND CONVENTIONS

Standard context analysis generally involves examining contexts for both functional and temporal data that contribute to the interpretation of the site. For clarity of presentation, the following conventions have been observed while writing analysis results:

- Artefact quantities represent minimum item counts (MIC).
- All artefact quantities are represented as numerals.
- All relative frequencies are designated by "%".
- Context numbers are represented in brackets "( )".
- Throughout this report, the term "artefacts" refers to glass artefacts only.
- Phases are identified by archaeological team in the archaeological report.

For this study, a principal focus of these analyses is to assess the temporal data to determine the consistency of deposits with site development phases. The contexts represent a range of deposits associated with structures, such as wharves and seawalls, to work surfaces and potential levelling fills. Area, phase and context organise the following discussion. Minimum item counts (MIC) for the glass artefacts are shown in tables grouped by each area.

2.2 AREA R

Area R was located in the eastern part of the site (Figure 1.1). Beneath numerous fill episodes associated with the construction of the 1960s container wharf, six deposits in Area R contained glass artefacts (Table 2.1). The deposits represent two phases of site development.

PHASE 5.1 – DIBBS' REDEVELOPMENT OF THE WHARF (1875-1890)

Fill deposit (029) was located behind the eastern side of a seawall (011) and contained eight glass artefacts (Table 2.1). Context (029) was a sandstone rubble fill and glass artefacts consisted mainly of bottles, which had a wide range of dates (1820–1920). The results of temporal analysis are consistent with Phase 5 site development. Identified bottle forms were limited to alcohol-related bottles, including gin/schnapps and beer/wine types. The only other identified artefact form was a blown glass tumbler.

Bluestone setts (016) were located at the termination of the paving for Clyde Street. There were two deposits (024, 052) associated with the setts and the terminus of Clyde Street which contained artefacts (Table 2.1). Context (024) was bedding fill for bluestone paving (016) and consisted of a sandstone rubble infill/rubble wharf platform (028). The deposit contained a datable artefact, a glass beer/wine bottle with sand pontil scar (1820–1870) consistent with Phase 3.2 and Phase 4 site development. Context (052) was an early reclamation fill deposit used to infill between seawalls (011, 041) to create the foot of Clyde Street. All artefacts from this deposit provided temporal information. The one glass bottle fragment from this context was identified as beer/wine, but provided no temporal information.

Context (020) was the fill of a post pipe within posthole (019) (Table 2.1). The one datable glass artefact is a gin/schnapps bottle with an applied oil-type finish (1850 *TPQ*).

PHASE 6 – GOVERNMENT RESUMPTION OF LAND (1900-1950)

Context (013) was a reclamation fill to the west of seawall (021) and the fill contained fragments of three bottles. Key temporal indicators for the reclamation fill suggest that the deposit represented redeposited mixed secondary deposition:

- 1 beer/wine bottle -rounded heel, domed push-up and sand pontil scar 1780–1830
- 1 Jukes Bros sauce bottle 1872 *TPQ*

Table 2.1: Quantitative data for deposits in Area R

Area	Phase	Trench	Context	Brief Description	MIC
R	5.1	-	020	Pipe fill	2
		-	024	Fill	1
		-	029	Fill	8
		-	052	Fill	4
	6	-	005	Working surface	1
		-	013	Fill	3
				TOTAL	19

2.3 AREA T

Area T was located in the west corner of the site, just west of Area R, with Clyde Street serving as the boundary between the two areas (Figure 1.1). There were 20 deposits in Area T that yielded glass artefacts. These deposits represent three phases of site development (Table 2.2).

PHASE 4 – SHIPBUILDING AND WHARFAGE, CUTHBERT, AND OSBORNE'S WHARF (1855-1876)

There are artefacts from three deposits associated with the wharf surface in this area (contexts 031, 094, 096):

- Abutting walls (041, 042) was a compact black ash wharf surface (031) found across Area T and in Test Trenches 1–4. Glass from this deposit consists of fragments from alcohol bottles (2MIC). Neither bottle exhibited datable attributes.
- Fill (094) within cut (093) was a loose black cinder coke/ash, and was very similar to (031). Temporal data for glass artefacts (five alcohol bottles) indicate an 1850–1870s date range which is consistent with Phase 4 site development.
- Light brown/grey sand fill (063) was located below crushed sandstone fill over the wharf surface. Datable artefacts consist of a bottle with an embossed British registry mark (1843-1868) and a dip-moulded beer/wine bottle (1780–1850) with date ranges that are consistent with Phase 4 site development.

Context (064) was a thin black organic layer that possibly represents a work surface. It contained three glass bottles and a glass tableware item. Datable artefacts consist of a dip-moulded beer/wine bottle (1780–1870) and pressed-glass tableware (1830 *TPQ*). Beneath the work surface (064) were several deposits:

- Test Trenches 1–4 were cut into sandstone rubble reclamation fill (070), which contained a gin/schnapps bottle (1750–1880).
- In Test Trench 1 was a weakly compacted, light grey to yellow sandy fill (066). There is one dip-moulded beer/wine bottle with a wide date range (1780–1870) that are consistent with Phase 3.2–Phase 4 of site development.

- Also, in Test Trench 1 was a soft black to light grey sandy fill deposit (068). There is one datable glass artefact – a dip-moulded beer/wine bottle (1820–1870) which is consistent with Phase 3.2–Phase 4 of site development.

Another Phase 4 deposit in Area T was a brown sand fill (053) that was located southwest of seawall (042), which contained three bottles that have 1820s–1920s date ranges and serve only to suggest the deposit pre-dates the Phase 6 government resumption of land.

PHASE 5.1 - DIBBS' REDEVELOPMENT OF THE WHARF (1875-1890)

There were several deposits associated with the wharf surface in Area T and identified as having an association with Phase 5.1 site development (Table 2.2). Two of these deposits contained glass artefacts (072, 079). A deposit of wood chips (073), found beneath levelling fill (072), was excavated at the northern end of Area T, with date ranges for artefacts consistent with Phase 4 site development. North of the wharf surface were two deposits: sandy fill (072) and industrial fill (079) which were later combined and subsequently identified as context (072/079). An 1850–1920 date range was established for bottles from the sandy fill (072) which is consistent with Phase 4-5 of site development. The industrial fill (079) contained three datable tableware items that post-date 1830 and six bottles that have an 1850–1870 date range. This temporal data is consistent with Phase 4 site development.

Deposit (082) was a mixed sand fill to the west of sandstone wall (081) and north of blocking wall (089), used to infill the slipway (083). All datable glass are bottles, including dip moulded beer/wine bottles with applied down-tooled finish (1780–1850) or abrupt heels and sand pontil scars (1820–1870); however, the deposit also included a bottle for *Dr J. F. Churchill's Specific Remedy for Consumption* (1860 *TPQ*) and beer/wine bottle made by *Wood Glass Bottle Works* (1886–1930). Analysis results indicate that dates for glass artefacts are consistent with Phase 5 site development.

Table 2.2: Quantitative data for deposits in Area T

Area	Phase	Trench	Context	Brief Description	MIC
T	4	-	031	Surface	2
		-	053	Reclamation fill	3
		-	073	Wood chip fill	11
		TT1	063	Reclamation fill	4
		TT1	064	Work surface	4
		TT1	066	Reclamation fill	7
		TT1	068	Reclamation fill	11
		TT1, TT2, TT3, TT4	070	Reclamation fill	1
		TT4	094	Cut fill	3
		TT4	096	Reclamation fill	2
		-	078	Accumulated timbers	9
	5.1	-	051	Fill	2
		-	072	Levelling fill	11
		-	079	Levelling fill	15
		-	082	Backfill of slipway	14
				TOTAL	99

2.4 AREA W

Area W was located south of Area X and was bordered on the east by Hickson Road (Figure 1.1). There was one fill deposit (103) that contained glass bottles (5MIC) artefacts, including four beverage bottles. While most artefacts are too fragmented for datable diagnostic attributes to be identified, one Codd patent aerated water bottle has an 1875 *TPQ* that is consistent with Phase 5 of site development.

2.5 AREA X

Area X is located north of Area W, northeast of Area R and south of Area Y (Figure 1.1). Given the steep downward slope from east to west across the site and drainage and tidal activities, it is highly probable that artefacts in many Area X deposits are either tossed as rubbish from the foot of Clyde Street or deposited by the tide onto the sandy beach before it was buried in the 1 860s. The remains of a wrecked timber boat (140) were recovered in this Area. Analysis results for deposits associated with the wrecked boat are discussed separately (Section 2.6). The remainder of deposits with glass artefacts are discussed below.

PHASE 3 – EARLY EUROPEAN OCCUPATION (1788-1855)

The majority of glass artefacts from Area X are associated with Phase 3 site development (Table 2.3). Three contexts represent clean-up activities across the area (147, 150, 248). Contexts (150) and (248) are clean-up activities from around the boat and are discussed in Section 2.6. Dates for artefacts from the clean-up activities are consistent with Phase 3 site development an example of this can be seen in (Figure 2.1).

Datable glass artefacts from these clean-up activities include:

- Context (147) a 3-piece shoulder hinge alcohol bottle 1830-1920

Figure 2.1: 'H. RICKETTS' bottle 147/#186. 100mm scale. DSC_1776. R.Workman.

A possible occupation/underfloor deposit (124) was identified within the northern half of Langford's House (107) that contained remnants of six glass bottles. The only datable bottle has an 1820–1870 date range which is consistent with Phase 3.2 site development.

Also found in Area X are small deposits (109, 119, 126) containing glass artefacts. There is a paucity of date-specific information for artefacts for these deposits; however, available temporal information is consistent with Phase 3 site development.

PHASE 5.1 – DIBBS' REDEVELOPMENT OF THE WHARF (1875-1890)

Demolition fill deposit (108) was a brownish-yellow coarse silty sand with whole and broken sandstock bricks, sandstone fragments and fine shell lime mortar fragments. Makers marks for two bottles are key to establish this deposits association with Phase 5.1 site development: a glass aerated water bottle made by J. Ross (1867–1893) and another aerated water bottle made by Lumb & Co (1870–1890) (Figure 2.2).

A clean-up context (106) produced one dateable artefact, a dip-mould beer/wine bottle, with a date ranging between 1820-1870.

Table 2.3: Quantitative data for deposits in Area X

Area	Phase	Trench	Context	Brief Description	MIC
X	3.2	-	109	Occupation deposit	2
		-	119	Levelling fill	2
		-	124	Occupation deposit	6
		-	126	Levelling fill	2
		-	147	Clean-up	3
	5.1	-	106	Clean-up	5
		-	108	Demolition fill	3
				TOTAL	76

Figure 2.2: Codd patent bottle 205/#293, LUMB & CO beverage bottle 108/#223. 100mm scale. IMG_3880. R. Workman.

2.6 AREA X - UNIDENTIFIED DARLING HARBOUR BARANGAROO NO. 1 (UDHB1)

As part of the archaeological excavations at Sydney Metro's Barangaroo Station, remains of a boat (140) were uncovered in Area X. The wrecked boat (140) was uncovered in September 2018 at the foot of Clyde Street and west of Langford's 1850s wharf wall. Hereafter the boat (140) is referred to as Unidentified Darling Harbour Barangaroo No. 1 (UDHB1) or the boat. A key component of the research design is to establish a timeline for the deposition of the boat. Therefore, the focus of analysis for contexts associated with this boat is to provide temporal data on glass artefacts that contribute to the interpretation of the surrounding sand and sediment deposits. These data serve to further define the timeline for the burial of the boat and the construction of Cuthbert's sawshed. It should be noted that all dates are based on technological advancements, as no glass artefacts associated with boat deposits provided manufacturer or product information. The lack of labelled (embossed) bottles also precluded any data to a market access that could contribute to the assessment of overseas verses local manufacturers. However, it should be noted that prior to the 1860s there was no glass manufactory in any Australian colony and therefore bottles with manufacturing dates prior to that date are assuredly of overseas origins.

These deposits were found beneath, above, around and within the ruins of the wrecked boat (140). Discussion of these deposits is group by their physical relationship to the boat.

All deposits associated with the boat were associated with Phase 3 site development. The discussion of these deposits is grouped by their physical relationship to the boat and consisted of:

- sediments pre-dating the boat
- sediments contemporary with the boat's abandonment
- sediments covering the boat as part of its burial between c.1840s and c.1860s

There are 15 contexts associated with deposits surrounding the boat. Collectively there are 998 glass artefacts, representing 177 minimum items (MIC). Quantitative data for glass from the boat deposits are shown in Table 2.4. There are four main types of glass artefacts in the collection. An overview of the collection indicates a dominance of beverage bottles for deposits with identifiable artefact forms (Figure 2.3). Table 2.5 shows relative frequencies of functional groups for glass artefacts from all contexts associated with the boat. Beyond beverage bottles, which are exclusively alcohol containers, there is food-related glass tableware, window panes and medicine bottles.

Table 2.4: Quantitative data for glass artefacts from boat (140) deposits

Area	Phase	Trench	Context	Brief Description	MIC
X	3.2	-	132	Intertidal Deposit / Fill	9
		-	133	Intertidal Deposit	55
		-	142	Deposit washed in above and around the loose timbers	3
		TT6	149	Deposit associated with runoff from historic termination of Clyde Street and tidal activity	45
		-	150	Clean-up	5
		-	151	Disturbed/contaminated bilge deposit, below ceiling planks	3
		-	152	Deposit overlying ceiling planks in UDHB1	4
		-	154	Disturbed/contaminated bilge deposit, below ceiling planks	2
		-	156	Deposit overlying ceiling planks in UDHB1	1
		-	158	Secure bilge deposit, below ceiling planks	2
		-	159	Secure bilge deposit, below ceiling planks	2
		-	246	Deposit observed beneath frames, above hull in UDHB1	2
		-	247	Wood pulp fill	1
			248	Clean-up	4
		TT7	249	Same as (149). Sieved – (149) deposit associated with runoff from historic termination of Clyde Street and tidal activity	39
				TOTAL	177

Table 2.5: Relative frequencies of functional groups for contexts associated with the boat (UDHB1)

Context	Architecture %	Beverage %	Food %	Pharmacy %	Unidentified %	Total MIC
132	11.1	22.2	11.1	11.1	44.4	9
133	3.6	56.4	14.5	5.5	20.0	55
140	50.0	50.0	-	-	-	3

Context	Architecture %	Beverage %	Food %	Pharmacy %	Unidentified %	Total MIC
142	25.0	75.0	-	-	-	4
149	2.2	51.1	24.4	-	22.2	45
151	33.3	-	-	-	66.7	3
152	-	50.0	-	-	50.0	4
154	-	-	-	-	100.0	2
156	-	-	-	-	100.0	1
158	-	-	-	-	100.0	2
159	-	-	-	-	100.0	2
246	-	-	-	-	100.0	2
247	-	100.0	-	-	-	1
249	11.4	40.0	31.4	-	17.1	39

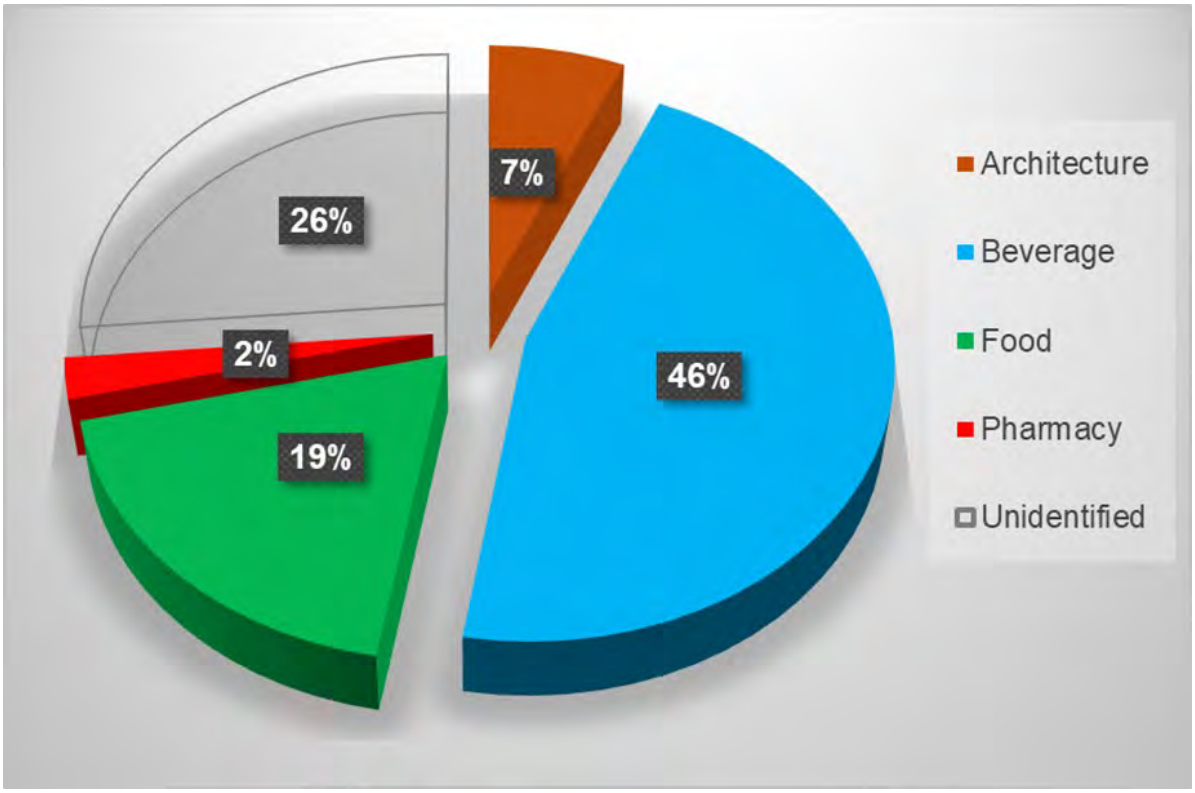

Figure 2.3: Overview of Relative Frequencies of Functional Groups for the Glass Artefacts from boat contexts.

SEDIMENTS PRE-DATING THE BOAT

The accumulation of sands (249) predates the abandonment of the boat. there are 35 glass artefacts from this deposit (Figure 2.4). Approximately 43% of artefacts (15MIC) provides temporal information that contributed to a calculated 1830-1870s date range. Key temporal indicators include:

- Press moulded tableware 1820 TPQ
- Rickett's type bottle mould 1820-1920
- Applied down-tooled bottle finish 1880 TAQ

In addition, there are two clean-up contexts (150, 248) from around the boat that contained glass artefacts that pre-date the boat. Key temporal indicators include:

- Context (150) three dip-mould beer/wine bottles 1820-1870
- Context (248) two dip-mould beer/wine bottles 1780-1830

Figure 2.4: Selected glass finds from context (249) (l-r). Left side: base of beer/wine bottle #237: Right side/Top row: press moulded diamond pattern #256. Second row: press moulded fragment #254. Bottom row: down tooled bottle neck #265. 100mm scale. DSC_1771. R. Workman.

SEDIMENTS CONTEMPORARY WITH THE BOAT

Attached to the structural elements of UDHB1 (140) were two glass artefacts: a crown type windowpane fragment (1850 *TAQ*) and a nondiagnostic alcohol bottle fragment. It cannot be determined if these items are associated with pre-abandonment, contemporary or post-abandonment of the boat.

OUTSIDE THE BOAT

The accumulation of sediment (149) that built up between the wharf and the boat contained 45 glass artefacts (Figure 2.5). Approximately 73% of artefacts (35) provides temporal information. The majority of datable artefacts are alcohol bottles (15) and tableware (4) (Figure 2.6).

Forty per cent of glass artefacts (18) have a calculated 1780–1830 date range that predate the construction of Langford's wharf. Key temporal indicators include:

- Beer/wine bottles - dip mould with sand pontil scar; rounded heel; basal sag 1780–1820
- Stemware – blown with centre bladed knop and open pontil scar 1790–1820
- Stemware – blown with a drawn and cut bowl/stem 1770–1840

The remaining datable artefacts (33%) have a calculated 1820–1870s date range that is consistent with the abandonment of UDHB1 and the expansion and redevelopment of Langford's wharf. Key temporal indicators include:

- Bottles – bottom hinge mould 1810–1880
- Beer/wine bottles – dip mould with sand pontil scar and abrupt heel 1820–1870
- Bottles – added glass for form tooled lip shape 1820–1920

With the exception of two bottles with wide-ranging 1800–1900 dates, no glass artefacts post-date 1870.

Figure 2.5: Selected glass finds from context 149 (l-r). Top row: dip-mould conical push up bottles with sand pontil scar #368, #370, bottom hinge mould bottle with chamfered corners #391. Bottom row: stemware; drawn and cut bowl/stem #395 (2), centre bladed knob #394, #393, form tooled bottle #406 (2), everted flanged lip shape bottle #409. 100mm scale. DSC_1793. R. Workman.

Figure 2.6: Dip-moulded conical push up champagne bottle with sand pontil scar 149/#366. 100mm scale. DSC_1753. R. Workman.

INSIDE THE BOAT

Seven sediment deposits recovered from inside the boat contained glass artefacts (142, 151, 152, 154, 156, 158, 159) (Figure 2.7). There are a total of 17 glass artefacts from these contexts with 6 datable artefacts (Table 2.6). Identified glass forms consist of bottles (15) and window glass (2). Identified bottle forms are alcohol types, including beer/wine (1), gin/schnapps (2), champagne (1) and unspecified alcohol (1).

Figure 2.7: Selected glass finds from inside boat/bilge (l-r). Top row: dip-moulded conical push up beer/wine bottle 152/#196; curved bottle fragments 156/#207 (7). Second row: curved bottle fragments 151/#214 (2), crown type window fragment 151/#216, curved bottle fragments 152/#198 (3), 154/#203, 158/#206, 159/#212 (6). Bottom row: curved bottle fragments 151/#215 (9), flat alcohol bottle fragment 152/#197, curved bottle fragments 154/#204, 158/#205 (2), 159/#213. 100mm scale. DSC_1764. R. Workman.

Table 2.6: Chronological data for deposits inside the boat (UDHB1)

Context	MIC	Dated Artefacts	Date From	Date To
142	3	4	1800	1880
151	3	1	-	1850
152	4	1	1820	1870
154	2	0	-	-
156	1	0	-	-
158	2	0	-	-
159	2	0	-	-
TOTAL	17	6	-	-

SEDIMENTS COVERING THE BOAT

Two sandy deposits covered two sections of UDHB1. The bow and middle were covered by (132) and the stern was covered by (133) (Figure 2.8, Figure 2.9). There are nine glass

artefacts from deposit (132) that covered the bow and middle sections of the boat. Four artefacts contributed temporal data and suggest an 1830–1850 date range:

- Crown windowpanes 1850 *TAQ*
- Schnapps bottle –long neck with applied pig snout lip shape 1850 *TAQ*
- Tumbler–ground and polished pontil scar 1830 *TPQ*
- Medical vial– open pontil scar 1920 *TAQ*

Figure 2.8: A selection of glass from context (132). Top row (l-r): Gin/schnapps bottle neck #174, bottle body sherd #173. Second row: colourless dip-moulded glass vial #180, tumbler base #172. Bottom row: Fragments of glass, clear #176, brown glass #177, dark aqua container fragment #179, window glass #178, light green bottle #175. 100mm scale. DSC_1788. R. Workman.

Figure 2.9: Near whole beer/wine bottle 133/#156 above demijohn base 133/#157. 100mm scale. DSC_1785 R. Workman.

There are 55 glass artefacts from deposit (133) that covered the stern of the boat. Approximately 75% of artefacts (41) provide temporal information, derived exclusively from alcohol bottles. There are three key temporal groupings of beer/wine bottles:

- Dip mould with rounded heel and sand pontil scar (5) 1780–1850
- Dip mould with abrupt heel and sand pontil scar (7) 1820–1870
- 3-part shoulder hinge mould with dip-mould body (3) 1820–1920

Collectively, these artefact types produce a calculated 1850–1870 date range that is consistent with the proposed burial of UDHB1.

2.7 AREA Y

Area Y is north of Area X and south of Area Z (Figure 1.1). There are six contexts in Area Y: three deposits (174, 184, 234) associated with Phase 4 of site development, two clean-up deposits (192, 164) are assigned to Phase 6, and clean-up deposit (165) was assigned to Phase 5.1. The latter two contexts represent clean-up contexts in areas at the south end (164) beneath Hickson Road and the north end (165) beneath sandstone rubble (Table 2.7). While artefacts date from the late-18th century to the late-19th century, one documented product date for a medicine bottle – *Barry's Tricopherous for the Skin and Hair* (1851–1920)– from (164) indicates that the artefacts from this clean-up effort resulted from activities that extended into the 20th century.

Table 2.7: Quantitative data for deposits in Area Y

Area	Phase	Trench	Context	Brief Description	MIC
Y	4	-	174	Fill of channel (173)	2
		-	184	Levelling fill	4
		-	192	Clean-up	1
		-	234	Reclamation fill	15
	5.1	-	165	Clean-up	22
	6	-	164	Clean-up	27
				TOTAL	71

2.8 AREA Z

Area Z is located north of Area Y at the northern limit of the study area. Evidence of late 19th-century development (1875–1900s) was evidenced across the area. Context (206) was a roughly circular cut, thought to be a cistern, into bedrock (199) with pick marks along the sides which contained three distinct deposits. The top deposit of fill (207) was industrial boiler ash, mixed with lots of small stones. Context (208) was a loose to moderately compact fill of orange, sandy silt with sandstone inclusions. Context (215) was a fill deposit at the base of the cistern (206). Discussion of the glass artefacts from the deposits in cut (206) are outlined below.

There are two artefacts from the industrial boiler ash deposit (207). Based on field assessment, this deposit layer was thought to be associated with Phase 5.1 site development; however, temporal data suggests a Phase 4 association for glass from this deposit. The middle deposit (208) in cut (206) contained only 14 artefacts and was also assigned a Phase 5.1 association, however, temporal data from glass artefacts suggest this deposit is also associated with Phase 4 site development. The lower deposit (215) produced one of the largest assemblages of artefacts. Datable glass consists principally of alcohol bottles and tableware items (Figure 2.10). The calculated 1850–1880 date range is consistent with Phase 4 site occupation.

Covering all of the cellar structure (196) - The City of Sydney Consumers Co-operative Ice Company Ltd - was a mixed rubbly brown sand (243) that was used as a bedding fill to level the area, and contained glass artefacts (Table 2.8). Datable glass consisted of one beer/wine bottle manufactured in a Rickett's type 3-piece mould with dip mould body (1820–1920).

Phase 6 artefacts (5MIC) are limited to clean-up activities (194). The majority of glass artefacts (4MIC) are beverage bottles, including aerated water, beer/wine and spirits. Datable bottles contribute to a calculated 1820–1880 date range which is consistent with Phases 3.2–4 of site development.

Table 2.8: Quantitative data for deposits in Area Z

Area	Phase	Trench	Context	Brief Description	MIC
Z	5		205	Drain fill of (203)	24
		-	208	Fill layer in cistern (206)	2
			215	Base layer in cistern (206)	17
		TT5	243	Bedding fill	1
	6	-	194	Clean-up	5
		-	207	Fill layer in cistern (206)	2
				TOTAL	51

Figure 2.10: Personal glass bottle finds from context (215). Rowlands Macassar Oil bottle #415, E. Rimmel perfume bottle #415. 100mm scale. IMG_3884. R. Workman.

3.0 REPORT SUMMARY & RESULTS

For most contexts, site phasing's field assessment is consistent with the glass artefacts temporal data. In three areas (Areas R, T and Z), temporal analysis results indicate artefacts in some contexts were consistent with different phasing than that which was assigned during the post excavation process (Table 3.1).

Table 3.1: Contexts that contain temporal data that differs from assigned phasing

Area	Context	Phase	Artefact Phase
R	024	5.1	3.2¬4
T	066	4	3.2–4
	068		
	072	5.1	4–5
	079		4
Z	194	6	3.2-4
	207	5.1	4
	208		

Initial function analysis results suggest artefacts from most contexts were food and beverage related items, which is a common result for the analysis of glass artefacts. Table 1.3 lists commercial containers with product labelling. This information provides insight into drink patterns, medical ailments, and grooming habits during the site's 19th-century occupation. While the relative frequencies of artefact types in these functional groups are insufficient to assess individual contexts or even areas of the site, some trends were observed.

By the mid-19th century, aerated water had become increasingly popular throughout New South Wales.[3] During the 19th century, Jones (2009) recorded over 600 aerated water manufacturers in Sydney and surrounding suburbs and approximately 80% of these firms (480) were established after 1860.[4] Nine of the 11 aerated water bottles were recovered in Phase 5 or Phase 6 contexts and indicated the trend towards alternative beverages that found support from local temperance movements.[5]

Embossed labelling on glass bottles provide information on medical ailments. Bottles for *St Jakobs Oel*, Area Z (205), were topical pain-relief / anti-inflammatory treatments, while *Vaseline*, Area Z (205), is an all-purpose petroleum jelly ointment initially developed to treat burns and protect wounds. *Barry's Tricopherous Treatment for Hair and Skin*, Area Y (164), was a hair restorative patent medicine (Figure 3.2).

[3] Emmins 1991:8–10

[4] Jones 2009

[5] Blocker et al. 2003b:570

Figure 3.1: Pharmaceutical patent medicine bottles with embossed labels (l-r). St Jackobs Oel 205/#294, Vaseline 205/#296, Barry's Tricopherous Treatment for Hair and Skin 164/#331. 100mm scale. DSC_3870. R.Workman.

Good personal hygiene and grooming were indicators of respectability as part of adherence to middle-class values. Identified personal grooming items are limited to embossed bottles, including *Rowlands Macassar Oil* hairdressing and an *E. Rimmel* perfume bottle, from Area Z (215) (Figure 2.10).

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

MISCELLANEOUS REPORT

MARCH 2022

VOLUME 3, SECTION 3.4

Miscellaneous artefacts from Barangaroo Station

FINAL REPORT | Report to **Sydney Metro**

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Report Status	Date Submitted	Purpose	Author	Reviewed
Draft Version 1	01.12.21	Internal review	Jane Rooke Robyn Stocks	Holly Winter Robyn Stocks
Final Report	23.03.22	Final report	Jane Rooke Robyn Stocks	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

MISCELLANEOUS REPORT

1.1 INTRODUCTION

1.2 BACKGROUND

Casey & Lowe were commissioned by AMBS Ecology and Heritage on behalf of John Holland CPB Ghella Joint Venture (JHCPG) to undertake historical archaeological investigations at the Barangaroo Station site, Sydney.

The Barangaroo Station site is in Hickson Road and part of the Barangaroo Headland site. The study area was divided into six excavation areas (Areas R, T, W, X, Y, Z) (Figure 2.1).

A program of excavation was undertaken across the study area in order to salvage any significant archaeological resource. The program was staged, with the final stage involving the removal of the abandoned vessel, Unidentified Darling Harbour Barangaroo No. 1 (UDHB1). The final artefacts were recovered from site in January when context (249), the sand under the boat, was sieved.

Figure 2.1: Location plan showing the Barangaroo Station site outlined in red and the excavation areas are shaded. Google Maps.

Historical research in the Archaeological Assessment provided baseline information for predicted phases of development and in general, these were consistent within each excavation area and relate to the activities and occupation of specific individuals. The study area was divided into seven main archaeological phases and are outlined in Table 2.1. Sub-phases were utilised in Phases 3 and 5 to account for the differences in land ownership and modifications to buildings that took place across the site.

Table 2.1: Table of phases in Barangaroo Station

Phase	Date	Brief Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 METHODOLOGY

The artefact processing for Barangaroo Station happened in several stages. Due to limited space on the site some of the artefacts were transported to a processing centre in Roseberry to be cleaned, bagged, and boxed. The artefacts were then transported to Yennora awaiting analysis. A selection of artefacts from the boat, including those from sieving, were taken back to Casey & Lowe's office for processing.

Robyn Stocks and Jane Rooke catalogued the artefacts using the cataloguing system developed by Dr Mary Casey. The basis of this system has been published elsewhere.[1] The main elements of this cataloguing system are the use of minimum item counts (MIC) to quantify the assemblage and the attribution of functional categories for the artefacts. This assists in understanding how artefacts related to the daily lives and activities of the people associated with the study area, as well as identifying items used by other residents and businesses of Sydney and discarded on site.

The category of miscellaneous artefacts for Barangaroo Station has its own numbering sequence of #20001-20270 which form part of the Artefact Catalogue in Volume 7. For the miscellaneous artefacts, the catalogue records: the catalogue number; the context number where the item was found; the shape or morphology of the item (i.e. pipe); the general function (i.e. recreation); specific function (i.e. smoking); fabric (i.e. kaolin); portion (i.e. bowl/stem); country of manufacture; manufacturer; producer or retailer; mark; age and gender associations; dimensions (in mm); joins (context/#catalogue number); weight (in grams); brief description (includes mark description); from and to dates (of manufacture); number of fragments; minimum item count (MIC).

1.4 REPORT AUTHORSHIP

This report was written by Jane Rooke, Archaeologist and Artefact Specialist, and Robyn Stocks, Senior Artefact Specialist, Casey & Lowe.

[1] Casey 2004

2.0 OVERVIEW OF ASSEMBLAGE

This section of the report will look at the 349 Minimum Item Count (MIC) and 464 fragments of miscellaneous artefacts excavated during the historical archaeological investigations at Barangaroo Station (Table 2.2, Table 2.2).

Area X had the largest number of contexts containing 268 MIC (78%) of the total miscellaneous assemblage. The individual contexts around and under the boat (149, 249) had the highest number of items (47 and 103 MIC respectively). Area Z had two contexts with artefacts - (205) is a deposit in a channel leading to the sump and (215) the lowest fill in a cistern. Area R, the smallest area (Figure 2.1), had only seven artefacts from four contexts. No miscellaneous artefacts were found in Area W.

Table 2.1: Sum of artefacts by area

Area	Fragments	%	MIC	%
Area R	2	*0*	7	*2*
Area T	32	*7*	32	*9*
Area W	0	*0*	0	*0*
Area Y	25	*5*	26	*7*
Area Z	3	*1*	8	*2*
Area X	402	*87*	276	*79*
TOTAL	464	*100*	349	*100*

Table 2.2: Sum and percentage of artefacts by area and context

Area	Context	Fragments	%	MIC	%
Area R	013	0	*0*	1	*0*
	023	1	*0*	2	*1*
	029	1	*0*	1	*0*
	052	0	*0*	3	*1*
Area T	063	4	*1*	5	*1*
	064	1	*0*	1	*0*
	068	5	*1*	5	*1*
	069	1	*0*	1	*0*
	072	2	*0*	2	*1*
	073	12	*3*	11	*3*
	079	2	*0*	2	*1*
	082	3	*1*	3	*1*
	094	2	*0*	2	*1*
Area X	101	0	*0*	1	*0*
	106	3	*1*	3	*1*
	108	1	*0*	3	*1*
	109	3	*1*	8	*2*

Area	Context	Fragments	%	MIC	%
	119	1	*0*	1	*0*
	122	1	*0*	1	*0*
	124	1	*0*	3	*1*
	126	2	*0*	4	*1*
	132	9	*2*	8	*2*
	133	63	*14*	40	*11*
	140	2	*0*	3	*1*
	141	1	*0*	1	*0*
	142	8	*2*	11	*3*
	149	83	*18*	47	*13*
	150	0	*0*	2	*1*
	151	2	*0*	4	*1*
	152	4	*1*	8	*2*
	153	2	*0*	4	*1*
	154	3	*1*	2	*1*
	157	0	*0*	1	*0*
	158	9	*2*	9	*3*
	159	0	*0*	2	*1*
	246	1	*0*	7	*2*
	249	203	*44*	103	*30*
Area Y	164	19	*4*	18	*5*
	165	3	*1*	5	*1*
	234	3	*1*	3	*1*
Area Z	205	3	*1*	7	*2*
	215	0	*0*	1	*0*
	TOTAL	**464**	*100*	**349**	*100*

The initial analyses of the miscellaneous assemblage identified artefact function and context (Table 2.3). The highest proportion (64%) of the artefacts are associated with recreational activities, of these the vast majority were broken ball clay (kaolin) tobacco pipes. Personal items were the next highest category represented, being 14% of the total.

Table 2.3: Function, sum, and percentage of artefacts from Barangaroo Station

General function	Specific function	Shape	Fragments	%	MIC	%
architectural	floor	cobble	0	*0*	1	*0*
arms	gun	bullet	0	*0*	1	*0*
	pistol	gunflint	0	*0*	1	*0*
arms/work	flintknapping	core/strike-a-light	0	*0*	2	*1*
		flake/strike-a-light	0	*0*	1	*0*
	flintknapping/tool	core/strike-a-light	0	*0*	1	*0*

General function	Specific function	Shape	Fragments	%	MIC	%
	tool/unidentified	core/strike-a-light	0	0	1	0
beverage	tableware	mug	0	0	1	0
cleric	writing	mechanical pencil	1	0	1	0
		slate pencil	6	1	6	2
economy	currency	coin	0	0	7	2
food	baby	feeding bottle	1	0	1	0
	serve	spoon	1	0	1	0
	tableware	spoon	1	0	1	0
	tea	teaspoon	0	0	1	0
household	furniture	knob	0	0	1	0
	light	candle snuffer	1	0	1	0
	ornamental	bead	1	0	1	0
		plaque	0	0	1	0
	sewing	pin	1	0	7	2
		reel	1	0	7	2
		thimble	0	0	1	0
household /transport	furniture	foot	0	0	1	0
industry	weighing	weight	0	0	1	0
personal	access	handle	0	0	1	0
	clothing	buckle	0	0	1	0
		button	8	2	36	10
	groom	brush	2	0	2	1
		toothbrush	0	0	1	0
	hygiene	toothbrush	2	0	3	1
	jewellery	bead	0	0	6	2
		pendant	1	0	2	1
	tool	handle	1	0	1	0
recreational	music	jews harp	1	0	1	0
	smoking	pipe	425	92	218	62
	toy	marble	3	1	15	4
service	tele/elect	insulator	1	0	1	0
transport	v-hull	seal	0	0	1	0
unidentified	container	container	1	0	1	0
	unidentified	ferrule	1	0	1	0
		flint	3	1	5	1
		wire	1	0	1	0
Work	sharpening	whetstone	0	0	1	0
	tool	strike-a-light	0	0	3	1
		TOTAL	464	100	349	100

3.0 CONTEXT ANALYSIS

3.1 AREA R

Area R was in the south of the site (Figure 2.1). This area contained multiple construction and reclamation phases, including: Dibbs' wharf established in c.1875; the termination of Clyde Street c.1880s; Langford's pre-1855 boat shed; and early 20th-century reclamation fills and finger wharfs.

The seven artefacts were found in five contexts across the smallest area excavated (Table 3.1), identified with Phase 6 (1900-1960 Government resumption of land – Hickson Road, 20th-century stores, and finger wharves) and Phase 5.1 (1875-1890 Dibbs' redevelopment of the wharf, 1875-1890).

Table 3.1: Artefacts from Area R by function and shape

Phase	Context	General function	Specific function	Shape	Fragments	MIC
6	013	personal	clothing	button	0	1
5.1	023	arms/work	flintknapping	core/strike-a-light	0	1
		personal	hygiene	toothbrush	1	1
	029	recreational	smoking	pipe	1	1
	052	economy	currency	coin	0	1
					0	1
		personal	clothing	buckle	0	1

3.1.1 PHASE 6: 1900-1960 GOVERNMENT RESUMPTION OF LAND – HICKSON ROAD, 20TH-CENTURY STORES AND FINGER WHARVES

A 4-hole bone button (#20001) was found in (013), the reclamation fills which were part of the Government resumption of Hickson Road. These inexpensive buttons were worn on outer and inner garments.[2] Before mechanisation, they were traditionally manufactured by hand on sawn and bit-turned sections of discarded animal bone (usually cattle). In the 18th and early-19th centuries this was often done by sailors, convicts, prisoners of war and slaves.[3] Bone buttons were not made after c.1950, replaced by those of other materials.[4]

3.1.2 PHASE 5.1 1875-1890 DIBBS' REDEVELOPMENT OF THE WHARF

Context (023) was a black ash fill below the bluestone paving of Clyde Street laid from 1875-1890. A newly invented 'Electric Toothbrush' (#20004), manufactured by Dr Scott in 1886 (Figure 3.1) was one of two miscellaneous artefacts found in this context.[5] It was one of several products that Dr Scott advertised as being electric when really inside the handles were magnetised iron rods. The toothbrush was advertised as far superior to bone toothbrushes, impervious to moisture and so eliminating the unpleasant, musty smell (Figure 3.2, Figure 3.3). To be thrown away within a short time after its invention suggests

[2] Lindbergh 1999.

[3] Bianchi, Bianco & Mahoney 2006; Klippel & Schroedl 1999.

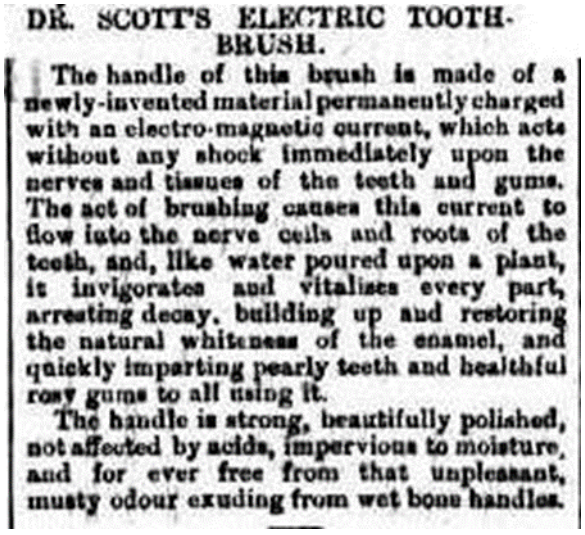
[4] Peacock 1978.

[5] Mercury (Hobart, Tas.: 18601954), Saturday 29 May 1886, page 3. Accessed at http://nla.gov.au/nla.news-article9122595

See also: U.S. National Library of Medicine. Dental instruments & apparatus: Advertisement for Dr. Scott's Electric Toothbrush. Accessed at https://collections.nlm.nih.gov/catalog/nlm:nlmuid-101435617-img

the toothbrush did not live up to its advertising. The second item found was a gunflint core and/or strike-a-light (#20003), for lighting fires, discussed in Section 4.2.6.

Figure 3.1: Dr Scott's electric toothbrush from Area R, 023/#20002. 100mm scale. IMG_3738. . R.Workman.



DR. SCOTT'S ELECTRIC TOOTH-BRUSH.

The handle of this brush is made of a newly-invented material permanently charged with an electro-magnetic current, which acts without any shock immediately upon the nerves and tissues of the teeth and gums. The act of brushing causes this current to flow into the nerve cells and roots of the teeth, and, like water poured upon a plant, it invigorates and vitalises every part, arresting decay, building up and restoring the natural whiteness of the enamel, and quickly imparting pearly teeth and healthful rosy gums to all using it.

The handle is strong, beautifully polished, not affected by acids, impervious to moisture, and for ever free from that unpleasant, musty odour exuding from wet bone handles.

Figure 3.2: Advertisement in The Hobart Mercury 1886

DR. SCOTT'S ELECTRIC TOOTH BRUSH

Sent to any part of the world, post-paid, on receipt of 50 cents, and if not perfectly satisfied in every case, the money will be promptly refunded.

Ladies or Gentlemen who wish to possess sound, white teeth, and rosy gums, are invited to read the brief but interesting description of this Brush.

50 CENTS EACH, POST-PAID.

DR. SCOTT'S ELECTRIC APPLIANCES are now sold and well known in every part of the world, and are guaranteed by the Pall Mall Electric Company of London, England, and New York.

The Royal Dental Society of London testify in the strongest terms as to the quick benefits following the use of Dr. Scott's Electric Tooth Brush, and many experts in dentistry declare it to be the greatest invention in dental appliances since the manufacture of artificial teeth.

Our Goods should be kept by all Druggists and Fancy Goods Dealers; but if you cannot get them conveniently, remit us the price by Draft, Money, Post-office Order, or Stamps, at our risk, and they will be promptly sent to any address, post-paid.

GREAT ANNOYANCE has been caused to all people using Tooth Brushes by the bristles coming out in the mouth. The Pall Mall Electric Company of London now take pleasure in introducing to the American Public a Tooth Brush, which they guarantee free from this troublesome defect. The bristles are inserted in the handle by a patented process, which renders it simply impossible for them to come out in use. In addition to this, the handle of the Brush is made of a newly invented material, permanently charged with an electro-magnetic current, which acts without any shock immediately upon the nerves and tissues of the teeth and gums. The act of brushing causes this current to flow into the nerve cells and roots of the teeth, and, like water poured upon a plant, it invigorates and vitalises every part, arresting decay, building up and restoring the natural whiteness of the enamel, and quickly producing healthful, rosy-colored gums.

The handles are strong, beautifully polished, not affected by acids, impervious to moisture, and free from that unpleasant, musty odor exuding from wet bone handles.

AGENTS WANTED.

AGENTS! (Either Sex) Wanted for Dr. Scott's Beautiful Electric Corsets, Belts, Electric Hair, Flesh, and Tooth Brushes, and Insoles. No Risk. Quick Sales. Satisfaction guaranteed. For terms, address

G. A. SCOTT, 870 BROADWAY, NEW YORK,

to whom all remittances should be made payable.

Figure 3.3: Dr Scott's Electric Tooth Brush

Two low denomination bronze coins, a British penny (#20006) and halfpenny (#20007), were found in (052), a fill for the construction of the foot of Clyde Street. Although a definitive date cannot be given due to thick oxidisation of both coins, both were minted in Queen Victoria's reign between 1861-1901. This suggests they were lost during the reclamation work for Clyde Street. Part of a man's waistcoat, braces, or suspenders buckle (#20005) marked 'PARIS' was also found in the same context (Figure 3.4). Such buckles were made in France from c.1850 until well into the 20th century.[6]

[6] http://warnerhomestead.com/yahoo_site_admin/assets/docs/Warner_Buckles.32893452.pdf

Figure 3.4: Selected finds from context (052), Area R (l-r). Buckle #20005, 1861 British Half Penny #20007, 1861-1901 British Penny #20006. 100mm scale. IMG_3750. R. Workman.

3.2 AREA T

James Munn was the first to establish shipbuilding yards in the area in the 1820s. In 1856, John Cuthbert acquired the property. Excavation of Cuthbert's wharf revealed a stage of construction directly followed by a phase of occupation. The first stage witnessed the construction of the seawalls, slipway and infill of space behind them to create a level building base. The phase of occupation included working wharf surfaces and a sawshed. A stone house and timber wharf were present on the site by 1861, along with a patented slipway by 1865.

The 32 (MIC) artefacts from Area T came from Phase 4 (1855-1875: Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf) and Phase 5.1 (1875-1890: Dibbs' Redevelopment of the Wharf) (Table 3.2).

Table 3.2: Number of artefacts by phase and function from Area T

Phase	Context	General function	Specific function	Shape	Fragments	MIC
4	063	recreation	smoking	pipe	4	4
		work	tool	strike-a-light	0	1
	064	household	ornamental	bead	1	1
	068	recreation	smoking	pipe	5	5
	069				1	1
	073	personal	clothing	button	0	1
		recreation	smoking	pipe	12	10
	094	recreation	smoking	pipe	2	2
5.1	072	recreation	smoking	pipe	2	2
	079				2	2
	082	clerical	writing	slate pencil	1	1
		recreation	smoking	pipe	2	2
TOTAL					32	32

3.2.1 PHASE 4: 1855-1875: SHIPBUILDING AND WHARFAGE, CUTHBERT, AND OSBORNE'S WHARF

This phase saw the establishment of Cuthbert's shipbuilding wharves, as well as the construction of the adjacent Clyde Street and the development of Osborne's wharf to the south. The increased development and occupation of the area and greater accessibility to the Miller's Point harbour is evident in the 25 (MIC) miscellaneous artefacts from six contexts representing the daily life of the increasing population. All except three objects were recreational items, in the form of broken smoking pipes (Figure 3.5). Where identifiable, the types of pipes, their dates of manufacture, and the contextual location suggest they were used by the workers on the wharf or perhaps brought in from another location and redeposited as part of fill (Table 3.3). All the identified pipes were imported from Britain or, to a lesser extent, Europe in the second half of the 19th century, with no locally-made pipes identified.

Table 3.3: Number and country of manufacture of pipes from Phase 4, Area T

Context	Name of Manufacturer	Country of Manufacture	From	To	Fragments	MIC
063	-	Germany/Austria	-	-	1	1
		-			3	3
068	-	UK/Holland	-	-	1	1
	Duncan McDougall	Scotland	1846	1967	1	1
	-	-	c.1860	-	1	1
			-		2	2
069					1	1
073	Charles Crop	England	1856	1924	3	1
	-	UK	1856	1874	1	1
		-	c.1870	-	1	1
			c.1830		1	1
			c.1850		1	1
		Scotland	-		1	1
	Duncan McDougall	Scotland	1846	1967	2	2
	-	-	-	-	2	2
094					2	2
				TOTAL	24	22

Figure 3.5: Selected pipes from phase 4 (l-r). Top row: 073/#20023, 07/ #20029, 094/#20037, 094/#20038. Second row: 07/#20024, 073/#20025, 073/#20021 (3), 069/#20019 and 073/#20030 above 07/#20022. Third row: 068/#20024, 073/#20027, 073/#20028, 073/#20020. Fourth row: 068/#20015, 068/#20016, 068/#20017, 068/#20018. Bottom row: 063/#20009, 063/#20010, 063/#20011, 063/#20012. 100mm scale. IMG_3768. R. Workman.

The three items that were not recreational in Area T consisted of a small porcelain button from c.1840[7] (#20031), an ornamental glass bead (#20013) possibly from a light fitting, and a flint tool used as a strike-a-light (#20008).

3.2.2 PHASE 5.1: 1875-1890: DIBBS' REDEVELOPMENT OF THE WHARF

Contexts (072, 079) were levelling fills for Dibbs' redevelopment of Cuthbert's wharf. They contained four pipe fragments, three clay and one partial porcelain composite pipe. A pipe from an unknown manufacturer 'T/D' (072/#20020) was found along with a pipe marked 'M/P' (#20032), believed to be a Scottish manufacturer, who stopped making pipes in c.1840. Clay pipes were inexpensive, broke easily and were therefore, disposable, giving them a limited time of circulation. To find artefacts with these dates indicates the fill was brought in from a location that had initially been established decades earlier. A porcelain bowl of a composite pipe (#20067), with hand painted floral spray with red and pink flowers and green leaves was found, fashionable from the 1850s (Figure 3.6)[8].

Context (082) was a fill used to infill the slipway and contained two clay pipes, an unidentified stem fragment and a worn 'Cutty' pipe (#20034) that could have been held in the mouth while working. A slate pencil, once used in schools by children up until 1960 was also found.

[7] Sprague, R. 2002

[8] Bradley, C. 2000:121

Figure 3.6: Selected pipes from phase 5.1 (l-r). Composite European porcelain pipe bowl 072/#20067, pipe bowls 072/#20020, 079/#20032; pipe stems, 079/#20033 above 082/#20035 above 082/#20034. 100mm scale. IMG_3769. R. Workman.

3.3 AREA X

Area X was to the north of Area W and northeast of Area R (Figure 2.1). The area contained Langford's House c.1830-c.1880, a pre-1855 wharf wall attributed to Langford, a pre-1865 sawshed structure, and c.1880 Clyde Street.

Area X had a total of 276 MIC (402 fragments), 250 of these artefacts were associated with the deposits in, on, around or under the boat, and will be discussed in Section 4.0. The remaining 22 artefacts from Area X came from Phases 3.2, 5 and 5.1 (Table 3.4).

Table 3.4: Artefacts by phase and function in Area X not associated with the boat

Phase	Context	General function	Specific function	Shape	Fragments	MIC
3.2	109	economy	currency	coin	0	1
		household	sewing	pin	1	1
		personal	cloth	button	0	1
			tool	handle	1	1
		recreation	smoking	pipe	1	1
			toy	marble	0	1
	119	recreation	smoking	pipe	1	1
	122				1	1
	124	arms	gun	bullet	0	1
		personal	cloth	button	0	1
			groom	brush	1	1
	126		clothing	button	0	1
			groom	toothbrush	0	1

Phase	Context	General function	Specific function	Shape	Fragments	MIC
		recreation	smoking	pipe	2	2
5.1	106	rec	smoking	pipe	3	3
	101	economy	currency	coin	0	1
	108	household	sewing	thimble	0	1
		personal	clothing	button	1	1
			jewellery	bead	0	1
				TOTAL	12	22

3.3.1 PHASE 3.2: 1833-1855 LANGFORD'S HOUSE AND WHARF

The functional categories of the 16 artefacts found in contexts associated with Langford's House, including recreational, personal, and household items, suggest all items are related to Langford and his family's occupation of the house. William Langford, his wife Margaret and their seven children occupied the house into the 1880s[9] and these artefacts allow a small insight into their family life.

Context (109) contained artefacts typical of an underfloor deposit, everyday items that have been dropped and then fallen or swept between the cracks in the floorboards. The evidence of children can be seen by the chipped glass marble, made in Germany from c.1846 (#20078). [10] A pin (#20075), with an early 'upset head' (EUH) was found. This name described how, from c.1809, the head was pushed and shaped by an early heading machine rather than by manually winding wire into a spherical (SW) or conical shape (SWC). A white porcelain button, sewn onto men's or women's outer wear, manufactured from c.1840 (#20076) and a fragment of a terracotta smoking pipe (#20077) were also found (Figure 3.7).

[9] Griffith, M. 1995 The Langford Family.

[10] Gartley, R. & J. Carskadden 1998 p.127

Figure 3.7: All artefacts from context (109) (l-r). Top row: glass marble #20078, bone buttons, 4-hole #20266, 3/4-hole #20267. Second row: porcelain button #20076, EUH head shank #20075, above terracotta pipe mouth piece #20077. Bottom row: ivory tool handle #20268. 100mm scale. IMG_3771. R. Workman.

Context (124), abutting the internal wall (162) of Langford's House (Figure 3.8), was an occupation deposit containing personal items. These include a men's metal trouser or shirt button (#20082) with manufacture dates from c.1850, and a clothing or possibly a shoe bone brush handle (#20083). A fragment of a clay pipe stem, classed as recreational, was found (#20124). A 0.4 calibre lead bullet with a flattened tip (#20081), made for a fire arm for hunting or personal protection was also found in this deposit.

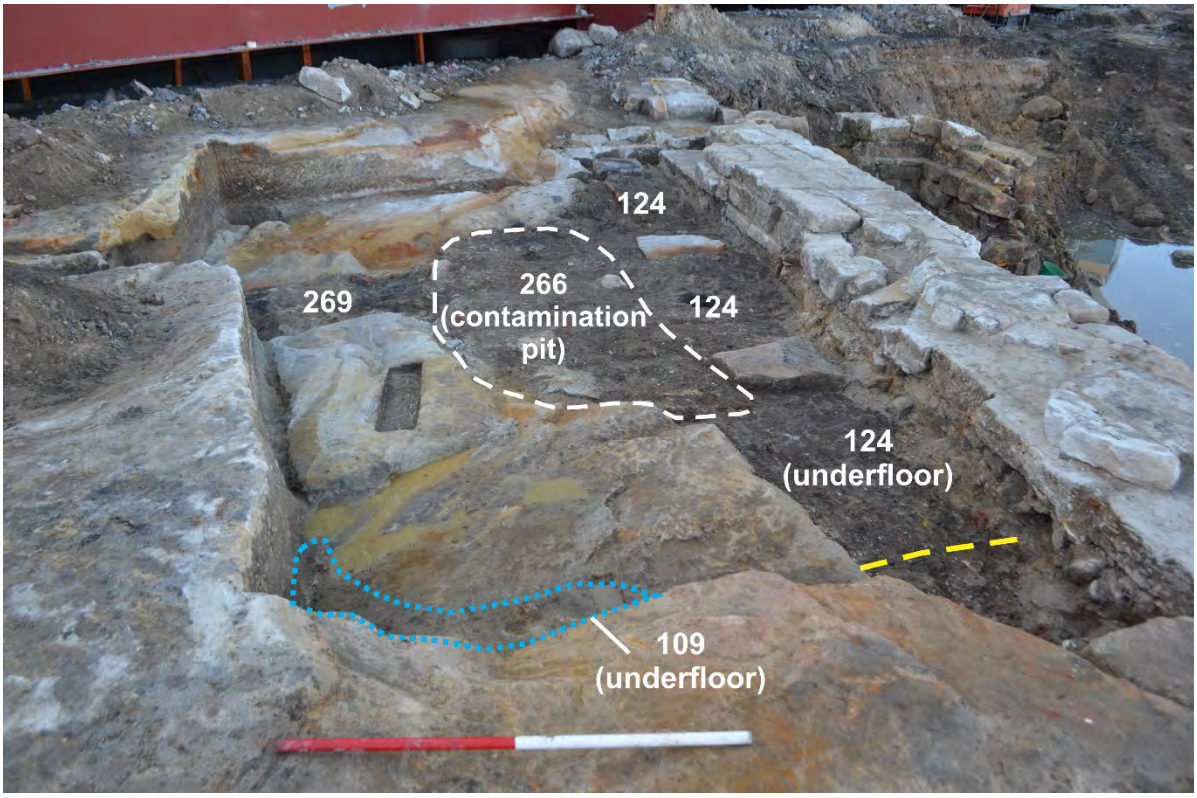


Figure 3.8: Occupation deposit (124) to the right of the image and occupation deposit (109) outlined in dotted blue. Cut (129) is marked with a yellow dashed line in the bottom right corner. A pocket of modern disturbance (266) is marked with a white dashed line. View to southeast, 1m scale. DSC_2594.

Context (126), above (124), is the patchy remnants of a construction or levelling fill in the south of the house structure (Figure 3.9). Several personal items were found in (126), however these items are likely to have been brought in from outside the area as part of the levelling fill. The artefacts include a mother of pearl button (#20085), a wooden cotton reel (#20126) and two fragments of clay pipes, with no discernible marks to identify the manufacturer. However, one of the fragments, a thick stem broken at the bowl junction with no spur (#20087) could be given the date of c.1860 due to the popularity of its style at that time.[11] A bone toothbrush (#20084) with a manufacture date of c.1830 was found. The date can be attributed due to the lack of use of a template to drill the holes into four rows for the bristles that were secured with copper wires through grooves in the back of the head.

[11] Atkinson, D.R. 1972 '-182. Oswald, A. 1975 Clay Pipes for the Archaeologist, BAR 14, Oxford

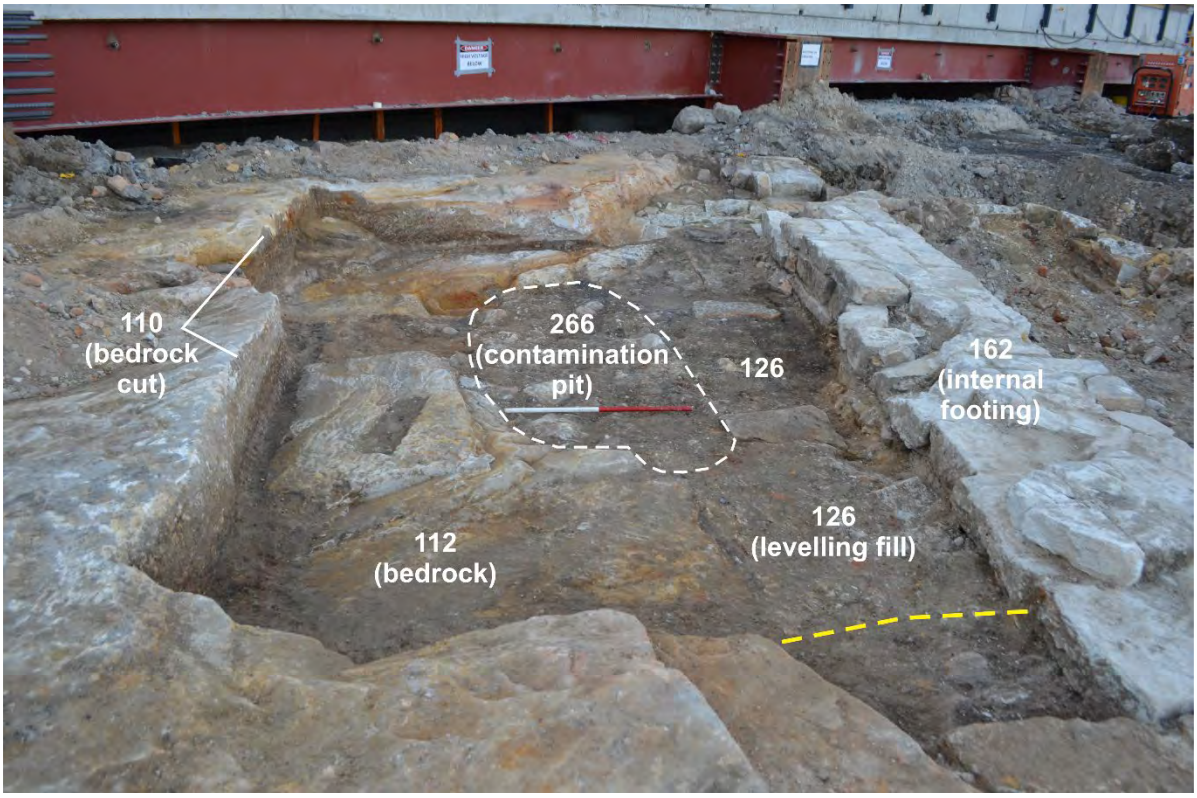


Figure 3.9: Fill (126) shown on an annotated image of the Langford House, pre-excavation of fill (126). The yellow dashed line indicates the location of a modern disturbance (266) and the red dashed line (129), a cut made through (124, 126) to repair wall (161). View to east, 1m scale. DSC_2443.

Context (122) was a pocket of sand at the top of (120), a circular cut carved into the sandstone bedrock in the northeast corner of Langford's House. It has a large bowl/stem fragment from a clay pipe (#20080), with circular marks along the stem making it distinguishable as a 'Milo' style pipe, made popular by the tobacconist who originally sold them, Theophilus Milo of The Strand in London from 1867-1870[12] and often replicated by other pipe makers (Figure 3.10). This pipe is marked 'HW TOWN UNION ST BORO' inside a shield on the back of the bowl, made by Henry William Town, who operated out of Union Street, Borough, England in 1854.[13] This is interesting as it allows the pipe to be dated earlier than the so-called Milo style.

[12] T. Milo had a shop at Finch Lane (1860-70), and tobacconists at The Strand (1867-70). See Oswald 1975: 142; marked examples in Macready & Goodwyn 1990: 57; Wilson 1999: Types 085-088.

[13] Atkinson and Oswald 1969:64. Archaeological Excavation Report on the Street Homestead, Penrod Drive, Bell Block, Taranaki. Accessed at: https://www.academia.edu/35423580/Archaeological_Excavation_Report_on_the_Street_Homestead_Penrod_Drive_Bell_Block_Taranaki

Figure 3.10: Commercial HW Town pipe with thick large trimmed rouletted bowl, 122/#20080. 100mm scale. IMG_3774. R. Workman.

Context (119) was a drainage run off within a fissure (268) and cannot be directly associated with the Langford House. It contained a composite copper alloy pipe (#20119) possibly from Europe or Turkey (Figure 3.11).

Figure 3.11: Composite pipe 119/#20119. 100mm scale. IMG_3776. R. Workman.

3.3.2 Phase 5.1: 1875-1890 DIBBS' REDEVELOPMENT OF THE WHARF

A clean-up (101) around the outcropping sandstone of Area X, produced a British penny (#20069) minted in 1877, from Queen Victoria's reign shows signs of being slightly worn while in circulation before its loss.

Context (108) was a demolition deposit from Langford's House. It contained three artefacts related to household and personal functions (Figure 3.12). The artefacts found were a small

thimble (#20074) once used for sewing, a brass button (#20073), its type, a flat face with a soldered cone shank, giving it the manufacture dates of c.1760-1830, and an opaque black bead (#20072). Although beads are usually regarded as jewellery, in the Victorian period, beads were also commonly used to decorate dresses, bags, as well as household furnishings including pillows and lamp shades.[14]

Figure 3.12: Selected finds from context (108) (l-r). Glass oblate wound bead #20072, brass button #20073, brass thimble with dimp dome band rim #20074. 100mm scale. IMG_3778. R. Workman.

3.4 AREA Y

Area Y was located to the north of Area X and northeast of Area T (Figure 2.1). It contained several phases of construction that followed the natural sloping topography of the site, including sandstone walls, the back portion of Cuthbert's sawshed (pre-1865), retaining walls, and possible machine foundations.

The twenty-six items found across Area Y came from Phases 4, 5.1 and 6 (Table 3.5). Smoking pipes, with a total of 13 MIC and 17 fragments, were the only artefacts found in all phases.

Table 3.5: Artefacts by phase and function in Area Y

Phase	Context	General function	Specific function	Shape	Fragments	MIC
4	234	personal	clothing	button	1	1
		recreational	smoking	pipe	1	1
		unidentified	container	container	1	1
5.1	165	household	ornamental	plaque	0	1
		recreational	smoking	pipe	3	3
			toy	marble	0	1
6	164	cleric	writing	slate pencil	1	1

[14] 5 Clabburn: 1980; Wright 1995.

Phase	Context	General function	Specific function	Shape	Fragments	MIC
		economy	currency	coin	0	1
		household	light	candle snuffer	1	1
		personal	clothing	button	1	2
			jewellery	pendant	1	1
		recreational	music	jews harp	1	1
			smoking	pipe	13	9
		service	telecommunications /electrical	insulator	1	1
		work	sharpening	whetstone	0	1
				TOTAL	25	26

3.4.1 PHASE 4: 1855-1875 SHIPBUILDING AND WHARFAGE, CUTHBERT, AND OSBORNE'S WHARF

Context (234) was used to infill the undulations and gaps within the bedrock to level the area for later construction work. Three artefacts were found, a partial brass button (#20068), a stem of a plain clay pipe (#20258) and an unidentified, small wooden container (#20259). Unlike the button or the pipe which are easily lost or discarded when broken, the container is an unusual find. It is handmade from lightweight wood with an inset rim for a missing lid (Figure 3.13).

Figure 3.13: Wooden container 234/#20259. 100mm scale. IMG_3785. R. Workman.

3.4.2 PHASE 5.1: 1875-1890 DIBBS' REDEVELOPMENT OF THE WHARF

Context (165) was a clean-up, or unstratified context, which produced five artefacts. A porcelain marble (#20055) made in Germany from c.1840-c.1914 was found. Imports of German manufactured items, including toys, ceased for WWI.[15] The three clay pipes found displayed designs and styles of different manufacturers enabling two of the pipes to be dated. A 'Squatters Budgeree' design, depicting a swagman and sheep below a Banyan tree on the left side with two Indigenous men on the other side. UK pipe makers made these types specifically for the colonial market in the c.1840s-c.1870's.[16] The other datable pipe was a 'carved cutty' with large rounded lobes arising from the upper stem, this style is known to be manufactured throughout the UK and Europe from c.1850's.

Figure 3.14: Pipe stems from context (164) (l-r). Top row: #20044, #20042 (2). Second row: #20043. Second, third and fourth row: #20039 (8). Bottom row: 1826-1904 stem #20040, 1820-1840 stem #20041. 100mm scale. IMG_3795. R. Workman.

A small, brass plaque, inlay or possibly buckle, depicting a bearded Greek soldier was found in (165). The soldier had a feathered plumed helmet with his hair tied back with a laurel wreath (Figure 3.15).

[15] Baumann 2004; Block 2012; Carskadden & Gartley 1990; Gartley & Carskadden 1998; Opie & Opie 1997; Randall 1971.

[16] Gojak & Stuart 1999:46

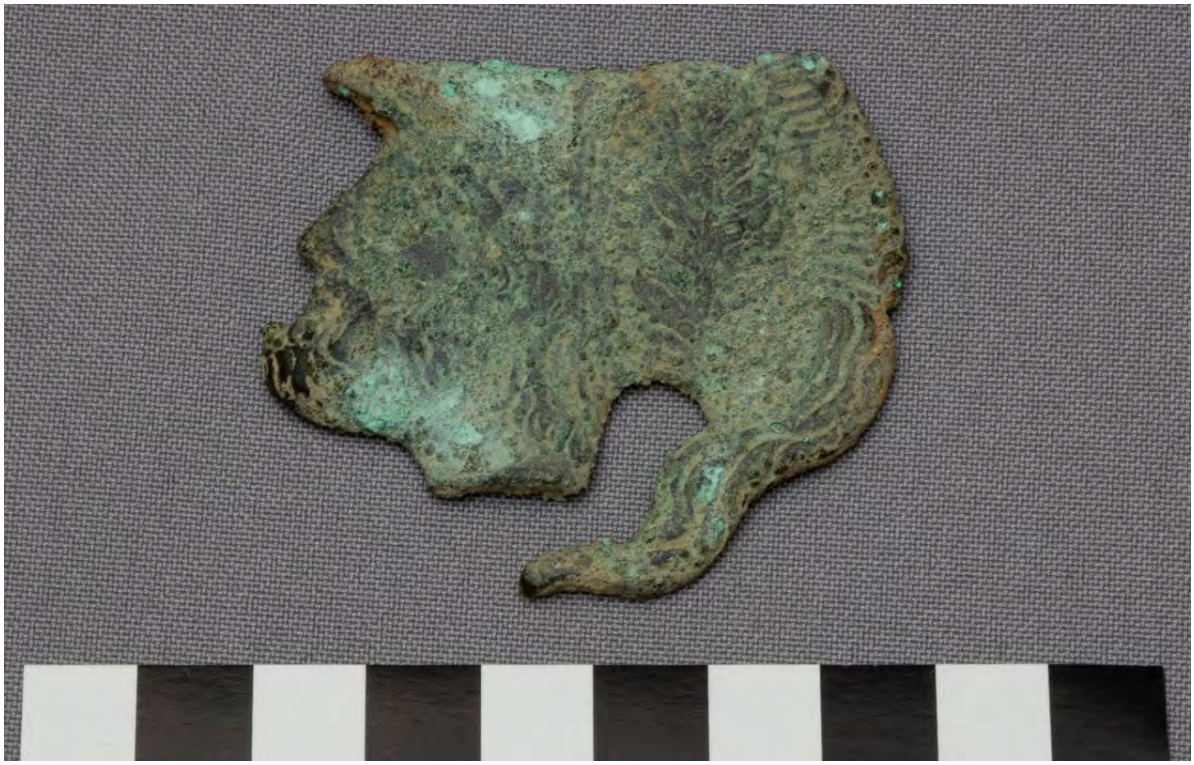


Figure 3.15: Cast, brass plague or inlay of a Bearded Greek soldier with feathered plumed helmet 165/#20054. 100mm scale. IMG_3847. R. Workman.

3.4.3 PHASE 6: 1900-1960 GOVERNMENT RESUMPTION OF LAND – HICKSON ROAD, 20TH-CENTURY STORES AND FINGER WHARVES

Context (164) was the clean-up from the south end of area Y, consisting of rubble beneath Hickson Road. The unstratified nature of this context cannot provide any reliable information for dating. However, the analysis of the 18 MIC and their functions (Table 3.5) allow us a small insight into the life of the residents and workers in the later phase of the area.

The pipe fragments mostly consist of stems with two identified to the country and date of manufacture from their style and partial marks (Table 3.6). An effigial style pipe, popular throughout the 19th century and often representing significant or infamous persons of the day was found (#20041). It was made in Sydney from c.1820-c.1840 with recognisable beads and bands on the stem identifying it as a Prince of Wales armorial. The date of the stem/spur found (#20043) is early (c.1810), identified by the relief mark 'W' on the left-hand side of the spur which relates it to William Cluer, an early pipemaker in Sydney (Figure 3.16).

Table 3.6: Details of pipes from (164)

Shape	Cat #	Portion	Country of Manufacture	From	To	Fragments	MIC
Pipe	20039	stem	-	-	-	8	4
	20040	stem	Scotland	1826	1904	1	1
	20041	stem	Australia/Sydney	1820	1840	1	1
	20042	mouth piece/stem	-	-	-	1	1

Shape	Cat #	Portion	Country of Manufacture	From	To	Fragments	MIC
	20043	stem/spur	-	1810	-	1	1
	20044	bowl/stem/spur	-	-	-	1	1
					TOTAL	13	9

Figure 3.16: All artefacts from context (164) (l-r). Top row: pipe stems, #20044, #20040, #20041. Second row: pipe stems #20042 (3). Third row: pressed aes pendant #20050, 1861-1901 Half penny #20047, brass/au button #20048, pipe stem and spur #20043. Third row: pipe stems #20039 (8), aes scissor handle #20049. Fourth row: jews harp #20046, porcelain insultator #20053. Bottom row: porcelain button #20051, slate pencil #20045. 100mm scale. IMG_3799. R. Workman.

The other recreational item from this context is a Jews harp (#20046). Made in England from c.1840s-1951, this hand-held musical instrument is missing the tongue.[17]

Personal items are represented by two buttons, made from gilded brass (#20048) and porcelain (#20051) respectively. There is also a thin, pressed copper alloy pendant (#20050, made from a reused front piece of a brooch, or a locket, depicting a design of a man under a palm tree in front of a fire (Figure 3.16).

One low denomination coin was found, a British halfpenny (#20017) minted during Queen Victoria's reign (1861-1901). A household, scissor style candle snuffer (#20049) was found with only one of three cylindrical legs extant. The legs, with rounded feet, kept the tool, and any residual heat after its use, off the table. A slate pencil (#20045) and a partial service insulator (#20053) were also among the artefacts reinforcing the mixed nature and date range of the artefacts (Figure 3.16).

A whetstone (#20052), made of mudstone, was also among the artefacts from (164). Rectangular in shape, double-sided with 6-8 parallel grooves along the length as well as single grooves across the width and along each side, this was a tool well used to sharpen tools or knives (Figure 3.17).

Figure 3.17: Whetstone 164/#20052. 100mm scale. IMG_3800. R. Workman.

[17] https://rowleyvillage.webs.com/rowleyandthejewsharp.htm

3.5 AREA Z

Area Z was the northern most area (Figure 2.1). A 20th-century sandstone and brick building with multiple phases was identified, disturbed by large modern services, and a cistern (206) cut into bedrock. A total of eight MIC miscellaneous artefacts came from two contexts in Area Z (Table 3.7), six artefacts came from (205) (Phase 5.1 (1875-1890 Dibbs' Redevelopment of the Wharf) and one came from (215) (Phase 41855-1875- Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf).

Table 3.7: Artefacts by function in (205) and (215).

Phase	Context	General function	Specific function	Shape	Fragments	MIC
5.1	205	food	baby	feeding bottle	1	1
		personal	clothing	button	0	2
		recreational	smoking	pipe	2	2
			toy	marble	0	1
4	215	personal	jewellery	pendant	0	1
		beverage	tableware	mug	0	1
				TOTAL	3	8

3.5.1 Phase 4: 1855-1875 Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf

Context (215) was the lowest fill in a circular cistern (206) associated with a house on Wentworth Street. The cistern was likely backfilled when reticulated water became available in the city from 1844, and the expansion of the water supply system between 1854 and 1858.[18] A personalised pewter mug (#20063), engraved, in cursive writing, with 'W. Turton' was one of the two miscellaneous artefacts from this context (Figure 3.19). Although pewter mugs, a lidless drinking vessel, have been in English taverns since the 17th century, squat, pewter mugs with a handle, became popular in the 19th century with shapes known as the 'pear', 'belly' or 'bulbous' form (Figure 3.18).[19] This is a rare personal find that allows us to link the assemblage with certainty to known occupants. William Turton owned a house on Wentworth Street from 1845[20] and from 1848 he was listed as occupying a house next door to James Turton, Senior.[21] At the same time a W. Turton is also listed as owning a house and three shops in Argyle Street. A Mrs W Turton is listed in the Sands Directories as living in Wentworth Street from 1858-1865.[22]

[18] WV Aird, The Water Supply, Sewerage and Drainage of Sydney, MWS & DB, Sydney, 1961: 5-6

[19] https://www.pewtersociety.org/about-pewter/pewter-drinking

[20] Rates Assessment Gipps Ward entry 730

[21] Rates Assessment Gipps Ward entry 1278

[22] Sands Wentworth Street West

Figure 3.18: Example of pewter mugs. See footnote 18.

Figure 3.19: Personalised pewter mug 215/#20063. 100mm scale. IMG_3806. R. Workman.

A large circular shell pendant was the other artefact from (215) (Figure 3.20, Figure 3.21). It is made from the apex of a large circular gastropod shell cone (Conus sp.). It has a highly polished top, and a large circular hole just off centre, perhaps accentuating an early natural

hole with a small additional circular hole near one edge (beside shell opening) for suspension. Both holes were drilled in a circular motion from the back. The back of the shell is cut flat showing the natural spiral and the upper surface polished. The form of this artefact is identical to cone shell pendants traditionally produced by Melanesian cultures, which commonly form part of ethnohistoric collections from the Solomon Islands, as well as the Torres Strait Islands in northeastern Australia.[23]

Figure 3.20: Front side of shell pendant from Area Z 215/#20066. 100mm scale. IMG_3807. R. Workman.

Figure 3.21: Back side of shell pendant from Area Z 215/#20066. 100mm scale. IMG_3809. R. Workman.

3.5.2 PHASE 5.1: 1875-1890 DIBBS' REDEVELOPMENT OF THE WHARF

Context (205) was a dark brown fill with a drainage channel (203) leading to a brick sump. The fill contained a large amount of unidentifiable metal and glass bottles and was possibly deposited as a waste dump relating to industrial activity. However, the miscellaneous artefacts also suggest household waste, possibly an opportunistic dump or run off from Wentworth Street. Smaller, recreational, and personal items, include a terracotta and clay pipe fragment (#20059, #20060), a limestone marble (#20062) made in Germany from c.1800-c.1914 until the interruption of importation due to WWI, and a small bone 1-hole button (#20064). Another bone item was a circular bone nipple guard (#20061) from a baby's feeding bottle, dummy, or a teething ring.

[23] Carter 2021 29

4.0 UDHB1

4.1 OVERVIEW OF THE BOAT (UDHB1)

As part of the archaeological excavations at Sydney Metro's Barangaroo Station, remains of a timber boat were uncovered in Area X. It was found within water-deposited sands and silts in the intertidal zone at the foot of the historical location of Clyde Street, less than 300mm east of Langford's c.1850s wharf wall. Its bow was towards the land, and its stern towards the harbour. The eastern wall of Cuthbert's c.1860s sawshed was built over the vessel (Figure 4.1). All contexts discussed in this section were associated with Phase 3.2 (1833-1855 Langford's House and Wharf).

Twice daily the boat would have been alternately exposed and covered by the tides. The overhang, the boat and the wall of the wharf would have created a trap for detritus which washed down the steep Clyde Street, and was brought in on the tides. The 21 contexts associated with the boat (Table 4.1) will be discussed below by their relationship with the boat.

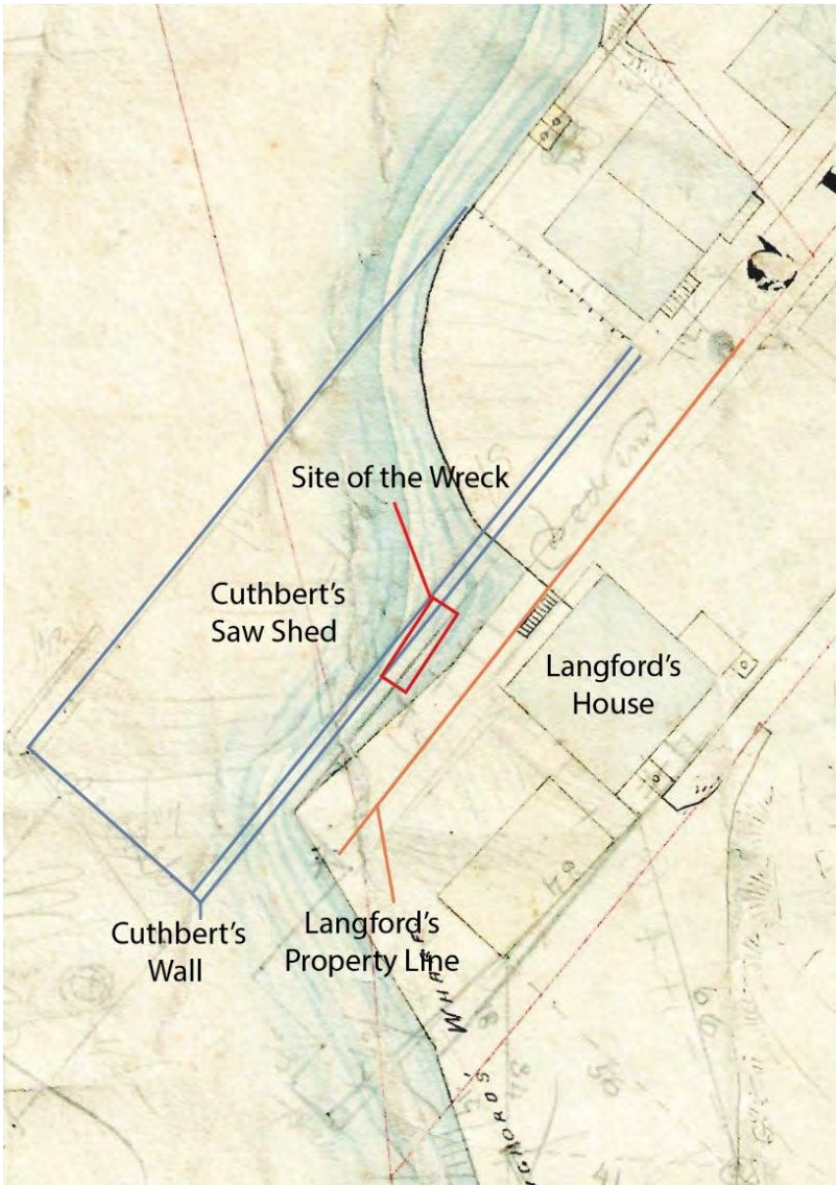


Figure 4.1: Detail of City Detail Sheets (1855), Sheet 2, showing the site of the abandoned vessel relative to Langford's House and Wharf, and the alignment of Cuthbert's sawshed and wall. Historical Atlas of Sydney, City of Sydney Archives.

Table 4.1: Contexts associated with structure of UDHB1 with miscellaneous artefacts.

Context	Context description/association with UDHB1
132, 133	Intertidal sands overlying UDHB1. (132) was the yellow sands observed above the high tide line, and (133), the grey sands observed below. They were the same composition but with different colouration due to waterlogging. These sands were observed overlying UDHB1 as well as built up against the sides of the vessel and wharf wall (145).
149/249	(149) observed around and above the boat. (249) is the same as (149) but found under the boat.
140	UDHB1.
141	10mm-thick lens of fine clay particles, organics, and timber splinters. Deposit has very little sand content, is patchy and occurs within the boat, "sealing" the sands that contain the timber elements. Only occurs above the high-water mark within the boat, with small patches on the sand west and south of the stern.
142	Pale grey sand which loose timbers (148) were sitting in.
148	Loose timbers.
150, 248	Clean up around (132, 133, 149).
151, 154, 155, 157, 158, 159	Context numbers assigned to bilge deposits found under the ceiling planks.
152, 153, 156	10-15mm thick layer of grey silty clay overlying the ceiling planks of the boat.
246	Thin dark silty deposit observed beneath frames, above hull in UDHB1.

4.2 CONTEXT ANALYSIS

A total of 250 items (MIC) (388 Fragments) were recovered from contexts associated with the UDHB1 vessel (Table 4.2). Context (249) had the highest number of items (103 MIC) which accounted for 41% of the miscellaneous artefacts associated with the boat.

Table 4.2: Sum and percentage of miscellaneous artefacts associated with UDHB1

Context	Fragments	%	MIC	%
132	8	*2*	7	*3*
133	62	*16*	39	*16*
140	2	*1*	3	*1*
141	1	*0*	1	*0*
142	8	*2*	11	*4*
149	83	*21*	47	*19*
150	0	*0*	2	*1*
151	2	*1*	4	*2*
152	4	*1*	8	*3*
153	2	*1*	4	*2*
154	3	*1*	2	*1*
157	0	*0*	1	*0*

Context	Fragments	%	MIC	%
158	9	*2*	9	*4*
159	0	*0*	2	*1*
246	1	*0*	7	*3*
249	203	*52*	103	*41*
TOTAL	**388**		**250**	

The initial analysis of the 250 miscellaneous items associated with UDHB1 was done according to their function and context (Table 4.3). The highest proportion of the artefacts relate to recreational activities with 71% of the total artefacts and 66% of these are clay tobacco pipes. Personal items were the next highest percentage, only making up a total of 12% of the miscellaneous assemblage.

Table 4.3: Functional sum and percentage of miscellaneous artefacts associated with UDHB1

General function	Specific function	Shape	Fragments	%	MIC	%
architectural	floor	cobble	0	0	1	0
arms	pistol	gunflint	0	0	1	0
arms/work	flintknapping	core/strike-a-light	0	0	1	0
		flake/strike-a-light	0	0	1	0
	flintknapping/tool	core/strike-a-light	0	0	1	0
	tool/unidentified		0	0	1	0
cleric	writing	mechanical pencil	1	0	1	0
		slate pencil	4	1	4	2
economy	currency	coin	0	0	2	1
food	serve	spoon	1	0	1	0
	tableware		1	0	1	0
	tea	teaspoon	0	0	1	0
household	furniture	knob	0	0	1	0
	sew	pin	0	0	6	2
	sew	reel	1	0	7	3
household /transport	furniture	foot	0	0	1	0
industry	weighing	weight	0	0	1	0
personal	access	handle	0	0	1	0
	cloth	button	4	1	22	9
	groom	brush	1	0	1	0
	hygiene	toothbrush	1	0	2	1
	jewellery	bead	0	0	5	2
recreational	smoking	pipe	367	95	166	66
	toy	marble	3	1	12	5

General function	Specific function	Shape	Fragments	%	MIC	%
transport	v-hull	seal	0	0	1	0
unidentified	unidentified	flint	3	1	5	2
		wire	1	0	1	0
work	tool	strike-a-light	0	0	2	1
		TOTAL	388		250	

4.2.1 ATTACHED TO UDHB1 - CONTEXT (140)

Context (140) was given to the timber boat UDHB1. Each timber element of (140) was given an element number, of which three had miscellaneous artefacts attached. The artefacts were removed from the elements at the storage facility, conserved as appropriate by Silentworld Foundation, before analysis by Casey & Lowe.

A bone toothbrush (#20260) was attached to the exterior of element (403), on the port side, midship. The manufacturing technique, with the four rows of holes, drilled without the aid of a template and its narrow neck style suggest the manufacture dates range from c.1830-1880.

The pipe fragments (#20263, #20264) were found on the interior of the timber elements (466, 480) (Table 4.4) which are positioned at the stern of the boat (element 466) and at midship on the port side (element 480) (Figure 4.2).

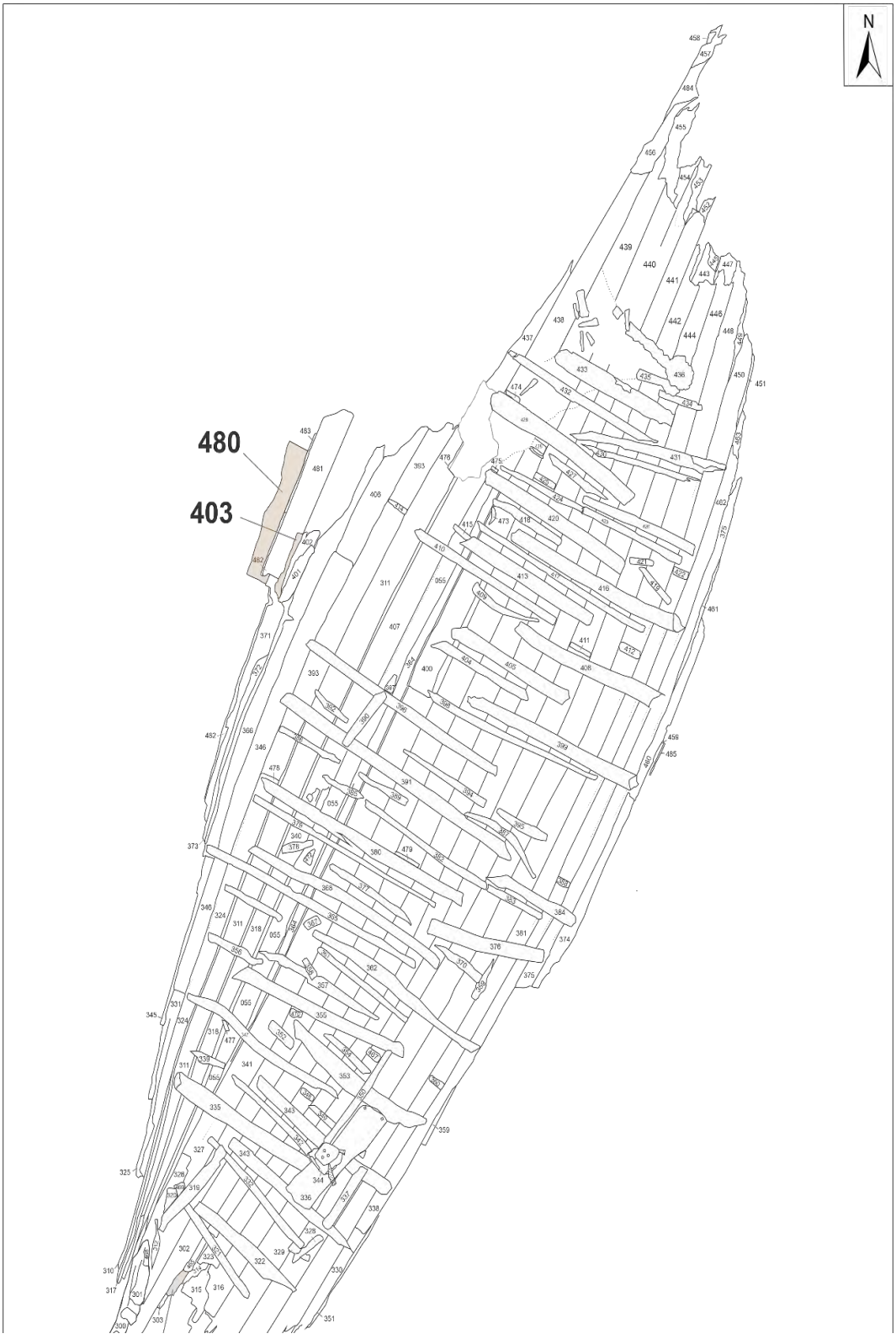


Figure 4.2: Plan 5.4 The shaded area showing the location of the elements with miscellaneous artefacts attached.

The decorated clay pipe stem fragment (#20263) found on element (466), has relief beads and bands on the stem, very similar to the effigial style pipe #20041 and identifying it as a Prince of Wales armorial (Table 4.4, Figure 4.3). The pipe found on element (480) was a rim fragment of the bowl, torrefied brown from use.

Table 4.4: Details of artefacts attached to elements from UDHB1

Element number	Cat #	General function	Specific function	Shape	Country of Manufacture	From	To	Fragments	MIC
403	20260	personal	hygiene	toothbrush	-	c.1830	c.1900	0	1
466	20263	recreational	smoking	pipe	Australia/ Sydney	c.1820	c.1840	1	1
480	20264				-	-	-	1	1

Figure 4.3: Artefacts attached to elements on UDHB1, context (140) (l-r). Top row: pipe bowl #20264, Armorial PoW swirl banded pipe mouth piece #20263. Bottom row: bone toothbrush. 100mm scale. IMG_3811. R. Workman

4.2.2 SEDIMENTS COVERING THE BOAT

Twice daily the boat would have been alternately exposed and covered by the tides. Contexts (132, 133), the overlying tidal sands, covered the remains of the boat and buried it. Context (132), the yellow sands observed around the high tide line, occurred at the bow and middle of the boat. Context (133), the grey sands observed below the low tide line, covered the stern. Context (150) was a clean-up around (132) and south of UDHB1.

CONTEXT 132

The sands around the high tide line contained seven artefacts, six of them clay tobacco pipes and only two of them able to be given dates of manufacture (Table 4.5, Figure 4.4). One pipe (#20088) was made in Sydney, Australia by William Cluer from c.1802-c.1846, identifiable by the relief marks 'W' 'C' on either side of the spur. A clay pipe bowl fragment with two rows of hair from the back of a man's head (#20089), known as 'effigial' style pipes often representing significant or infamous persons of the day were popular throughout the 19th century. The features on this example indicate that it was made in Australia around c.1820-1840 rather than in the UK or Europe.[24]

[24] Duco 2004; Gojak & Stuart 1999; Wilson 1999

The remaining artefact was a polished ivory handle (#20093), with no carving evident. This could have been from a walking stick or parasol. However, the lack of decoration and the size of the item might suggest it came from a knife or tool used on the boat yard (Figure 4.5, Figure 4.6).

Table 4.5: Artefacts from (132)

Shape	Name of manufacturer	Country of Manufacture	From	To	Fragments	MIC
pipe	William Cluer	Australia /Sydney	c.1802	c.1846	1	1
	-	Australia /Sydney	c.1820	c.1840	1	1
		-	-	-	6	4
handle					0	1
				TOTAL	8	7

Figure 4.4: Pipes from context (132) (l-r). Bowl/stem and spur #20088, bowl #20089. 100mm scale. IMG_3812. R. Workman.

Figure 4.5: Ivory handle, view of inside 133/#20093. 100mm scale. IMG_3813. R. Workman.

Figure 4.6: Ivory handle 133/#20093. 100mm scale. IMG_3816. R. Workman.

CONTEXT 133

Context (133), the intertidal sands below the high tide line, had a total of 40 MIC (63 fragments) (Table 4.6). Pipes, once again provide the highest number of items (30 MIC, 54 fragments). The remaining artefacts, having been brought in on the tide or run down from the Clyde Street, relate to domestic activities, including hygiene and children's games, and reflect the behaviours of the wider Sydney area of the 19th century.

Table 4.6: Artefacts by function from (133)

General function	Specific function	Shape	MIC	Fragments
food	serve	spoon	1	1
personal	cloth	button	2	0
	hygiene	toothbrush	1	1
recreational	smoking	pipe	30	58
	toy	marble	3	1
unidentified	unidentified	ferrule	1	1
		flint	2	1
		TOTAL	40	63

Marbles were a popular pastime for children, they were a relatively cheap toy, easy to carry around but also very easy to lose, dropped from pockets or to roll in to inaccessible spaces. The three marbles found in (133) had probably rolled down the steep slope of Clyde Street. All the marbles found were manufactured in Germany (Figure 4.7). The hard limestone marble (#20095) had two battering marks from use. The half of a hand rolled clay marble (#20096) was overfired or stained with cream and dark grey colours. Both types of marble were cheaper manufactured styles. Hard limestone was commonly used as cannon shot in Germany until European munition technology changed in c.1800 and the limestone was specifically ground down to make marbles for the export toy market.[25] This ended at the start of World War I. The third type of marble found is a hand painted porcelain 'China alley' (#20094), with black and red bullseyes.

[25] Gartley, R. & J. Carskadden 1998 Colonial Period and Early 19th -Century Children's Toy Marbles, History and Identifications for the Archaeologist and Collector, Muskingum Valley Archaeological Survey, Zanesville Ohio, USA.

Randall, M.E. 1971 'Early Marbles', Historical Archaeology 5: 102-105.

Carskadden, J. & R. Gartley 1990 Chinas, Hand-Painted Marbles of the Late 19th Century,

Muskingum Valley Archaeological Survey, Zanesville Ohio, USA.

Baumann, P. 2004 Collecting Antique Marbles, Identification and Price Guide, 4th Ed., kp books, Iola Wisconsin, USA.

Figure 4.7: Marbles from context (133) (l-r). China alley bullseye #20094, marble #20095, hand rolled clay #20096, ovoid and spherical pebbles/nodules of black flint #20097. 100mm scale. IMG_3817. R. Workman.

The majority of the pipes from (133) are stem fragments (#20118) of various thickness, many stained, four with remnant honey brown glaze (#20117) and two with simple mouthpieces (#20115, #20116) (Figure 4.8). Of the remaining fragments, three were recognised as being manufactured in Germany or Austria by their decoration and manufacture styles (#20105, #20107, #20108) (Table 4.7, Figure 4.9). An Australian-made effigial type pipe, with manufacture dates of c.1820-1840, was identified by the series of lobes above the spur. Another Australian-made pipe with a wavy relief design near the bowl and large lettering on the stem identifies it as made by Samuel Elliot. Although only the partial name remains, it is identifiable as made by him due to the address 'Clarence Street' on the right-hand side of the stem. Along with the other Sydney pipe making businesses in the small Sydney market of the early-19th century, the Elliott family found it difficult to keep trading, especially when confronted with cheaper models imported in bulk from Britain and the Netherlands from the 1850s and 1860s.[26] One fragment of a ceramic composite pipe (#20102) was found with a hand painted floral design.

Table 4.7: Pipes with name, country, and date of manufacture from (133)

Shape	Name of manufacturer	Country of Manufacture	From	To	Fragments	MIC
Pipe	-	Australia/Sydney	c.1820	c.1840	1	1
	Samuel Elliott		c.1832	c.1840	2	1
	-	Germany/Austria	-	-	1	1
					2	1
					3	1
		UK	c.8137	1867	1	1
		UK/Holland	c.1860	-	1	1
		-	-	c.1850	1	1
				-	46	22
				TOTAL	58	30

[26] Gojak & Stuart 1999; Jack 1986; Wilson 1999; Wilson & Kelly 1987.

Figure 4.8: Broken stem fragments from context (133). Ten rows #20118 (31). Bottom row: #20111 (1), #20117 (4). 100mm scale. IMG_3821. R. Workman.

Figure 4.9: Remaining pipes from context (133) (l-r). Top row: beaded and band stem and spur #20107 (3), plain bowl #20104 (2). Second row: plain bowl #20103, relief decoration of sailing ship on bowl #20105. Third row: fluted bowl and plain stem #20106 (2), rope cartouche on torrified stem #20110. Fourth row: stem fragment #20109, ALDIS stem #20114. Fifth row: stems Effigial stem #20108, mottled grey stem #20112, simple mouthpiece with teeth ware #20115. Bottom row: stem made in Clarence St (note the upside down 'N') #20113, brown glazed mouthpiece #20116. 100mm scale. IMG_3822. R. Workman.

Personal items within this context consisted of a bone button (#20100) with four holes in the centre made until c.1950. There was also a 4-hole porcelain button made from 1840-c.1930. A bone toothbrush head was found (#20098), a template clearly used to drill the regular rows of holes before adding the bristles. This technique dates the brush from c.1850. A partial serving spoon was also found (#20099). The buttons could have come directly from a piece of clothing or, as was probably likely for the toothbrush and spoon, come from a dumping event on Clyde Street making its way down to the harbour. The harbour would also have been littered with debris from the rubbish dumping events as well as flotsam and jetsam, debris floating and sinking in a shallow tidal zone, washing up on shore from the boats on the busy harbour.

CONTEXT 150

Context (150) was a clean-up around (132) and south of the boat. The context had two pieces of flint, both possible strike-a-lights, one part of an exhausted gunflint core (#20171) and the other on a ballast flint (#20172).

4.2.3 OUTSIDE THE BOAT

Outside the boat was an accumulation sediment (149, 249) which had primarily built-up between the boat and the wharf wall (145), but was also patchily present around and under the boat, particularly near the stern (Figure 4.10). Following the complete removal of UDHB1 from the site, a test trench (TT7) was excavated by machine and using hand tools where the vessel had laid. The test trench found that the vessel had been pulled up on to a sandstone shoreline (112), gradually sloping towards the water. An interface (249) between dark grey deposits (149) and the homogenous, culturally sterile yellow-brown sands (134) was observed to the south of the bedrock. Context (249) was identified as the same as (149) and wet sieved in January 2019.

Figure 4.10: Test Trench 7 (TT7) dug after extraction of the boat (140). Northern end of test trench shows the sandstone bedrock shoreline, gradually sloping towards the water. A red arrow marks where the bow of the boat sat. View to northeast, 1m scale. DSC_0960.

CONTEXT 149

Context (149) was 300mm deep between the wall and the boat and below (132). It was wet sieved on site and had 47 MIC and 83 fragments (Table 4.8). With functional categories including household, personal and clerical, the artefacts found in this context are likely associated with everyday living and came from the run off from Clyde Street rather than the boat yard or the boat building industry.

Several of these artefacts were able to have their manufacture dates identified. Two pennies (#20136, #21037) from the reign of King George IV (1825-1827) were found, both very worn and thin. A partial mechanical pencil, invented in c.1822 was also found (#20134).[27] A brass button (#20133), although heavily decayed, was able to have its manufacture dated from c.1840. Half a limestone marble (#20130), made from c.1700-c.1914, and half a hand rolled porcelain marble (#20131), c.1840-c.1914, both manufactured in Germany were also found while wet sieving (Figure 4.11).

Artefacts that have an industrial and/or boat building function consisted of the small weight (#20135), totally encrusted in pitch, and the fragment of flint once used as ballast (#20129).

Table 4.8: Sum of artefacts from (149) by function

General function	Specific function	Shape	Fragments	MIC
cleric	writing	mechanical pencil	1	1
economy	currency	coin	0	2
food	tea	teaspoon	0	1
household	furniture	knob	0	1
	sew	reel	0	1
industry	weighing	weight	0	1
personal	cloth	button	0	1
	jewellery	bead	0	1
recreational	smoking	pipe	79	34
	toy	marble	2	2
unidentified	unidentified	flint	1	2
		TOTAL	83	47

[27] ; Petroski 1989. Mechanical pencils and lead holders

Figure 4.11: Remaining artefacts from context (149), excluding pipes (l-r). Top row: bugle glass bead #20132, mechanical pencil #20134, brass 4-hole button #20133, wooden reel #20140. Second row: British copper penny #20136, stonie marble #20130, China alley marble #20131, button weight #20135. Third row: brass knob #20138, flint #20128, British copper penny #20137, flint #20129. Bottom row: fiddle teaspoon #20139. 100mm scale. IMG_3828. R. Workman.

The majority of the artefacts found in (149) were pipe fragments (Table 4.8). Due to the popularity of smoking in the 18th to 20th centuries, evidence of that recreational activity is found on almost all archaeological sites, as is evident at Barangaroo Station. Pipes were the main method of smoking tobacco until cigarettes became more widely adopted from c.1900.[28] Almost all pipes were moulded from white ball clay (kaolin) with a few being red or terracotta. Only some of the mouthpieces had been lead glazed to make them more comfortable to smoke.

Of the pipes found there are some which can be securely dated. A bowl fragment with relief fluting and long slightly curved leaves running up the back of the seam is indicative

[28] Ayto 1994; Bradley 2000;

of a pipe made in Sydney by John Moreton, (1822-1847) in the Brickfields and later in Haymarket (Table 4.9).[29]

The pipes found in this area provide evidence that the population around Darling Harbour, whether residents or workers, were able to acquire locally-made recreational goods. This is seen with the four fragmentary marked clay tobacco pipes (#20146, 20159, 20060), made by Sydney manufacturers Samuel Elliott (c.1832-c.1840) and Joseph Elliott (c.1831-c.1840). Two fragments of Australian-made pipes, a partial bowl with relief design strands of hair at the base of the bowl (#20147), and a fragment with the fluted design of the three Prince of Wales Feathers (#20155), were 'effigial' styles and probably made in Sydney by Samuel Elliot or Joseph Elliot (Figure 4.12). From the late 18th-century pipe makers in Europe, Britain, Australia, and North America sometimes chose to respond to current events by moulding the bowl into the bust or head of a famous or infamous person. Other perennial subjects were kings and queens or stock folklore characters.

Pipes imported from the UK were also present including those made by John Ford, 1805-1865, Thomas Balme, 1805-1832, and Thomas White & Company, 1825-1870. There were 64 fragments of plain, unmarked stems, some torrefied from use and some stained.

Table 4.9: Pipe manufacturing countries, dates, and their makers in (149)

Shape	Name of Manufacturer	Country of Manufacture	Type name	From	To	Fragments	MIC
pipe	John Moreton	Australia/Sydney	Fluted leaf	1822	1847	1	1
	Joseph Elliott	Australia/Sydney	Fluted floral leaf	c.1831	c.1840	1	1
			-	c.1831	c.1840	2	1
	Samuel Elliott	Australia/Sydney		c.1832	c.1841	1	1
	-	Australia/Sydney	Armorial PoWF swirl banded	c.1820	c.1840	1	1
		Australia/Sydney	Effigial	c.1831	c.1840	1	1
	John Ford	England	-	1805	1865	1	1
	Thomas Balme, Warden	England	Wheat & leaf	1805	1832	1	1
	Thomas White, & Company	Scotland	-	1825	1870	2	1
	MG	UK		c.1800	c.1840	1	1
	MG	UK		c.1800	c.1840	2	2
	-	-	Wheat	-	-	1	0
			-			64	22
					TOTAL	**79**	**34**

[29] Ford 1995.

Figure 4.12: Pipes from contexts (149) (l-r). Top row: stems #20170 (38). Second row: glazed mouth pieces #20167 (2), mouth piece #20168, glazed mouthpieces #20169 (8). Third row: stem #20162 above stem and spur #20163, # stems and spurs #20164 (2), #20165 (3), stem #20166. Fourth row: bowl/stem #29148, bowl/stem and spur #20151, Armorial PoWF bowl/stem and spur #20155, bowl/spur #20156, bowl fragments #20157, #20158. Fifth row: UK pipes, bowl/stem, and spur #20149, Wheat & leaf bowl #20145, bowl/spur #20154, bowl #20150; Australian pipes, Fluted floral leaf bowl/spur #20146, Effigial bowl/spur #20147, Fluted leaf bowl #20152. Bottom row: UK pipes, stem #20161 (2), bowl/spur #20150; Australian pipes, stems #20160 (3). 100mm scale. IMG_3842. R. Workman.

CONTEXT 249

Context (249) was initially recorded and the artefacts analysed as a separate event, until further analysis identified it as the same as (149), positioned beneath the boat. The deposit

was excavated and stored on site for a period before being 100% wet sieved. This context held the greatest number of artefacts across Barangaroo Station with 103 MIC (203 fragments) (Table 4.10, Figure 4.13).

Several of the buttons from (249) have been identified and were able to have the date of manufacture assigned to them. Two of these are the japanned (covered with a hard black varnish) brass buttons (#20208), which were also found in contexts (152, 018, 246) and date from c.1840. Two other brass buttons, made in the UK, have early manufacturing dates of c.1760 (#20210) and c.1800 (#20209).

Sew-through bone buttons are likely the earliest buttons found on an archaeological site in Australia, varying from one to five holes in the centre of the button. In (249), two single hole buttons were found, both with turning marks (#20215, #20216). There were also four bone sew-through buttons with four drilled holes in the centre, one of which was slightly off-centre. Bone buttons were made from animal bone or horn, the smaller ones were traditionally used to secure underwear but could also have been used on men's shirts and other clothing. These were made until c.1850.[30]

Three glass beads, made in Europe were found. Beads are usually regarded as jewellery, mostly worn by women strung onto necklaces, bracelets, and earrings. However, there are many other uses. The smaller sized beads were commonly used to decorate dresses and other apparel, accessories such as bags, and a range of household furnishings including pillows and lamp shades.

The two German-made limestone marbles date from c.1820-c.1914 (#20220, #20221). There were also hand rolled, clay marbles (#20222, #20223) with evidence of use in the form of battering marks. Children used slate pencils to write lessons on slate boards in the classroom at school and Sunday school. Of the five pieces of slate pencil found, two had worn surfaces where the fingers had gripped (#20201, #20202) and three had facetted points. Slate pencils were used until c.1960s.

Everyday household items were also found, including a silver plate or EPNS handle of a spoon (#20219), made in Sheffield from c.1840,[31] and a wooden shoe or clothes brush head (#20217).

Two pieces of flint, one black (#20225), and one opaque grey (#20224), once used as strike-a-lights were found.

Table 4.10: Sum of artefacts in (249) by function

General function	Specific function	Shape	Fragments	MIC
arms/work	flintknapping/tool	core/strike-a-light	0	1
cleric	writing	slate pencil	4	4
food	tableware	spoon	1	1
personal	clothing	button	3	10
	groom	brush	1	1
	jewellery	bead	0	4
recreational	smoking	pipe	193	74

[30] Lindbergh, J. 1999

[31] Banister 1970; Dunning 2000; Moore 1995

General function	Specific function	Shape	Fragments	MIC
	toy	marble	0	6
unidentified	unidentified	wire	1	1
work	tool	strike-a-light	0	1
		TOTAL	203	103

Figure 4.13: All artefacts from context (249) (l-r). Top row: pipe stems #20257 (99). Second row: pipe stems #20244 (2), Effigial pipe bowl #20245, pipe stem #20248, stem/spur #20249, stem #20253, bowl fragments #20251 (13). Third row: pipe stem #20242, Armorial PoWf stems #20246 (3), #20247, stems #20243 (3). Fourth row: bowl/spur #20236, bowl/stem and spur #20240, Fluted floral leaf bowl/stem and spur #20226 (3), bowls/stems and spurs #20239, #20234, stems #20333, #29252 (7). Fifth row: bowl fragments #20229 (4), bowls/stems and spurs #20237, #20232, bowl/stem #20230, stem/spur #20250 (3). Sixth row: bowls/stems and spurs #20231 (2), #20227, #20238, mouth pieces #20255 (13). Seventh row: fluted bowl/spur #20228, mouth piece #20254 above bowl/stem and spur #20235, #20241. Eighth row: flint knapping/tool #20225, clay marbles #20223 (3), #20222, limestone marbles #20221, #20220, pipe stems #29256 (16). Ninth row: bone brooch fragment #20217, 1-hole bone buttons #20216, #20215, 4-hole bone buttons #20213, #20214, #20212, #20211, aes button #20209, brass flat cone button #20210. Tenth row: oblate wound beads #20205 (2), bugle drawn bead #20206, spherical wound bead #20207, copper wire fragment #20218, slate pencils #20204 (2), #20202. Bottom row: aes fiddle spoon #20219, slate pencils #20203 (2), #20201. 100mm scale. IMG_3852. R. Workman.

A total of 74 MIC (193 fragments) pipes were found in (249) with a total of 161 fragments (51 MIC) unable to be identified or dated (Table 4.11, Figure 4.14). Australian made pipes are in the majority for this context. Manufacturers, William Cluer, Joseph Elliot, Samuel Elliot, and Jonathan Leak, competed for the market with UK and European pipe makers. The UK pipes in this context came from the large firms of Thomas Balme and John Ford.

Table 4.11: Pipe manufacturing countries, dates, and their makers (249)

Shape	Manufacturer	Manufacturer Country	Type name	From	To	Fragments	MIC
Pipe	Thomas Balme	England	Fluted wheat &leaf	1805	1845	2	1
	William Cluer	Australia	Cluer	c.1802	c.1846	1	1
	Joseph Elliott	Australia	Fluted floral leaf	c.1831	c.1840	5	2
		Australia	-	c.1831	c.1840	3	2
	Samuel Elliott	Australia		c.1832	c.1840	2	1
	John Ford	England		c.1805	c.1865	2	2
	Jonathan Leak.	Australia		1826	1839	1	1
	MG	UK		c.1800	c.1840	3	3
	-	-	Armorial PoWF swirl banded	c.1820	c.1840	1	1
			Armorial PoWf swirl banded	c.1820	c.1840	3	1
			Banded	-	-	1	1
			Effigial	c.1820	c.1840	1	1
			Fluted	c.1805	c.1860	2	1
			Oak leaf	c.1810	c.1860	1	1
			-	c.1805	c.1860	1	1
				c.1805	c.1860	1	1
				c.1805	c.1860	1	1
				c.1810	c.1860	1	1
				-	-	161	51
					TOTAL	193	74

Figure 4.14: Pipes from context (249) (l-r). Top row: pipe stems #20257 (99). Second row: pipe stems #20244 (2), Effigial pipe bowl #20245, pipe stem #20248, stem/spur #20249, stem #20253, bowl fragments #20251 (13). Third row: pipe stem #20242, Armorial PoWf stems #20246 (3), #20247, stems #20243 (3). Fourth row: bowl/spur #20236, bowl/stem and spur #20240, Fluted floral leaf bowl/stem and spur #20226 (3), bowls/stems and spurs #20239, #20234, stems #20333, #29252 (7). Fifth row: bowl fragments #20229 (4), bowls/stems and spurs #20237, #20232, bowl/stem #20230, stem/spur #20250 (3). Sixth row: bowls/stems and spurs #20231 (2), #20227, #20238, mouth pieces #20255 (13). Seventh row: fluted bowl/spur #20228, mouth piece #20254 above bowl/stem and spur #20235, #20241. Bottom row: mouth pieces #20250. 100mm scale. IMG_3854. R. Workman

4.2.4 INSIDE THE BOAT - CONTEXT 141

Context (141) was a 10mm-thick lens of fine clay particles, organic material, and timber splinters. It had very little sand content and occurred only within the boat. It occupied a distinct position as the last deposit which was exclusively contained within the boat, and effectively sealed the sand (142) and the timbers (148) below. It seemed to occur only in the higher parts of the boat.

Only one miscellaneous artefact was found in this context, a partial translucent black flint thought to have been brought to Australia as ships ballast (#20127).

CONTEXT 142

Context (142) was a pale grey, largely homogenous body of sand, marine in origin, and had accumulated within the boat once its sides had broken down to a point that freely allowed the tide to wash over it. This sediment accumulated around the loose timbers (148) which covered the ceiling planks. The loose timbers are discussed in Volume 3.11.

All artefacts found in this context are lightweight, with functions identified as household, transport or recreational and as such most likely to have washed in with the tide or, as with the loose timbers, could have been thrown in to the boat as rubbish (Table 4.12, Figure 4.15). There are six wooden cotton reels in this context (#20126, #20141, #20142, #20143, #20144). The combination of size of the reels (between 32-44mm in height, 6-19mm in diameter) and no distinguishing marks, make it hard to distinguish if these reels were used in a domestic setting or within the boat yard for sail making/repairs.

The seven pipe fragments were unable to be dated. Most were stained brown/black from use, some olive-green glaze is evident on two simple mouthpieces. One stem fragment had pitch attached (#20123).

One small, barrel shaped, wooden foot (#20125), was found in this context. It appears unused and in good condition and could have been intended for a piece of furniture in a house or a larger boat/ship.

Table 4.12: Artefacts from (142) by function

General function	Specific function	Shape	Fragments	MIC
household	sewing	reel	0	1
			0	1
			0	2
			0	1
			1	1
household /transport	furniture	foot	0	1
recreational	smoking	pipe	1	1
			1	1
			2	2
			2	0
			1	0
		TOTAL	8	11

Figure 4.15: Pipes from context (142) (l-r). Top row: bowl and spur #20120, bowl/stem #20121, stem #20121 (2). Second row: stem #20124. Bottom row: stem #20122 (2). 100mm scale. IMG_3830. R. Workman.

4.2.5 UNDER THE CEILING PLANKS

The space between the ceiling planks and hull below was between 100-120mm deep and an ideal cavity for accumulating occupation/bilge deposits, such as those found in the underfloor deposits of a house. Such an occupation deposit on a boat offers the opportunity to piece together what different parts of the vessel were used for, what the vessel might have transported during its lifetime and what sort of people used the vessel. Six different context numbers were assigned to the deposits in order to, firstly, demarcate where the deposit had come from within the vessel (bow, midship or stern), and secondly, to divide those parts of the deposit considered to be contaminated from intact. The planks furthest to the starboard and port sides were considered to hold less secure, likely contaminated, deposits beneath. Whereas the central planks, closer to the hull, were more likely to have preserved intact occupation deposits. Figure 4.16 illustrates the location of the context numbers assigned.

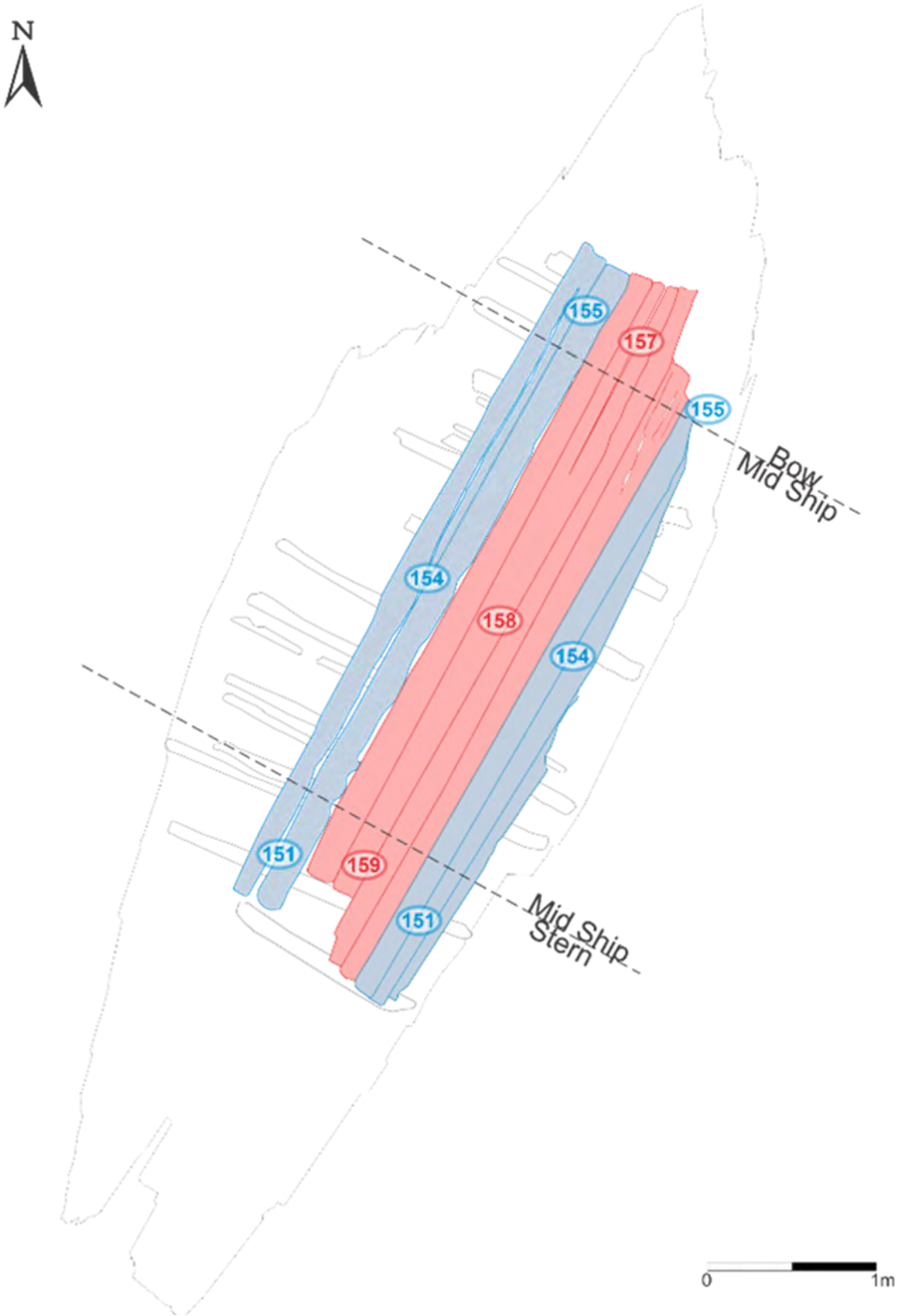


Figure 4.16: Plan highlighting the ceiling planks and the fills beneath. The planks highlighted blue represent those areas considered to have contaminated or disturbed deposits beneath. The planks highlighted red represent the areas considered to have intact deposits beneath.

BOW: CONTEXT 157

The bow end of the boat was sitting at the high tide mark, with the broken planks exposed, allowing items to be caught from the run off from Clyde Street. It had two context numbers (157, 155) assigned to it. Context (157) had one brass pin once used for sewing (#20189). The pin was complete with a spherical wound wire head dating it to c.1880. Context (155) had no miscellaneous artefacts within it.

STERN: CONTEXTS 151 AND 159

A total of seven MIC (three fragments) were found in the stern area of the boat (Table 4.13, Figure 4.17). Two of the buttons were made from bone (#20173, #20174) and one, possibly from a waistcoat, was made of brass (#20175) with a floral design of an open flower, made from c.1830-c.1850. The three buttons may have fallen off the clothing of workers on the boat yard or equally been carried down with the run-off from Clyde Street. Two pins, once used for sewing, were found in (159), one with an early 'upset head' (EUH), from c.1809. The other pin was a SWC with a later date of c.1840-c.1880.

Table 4.13: Function of artefacts from (151, 159), the stern area of UDHB1

Context	General function	Specific function	Shape	From	To	Fragments	MIC
151	personal	clothing	button	-	c.1950	0	1
					c.1950	1	1
				c.1820	c.1850	0	1
	recreational	smoking	pipe	-	-	1	1
						1	1
159	household	sewing	pin	c.1840	c.1880	0	1
				c.1809	-	0	1
					TOTAL	3	7

Figure 4.17: Finds from stern contexts (l-r). Bone buttons 151/#20173, 151/#20174, brass Flate Golden Age Floral button 151/#20175. (t-b) SWC pin #20196, EUH pin #20197, pipe stem #20176. 100mm scale. IMG_3833. R.Workman.

MIDSHIP: CONTEXT 154 AND 158

The contexts in the midship (154, 158) covered the largest amount of area under the planks. A total of 11 artefacts (12 fragments) were found in this area (Table 4.14).

Context (154), open at the sides to the tide, had three fragments of pipe, one with marks 'M' 'G' high above the spur (#20188). These were manufactured in the UK from c.1800-c.1840.

Context (158) was considered the most intact or undisturbed context under the ceiling planks, possibly a true bilge deposit as it was in the centre of the boat. It contained nine MIC (nine fragments). The contents of this context include nine fragments of pipes, with no dates or manufacturers able to be identified from the fragments, a piece of flint used as a strike-a-light (#20194), as well as a circular brass button (#20195) (Figure 4.18). The button is the same japanned black style as buttons found in contexts (152, 246, 249), suggesting someone had a stash of buttons, possibly a tailor, or a whole garment had been thrown away (Figure 4.19).

Table 4.14: Function of artefacts from (154, 158), the mid ship area of UDHB1, below the ceiling planks.

Context	General function	Specific function	Shape	Fragments	MIC
154	recreational	smoking	pipe	2	1
				1	1
158	arms/work	flintknapping	flake/strike-a-light	0	1
	personal	clothing	button	0	1
	recreational	smoking	pipe	6	4
				1	1
				1	1
				1	1
			TOTAL	12	11

Figure 4.18: Artefacts from the mid ship area of UDHB1, below ceiling planks (l-r). Top row: pipe stems: 154/#20187 (2), 158/#20191, near whole pipe 154/#20188. Second row: pipe stems 158/#20190 (6), glazed/stained stem #158/#20192. Bottom row: pipe bowl 158/#20193, flint/strike-a-light #158/#20194, brass 4-hole button #158/#20195. 100mm scale. IMG_3834. R. Workman.

Figure 4.19: Japanned 4-hole concave beaded buttons (l-r). Top row: 152/#20179, 249/#20208 (2). Bottom row: 153/#20185, 158/#20195, 246/#20198 (2). 100mm scale. IMG_3848. R.Workman.

4.2.6 ABOVE THE CEILING PLANKS

The artefacts above the ceiling planks were positioned similarly to those under the ceiling planks. There were three context numbers given out for the bow (153), stern (156) and midship (152) area. Context (246) was a deposit beneath the frames and above the hull area. The deposits were like those beneath the ceiling planks and likely represent the redeposition of heavier particles caused by water movement.

CONTEXT 152

The midship area of the boat above the ceiling planks (Figure 4.20), had eight miscellaneous artefacts (Table 4.15), with pipes (#20177, #20178) and a clay marble (#20180), relating to recreational activities and one artefact, a japanned button (#20179), associated with personal clothing.

Figure 4.20: Mid ship above ceiling planks where eight miscellaneous artefacts were found. View to east.

Table 4.15: Function of artefacts from (152)

General function	Specific function	Shape	Fragments	MIC
architectural	floor	cobble	0	1
arms	pistol	gunflint	0	1
personal	clothing	button	0	1
recreational	smoking	pipe	4	3
	toy	marble	0	1
transport	v-hull	seal	0	1
		TOTAL	4	8

This context also had a sub-rectangular lead seal used to plug gaps in timbers (#20181). There are clear impressions of hessian or other coarse woven fabric and a narrow jutting centre from the impression of a nail hole. The back of the seal is slightly concave and irregular where it was pressed into the timbers' gap (Figure 4.21).

Figure 4.21: Lead seal 152/#20181. 100mm scale. IMG_3836. R. Workman.

CONTEXT 153

Context (153) was at the bow of the boat (UDHB1) above the ceiling planks. A total of three miscellaneous artefacts were found: a brass button, dating from c.1840 (#20185), a piece of British flint used as a strike-a-light (#20184) and two fragments of clay pipe stems (#20186).

CONTEXT 246

Context (246) was a deposit/fill beneath the frames above the hull in the boat. There were eight items (four fragments) from this context with functions of household, personal and recreational (Table 4.16, Figure 4.22).

The two pins found demonstrate different dates of manufacture due to the style of heads, one a conical head dress pin (#20261) which can be dated from c.1840-c.1880 and the other with an early upset head (#20262) dating from c.1809.

Another japanned button was found in this context (#20198), the same as the buttons from (158, 249, 152) (Figure 4.23). The second button from this context is a one-hole wooden button.

This context also contained one pipe fragment (#20200). A broken stem with relief marks 'M' 'G' high above the spur, which possibly represent a Scottish pipemaker from c.1800-1840.

Table 4.16: Function of artefacts from (246)

General function	Specific function	Shape	Fragments	MIC
household	sewing	pin	0	2
			0	1
personal	clothing	button	0	1
			0	2
recreational	smoking	pipe	1	1
			3	1
		TOTAL	4	8

Figure 4.22: All artefacts from context (246) (l-r). Top row: EUH pin #20262. Second row: SWC pins #20261 (2), stem and spur #20200. Bottom row: Jappanned 4-hole concaved beaded buttons #20198 (2), 1-hole wooden button #20199. 100mm scale. IMG_3849. R. Workman.

Figure 4.23: Japanned buttons from context (246), #20198 (2). 100mm scale. IMG_3838. R. Workman.

FLINT ARTEFACTS

Several pieces of flint have been found throughout the Barangaroo Station site (Figure 4.24, Table 4.17). Flint does not naturally occur in the Sydney region. The light to dark brown and black flint nodules and flakes are thought to have been brought to Australia as one or more ship's ballast. It was used to stabilise ships, often travelling across continents, then as soon as ballast material was no longer needed it was dumped at the destination and often left on shore. The darker brown flint is more typical of that mined in England and the paler browns more common to France. These two countries manufactured most of the gunflints during the 18th and 19th century, but there were other source countries. The blade pistol gunflint (152/#20182) was made in Brandon, England where a lot of the dark brown and black flint was mined.

Percussion weapons, which replaced flintlock guns, were developed from the 1840s and in common use from the 1860s providing a general end date for the use of gunflints. Pistols and small guns of .22 calibre had a limited accurate firing range and were typically carried for personal protection in towns, cities and when travelling. Gunflints are still being produced in small quantities today for weapons as well as flint 'strike-a-lights' that create a spark for lighting fires by striking the surface with a steel rod or similar implement. Gunflints could be reused for this latter purpose when they were too worn or became obsolete. Research into gunflint making and flint sources is ongoing.[32]

[32] French flint in Australian sites see: Stocks 2010; Allen, J 2008; Delaney 1989. Ballast flint in Jones, W.M. 1976; Hamilton & Emery 1988: 53-57

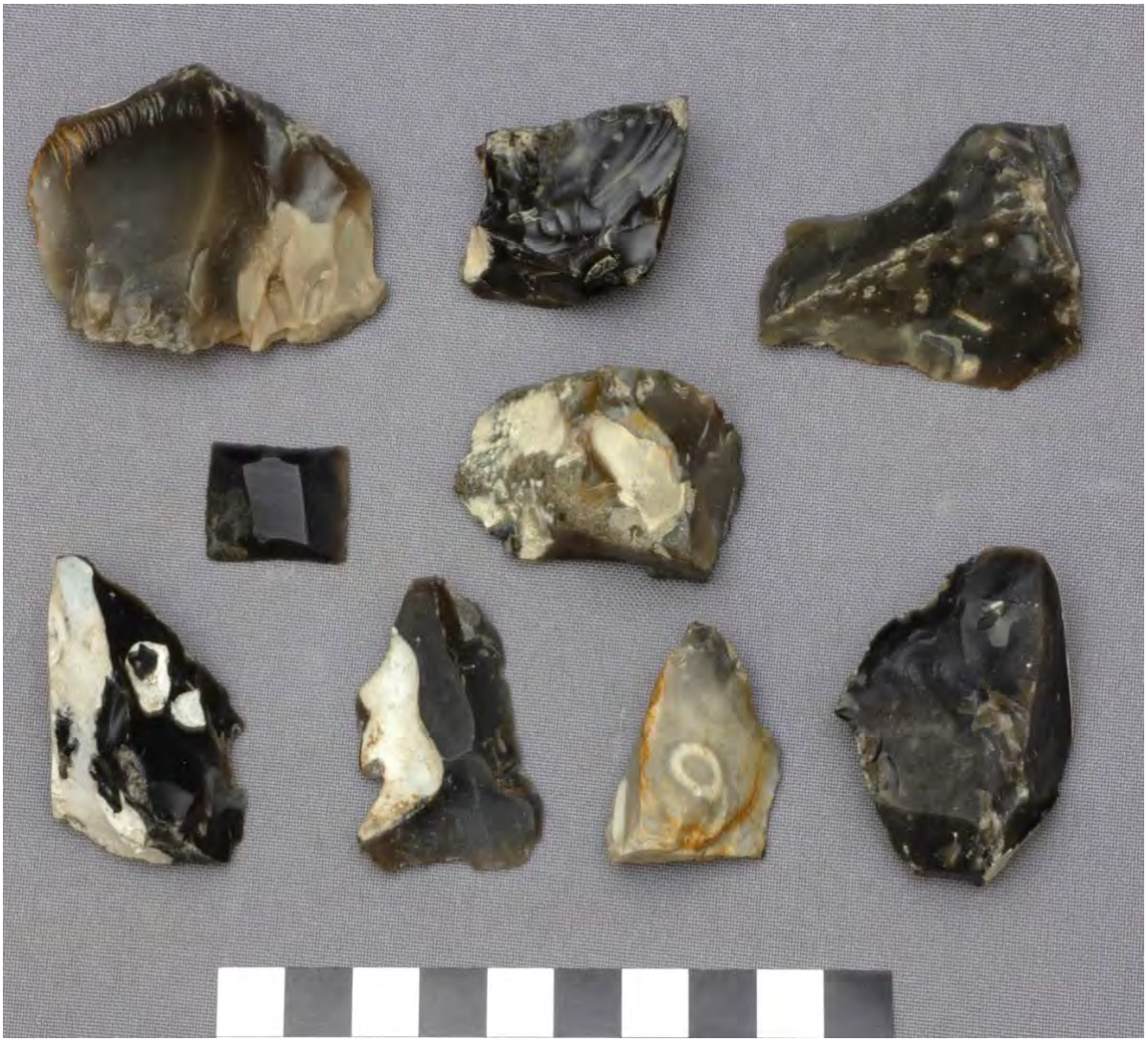


Figure 4.24: Flint for knapping or arms/strike-a-light (l-r). Top row: 150/#20171, 023/#20003, 063/#20008. Second row: pistol gunflint 152/#20183, 150/#20172. Bottom row: 153/#20184, 158/#20194, 240/#20224, 249/#20225. 100mm scale. IMG_3857. R. Workman.

Table 4.17: Flint artefacts from across Barangaroo Station

Area	Context	Cat #	General function	Specific function	Shape	Colour	Fragments	MIC
R	23	20003	arms/work	flintknapping/ tool	core/strike-a-light	dark brown	0	1
T	63	20008	work	tool	strike-a-light	dark brown	0	1
X	152	20182	arms	pistol	gunflint	dark brown	0	1
	150	20171	arms/work	flintknapping	core/strike-a-light	dark brown	0	1
	158	20194			flake/strike-a-light	dark brown	0	1

Area	Context	Cat #	General function	Specific function	Shape	Colour	Fragments	MIC
	249	20225		flintknapping/ tool	core/strike-a-light	black	0	1
	153	20184		tool/ unidentified	core/strike-a-light	black	0	1
	133	20097	unidentified	unidentified	flint	black	1	2
	141	20127				black	1	1
	149	20128				black	0	1
	149	20129				brown	1	1
	150	20172	work	tool	strike-a-light	dk brown	0	1
	249	20224				lt grey-brown	0	1
						TOTAL	3	14

5.0 REPORT SUMMARY & RESULTS

Barangaroo Station has a total of 349 (MIC) miscellaneous artefacts with the majority (79%) from Area X and associated with the boat (UDHB1).

Household rubbish was often dumped into the yard area or a convenient dumping ground in the surrounding area. Any rubbish dumped in the yards of the houses or businesses on Clyde Street may well end up washing down onto the harbour shore. A report by the Harbour Commissioners in April 1866 concluded that rapid and serious 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. This was not the only source of rubbish on the foreshore however. The City Council was criticised for using the harbour as an easy and cheap method of rubbish disposal at the expense of public health and the environment.[33]

In general, the material culture associated with the 19th-century occupation of Darling Harbour/Millers Point area has a limited ability to inform us about day-to-day issues associated with the lives of the residents, and workers of the area. Although many of the artefacts can be categorised within the household, personal or recreational function and provide information on living standards, consumer choices, construction of gender identity and the nature of childhood, it is hard to be certain if the artefacts came from the residents/workers or from households further afield. To be taken into consideration is the disturbance of the area by the harbour tides as well as the runoff water and sewerage from the steep streets above. The other consideration is with the harbour littered with debris from flotsam and jetsam and items floating and then sinking in a shallow tidal zone, washing up on shore from the boats on the busy harbour.

The occupation deposits from Langford's House (109, 124) are an exception to this. The Langford family lived in their home from the 1830s to the 1880s when the street was resumed.[34] The artefacts, including pins, historically associated with women and sewing, marbles, associated with children, and the various buttons coming from underwear or general clothing, provide a small insight into their family life.

A few individual items (also from secure contexts) provide glimpses into 19th-century Millers Point; a pewter mug once belonging to W. Turton a resident of Wentworth Street, a terracotta pipe, and a ceramic pipe imported from the UK or Holland. The pipes increasing their cost compared to locally made clay pipes, suggest recreational activities such as drinking and smoking were not only prevalent but a valued part of social life.

Presence of the newly invented 'electric' toothbrush, alongside three bone toothbrushes found across the site, made with continuing trends of manufacture techniques, suggest hygiene was an ongoing and important part of life of the local Sydney population through the 19th century.

Due to the popularity of smoking in the 18th to 20th centuries, evidence of that recreational activity is found on almost all archaeological sites. Pipes were the main method of smoking tobacco until cigarettes became more widely adopted from c.1900. There was no evidence for any other smoked substance. Almost all pipes were moulded from white ball clay (kaolin) with a few being ceramic, terracotta or copper alloy. Only some of the mouthpieces had been lead glazed, most were torrefied black from use. As clay pipes were

[33] Broadbent 2010 (5): 506.

[34] Griffith 1995 *The Langford Family*. p38

easily broken, displaying constantly changing styles, decoration and sometimes marks, they are an important resource for archaeological research and stratigraphic dating. Once broken, the small fired clay fragments do not decay in the soil and withstand many types of post-depositional movement and pressure. There were 425 fragments of pipe, with no whole pipes found across Barangaroo Station. Clay pipes are considered an important dating tool for archaeological sites. The manufacturing dates of the clay pipes from Barangaroo Station have a range of *TPQ* dates from c.1800 to c.1860.

Pipes also highlight consumer choices. Of the 425 fragments, 83% were unidentified, 7% of them were made in Australia/Sydney and 10% were imported from Europe or the United Kingdom. These numbers suggest that the local pipemakers were able to compete with the European/UK import market during the site period.

Given the industrial nature of the area, with Langford's boat yard and Cuthbert's shipyard eventually covering the whole of the excavation area, the miscellaneous artefacts provide little evidence of industrial or boatbuilding activity. Only one miscellaneous artefact from across the site was attributed the industrial function, a small copper alloy button weight. There was also a small lead seal, classified within the transport function, perhaps demonstrating the need for quick and cheap repairs to the boats. Additionally, several pieces of flint (nodules and flakes) have been found at the site. These are thought to have been brought to Australia as ships ballast, and dumped on the waterfront.

The miscellaneous artefacts from Barangaroo Station demonstrate that the development of the site, landfill and dumping from the wider Sydney area of the 19th century have, in the most part, removed evidence of the industrial nature of the site. Although only a few items from secure deposits can provide us with evidence of a domestic lifestyle on the foreshore, it is important to note artefacts and associated assemblages specifically linked to known individuals, for example Turton, provide great value as a resource.

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

ANIMAL BONE REPORT

MARCH 2022

VOLUME 3, SECTION 3.5

The tooth of a sperm whale, recovered from (142).

FINAL REPORT | Report to **Casey & Lowe**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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Report Status	Date Submitted	Purpose	Author	Reviewed
Draft Version 1	19.07.21	Internal draft	James Roberts	Holly Winter
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Final Report	18.03.22	Final report	James Roberts	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

ANIMAL BONE REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

Excavations conducted by Casey & Lowe at the Barangaroo Station site, Sydney, yielded 1312 fragments of animal bone. These bones were cleaned where required, then sent to Dr James Roberts for analysis.

1.2 ARCHAEOLOGICAL AREAS AND PHASES

The archaeological investigation was conducted by Casey & Lowe for AMBS Ecology and Heritage between July and December 2018. The study area was divided into six excavation areas (Areas R, T, X, Y, Z) (Figure 1.1).

Figure 1.1: Location plan showing the site outlined in red and the excavation areas marked with dashed yellow lines. Google Maps.

The study area was divided into seven main archaeological phases and are outlined in Table 1.1. Sub-phases were utilised in Phases 3 and 5 to account for the differences in land ownership and modifications to buildings that took place across the site.

Table 1.1: Archaeological phases identified at the Barangaroo Station site

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 AIMS OF REPORT

This report presents the data recovered from analysis of the faunal remains from Barangaroo Station. This data is presented with reference to the area of the site and context from which the remains were recovered, in order to aid comparison between the faunal remains and other material remains from the site. These remains are then interpreted, with reference to the history of occupation at the site and zooarchaeological analysis conducted at an adjacent site (Barangaroo South), and some preliminary hypotheses are put forward regarding the activities represented by these remains and the nature of their deposition.

1.4 METHODOLOGY

All bone fragments were subject to visual examination during which, where possible, each fragment was assigned to a taxa and skeletal element. All bone surface modifications (i.e. butchery,[1] burning patterns and colours,[2] pathology, animal gnawing etc.) were recorded. Taxonomic identification of remains was undertaken with reference to the reference collection kept by the University of New England, Australia, as well as identification manuals for faunal material.[3]

Bone that was not identifiable to species or genus was assigned to a size class and more general taxonomic class (e.g., Large Mammal, Small Reptile etc.). These are only discussed where relevant below. The Number of Identified Specimens (NISP) was quantified for each taxonomic class during identification. This method of quantification includes every bone fragment identified as each individual taxon, and while it does not give insight into the real number of animals deposited at the site in the past, it does provide an accurate depiction of the relative amounts of taxa in the assemblage. In addition to NISP, the Minimum Number of Individual (MNI) was also calculated for the remains from notable contexts. This quantification method estimates the number of individual animals represented based upon

[1] Lauwerier 1988

[2] Lyman 1994

[3] Schmidt 1972; Hillson 1992; Cohen & Serjeantson 1996; Fillios & Blake 2015

the characteristics of the skeletal elements represented in the remains, however it should be noted that this method likely underestimates the actual number of animals deposited at the site in the past.[4] The fusion state of all long bone epiphyses was recorded to gain an insight into the demographic profiles of the animals in the assemblage. Similarly, the wear stage of all teeth, including loose, individual teeth was recorded.[5] Anatomical measurements were taken, where possible, according to von den Driesch.[6] Additional measurements were taken on fragments identified as sheep/goat to distinguish between the remains of sheep and goat.[7] These measurements suggest that sheep were predominant in the assemblage, if any goat were present at all.

1.5 REPORT AUTHORSHIP

This report was written by Dr James Roberts, zooarchaeological analyst and independent researcher.

[4] Lyman 2019

[5] Grant 1982

[6] Von den Driesch 1976

[7] Salvagno & Albarella 2017

2.0 OVERVIEW OF ASSEMBLAGE

The 1312 animal bone fragments recovered from the Barangaroo Station site were recovered from contexts excavated in Areas T, X, Y and Z. A number of these contexts were in association with the abandoned boat (140 - UDHB1). The majority of the remains in the assemblage displayed good preservation, however there were some examples of severe bone-surface degradation which could be attributed to water damage or abrasion from sand (Figure 2.1). The majority of these fragments (86.3%) derived from contexts associated with the boat (140) and provide an insight into the nature of the deposition of the fragments in those contexts (Section 3.5).

Figure 2.1: Bone fragments displaying abrasion from sand, recovered from (133, 249). 3cm scale.

Domestic mammals (cattle, sheep and pigs) were the most frequently identified species in the assemblage, which is common for zooarchaeological assemblages in Sydney from this period. A number of other introduced domesticates (cat, dog, goose and chicken) were present, along with some introduced wild species (rabbit and hare). Native fish, marine mammal, reptiles and bird species were also identified. Notably, this included a tooth from a sperm whale. This remarkable find is discussed further below (Section 0).

While there was a slight predominance of meat bearing parts in the assemblage (i.e. upper limbs), whole carcasses of sheep, cattle and pigs were present. None of those bones were found to be in articulation. Additionally, a high proportion (39.7%) of the remains from the Barangaroo Station assemblages also displayed butchery marks. Saw marks were the most common type of butchery mark identified, which in turn were often representative of the primary butchery process (i.e. carcass halving and quartering). These factors are highly significant in terms of interpreting the assemblage and discussed in further detail below.

3.0 CONTEXT ANALYSIS

While remains from all contexts excavated at the Barangaroo Station were analysed, contexts from each area were selected for in-depth analysis. These are listed below, and at the focus of each of the following sections. While the contexts associated with the boat (140) were recovered from Area X, they are discussed below with regards to their association with the boat in Section 3.5.

3.1 AREA T

A total of 39 fragments of bone were recovered from twelve contexts in Area T (Table 3.1).

Table 3.1: The contexts from Area T that yielded animal bone fragments, along with their relationship to the archaeological features in Area T and the number of fragments associated with each group of contexts.

	Structures	Potential Working Surface	Fills Associated with Slipways	Fill of Cut with Unknown Purpose	Levelling Fills for Cuthbert's Wharf
Context(s)	047, 078	073	082, 096	094	063, 066, 068, 069, 072, 079
Number of Fragments	5	1	7	2	24

3.1.1 REMAINS ASSOCIATED WITH STRUCTURES (CONTEXTS 047 & 078)

Five fragments from Area T were recovered from contexts associated with structures. One of these fragments was recovered from (047), associated with the structure of Cuthbert's Wharf. The fragment was from the rib of an indeterminate medium-sized mammal and displayed a butchery mark; little else can be said about this fragment. Four fragments were recovered from (078), structural remains with scaffolding around Cuthbert's Wharf. Three of these fragments were identified as cattle, with remains from the upper forelimb and upper hindlimb represented. A fragment of indeterminate long-bone displaying butchery marks was also present, however little else can be said about this fragment.

3.1.2 WOOD CHIP DEPOSIT (CONTEXT 073)

A single fragment of bone was recovered from this context; a fragment of cattle lower forelimb. This fragment displayed a butchery mark indicative of carcass portioning for commercial resale and displayed marks consisted with long-term surface exposure. These marks would correlate with the interpretation of this context as a possible working surface.

3.1.3 FILLS ASSOCIATED WITH SLIPWAYS (CONTEXTS 082 & 096)

Seven fragments of bone were recovered from fills associated with the slipway at Cuthbert's Wharf. The first of these contexts, (082) – a fill deposited atop the slipway surface, yielded four fragments; two were identified as cattle and two were identified as sheep. The cattle fragments were from the ribcage and the lower limb and the sheep remains were from the lower hindlimb and the lower forelimb. No further observations were made regarding these fragments. (096) yielded three fragments, all of which were identified as cattle. These fragments were from the lower hindlimb, the lower forelimb and the ribcage, and all of them displayed butchery marks indicative of carcass portioning for commercial resale.

3.1.4 FILL OF CUT WITH UNKNOWN PURPOSE (CONTEXT 094)

Two fragments of bone were recovered from (094), the fill of a feature of unknown function. One of these fragments were identified as sheep lower hindlimb and the other fragment was identified as cattle lower hindlimb. No further observations were made regarding these fragments.

3.1.5 LEVELLING FILLS FOR CUTHBERT'S WHARF (CONTEXTS 063, 066, 068, 069, 072 & 079)

A total of 24 fragments were recovered from six contexts that represent two different levelling events that were part of the construction of Cuthbert's Wharf. The first of these, (068), was identified as the base of these levelling fills. Nine fragments of bone were recovered from this context; three of these were identified as cattle, two were identified as sheep, two were identified is indeterminate large-sized mammal and two were identified as indeterminate medium-sized mammal. The three fragments of cattle were from the lower vertebral column and the ribcage, with the ribcage displaying a butchery mark indicative of carcass portioning for commercial resale. The two fragments of sheep were both from the lower hindlimb, with a single fragment displaying a butchery mark indicative of carcass portioni9ng for commercial resale. The four fragments identified as indeterminate mammal were all indeterminate long-bone fragments, and three of them displayed marks from being heavily burnt.

Ten fragments were recovered from (072 and 079); the contexts represent the same small patch of fill situated within a larger levelling event and the contexts were subsequently amalgamated. Of these ten fragments five were identified as cattle, four were identified as sheep and a single fragment was identified as indeterminate large-sized mammal. The cattle remains were from the upper and lower forelimb, the lower hindlimb and the upper vertebral column. These remains displayed butchery marks indicative of carcass halving and portioning for commercial resale. The four fragments of sheep were from the ribcage, the upper hindlimb and the lower forelimb. No further observations were made regarding these sheep fragments. The single fragment of indeterminate large-sized mammal was from an indeterminate long-bone; no further observations were made regarding this fragment.

Contexts (063, 066 and 069) represent a single levelling event and yielded five fragments of bone. Three of these were identified as sheep, one was identified as cattle and one was identified as indeterminate large-size mammal. The sheep remains were from the upper and lower forelimb, the cattle fragment was from the upper vertebral column and the indeterminate large-sized mammal fragment was from an indeterminate long bone – no further observations were made regarding any of these fragments.

3.1.6 DISCUSSION

The remains from Area T have limited potential to inform on the nature of human activity in this area of the site. They largely derive from contexts comprised of redeposited material (i.e. levelling fills), therefore the archaeological remains recovered from them may not relate to activity undertaken at the site - other material classes from these contexts must also be considered when interpreting the zooarchaeological remains from this context. Of some note is the fragment from (073), as the marks on this fragment suggest long-term surface exposure which are consistent with the possible interpretation of this context as a surface deposit.

3.2 AREA X

A total of 13 fragments of bone were recovered from the five Area X contexts that were selected for further analysis (Table 3.2).

Table 3.2: The contexts from Area X that were selected for further analysis, along with their relationship to the archaeological features in Area X and the number of fragments associated with each group of contexts

	Occupation and Demolition of Langford's House	Potential Predating or Occupation deposit of Langford's House	Levelling Fills from the Construction of Langford's House
Context(s)	106, 109, 124	119	126
Number of Fragments	10	2	1

3.2.1 OCCUPATION AND DEMOLITION OF LANGFORD'S HOUSE (106, 109, 124)

Three fragments of bone were recovered from (109), which has been interpreted as an underfloor deposit. Two of the bones were identified as fragments of sheep lower hindlimb, and the third was identified as a rib fragment from an indeterminate medium sized mammal, which was also likely sheep. None of these fragments displayed butchery or gnawing marks, and therefore little can be inferred from their presence. Context (124) was interpreted as the same underfloor deposit as (109), but was located to the northwest. One of the fragments from this context was identified as a fragment from the lower vertebral column of cattle, four were identified as the lower limbs and lower vertebral column of sheep, and a single fragment was also identified as indeterminate large mammal. Two of the fragments of sheep had been gnawed by rodents, and two fragments of sheep displayed butchery marks, which were indicative of carcass halving and portioning for commercial resale.

A single fragment of bone was recovered from (106), located within the footing of Langford's House and interpreted as remains associated with the occupation or demolition of the house. The fragment was identified as a cattle rib, however no butchery or gnawing marks were identified on the fragment and little else can be said about it.

3.2.2 POTENTIAL PREDATING OR OCCUPATION DEPOSIT OF LANGFORD'S HOUSE (119)

Two fragments of bone were recovered from (119), interpreted as drainage runoff. Both of these fragments were identified as sheep, representing the lower forelimb, vertebral column and ribs. Both of these fragments had been gnawed by rodents and displayed butchery marks. The gnawing on these bones is potential indicative of the presence of rodents on the site during this period.

3.2.3 LEVELLING FILLS FROM THE CONSTRUCTION OF LANGFORD'S HOUSE (126)

A single fragment of bone was recovered from a single context identified as a levelling deposit (126) used in the construction of Langford's House. This fragment was from the lower vertebral column of a sheep. Given that this deposit was comprised of redeposited material that was likely from elsewhere, it is unclear as to whether this fragment relates to activity in Area X.

3.2.4 DISCUSSION

The remains from the contexts outlined above provide some insight into the nature of occupation in Area X. Remains are present from an underfloor deposit of Langford's House (109, 124), which demonstrate the presence of rodents on the site and highlight the consumption of cattle and sheep. The fragment from the levelling fill is likely redeposited material and may therefore not relate to activities at the site at all. Consideration of the other material types recovered from these contexts would therefore have to be made before conclusions regarding the levelling fill fragment was drawn.

3.3 AREA Y

A total of 16 fragments of bone were recovered from the two contexts in Area Y that were highlighted for in-depth analysis (Table 3.3).

Table 3.3: The contexts from Area Y that were selected for further analysis, along with their relationship to the archaeological features in Area Y and the number of fragments associated with each context.

	Levelling Fill for Cuthbert's Saw Mill	Reclamation Fill in Cuthbert's Wharf
Context(s)	184	234
Number of Fragments	3	13

3.3.1 LEVELLING FILL FOR CUTHBERT'S SAW MILL (184)

Three fragments were recovered from (184), which was interpreted as a levelling fill used in the construction of Cuthbert's saw mill. Two of the fragments were identified as the forelimb of a sheep, and the third fragment was identified as the lower forelimb of a cattle. The fragment of cattle forelimb was sawn through its shaft. No other observations were made regarding these fragments.

3.3.2 RECLAMATION FILL IN CUTHBERT'S WHARF (234)

Seven of the 13 fragments recovered from (234) were identified as cattle, with remains present from the lower fore and hindlimbs, as well as the vertebral column and ribs. Three fragments of cattle rib and a fragment of cattle vertebra had been sawn through, with marks indicative of carcass portioning for commercial resale. Two of these fragments also displayed evidence of heavy water damage. An additional three fragments were identified as indeterminate large mammal, and are likely also cattle. These fragments were indeterminate long bones. The other three fragments from this context were identified as sheep, with ribs and the lower forelimb represented. None of the sheep fragments were butchered and no other observations were made regarding them.

3.3.3 DISCUSSION

As with the remains from Areas T and X presented above, these remains from Area Y have limited potential to inform on the nature of human activity in this area of the site. Both contexts in question are likely comprised of redeposited material and therefore the archaeological remains recovered from them may not relate to activity undertaken at the site. As above, this means that the other material classes from these contexts must also be considered when interpreting the zooarchaeological remains from this context. It is worth noting that two fragments from these contexts display extensive water damage, suggesting they may derive from a waterlogged context.

3.4 AREA Z

A total of 169 fragments were recovered from the fills of two archaeological features in Area Z, comprised of four separate contexts (Table 3.4).

Table 3.4: The contexts from Area Z that were selected for further analysis, along with their relationship to the archaeological features in Area Z and the number of fragments associated with each group of contexts.

	Fill of Drain (203) with 1880s Wharf Building	Fill of Cistern (206) Associated with pre-1910s House on Wentworth Street
Context(s)	205	207, 208, 215
Number of Fragments	11	158

3.4.1 FILL OF DRAIN WITH 1880S WHARF BUILDING (205)

Nine of the eleven fragments from this context were identified as sheep, with remains present from the lower limbs and ribs. The remaining two fragments were identified as chicken with one elements from the wing and one from the leg represented. None of these fragments were burnt, butchered or displayed any gnawing marks. The only other observation made regarding these fragments was that all but one of them were stained black, which likely reflects the heavily organic composition of the fill.[8]

3.4.2 FILL OF CISTERN ASSOCIATED WITH PRE-1910S HOUSE ON WENTWORTH STREET (207, 208, 215)

Contexts (207, 208, 215), the upper, middle and lower fills of cistern (206) respectively – yielded 158 fragments of bone (Table 3.5, Table 3.5). The vast majority of these (154 fragments) derived from (215). The two fragments from the upper fill of the cistern (207) were both identified as sheep, and represented the upper hindlimb and lower forelimb. The fragment of lower forelimb displayed a cut mark indicative of meat extraction. No other observations were made regarding the remains from this context. The middle fill of the cistern (208) also yielded two fragments of bone, one of which was identified as sheep lower vertebral column and the other was identified as cattle rib. The fragment of sheep vertebrae had been chopped through axially, indicative of carcass halving.

Table 3.5: The taxonomic identifications made in the remains from the fills of Cistern 206. Values presented in NISP.

Taxa / Context	Cattle	Sheep	Pig	Dog	Rabbit	Chicken	Large Mammal, indet.	Shark, indet.	Fish, ident.	Total
207	-	2	-	-	-	-	-	-	-	**2**
208	1	1	-	-	-	-	-	-	-	**2**
215	64	73	3	1	4	3	3	1	2	154
TOTAL	**65**	**76**	**3**	**1**	**4**	**3**	**3**	**1**	**2**	**158**

Much more can be said about the 154 fragments of bone recovered from (215), the lower fill of the cistern. Sheep was the most common identification made in the remains from this context (47.4%), with remains from a wide range of body parts represented (Figure 3.1). While entire carcasses were present, there was a clear predominance of meat bearing

[8] Fernández-Jalvo & Andrews 2016: Chapter 4.

elements, i.e. upper forelimbs and entire hindlimbs (Figure 3.1). Nine of the sheep fragments were butchered, with marks indicative of primary butchery, including horn, head and tongue removal, as well as carcass portioning for commercial resale and meat extraction (Figure 3.1). The epiphyseal fusion observed on the sheep remains from this context suggest that the majority of animal present were adult, with the majority of remains from animals older than three years of age at death (Table 3.6).

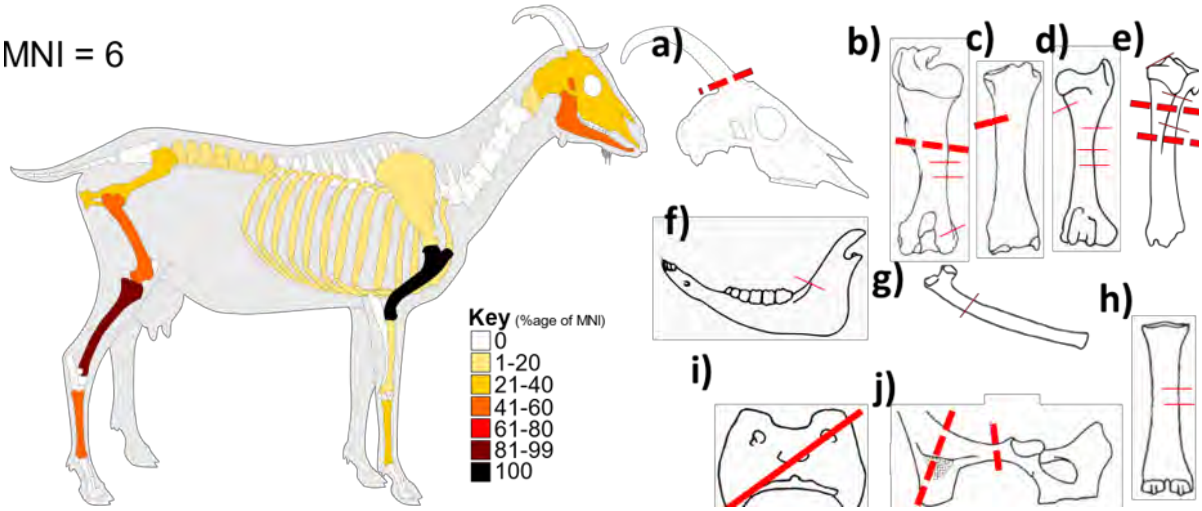

Figure 3.1: (Left). The skeletal element representation of the sheep remains from (215). (Right). The butchery marks identified on the sheep remains from the intact boat bilge deposits. Dashed lines denote saw marks, thick red lines denote chop marks and thin red lines indicate cut marks. a) Skull; b) Humerus; c) Radius; d) Femur; e) Tibia; f) Mandible; g) Ribs; h) Metacarpal; d) Atlas vertebrae; j) Pelvis.

Table 3.6: The epiphyseal fusion status of sheep remains analysed from (215). Values are given as the Minimum Number of Elements (MNE). F = Fused, UF = Unfused.

	Number of Fragments		
	F	UF	%F
Scapula	-	-	-
Pelvis	-	-	-
D. Humerus	6	-	-
P. Radius	-	-	-
P. Metapodia	5	-	-
<10 mths.	**11**	**-**	***100***
D. Tibia	3	-	-
D. Metapodia	4	-	-
Phalanx I	-	-	-
Phalanx II	-	-	-
1-2 years	**7**	**-**	***100***
Ulna	-	-	-
P. Femur	1	-	-
Calcaneum	-	-	-
D. Radius	1	-	-
2.5-3 years	**2**	**-**	***100***

P. Humerus	-	1	-
D. Femur	2	1	-
P. Tibia	-	-	-
3-3.5 years	**2**	**2**	*50*

The 64 fragments of bone identified as cattle largely represented the vertebral column and ribs, with some long bones and girdles (i.e. pelvis) present (Figure 3.2). Butchery marks were identified on 30 of the cattle fragments (46.9%). All of these marks were made by a saw, with marks indicative of carcass halving and quartering, as well as portioning for commercial resale. The remains also included a common cut from pelvis, that would be indicative of high-quality meat.[9] The epiphyseal fusion observed in the cattle remains from this context suggests that the a relatively high proportion of the remains were from individuals younger than two and a half years old (Table 3.7).

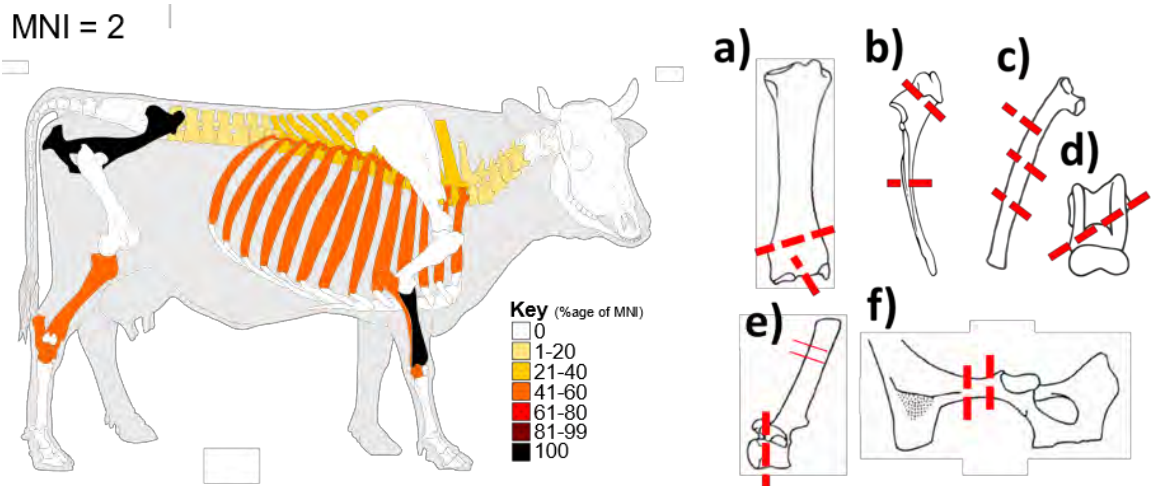

Figure 3.2: (Left). The skeletal element representation of the cattle remains from (215). (Right). The butchery marks identified on the cattle remains from (215) Dashed lines denote saw marks, thick red lines denote chop marks and thin red lines indicate cut marks. a) Radius; b) Ulna; c) Rib; d) Astragalus; e) Thoracic Vertebrae; f) Pelvis.

Table 3.7: The epiphyseal fusion status of cattle remains analysed from (215). Values are given as the Minimum Number of Elements (MNE). F = Fused, UF = Unfused.

	Number of Fragments		
	F	UF	%F
Scapula	-	-	-
Pelvis	-	-	-
D. Humerus	-	-	-
P. Radius	-	-	-
P. Metapodia	-	-	-
<10 mths.	**-**	**-**	**-**
D. Tibia	1	-	-
D. Metapodia	-	-	-
Phalanx I	-	-	-
Phalanx II	-	-	-

[9] Colley 2006

	Number of Fragments		
	F	UF	%F
1-2 years	**1**	**-**	***100***
Ulna	-	1	-
P. Femur	-	-	-
Calcaneum	1	1	-
D. Radius	-	2	-
2.5-3 years	**1**	**4**	***20***
P. Humerus	-	-	-
D. Femur	-	-	-
P. Tibia	2	-	-
3-3.5 years	**2**	**-**	***100***

As well as sheep and cattle, three fragments of bone were also identified as pig. Two of these fragments were from the hindlimb, while the third was from the ribs. None of these fragments displayed butchery marks and no further observations were made regarding them. The last domestic mammal identified in the remains was dog, with a single fragment of neonatal femur present (Figure 3.3). Four fragments of bone were identified as rabbit, with the upper forelimbs and lower hindlimbs represented. In addition to mammals, three fragments of bone were identified as chicken, with the pelvis, sacrum and ribs present. Lastly two fish scales were identified, as was a vertebra from a shark (Figure 3.3). It is also important to note that 11 fragments of bone displayed marks from dog gnawing and a single fragment displayed marks from rodent gnawing.

Figure 3.3: (Left). The neo-natal dog bone recovered from (215); anterior view above, posterior view below. (Right). The shark vertebra recovered from (215).

3.5 REMAINS ASSOCIATED WITH THE BOAT (UDHB1)

A total of 1008 fragments of bone were recovered from contexts associated with the boat (140). These are discussed below in terms of the nature of their association with the boat (Table 3.8). Given the significance of the vessel the remains from each of the different context groups are discussed in turn through the following section.

Table 3.8: The contexts associated with the boat (140), with their relationship to the vessel and number of fragments associated with each group of contexts

	UDHB1 Bilge Deposits	Contemporary Deposit Surrounding UDHB1 Prior to Being Covered by Sediment	Deposit Underlying UDHB1	Deposits Overlying UDHB1
Contexts	151, 154, 155, 157, 158, 159	149	249	132, 133, 141, 142, 152, 153, 156, 246
Number of Fragments	69	419	255	264

3.5.1 UDHB1 BILGE DEPOSITS (151, 154, 155, 157, 158, 159)

A total of 69 fragments of animal bone were analysed from deposits associated with the use of the boat. These remains were recovered from six individual contexts (Table 3.9), three of which were likely disturbed; the disturbed contexts are considered separately from the intact deposits below.

Table 3.9: The taxonomic identifications of the remains from the bilge deposits recovered from the boat. Values given in NISP. *These contexts were identified as disturbed.

Taxa / Context	Cattle	Sheep	Pig	Medium Mammal	Snapper	Fish, indet.	Total
151*	4	9	-	1	1	3	**18**
154*	1	6	-	-	2	2	**11**
155*	2	3	-	-	-	-	**5**
157	-	2	-	2	-	-	**4**
158	6	15	1	5	-	-	**27**
159	-	3	-	1	-	-	**4**
TOTAL	13	38	1	9	3	5	69

3.5.1.1 INTACT BILGE DEPOSITS

Animal bone was recovered from three contexts identified as intact bilge deposits (157, 158, 159). All of these remains were identified as domestic mammal, with sheep being the most abundant taxa. The sheep remains represented a minimum of one individual, with the vertebral column, forelimb and hindlimb represented (Figure 3.4). A relatively high portion (30%) of these sheep remains were butchered, with marks indicative of carcass halving and quartering (Figure 3.4). The skeletal element profile combined with the butchery suggests that the sheep remains from these contexts represent pre-butchered cut of meat as opposed to whole carcasses. All epiphyses observed in the remains were fused, suggesting that no juvenile animals were represented by these remains.

Six fragments of cattle were also present, with remains from the ribs and central vertebral column present. Butchery marks were observed on all of these fragments, with marks consistent with carcass halving, quartering, and further portioning for commercial meat sales (Figure 3.4). A single fragment was also identified as pig; a fragment of femur with cut marks running laterally across the shaft. The other eight fragments from these contexts could only be identified as 'Medium-Sized Mammal'. All but one of these fragments were ribs and were likely from sheep. A single fragment was from an unidentified long bone.

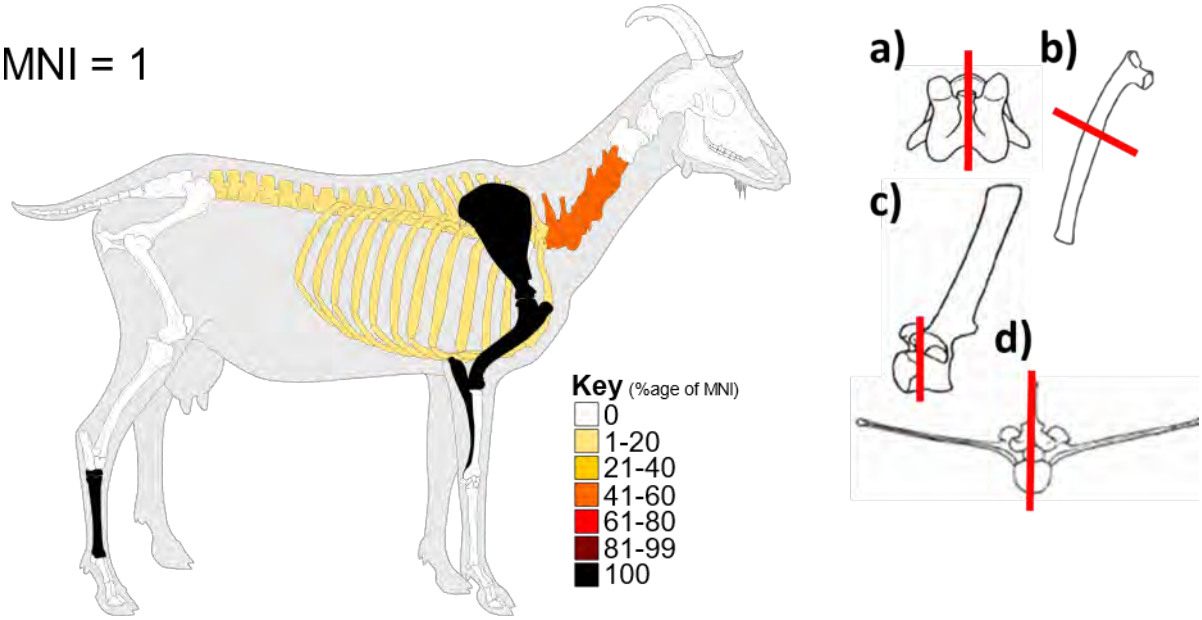

Figure 3.4: (Left). The skeletal element representation of the sheep remains from the intact boat bilge deposits. (Right). The butchery marks identified on the sheep remains from the intact boat bilge deposits. Red lines denote chop marks. a) Cervical vertebrae; b) Ribs; c) Thoracic vertebrae; d) Lumbar vertebrae.

3.5.1.2 DISTURBED BILGE DEPOSITS

Faunal remains were also recovered from three disturbed contexts associated with the boat's use (151, 154, 155). As with the contexts discussed in Section 3.1. domestic mammals were the most frequently identified taxa. Sheep were predominant, with fragments present from the forelimb, vertebral column and skull (Figure 3.6). Ten of these fragments (55.6%) display butchery marks (Figure 3.5), indicative of carcass skinning, halving and further portioning for meat sale. The skeletal element pattern and butchery marks observed on these remains, particularly those indicative of primary butchery (e.g. cut marks on the skull from skinning) suggest that these remains were partially from whole carcases. A single fragment was present from a sheep younger than 10 months of age.

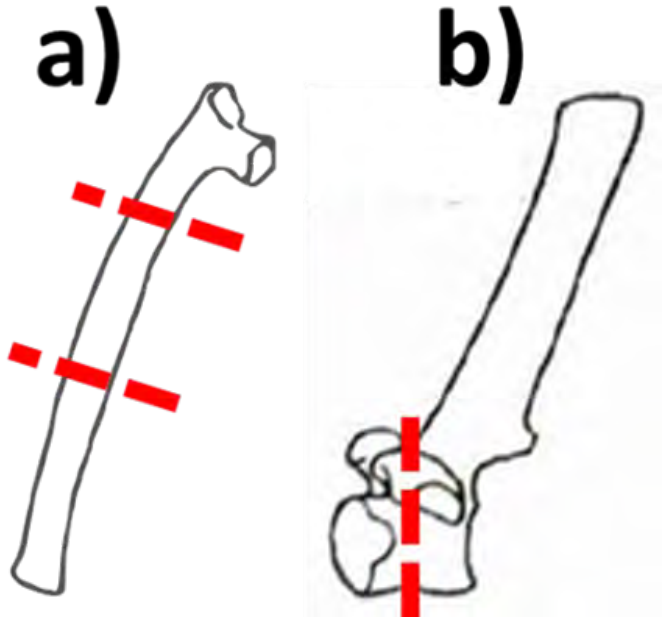

Figure 3.5: The butchery marks identified on the cattle remains from the intact boat bilge deposits. Dashed red lines denote saw marks. a) Ribs; b) Thoracic vertebrae.

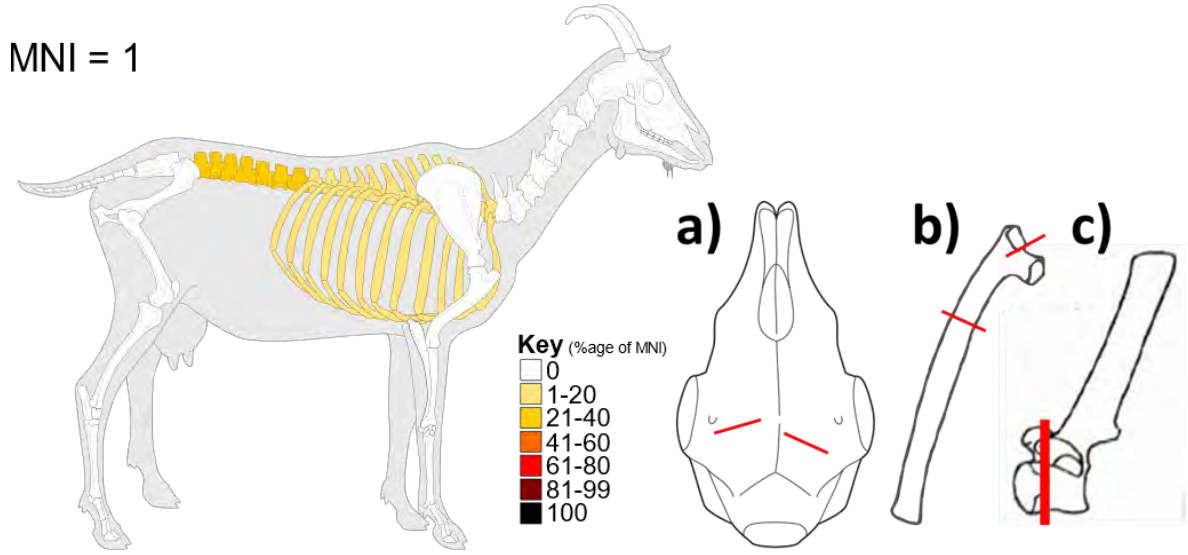

Figure 3.6: (Left). The skeletal element representation of the sheep remains from the disturbed boat bilge deposits. (Right). The butchery marks identified on the sheep remains from the intact boat bilge deposits. Thin red lines denote cut marks, thick red lines denote chop marks. a) Skull; b) Ribs; c) Thoracic vertebrae.

Seven fragments were also identified as cattle; one of these was an unidentifiable long bone, and the rest were from the vertebral column (Figure 3.7). Butchery marks were observed on four of these fragments, representing carcass halving and portioning for commercial meat sale. In addition to mammalian remains, eight fragments of fish were also present in the remains from these contexts, three of which were identified as snapper. All fragments of fish were from the head. Given the occurrence of this species in the Parramatta estuary,[10] the potential for these remains to have been deposited in these contexts due to natural processes rather than cultural processes, should be considered.

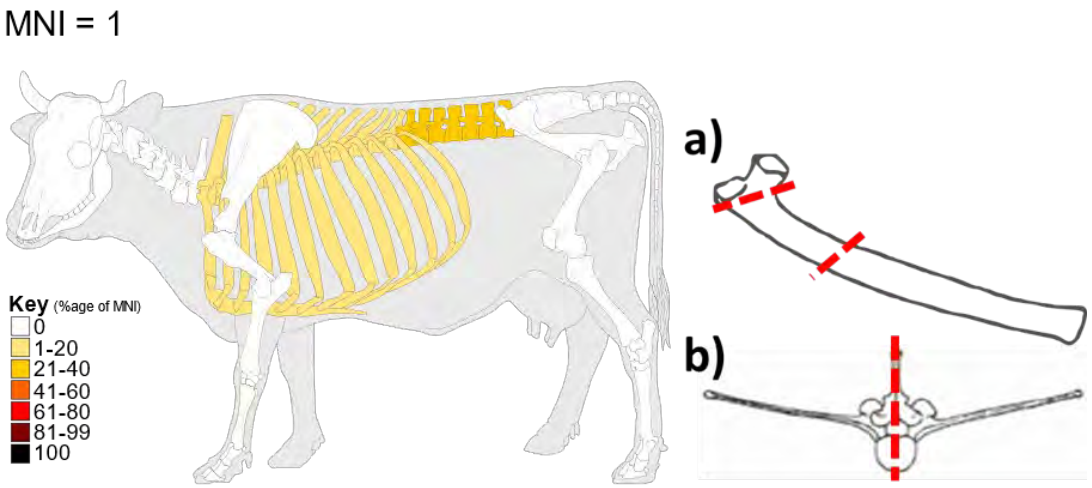

Figure 3.7: (Left) The skeletal element representation of the cattle remains from the disturbed boat bilge deposits. (Right) The butchery marks identified on the sheep remains from the intact boat bilge deposits. Thick red lines denote chop marks, dashed red lines denote saw marks. a) Ribs; b) Lumbar vertebrae.

[10] Paulin 1990

3.5.1.3 DISCUSSION

The animal bones from the intact bilge deposits are from domestic mammals (cattle, sheep and pig), the majority of which display butchery marks. This suggests that the bones are the remains of individuals meat joints, as opposed to full carcasses. On the other hand, the remains from the disturbed bilge deposits represent a full sheep carcass, including a skull, and butchered cattle remains. The presence of sheep skull and the identification of butchery marks indicative of the skinning process, suggest that this fragment is associated with primary butchery; i.e. slaughtering and skinning. Due to the extensive slaughtering and butchery that took place around Darling Harbour throughout the early 1800s and the high levels of related pollution into the waterbody (see Section 4.2), these remains were re-deposited in these contexts by tidal action. The fish fragments present in these contexts were also likely deposited as a result of this same action.

3.5.2 CONTEMPORARY DEPOSIT SURROUNDING THE BOAT (149)

Remains were recovered from a single deposit, (149), that surrounded the vessel prior to it being covered by overlying deposits. This context yielded the greatest number of fragments out of all the contexts, with a total of 419 fragments analysed from it (Table 3.10).

Table 3.10: The taxonomic identifications of the remains from (149). Values given in NISP.

Context / Taxa	Cattle	Sheep	Pig	Dog	Hare	Large	Medium Mammal, indet.	Goose	Chicken	Curlew	Snapper	Bream	Fish, indet.	TOTAL
149	98	222	13	1	1	7	35	2	6	3	11	2	18	419

Sheep were by far the most predominantly identified taxa, with sheep remains representing entire carcasses with a clear predominance of the lower hindlimb, the upper fore and hindlimb and the skull (Figure 3.8). A large number of these fragments (41.4%) displayed butchery marks. The butchery marks reflected a number of activities, from skinning to carcass halving and quartering, to the eventual hanging of meat joints (Figure 3.9). The presence of whole sheep carcasses with this array of butchery marks is strongly indicative of industrial slaughtering and subsequent butchery. The epiphyseal fusion observed in the remains from this context suggested that, while no juvenile animals (younger than 10 months) were present in the remains, a large number of the remains were from younger adults, and very few of the remains came from individuals older than 3.5 years of age (Table 3.11).

A large number of cattle remains were also identified in the assemblage from (149). Upper hindlimbs and lower forelimbs were predominant, as were elements from the vertebral column (Figure 3.10). The majority of the remains (75.5%) displayed butchery marks, representative of carcass halving, quartering and further portioning for commercial sale (Figure 3.10). The majority of epiphyses observed in the cattle remains from the context were fused, suggesting that adult animals were largely represented by these remains. The 13 fragments identified as pig were largely rib fragments, with some fragments of upper and lower forelimb, as well as the lower vertebral column. Four of these rib fragments displayed butchery marks, with cut marks through their shafts. Additionally, all observed epiphyses were unfused suggesting that only juvenile animals were present in these remains.

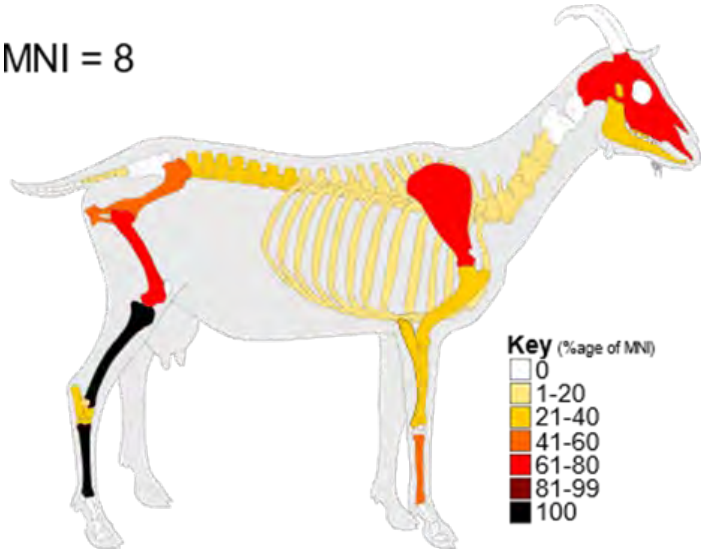

Figure 3.8: The skeletal element representation of the sheep remains from (149).

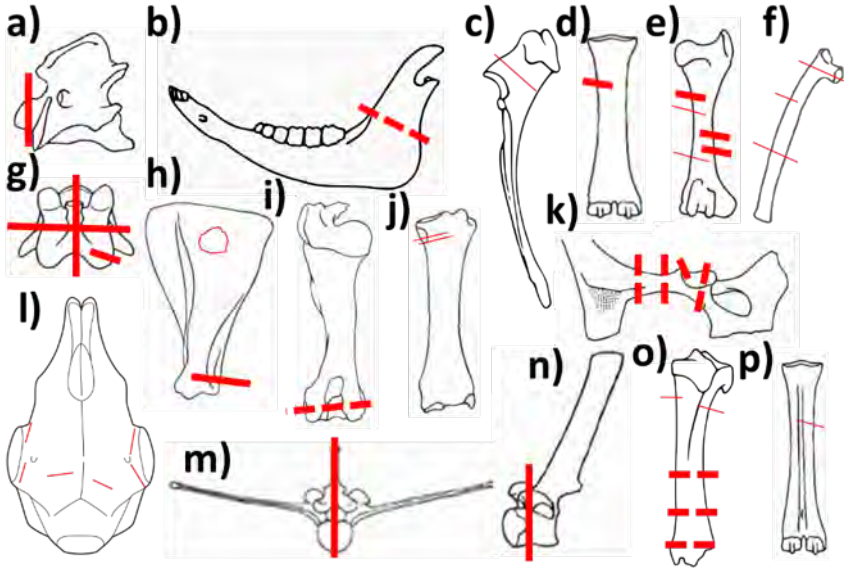

Figure 3.9: The butchery marks identified on the sheep remains from (149). Thick red lines indicate chop marks, thin red lines indicate cut marks, dashed red lines denote saw marks. a) Axis vertebrae; b) Mandibles; c) Ulna; d) Metacarpal; e) Femur; f) Ribs; g) Cervical vertebrae; h) Scapula; i) Humerus; j) Radius; k) Pelvis; l) Skull; m) Lumbar vertebrae; n) Thoracic vertebrae; o) Tibia; p) metatarsal.

Table 3.11: The epiphyseal fusion status of sheep remains analysed from (249). Values are given as the Minimum Number of Elements (MNE). F = Fused, UF = Unfused, FS = Fusing.

	Number of Fragments			
	F	UF	%F	FS
Scapula	10	-	-	*1*
Pelvis	-	-	-	-
D. Humerus	3	-	-	-
P. Radius	4	-	-	-
P. Metapodia	16	-	-	-
<10 mths.	33	-	*100*	*1*
D. Tibia	6	-	-	-
D. Metapodia	15	3	-	-

	Number of Fragments			
	F	UF	%F	FS
Phalanx I	-	-	-	-
Phalanx II	-	-	-	-
1-2 years	21	3	*87.5*	-
Ulna	3	-	-	*1*
P. Femur	2	1	-	*1*
Calcaneum	5	-	-	-
D. Radius	1	1	-	*2*
2.5-3 years	11	2	*84.6*	*4*
P. Humerus	1	1	-	*1*
D. Femur	1	4	-	*3*
P. Tibia	-	2	-	*1*
3-3.5 years	2	7	*22.2*	*4*

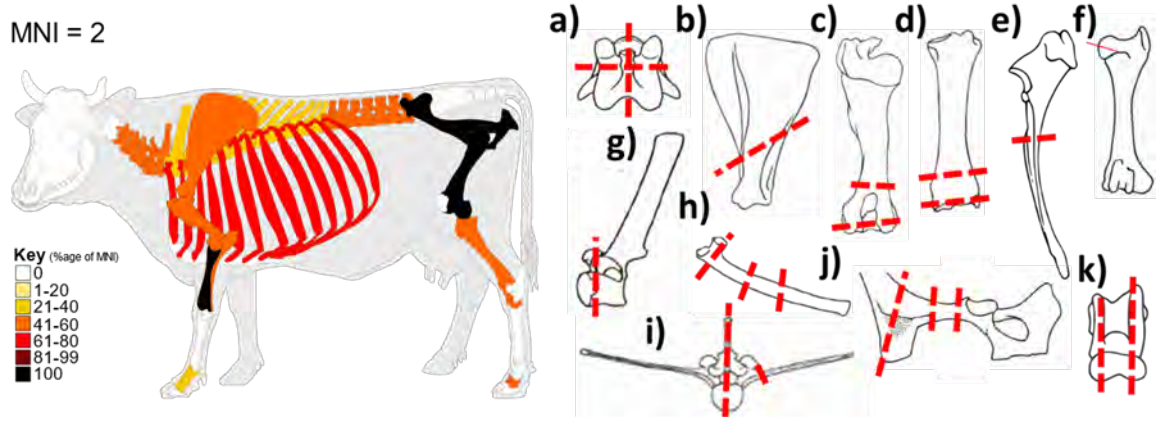

Figure 3.10: (Left). The skeletal element representation of the cattle remains from (149). Figure 11 (Right). The butchery marks identified on the cattle remains from the (149). Thick red lines denote chop marks, thin red lines indicate cut marks, dashed red lines denote saw marks. a) Cervical vertebrae; b) Scapula; c) Humerus; d) Radius; e) Ulna; f) Femur; g) Thoracic vertebrae; h) Ribs; i) Lumbar vertebrae; j) Pelvis; k) Astragalus.

In addition to cattle, sheep and pig, single fragments were identified as dog and hare. The fragments identified as dog was from the pelvis and the fragment of hare was from the upper forelimb. No further observations were made on these fragments. Three species of bird were also identified in the remains from (149); goose, chicken and curlew. The fragments of chicken represented the wing, the leg and the sternum, and the goose remains represented the wing. A fragment of goose humerus has a cut mark across its shaft. The fragments of curlew were both from the wing. Fish remains were frequently identified in this context, with both snapper and bream being identified. Elements were present from the head and the body, and both of these species are local to Sydney harbour. It is also important to note that 12.6% of the assemblage had displayed gnawing marks; the majority of these marks were from rodents, however cat and dog gnawing was also identified. Two fragments of bone displayed heavy water damage.

3.5.2.1 DISCUSSION

The sheep and cattle fragments from this context represent full carcasses and have butchery marks representative of all stages of the butchery process. These remains are

therefore best interpreted as the remains of industrial slaughter and butchery. This corroborates with known activity around Darling Harbour during the first half of the 1850s (see Section 4.2). It is unclear whether these remains relate to activity that can be specifically associated with Clyde Street or at Langford's Wharf. The remains of dog, hare, birds and fish did not fit this pattern, and instead it is likely that these fragments represent debris from the estuary, deposited in this context by tidal action. This hypothesis is reinforced by the presence of two fragments of bone displaying heavy water damage.

3.5.3 DEPOSIT UNDERLYING THE BOAT (249)

Remains were recovered from a single context underlying the boat, (249). A total of 255 fragments were analysed from this context, with a wide range of taxa identified (Table 3.12).

Table 3.12: The taxonomic identifications of the remains from the deposit underlying UDHB1. Values given in NISP.

Context \ Taxa	Cattle	Sheep	Pig	Dog	Cat	Large [illegible]	Medium Mammal indet.	Goose	Chicken	Small [illegible]	Snapper	Fish, indet.	TOTAL
249	47	143	15	1	2	5	21	1	2	1	3	14	255

Domestic mammals were the most frequently identified taxa, with sheep being predominant. The sheep remains represented entire carcasses, with a slight preponderance of the upper forelimb, lower hindlimb, mandible and upper vertebral column (Figure 3.11). A relatively large proportion (35.7%) of these remains displayed butchery marks consistent with the entire butchery process, from skinning, carcass halving and quartering and then further carcass portioning for commercial sale (Figure 3.12). Furthermore, three scapulae were recovered with holes punctured in their blades, which likely reflect the hanging of meat cuts, for storage or for sale purposes (Figure 3.12). The epiphyses identified in the sheep remains were largely observed to be fused, suggesting that most of the animals represented were adult when they died (Table 3.13). Additionally, tooth-wear analysis undertaken on three mandibles from this context suggested that two of the mandibles were from individuals between the ages of 3 - 4 years old, and the third mandible was from an individual aged between the ages of 4 - 8 years.

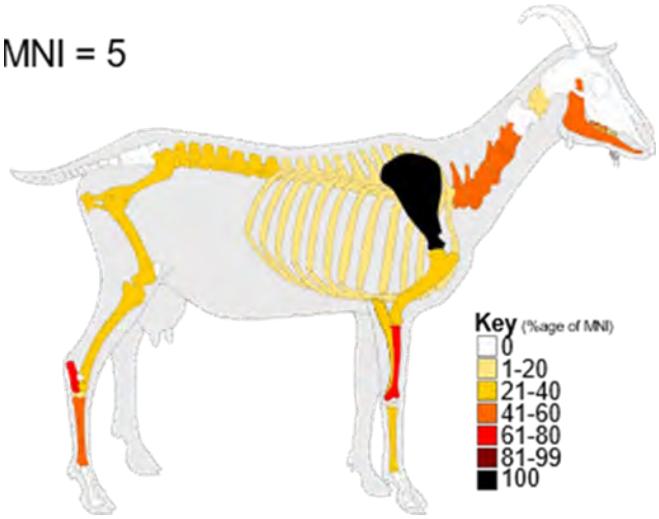

Figure 3.11: The skeletal element representation of the sheep remains from (249).

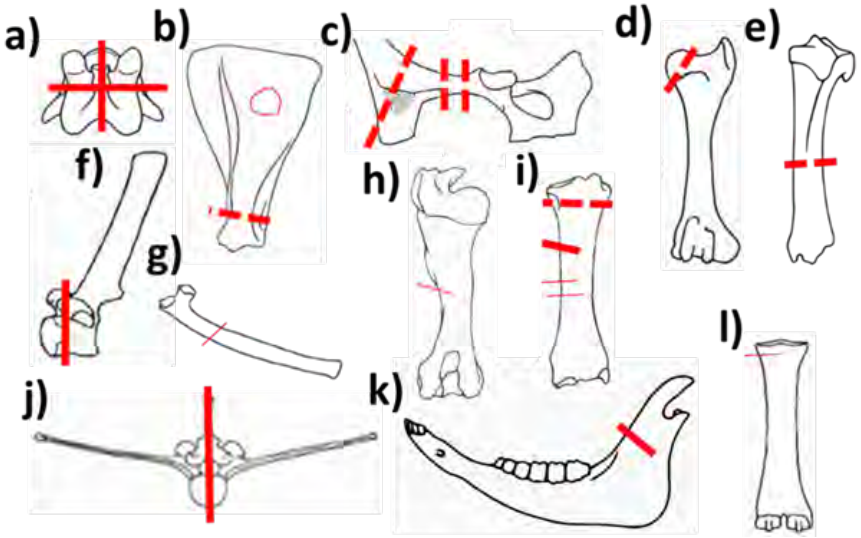

Figure 3.12: The butchery marks identified on the sheep remains from the (249). Thick red lines denote chop marks, thin red lines indicate cut marks, dashed red lines denote saw marks. a) Cervical vertebrae; b) Scapula; c) Pelvis; d) Femur; e) Tibia; f) Thoracic vertebrae; g) Ribs; h) Humerus; i) Radius; j) Lumbar vertebrae; k) Mandible; l) Metacarpal.

Table 3.13: The epiphyseal fusion status of sheep remains analysed from (249). Values are given as the Minimum Number of Elements (MNE). F = Fused, UF = Unfused.

	Number of Fragments		
	F	UF	%F
Scapula	7	-	-
Pelvis	-	-	-
D. Humerus	3	-	-
P. Radius	3	-	-
P. Metapodia	8	-	-
<10 mths.	21	-	*100*
D. Tibia	2	-	-
D. Metapodia	4	-	-

	Number of Fragments		
	F	UF	%F
Phalanx I	-	-	-
1-2 years	6	-	*100*
Ulna	1	-	-
P. Femur	1	1	-
Calcaneum	5	1	-
D. Radius	1	2	-
2.5-3 years	8	4	*66*
P. Humerus	-	-	-
D. Femur	-	1	-
P. Tibia	3	-	-
3-3.5 years	3	1	*75*

Cattle remains were also well represented in the assemblage from this context. The cattle remains represented are largely from meat bearing elements, however remains from the lower limb, vertebral column and teeth are also present (Figure 3.13). 28 fragments of cattle bone (59.6%) displayed butchery marks, reflecting carcass halving, quartering and further portioning for commercial resale (Figure 3.13). All of the epiphyses identified in the cattle remains were fused, suggesting that no juveniles were present in the remains. In addition to cattle, 15 fragments of pig were also present. Some aspects of the pig bone assemblage provided insight into the demographic of the pigs represented by these remains. A fused distal tibia was identified, highlighting the presence of an individual over the age of 2 years old in the remains. Additionally, a canine was identified as pig that had an open root, suggesting that it was from a male animal.

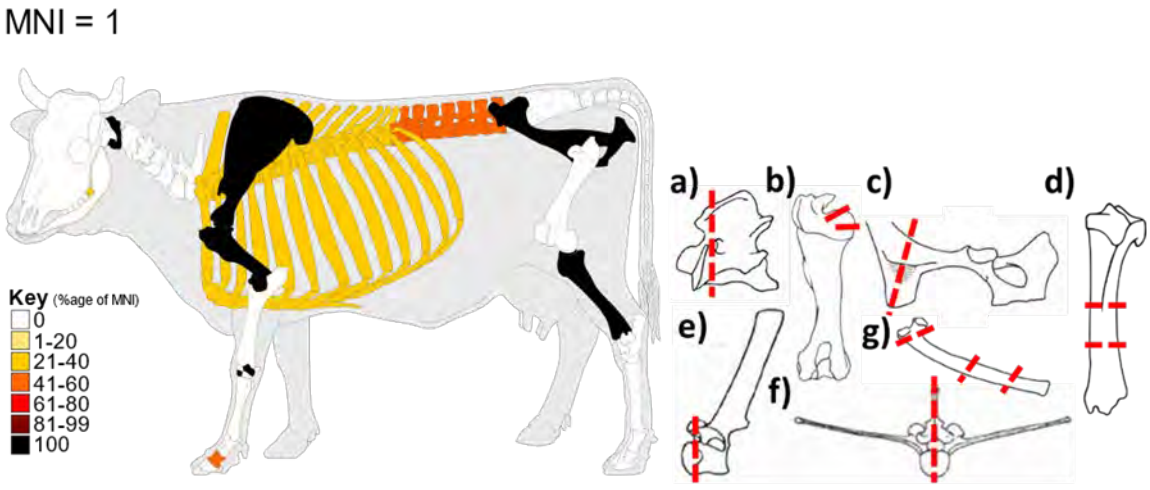

Figure 3.13: (Left). The skeletal element representation of the cattle remains from (249). (Right). The butchery marks identified on the cattle remains from (249). Thick red lines denote chop marks, dashed red lines denote saw marks. a) Axis vertebrae; b) Humerus; c) Pelvis; d) Tibia; e) Thoracic vertebrae; f) Lumbar vertebrae; g) Ribs.

A single fragment of bone from (249) was identified as dog, and another two fragments were identified as cat. The fragment of dog was from the lower forelimb and little else can

be said about it. The two fragments of cat represented a jaw and an upper forelimb. These fragments were from an animal over the age of 1 year old. Birds and fish were also identified in the remains from this context. Two fragments of bone were identified as chicken, one as goose and one as a small wading bird. The two fragments identified as chicken were from the leg and a vertebra and the fragment of goose was from the wing. Little else can be said about these fragments aside from noting their presence. The fragment of small wading bird could not be identified to species, however it was likely extant within the estuarine environment. Of the 15 fragments identified as fish, one could be further identified as snapper. The majority of fish fragments were from the vertebrae and, given the context from which they were recovered, were likely naturally deposited at the site.

Gnawing marks were observed on 11.4% of the remains from this context, with both dog and rodent gnawing being identified. These gnawing marks suggest that these bones were accessible to scavengers and were likely exposed on the surface. Nine fragments from this context displayed water damage and surface abrasion from interactions with sand.

3.5.3.1 DISCUSSION

The composition of the animal bone assemblage recovered from the deposits underlying the boat strongly reflect the slaughtering and other butchery operations that occurred around Darling Harbour and along Sydney's shoreline. This activity is known to have polluted the estuary and these bones are likely part of that pollution (see Section 4.2). In addition to remnants of this activity, the remains from this context also consist of fragments of species that were probably not involved in this activity (fish, wading birds etc.) and were likely naturally deposited in this intertidal zone. The presence of abraded and water damaged fragments are further evidence for these remains being part of intertidal deposits.

3.5.4 DEPOSITS OVERLYING THE BOAT (132, 133, 141, 142, 152, 153, 156, 246)

A total of 264 fragments were recovered from eight contexts overlying the boat (Table 3.14). These contexts span a wide area, yet have been grouped together below where appropriate, for ease of discussion.

Table 3.14: The taxonomic identifications of the remains from the deposit underlying UDHB1. Values given in NISP

Context / Taxa	132	133	141	142	152	153	156	246	TOTAL
Cattle	-	36	1	11	11	-	1	-	60
Sheep	2	69	4	15	21	-	2	4	116
Pig	-	12	-	1	7	-	-	-	20
Dog	-	1	-	-	-	-	-	-	1
Large mammal, indet.	-	4	-	-	-	-	-	1	5
Medium mammal, indet.	-	21	-	2	9	2	6	-	40
Sperm Whale	-	-	-	1	-	-	-	-	1
Chicken	-	7	1	-	-	-	-	-	8
Gull	-	1	-	-	-	-	-	-	1
Snapper	-	9	-	-	-	-	-	-	9
Fish, indet.	-	1	-	-	1	-	-	-	2
Turtle	-	1	-	-	-	-	-	-	1
Total	**2**	**162**	**6**	**30**	**49**	**2**	**9**	**5**	265

3.5.4.1 DEPOSIT BETWEEN FRAMES/FUTTOCKS AND HULL (246)

A small number of bone fragments were analysed from a deposit located between the frames and hull of the boat (246). Four of the fragments were identified as sheep and a single fragment could only be identified as large-sized mammal. The sheep fragments represented the upper and lower vertebral column. No butchery marks were identified on these remains and little else could be said about these fragments.

3.5.4.2 THIN LAYER OF CLAY ABOVE CEILING PLANKS (152, 153, 156)

A total of 60 fragments of bone were analysed from this deposit. The deposit was divided into three contexts based upon location relative to the boat; (152) midship, (153) bow and (156) stern. The majority of remains were recovered from the midship. Sheep were the predominantly identified species in these remains, with entire carcasses represented and a predominance of upper fore and hindlimbs (Figure 3.14). A number of these remains had been butchered, representing skinning and carcass portioning for commercial resale (Figure 3.14). All of the epiphyses identified in the sheep remains were fused, suggesting that only adults were represented in the remains.

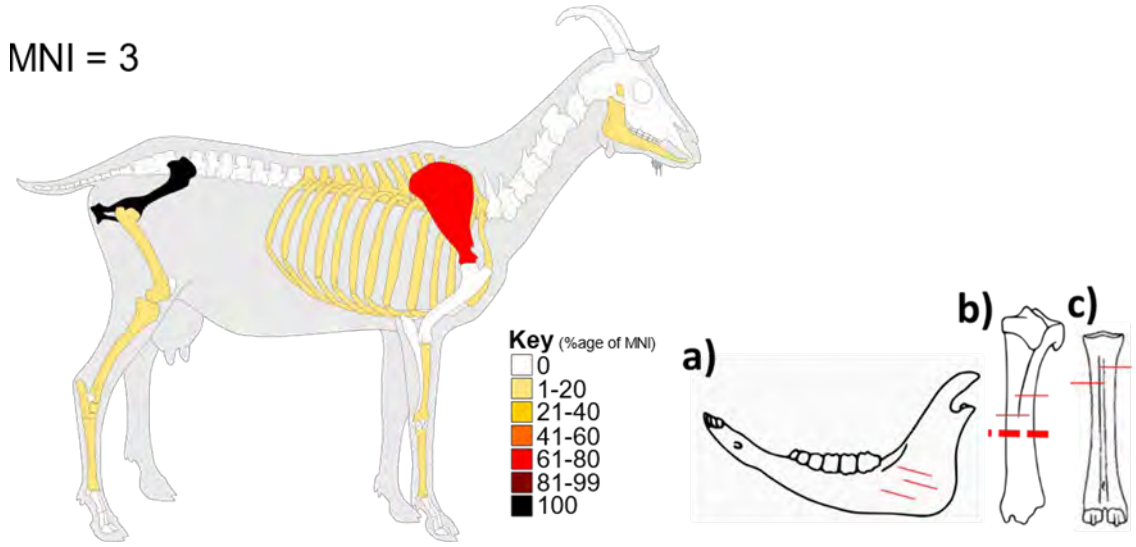

Figure 3.14: (Left). The skeletal element representation of the sheep remains from (133). (Right). The butchery marks identified on the sheep remains from the (249). Thick red lines denote chop marks, thin red lines indicate cut marks, dashed red lines denote saw marks. a) Cervical vertebrae; b) Scapula; c) Humerus; d) Ulna; e) Ribs; f) Femur; g) Tibia; h) Skull; i) Thoracic vertebrae; j) Lumbar vertebrae.

Eleven fragments from this context were identified as cattle; 8 of these were from ribs and three were from thoracic vertebrae. All of the vertebral fragments had been sawn though axially, indicative of carcass halving, and four of the ribs had been sawn through their shafts. Seven fragments of bone were identified as pig, with the lower forelimb and vertebral column represented. The single vertebral fragment had been chopped through axially, which as with the aforementioned cattle vertebrae, is indicative of carcass halving. A single fragment of fish vertebra was also present in the assemblage, however little else can be said about the fragment.

Nine fragments were recovered from the stern, two of which were identified as sheep and one of which was identified as cattle. The sheep fragments were from the lumbar vertebrae and the lower hindlimb, and the cattle fragment was from a thoracic vertebra. The

remaining 6 fragments could only be identified as medium-sized mammal, and consisted of three skull fragments and three rib fragments.

Only two fragments of bone were recovered from the bow; both of these were identified as indeterminate long bone from an indeterminate medium-sized mammal. Little else could be said about these fragments.

3.5.4.3 OVERLYING DEPOSITS INSIDE THE BOAT (141, 142)

Two deposits were overlying the deposits discussed in Section 3.5.4.2. These deposits filled the boat cavity entirely, with (142) being deposited prior to (141). The characteristics of the sheep and cattle remains in (142) were identical in nature to those described in Section 3.5.4.2. Notably, the faunal assemblage from (142) included the tooth of a sperm whale (Figure 3.15). This fragment was the only whale identified in the entire assemblage associated with the boat (140), and it is therefore difficult to assign a provenance to it (see Section 4.2).

Figure 3.15: A sperm whale tooth recovered from (142).

Only six fragments of bone were analysed from (141). Four of these fragments were identified as sheep, with single fragments being identified as cattle and chicken. The sheep remains were from the vertebral column and upper forelimb, with butchery marks indicative of carcass halving observed on the vertebral fragments. The cattle fragment was from the rib and no other observations were made regarding it. The chicken fragment was from the leg and was identified as juvenile based upon the porous nature of the bone surface.

3.5.4.4 DEPOSITS OVERLYING ENTIRE BOAT (132, 133)

Two deposits covered the entire boat and its immediate surroundings (132, 133). Context (133) was situated at the stern of the boat, whereas (132) was situated at the bow. A total of 162 fragments were recovered from (133). Sheep were the predominant taxa in the

remains from this context; complete carcasses were represented, with a predominance of the hindlimb, forelimb and skull (Figure 3.16). The butchery marks observed on these remains are representative of carcass halving, quartering and further portioning for commercial resale (Figure 3.16). All of the observed epiphyses in the sheep remains from this context were fused, suggesting that only adult individuals were represented by these remains.

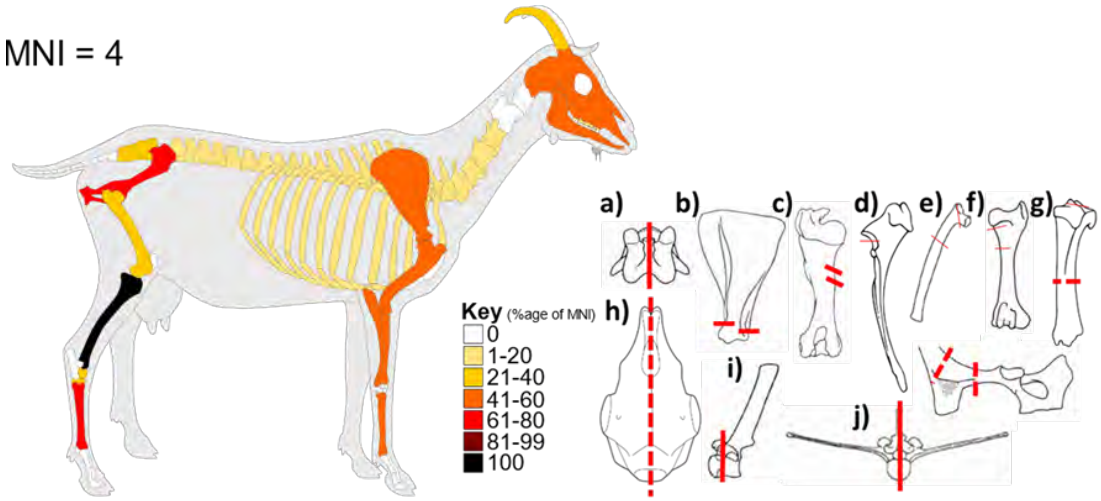

Figure 3.16: (Left). The skeletal element representation of the sheep remains from (133). (Right). The butchery marks identified on the sheep remains from the (249). Thick red lines denote chop marks, thin red lines indicate cut marks, dashed red lines denote saw marks. a) Cervical vertebrae; b) Scapula; c) Humerus; d) Ulna; e) Ribs; f) Femur; g) Tibia; h) Skull; i) Thoracic vertebrae; j) Lumbar vertebrae.

Cattle remains were also numerous in the assemblage from this context; full carcasses were represented, with a predominance of hindlimb. All of the butchery marks observed on these remains reflected carcass halving and quartering, and all observed epiphyses were fused suggesting that only adults were present in the assemblage. The 12 fragments of pig identified in the remains were comprised primarily of the vertebral column, as well as the upper forelimb. The only identified epiphysis in the remains was unfused, demonstrating the presence of at least one individual younger than 2 years old in the remains.

Only two fragments were analysed from (132). Both of these were identified as sheep and were from the lower forelimb. Neither of the fragments displayed butchery marks and little else can be said about them.

3.5.4.5 DISCUSSION

When considered as a whole, the remains from (152, 153, 156) represent remains from the entire carcass of sheep and cattle, as do the remains from (142, 133). This suggests that the faunal remains in the overlying deposits had generally the same provenance, or reflect the same activity; the industrial slaughtering and butchering that occurred intensively around Darling Harbour. This does not mean that all of the remains in these deposits came from this activity, however it seems that a major factor in the formation of this faunal assemblage was the redeposition of waste from the slaughtering and butchery industry that polluted Darling Harbour, in close proximity to the study area (see Section 4.2). The small number of disarticulated fragments from species such as turtle, whale and marine birds strengthens this conclusion, as the remains of these species could have easily been

deposited naturally in Darling Harbour or the wider Sydney shoreline, before being washed up and redeposited in the study area.

4.0 REPORT SUMMARY & RESULTS

The remains outlined above provide insight into two important aspects of the archaeology at Barangaroo Station; the remains associated with the occupation of Area Z and the remains that were found in association with the boat UDHB1. These are discussed separately below, due to the very different nature of the remains from the areas.

4.1 REMAINS FROM AREA Z

The remains from Area Z have much greater potential to inform on the human occupation of this area of the site, than those remains from Areas X and Y. The remains from (205) potentially show insights into the diets of the occupants of property, or maybe even the wharf workers, who were interacting with this area of the site during this period. The presence of sheep and chicken is not surprising, as both of these species are well represented in contemporary zooarchaeological assemblages from Sydney,[11] including the assemblage from the adjacent site of Barangaroo South.[12]

The remains from the cistern associated with a pre-1910s house on Wentworth Street provide significant insight into the nature of the food resources that were being consumed by the occupants of this house. The prevalence of sheep and cattle in these remains is widely observed in contemporary zooarchaeological assemblages from sites in Sydney and adjacent regions.[13] The populations of these animals in Australia were expanding dramatically during this period,[14] and it is therefore expected that they would form the bulk of the meat diet consumed at this site.

The predominance of upper hind limbs and forelimbs in the sheep assemblage from (215) is reflective of mid to high-quality meat cuts,[15] and indicate that sheep meat was predominantly brought to the site in the form of pre-cut joints of meat. It should be noted here that the wider sheep economy and the price of meat for the period must be considered before inferring the socio-economic status on the household from these cuts. The presence of sheep crania in the assemblage may reflect the consumption of whole sheep heads, for which there are several recipes for in contemporary cookbooks.[16] They may also suggest that sheep were occasionally brought to the site to be slaughtered, however a lack of extremities and elements from the mid-vertebral column suggests that whole carcasses are not present.

The predominance of pelvis, and abundance of mid-lower vertebral column in the cattle remains from (215) are indicative of high-quality meat cuts.[17] This is contrasted by the predominance of lower forelimb and abundance of lower hindlimb, which represent very low-quality cuts of meat. As with the sheep remains, the wider cattle market and price of meat in the region must be taken into account when inferring the economic status of the house's occupants from this evidence.

The paucity of fish in the remains is notable, and should be discussed further. Fish are commonly identified in assemblages from contemporary sites and the fishery was a major

[11] Blake 2010; Fillios 2010, 2014; Roberts 2020

[12] Fillios 2014

[13] Blake 2010; Fillios 2010, 2014; Roberts 2020

[14] Dale 2007

[15] Colley 2006

[16] Connor 2016: 88

[17] Colley 2006

industry and food source at this time.[18] The paucity of fish in the remains from the contexts discussed in this report is mirrored by a paucity of fish in the remains from the adjacent site of Barangaroo South.[19] This aspect of the assemblage is hard to interpret and may be due to a multitude of factors; fish consumption has been linked to households lower socio-economic status,[20] however different fish species have been evidenced to be preferred by the upper classes elsewhere in the world therefore caution must be taken when making inferences regarding the socio-economic status of a household based upon the presence/absence of fish remains.[21]

The presence of a neonatal dog in the remains is also worthy of a brief mention here. It is clearly unlikely that this fragment derives from dietary waste, and instead likely reflects the occupants of the site keeping dogs, or the presence of feral dogs in the area of the site. The identification of canid gnawing marks on a number of the fragments from (215) is further evidence of dogs being active at the site, and also suggest that the remains were exposed on the surface and available to dogs for a period of time. Additionally, the identification of rodent gnawing on some of the remains is indicative of the presence of rodents at the site, however the relative absence of rodent gnawing and rodent remains is notable given the site's location, and is also reflected in the remains from the site of Barangaroo South.[22]

4.2 REMAINS ASSOCIATED WITH UDHB1

The remains discussed in Section 3.5 are the only fragments in the assemblage that can be definitively linked to the operation of the timber boat (UDHB1) and the related activity at Langford's Wharf. These remains suggest that pre-butchered meat cuts of beef, pork and mutton were onboard the vessel at some point during its operation. The remains in deposits underlying, contemporary with and overlying the boat have characteristics that are similar to one another, with whole carcasses with heavy butchery marks represented. While it may be tempting to relate these remains back to activity undertaken at Langford's House or Clyde Street more generally, the presence of a number of slaughterhouses in the area that were depositing waste into Darling Harbour make the remains harder to provenance.

A number of slaughterhouses had established themselves around Darling Harbour in the 1820s,[23] following concerns regarding the slaughtering industry polluting the Tank Stream and the danger to public safety posed by driving cattle herd through Sydney Centre.[24] An act regulating the driving and slaughter of cattle through Sydney passed by Governor Darling in 1830 cemented the importance of Darling Harbour, and the waterfront more generally, to the slaughtering industry;

[18] Blake 2010; Colley 2013; Fillios 2010; Roberts 2020

[19] Fillios 2014

[20] Torres 1997

[21] Colley 2013: 128

[22] Fillios 2014

[23] 'Classified Advertising', Page 3 – The Sydney Gazette and New South Wales Advertiser, Friday 25th January 1828; 'The New Slaughter-house, Darling Harbour', Page 3 – The Sydney Gazette and New South Wales Advertiser, Friday 12th December 1828; 'Chamber of Commerce', Page 2 – The Sydney Gazette, Saturday 25th July 1829; 'Advance Australia Sydney Gazette and New South Wales Advertiser', Page 2 – The Sydney Gazette and New South Wales Advertiser, Saturday 2th October 1829.

[24] 'The Races' – The Monitor, Friday 23rd June 1826; 'Mr Atkinson's Book' – The Sydney Gazette and New South Wales Advertiser, Saturday 20th January 1827.

> "...and it be further enacted that no Slaughter-house, or Place of slaughtering Cattle, shall be licensed in any Town, unless within 60 feet of a creek or river..."[25]

This situation continued until 1860, when public slaughtering houses were opened on Glebe Island.[26] This followed an extensive debate in both public and legislative forums,[27] with many citing concerns regarding the pollution of Sydney's harbour by the multiple slaughterhouses operating there.[28] It is therefore likely that some of the animal bone is related to this activity, particularly due to the apparent practice of depositing offal into the harbour,[29] and a number of slaughterhouses producing salt beef and pork which involves removing and discarding bone.[30] The ubiquity of this activity around Darling Harbour and the effects of taphonomic processes (i.e. tidal action) makes it impossible to relate any of the remains back to activity on Clyde Street specifically. The identification of a number of disarticulated and individual bone fragments from marine species identified throughout the assemblage, provides further indication that tidal processes had a key role in the formation of this assemblage.

The sperm whale tooth identified in the remains from (142) is an important component of this assemblage, and is worthy of further discussion here. A sperm whale fishery was operated in Sydney as early as the 1820s,[31] and many of the wharfs along Darling Harbour were advertised as being appropriate to be a base for whaling activity.[32] This tooth may be the remains of this activity occurring in Darling Harbour and whale carcasses being brought back to the area for processing, however there is a lack of any other whale remains which would be expected if whale carcasses were being processed in the area. As discussed above with reference to the remains of other marine species, it seems likely that this tooth was redeposited in the study area from elsewhere.

4.3 SUMMARY

The remains from the archaeological features, drain (203) and cistern (206) in Area Z provide some insight into the nature of the occupants of this area of the site in the associated periods. The remains from Cistern (206) demonstrate that the occupants of Area Z during this occupation phase had access to high-quality meat cuts of both sheep and cattle, yet were also consuming lower quality meat cuts. Pig, chicken and rabbit infrequently contributed to the diet of the occupants. Fish, including shark, were also infrequent contributions; the absence of fish in these remains, which is mirrored in the remains from the site of Barangaroo South, is notable given their preponderance on other contemporary sites from the area.

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[25] 'Anno Undecimo', Page 4 – The Sydney Gazette and New South Wales Advertiser, Saturday 3rd April 1830.

[26] 'Sydney Slaughter-houses and the Glebe Island Abattoirs', Page 4 – The Sydney Morning Herald, Saturday 10th April 1858.

[27] 'Legislative Council', Page 2 – Sydney Chronicle, Thursday 20th April 1848; 'Legislative Council', Page 2 – The Sydney Morning Herald, Wednesday 7th June 1848; 'Public Abattoirs', Page 9 – Freeman's Journal, Thursday 24th 1852; 'The Abattoirs', Page 3 – The Sydney Morning Herald, Thursday 3rd December 1852.

[28] 'Abstract of the Evidence Taken Before the Select Committee on Slaughter-Houses', Page 2 – The Sydney Morning Herald, Thursday 22nd June 1848.

[29] 'Abstract of the Evidence Taken Before the Select Committee on Slaughter-Houses', Page 2 – The Sydney Morning Herald, Thursday 22nd June 1848.

[30] 'The New Slaughter-house, in Darling Harbour', Page 4 - The Sydney Gazette and New South Wales Advertiser, Thursday 1st January 1829.

[31] 'Colonial Times', Page 3 – Colonial Times (Hobart), Friday 27th February 1829.

[32] 'Classified Advertising', Page 1 – The Sydney Gazette and New South Wales Advertiser, Tuesday 11th May 1830; 'Classified Advertising', Page 1 – The Sydney Gazette and New South Wales Advertiser, Saturday 12th June 1830.

A small portion of the animal bone assemblage from contexts associated with the timber boat (140 - UDHB1) (i.e. Section 3.5.1) can be directly related to the operation of the vessel, and suggest that pre-butchered meat cuts were onboard the vessel at some point during its operation. The remaining assemblage from the contexts associated with the boat appears to reflect the slaughtering and butchery industry that was incredibly active at Darling Harbour from the 1820s to the 1850s. While some of the remains discussed in this report *may* be direct waste from activities at Langford's Wharf or Clyde Street, the intense deposition of faunal remains into the harbour from nearby slaughterhouses, combined with taphonomic agents active in the harbour (i.e. tidal processes) prohibits conclusively linking these remains to the activities of any particular wharf. Despite this, these remains provide information regarding the wider industrial landscape in which Langford's Wharf was situated. In that sense, these faunal remains are an integral part of the archaeology surrounding the boat and greatly help to place the activity at Langford's Wharf into the wider industrial complex of Darling Harbour.

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

SHELL REPORT

MARCH 2022

VOLUME 3, SECTION 3.6

Sydney rock oysters on wooden planks of UDHB1 (photo courtesy of Casey & Lowe)

FINAL REPORT | Report to **Sydney Metro**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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CONTENTS

Report Status	Date Submitted	Purpose	Author	Reviewed
Final Report Version 1	21.02.21	Final Report	Melissa Gibbs	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

SHELL REPORT

1.0 INTRODUCTION

This report presents the results of analyses of the excavated historical shell remains from the site of Barangaroo Station at Hickson Road, Barangaroo on the western side of Millers Point in Sydney Harbour. Archaeological excavations at the site form part of historic heritage investigations conducted by Casey & Lowe for development of the Sydney Metro. Barangaroo Station is one of three excavated Sydney Metro sites where historic archaeological shell remains were recovered. The reports on the Blues Point and Pitt Street North shell assemblages are produced as two separate documents.

Also included in this report is an additional description of the marine shell that was adhered to the remains of a timber vessel (UDHB1) found buried in sediments at the site. As this assemblage does not constitute archaeological material (and was not a direct product of anthropogenic processes) its analyses were undertaken separately, and the resulting data and interpretation is provided as a stand-alone section.

1.1 BACKGROUND

The Barangaroo Station shell assemblage was recovered from three of the six different excavation areas at the site. These are Areas X, Y and Z which were in the northern half of the study area and within the zone identified to have moderate archaeological potential (Figure 1.1).[1] Within the larger study area, the excavations revealed evidence of 19th century structures and remains associated with a c.1830s house with sandstone foundations and a seawall built by landowner William Langford, a pre-1855 timber boatshed, an abandoned timber boat (pre-1865) located adjacent to Langford's House, and the sandstone foundations of a 19th century steam sawshed. A range of other 19th century sandstone seawalls and foundations were also revealed, in addition to extensive modification of the natural bedrock outcrops underlying the site.

[1] Casey & Lowe 2019:6

Figure 1.1: Location plan showing the Barangaroo Station site outlined in red and the excavation areas are shaded. Google Maps.

1.2 ARCHAEOLOGICAL PHASES

The chronological framework for the site is provided by the identification of archaeological phases. The archaeological phases are based on review of historical developments for the site and are also informed by the outcomes of the archaeological investigations. The archaeological phases for Barangaroo Station are provided in Table 1.1.

Table 1.1 Archaeological Phases for Barangaroo Station

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 AIMS OF REPORT

Analyses of the archaeological shell assemblage will provide an insight into the composition and function of marine shell remains recovered from the Barangaroo Station site. Specifically, it will address the following:

EXCAVATED SHELL ASSEMBLAGE

Most of the shell remains from Barangaroo Station were recovered in association with the UDHB1 feature. This includes remains within sediments directly overlying the boat, deposits recovered both surrounding and within the UDHB1 structure, and remains uncovered in intertidal deposits beneath the vessel. Based on the results of the analyses the aims of this report are:

- To identify whether the shell recovered in key contexts associated with UDHB1 are naturally occurring from the tidal estuary, or if they are subsistence discard which may have accumulated as in situ or redeposited remains from elsewhere (for example, residences in historic Clyde Street), or alternatively, if the assemblage comprises intermixed natural and cultural shell remains
- To identify the habitat of identified species as a tool for informing the likely origin of the remains and interpretation of the natural and/or cultural processes responsible for the deposition of the shell assemblage
- To utilise other recorded features of the shell assemblage, such as species diversity, shell size and other distinctive shell characteristics for supporting interpretations of processes of deposition.

For the small quantity of shell recovered in contexts not associated with UDHB1, the analyses similarly aimed to determine the origin of these deposits in addition to identifying their cultural and/or natural origins, and the nature of their original function.

THE BOAT (UDHB1) SHELL ASSEMBLAGE

At the time of excavation of UDHB1 a quantity of oyster shells was attached to several parts of the wooden vessel. These remains were removed from the timbers and kept as a separate assemblage from the shell excavated from the surrounding contexts. The UDHB1 shell assemblage was also subject to analyses with the aims to:

- Characterise the composition and nature of the assemblage through standard identification and quantification analyses
- Based on the analytical data, to identify any features which distinguish the UDHB1 shell assemblage and provide possible explanations for such features.

1.4 METHODOLOGY

The shell remains were cleaned and dried by Casey & Lowe as part of post-excavation procedures and bagged according to context and other provenience information. Where possible shell remains were identified to genus and species level. If required, identifications were made using several shell reference books.[2]

Each shell remain was classified to fragment type based on the degree of fragmentation. For example, Whole shells (W) demonstrate ≥50% of the diagnostic or non-repetitive element (NRE) (i.e., the umbo or hinge of bivalves and the columella of gastropods) and 100% of the maximum dimension used for size class analysis. Shells which demonstrated >50% of the NRE but could not be size-classed due to fragmentation were classified as Half shells (H). Shell remains possessing <50% of the NRE were classified as Fragments (F). An illustrated summary of shell diagnostic features and quantitative elements is provided in Table 1.2.

Number of Identified Specimens (NISPS) per taxon, Minimum number of individuals (MNI) per taxon and weight per taxon were each recorded as part of the quantitative analysis of the shell assemblage. Using the identified specimen as the basic counting unit, the NISPS for any given taxa is the collective total of Whole shells, Half shells and Fragments. The MNI method relies on the frequency of diagnostic morphological features or NRE for each taxon and includes both Whole and Half shells (for bivalves MNI is determined by counting the highest frequency of either left or right valves per taxon). The following presentation of results and interpretation of the shell data utilises all three quantitative measurements. For this report, weight calculations represent the total weight of all shell remains (Whole, Half and Fragments) per taxa.

A size class analysis of the shell assemblage was also undertaken. It is generally agreed that anthropogenic shell deposits will contain a higher proportion of larger shells, which are 'selected for size and food potential'.[3] In comparison, natural shell deposits will generally contain a more random selection of shell sizes. It should be noted, however, that both the size and selectivity of species in cultural deposits is variable and is dependent on a range of influences. Among these are the shellfish population(s) available, dietary choice and preferences, and the collection of shells for non-dietary purposes, for example, as ornaments or children's play items.[4] The degree of fragmentation of a shell assemblage can also provide insight into the function of shell (for example, use as fill), as well as taphonomic processes which have impacted the assemblage post-deposition.

Size classing of shells from the excavated contexts was undertaken and involved measuring the maximum dimension of all Whole shells (Figure 1.2). Half shell remains and fragments could not be sized because the maximum dimension (i.e., shell length) is not discernible due to fragmentation. Size analysis was undertaken using a size chart divided into 2cm increments representing a consecutive numeric category (0-2cm, 2-4cm, 4-6cm, 6-8cm

[2] Abbott and Dance 1998, Lamprell and Whitehead 1992 and Short and Potter 1987

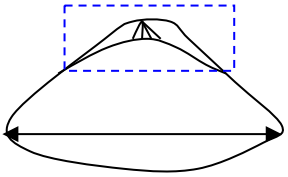
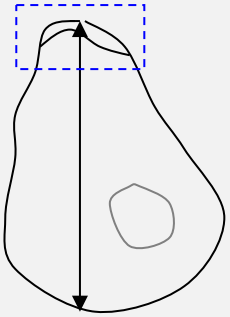
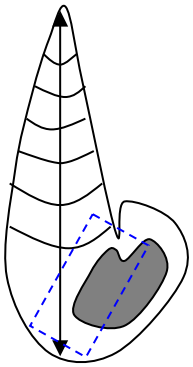
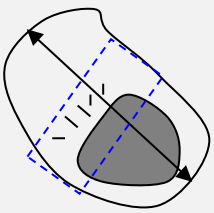
[3] Bonhomme and Buzer 1994:53

[4] Poiner and Catterall 1987; Coutts 1966:43

etc). An example of the size chart used for size analysis is provided in Table 1.1, while a summary of the shell dimensions used for size analysis is included in Table 1.2.

Although the same analytical methods for identification and quantification were applied to the UDHB1 shell assemblage, these remains were not size classed. Size information was limited to observations about prevalence of smaller or larger individuals, in addition to other distinguishing shell characteristics including form and thickness.

Table 1.2 Diagnostic elements or NRE used for quantification of shell types and shell dimensions for size class analysis

Shell type	Species example	Max. dimension measured	Diagnostic element	Illustrative example (also indicating diagnostic element)
Bivalves (excluding oyster)	Anadara trapezia, Tapes dorsatus	Length	Umbo or hinge	
Oyster (bases and lids)	Saccostrea glomerata, Ostrea angasi	Height	Umbo or hinge	
Gastropods (large)	Pyrazus ebeninus	Height	Columella	
Gastropods (small)	Caltholotia fragum, Nerita sp.	Width	Columella	

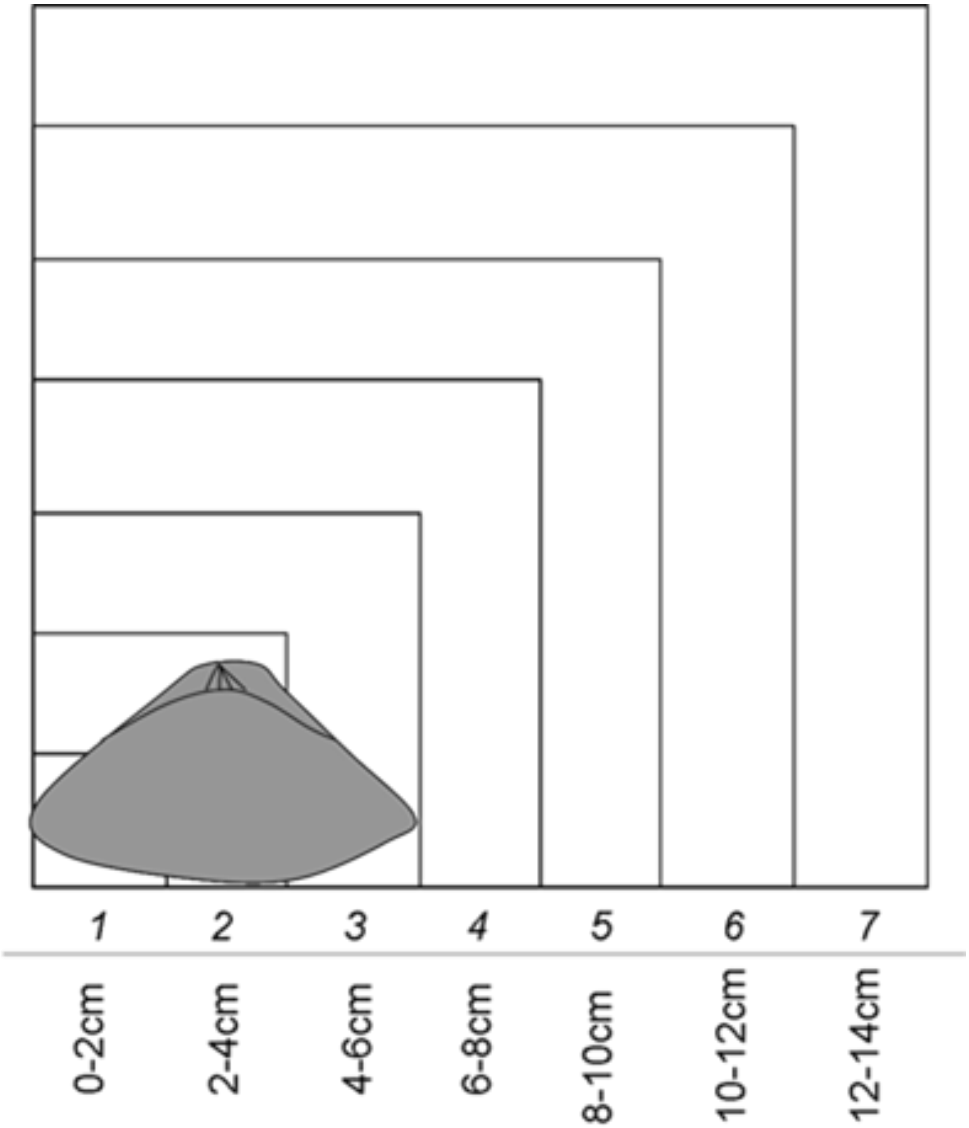


Figure 1.2: Size chart used to measure Whole shells. Diagram shows correct placement of a bivalve, which measure 4-6cm (size class 3).

1.5 REPORT AUTHORSHIP

The shell analyses presented here was undertaken by Dr Melissa Gibbs, who also produced this report.

2.0 OVERVIEW OF THE EXCAVATED ASSEMBLAGE

2.1 DISTRIBUTION OF THE ASSEMBLAGE

Almost 8kg of shell remains comprising 1283 NISPS and 714 MNI was recovered from a total of 35 different contexts within the excavation at Barangaroo Station. The distribution of the assemblage within the three excavation areas is provided in Table 2.1.

Table 2.1 Summary of total quantitative shell data (NISP, Weight and MNI) for shell bearing contexts in Areas X, Y and Z

Area / Number of shell bearing contexts	NISPS	% NISPS	Weight	% Weight	MNI	% MNI
R / 2	4	*0.3*	73.8	*0.9*	3	0.4
T / 10	21	*1.6*	253.2	*3.2*	18	2.5
X / 17	1072	*83.6*	5641.9	*70.6*	588	*82.4*
Y / 3	27	*2.1*	567.3	*7.1*	11	*1.5*
Z / 3	159	*12.4*	1458.6	*18.2*	94	*13.2*
TOTAL	**1283**	***100***	**7994.8**	***100***	**714**	***100***

Based on all three quantitative measures the largest proportion of the assemblage was recovered in Area X. Shell remains in Area X were recovered from 17 different contexts, representing almost 83.6% of the assemblage. Area X contained structural remains of Langford's c. 1830s House, a pre-1855 wharf (attributed to Langford), a pre-1865 sawshed, 1880s Clyde Street, and the timber boat (140) known as UDHB1. Almost all shell bearing contexts from Area X were defined as deposits, although interpretations of different contexts as 'intertidal', 'estuarine sands' or 'bilge deposits' made at the time of excavation suggest the possibility that a range of formation processes were responsible for deposition of recovered materials. A more detailed examination of the distribution of shell in key contexts in Area X is provided in Section 3.0.

Based on all three quantitative measures the combined shell from Areas Y and Z comprised between 2% and 13% of the total assemblage. The three provenanced Contexts from these areas are defined as fill, including one reclamation fill. Further examination of the assemblages is limited to one context from both Area Y and Area Z and is presented in Section 3.0.

2.2 COMPOSITION OF THE ASSEMBLAGE

Remains from 22 different invertebrate taxa (21 marine and one freshwater) were identified in the Barangaroo Station assemblage. Table 2.2 provides a list of identified invertebrate taxa, including name and habitat information (this list excludes *Acropora* sp. coral, of which one small fragment was identified). The identified species are predominantly found in estuaries and intertidal areas, with species from mudflats and rocky shore habitats dominating the assemblage.

As a large proportion of the site was originally located below the high-water mark at the time of British settlement,[5] this meant it was situated within the intertidal zone and thus subject to daily tidal inundations. Excavation of the site revealed a foreshore characterised

[5] Casey & Lowe 2019:6

by sandstone outcrops,[6] while mid-late 19th century historical illustrations also depict small areas of open beach.[7] The type and diversity of shellfish taxa identified in the excavated shell assemblage are broadly consistent with both this coastal zonation and the sites past marine habitats.

Table 2.2 Nomenclature and habitat information of identified shell taxa

Code	Common Name	Scientific Name	Environment
AnCh	Venus Chemnitzi	*Antigona chemnitzi*	Buried (usually) in subtidal muds in sheltered estuaries
AnGr	Blood cockle	*Anadara granosa*	Sheltered intertidal areas and shallow mudflats, sand and seagrass
AnTr	Sydney cockle, Mud Ark	*Anadara trapezia*	Sheltered intertidal areas and shallow mudflats, sand and seagrass
AuCo	Common periwinkle	*Austrocochlea constricta*	Exposed rocky shores to sheltered environments
BeAu	Gold-mouthed top shell	*Bembicium auratum*	Estuaries and inlets, on the roots and trunks of mangroves, and on mud, rocks and oysters; also, sometimes on sheltered rocky shores. Lives in the lower half of the intertidal zone.
BeHa	Oyster drill	*Bedeva hanleyi*	Intertidal under rocks, among mussel or oyster beds, or in seagrass beds
CaFr	Spotted strawberry top shell	*Cathalotia fragum*	Estuarine seagrass beds
CySp	Unidentified Cowrie	*Cypraea* sp.	Intertidal zones, hidden under coral or rock boulders and amongst seagrasses.
GlSp	Dog cockle	*Glycymeris* sp.	Shallow seabeds, sand to fine gravels
HySp	Freshwater mussel	*Hyridella* sp.	Coastal rivers
NaPo	Pearly Nautilus	*Nautilus pompilius*	Deep water
OsAn	Mud oyster	*Ostrea angasi*	Silty or sand-bottomed estuaries (depths of 1 to 30m)
PeSp	Scallop	*Pecten fumatus*	Sand to 80m
PoSp	Moon shell	*Polinices* sp.	Subtidal to 40m
PyEb	Club mud whelk	*Pyrazus ebeninus*	Estuarine mudflats and mangrove swamps
SaGl	Sydney rock oyster	*Saccostrea glomerata*	Attached to rocks in subtidal areas
Surchin	Sea urchin	Echinoidea	Intertidal to significant depths
TaDo	Venus shell	*Tapes dorsatus*	Littoral sand
TrHi	Hairy mussel	*Trichomya hirsuta*	Exposed rock platform
TrNi	Commercial top shell	*Trochus niloticus*	Intertidal reef flats to 20m
TrSp	Trochus shell	*Trochus* sp.	Intertidal reef flats
VeAu	Australian mud whelk	*Velacumantis australis*	Mud flats and estuaries

[6] Casey & Lowe 2019:6

[7] Casey & Lowe 2022: 222, Figure 4.66

The species composition of the Barangaroo Station shell assemblage is summarised in Table 2.3. This data shows that Sydney rock oyster (*Saccostrea glomerata*) is the most commonly occurring shell species, comprising 63% of total shell NISPS, 53% of total shell weight and 57% of total shell MNI. Mud oyster (*Ostrea angasi*) is the second most commonly occurring taxa, followed by Sydney cockle (*Anadara trapezia*). Collectively these three species contribute 92% of the total NISPS, and 87% of both total shell weight and MNI. The remaining 19 taxa comprise 8% of total shell NISPS, and 13% of both the total shell weight and MNI.

Table 2.3 Total quantitative data (NISPS, Weight and MNI) for all identified shell taxa at Barangaroo Station

Taxa code	Total NISPs	% NISP	Total Weight (g)	% Weight	Total MNI	% MNI
AnCh	1	*0.1*	12.80	*0.2*	0	*0.0*
AnGr	1	*0.1*	1.00	*0.0*	0	*0.0*
AnTr	98	*7.6*	743.90	*9.3*	45	*6.3*
AuCo	5	*0.4*	9.30	*0.1*	5	*0.7*
BeAu	4	*0.3*	7.50	*0.1*	4	*0.6*
BeHa	1	*0.1*	0.70	*0.0*	1	*0.1*
CaFr	10	*0.8*	11.80	*0.1*	10	*1.4*
Coral	1	*0.1*	3.20	*0.0*		*0.0*
CyAr	1	*0.1*	17.20	*0.2*	1	*0.1*
CySp	4	*0.3*	98.70	*1.2*	2	*0.3*
GlSp	1	*0.1*	32.70	*0.4*	1	*0.1*
HySp	2	*0.2*	4.20	*0.1*	1	*0.1*
Lala	1	*0.1*	65.40	*0.8*	1	*0.1*
NaPo	2	*0.2*	69.20	*0.9*	1	*0.1*
OsAn	135	*10.5*	1178.60	*14.7*	77	*10.8*
PeFu	1	*0.1*	6.10	*0.1*		*0.0*
PoSp	3	*0.2*	3.90	*0.0*	3	*0.4*
PyEb	4	*0.3*	51.00	*0.6*	4	*0.6*
SaGl	981	*76.5*	5306.10	*66.4*	541	*75.8*
Surchin	2	*0.2*	2.30	*0.0*		*0.0*
TaDo	2	*0.2*	25.60	*0.3*	2	*0.3*
TeSc	1	*0.1*	2.30	*0.0*	1	*0.1*
TrHi	3	*0.2*	2.50	*0.0*	1	*0.1*
TrNi	6	*0.5*	303.40	*3.8*	1	*0.1*
TrSp	1	*0.1*	18.10	*0.2*	1	*0.1*
VeAu	12	*0.9*	17.30	*0.2*	11	*1.5*
TOTAL	**1283**	***100***	**7994.80**	***100***	**714**	***100***

3.0 CONTEXT ANALYSIS (EXCAVATED ASSEMBLAGE)

This section presents the data from several contexts selected for their high potential to inform on the origin and function of the excavated archaeological shell remains. This is largely limited to contexts from Area X, which as identified in Section 2.1 contributed the largest proportion of excavated shell remains. With the specific aim to develop an understanding of the compositional nature, origin and function of the shell assemblage in direct spatio-temporal relation to the boat (UDHB1), this section presents data from four key contexts from the following settings (as identified during excavation):

- Surrounding UDHB1,
- Overlying UDHB1,
- Found within UDHB1,
- Underlying UDHB1.

Brief examination of the analytical data from Areas R, T, Y and Z are also provided and may provide insight into the use of shell as fill at the site.

3.1 AREA R

A total of 73.8g of shell comprising four NISPS and 3 MNI was recovered from two fill contexts in Area R (Table 3.1). The remains of two species – *Anadara trapezia* and *Saccostrea glomerata* – were identified. Overall, the shell was relatively well preserved, with one *A. trapezia* valve displaying adhering mortar.

Table 3.1 Summary of shell remains excavated from Area R.

Context	Type	Shell taxa	Weight (g)	NISPS	MNI
24	Fill	AnTr	45.2	2	1
		SaGl	8.6	1	1
52	Fill	AnTr	20	1	1
Shell totals			73.8	4	3

3.2 AREA T

A total of 253.2g of shell comprising 21 NISPS and 18 MNI was recovered from 10 different contexts (Table 3.2). All contexts are defined as fill, excluding context 78 which is described as the remains of timber shipyard infrastructure. In this context it is most likely was directly associated with (for example, on top of) the timbers.

Table 3.2 Summary of shell remains excavated from Area T.

Context	Type	Shell taxa	Weight (g)	NISPS	MNI
32	Fill	SaGl	23.5	2	1
51	Fill	AnTr	8.7	1	1
63	Fill	AnTr	32.1	3	2
		OsAn	15.9	1	1
		CyAr	17.2	1	1
66	Fill	SaGl	13.7	1	1
68	Fill	SaGl	5.9	1	1
		LaLa	65.4	1	1
72	Fill	SaGl	20.6	4	3
		AnTr	3.7	1	1
78	Ship repair yard infrastructure (timber)	SaGl	9.7	1	1

Context	Type	Shell taxa	Weight (g)	NISPS	MNI
		TeSc	2.3	1	1
79	Fill	AnTr	4	1	1
94	Fill	OsAn	21.3	1	1
96	Fill	OsAn	9.2	1	1
Shell totals			253.2	21	18

The remains of six different species were identified from Area T, including *A. trapezia, S. glomerata and Ostrea angasi* – each of which are found in the intertidal habitats of estuaries. The three remaining species - *Cypraea arabica, Lambis lambis and Tellina scobinata* – are typically associated with coral reef habitats and were recovered from contexts 63, 68 and 78 respectively. Excluding context 68 which included a whole *L. lambis* shell, context 63 contained the largest quantity of shell remains based on weight (45.5g) and MNI (4). Context 72 contained the second largest quantity of remains comprising 24.3g, 4 MNI and 5 NISPS.

The identification of three 'exotic' species in Area T contexts is broadly consistent with limited presence of several other exotic species identified in several contexts in Areas X and Z. The presence of these species was interpreted as evidence for the collection of shells or shell items as curios by Sydney-based mariners from tropical and far-off regions. These goods were then bought back to the study area where they were subsequently lost/discarded.

Although the *L. lambis* shell has a distinctive fracture of the dorsum typically interpreted as a result of shell processing strategies (within Melanesian cultural contexts), the fresh and clean break margins suggest it was more likely caused during the recent archaeological excavation process (by a trowel, maddock or shovel).

It is concluded that the remains of the three locally available shellfish species comprised both naturally occurring intertidal shell detritus and discarded subsistence remains, both of which were incorporated into fill deposits used for a range of backfilling, levelling and constructions purposes within Area T.

3.3 SURROUNDING UDHB1 - CONTEXT 149

Context (149) is described as artefact-rich sediment which accumulated around the vessel after it was abandoned.[8] Based on all three quantitative measures, the shell from this context contributes approximately 60% of the total shell assemblage recovered from Area X (Table 3.3).

Table 3.3 Quantitative data and proportion of shell in (149)

Context	Area	Description	Phase	NISP	Weight	MNI
Context surrounding the boat (UDHB1)						
149	X	Deposit (Clyde Street runoff)	3	437	2416.9	203
Percentage of total Area X shell assemblage				60%	58%	59%

[8] Casey & Lowe 2022:217

Context (149) is defined as runoff from Clyde Street which post-dates the deposition/abandonment of the boat.[9] Clyde Street ran in a north-east to south-west orientation generally following the natural underlying topography of the site revealed during excavation, which showed a steep drop off from the eastern side of the site to the west where the bedrock coastline descended into the harbour.[10] Clyde Street was resumed by the newly formed Sydney Harbour Trust between 1901 and 1909, and after this time construction of Hickson Road commenced.[11]

The boat was uncovered at the termination of historical Clyde Street, located within the intertidal (beach) zone adjacent to a low sandstone wall constructed as part of Langford's wharf (c.1855). The situation of the boat meant that it would have been the deposition or end point of runoff from Clyde Street. The accumulated sediment surrounding the boat (149) is described as artefact rich deposit run-off (detritus) associated with the pre-1880 termination of Clyde Street, as well as accumulation of discarded remains pre- and post-dating the deposition of UDHB1. The date for deposition or abandonment of the boat is concluded to pre-date the 1850s and may have occurred in the 1830s.[12]

Table 3.4 provides a summary of the species composition and quantities for (149). This data demonstrates Sydney rock oyster as the most dominate taxa, comprising between 73% and 77% of the assemblage based on all three quantitative measures. Based on NISPS and weight, Mud oyster and Sydney cockle are the next most commonly occurring species, however, based on MNI, almost double the quantity of Mud oyster was identified. The remains of nine other taxa were identified in (149), and which represent a range of habitats including coastal rivers (*Hydrilla* sp., freshwater mussel) and deep water (*Nautilus pompilius*, Pearly nautilus).

Table 3.4 Quantitative data (NISPS, Weight and MNI) for identified shell taxa in (149)

Taxa Code	Total NISPS	% NISPS	Total Weight (g)	% Weight	Total MNI	% MNI
SaGl	338	*77*	1796.7	*74*	150	*74*
OsAn	43	*10*	270.1	*11.6*	28	*14*
AnTr	43	*10*	287.9	*11.9*	16	*9*
HySp	4	*1*	4.2	*0.05*	1	*0.4*
BeAu	2	*0.4*	5.4	*0.2*	2	*0.5*
CaFr	2	*0.4*	1	*0.05*	2	*0.5*
VeAu	1	*0.2*	0.8	*0.003*	0	*0*
AuCo	1	*0.2*	1.2	*0.04*	1	*0.4*
CySp	1	*0.2*	9.7	*0.4*	1	*0.4*
PyEb	1	*0.2*	11.3	*0.6*	1	*0.4*
PoSp	1	*0.2*	1.1	*0.04*	1	*0.4*
NaPo	1	*0.2*	24.1	*1*	0	*0*
TOTAL	**437**	***100***	**2416.9**	***99.88***	**203**	***100***

The results of size classing are provided in Table 3.5. This revealed that most whole Sydney rock oysters measured 4 to 6cm (size class 3). Shells measuring 2 to 4cm (size class 2) were the next most common size, while individuals belonging to larger size classes (6 to

[9] Casey & Lowe 2022:217

[10] Casey & Lowe 2019:6

[11] (http://www.visitsydneyaustralia. com.au/lost-clyde-street.html

[12] Cos Coroneus pers. email comm. 20 July 2021

8cm, size class 4 and 8 to 10cm, size class 5) were the least common. Two distinctive features of many the rock oyster bases were their flattened form and the presence of wood on their exterior surface. This provides evidence for their previous attachment to flat wooden surfaces, such as wooden planks.

Size class analysis of whole Mud oysters revealed the presence of two large shells measuring 8 to 10cm (size class 5). The majority of shells for this species were smaller, however, measuring 4 to 6cm (size class 3) and less commonly 2 to 4cm (size class 2). The whole Sydney cockle shells were limited to size class 2 (2 to 4cm) and size class 3 (4 to 6cm), with several valves also displaying intact periostracum (the horny skin covering the exterior of the shell). Notable fracture patterns on a Cypraea sp. (Cowry) shell, and a Club mud welk (*Pyrazus ebeninus*) suggest the possibility of deliberate breakage.

Table 3.5 Size class data for (149)

Taxa	Size Class 1 (0-2cm)	Size Class 2 (2-4cm)	Size Class 3 (4-6cm)	Size Class 4 (6-8cm)	Size Class 5 (8-10cm)
SaGl	-	42	138	25	2
OsAn	-	9	19	-	2
AnTr	-	4	7	-	-
HySp	1	-	-	-	-
BeAu	-	2	-	-	-
CaFr	-	2	-	-	-
VeAu	-	-	-	-	-
AuCo	1	-	-	-	-
CySp	1	-	-	-	-
PyEb	-	-	1	-	-
PoSp	1	-	-	-	-
NaPo	-	-	-	-	-

3.3.1 INTERPRETATION

The range of features demonstrated by the shell assemblage in (149) suggest the presence of intermixed natural and cultural shell remains. The large proportion of immature Mud oyster shells suggests these remains may have accumulated as post-mortem shell detritus from offshore shell reefs. Similarly, the large number of immature Sydney rock oyster shells indicates that they may not have originated through anthropogenic activities (such as human selection for dietary consumption). Furthermore, the presence of many flattened oyster bases with adhering wood suggests that prior to their death and subsequent deposition, these individuals were attached to wooden planks, most logically the (exterior) planks of UDHB1. This means this proportion of the Sydney rock oyster assemblage was part of natural accumulations at the site and did not originate from discarded dietary remains. The higher proportion of oyster lids (57%) compared to bases (43%) in this context supports this hypothesis (as it is likely that some bases remained attached to the planks – this issue is further addressed in Section 4.0). The presence of periostracum on Sydney cockle valves suggests that these remains have not been subject to anthropogenic processes, such as roasting or boiling, which tends to lead to the loss of this friable material.

The origin of the small quantity and relatively limited diversity of other shell taxa in (149) is difficult to determine. Although it is possible that all the remains may have originated as natural tidal deposits, the observation of suspected deliberate breakage patterns in a Cowry shell and Club mud whelk shell suggests that they were culturally modified, possibly for the purpose of shellfish extraction, or in the case of the Cowry, removal of the colourful patterned dorsum for non-subsistence related purposes, such as jewellery making. The author has observed the same fracture patterns in both these species in prehistoric shell midden deposits in the Torres Strait and the Solomon Islands. While both species are edible, Cowry shell was also commonly used throughout these regions for body ornamentation and decoration.[13]

Based on the above evidence, it is concluded that the excavated shell remains may have originated as occupation runoff from Clyde Street, or as subsistence discard related to occupation activities at Langford's Wharf (c. 1850s). Although the presence of a large quantity of animal bone in (149) confirms the presence of subsistence remains in (149), the

[13] Carter 2004

vertebrate assemblage is interpreted as the remains of industrial slaughter and butchery, rather than as household discard.[14] The presence of fish and waterbirds in (149) are interpreted as naturally deposited through tidal activities,[15] lending further support to the likelihood that a large proportion of the shell remains in this context may have originated through natural marine processes.

3.4 OVERLYING UDHB1 - CONTEXT 133

Shell was recovered from six different contexts overlying UDHB1 (Table 3.6). After (149), shell from these contexts comprise the second largest component of the excavated shell assemblage (between 20% and 23% based on all three quantitative measures). Context (133) contains the largest quantity of shell and is described as intertidal sands.

Table 3.6 Quantitative data and proportions of shell in contexts overlying UDHB1

Context	Area	Description	Phase	NISP	Weight	MNI
Contexts overlying UDHB1						
133*	X	Deposit (intertidal sands)	3	131	881.4	73
141	X	Deposit (estuarine sands)	3	2	3.1	0
142	X	Deposit (estuarine sands)	3	12	144	5
247	X	Fill (wood pulp deposit overlying boat hull)	3	2	10.7	1
152	X	Deposit (dark grey silty clay within boat – mid ship)	3	10	59.1	7
153	X	Deposit (dark grey silty clay within boat – bow)	3	4	33.6	3
		SUB-TOTAL		**161**	**1131.9**	**89**

The species composition of (133) is provided in Table 3.7. It demonstrates Mud oyster as the most frequently occurring species comprising 52% NISPS, 59% weight and 42% of MNI. Sydney rock oyster and Sydney cockle are the two most next commonly occurring species. The presence of five other species was identified, suggesting a dominance of taxa from estuarine and rocky shore habitats.

Table 3.7 Quantitative data (NISPS, Weight and MNI) for identified shell taxa in (133)

Taxa Code	Total NISPS	% NISPS	Total Weight (g)	% Weight	Total MNI	% MNI
OsAn	68	*52*	517.3	*59*	31	*42*
SaGl	34	*26*	204.1	*23*	21	*29*
AnTr	14	*10.1*	111.2	*12.6*	6	*8*
CaFr	6	*5*	4.5	*0.5*	6	*8*
VeAu	5	*4*	8.4	*1*	5	*7*
PoSp	2	*1.5*	2.6	*0.3*	2	*3*
PyEb	1	*0.7*	15.2	*1.6*	1	*1.5*
TrSp	1	*0.7*	18.1	*2*	1	*1.5*
TOTAL	**131**	***100***	**881.4**	***100***	**73**	***100***

[14] Roberts 2022:19

[15] Roberts 2022:19

The results of size classing are provided in Table 3.8. A large proportion of Mud oysters measured to less than 8cm (size class 4), indicating a dominance of immature individuals. Similarly, the size of Sydney rock oysters revealed a dominance of smaller individuals, with many measuring between 4 and 6cm in height (size class 3). The size of the whole Sydney cockle valves was generally consistent with the presence of large to mature individuals (the majority measuring between 4 and 6cm (size class 3), however, the presence of periostracum (the horny skin covering the exterior of the shell) on several individuals was also a noted feature.

Table 3.8 Size class data for (133)

Taxa	Size Class 1 (0-2cm)	Size Class 2 (2-4cm)	size Class 3 (4-6cm)	Size Class 4 (6-8cm)	Size Class 5 (8-10cm)
OsAn	-	9	27	10	1
SaGl	-	5	25	5	-
AnTr	-	1	5	-	-
CaFr	-	-	-	-	-
VeAu	-	-	-	-	-
PoSp	-	1	-	-	-
PyEb	-	-	-	-	-
TrSp	-	1	-	-	-

3.4.1 INTERPRETATION

Based on the above results, the shell assemblage from (133) is interpreted as predominantly comprising natural shell remains. The large quantity of Mud oyster shell, which consists of a large proportion of immature individuals, is the likely accumulation of post-mortem shell detritus within naturally deposited harbour sediments. Although the Sydney rock oyster shells may have originated as cultural deposits (the absence of flat bases and adhering wood indicate they could be discarded subsistence remains), the dominance of Mud oyster in the assemblage lends more support to the hypothesis that the shell assemblage in (133) originated as redeposited natural remains. As described above for (149), the presence of periostracum on Sydney cockle shells indicates the likelihood of natural deposition processes. The presence of turtle, whale and marine bird bone in this context further confirm the likelihood of naturally occurring faunal remains being incorporated into sediments overlying UDHB1.[16]

3.5 RECOVERED WITHIN UDHB1 STRUCTURE - CONTEXT 159

A total of five shell bearing contexts were excavated within the UDHB1 structure. Context (159) is described as bilge deposit from the stern section of UDHB1 and contained the largest quantity of shell (Table 3.9).

Table 3.9 Quantitative data and proportions of shell in contexts within UDHB1

Context	Area	Description	Phase	NISP	Weight	MNI
Contexts associated with structure of UDHB1 (recovered within boat)						
151	X	Deposit (Boat bilge deposit)	3	6	12.9	3
155	X	Deposit (Boat bilge deposit)	3	4	13.7	2
157	X	Deposit (Boat bilge deposit, bow)	3	3	26.5	3

[16] Roberts 2022:25-26

Context	Area	Description	Phase	NISP	Weight	MNI
158	X	Deposit (bilge deposit, mid ship)	3	13	30.9	3
159*	X	Deposit (bilge deposit, stern)	3	30	58	10
			SUB-TOTAL	56	142	21

A small quantity of largely fragmented remains of eleven different taxa were identified in (159) (Table 3.10). Although size class analysis offered only limited data (Table 3.11), the range of species in this context confirm that estuarine, rocky shore and littoral sand as the main habitat sources. The assemblage is dominated by Sydney rock oyster, Mud oyster and Sydney cockle which is consistent with the shell assemblages in both (149, 133) discussed above. Evidence for burning was identified on fragments of *Anadara granosa* (Blood cockle) and *Trichomya hirsuta* (Hairy mussel).

Table 3.10 Quantitative data (NISPS, Weight and MNI) for identified shell taxa in (159)

Taxa Code	Total NISPS	% NISPS	Total weight (g)	% Weight	Total MNI	% MNI
SaGl	16	*53*	21.6	*37.3*	0	*0*
OsAn	4	*13.6*	13.2	*23*	2	*20*
AnTr	2	*7*	7.1	*12.2*	2	*20*
VeAu	1	*3.3*	0.7	*1.2*	1	*10*
BeAu	1	*3.3*	1	*1.7*	1	*10*
CaFr	1	*3.3*	0.8	*1.4*	1	*10*
CySp	1	*3.3*	4	*6.8*	1	*10*
AnGr	1	*3.3*	1	*1.7*	0	-
BeHa	1	*3.3*	0.7	*1.2*	1	*10*
TaDo	1	*3.3*	7.3	*12.5*	1	*10*
TrHi	1	*3.3*	0.6	*1*	0	*0*
TOTAL	30	*100*	58	*100*	10	*100*

Table 3.11 Size class data for (159)

Taxa	Size Class 1 (0-2cm)	Size Class 2 (2-4cm)	Size Class 3 (4-6cm)	Size Class 4 (6-8cm)	Size Class 5 (8-10cm)
SaGl	-	-	-	-	-
OsAn	1	1	-	-	-
AnTr	-	2	-	-	-
VeAu	-	-	-	-	-
BeAu	1	-	-	-	-
CaFr	1	-	-	-	-
CySp	-	1	-	-	-
AnGr	-	-	-	-	-
BeHa	1	-	-	-	-
TaDo	-	-	1	-	-
TrHi	-	-	-	-	-

3.5.1 INTERPRETATION

Two notable features of the shell assemblage in (159) are the relatively high degree of fragmentation (particularly demonstrated by Sydney rock oyster remains) and the presence of burnt shells. Both features can be diagnostic of subsistence processing strategies but can also be indicative of post-deposition taphonomic processes. As (159) is described as an intact bilge deposit, it is likely that the characteristics of the assemblage are due to cultural processes. The presence of individual meat joints of cattle, sheep and pig in this context is interpreted as evidence of subsistence discard, providing further suggestion that the shell remains are also the result of the discard of dietary remains.[17] In contexts described as disturbed bilge deposits associated with UDHB1, the identification of fish bone fragments and faunal remains representing full carcasses and thus industrial slaughter of domestic animals are both interpreted as evidence for re-deposition of materials through tidal action.

3.6 UNDERLYING UDHB1 - CONTEXT 249

Two shell-bearing contexts underlying the boat (UDHB1) were identified. The shell assemblage from these contexts comprised the smallest proportion of the excavated shell assemblage from Area X (Table 3.12). Context (249) is defined as natural harbour sands and contributed most of the shell recovered from beneath UDHB1.

Table 3.12 Quantitative data and proportions of shell in contexts overlying UDHB1

Context	Area	Description	Phase	NISP	Weight	MNI
Contexts underlying UDHB1						
246	X	Deposit (deposit beneath boat frame)	3	6	13.5	2
249*	X	Deposit (harbour sands)	3	64	391.5	26
			SUB-TOTAL	70	405	28

The remains of seven different taxa were identified in (249) (Table 3.13), including Sydney rock oyster, Sydney cockle and Mud oyster as the three dominant species. A small quantity of remains from four other estuarine and rocky shore species were also identified, including a fragment of Cypraea sp. (Cowry) shell.

Table 3.13 Quantitative data (NISPS, Weight and MNI) for identified shell taxa in (249)

Taxa code	Total NISPS	% NISPS	Total weight (g)	% Weight	Total MNI	% MNI
SaGl	43	*67*	236.1	*60.3*	13	*46*
AnTr	12	*19*	93.1	*24*	6	*21.5*
OsAn	3	*4.6*	43.7	*11.1*	3	*11*
VeAu	3	*4.6*	4.5	*1*	3	*11*
BeAu	1	*1.6*	1.1	*0.2*	1	*3.5*
CaFr	1	*1.6*	5.5	*1.4*	1	*3.5*
CySp	1	*1.6*	7.5	*2*	1	*3.5*
TOTAL	**64**	***100***	**391.5**	***100***	**28**	***100***

The results of size classing are provided in Table 3.14. The data reveals the presence of Sydney rock oysters ranging from size class 2 (2 to 4cm) to size class 5 (8 to 10cm). The

[17] Roberts 2022:16

presence of adhering wood and flattened base form was not observed in these remains. The fragmented nature of the three Mud oyster bases meant obtaining an accurate size class was not possible, however, their large form indicated they were remains of mature individuals. Three of the whole Sydney cockle valves measured to size class 3 (4 to 6cm). Periostracum was not observed on any of the Sydney cockle remains.

Table 3.14 Size class data for (249)

Taxa	Size Class 1 (0-2cm)	Size Class 2 (2-4cm)	Size Class 3 (4-6cm)	Size Class 4 (6-8cm)	Size Class 5 (8-10cm)
SaGl	-	4	5	5	1
OsAn	-	-	-	-	-
AnTr	1	-	3	-	-
VeAu	-	2	-	-	-
BeAu	1	-	-	-	-
CaFr	1	-	-	-	-
CySp	-	-	-	-	-

3.6.1 INTERPRETATION

The absence of flattened oyster bases with adhering wood indicates that these shells did not grow attached to the wooden planks of UDHB1, and thus their deposition pre-dates the abandonment of the boat (c.1830s). The larger size of some Sydney rock oyster shells and the Mud oyster shells in this context suggest the possibility that a proportion of remains may have been discarded subsistence material which accumulated on the foreshore. In contrast to (149, 133), periostracum was not observed attached to any of the Sydney cockle valves, suggesting the remains might have been deliberately processed (i.e roasted) for dietary consumption. The presence of vertebrate faunal remains in (249) is interpreted as redeposited slaughtering and butchery remains, also confirming the cultural origins of faunal material in contexts underlying the boat (UDHB1).[18] The small quantity of other shell remains in (249) demonstrates that naturally occurring shells and shell detritus did not form a significant component of the harbour matrices in this part of the foreshore during this period (c. pre-1855). However, the presence of fish and marine bird bones indicates that these species were naturally deposited in the intertidal zone, and that such processes did contribute to the contents of (249).[19]

3.7 AREA Y – CONTEXT 234 (RECLAMATION FILL)

Three contexts containing shell were identified in Area Y (Table 3.15). Context (234) is described as a reclamation fill at Cuthbert's Wharf rich in metal and ceramics. Shell in this context comprised remains of Sydney rock oyster, Mud oyster and Sydney cockle (Table 3.16). Size class data revealed the presence of one large Mud oyster shell (size class 6, 10 to 12cm) and several Rock oyster shells measuring greater than 6cm (size class 4 and 4) (Table 3.17). Deliberate lateral breakage of a Sydney rock oyster lid was observed, as was the presence of sandstone adhering to a base. The Sydney cockle valve recovered had adhering periostracum.

[18] Roberts 2022:22

[19] Roberts 2022:22

Table 3.15 Quantitative data and proportions of shell in Area Y contexts

Context	Area	Description	Phase	NISP	Weight	MNI
234*	Y	Fill (reclamation fills)	4 (1855-1876)	11	137.1	5
164	Y	Clean up	?	7	57.3	2
165	Y	Clean up	?	9	372.9	4
			TOTAL	27	567.3	11

Table 3.16 Quantitative data (NISPS, Weight and MNI) for identified shell taxa in (234)

Taxa Code	Total NISPS	% NISPS	Total Weight (g)	% Weight	Total MNI	% MNI
SaGl	9	*82*	82.6	*60*	3	*60*
OsAn	1	*9*	35.7	*26*	1	*40*
AnTr	1	*9*	18.8	*14*	1	*40*
TOTAL	11	*100*	137.1	*100*	5	*100*

Table 3.17 Size class data for (234)

Taxa	Size Class 1 (0-2cm)	Size Class 2 (2-4cm)	Size Class 3 (4-6cm)	Size Class 4 (6-8cm)	Size Class 5 (8-10cm)	Size Class 6 (10-12cm)
SaGl	-	1	-	2	1	-
OsAn	-	-	-	-	-	1
AnTr	-	-	1	-	-	-

3.7.1 INTERPRETATION

Several characteristics of the shell in (234) suggest that the assemblage may be re-deposited subsistence discard. The prevalence of larger individuals of both Sydney rock oyster and Mud oyster, in addition to the presence of sandstone adhering to oyster bases support the likelihood that shellfish were procured locally for dietary consumption. Deliberate breakage of Sydney rock oyster lids for the purpose shellfish extraction is often demonstrated by a distinct lateral break across the mid-point of the shell. The same breakage patterns were recorded in the historic oyster remains from the 3PS site in Macquarie Street, Parramatta.[20] The presence of a lid demonstrating this break supports the interpretation of (234) as re-deposited household discard. The periostracum attached to a Sydney cockle shell, however, indicates that inclusion of naturally occurring shell remains within the assemblage cannot be entirely ruled out. The identification of water damaged bone fragments in this context attests to the possibility that tidal influences may have played an additional role in the composition of mid-19th century (Phase 4) fill deposits in Area Y.[21]

3.8 AREA Z – CONTEXT 215 (CISTERN FILL)

Three contexts containing shell were identified in Area Z (Table 3.18). Context (215) is described as the lower fill of a circular-shaped cistern (206) cut into sandstone bedrock associated with a house on Wentworth Street (resumed along with Clyde Street by 1909). The context contained degraded metal, sand, charcoal flecks and the largest quantity of vertebrate faunal remains from all fill deposits found within the cistern.

[20] Carter 2019: 6

[21] Roberts 2022:8

The shell comprised remains of five different taxa, in addition to two fragments of sea urchin (Class Echinoidea) (Table 3.19). Sydney Rock oyster and Mud oyster were the most common species, although their NISPS and weight quantities illustrate a degree of proportional disparity. Sydney cockle shell is the next most commonly occurring species (based on NISPS), while Cowry shell and *Nautilus pompilus* (Pearly Nautilus) shell comprise the remaining taxa.

Table 3.18 Quantitative data and proportions of shell in Area Z contexts

Context	Area	Description	Phase	NISP	Weight	MNI
215*	Z	Fill (Fill below 208 fill)	4 (1855-1876)	25	534.1	18
205	Z	Fill (fill of 203)	5 (1876-1900)	2	10.4	0
194	Z	Clean up	?	1	32.7	1
			TOTAL	28	577.2	19

Table 3.19 Quantitative data (NISPS, Weight and MNI) for identified shell taxa in (215)

Taxa Code	Total NISPS	% NISPS	Total Weight (g)	% Weight	Total MNI	% MNI
SaGl	11	*44*	172.4	*32.2*	6	*33.5*
OsAn	6	*24*	180.6	*34*	6	*33.5*
AnTr	4	*16*	56.2	*10.5*	4	*22*
Surchin	2	*8*	2.3	*0.4*	0	*0*
CySp	1	*4*	77.5	*14.5*	1	*5.5*
NaPo	1	*4*	45.1	*8.4*	1	*5.5*
TOTAL	25	*100*	534.1	*100*	18	*100*

The results of size classing are provided in Table 3.20. Although fewer in number than Sydney rock oyster, the presence of large Mud Oyster shells (including one shell measuring 10 to 12cm - size class 6) account for the quantitative disparity. Most of the Sydney rock oysters were also relatively large, however measuring 6 to 8cm (size class 4). Several oyster bases had adhering sandstone. The Cowry shell was also large measuring to size class 5 (8 to 10cm), and in addition was missing the entire shell dorsum. The large fragment of Pearly nautilus shell showed evidence of burning.

Table 3.20 Size class data for (215)

Taxa	Size Class 1 (0-2cm)	Size Class 2 (2-4cm)	Size Class 3 (4-6cm)	Size Class 4 (6-8cm)	Size Class 5 (8-10cm)	Size Class 6 (10-12cm)
SaGl	-	-	3	5	-	-
OsAn	-	-	-	1	3	1
AnTr	-	-	4	-	-	-
CySp	-	-	-	-	1	-
NaPo	-	-	-	-	-	-

3.8.1 INTERPRETATION

A wide range of faunal remains including cattle, sheep and pig, dog and rabbit were identified in (215). In particular, the type of identified sheep and cattle bones are interpreted as the presence of high-quality meat cuts, indicating meat was also brought to the site in the form of pre-cut joints of meat. These remains are interpreted as household

subsistence discard, while the presence of dog is interpreted as evidence of either a household pet, or feral dogs in the area (bones identified with dog gnaw marks lends further support for the latter).[22]

In line with the nature of the vertebrate faunal assemblage, the shell remains in (215) are also interpreted as residential or household waste. While the large size of Sydney rock oysters and Mud oysters demonstrate likely subsistence discard of locally collected shellfish, the function of the broken Cowry shell and burnt Nautilus shell is less clear. Although edible, the aesthetic and attractive form of both shells means they are commonly collected as ornaments or curios. This has previously been demonstrated in historic archaeological shell assemblages from Blues Point,[23] and George Street.[24] Regardless of their original function, however, these remains are also interpreted as evidence of household waste originating from residential occupation of Wentworth Street during the mid-19th century (Phase 4).

[22] Roberts 2022:28

[23] Gibbs 2020

[24] Carter 2014

4.0 THE UDHB1 SHELL ASSEMBLAGE

The UDHB1 shell assemblage was received by the report author from Casey & Lowe as wet with a considerable amount of adhering sediment. After consultation with Casey & Lowe permission was given to clean the shell for the purpose of analysis. This was undertaken by carefully washing individual shells in clean fresh water. Where oyster bases and lids were joined, the shells were carefully pulled apart to remove the sediment within the cavity. In five instances where shells did not come apart easily, these were left joined (articulated). The cleaned material was then air-dried in the shade. Once dry the shell was bagged (in snap lock bags that were perforated to allow the material to breath) according to its original label.

The entire UDHB1 shell assemblage comprised remains of Sydney rock oyster (*S. glomerata*). The assemblage weighed a total of 2341 grams and comprised 679 NISPS and 308 MNI. A summary of the quantitative data is provided in the appendix. Based on all quantitative measures over 90% of the shell remains were from exterior (or outboard) surfaces of the boat. The other locations from which shell was removed (as per the original context labels) was interior/inboard, portside, aft, and starboard. Although the latter three locations may also refer to exterior surfaces, this was not clearly identified on the context information provided and thus are excluded from inclusion in exterior shell quantities.

The presence of oyster shells on the exterior surfaces is interpreted as confirmation that the vessel was situated within the intertidal zone, that is, between the high tide mark and the low tide mark. This bivalve species grows attached to hard surfaces (rocks, mangrove roots, jetty pylons etc) within the shallow subtidal and intertidal zone where attachment surfaces have periods of both immersion (during high tides) and exposure (during low tides). The placement of the boat within this zone would have facilitated the growth of oysters, at least until the vessel became buried in sediments and accumulated debris.

In comparison to the excavated Sydney rock oyster assemblage from (149) which comprised 43% bases and 57% lids (see section 3.1.1), the proportion of bases and lids in the UDHB1 assemblage is significantly different, comprising a greater proportion of bases (65%) and less lids (35%). One explanation for this is that while bases remained adhered to the vessel, the lids of those individuals once detached, became incorporated into the surrounding sediment matrices (contexts). This supports the earlier interpretation that in (149), some of the excavated Sydney rock oyster shell was not culturally derived, but originated as naturally occurring deposit, and in this instance was attached to the body of the vessel itself. Figure 4.1 illustrates both whole oysters and oyster bases attached to a wooden plank (UDHB1) recovered from the site.

Figure 4.1: Whole oysters and oyster bases attached to a wooden plank of UDHB1. 300mm scale. Camera 2 – Element Recording (Volume 6), DSC_450.

Approximately two-thirds of the UDHB1 assemblage (67%) consisted of bases or lids displaying more than 50% of the umbo. The remaining assemblage (33%) consisted of fragments (pieces of shell displaying no or less than 50% of an umbo). This suggests that a relatively high proportion of the assemblage remained intact, or at least intact to a level which permitted accurate identification of diagnostic shell components for quantification.

The relatively intact nature of the UDHB1 shell assemblage is not unsurprising. As it is not a subsistence assemblage it has therefore not been subject to human procurement, processing, discard and possible re-use – all of which are often reflected in the nature of subsistence remains, for example by a high proportion of fragments, distinctive fracture patterns, and evidence of burning.

Two distinctive features of the oyster bases in the assemblage were the presence of wood adhering to the exterior surface, and their unusually flattened form (Figure 4.2). Both features are a product of the attachment of individual shellfish to the planks (strake) of the vessel. On many bases the presence of small barnacle plates within the attached wood was also observed. These barnacles must have been attached to the boat hull and became embedded between the wood and shell, possibly having grown on the vessel both while it was still in use and after it was abandoned.

Figure 4.2: Sydney rock oyster bases from exterior of UDHB1 (529/1). 1 – 4 show flattened base form, 1-3 show adhering wood, 3 shows adhering wood with embedded barnacles, 5 and 6 are modern oyster bases showing normal ovate shell form. 80mm scale. Melissa Gibbs.

Another distinctive feature of the assemblage, again particularly demonstrated by the bases, was the very thin-walled nature of the shell. Although juvenile oysters (spat less than approximately three years old) may naturally display such a characteristic, this is not a common feature of mature, healthy shellfish. Although a size analysis of the UDHB1 shell assemblage was not undertaken, a high proportion of large bases and lids (ranging 5 to 7cm in height) were observed during analysis. The presence of large individuals was observed in most contexts, particularly where there was a greater number of remains.

Recent studies have demonstrated the effects of increasing acidification of oceans, which includes lower pH and less available carbonate for the building of shells. A result is decreasing shell thickness and shells which subsequently dissolve more easily in corrosive conditions.[25] In addition to being particularly thin, a distinct petrol-like smell was detected from the assemblage during analysis. Both features provide evidence to suggest the possibility that the substrates in which UDHB1 was buried were polluted by petrochemicals typically used and discharged by historic harbour industries. As the vessel was abandoned in the intertidal zone it was subject to the flow of daily tidal regimes, and its deliberate placement between a rock overhang, sandstone wall and wharf would have created a trap for detritus that was washed down and brought in on the tides.[26] It is therefore more than

[25] https://theconversation.com/the-worlds-shellfish-are-under-threat-as-our-oceans-become-more-acidic-103868 - 02/02/2021

[26] Volume 1, Section 4.7.3.1., p.217

likely that the attached oysters were exposed to sustained high concentrations of pollutants, and as a direct result their natural form was adversely affected.

The estimated time of abandonment of the boat prior to 1855 indicates that the attachment of the oysters must have post-dated the mid-19th century. By the second half of this century Sydney Harbour was heavily polluted by increasing human occupation and development of foreshore industries. By the 1860s a sawshed had been built over the abandoned vessel. Both the operation of this facility and the demonstrated discard from its construction activities would have also contributed to the general pollution of the surrounding boat matrices.

5.0 REPORT SUMMARY & RESULTS

5.1 THE EXCAVATED SHELL ASSEMBLAGE

Analyses of the excavated Barangaroo Station shell assemblage demonstrated the dominance of three estuarine taxa – Sydney rock oyster, Mud oyster and Sydney cockle – in all contexts. This is consistent with the past environment of the site and the nature of available habitat types from the time of European occupation. It is also broadly consistent with many other historic archaeological shell assemblages recovered throughout the Sydney CBD and harbour foreshore areas (refer to other reports by the author listed in section 6.0). Based on the results presented above, however, some refinement of the archaeological phases initially proposed for the analysed contexts (by Casey & Lowe) is apparent. A summary of the interpretations of the origin, function, key assemblage features and phases of the analysed contexts is provided in Table 5.1.

Notably, the small quantity of shell detritus (shell fragments or 'grit') and the absence of large numbers of the small, incidental species (for example, Cerithidae sp., *Calthalotia fragum*, *Velacumantis australis*) which commonly form a large component of naturally deposited foreshore marine accumulations, is concluded to demonstrate the relatively low energy of the tidal estuary at the site during the historic period. The presence of large numbers of immature Mud oysters (spat) in (149, 133) are interpreted as possible evidence of disturbance or destruction of nearby oyster beds, which resulted in post-mortem foreshore accumulations deposited through tidal action. Widespread dredging or 'skinning' of Mud oyster reefs throughout the estuaries of Sydney Harbour led to critical decimation of this species during the mid- to late-1800s.[27] Based on this evidence, the likely timing of the deposition of (149) (sediment surrounding UDHB1) is Phase 4 (1855-1876) to Phase 5 (1876-1900), while (133) (sediment overlying UDHB1) may be limited to Phase 5 (1876-1900).

The shell assemblage recovered in sediments underlying UDHB1 (249) obviously predates the abandonment of the boat (possibly 1830s-40s). Along with large Sydney rock oysters, this assemblage also contained large Mud oyster remains, suggesting the availability of mature individuals prior to the mid-19th century. This period predates widespread skinning activities and is thus consistent with the allocation of Phase 3 (1788-1855) for (249).

The shell remains in the cistern fill (215) associated with a house on Wentworth Street in Area Z are interpreted as household discard deposited during Phase 4 (1855-1876). The nature of this assemblage reflects the availability of local edible species during the mid- to late-19th century, in addition to evidence of deliberate shell breakage and modification for both subsistence and non-subsistence purposes. Although not included in this analysis (but catalogued as small finds – refer to Volume 3, Section 4 Miscellaneous Report), a pendant made from the apex (top) of a *Conus* sp. (Cone) shell was also recovered in (215) (Figure 5.1).

[27] Ogburn et al. 2007:274

Figure 5.1: Cone shell pendant (left – exterior surface, right – interior surface) recovered from cistern fill (215) is Area Z. 10mm increments on scales.

The form of this artefact is identical to Cone shell pendants traditionally produced by Melanesian cultures, and which commonly form part of ethnohistoric collections from the Solomon Islands as well as the Torres Strait Islands in northeastern Australia.[28] The presence of this item along with the burnt Nautilus shell and deliberately fractured Cowry shell provide possible evidence for the collection of exotic shell species and shell artefacts by Wentworth Street residents during the mid- to-late 19th century. A similar interpretation was drawn for exotic shell remains recovered from mid- to late-19th century occupation deposits at the Sydney Metro site of Blues Point.[29] As the Barangaroo Station site was also the location of historic maritime activities, it is not unsurprising that items collected from far-off lands by mariners were also lost or discarded here. Research into the occupants of the house associated with the cistern may shed further light into the possible (geographic) origin of these shell remains, and perhaps even the resident(s) responsible for their collection and/or discard.

The nature of shell from (234) in Area Y similarly reflects the locally available shellfish species, but also demonstrates the presence of subsistence remains in reclamation deposits associated with built maritime structures during Phase 4 (1855-1876).

[28] Florek 2005

[29] Gibbs 2020:12

Table 5.1: Summary of context interpretations, including key evidence and phase information.

	Tidal deposits (natural remains)	Tidal deposits (cultural remains)	Tidal deposits (intermixed natural and cultural remains)	Occupation/bilge deposit	Key evidence'/assemblage features	Phase
Surrounding UDHB1 (149)			✓		Large proportion of immature Mud oysters Sydney rock oyster with flat bases and adhering wood, and higher frequency of lids Large Sydney rock oysters, Deliberate breakage of Cowry and Club mud whelk shells	4 (1855-1876) 5 (1876-1900)
Overlying UDHB1 (133)	✓				Mud oyster dominant, comprising large proportion of immature individuals Presence of periostracum on Sydney cockle shells	5 (1876-1900)
Within UDHB1 (159)				✓ (undisturbed)	Sydney rock oyster dominant High degree of shell fragmentation Presence of burnt shells	4 (1855-1876)
Underlying UDHB1 (249)				✓ (re-deposited)	Large Sydney rock oysters and Mud oysters Absence of flattened rock oysters and adhering wood Limited quantity and diversity of other shell remains	3 (1788-1855)
Fills (Area Y) (234)				✓ (re-deposited)	Shell limited to Sydney rock oyster, Mud oyster and Sydney cockle Deliberate breakage of rock oyster lid (evidence of processing)	4 (1855-1876)
Fills (Area Z) (215)				✓ (undisturbed)	Large Sydney rock oyster and Mud oyster shells Deliberate breakage of Cowry and burnt Nautilus shell	4 (1855-1876)

5.2 THE UDHB1 SHELL ASSEMBLAGE

It is concluded that the abandonment of UDHB1 in the intertidal zone facilitated the growth and attachment of Sydney rock oysters to its surfaces. Analyses of these remains revealed a high incidence of flattened bases with adhering wood, providing direct evidence of their past attachment to the wooden planks of the vessel. A higher incidence of bases (compared to lids) in the assemblage is interpreted to reflect the loss or deposition of oyster lids within the sediment which accumulated around the boat post its abandonment. This is confirmed by the higher incidence of lids (compared to bases) in the shell assemblage from (149).

The distinctly thin oyster bases and noticeable petrol-like smell of the shell assemblage is interpreted to reflect the polluted environment of Sydney Harbour during the historic period (and perhaps well into the 20th century). The boat and both the natural and built features against which it was placed, meant that tidal detritus including petro-chemical waste, would have accumulated against the structure. Although a relatively resilient species, both the presence and nature of the Sydney rock oyster remains extracted from UDHB1 provide evidence of the high degree of modification and disturbance to Sydney Harbour from the mid-19th century (Phase 4).

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7.0 APPENDIX

Summary of data for the UDHB1 shell assemblage

Context	Location	Shell Frag Type.	NISP	Shell Wt. (g)	MNI
529/1	EXTERIOR	Lids	39	171.5	-
		Bases	62	458	-
		Frags	3	2.6	-
		Articulated shells	2	27.8	-
		TOTAL	**106**	**659.9**	**64**
464/1	EXTERIOR ALL OVER	Lids	15	33.8	-
		Bases	31	171.8	-
		Frags	18	41.1	-
		TOTAL	**64**	**246.7**	**31**
514/1	EXTERIOR ALL OVER	Lids	0		-
		Bases	5	13.1	-
		Frags	9	7.1	-
		TOTAL	**14**	**20.2**	**5**
528/1	EXTERIOR ALL OVER	Lids	24	30.1	-
		Bases	30	48	-
		Frags	9	6.5	-
		TOTAL	**63**	**84.6**	**30**
452/1	EXTERIOR ALL OVER	Lids	6	7.8	-
		Bases	12	19.2	-
		Frags	20	16.9	-
		TOTAL	**38**	**43.9**	**12**
314/2	EXTERIOR	Lids	6	24.3	-
		Bases	16	105.5	-
		Frags	7	5.5	-
		TOTAL	**29**	**135.3**	**16**
502/2	EXTERIOR	Lids	15	18.3	-
		Bases	31	87.1	-
		Frags	20	27.1	-
		Articulated shells	2	12.1	-
		TOTAL	**68**	**144.6**	**33**
304/1	OUTBOARD	Lids	4	14.3	-
		Bases	7	62	-
		Frags	8	17.2	-
		TOTAL	**19**	**93.5**	**7**
500/1	EXTERIOR ALL OVER	Lids	7	13.8	-
		Bases	11	57.5	-
		Frags	23	52.5	-
		TOTAL	**41**	**123.8**	**11**
540/2	EXTERIOR	Lids	4	14.5	-
		Bases	19	111	-
		Frags	7	12.7	-
		TOTAL	**30**	**138.2**	**19**
506/3	EXTERIOR	Lids	6	18.4	-

Context	Location	Shell Frag Type.	NISP	Shell Wt. (g)	MNI
		Bases	19	138	-
		Frags	7	16.9	-
		TOTAL	**32**	**173.3**	**19**
466/3	OUTBOARD	Lids	4	21.4	-
		Bases	8	86.7	-
		Frags	0	0	-
		TOTAL	**12**	**108.1**	**8**
539/4	INTERIOR ALL	Lids	7	6.4	-
		Bases	14	24.9	-
		Frags	15	10.1	-
		TOTAL	**36**	**41.4**	**14**
315/3	EXTERIOR ALL OVER	Lids	4	11	-
		Bases	17	88.8	-
		Frags	18	50.7	-
		TOTAL	**39**	**150.5**	**17**
530/2	EXTERIOR	Lids	3	4.5	-
		Bases	3	18.7	-
		Frags	2	1.3	-
		TOTAL	**8**	**24.5**	**3**
550/1	PORTSIDE	Lids	0	0	-
		Bases	0	0	-
		Frags	7	6.8	-
		TOTAL	**7**	**6.8**	**0**
531/2	EXTERIOR	Lids	1	0.6	-
		Bases	0	0	-
		Frags	3	5.4	-
		TOTAL	**4**	**6**	**1**
530/1	INBOARD	Lids	0	0	-
		Bases	1	2.3	-
		Frags	2	5.6	-
		TOTAL	**3**	**7.9**	**1**
533/1	AFT	Lids	0	0	-
		Bases	0	0	-
		Frags	0	0	-
		Articulated shell	1	9.1	-
		TOTAL	**1**	**9.1**	**1**
522/4	EXTERIOR	Lids	1	1	-
		Bases	2	6.6	-
		Frags	4	3.2	-
		TOTAL	**7**	**10.8**	**2**
542/2	EXTERIOR STERN	Lids	0	0	-
		Bases	4	15.3	-
		Frags	1	3.4	-
		TOTAL	**5**	**18.7**	**4**
314/1	INTERIOR	Lids	1	5	-
		Bases	1	11.7	-

Context	Location	Shell Frag Type.	NISP	Shell Wt. (g)	MNI
		Frags	0	0	-
		TOTAL	**2**	**16.7**	**1**
534/1	INTERNAL. OYSTER SAMPLE	Lids	3	18.1	-
		Bases	1	5.4	-
		Frags	1	1.4	-
		TOTAL	**5**	**24.9**	**3**
055/3	STARBOARD	Lids	0	0	-
		Bases	0	0	-
		Frags	1	1.1	-
		TOTAL	**1**	**1.1**	**1**
509/1	EXTERIOR ALL	Lids	1	0.7	-
		Bases	0	0	-
		Frags	24	30.6	-
		TOTAL	**25**	**31.3**	**1**
443/1	EXTERIOR	Lids	2	1.6	-
		Bases	2	3.7	-
		Frags	8	6.2	-
		TOTAL	**12**	**11.5**	**2**
508/8	EXTERIOR ALL	Lids	2	1.6	-
		Bases	2	2.4	-
		Frags	3	2.8	-
		TOTAL	**7**	**6.8**	**2**
542/3	EXTERIOR CENTRE	Lids	0	0	-
		Bases	0	0	-
		Frags	1	0.9	-
		TOTAL	**1**	**0.9**	**0**

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

ORGANICS REPORT

MARCH 2022

VOLUME 3, SECTION 3.7

A leather shoe once belonging to a child

FINAL REPORT | Report to **Sydney Metro**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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CONTENTS

Report Status	Date Submitted	Purpose	Author	Reviewed
Draft Version 1	24.03.21	Internal review	Jane Rooke	Holly Winter
Draft Version 2	01.12.21	Internal review	Jane Rooke	Holly Winter
Final Report	23.03.22	Final report	Jane Rooke	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

ORGANICS REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

Casey & Lowe were commissioned by AMBS Ecology and Heritage on behalf of John Holland CPB Ghella Joint Venture (JHCPG) to undertake historical archaeological investigations at the Barangaroo Station site, Sydney.

The Barangaroo Station site is located in Hickson Road and part of Barangaroo Headland site. The study area was divided into six excavation areas (Areas R, T, W, X, Y, Z) (Figure 1.1).

A program of excavation was undertaken across the study area in order to salvage any significant archaeological resource. The program was staged, with the final stage involving the removal of the abandoned vessel, Unidentified Darling Harbour Barangaroo No. 1 (UDHB1 – 140). The final artefacts were recovered from site in January 2019 when artefacts associated with the boat deposit were sieved from the sand under the boat (249).

Figure 1.1: Location plan showing the site outlined in red and the excavation areas are shaded. Google Maps.

Historical research in the Archaeological Assessment provided baseline information for predicted phases of development and in general, these were consistent within each excavation area and relate to the activities and occupation of specific individuals. The study area was divided into seven main archaeological phases and are outlined in Table 1.1. Sub-phases were utilised in Phases 3 and 5 to account for the differences in land ownership and modifications to buildings which took place across the site.

Table 1.1: Table of phases in Barangaroo Station

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.2 METHODOLOGY

The artefact processing for Barangaroo Station happened in several stages. Due to limited space on the site some of the artefacts were transported to a processing centre in Roseberry to be cleaned, bagged and boxed. The artefacts were then transported to Yennora awaiting analysis. A selection of artefacts from the boat, including the sieving, were taken back to Casey & Lowe's office for processing. Leather and timber artefacts were temporarily conserved as they were found, wet and uncleaned, in a fridge.

The category of organic artefacts for Barangaroo Station has its own numbering sequence of #25001-25689 which form part of the Artefact Catalogue in Volume 7. They were catalogued by Hannah Flood and Jane Rooke.

The loose timbers within the boat (140) will be discussed in a separate report in Volume 3.11. Organic artefacts that were associated with, on, around and under the boat (140) will be discussed separately in Section 4.0 of this report.

For the organic artefacts, the catalogue records:

- the catalogue numbers;
- the context number where the item was found;
- the shape of the item (i.e. shoe);
- the general function (i.e., personal)
- specific function (i.e., clothing)
- fabric (i.e., leather)
- portion (i.e., sole/heel)
- country of manufacture
- manufacturer
- producer or retailer
- mark
- age and gender associations
- dimensions (in mm)
- joins (context/#catalogue number)
- weight (in grams)
- brief description (includes mark description)
- from and to dates (of manufacture)
- number of fragments
- minimum item count (MIC).

The footwear from the site was catalogued according to traditional terminology. The shoe has basic components which form the whole shoe and form the basis of cataloguing and analysis. A glossary of terms is given in Section 6.0. The classification system for the footwear is based on criteria of function, shape, material, technology, style, gender and age use.

Turned pumps, slippers and latchets were the most common styles for lighter shoes, simply made by hand sewing the uppers to the outsole when inside out. Welted construction, often using a holdfast seam on the insole, was used for sewn heavier shoes and boots. Experimentation and adoption of other methods of sole attachment were increasingly used including wood pegs, and metal nails and screws. The leather had little treatment, shoe or slipper uppers were supple, those for boots, coarser. The outsoles were often hammered to make them more compressed and durable.

The general size and form give clues as to the gender and age of the wearer. The type of material used, and its quality, can give an idea of occupation, status and wealth of the intended purchaser. Shoe style characteristics are most notable when examining the shoe upper while construction characteristics show best when examining the shoe sole.[1] The style of the upper, toe and heel in combination can often locate the shoe within a general time frame. Depictions of the main parts of footwear as well as the main construction methods to be identified where possible are shown above (Figure 1.2, Figure 1.3) and defined below (Table 1.2). The first of these criteria define the shoe types used in the catalogue and this report. They comprise the categories of last form, attachment method and shoe construction method (Table 1.2). The shoes were further described in the catalogue using a checklist of variables (Table 1.3). For ease of data entry, those which related to the four major parts of the upper as well as the heel were given numerical values which are also used in some of the tables in this report. Where shoes are fragmentary the manufacturing method can often be deduced from the actual hardware used to attach the various pieces together or the distinctive holes they leave behind. Some shoes and boots can be dated from a time after the invention of a specific patent but others fall within broader parameters.

Table 1.2: Construction methods used in shoe analysis

Last		From	To
Straight	Left and right shoes are the same. Before machine manufacture it was difficult for shoemakers to keep ranges of lasts. They were used longer for children's and poorer quality shoes.	c.1700	c.1860 (adult)
Crooked	Left & right shoes follow the of curve of feet. Medieval period, expensive shoes. Reintroduced when fashionable shoes had no heels. In general use after 1860s when nailing & sewing machinery & invention of pantograph enabled easy production of lasts with heels.	Medieval c.1800 c.1860	-
Sole Attachment Method			
Turned	Upper stitched directly to sole inside out then turned. Indoor shoes and slippers.	-	-
Other	Welted & other construction methods, upper attached to insole, then the outsole attached.	-	-

[1] Stevens, S.C., Ordoñez, M.T. Fashionable and Work Shoes from a Nineteenth-Century Boston Privy. Hist Arch 39, 9–25 (2005).

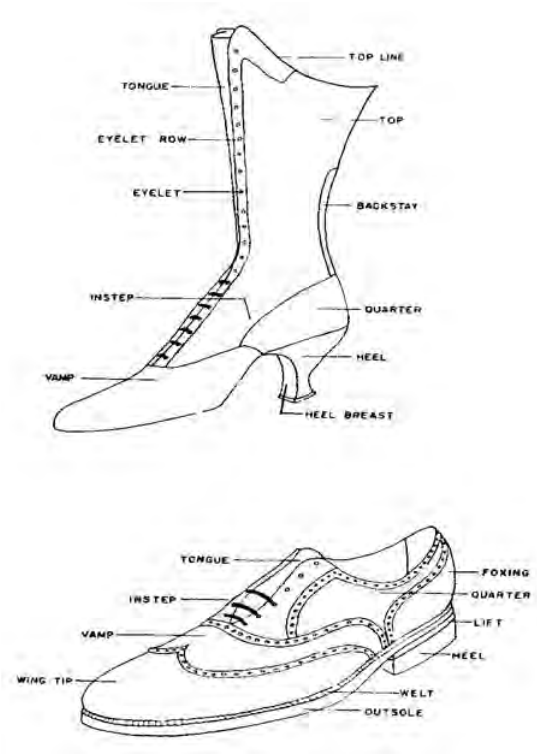


Figure 1.2: Shoe part terminology of 1920 shoe boot and shoe. The upper is the top part of the shoe and includes the toe cap and the vamp which meets the quarters, the rear component of the upper.[2]

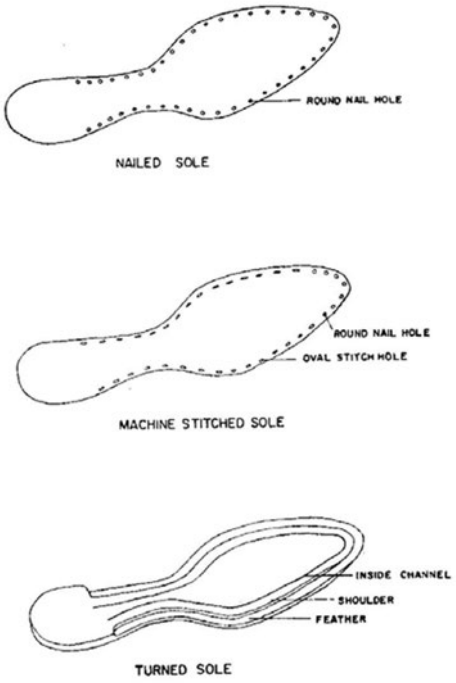


Figure 1.3: Upper surface of insole showing evidence of different types of construction.[3]

Table 1.3: Shoe types relating to construction method and dating. Note underlined letters in method used as abbreviations in catalogue

Method	No.	Description	From	To
Hand Stitched	0	Other or irregular.	-	c.1860
	1	Unknown turned type.		c.1860
	2	Turned, stitching shoulder around entire upper edge of outsole.	-	c.1860
	3	Turned, stitching shoulder shank – toe. Heel seat separately sewn.	-	c.1860
	4	Turned out or stitched down, usually thick leather with welt or rand. Found UK from 17th century. Common South African technique, known as Veldtschoen.	-	c.1860
	5	Welted.	-	c.1880
	6	Welted, insole holdfast seam.		c.1880
Machine Stitched	1	Other/Unknown, usually 2 or 3.	c.1860	-
	2	Early Patents, toe & heel nailed.	1860	
	3	McKay Patent, exposed (uncomfortable) stitching around entire upper edge of insole, stitching around entire edge of outsole, welted.	1862	-
	4	Goodyear Welt, stitching shoulder around entire lower edge of insole only, stitching around entire edge of outsole, welted.	1875	-

[2] Anderson 1968 Fig 7

[3] Anderson 1968 Fig 5

Method	No.	Description	From	To
	5	Feather, stitching around entire edge of outsole, on upper side holes are oval shoe-width wise, on lower side holes are more triangular/feathered. Combination with insoles, welted.	-	-
	6	Turned Out or stitched down (see H St 4).	-	-
Wood Pegged	1	Unknown type, usually 2 or 3. (peg holes are lozenge or square).	-	-
	2	Hand hammered, irregular shape (generally only heel to sole).		
	3	Hand operated pegging machine, mixed shape (upper, sole). Patent 1829, generally adopted USA 1843.	1829	1920
	4	Davey Pegging Machine hammered, uniform shape (upper, sole).	1854	
	5	Wood Pegged & hand nailed.	1829	-
	6	Wood Pegged & machine nailed.	1862	
Nailed	1	Unknown, mixed holes.	1812	-
	2	Fe (square/rectangular section) hand hammered.		
	3	Aes (square/rectangular section) hand hammered.	1812	-
	4	Fe & Aes hand hammered combination.	1812	
	5	Fe (rectangular/circ section) cable nailing, machine hammered & cut.	1862	
	6	Aes (rectangular/circ section) wire nailing, machine hammered & cut.	1862	-
	7	Fe & Aes machine hammered combination.	1862	
	8	Aes (diamond section) wire nailing, machine hammered and cut	1862	-
	9	Aes (rectangular section) wire nailing, machine hammered and cut	1862	-
Screwed	0	Aes screw unknown.	1862	-
	1	Aes (circ section) cont. brass wire, no head, early machine hammered & cut.		
	2	Aes Standard Screw Machine, very regular placement.	1880	-
	3	Aes screw with Fe machine nailing combination.	1862	
Rubber	1	Unknown, mixed.	c.1850	-
	2	Sole/heel inserts.		
	3	Heel screwed, black vulcanised, thick solid.	1895	-
	4	Solid cast, pink.		
Cemented	1	Unknown.	1926	-
	2	Sole method upper glued to outsole.	1926	
	3	Combination with stitching/nailing.	1926	

The study and analysis of footwear has the potential of providing information on dating and an understanding on the social and economic aspects of a site. Providing an end date is possible in terms of an end date of manufacture, determined by the method of manufacture and also when the context in which the item was deposited was sealed stratigraphically if it can be determined. The latest possible date for manufacture does not account for the possible re-use and recycle of the item. The footwear was possibly used over a period of time, and probably re-used in terms of hand-me-downs and second-hand items, although this is more difficult to date. Any evidence of repair on many of the items

serves as confirmation of at least the prolonged life of much of the footwear, if not also the re-use.[4]

1.3 REPORT AUTHORSHIP

This report was written by Jane Rooke, Archaeologist and Artefact Specialist, and Hannah Flood, Archaeologist, Casey & Lowe.

[4] Stocks 2009: Veres 2005

2.0 ARTEFACT OVERVIEW

This section of the report will look at the 997 Minimum Item Count (MIC) and 961 fragments of organic artefacts excavated during the historical archaeological investigations at Barangaroo Station (Table 2.1).

Area X had the highest number of artefacts (944 MIC), with the majority coming from context (149) (30%), the dark grey sand deposit around the boat (140 - UDHB1), which had run off from Clyde Street (Table 2.1).

Table 2.1: Areas and Contexts with organic artefacts

Area	Context	MIC	%	Fragments	%
Area R	052	1	*0*	8	*1*
Area T	073	1	*0*	1	*0*
	078	9	*1*	10	*1*
	082	2	*0*	3	*0*
	096	2	*0*	3	*0*
Area X	132	83	*8*	77	*8*
	133	117	*12*	149	*16*
	140	23	*2*	21	*2*
	141	11	*1*	5	*1*
	142	30	*3*	43	*4*
	146	4	*0*	0	*0*
	148	6	*1*	9	*1*
	149	300	*30*	326	*34*
	150	2	*0*	2	*0*
	151	24	*2*	13	*1*
	152	36	*4*	27	*3*
	153	11	*1*	8	*1*
	154	22	*2*	15	*2*
	155	10	*1*	7	*1*
	156	11	*1*	6	*1*
	157	4	*0*	2	*0*
	158	20	*2*	12	*1*
	159	20	*2*	8	*1*
	246	7	*1*	4	*0*
	247	10	*1*	16	*2*
	248	5	*0*	8	*1*
	249	194	*19*	143	*15*
Area Y	165	1	*0*	1	*0*
	234	7	*1*	7	*1*
Area Z	205	5	*0*	8	*1*

Area	Context	MIC	%	Fragments	%
	215	22	*2*	25	*3*
	243	3	*0*	3	*0*
	TOTAL	1003	*100*	970	*100*

The general function of artefacts within the study area are suggestive of the historical phases which were identified. These phases, buried beneath thick layers of imported fill material used as construction fill for the 1910s finger wharves and for the construction of the container terminal in the 1960s, or sealed beneath levelling fills for the construction of Hickson Road, included: the remains of a c.1830s house consisting of sandstone foundations and seawall, structural remains for a pre-1855 timber boatshed adjacent to Langford's House deposited pre-1865, sandstone foundations for 19th-century sawshed, multiple 19th-century sandstone seawalls, sandstone foundations for 20th-century stores, timber piles and the foot of Clyde Street constructed from sandstone blocks and bluestone setts dated to c.1880s. The evidence for occupation of the site and the surrounding area can be seen in the high percentage of food (37%) and personal items (36%) (Table 2.2). A number of artefacts (210 MIC) were placed in the unidentified general function due to their generic nature. For instance, rope can be used in industry or the household and for many specific functions (Table 2.2).

Table 2.2: Total number and percentage of artefacts by General Function

General Function	MIC	%	Fragments	%
architecture/industry	1	*0*	0	*0*
food	372	*37*	226	*24*
household	1	*0*	0	*0*
household /industry	23	*2*	26	*3*
industry	6	*1*	60	*6*
industry /transport	1	*0*	1	*0*
personal	355	*36*	354	*37*
personal/household	1	*0*	1	*0*
personal/transport	3	*0*	5	*1*
store	7	*1*	0	*0*
transport	10	*1*	6	*1*
transport/industry	4	*0*	1	*0*
unidentified	213	*21*	287	*29*
yard	6	*1*	3	*0*
TOTAL	1003	*100*	970	*100*

The condition of all archaeological artefacts is a result of the interaction between the materials and the surrounding environment, which can be protective or destructive. Environmental factors which impact artefacts include, but is not limited to, water, biological growth, oxygen, temperature, light and human action. It is for this reason that organic materials including animal i.e., leather, wool, silk (bone is catalogued separately) or plant i.e., wood (soft and hard), seeds, as well as fibres i.e., cotton, linen or materials used for textiles, paper, rope etc, are often less common on archaeological sites than other materials such as glass and ceramic.

However, Barangaroo Station, which is situated on the foreshore, created an ideal environment for organic material. The anaerobic conditions conserved and protected much of the leather, wooden artefacts and seeds (Table 2.3). Clothing, which in this instance is all shoe related items, accounts for 30% of the artefacts. There is also a high percentage of seeds, both fruit and vegetable, as well as native seed pods.

Table 2.3: Artefacts by specific function and shape

Specific Function	Shape	MIC	Fragments
by-product	charcoal	22	25
	hide	1	0
clothing	boot	3	1
	boot, lace-up	3	2
	offcut	2	2
	pump	2	5
	pump/slipper	5	4
	shoe	281	256
	shoe, lace-up	2	3
	shoe/boot	9	18
	shoe/slipper	34	40
	unidentified	5	8
clothing/horse	belt/strap	3	5
container	container	1	2
	cork	14	5
fruit	apple	4	0
	coconut	8	9
	nectarine	152	90
	nectarine/peach	25	3
	peach	133	84
	plum	2	1
fuel	coal	1	1
furniture	doorknob	1	0
garden	flora	1	1
	fruit pod	2	0
	gumnut	2	1
nut	almond	1	1
	hazelnut	28	28
seed	unidentified	2	1
store	barrel	4	0
structure	offcut	1	0
	post	1	0
structural /vessel fitting	dowel	1	0
unidentified	brush	1	1
	bung	2	0
	container	1	0
	cord	1	1
	dowel	6	5
	fabric	4	5

Specific Function	Shape	MIC	Fragments
	felt	1	60
	ferrule	1	1
	fibre	1	1
	handle	1	1
	offcut	32	24
	peg	3	3
	pin	6	4
	rope	26	121
	seed	1	0
	shoe	8	15
	strap	3	2
	string	5	9
vessel/fitting/unidentified	timber	29	21
	treenail	1	0
	twine	4	9
	unidentified	12	10
	wedge	5	2
	wood	52	53
	timber	1	1
vegetable	pumpkin	20	9
vessel	dowel	1	1
	timber	4	4
	treenail	1	1
vessel/unidentified	offcut	2	1
vessel-hull	frame	4	0
	TOTAL	1003	970

3.0 CONTEXT ANALYSIS

3.1 AREA R

Area R was located to the north of Area W in the southeast of the site (Figure 1.1). One artefact was found from this area, within (052) (Phase 5.1), a backfill event for the construction of the foot of Clyde Street. It overlies a timber fender (045), which was used to stop boats bumping against the sandstone wharf (Figure 3.1).

Figure 3.1: North face of timber fender (045). View to southwest, 500mm scale. DSC_1860.

The single organic artefact from (045) was a large shoe or boot heel, the size indicating it was once worn by a male (Figure 3.2). This was one of only 15 near complete shoe heels found throughout the whole site, in comparison to 318 shoe related artefacts with no complete heels. Heels are often made with thick leather, called lifts, stacked on top of each other with iron fastenings holding them together. This makes them heavier than other parts of the shoe and less able to be carried by water. This would suggest that this partial shoe was thrown or dropped here, whereas the majority of the soles and uppers from the rest of the site were likely carried in with the tide or came from the streets above.

Figure 3.2: 052/#25619 Shoe or boot heel with five or six thick leather lifts. 100mm scale. Img_2298. R. Workman.

3.2 AREA T

Shipbuilding was an important part of the economy and exploitation of Millers Point in the early-19th century. James Munn was the first to establish shipbuilding yards in the area in the 1820s. After the death of Munn, Lawrence Cochrane was in charge of the property and built several ships during this time. In 1856, John Cuthbert acquired the property from Cochrane. A stage of construction directly followed by a phase of occupation was evidenced in Cuthbert's wharf during excavations. The first stage witnessed the construction of the seawalls, slipway and infill of space behind to create a level building base, with a phase of occupation following straight after, including the working wharf surfaces and the sawshed.

A stone house and timber wharf were present on the site by 1861, along with a patented slipway by 1865. The remains of a sawshed were found in Areas R and T during excavations, as well as the slipway and seawalls being uncovered in the south of the area.

Area T has 14 organic artefacts which are all shoe related (Table 3.1). The artefacts came from Phase 4 and Phase 5.1.

Table 3.1: Total number of organic artefacts from Area T

Context	Phase	Shape	Portion	MIC	Fragments
073	4	offcut	offcut	1	1
078	4	boot, lace-up	quarter	1	2
		fabric	fragment	1	1
		shoe	outsole	1	1
			upper	1	1
			sole	1	1
				1	1
				1	1
			outsole	1	1
			heel	1	1
082	5.1	pump	heel	1	2
		shoe		1	1
096	4	offcut	offcut	1	1
		shoe/slipper	sole	1	2
			TOTAL	14	17

Context (078), the flat lying timbers and assorted timber pieces, and (073), a deposit of wood chips on and around the timbers, had a combined 10 MIC of small, fragmented leather shoe related items and these were unable to be dated (Figure 3.3, Figure 3.4, Figure 3.5).

Figure 3.3: Fragmented leather artefacts from (073 and 078) (t-b). First column: Outsole fragment 78/#25627, leather offcut #25620, Lace up boot quarter #25621. Second column: Hand stitched leather fragment #25623, Outsole fragment #25625, left outsole #25622. Third column: brown fabric #25629, pegged shoe heel #25624, outsole fragment #25626, two heel lifts #25628. 100mm scale. Img_2299. R. Workman.

Figure 3.4: Wood chip fill (073) sitting above and around timbers (078). View to southwest, 500mm scale. DSC_1841.

Figure 3.5: Dark grey sandy working surface (080), with timbers (078) sitting above. View to northeast, 1m scale. DSC_2038.

A worn sole with frequent shallow linear cuts on the underside was found in (096), a black sandy fill, possibly part of the reclamation associated with the slipway. The square toe on the sole suggests it dates from 1820 when this style was in fashion.[5] The hand stitching suggests it was made before c.1860 when machines became more commonly used in shoemaking. Context (096) also had a very thick piece of leather, an offcut with curved cuts, parallel to each other on the grain side of the leather indicating its use in the shoe making process (Figure 3.6).

Figure 3.6: Leather from (096) (l-r). Leather offcut with deep cut lines #25632, insole and outsole from the same shoe with square toe #25633. 100mm scale. Img_2300. R. Workman.

3.3 AREA X

Area X was to the south of Area Y and northeast of Area R (Figure 1.1). The area contained Langford's House c.1830-c.1880, a pre-1855 wharf wall attributed to Langford, a pre-1865 sawshed structure and from c.1880s, Clyde Street.

Area X had a total of 950 MIC (901 fragments), all but four of these artefacts were associated with the deposits in, on, around or under the boat. The four artefacts from (146) will be discussed below and the artefacts associated with the boat will be discussed in Section 4.0. Context (148) was assigned to the loose timbers sitting on the pale grey sand within the boat (142). Timber elements from this context will be discussed in the loose timber report in Volume 3.11. The sum of loose timbers is not included in any counts in this report. Organic artefacts (not timber) attached to some of these elements will be discussed in Section 4.2.2.

[5] Bower 1999: 125; Stocks 2009: Pratt & Woolley 1999:52-60

CONTEXT 146

Context (146) was a fill including timber knees, planks and shaped pieces (#25690). They were found alongside Langford's House, once on the water's edge (Figure 3.7).

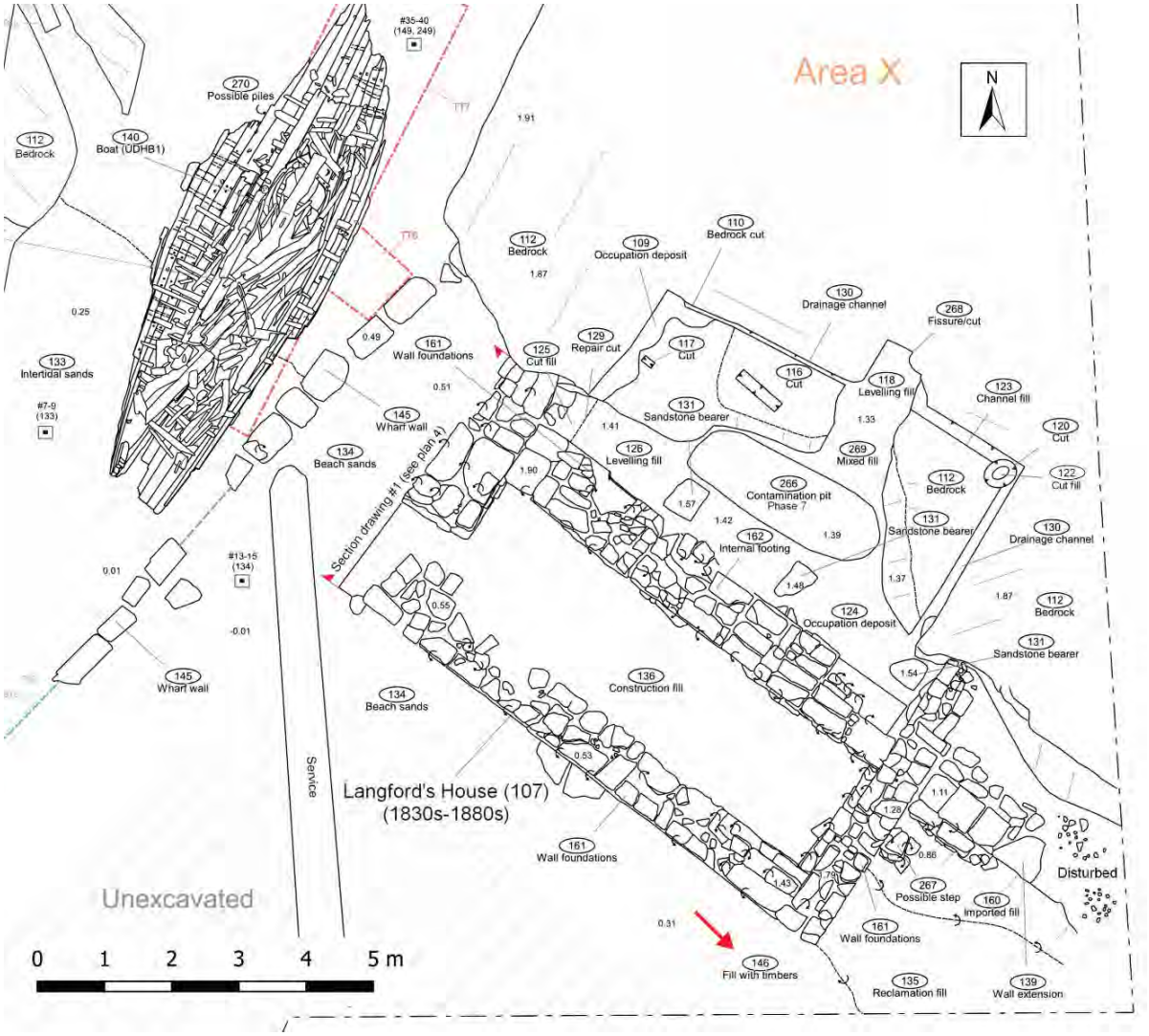


Figure 3.7: Detail of phase 3.2 Plan 3 Area X early European occupation 1788-1855 showing Langford's House, the boat and the location of the knees (146).

In his *Illustrated Glossary of Ship and Boat Terms, Steffy* defines knees as:

> An angular piece of timber used to reinforce the junction of two surfaces of different planes; usually made from the crotch of a tree where two large branches intersected, or where a branch or root joined the trunk.[6]

The knees were comprehensively recorded on site with the results presented below (Table 3.2, Figure 3.8).

[6] Steffy. J The Oxford Handbook of Maritime Archaeology. Edited by Ben Ford, Donny L. Hamilton, and Alexis Catsambis. Available at:
https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199336005.001.0001/oxfordhb-9780199336005-e-48

Table 3.2 : Knee dimensions from (146)

Knee	Dimensions
A	1060 mm long trunk, 520 long branch.
B	1100 mm long trunk, 420 mm long branch.
C	1020 mm long trunk, 840 mm long branch.
D	850 mm long trunk, 350 mm branch.

Figure 3.8: Photogrammetry of (146) Timber pieces, including four knees (A,B,C,D;#25690), recovered during machine excavation to the south of Langford's House. 1m scale. Ortho by Casey & Lowe.

The four timber knees appear to be unused stock. The two largest knees (A and B) are split from approximately 400mm trunk, then quartered and hewn to size to match the branch. Knee C is cut from a tree with a trunk of a smaller diameter. The purpose of knee D is unclear, as the diameter of the full trunk remains with bark in situ. Some tool marks

are evident on the flat surface of the worked trunk areas on knees A and C. The face of knee B's trunk has been broken away longitudinally. Knee D does not appear to be a 'trunk and branch' composition, instead it seems like a curved continuous trunk/branch. The angles of the knees are 110°-120°.

It was not unusual to find timbers stored in shipyards in any accessible spaces, often close to the water, as the photograph of Cuthbert's Ship Yard shows (Figure 3.9).

Figure 3.9: Cuthbert's Ship Build Yard Sydney, New South Wales by the Freeman Brothers. Photograph was taken looking to the east c.1870. It shows in great detail the large amount of ship building materials present on the wharf surface, including timber knees, marked with a blue arrow. The red arrow marks Langford's House. Held by the Australian Maritime Museum, Object no. 00028442.

3.4 AREA Y

Area Y was located to the north of Area X and east of Area T (Figure 1.1). Archaeology uncovered included sandstone walls and a series of industry specific structures, responding to the natural topography of the site. Several phases of construction were uncovered: the back portion of Cuthbert's pre-1865 sawshed; and a series of multi-phase retaining wall and construction levels. There were eight artefacts found in Area Y (Table 3.3). They were found in (165), a clean-up context and (234), a series of mixed fills used to infill the undulations and gaps within the bedrock, helping to reclaim and level the area for the construction of Cuthbert's wharf. All but one of the artefacts were shoe related, with no dates able to be identified for manufacture or style (Figure 3.10). Municipal and private rubbish dumps were commonly used as a source of reclamation material in 19th-century Sydney.[7] The various shoe related artefacts suggest that this fill came from a shoe maker, possibly one of the shoe makers from the streets above the boatyard. One piece of partial rope (#25640) was found. The rope has an unidentified copper alloy fragment attached to it. It is unclear if this was associated with the ropes usage or it was attached during the deposition process.

[7] Casey & Lowe 2013

Table 3.3: All organic artefacts from Area Y

Context	Shape	Portion	MIC	Fragments
165	shoe	sole	1	1
234	shoe/boot	outsole	1	1
	shoe	offcut	1	1
		outsole	1	1
		upper	1	1
		upper	2	2
	rope	partial	1	1
		TOTAL	8	8

Figure 3.10: Leather artefacts from Area Y. Top: leather sole with ferrous staining 165/#25634. Far left: leather sole 234/#25637. Middle row (l-r): small piece of leather offcut 234/25636; Suede shoe vamp 234/#25638. Bottom row: fragment of heel 234/#25634; leather shoe upper fragments 234/ #25639. 100m scale. Img_2600. R. Workman.

3.5 AREA Z

Area Z was in the far north end of the Barangaroo site. This area contained the extensive remains of a multi-phase late 19th-century sandstone and brick building and was disturbed by three large modern services. A total of 28 MIC were found (Table 3.4) with the majority shoe related.

Table 3.4: All organic artefacts from Area Z

Context	Shape	Portion	MIC	Fragments
205	fabric	frag	2	3
	pump	heel	1	3
	timber	offcut	1	1
	timber	fragment	1	1
215	boot	upper	1	1
	nectarine/peach	whole	2	1
	offcut	offcut	1	1
	shoe	counter	1	1
		heel	1	2
		insole	2	2
		nr whole	2	0
		outsole	2	2
		sole	2	3
		whole	1	0
	shoe/slipper	outsole	3	3
		outsole/heel cupping	1	2
		upper/sole	1	5
	string	frag	1	1
	unidentified	unidentified	1	1
243	shoe	outsole	1	1
		TOTAL	28	34

Context (205) was a dark brown-black sandy clay fill found within the channel (203) that was used to direct the water run off to the sump, (255) in the northern end of Area Z. A timber offcut (#25644) that was found was cut on one end and quite thin. Although there was a fair amount of timber in the area, the sump (255) had a timber cover and there were a large number of timber pieces (202) lying on a cement surface (Figure 3.11), it is unlikely this offcut came from these. However, a very small piece of timber, broken at all edges with possible evidence of shaping at one end (#25642) could have come from either of these contexts.

Figure 3.11: Sump (203), timbers (202) and modified bedrock shelf. View to northeast, 500mm scale. IMG_3829.

Context (215) from Phase 4 was the lowest fill in the cistern (206), a circular cut which was hand dug in the bedrock with pick marks evident. The cistern was likely backfilled when reticulated water became available in the city from 1844, and the expansion of the water supply system between 1854 and 1858.[8] The clayey, sandy fill had a mix of artefacts with the majority shoe related. The shoes all ranged in date from c.1820-c.1860 (Table 3.5). The size and style of the shoes provided the age and gender associated with the wearer.

Table 3.5: Shoe related artefacts from (215) with age and gender association

General Function	Specific Function	Shape	From	To	Age	Gender	MIC	Fragments
Personal	clothing	boot	-	-	-	-	1	1
		offcut	-	-	-	-	1	1
		shoe	-	c.1880	Child	-	1	0
			c.1820	c.1860	-	-	1	0
			c.1820	c.1880	-	-	1	0
			c.1820	c.1860	Adult	Female	1	1
			c.1820	c.1860	-	-	1	2
			c.1820	c.1880	Adult	Female	1	1
			-	-	Child	-	1	1
			-	-	-	-	4	5
		shoe/ slipper	c.1820	c.1860	-	-	1	1
			c.1820	c.1860	-	-	1	1

[8] WV Aird, *The Water Supply, Sewerage and Drainage of Sydney*, MWS & DB, Sydney, 1961: 5-6.

General Function	Specific Function	Shape	From	To	Age	Gender	MIC	Fragments
			-	c.1860	-	-	1	2
			-	-	Child	-	1	5
			-	-	-	-	1	1
		unidentified	-	-	-	-	1	1
						TOTAL	19	23

The shoes from (215) were very similar to each other, and to others from across the Barangaroo Station site, in style and manufacture, providing the dates c.1820-c.1860. Many of them had square toes, very narrow shanks, no heels evident and were hand stitched (Figure 3.12). The style indicates that the shoes were not working boots and were made for indoor use. A deconstructed shoe from (215) highlights the difference of the original hand stitching and the robust repairs with clump soles and ferrous fastening on the many pieces of the shoe/slipper (#25650) (Figure 3.13, Figure 3.14).

Figure 3.12: Context (215) with various sized square toe and hand stitched soles (l-r): child's left shoe insole #25657, female left shoe insole #25656, female or adolescent left shoe/slipper outsole #25658, adolescent right shoe outsole #25655, adolescent right shoe/slipper #25653, female or adolescent right shoe/slipper #25652, female right shoe outsole #25654. 100mm scale. Img_2321. R. Workman.

Figure 3.13: Context (215) #25650, Female shoe or slipper deconstructed to show shoe parts and manufacturing process (l-r). Top row: outsole with damaged heel cupping below; small piece of trim above the mid sole and shank support with wooden peg fastenings; welt with 3 rows of stitching and 1 row of wheel pricked stitching holes; square toe insole with holdfast seam around entire edge and lasting peg holes down the centre. Bottom row; Upper vamp with square throat; 2 quarters and a single counter. 100mm scale. Img_2333. R. Workman.

Figure 3.14: Context (215) #25650, Detail of repairs including clump sole and ferrous fastenings. 100mm scale. Img_2942. R. Workman.

A small child's shoe (#25648) with a rectangular ankle strap was found in (215) (Figure 3.15). The shoe has been heavily repaired, including a repair patch above the ball of the sole and iron nails around the toe and the ball of the outsole (Figure 3.16). The square

throat is a similar style to the female shoe #25650. The holdfast seams on this shoe tell us it was not made after c.1880. The young child who wore this shoe would have only worn it for a short time as they would have outgrown it faster than they could wear it out. The repairs therefore suggest the shoe was handed down, possibly multiple times.

A piece of elastic, probably from a boot, was also found (#25644). Elastic sided boots were first made in England in 1838 and originally made from coiled wire until rubber came into use after the 1840s. Elastic sided boots are still popular in Australia today.

Figure 3.15: Context (215) #25648 child's right shoe with ankle strap, square toe and throat. Well-worn with repairs. 100mm scale. Img_2311. R. Workman.

Figure 3.16: Underside of child's shoe #25648. Note the repaired sole and ferrous staining from repair fasteners. 100mm scale. Img_2313. R. Workman.

4.0 THE BOAT

4.1 OVERVIEW OF THE BOAT (140 - UDHB1)

As part of the archaeological excavations at Sydney Metro's Barangaroo Station, remains of a boat (140) were uncovered in Area X. It was found within water deposited sands and silts in the intertidal zone at the foot of the historical location of Clyde Street, less than 300mm west of Langford's c.1850s wharf wall. Its bow was toward the land, and its stern towards the harbour. The eastern wall of Cuthbert's c.1860s sawshed was built over the vessel (Figure 4.1).

Twice daily the boat would have been alternately exposed and covered by the tides. The overhang, the boat and the wall of the wharf would have created a trap for detritus which washed down the steep Clyde Street, and was brought in on the tides.

The 21 contexts associated with the boat (Table 4.1) will be discussed below by their relationship with the boat (140). Context (148), the loose timbers found within the boat, will be discussed in Volume 3.11.

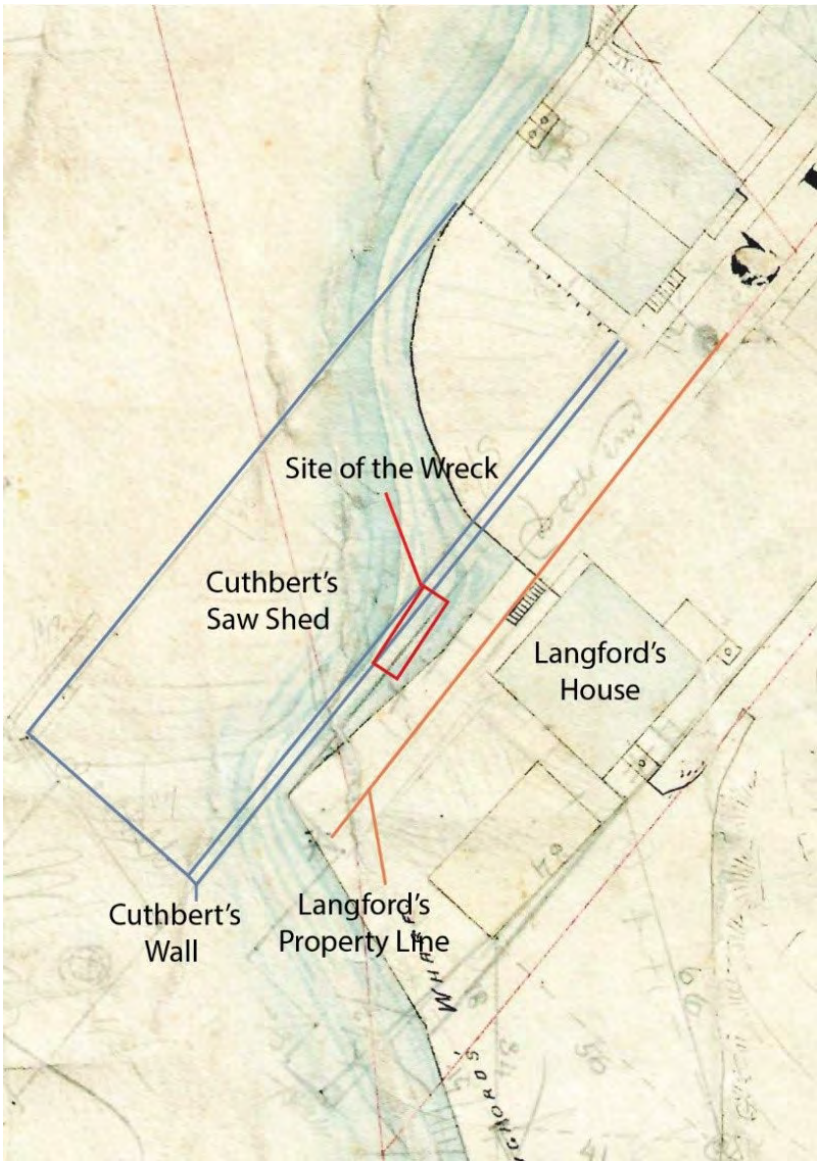


Figure 4.1: Detail of City Detail Sheets (1855), Sheet 2, showing the site of the abandoned vessel relative to Langford's House and Wharf, and the alignment of Cuthbert's sawshed and wall. Historical Atlas of Sydney, City of Sydney Archives.

Table 4.1: Context associated with structure of the boat (140 - UDHB1)

Context	Context Description/Association with UDHB1
132, 133	Intertidal sands overlying UDHB1. (132) was the yellow sands observed above the high tide line, and (133), the grey sands observed below. They were the same composition but with different colouration due to water logging. These sands were observed overlying UDHB1 as well as built up against the sides of the vessel and wharf wall (145).
140	The boat (UDHB1)
141, 142, 144, 149	Grey sands with organic lenses of silty material. (142) was the deposit loose timbers (148) were sitting in
148	Loose timbers
149, 249	(149) was the water-deposited sands and silts around the boat. The same as (149) but under the boat
150, 248	Clean up around (132, 133, 149).
151, 154, 155, 157, 158, 159	Context numbers assigned to bilge deposits.
152, 153, 156	10-15mm thick layer of grey silty clay overlying elements comprising (140)
246	Thin dark silty deposit observed beneath frames, above hull in the boat.
247	Wood Pulp deposit found between elements 420 and 446

A total of 946 items (MIC) (899 Fragments) were recovered from contexts associated with the vessel (140) (Table 4.2). This table does not include the loose timbers (148).

Table 4.2: Overview of contexts with organic items associated with the boat

Context	MIC	%	Fragments	%
132	83	*9*	77	*9*
133	117	*12*	149	*17*
140	23	*2*	21	*2*
141	11	*1*	5	*1*
142	29	*3*	41	*5*
148	6	*1*	9	*1*
149	300	*32*	326	*36*
150	2	*0*	2	*0*
151	24	*3*	13	*1*
152	36	*4*	27	*3*
153	11	*1*	8	*1*
154	22	*2*	15	*2*
155	10	*1*	7	*1*
156	11	*1*	6	*1*
157	4	*0*	2	*0*
158	20	*2*	12	*1*
159	20	*2*	8	*1*
246	7	*1*	4	*0*
247	11	*1*	24	*2*
248	5	*1*	8	*1*
249	194	*21*	143	*16*
TOTAL	946	*100*	899	*100*

4.2 CONTEXT ANALYSIS

4.2.1 ATTACHED TO ELEMENTS

CONTEXT 140

Context (140) was given to the timber boat (140 - UDHB1). Each timber element of (140) was given an element number. On a number of elements small fragments or samples of material were attached to the timber (Table 4.3). The samples were removed from the elements at the storage facility, conserved as appropriate by Silentworld Foundation. These small fragments of materials are a good representation of the general artefacts found in and around the boat.

Table 4.3: Element numbers with samples by function and shape

Element/ Sample number	General Function	Specific Function	Shape	MIC	Fragments
311/1	unidentified	unidentified	fibre	1	1
313/3			peg	2	2
344/1	personal	clothing	shoe	1	1
347/1	unidentified	unidentified	dowel	5	4
379/2				1	1
381/1			unidentified	1	1
381/2			fabric	1	1
381/3			unidentified	1	1
404/3	personal	clothing	shoe	1	1
440/1	unidentified	unidentified	unidentified	1	1
454/2	yard	garden	gumnut	1	1
454/3	food	fruit	peach	1	1
490	unidentified	unidentified	cord	1	1
494/3			peg	1	1
502/1	transport	vessel	dowel	1	1
527/4	household/industry	by-product	charcoal	1	1
529/3	food	vegetable	pumpkin	1	0
532/1	transport	vessel	treenail	1	1
			TOTAL	23	21

4.2.2 CONTEXT 148

Context (148) is the context number given to the loose timbers within the boat and are discussed in a separate report (see Volume 3.11). Each timber element of (148) was given an element number (Table 4.4). On a number of elements small fragments or samples of material were attached to the timber. The samples were removed from the elements at the storage facility, conserved and stored as appropriate by Silentworld Foundation. The six items were catalogued at a later date by Casey & Lowe and remain at the same location as the loose timbers. Element (073/2), a pin or plug was found in the end hole of a pin rack (discussed in Loose Timbers report, Volume 3.11). The pin was removed for conservation purposes and is stored with the loose timbers. Three pieces of rope or cord were amongst the timbers, with two given an element number and one attached to element (084) and given a sample number. There were two pieces of leather, an upper from a shoe with fine hand stitching evident, attached to element (142) and an unidentified 'L' shape piece of leather attached to element (087).

Table 4.4: Element numbers with samples by function and shape

Element	General Function	Specific Function	Shape	Fragments	MIC
060	unidentified	unidentified	cord	1	1
074	unidentified	unidentified	rope	1	1
142/1	personal	clothing	shoe	2	1
73/2	unidentified	unidentified	plug	1	1
084/1	unidentified	unidentified	cord	3	1
087/1	unidentified	unidentified	unidentified	1	1
			TOTAL	9	6

4.2.3 SEDIMENTS COVERING THE BOAT

Twice daily the boat would have been alternately exposed and covered by the tides. Contexts (132, 133), the overlying tidal sands, covered the remains of the boat and buried it. Context (132), the yellow sands observed around the high tide line, occurred at the bow and middle of the boat. Context (133), the grey sands observed below the low tide line, covered the stern.

The intertidal deposits (132, 133) had 200 items in total (Table 4.5). The movement of the tide, bringing in flotsam and general debris from the harbour was a contributing factor in the number and category of artefacts in (132, 133). Context (132), the sands around the high tide had less artefacts than (133), the sands found around the lower tide line. Context (133) also has a more diverse range of categories, whereas (132) had no artefacts from household/industry, personal/transport or yard.

Table 4.5: Comparison of organic artefacts from (132, 133) by general function

General Function	132		133		Total	Total
	MIC	Fragments	MIC	Fragments	MIC	Fragments
food	37	17	44	29	81	46
household /industry	0	0	5	5	5	5
industry	1	7	0	16	1	23
personal	27	28	34	31	61	59
personal /transport	0	0	1	2	1	2
unidentified	18	25	31	66	49	91
yard	0	0	2	0	2	0
TOTAL	83	77	117	149	200	226

CONTEXT 132

Context (132) had 82 MIC (Table 4.6). There are a high number of shoe related items within this context, however many of these are small pieces of leather increasing the fragment count but unable to assist with dating. Food related artefacts, in particular nectarine and peach seeds, have a high percentage of items and are a common find on archaeological sites in NSW (Casey & Lowe data set) and indicate a diet of fresh fruit.

Table 4.6: Number of organic artefacts in (132)

General Function	Specific Function	Shape	MIC	%	Fragments	%
food	fruit	coconut	4	*5*	4	*5*
		nectarine	18	*22*	8	*10*
		peach	12	*14*	5	*6*
	vegetable	pumpkin	3	*4*	0	*0*
industry	unidentified	felt	0	*1*	7	*9*
personal	clothing	shoe	23	*28*	24	*31*
		shoe/boot	2	*2*	2	*3*
		shoe/slipper	2	*2*	2	*3*
unidentified	container	cork	1	*1*	0	*0*
	unidentified	offcut	5	*6*	4	*5*
		pin	1	*1*	0	*0*
		rope	3	*4*	12	*16*
		string	1	*1*	2	*3*
		timber	1	*1*	1	*1*
		twine	1	*1*	1	*1*
		unidentified	4	*5*	4	*5*
		wedge	1	*1*	1	*1*
		TOTAL	82	*100*	77	*100*

The artefacts from (132) were mixed but all of them light in weight (Figure 4.2). Rope and timber, both materials which can easily float and be moved around with the tide, were found in this context, coming from the surrounding industrial areas as well as flotsam from the working harbour waters.

Figure 4.2: Mixed artefacts from (132). Unidentified fragments of rope and wood (l-r). Top row: thick twisted rope #25208, fragment of wood #25214. Second row: Very brittle rope fragments #25211, three stranded rope with 2 yarns per strand; figure-eight knot #25209, square timber offcut #25213. Bottom row: fine fibre twisted into yarns #25210, twisted twine fragment #25212, upper fragment rectangular offcut #25215, lower fragments of bark #25207. 100mm scale. Img_2341. R. Workman.

Coconuts were only found in Area X with several pieces of coconut, possibly from the same nut, found in (132) (Figure 4.3). There is much debate on the coconut and its origins in Australia. They were first spotted washed up on shore or floating in coastal waters in the north of the east coast of Australia. The tree is immensely valuable: the oil is used in cooking, and was once burnt for light; the meat is eaten directly, or mixed with water to make milk or cream for cooking; the husks are an efficient fuel; and the shells are used as bowls and utensils. The fronds are woven, and the tree itself will eventually be cut down for timber[9]. Partial coconuts have been found on other archaeological sites, where, according to Casey & Lowes data set[10], they are more commonly found on harbour sites in Sydney. This could suggest that the crews on the boats entering the harbour, having collected the coconuts on their journey, were eating and utilising them before discarding the surplus overboard, leaving them to float in as flotsam and jetsam.

Figure 4.3: All coconut from Barangaroo station. Left column mesocarp/husk fragments 132/#25242. Right column (t-b) mesocarp & thin exocarp 151/#25514; mesocarp/husk fragment 149/#25324; single endocarp fragment 132/#25201; three fragments of endocarp with rodent gnaw marks evident 133/#25250. 100mm scale. Img_5401. R. Workman.

A total of 27 MIC shoe related artefacts were found in (132) (Table 4.7). The dating of four of the shoes was possible through the manufacturing process as well as the style, giving a date of manufacture from c.1820-c.1880. The end date of c.1880 is given due to the manufacturing process using the Holdfast seam. The Holdfast seam was a welting technique used to attach the sole to the upper. This technology changed in c.1880 with the introduction of new machinery. The size and style of the shoe allowed age associations to be made, however only one gender association could be made on a large work shoe or boot, made of thick leather for an adult male.

[9] Dowe J., L. Smith. L.T 2002

[10] Casey & Lowe combined database.

Table 4.7: Shoe related artefacts from (132) with age and gender association

Shape	Portion	Age Association	Gender Association	From	To	MIC	Fragments
shoe	heel cupping	-	-	-	-	1	1
	insole	Adult		c.1820		1	1
				c.1820	c.1880	1	1
		Child		-	-	1	1
				1820	-	1	1
	offcut	-		-	-	3	3
	outsole	Adult			-	1	1
	sole	-			-	1	1
					-	1	1
					-	1	1
					-	1	1
					-	1	1
	upper				-	1	1
	upper/ sole				-	7	7
	upper/ sole				-	1	2
shoe/ boot	heel/ sole	Adult	Male		-	1	1
	upper	-	-	1820	-	1	1
shoe/ slipper	sole	-		-	1860	1	1
		-		-	-	1	1
					TOTAL	27	28

One complete sole was found from (132) (#25219). The fine leather sole has a square toe and has a very narrow shank (Figure 4.4). By the early 1800s shoes with pointed toes and low heels were being replaced by those with blunter toes and no heels. They could be flimsy and often worn with ribbons around the ankle[11]. If a heel was required it was hand sewn on and reinforced by hand nailing or wood pegging. Toes were fully square by c.1820, becoming duck-billed in Australia for a brief period during the 1830s to 1840s. Most continued to be square until the 1870s when they became rounded. This change began in British women's shoes from the 1850s, influenced by the new fashion of round toes in France from 1848.

[11] Bower 1999: 125; Pratt & Woolley 1999:52-60 Stocks 2009; Veres 2005

Figure 4.4: Fine leather sole with square toe (132/#25219). 100mm scale. Img_2344. R. Workman.

CONTEXT 133

Context (133), the intertidal sands below the high tide line, had a total of 116 MIC (149 fragments) (Table 4.8). Combined food items, including fruit and vegetable seeds, have the highest percentage of items (38%). Native fruit pods and seeds were also present. Personal items, shoes, boots and slippers, also had a high percentage of items (23%). There were 16 fragments of felt in context (133) with fragments found in several other contexts associated with the boat. This will be discussed in Section 4.2.4.

Table 4.8: Number of organic artefacts in (133)

General Function	Specific Function	Shape	MIC	%	Fragments	%
food	fruit	coconut	1	1	3	2
		nectarine	18	15	9	6
		peach	17	15	11	7
	nut	hazelnut	5	4	5	3
	unidentified	unidentified	1	1	1	1
	vegetable	pumpkin	2	2	0	0
household /industry	by-product	charcoal	4	3	4	3
	fuel	coal	1	1	1	1
industry	unidentified	felt	0	0	16	11
personal	clothing	shoe	27	23	26	17
		shoe/boot	3	3	2	1
		shoe/slipper	4	3	3	2
personal /transport	clothing/horse	belt/strap	1	1	2	1
unidentified	container	cork	2	2	2	1
	unidentified	offcut	9	8	9	6
		rope	3	3	34	23
		strap	1	1	1	1
		twine	2	2	6	4
		unidentified	1	1	1	1
		wood	13	11	13	9
yard	garden	fruit pod	1	1	0	0
		gumnut	1	1	0	0
		TOTAL	116	100	149	100

There are 34 MIC shoe related artefacts in (133), including seven near complete soles and a partial heel (Table 4.9). The soles and out soles, straight and crooked, showed a common manufacturing process of hand stitching, and were similar to each other in style, with square toes where present (refer to Table 1.3 for types). Slippers, named as they were slipped on, often had no heels and were made with soft leather and usually worn by women or children (Figure 4.5). The slippers in (133) were smaller and once worn by a child. No gender association could be made due to the average size of the soles. One partial heel was attached to a sole and can be dated from 1812 due to the nails used (Figure 4.6).

Table 4.9: Shoe related artefacts from (133) with age and gender association

Shape	Portion	Type Name	Age Association	From	To	MIC	Fragments
shoe	heel seat	-	-	-	-	1	0
	insole	SOHSt6	Child	c.1820	c.1880	1	0
		-	-	-	-	1	1
	outsole	SHSt5	-	c.1820	c.1880	1	0
	reinforcement strap	-	-	-	-	1	1
	sole	COHSt6	Child	c.1820	c.1880	1	2
		-	Child	c.1820	-	1	1
			-	-	-	1	1
	unidentified					1	1
						12	12
	upper					4	4
		-				1	2
	welt	HSt5/6				1	1
shoe/boot	heel/sole	-		c.1812		1	1
	insole	COHSt6	Adult	c.1820	c.1880	1	0
	outsole	-	-	c.1820	-	1	1
shoe/slipper	outsole		Child	c.1820		1	1
		CTHSt3	-	-	c.1860	1	1
		STHSt3	Child	-	c.1860	1	1
		CTHSt3	Child	c.1820	c.1860	1	0
					TOTAL	34	31

Figure 4.5: Context (133), group of square-toed soles in poor condition (l-r). Hand stitched straight outsole #25260, pegged left shoe/slipper #25269, child's outsole #25271, handstitched left insole #25263, welted insole #25262. 100mm scale. Img_2350. R. Workman.

Figure 4.6: Partial shoe/boot outsole and heel with iron nails (133/#25265). 100mm scale. Img_5401. R. Workman.

CONTEXT 150

Context (150) was a clean-up around (132) and south of the boat. It had two leather shoe offcuts in it (Table 4.10), a thick leather strap, possibly a sole offcut and a thin, triangular shaped fragment from a shoe upper.

Table 4.10: Number of organic artefacts in Context 150

General Function	Specific Function	Shape	MIC	Fragments
personal	clothing	shoe	2	2
		TOTAL	2	2

4.2.4 OUTSIDE THE BOAT

Outside the boat was an accumulation sediment (149/249) which had primarily built-up between the boat and the wharf wall (145), but was also patchily present around and under the boat, particularly near the stern (Figure 4.7).

Following the complete removal of the boat (140 - UDHB1) from the site, a test trench (Test Trench 7) was excavated by machine and using hand tools where the vessel had laid. The test trench found that the vessel had been pulled up on to a sandstone shoreline (112), gradually sloping towards the water. An interface (249) between dark grey deposit (149) and the homogenous, culturally sterile yellow-grey/brown sands (134) was observed to the south of the bedrock. This context was identified as the same as (149) and wet sieved in January 2019.

Figure 4.7: Test Trench 7 dug after extraction of the boat (140). Northern end of test trench shows the sandstone bedrock shoreline, gradually sloping towards the water. A red arrow marks where the bow of the boat sat. View to northeast, 1m scale. DSC_0960.

CONTEXT 149

Context (149) was 300mm deep between the wall and the boat. A total of 301 MIC and 327 fragments (Table 4.11) were found in (149). There was a high percentage (39%) of leather shoes, including two near complete lace up shoes/boots and several soles from children's shoes. There were also a high percentage of food items (42%), consisting of seeds from fruit and vegetables.

Organic material was well-preserved within this deposit, including rope, coconut and leather, all of which survived well and were conserved wet within the fridge on site. These artefacts were then transported to an artefact fridge at the Casey & Lowe office (Figure 4.8). They were analysed and returned to the fridge waiting for permanent conservation

decisions. Other artefacts from this context were sent to Rosebery processing centre, washed, dried, bagged, boxed and stored until analysis (Figure 4.9).

Table 4.11: Number of organic artefacts in (149)

General Function	Specific Function	Shape	MIC	%	Fragments	%
food	fruit	coconut	1	0	1	0
		nectarine	59	20	59	18
		peach	57	19	57	17
		plum	1	0	1	0
	nut	hazelnut	5	2	5	2
	vegetable	pumpkin	4	1	4	1
household /industry	by-prod	charcoal	1	0	4	1
industry	unidentified	felt	0	0	19	6
	by-product	hide	1	0	0	0
personal	clothing	boot	2	1	0	0
		boot, lace-up	2	1	0	0
		pump/slipper	1	0	0	0
		shoe	93	31	70	21
		shoe, lace-up	2	1	3	1
		shoe/boot	1	0	1	0
		shoe/slipper	13	4	16	5
		unidentified	3	1	5	2
personal /household	unidentified	ferrule	1	0	1	0
personal /transport	clothing/horse	belt/strap	2	1	3	1
store	store	barrel	3	1	0	0
	container	unidentified	1	0	0	0
	unidentified	bung	1	0	0	0
unidentified	container	container	1	0	2	1
		cork	7	2	2	1
	structural	offcut	1	0	0	0
	unidentified	offcut	4	1	1	0
		pin	1	0	1	0
		rope	12	4	56	17
		strap	1	0	1	0
		timber	1	0	1	0
		treenail	1	0	0	0
		unidentified	2	1	1	0
		wedge	2	1	0	0
		wood	11	4	11	3
yard	garden	flora	1	0	1	0
		fruit pod	1	0	0	0
	unidentified	unidentified	1	0	1	0
		TOTAL	301	100	327	100

Figure 4.8: Context (149): Working shot of wet artefacts from the fridge. 500mm scale. Img_2391.

Figure 4.9: Working shot of dry artefacts from (149) during analysis. 500mm scale. Img_2388.

SHOES

There are 114 MIC (90 fragments) of shoe related artefacts from (149) (Table 4.12). The shoes are similar style and have the same manufacturing techniques as the shoes found in other contexts associated with the boat. The soles and out soles, straight and crooked, turned or welted, showed a common process of hand stitching (refer to Table 1.2 for types), and were similar to each other in style with square toes, where present. There was one anomaly to these shoes, catalogue #25378 is an adult women's shoe/slipper (Figure 4.10). The shoes length 245mm (9.64 in) translates to a size 7-8-women's shoe. The outsole is

thick leather with a square toe with the anomaly in the wide hand stitching on a shoulder around the edge.

Table 4.12: Shoe related artefacts from (149) with age and gender association

Shape	Portion	Type Name	Age Association	Gender Association	From	To	MIC	Fragments
Boot/lace up	near whole	COHSt5/6	Adult	-	-	c.1880	1	0
		COHSt5/6	Adult			c.1880	1	0
Boot	outsole	CTHS3	Adult	Male		c.1860	1	0
	quarter		-			-	1	0
pump/slipper	near whole	SOHSt5/6	Child		1820	1880	1	0
shoe	counter	-	-		-	-	8	6
	heel cupping						3	2
	heel plate						1	0
	heel seat						2	0
	heel/ outsole	COHSt5			c.1820	c.1880	1	0
	insole	COHSt6			c.1820	c.1880	6	3
		-	Child		c.1820	-	2	1
	nr whole	COHSt5/6	-		-	c.1880	1	0
		SOHSt5/6	Child		c.1820	c.1880	1	0
	offcut	-	-		-	-	13	5
	outsole	CTHSt2/3	-				4	5
		CTHSt3	Adult		c.1820	c.1860	1	0
	quarter	-	-	-	-	-	1	2
	reinforcement strap						2	2
	sole		Child		c.1820		1	0
			-		-		6	5
	strap						1	1
	upper						30	31
	upper/ sole						1	0
	vamp						1	1
	welt						7	6
shoe, lace up	upper						2	3
shoe/boot	insole		Adult				1	1
shoe/ slipper	outsole		Child				5	4
	sole		-				4	4
			Child				1	1
	upper/ sole	STHSt2	Child				1	2
		STHSt3	Adult		c.1820	c.1860	1	2
		-	Adult	Female	c.1820	c.1860	1	3
						TOTAL	114	90

Figure 4.10: A lady's shoe with bespoke wide hand stitching (149/#25378). 100mm scale. Img_5402. R. Workman.

There were 11 shoes associated with children from (149), all 11 shoes or slippers had hand stitching and eight had square toes (Figure 4.11).

Figure 4.11: A sample of shoes and slippers from (149) (l-r). Top row: Childs shoe with split throat #25412. Second row: Straight shoe/slipper with partial heel cup #25351, shoe/slipper outsole #25360. Third row: shoe/slipper sole and partial quarter #25355, square toe insole #25420. Bottom row: square toe insole #25379, shoe/slipper outsole #25361. 100mm scale. Img_2353. R. Workman.

Evidence of boots can be seen in the presence of two near whole ankle boots with lace holes, large outsoles with low heels and broad, high vamps. Boots are usually of welted construction to provide a sturdier form of footwear. They were worn by men and women and were commonly used outdoors, particularly for work (Figure 4.12, Figure 4.13).

Figure 4.12: Lace up ankle boot (149/#25407). 100mm scale. Img_2356. R. Workman.

Figure 4.13: Lace up ankle boot (149/#25425). 100mm scale. Img_2360. R. Workman.

FELT

Several pieces of felted material have been found throughout Area X (Table 4.13). With 19 fragments, (149) had the most fragments and largest-sized pieces. There were 60

fragments in total and recorded as one item. They all vary in shape and dimensions but have the same coarse fibres, which are likely animal hair, with concretions of ferrous material, sediment and pitch. There are several pieces with circular holes and straight cut edges (Figure 4.14, Figure 4.15).

Wool felt has been found between planks on other boats, used as caulking (or calking). Caulking involves using fibres which are driven into the seam between planks as a sealant. However, the felt fragments found associated with the boat (140) are large flat pieces rather than long loose fibres. They also have the large circular holes which could have been made by fastenings attaching it to boats under sacrificial planking. Sacrificial planking was attached to the outer surface of the boats/ship's hull to protect the timbers from marine organisms and environmental wear and tear. If sacrificial planking became damaged, it could be stripped off and replaced without too much impact on the hull. The boat was originally single planked with another external layer of hull planking added. The additional layer of timber planking may have been necessary to repair the boat, or it may have been used as the sacrificial layer.[12]

Table 4.13: Felt from Barangaroo Station site

Shape	Context	Dimensions mm Length x Width x Thickness	MIC	Fragments
Felt	132	LxWxTh=180x110x6	0	7
	133	LxWxTh=<280x150x5	0	16
	142	LxWxTh=<235x140x3	0	6
	149	LxWxTh=<350x198x3	1	19
	249	LxWxTh=<120x80 x5	0	6
	248	LxWxTh=<290x180x=3	0	6
		TOTAL	1	60

12 Cosmos Coroneos. 2021 SM2 Barangaroo UDHB1 'Barangaroo Boat' Excavation Report.

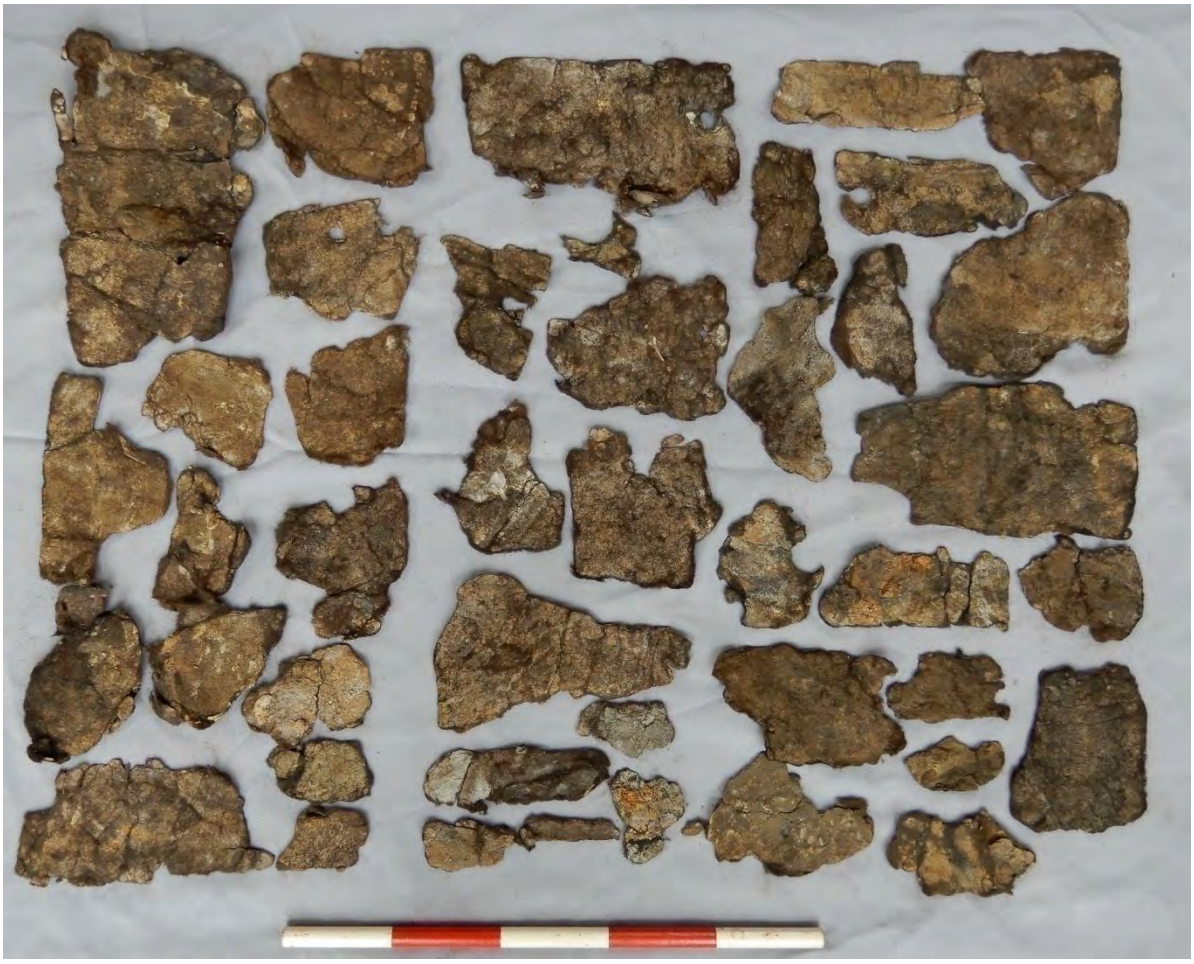


Figure 4.14: Working shot of all felt from Area X. 500mm scale. Img_0480.

Figure 4.15: Detail of holes, large and small in felt fragment (133/#25309). 100mm scale. Img_2777. R. Workman.

The Australian National Maritime Museum (ANMM) took a sample of the felt and examined it under a microscope identifying two fibres present (Figure 4.16, Figure 4.17, Figure 4.18). The fibres were then compared to known natural and synthetic samples of fibres (Figure 4.19, Figure 4.20, Figure 4.21, Figure 4.22). The results suggest the felt was made with wool and horse hair.

Figure 4.16: Close up of felt sample.

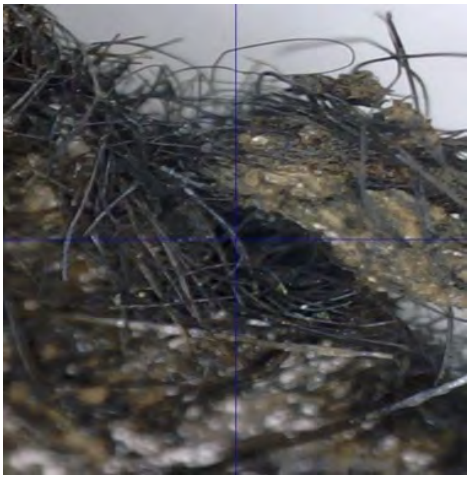


Figure 4.17: Felt sample at 10X magnification.

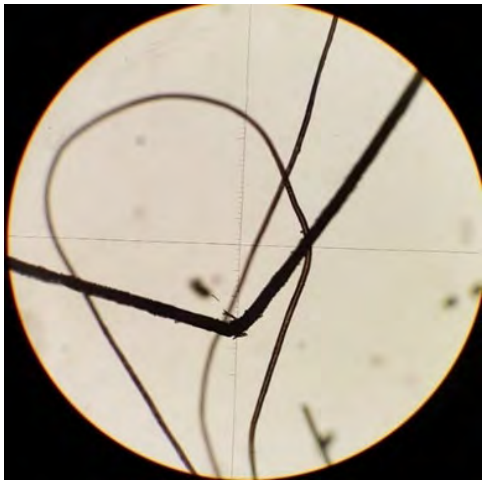


Figure 4.18: Felt sample fibres showing two different fibres at 40X magnification.

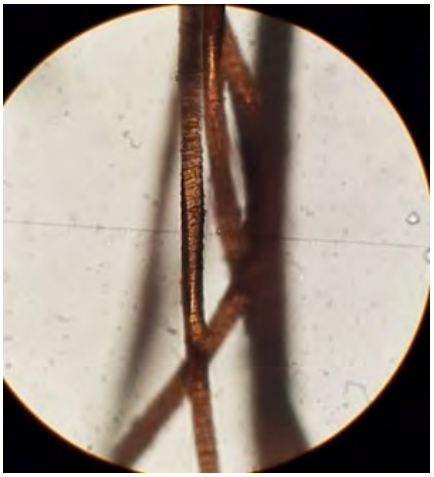


Figure 4.19: Wool fibre from felt sample at 40X magnification.

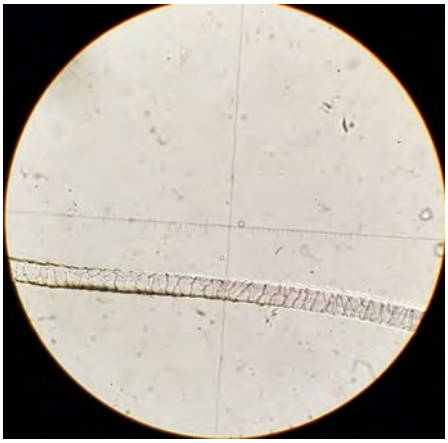


Figure 4.20: Known wool fibre sample for comparison at 40X magnification.

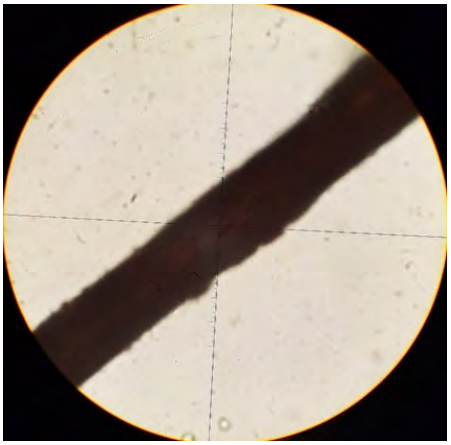


Figure 4.21: Potential horse hair from felt sample showing medulla striations at 40X magnification.

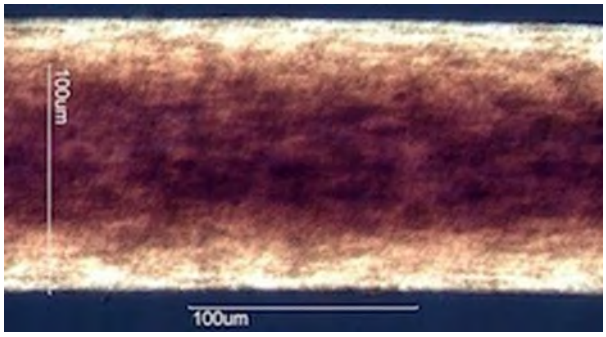


Figure 4.22: Known horse hair sample for comparison.

SCREW PINE (PANDANUS TECTORIUS PARKINSON)

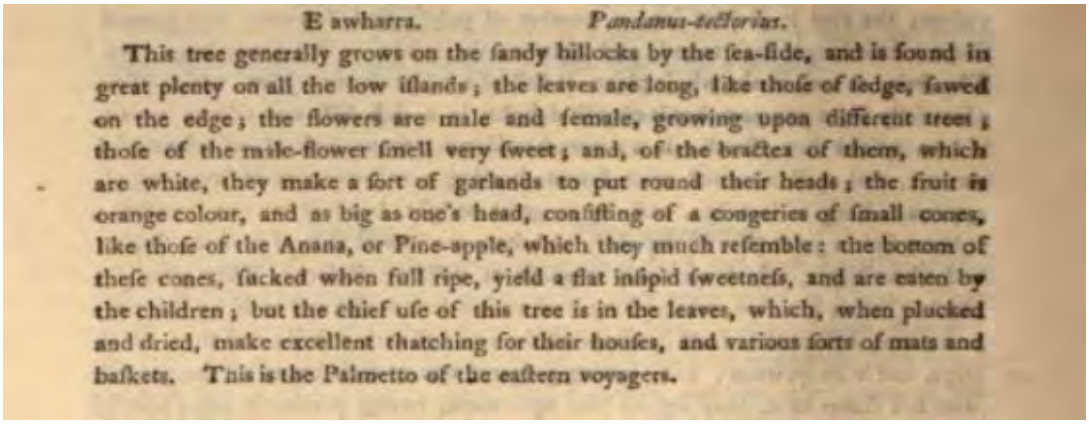
A single segment, or phalanges, from a native plant was found in (149/#25311) (Figure 4.23). After consultation with the Botanical Information team from National Herbarium of New South Wales, it was identified as *Pandanus tectorius Parkinson* with the common name Screw Pine[13]. There are more than 30 species native to Australia, and one species recorded for NSW, Pandanus tectorius, which grows on exposed coastal headlands and along beaches; north from Port Macquarie district.[14] Sydney Parkinson writes in '*A Journal of a Voyage to the South Seas in his Majesty's ship, the Endeavour*' about the plants many uses, including the eating of the fruit (Figure 4.24).[15] The phalanges could have washed up on the tide or have been traded for food from further north.

Figure 4.23: 149/#25311. Phalanges from the seed of the native plant, Screw Pine (Pandanus tectorius). 100mm scale. Img_2361. R. Workman.

[13] National Herbarium of New South Wales

[14] New South Wales Flora Online. Pandanus tectorius Parkinson ex Du Roi https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Pandanus~tectorius Accessed 25/01/2021

[15] Parkinson, S. 1778



E awharra. *Pandanus-tectorius.*

This tree generally grows on the ſandy hillocks by the ſea-ſide, and is found in great plenty on all the low iſlands; the leaves are long, like thoſe of ſedge, ſawed on the edge; the flowers are male and female, growing upon different trees; thoſe of the male-flower ſmell very ſweet; and, of the bractea of them, which are white, they make a ſort of garlands to put round their heads; the fruit is orange colour, and as big as one's head, conſiſting of a congeries of ſmall cones, like thoſe of the Anana, or Pine-apple, which they much reſemble: the bottom of theſe cones, ſucked when full ripe, yield a flat inſipid ſweetneſs, and are eaten by the children; but the chief uſe of this tree is in the leaves, which, when plucked and dried, make excellent thatching for their houſes, and various ſorts of mats and baſkets. This is the Palmetto of the eaſtern voyagers.

Figure 4.24: Excerpt from Sydney Parkinson's *Journal of a Voyage to the South Seas in His Majesty's Ship, the Endeavour discussing Pandanus tectorius.*

ROPE

A wide variety of cordage, or rope, has been recovered from (149) and indeed all of Area X (Figure 4.25). Rope is an important component in ship yards and on boats as well as for household functions. For this reason, the general and specific functions are unable to be identified. Rope is made by grouping individual yarns, fibres or strands together by twisting or braiding them to unify the strength of the individual fibres. Historically, rope was made from natural fibres including cotton, manila, jute, sisal, and hemp fibre blends, with synthetic fibre ropes becoming an option in the 1930s when nylon was developed[16].

Figure 4.25: Rope from (149) (l-r). Top row; Twisted rope frags, 2 strands of 7 plaited yarns, coarse fibres #25338, twisted rope, 3-strands, 3 yarns per strand, 3 plaits per yarn, medium fibres #25335. Second row; knotted rope #25342. Bottom row: Partial twisted rope, 4 strands, 3 yarns per strand, 2 twists per yarn, coarse fibres #25341, coiled rope fragment, 4 twisted strands, approx. 9 twisted yarns per strand, coarse fibres #25539, 3 twisted strands, 3 yarns per strand, approx. 7 plaits per yarn #25340. 100mm scale. Img_5418. R. Workman.

[16] Sanders 2010

CONTAINERS

There were 12 MIC (four fragments) of artefacts related to containers (Table 4.14), varying from wooden barrels to an unidentified leather piece.

Table 4.14: Artefacts relating to containers from (149)

General Function	Specific Function	Shape	Fabric	MIC	Fragments
store	container	offcut	wood	4	0
		bung	cork	1	0
		barrel	wood	1	0
unidentified	container	cork	cork	7	2
		unidentified	leather	1	2
			TOTAL	14	4

Barrels were an essential container, used to transport and store many commodities including milled flour, gunpowder, cotton, sugar, fruit, soap, coffee, salt, whisky, wine, tobacco, shoes, paints and pickles to name a few. Often parts of the barrel or cask will show signs of the product it was holding. A small head or lid of a container (#25337) was found in (149). There are two holes in the centre of the circular wood with a bevelled edge (Figure 4.26, Figure 4.27). On one side of the wood is remnant of a white substance. This was originally thought to be caulking cement. Caulking is to drive oakum, moss, animal hair, or other fibrous material into the seams of planking. This is then covered with pitch or caulking cement to make the seams watertight. However, initial spectroscopy reveals a high level of calcium without inclusion, and as being set in a paste-like consistency it is presumed that the substance is slaked lime.

Figure 4.26: 149/#25337, Top of small barrel head. 100mm scale. Img_2399. R. Workman.

Figure 4.27: The inside of the small barrel head with remnants of possible caulking cement. 100mm scale. Img_2402. R. Workman.

The corks found in (149) were all small corks, once used to seal alcohol bottles. One slightly larger cork was possibly used to seal a champagne bottle (#25320). One very narrow cork (#25319) was a seal for a smaller, possible medicinal or perfume bottle.

A bunghole is a hole bored, punched or cut through the head or a stave in a liquid-tight barrel to remove contents. The wooden circle removed in this process is an offcut. Three of these offcuts were found in (149). The hole is then capped with a large cork called a bung, one of which one was found from (149/#25345) (Figure 4.28).

Figure 4.28: Various corks and bung offcuts from Area X showing size difference between barrel and bottle corks (l-r). Top row: bunghole offcut #154/25547; cork bung 149/#25345; cork bung or stopper 142/#25296. Second Row; various sized cork bottle stoppers 155/#25559; 158/#25580; 132/#25237; 149/#25344; 152/#25526. Bottom row; various sized cork bottle stoppers 133/#25252; 149/#25320; 149/#25319; 149/#25343. 100mm scale. Img_2405. R. Workman.

The two fragments of unidentified leather, a long flat rectangular piece and a flat circular piece, once sewn together, to possibly create a cover to a lid of a circular container or post (Figure 4.29, Figure 4.30).

Figure 4.29: 149/#25426, Rectangular strap and circular piece of unidentified leather. 100mm scale. Img_5395. R. Workman.

Figure 4.30: 149/#25426, Unidentified leather placed together, possible cap for post. 100mm scale. Img_5396. R. Workman.

TREENAIL/PINS

A treenail (#25348) was found in context (149) (Figure 4.31). *Treenails or Trunnels* are both terms used to describe the wooden nail-like fastener used in timber frame construction. A treenail is an octagon pin and made from wood. It is driven into a round hole so the corners will bite into the wood and keep it securely in place. A pin, cylindrical in shape, was also found (#25323).

Figure 4.31: 149/#25348, Wooden Treenail. 100mm scale. Img_5388. R. Workman.

CONTEXT 249

Context (249) was initially recorded as a separate event until further analysis identified it as the same as (149), positioned beneath the boat. The deposit was excavated and stored on site for a period of time before being 100% wet sieved. Compared with (149), there were less artefacts in (249) (with 193 MIC, 143 fragments), however the function of the artefacts was similar in both contexts (Table 4.15). Context (249) had no vegetable seeds, coconut and no container fragments or offcuts. Leather shoe related artefacts had a high

percentage, much like (149). Timber had a higher percentage of items in (249), possibly having fallen through or off the boat.

Table 4.15: Sum of organic artefacts in (249)

General Function	Specific Function	Shape	MIC	%	Fragments	%
food	fruit	nectarine	38	*20*	11	*8*
		peach	38	*20*	9	*6*
	nut	almond	1	*1*	1	*1*
		hazelnut	1	*1*	1	*1*
industry	unidentified	felt	0	*0*	6	*4*
personal	clothing	pump/slipper	3	*2*	3	*2*
		shoe	75	*39*	70	*49*
		shoe/boot	1	*1*	4	*3*
		shoe/slipper	5	*3*	2	*1*
	unidentified	shoe	8	*4*	15	*10*
unidentified	unidentified	brush	1	*1*	1	*1*
		offcut	3	*2*	1	*1*
		pin	2	*1*	2	*1*
		rope	3	*2*	3	*2*
		wood	14	*7*	14	*10*
		TOTAL	193	*100*	143	*100*

There are 89 MIC (91 fragments) of shoe related artefacts from (249) (Table 4.16). The shoes are of a similar style and have the same manufacturing techniques as the shoes found in other contexts associated with the boat (Table 1.3, Table 4.1). As well as the type of shoe the table below shows the age and gender association of the wearer if possible. The majority of identifiable shoes reveal more shoes related to children (6 items) than adults (3 items), and no shoes related to male wearers.

There were a large number of offcuts within (249) (38 fragments), suggesting a single dumping of waste from a shoe maker.

Although children's shoes continued to be turned even after the introduction of welted manufacture, turned adult shoes represent earlier made shoes. One adult turned shoe was found in (249). The shoe was hand stitched and had a pointed toe. The combination of both the manufacture technique and the style gave this shoe the earliest date of manufacture (1790-1820) in Barangaroo Station.

Table 4.16: Shoe related artefacts from (249) with age and gender association

Shape	Portion	Type Name	Age Association	Gender Association	From	To	MIC	Fragments
Pump/ slipper	outsole	CTHSt3	Adult	-	c.1790	c.1820	1	1
shoe	whole	CHSt6	Adult	Female	c.1820	c.1880	1	8

Shape	Portion	Type Name	Age Association	Gender Association	From	To	MIC	Fragments
	insole	-	-	-	-	-	1	2
	sole	THSt1			c.1820	c.1860	1	1
	insole		Child	-	-	-	2	2
	upper		Child				1	1
	upper/ sole			Female			1	3
	insole				c.1820		2	2
	sole				c.1820	c.1860	1	1
	counter						3	3
	heel						1	1
	heel cupping						5	2
	heel seat						3	1
	insole	-					2	2
	offcut		-	-			39	38
	outsole						1	1
	rim						1	1
	sole				-	-	5	5
	strap						2	3
	tongue						1	0
	unidentified						1	1
	upper						6	4
	welt						3	3
shoe/boot	sole	OHSt5	Adult	-			1	4
shoe/slipper	upper/sole	CTHSt3	Adolescent			c.1860	1	2
	outsole	-	Child		c.1820	-	2	0
	outsole		Child		-		2	0
						TOTAL	89	91

CONTEXT 248

Context (248), a clean-up context around (132, 133, 149), had a total of four artefacts, including peach or nectarine stones, leather fragments, felt and wood offcuts (Table 4.17).

Table 4.17: Total of organic artefacts from (248)

General Function	Specific Function	Shape	MIC	Fragments
industry	unidentified	felt	0	6
industry	fruit	peach	2	0
personal	clothing	offcut	1	1
unidentified	unidentified	offcut	1	1
		TOTAL	4	8

4.2.5 INSIDE THE BOAT

CONTEXT 141

Context (141) was a 10mm-thick lens of fine clay particles, organic material and timber splinters. It had very little sand content and occurred only within the boat (140). It occupied a distinct position as the last deposit which was exclusively contained within the boat, and effectively sealed the sand (142) and the timbers below. It seemed to occur only in the higher parts of the boat. A total of 11 artefacts were found in (141), including several pieces of twine, fragments of wood and nectarine or peach seeds (Table 4.18).

Table 4.18: Number of organic artefacts in (141)

General Function	Specific Function	Shape	MIC	Fragments
food	fruit	nectarine/peach	6	0
personal	clothing	shoe	1	1
unidentified	seed	unidentified	1	1
	unidentified	wood	1	1
		string	1	1
		timber	1	1
		TOTAL	11	5

CONTEXT 142

Context (142) was a pale grey, largely homogenous body of sand, marine in origin, and had accumulated within the boat once its sides had broken down to a point that freely allowed the tide to wash over it. This sediment accumulated around the loose timbers (148) which covered the ceiling planks. The loose timbers are discussed in Volume 3.11.

There were 30 MIC (43 fragments) in (142) (Table 4.19). The majority of the artefacts from this context are light weight and relatively small fragments which suggest they fell in between and below the loose timbers from above. The artefacts, identified as industrial or transport related, are items that can be associated with a boat yard and its workers, possibly thrown into the boat as rubbish, as were the loose timbers, falling below the timbers to settle in (142). There are 16 fragments of shoe related artefacts, all worn and/or broken suggesting they were thrown away, possibly by a shoe maker. It is unclear, however, if they were thrown directly into the boat or if they washed down from Clyde Street as part of dump from the shoe makers.

Table 4.19: Number of organic artefacts in (142)

General Function	Specific Function	Shape	MIC	%	Fragments	%
food	fruit	nectarine	2	*7*	0	*0*
household /industry	by-product	charcoal	4	*13*	4	*9*
industry	unidentified	felt	0	*0*	6	*14*
personal	clothing	pump/slipper	1	*3*	1	*2*
		shoe	7	*23*	12	*28*
		shoe/slipper	2	*7*	1	*2*
transport /industry	vessel/unidentified	offcut	2	*7*	1	*2*
unidentified	clothing	unidentified	1	*3*	2	*5*
	container	cork	1	*3*	0	*0*
	unidentified	rope	3	*10*	7	*16*
		twine	1	*3*	2	*5*
		wood	6	*20*	7	*16*
		TOTAL	30	*100*	43	*100*

4.2.6 ABOVE CEILING PLANKS

The artefacts above the ceiling planks were positioned similarly to those under the ceiling planks. There were three context numbers given out for the bow (153), stern (156) and mid ship (152) area. The deposits were similar to the deposits beneath the ceiling planks and likely represent the redeposition of heavier particles caused by water movement.

CONTEXT 152

Context (152), the mid ship area, is the largest area above the ceiling planks and has a total of 36 MIC (Table 4.20). A high percentage of the artefacts are pieces of leather shoe (31%), including shoes and slippers. A number of nectarine and peach seeds were found (11 MIC), with coconut, plum and hazelnut also providing information of the diet of the workers or residents of the area.

Table 4.20: Function of summed artefacts from (152)

General Function	Specific Function	Shape	MIC	%	Fragments	%
food	fruit	coconut	1	*3*	1	*4*
		nectarine	6	*17*	0	*0*
		nectarine/peach	5	*14*	0	*0*
		plum	1	*3*	0	*0*
	nut	hazelnut	2	*6*	2	*7*
personal	clothing	shoe	9	*25*	9	*33*
	clothing	shoe/slipper	2	*6*	4	*15*
transport	vessel	timber	4	*11*	4	*15*
unidentified	container	cork	1	*3*	1	*4*
	unidentified	offcut	4	*11*	4	*15*
		timber	1	*3*	2	*7*
		TOTAL	**36**	***100%***	**27**	***100%***

The nine pieces of timber or wood from this context were divided into different functions depending on the shape, size and if any marks or fastenings were evident. The general function, transport, had four pieces of timber (Figure 4.32) all with square nail holes measuring, approximately, 6mm. This indicates the timber could have been used in boat building. One piece of timber (#25518) was oval in shape with two narrow extensions for attachment. The underside was hollowed out for use.

Figure 4.32: Timber from (152), possibly associated with the boat due to fastening hole sizes, or with boat building (l-r). Top row: Two fragments with fastening holes at either end #25518; one fragment with one fastening hole #25517. Second row; tapering rectangular timber with one fastening hole (5mm sq) #25515. Bottom row; Tapered rectangular timber component with 2 nail holes (6mm sq) #25516; trapezoidal timber with intentional split and possible tool marks #25519. 100mm scale. Img_5392. R. Workman.

There were 11 shoe related artefacts found. Two smaller shoes, possibly once belonging to an adolescent, were found, along with a female's shoe with a straight throat with 'V' corners, all with square toes and hand stitching. One of these was attached to a large concretion made up of a timber block and some twine. The manufacturing techniques and the style of these shoes can be dated from c.1820 to c.1860. Three pieces of leather for the upper part of shoes was also found, with very fine hand stitching but most sides damaged and unable to be dated.

CONTEXT 153

Context (153) was at the bow of the boat above the ceiling planks. There are a total of 11 artefacts (MIC), all of which are nectarine seeds or shoe related items (Table 4.21). One partial outsole can be dated to c.1860 due to the hand stitching. The other fragments of leather are small, damaged and unable to be dated.

Table 4.21: Function of summed artefacts from (153)

General Function	Specific Function	Shape	MIC	Fragments
food	fruit	nectarine	3	0
pers	cloth	shoe	8	8
		TOTAL	11	8

CONTEXT 156

Context (156) was at the stern of the boat above the ceiling planks. There are a total of 11 MIC (Table 4.22). As with the other contexts associated with the boat, nectarine and peach seeds are present. There were two pieces of unidentified wood, this was driftwood or bark.

Context (156) has the highest concentrate of heels, albeit partial, across Barangaroo Station site. Although the three heels have different styles and size, they all show signs of wear and tear and repair/reuse is evident (Figure 4.33).

Table 4.22: Total of organic artefacts from (156)

General Function	Specific Function	Shape	MIC	Fragments
food	fruit	nectarine/peach	2	0
	nut	hazelnut	1	1
personal	clothing	shoe	3	3
trans/industry	unidentified	pin	1	0
unidentified	unidentified	wood	2	2
	offcut	timber	2	0
		TOTAL	11	6

Figure 4.33: A selection of different sized and shaped heels showing signs of repair and reuse from (156) (l-r). Heel lift with straight heel breast #25566, concave heel breast #25567, #25568. 100mm scale. Img_2946. R. Workman.

4.2.7 UNDER THE CEILING PLANKS

The space between the ceiling planks and hull below was between 100-120mm deep and an ideal cavity for accumulating occupation deposits, such as those found in the underfloor deposits of a house. Such an occupation/bilge deposit on a boat offers the opportunity to piece together what different parts of the vessel were used for, what the vessel might have transported during its lifetime and what sort of people used the vessel. Six different context numbers were assigned to the deposits in order to, firstly, demarcate where the deposit had come from within the vessel (bow, midship or stern), and secondly, to divide those parts of the deposit considered to be contaminated from intact. The planks furthest to the starboard and port sides were considered to hold less secure, likely contaminated, deposits beneath. Whereas the central planks, closer to the hull, were more likely to have preserved intact occupation deposits. The working shot (Figure 4.34) of all the organic artefacts from these contexts shows the extent of the artefacts from each context as well as from (152, 153, 156), the clayey deposits above ceiling planks in the middle of the boat. These deposits are considered a result of the under-plank deposits being stirred up and

redeposited above the ceiling planks. Figure 4.35 illustrates the location of the context numbers assigned.

Figure 4.34: Working shot of artefacts from within the boat. 500mm scale. IMG_2405.

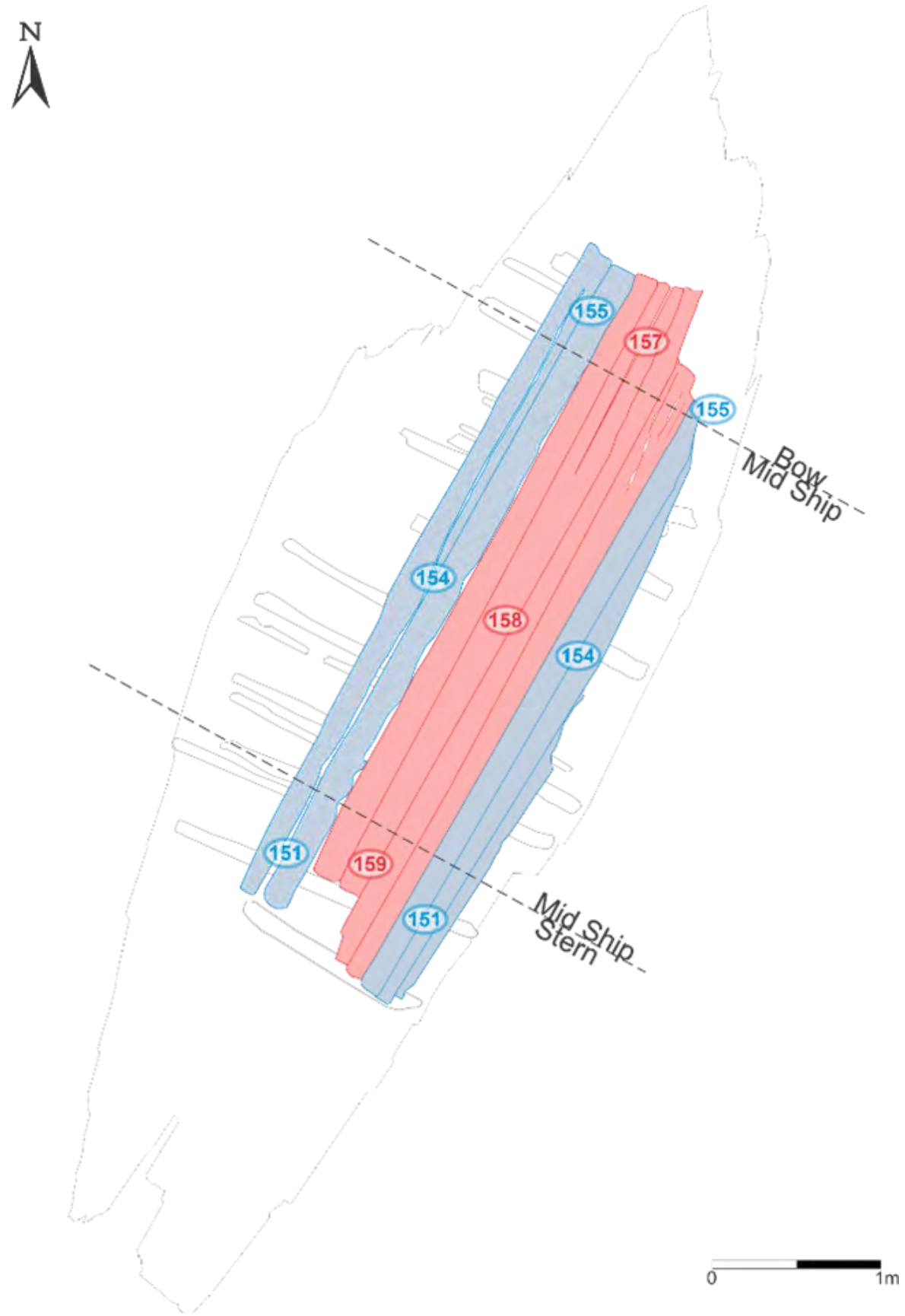


Figure 4.34: Plan highlighting the ceiling planks and the fills beneath. The planks highlighted blue represent those areas considered to have contaminated or disturbed deposits beneath. The planks highlighted red represent the areas considered to have intact deposits beneath. 1m scale.

There are a total of 100 MIC from the underfloor or bilge deposits (Table 4.23). Each context was considered by its position in the boat and will be discussed below.

Table 4.23: Sum and percentage of artefacts from under the ceiling planks

Context	MIC	%	Fragments	%
151	24	*24*	13	*23*
154	22	*22*	15	*26*
155	10	*10*	7	*12*
157	4	*4*	2	*4*
158	20	*20*	12	*21*
159	20	*20*	8	*14*

BOW: CONTEXTS 155 AND 157

The bow planking was damaged allowing the context to be disturbed by the high tide. The contexts at the bow (155, 157) had the least number of artefacts (Table 4.24) (10 and 4 MIC respectively). All the artefacts are small and light weight (Figure 4.36).

There is a high percentage of charcoal in these contexts. Charcoal is a lightweight black carbon residue produced by heating wood used in fires for heating and cooking, inside and out, in household and industrial settings.

There is leather from almost every context associated with the boat (140). Only one small piece of thick leather offcut was found in the bow.

Table 4.24: Function of artefacts from (155, 157)

Context	General Function	Specific Function	Shape	MIC	%	Fragments	%
155 Starboard and Port at Bow	food	fruit	nectarine	1	*10*	0	*0*
	household/ industry	by-prod	charcoal	6	*60*	6	*86*
	pers	cloth	shoe	1	*10*	1	*14*
		unidentified	seed	1	*10*	0	*0*
	unidentified	container	cork	1	*10*	0	*0*
			TOTAL	10	*100*	7	*100*
157 Middle at Bow	food	fruit	nectarine	1	*25*	0	*0*
			peach	1	*25*	0	*0*
	household/ industry	by-prod	charcoal	2	*50*	2	*100*
			TOTAL	4	*100*	2	*100*

Figure 4.35: Detail shot of all artefacts from (155), highlighting the smallness in size of the artefacts (l-r). Top row: charcoal #25557, cork #25559. Bottom row; nectarine seed#25558, leather offcut, #25561 seed. 100mm scale. Img_2364. R. Workman.

STERN: CONTEXTS 151 AND 159

The contexts at the stern (151, 159) had the most artefacts from under the ceiling planks (24 and 20 MIC) (Table 4.25). Compared with the bow end, the stern would have been impacted with the low and the high tide, with the tide possibly bringing more artefacts in with it but with more complete planking the artefacts had more area to be lodged in. The stern was also slightly lower than the bow contributing to the natural resting place of items. Compared to the bow there were more artefacts from each context in the stern and the pieces were larger and heavier. Several pieces of structural items, a post, a dowel and pieces of unidentified timber, were found along with fruit and vegetable seeds. There were no pieces of leather found in these contexts. This would suggest that the artefacts came in on the tide or were deposited as rubbish from the boat yard, but that they did not run off from Clyde Street.

Table 4.25: Function of artefacts from (151, 159)

Context	General Function	Specific Function	Shape	MIC	%	Fragments	%
151 Starboard and port at Stern	architectural /industry	structural/ vessel fitting	dowel	1	*4*	0	*0*
	food	fruit	apple	4	*17*	0	*0*
			coconut	1	*4*	0	*0*
			nectarine	3	*13*	2	*15*
			peach	2	*8*	0	*0*
		nut	hazelnut	5	*21*	5	*38*
		vegetable	pumpkin	2	*8*	0	*0*
	unidentified	structural	post	1	*4*	0	*0*
		unidentified	strap	1	*4*	0	*0*
			string	1	*4*	4	*31*
			timber	2	*8*	2	*15*
			wedge	1	*4*	0	*0*
			TOTAL	24	*100*	13	*100*
159 Middle at Stern	food	fruit	nectarine/ peach	7	*35*	1	*14*
		nut	hazelnut	4	*20*	4	*50*
		vegetable	pumpkin	2	*10*	1	*14*
	transport/ industry	unidentified	timber	1	*5*	0	*0*
	unidentified	seed	unidentified	1	*5*	0	*0*
		unidentified	timber	4	*20*	1	*14*
			wood	1	*5*	1	*14*
			TOTAL	20	*100*	8	*100*

MID SHIP: CONTEXT 154 AND 158

The contexts in the mid ship (154, 158) covered the largest amount of area but had a similar number of artefacts as the stern end, a relatively small area (22 and 20 MIC) (Table 4.26). These contexts had more fragmented items than the other contexts in the boat (15 and 12 fragments).

Table 4.26: Function of artefacts from (154, 158)

Context	General Function	Specific Function	Shape	MIC	%	Frags	%
154 Starboard and Port at Mid Ship	food	fruit	nectarine	1	*5*	0	*0*
		nut	hazelnut	1	*5*	1	*7*
		vegetable	pumpkin	5	*23*	4	*27*
	household/ industry	by-product	charcoal	1	*5*	1	*7*
	industry/ transport	vessel/fitting/ unidentified	timber	1	*5*	1	*7*
	personal	clothing	shoe	1	*5*	1	*7*
	store	store	barrel	1	*5*	0	*0*
		unidentified	bung	1	*5*	0	*0*
	unidentified	unidentified	offcut	4	*18*	2	*13*
			timber	5	*23*	4	*27*
			wood	1	*5*	1	*7*
			TOTAL	22	*100*	15	*100*
158 Middle at Mid Ship	food	fruit	nectarine	2	*9*	1	*8*
			nectarine/ peach	1	*5*	1	*8*
			peach	3	*14*	1	*8*
		nut	hazelnut	2	*9*	2	*17*
	household /industry	by-product	charcoal	3	*14*	3	*25*
	personal	clothing	shoe	1	*5*	0	*0*
	unidentified	container	cork	1	*5*	0	*0*
		unidentified	pin	1	*5*	1	*8*
			timber	3	*14*	1	*8*
			unidentified	1	*5*	0	*0*
			wood	2	*9*	2	*17*
			TOTAL	20	*100*	12	*100*

Context (154), under the ceiling planks in the port and starboard area of the boat, had several food related items, fruit and vegetable seeds as well as nut shells. Other than the small seeds, the artefacts from (154, 158) were larger than the artefacts from the other contexts under the ceiling planks.

Context (154) had nine pieces of timber within it (Figure 4.37). Most were timber offcuts, one piece with a bevelled edge and a square nail hole. There was also a cylindrical bung hole offcut, with evidence of possible pitch on one side and parallel grooves on the other side. The offcut was 66mm in diameter, suggesting it came from a small barrel.

Figure 4.36: Timber offcuts from (154). Left column (t-b): #25549, #25551. Middle column: #25548; #25546, #25555, #25552. Right column: #25550. 100mm scale. Img_5421. R. Workman.

Context (158) was considered the most intact or undisturbed context under the ceiling planks as it was in the centre of the boat. The context had no small pieces of leather but one whole turned sole with a square toe (#25579) (Figure 4.38). Turned shoes have the upper stitched directly to the sole inside out before being turned. This technique was mainly used for indoor shoes and slippers, and was commonly used on children's shoes even after the introduction of welted manufacture. This was due to the softer leather used in children's shoes. Welts were added to increase the durability and hardiness of adult shoes, whereas in children's shoes this was not as necessary. These shoes are dated until c.1860 when new technology changed the way shoes were made.

Figure 4.37: Outsole of turned shoe (158/#25579). 100mm scale. Img_5383. R. Workman.

Context (158) also had an unidentified piece of leather (Figure 4.39). It is possibly boat related, a flat rectangular piece of thick leather with inverted corners and two large circular holes at each end. There are wear and cut marks in the centre.

Figure 4.38: Unidentified piece of leather (158/#25585). 100mm scale. Img_5387. R. Workman.

CONTEXTS 246

Context (246) was a deposit/fill beneath the frames above the hull in the boat. The six food items (Table 4.27) were small, lightweight artefacts, washed in on the tide or down from Clyde Street. The timber offcuts (#25600, #25601) were small had possibly fallen through from the loose timbers above.

Table 4.27: Number of organic artefacts in (246)

General Function	Specific Function	Shape	MIC	Fragments
food	fruit	nectarine/ peach	2	2
	nut	hazelnut	2	2
	vegetable	pumpkin	1	0
unidentified	unidentified	timber	2	2
		TOTAL	7	4

There were two hazelnut fragments (#25598) found. Hazelnuts are not native to Australia and were introduced approximately 150 years ago. Nursery catalogues from 1840s show hazelnut planting material for sale in Tasmania and later in Victoria in the 1880s, most likely plants introduced from England. Records from the 19th century reveal that hazelnuts were grown in rural NSW as well as continuing to grow in Victoria and Hobart in Tasmania.[17] It is possible the fragments floated in or down from Clyde Street, from refuse in the harbour or it came in on the tide as flotsam or jetsam from a cargo ship.

CONTEXT 247

Context (247), found between elements (420, 446) of the boat (140), had high concentrations of timber fragments and wood pulp, along with 11 organic artefacts

[17] Baldwin, B 2015

(Table 4.28). A household teardrop doorknob was identifiable (Figure 4.40), however the remaining artefacts general, and specific, function is unidentified due to the generic nature of the items.

Table 4.28: Number of organic artefacts in (247)

General Function	Specific Function	Shape	MIC	%	Fragments	%
household	furniture	doorknob	1	10	0	0
unidentified	unidentified	rope	1	10	8	50
		string	1	10	1	6
		handle	1	10	1	6
		timber	5	50	5	31
		wedge	1	10	1	6
		TOTAL	11	100	24	100

The doorknob (#25610) is small and wooden and would have been attached to a piece of furniture. It is unclear if this furniture was from a house, the boatyard or even a larger boat (Figure 4.40).

Figure 4.39: Wooden teardrop doorknob (247/#25610). 100mm scale. IMG_3279. R. Workman.

5.0 REPORT SUMMARY & RESULTS

5.1 CONTEXTUAL DISCUSSION

Barangaroo Station has a total of 1003 (MIC) organic artefacts, well preserved in the anaerobic conditions of the site. Although 95% of the artefacts came from contexts associated with the boat in Area X, the organic assemblage discussed in this report reflect the lifestyle of the people working and living, in and around the area, rather than portraying the small-scale industrial shipbuilding nature of the area.

The harbour would have been littered with debris from the rubbish dumping events as well as flotsam and jetsam, debris floating and sinking in a shallow tidal zone, washing up on shore from the boats on the busy harbour. Household rubbish was often dumped into the yard area or a convenient dumping ground in the surrounding area. Any rubbish dumped in the yards of the houses or businesses on Clyde Street may well end up washing down onto the harbour shore. 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. This was not the only source of rubbish on the foreshore however. The City Council was criticised for using the harbour as an easy and cheap method of rubbish disposal at the expense of public health and the environment.[18]

Leather shoe related items are the highest percentage (36%) of artefacts from Barangaroo Station. There were a total of 361 shoes and shoe related artefacts, including offcuts from the manufacturing process. The overall dominant shoe construction method was hand stitched. The majority of the shoes had square toes. There were very few heels in the Barangaroo Station assemblage, suggesting the shoes, slippers or pumps were for inside use and not working boots for the boat yard and that they had been washed down from the streets above. The exception to this is the thick leather heel once belonging to a shoe or boot found in Area T. The combination of manufacturing methods and style allow us to get an overall date of c.1820-c.1880 for the shoes.

The Sands Directory records two shoemakers, Charles and Daniel Foran, already living on the west side of Clyde Street (no. 29) in the year of its commencement, 1858, until 1864.[19] Daniel Foran is also recorded as living on the east side of Clyde Street (no. 30) from 1858-1869. This would suggest a father/son business and possibly explain why many of the shoes found in Barangaroo were similar in style and manufacturing techniques. The shoes that could no longer be repaired, reused or passed on were likely thrown out by the shoemakers and washed down to the harbour.

The timber knees do reflect the boat/ship building nature of the site. These items allow us a small insight into how a shipyard functioned, the use of space, as well as the use and reuse of timber, vital in the day to day running of the yard.

[18] Broadbent 2010 (5): 506.

[19] *Sands Sydney and Suburban Directory 1858-1869*

6.0 GLOSSARY

Anklestrap	Narrow extensions of top fronts of quarters continuing around ankle and attached with a buckle fastening. The shoes do not generally have a tongue and are usually worn by children and women.
Back Seam	Vertical seam, often closed, at the rear of quarters.
Bespoke	Footwear individually made, often by hand, by a shoemaker. From c.1850 this implied high-quality and expensive shoes.
Bevel	Pared leather edge, skived, also seen in repaired heels/soles.
Binding	Sewn band of leather/fabric along raw edge to finish it off, commonly at the opening or throat.
Boot	Footwear with an opening cut at the ankle or higher level. Often robust and for outdoor use the fastenings, technology and styles define different types.
Bracing	Method of tightening & holding welt or seat cupping in place with thread in zigzag or crosswise pattern so outsole etc can be sewn on.
Butt Seam	Direct head-on join between leather sections, sewn together.
Cemented Shoe	Shoes/boots where upper is glued to the outsole at the sole seam, post 1926.
Channel	Cut channel for the sole seam on lower side of outsoles in order to protect stitching from wear, often used in conjunction with feathering.
Closed Seam	Join between leather sections where each piece has a conjoined narrow fold where they are stitched together, the stitches not visible on the outside.
Clog	Shoe made from hand-carved wood with leather or fabric upper strap. Provides protection from cold and damp.
Clump Sole	Fore (toe/ball) & rear (shank/ part heel) repair patches / soles, usually tunnel stitched together.
Counter	Thick reinforcement piece inside the quarter at back of upper.
Court Shoe	See Pump.
Cobbler	Repairs shoes & makes shoes from recycled leather. Separate trade & guild from Shoemaker.
Crooked Shoe	Shoe/last shaped to more closely fit the different curves of left and right feet.
Edge Binding	Strip of leather whip stitched to edge of shoe' s opening.

Eyelet Facing	Leather reinforcement or lining.
Eyelet Row	Row of eyelets on instep.
Eyelet Tab	Short extensions in front of quarter for lace holes.
Eyelets	For lace or thong, metal reinforcing invented 1827.
Feathering	Pointed holes for sole seam on lower side of outsoles in order to facilitate stitching and protect them from wear, often used in conjunction with channels. A common practice from c.1850.
Filling	Material used to fill gaps or provide insulation between insole and outsole, often soft and organic.
Filling Piece	Insole inserts.
Flesh Side Out	Outer surface of upper that corresponds to the original inner flesh side of the animal' s hide. Flesh removed during skinning and tanning.
Grain Side Out	Outer surface of upper that corresponds to the original outer hairy surface of the animal' s hide. Hair removed during tanning.
Hand-made Nail	Various sizes and materials, shanks are square in section. Iron types are usually larger and stronger for sturdy shoes/boots and include hobnail types with prominent heads. Copper or brass (aes) nails are generally used on female or child shoes or those of better quality.
Hand-stitch	Stitching of upper, sole or heel done by hand, stitching holes oval and often irregular. Better-quality bespoke shoes in later years.
Heel Breast	Front-facing side of heel.
Heel Cupping	First roughly horseshoe-shaped layer of heel (lift) or used as welt below heel seat.
Heel Seat	Insole area where heel rests, can be above cupped welt.
Heel Welt	Cup shaped narrow strip of leather at heel seat of some shoes, often shaped with hand stitching & bracing, Seen mainly on machine stitched shoes. Earlier hand stitched shoes have cupped shoulder of stitching at base of insole (see H St.3).
Hobnail	Iron nail with large or thickened head hammered into underside of outsoles or heel for reinforcement or extra grip in wet, slippery or icy conditions.
Holdfast Seam	Raised narrow border on underside of insole seam pierced by tunnel stitching to attach sole. Commonly used on firm insoles in welted shoes and utilized as the Goodyear Welt in machine stitched shoes.
Insole	Upper part of sole, single piece or small inserts that foot treads on.

Instep	Part of upper covering top of foot above the arch, can be the front of quarters or a separate section in lace-up shoes/boots.
Internal Strengthening	Reinforcement pieces inside shoe, especially insole shank.
Lace Tag	Metal or other covering to reinforce tie lace end.
Lace-up	Shoes or boots with one or more eyelets along inner edges of the instep or front of quarters that can be tightened against the foot using a thong or lace. Alternatively the lacing occurs at a side seam.
Lapped Seam	Seam formed by overlapping leather sections which are then stitched, pegged or nailed together.
Last	Wooden model around which shoe is shaped and made.
Latchet Fastening	Extensions of top fronts of quarters continuing over a long vamp or tongue at the instep, with thong, lace or buckle fastening. Latchet shoes have this fastening as distinct from those used on lace-up or ankle-strap shoes.
Lining	Internal layer inside outer layer of upper made of leather or fabric.
Machine-made Nail	Various sizes and materials, shanks are rectangular or circular in section. Iron types are usually larger and stronger for sturdy shoes/boots and include hobnail types with prominent heads. Copper or brass (aes) nails are generally used on female or child shoes or those of better quality. Machine- made and used, or directly cut from nail-chains and inserted using machinery from c.1862. The circular shank sections can be confused with screws. For unusual types follow chronology for cut, cut and wrought and machine-made nails.
Machine-stitch	Use of machines to stitch upper or sole seam. Upper machines first patented 1846 and in general use by 1856. Sole machines from 1860 with major improvements in 1862 and 1875.
Medial	Inside edge of foot.
Midsole	Between insole & outsole.
Nail	Small tack-sized nails of various metals used to secure leather to last and to fasten soles and heels. Used in Roman times and then from c.1800 with known references only from c.1812. Made and applied by machine from c.1862. See hand-made nail, hobnail, machine-made nail, screw.
Opening	Top of shoe/boot where foot is inserted.

Outsole	Lower part of shoe that is below the foot and has contact with ground, outer surface is often rough/worn. Below insole and midsole, heel is attached to outer side.
Paring	Use of paring knife to shape or trim leather.
Paten	Footwear with clog or shoe attached above a circular metal ring. Provides good grip in wet, muddy, slippery or icy conditions.
Peg hole	Distinctive lozenge-shaped or square hole in heel or sole. See Wooden Peg.
Pump	Slip-on shoe with simple upper having no tongue or fastening, often but not always with heel. Those dress shoes with heel also known as Court Shoes. Those without heels were common in decades around 1800 and can also be called slippers. Upper made of leather or fabric.
Quarter	Part of upper at back of shoe curving around heel of foot, can be single or two pieces joined at back seam, can extend to sides or even toe depending on style and technique.
Rand	Narrow strip of leather included in sole seam of some turnshoes between upper & outsole, to make them more waterproof. Single line of holes, compared with two rows in welt. Usually used in footwear before c.1800.
Rubber	Natural and later hardened rubber used in footwear. Initially used for heel inserts from c.1850 with a solid heel patented in 1895. Man-made synthetics later substituted.
Screw	Small machine-made and applied copper or brass screw used to fasten soles or heels, short, narrow, circular in section and similar in appearance on surface of leather to copper or brass nails/tacks. Cut and inserted using machinery from c.1862.
Seam	Join between different parts or leather sections of shoe. See Butt, Closed, Holdfast and Lapped Seams.
Shank /Arch Support	Stiff pieces of leather between insole & outsole under arch of foot.
Shoulder	Raised narrow border on upper side of outsole, the sole seam pierced by tunnel stitching to attach upper in turned shoe construction method. Also on lower side of insole as part of a holdfast seam.
Side Seam	Between vamp & quarter.
Single Heel Lift	Layer of leather under heel seat of 16th century shoes etc. Slipper Soft indoor shoe usually without heel. See also Pump.
Sole Filling Piece	Between sole layers.
Sole seam	Between upper & sole of turnshoe.

Stitched Down Shoe See Veldtschoen shoe.

Straight Shoe Shoe/last that is straight from toe to heel with no allowance for different curves of left and right feet.

Strap Keeper Small loops to hold buckle straps in place.

Suede Outer surface of upper with short soft or downy finish achieved by rubbing the tanned flesh side into nap.

Tack Hole Lasting tack held shoe parts to last where it was to be sewn.

Thong Lace made of strip of leather.

Throat Rear end of vamp, can be over instep & up to shin in boots.

Toe Puff Internal reinforcement for the toe.

Toe Cap External reinforcement for the toe.

Tongue Backwards extension of vamp, or separately sewn piece above instep.

Top Band Strip of leather sewn all around top line of open edge of boot as finish, often using whip stitch.

Top Line Top edge of shoe or boot.

Top Lift Top or final heel lift as made/seen from below by shoemaker.

Tunnel Stitch Method where needle pierces through leather or shoulder to butt join leather sections or in decorative stitching.

Turned Shoe Shoe made by sewing upper directly to outsole inside out, then turning outward. Usually hand stitched.

Vamp Part of upper covering toe & forepart of foot.

Vamp Wings Extensions backwards to quarters.

Veldtschoen Turned out or stitched down shoe, usually thick leather with welt or rand. Found UK from 17th century, & possibly earlier. Common South African technique, known as Veldtschoen.

Waist / Shank Central narrower part of sole below arch of foot.

Wedge Thin piece of leather, often triangular, between layers/lifts, can be part of welt.

Welted Shoe Shoes/boots with robust construction often for outdoor or work wear, can be stitched or nailed. Generally have narrow strip welt(s) of leather with two rows of holes between upper & soles. These are

	often wider and thicker than rands. Welts provide improved strength, flexibility and damp-proofing, see also holdfast seam and rand.
Whip Stitch	Hemming stitch. Small angled stitching of lapped seam, often of top band or as decorative stitching.
Wooden Peg	Small shaped slivers of wood used to secure leather during cutting or paring, or to last when maki ng shoes and to fasten shoe soles or heels. Hand-made pegs irregular, often square or rectangular in section but similar in size to matchsticks, inserted using machinery from 1829. Fully machine-made pegs were smaller with a uniform lozenge or diamond-shape and invented in 1854

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

METAL REPORT

MARCH 2022

VOLUME 3, SECTION 3.8

Shipbuilding related copper alloy artefacts from (109).

FINAL REPORT | Report to **Sydney Metro**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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Draft Version 1	01.12.21	Internal review	Catherine Munro Hannah Flood	Holly Winter
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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

METAL REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

In 2018 Casey & Lowe were commissioned by AMBS Ecology and Heritage on behalf of John Holland CPB Ghella Joint Venture (JHCPG) to undertake historical archaeological investigations at the Barangaroo Station site, Sydney. The site was divided for the purpose of excavation into 6 areas: Area R, Area T, Area W, Area X, Area Y and Area Z (Figure 1.1). This report will discuss the metal artefacts that were uncovered and catalogued.

Figure 1.1: Archaeological excavation areas at Barangaroo Station. Google maps.

1.2 ARCHAEOLOGICAL PHASES

The study area was divided into seven main archaeological phases across the six archaeological areas (Table 1.1). These are referred to throughout this report, and summarised below.

Table 1.1: Summary of the identified archaeological phases

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

1.3 METHODOLOGY

The metal artefacts recovered from Barangaroo have been catalogued according to the methodology developed by Casey & Lowe Pty Ltd. All artefacts were entered into a database developed by Dr Mary Casey for Casey & Lowe.[1] This report includes tables extracted from the artefact catalogue to inform discussion.

The metal artefacts were sorted by area and context prior to cataloguing to ensure that the items are catalogued in sequential order by context. The catalogue records the catalogue numbers; the context number and other information specifying where the item was found; the shape of the item (i.e. nail); the general function (i.e. architecture); specific function (i.e. structural); fabric (i.e. iron); portion (i.e. head/shank); country of manufacture; manufacturer; producer or retailer; marks; dimensions (in mm); joins (context/#catalogue number); weight (in grams); brief description (includes mark description); from and to dates (of manufacture); number of fragments; minimum item count (MIC); and box number. Where the function of an item is unclear, or could possibly be used in multiple situations, two functions can be assigned, i.e., structural/non-structural. Where the portion of an artefact was recorded as whole or near whole, the item was listed as having no fragments. Joining fragments recorded separately by context were considered one item and the largest or first catalogued entry contains the item count and the other entry was listed with zero items.

Metal artefacts are extremely vulnerable to their environment, and often found to be highly degraded or corroded. The extent of which this occurs depends on the environment the artefact is deposited in, and whether this environment is high or low in water, salt, and oxygen.[2] This level of decay is noted in the brief description as fabric decay (FD), high

[1] Casey 2004.

[2] Turner-Walker 2008.

fabric decay (HFD) or very high fabric decay (VHFD), and low encrustation (LE), moderate encrustation (ME), heavy encrustation (HE), or very heavy encrustation (VHE).

Casey & Lowe developed a type series predominately based on the work of Varman,[3] who created a comprehensive comparative typology of nail types. The types that are relevant to artefacts recovered from Barangaroo Station are summarised below (Table 1.2). This type series has informed how the nails were catalogued, through identifying features such as the length, the shape of the head, shank, and point, the fabric used, and if there are any signs of manufacturing processes (i.e., brackets on the underside of the head, grooves along shank) to indicate the period of manufacture and potential use. For the purpose of consistency in cataloguing, tacks, nails, and spikes have been differentiated by length. Tacks have been defined when the length is less than 30mm, nails from 30mm to 99mm, and spikes are greater than 100mm.

Table 1.2: Summary of Casey & Lowe type series for relevant metal artefacts from Barangaroo Station

Type	Abbreviation	Date of Manufacture	Common use
Hand-forged nails	HF	c.1788-c.1890	c.1788-c.1850
Hand-forged spikes		c.1788-c.1950	c.1788-
Cut nails	Cut	c.1805-	c.1809
Cut-wrought (iron)	CW	c.1815-c.1870	c.1820-c.1870
Cut-wrought (Copper alloy)		c.1820	c.1820
Machine-wrought	MW	c.1840-c.1870	c.1840-c.1870
Screw (tapered point)	-	c.1853	c.1853
Wire-drawn nails (iron)	WD	c.1850-c.1890	c.1853
Wire-drawn nails (steel)		c.1875-	c.1880/1890's
Wire-drawn nails (Copper alloy)		c.1835-	c.1835-

1.4 REPORT AUTHORSHIP

The metal artefacts were catalogued by Catherine Munro, Archaeologist, Casey & Lowe, who also wrote this report. Hannah Flood, Archaeologist, Casey & Lowe catalogued the metal artefacts found in contexts relating to the abandoned boat (140 - UDBH1), and wrote Section 4.0.

[3] Varman 1993

2.0 OVERVIEW OF ASSEMBLAGE

2.1 OVERVIEW OF ASSEMBLAGE

The excavation of Barangaroo Station recovered a total of 350 MIC and 153 fragments of metal artefacts from 50 contexts (Table 2.1). The distribution of artefacts varied between areas depending on the presence of different types of occupation, deposits, and features. Area X had the largest quantity of metal artefacts (64% of MIC of the total metal assemblage) (Table 2.2). This is due to the presence of a possible underfloor or occupation deposit (context 109) that contained 104 MIC (22 fragments). The presence of the wreck (context 140) within Area X resulted in 69 MIC (47 fragments) identified from the 12 related contexts. The artefacts relating to the wreck (140) are discussed in Section 4.0. Area T resulted in the second highest frequency of metal artefacts (63 MIC, 20 fragments), while the other areas had markedly fewer metal artefacts, 36 MIC (33 fragments) from Area Z, 21 MIC (five fragments) from Area Y, nine MIC (15 fragments) from Area R, while no metal artefacts were recovered from Area W (Table 2.2).

Table 2.1: Metal artefact totals by area and context

Area	Context	MIC	%	Fragments	%
R	12	3	1	7	5
	20	1	0	2	1
	24	1	0	1	1
	31	1	0	0	0
	52	1	0	1	1
	75	2	1	4	3
T	32	1	0	1	1
	46	5	1	5	3
	47	3	1	2	1
	51	3	1	2	1
	53	1	0	1	1
	58	1	0	0	0
	63	4	1	4	3
	66	1	0	0	0
	70	1	0	0	0
	72	3	1	0	0
	73	3	1	4	3
	78	20	6	1	1
	79	4	1	0	0
	82	1	0	0	0
	83	10	3	0	0
	94	1	0	0	0
W	-	0	0	0	0
X	108	7	2	1	1
	109	104	30	22	14
	119	1	0	0	0
	124	31	9	6	4
	126	13	4	1	1
	133	5	1	1	1
	140	17	5	13	8

Area	Context	MIC	%	Fragments	%
	142	1	0	1	1
	148	1	0	2	1
	149	6	2	4	3
	151	1	0	0	0
	152	2	1	2	1
	153	1	0	1	1
	154	6	2	6	4
	158	1	0	1	1
	246	1	0	0	0
	249	27	8	16	10
Y	164	13	4	5	3
	165	6	2	0	0
	174	1	0	0	0
	184	1	0	0	0
Z	194	3	1	3	2
	205	2	1	2	1
	207	2	1	2	1
	208	4	1	4	3
	215	20	6	24	16
	241	1	0	0	0
	251	1	0	1	1
	TOTAL	350	100%	153	100%

Table 2.2: Metal artefact totals by Area

Area	MIC	Fragments	%
R	9	15	3
T	62	20	18
X	225	77	64
Y	21	5	6
Z	33	36	9
W	0	0	0
TOTAL	350	153	100%

Across all areas and contexts, 48% of metal artefacts were identified as transport (predominately maritime) items (167 MIC and 12 fragments), reflecting the harbourside nature of the site and its shipbuilding history (Table 2.3). Of these transport items, 149 MIC (six fragments) were nails, (including tacks and sheathing nails) screws or spikes. Architectural items were the second most commonly identified general function though significantly less frequent than transport items, with 71 MIC and 61 fragments (Table 2.3).

Table 2.3: Functions and shapes of metal artefacts from all areas

General function	Specific function	MIC	Fragments
architectural	door	2	0
	door/machine	1	5
	non-structural	1	1
	roof	4	3
	structural	56	46
	structural /non- structural	7	6
architectural/household	non- structural	2	2
architectural/industrial	structural /machine	1	0
	unidentified	1	0
architectural/trans	structural/v fitting	2	0
	vessel/fitting/unidentified	2	1
food	container	1	0
	cooking	1	1
household	container	1	1
	cooking	1	1
	fitting	1	1
	furniture	1	0
	furniture/fitting	1	1
	non-structural	1	0
	structural /non-structural	9	10
household/architectural	unidentified	1	1
household/industrial	by-prod	3	3
household/trans	furniture	13	0
	furniture/fitting/vessel superstructure	24	3
	furniture/vessel hull	0	3
	unidentified	1	0
household/unidentified	unidentified	1	0
industrial/trans	machine/vehicle	1	0
service	gas	1	1
store	store	5	9
trans	horse	1	0
	unidentified	2	2
	vessel	23	5
	vessel hull	53	2
	vessel superstructure	88	3
trans/industrial	fitting/vessel fitting	1	1
unidentified	container	5	4
	unidentified	29	29
work	tool	1	1
yard	tool	1	7
	TOTAL	350	153

Copper alloy wire-drawn square nails were the most common artefact type from the metal assemblage (Figure 2.1). Similar techniques were used for producing copper alloy wire

drawn nails to that of iron or steel, however, a square wire was used.[4] The wire was produced by drawing it through a machine to the required thickness, and then after being cut to size, the points and ends were shaped by hammering in a clamp.[5] They were used in Australia from c.1835 onwards and were predominately used in boat building due to their resistance to water damage.[6] There are multiple reasons that copper alloy nails are unsuitable and an unlikely choice over iron for terrestrial (i.e., architectural) applications. These include: the higher cost per nail, and the softness of copper alloy resulting in a more laborious application that requires a pre-drilled hole in order to be sunken, and a less secure application that need to be clinched or riveted to remain in place (Figure 2.2).[7]

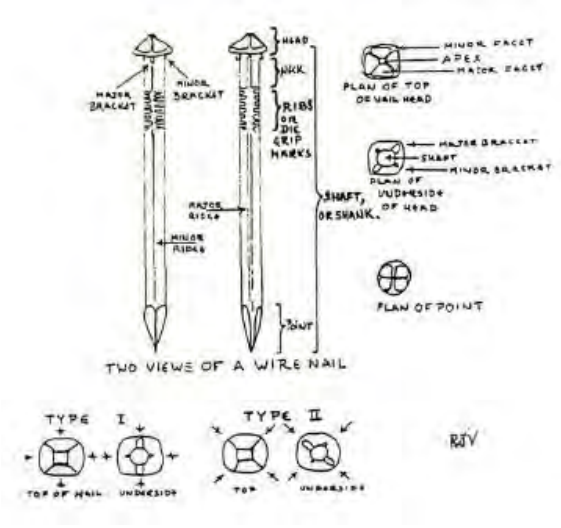

Figure 2.1: Parts of a rose headed wire nail, showing features commonly identified at Barangaroo Station, i.e., square shank, major/minor bracket, rose head, grip marks.[8]

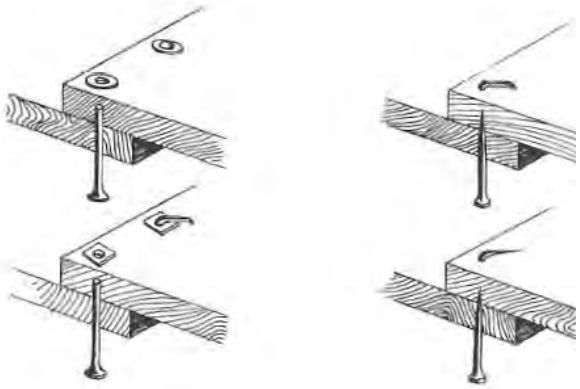

Figure 2.2: Types of nail fastenings.[9] Top row (l-r): riveted nails, clinched and re-inserted. Bottom row: clinched over a rove, clinched flat.

The superiority of copper alloy over iron for resistance to water damage is particularly evident in the artefacts recovered from Barangaroo Station (Figure 2.1, Figure 2.3). The majority of iron nails have very high fabric decay and encrustation noted, whereas the majority of copper alloy nails recovered have low or moderate fabric decay and encrustation. This is also evident in the MIC/fragment counts between architectural and transport. Transport items are most frequently made of copper alloy and have significantly higher proportions of whole items and fewer fragments (Figure 2.4). Comparatively architectural items are predominately iron, and have much closer proportion of MIC and fragments, indicating that copper alloy survives much more intact than iron in the archaeological record. Many of the copper alloy nails from Barangaroo Station appear unused. The majority are straight and have not been distorted through use, nor bent from removal or clenching (Figure 2.4). In general, the size of the copper nails is relatively short with only 3 larger boat spikes found.

[4] Hebert 1836, pp. 187-188

[5] Hebert 1836, pp. 187-188

[6] Hebert 1836, pp. 187-188, Varman 1993, pp. 196

[7] McCarthy 2005, p. 109

[8] Varman 1993, p. 161

[9] McCarthy 2005, p. 54

Figure 2.3: Selection of iron artefacts from (046, 063, 078, 109). (l-r) Top row: two iron nail fragments 078/#2061. Second row: iron tool with straight shank 063/#2051. Third row: nail 109/#2131, two iron nail/spike fragments 063/#2052. Bottom row: six iron spike fragments 046/#2044. 100mm scale. IMG_3044. Russell Workman.

Figure 2.4: Metal transport nails and roves from (109). (l-r) Top row: five nails #2123, six nails #2122. Second row: boat spikes #2126, #2125. Third row: twelve nails #2113, three nails #2111. Fourth row: three tacks #2100, three tacks #2101, screw #2102, sheathing tack #2105 (top), nail #2103 (bottom). Bottom row: diamond-shaped rove #2129, four diamond roves from the same strip #2127, small diamond rove #2128. 100mm scale. IMG_3031. Russell Workman.

3.0 CONTEXT ANALYSIS

3.1 AREA R

Area R was located in the southeast of the site (Figure 1.1). The area contained multiple construction and reclamation phases, including: c.1880 Dibbs wharf, the termination of Clyde Street c.1880s, Langford's pre-1855 boat shed, and early 20th-century reclamation fills and finger wharfs (Figure 3.1). The metal artefacts from Area R made up only 3% of the whole site assemblage, with nine MIC and five fragments (Table 2.2). The majority of items found were architectural nails (six MIC, 12 fragments), with comparatively fewer transport related artefacts (one MIC, one fragment) than other areas, despite the area containing Langford's boat shed and Dibbs' wharf (Table 3.1).

Table 3.1: Summary of the general and specific functions of metal artefacts from Area R

General Function	Specific Function	Shape	MIC	Fragments
architectural	door/machine	handle	1	5
	fitting	bracket	1	1
	structural	nail	2	4
		nail/spike	1	1
		screw	1	1
transport/industry	fitting/vessel fitting	unidentified	1	1
unidentified	unidentified	strap	1	2
		TOTAL	8	15

HARBOUR SANDS (PHASE 4)

Context (075) is a natural harbour sand deposit, and the earliest event with metal artefacts from Area R. From this context, one MIC (two fragments) of an unidentifiable strap, as well as one MIC (two fragments) of a hand-forged iron nail (#2037) were catalogued. The hand-forged iron nail was identified, datable from 1788-c.1890. The presence of these items in this natural deposit is circumstantial and likely a result of activities occurring on top of the jetty/sea wall.

DIBBS' WHARF (PHASE 5)

Context (012) is Dibbs' c.1880s wharf surface. This context contained three MIC (seven fragments). A galvanised door or machine handle (#2031) was identified, providing a date of post c.1860. Similar to (075) (above), the presence of this artefact in this deposit is a result of the occupation and activities of the wharf.

CLYDE STREET FENCELINE (PHASE 5)

Context (020) was the pipe fill of three postholes (019) that were part of railing used to separate Clyde Street from the water/steps. One iron nail (#2034) was recovered but too heavily encrusted to identify the type so no date can be provided.

Figure 3.1: General view of eastern side of Area R with Dibbs' wharf wall (011) and wharf surface (012) pre-excavation for Langford's boat house. The termination of Clyde Street (016, 021) is visible in the background. View to northwest, 1m scale. DSC_1700.

3.2 AREA T

Area T was to the northwest of Area R (Figure 1.1). The area contained a wharf, jetty and slipway constructed by Cuthbert between 1855 and 1865, slipway infilling c.1875-1880, and timber piles driven through wharf surface for a 1910's structure. Area T had the second highest proportion of metal artefacts compared to the other areas (63 MIC and 20 fragments), making up 22% of the total MIC assemblage across the site (Table 2.2). Transport was identified as the most frequent category with 31 MIC and one fragment, followed by architectural with 19 MIC and 16 fragments within Area T, with common items including nails, tacks, sheathing nails/tacks, and spikes (Table 3.2).

Table 3.2: Summary of general and specific functions of metal artefacts from Area T

General Function	Specific function	Shape	MIC	Fragments
architectural	door	pintle	1	0
	structural	bolt/spike	2	3
		nail	6	6
		nail/spike	1	2
		spike	7	5
		staple	1	0
	structural/non-structural	screw	1	0
architectural /industrial	structural/machine	bolt/spike	1	0
	unidentified	rod/spike	1	0
household	furniture	tack	1	0
household/transport	furniture	tack	2	0
	furniture/fitting/vessel superstructure	tack	2	0
household/unidentified	unidentified	strip	1	0
industrial/transport	machine/vehicle	hinge	1	0
transport	vessel	spike	1	0
	vessel hull	nail	4	0
		sheathing nail	16	1
		sheathing tack	6	0
	vessel superstructure	nail	4	0
unidentified	unidentified	rod	1	0
		sheet	1	1
		tool	1	2
		unidentified	1	0
		TOTAL	63	20

SLIPWAY (PHASE 4)

Context (083) is a sandstone slipway surface of Cuthbert's property. The context contains 10 MIC (0 fragments), notably, all whole copper alloy nails for use on the hull of a vessel. Most have low fabric decay and low encrustation. Nine out of the ten nails are sheathing nails, six of which have been identified as possibly being wire-drawn manufacture, providing a possible date of c.1835 (Figure 3.2). Four of these are bent near the head from being pulled out, possibly when the vessel passed down the slipway. However, the varying lengths of the sheathing nails indicates that they would have come from different vessels and hence accumulated across the slipway surface over time.

Figure 3.2: Sheathing nails from (083), showing slight variations in size and shape (l-r). Top row: #2083, #2084, #2088. Second row: #2086, #2087, #2085. Bottom row: #2089, #2090, #2091. 100mm scale. IMG_5426. Russell Workman.

Contexts (073, 078) are associated with wooden scaffolding used for the repair of ships within Cuthbert's slipway and stockpiling of timbers (Figure 3.4). The metal artefacts were found in and around larger structural pieces and loose timber pieces, as well as within a wood chip deposit (073) that was a product of works occurring in the area. Of the 23 MIC and five fragments that were catalogued, eight MIC and four fragments were architectural. The types of architectural nails included hand-forged (1788-c.1890), wire-drawn circular iron (c.1853), and machine-wrought (c.1840-c.1914). A very large wrought iron staple (#2076) would have been used to join large timber sleepers. A pintle (#2060) was found, made of wrought iron that would have been part of a two-piece driven door hinge (Figure 3.3). It is possible that it could have also been used as a hitch for horses or vessels, with the ring missing. This does not provide any date information only functional interpretations. Also identified were 11 MIC of transport items, including two sheathing nails, five sheathing tacks, and four copper alloy wire-drawn square nails, datable from c.1835.

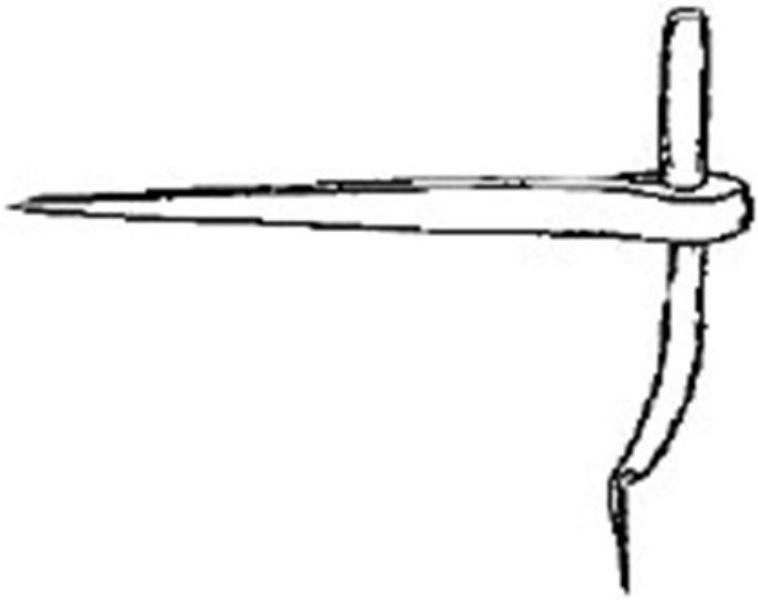

Figure 3.3: Two-piece driven pintle door hinge.[10]

Figure 3.4: Metal artefacts from (073, 078) (l-r). Top: large iron staple 78/#2076. Second row: eye or two-piece driven pintle 73/#2060. Bottom row: sheathing nail 78/#2068, WD sq nails 78/#2064, 78/#2066, copper alloy sheet 78/#2063, iron nail 78/#2062, iron MW nail 78/#2061. 100mm scale. IMG_5451. Russell Workman.

[10] Priess 2000, p. 54

DIBBS'S WHARF (PHASE 5)

Context (031) was a black wharf surface inside the sawshed building, with industrial gravel, ash and charcoal. It contained one wire-drawn square shank copper alloy boat nail (#2039) providing a date of c.1835 (Figure 3.5). Due to the length (105mm) and fabric this type of nail would likely have been used on the hull of a vessel.

Context (058) was a circular feature of decayed timber, possibly a barrel or a remnant of wooden flooring or part of a structural support. It contained a single metal artefact - a copper alloy possibly wire-drawn square tack (#2048) (Figure 3.5). Wire-drawn nails date from c.1835. The tack would have been used as a furniture tack or a fitting in either a structure or a vessel.

Context (063) was one of the levelling fills laid after the original working surface (064) to build up the ground in preparation for Cuthbert's wharf. It contained a total of four MIC (four fragments) (Figure 3.5). Two sheathing nails (#2050), one unidentifiable tool (#2051), and one hand forged iron nail/spike (#2052). The hand forged nail/spike has a date range of 1788-c.1950, whilst the others have no date.

Context (072) was a levelling fill contemporary with the sawshed surface (031). It contains three MIC (0 fragments), two of which are copper alloy wire-drawn square sheathing nails used to attach sheathing to the outside of a vessel hull, datable from c.1835 (Figure 3.5). One copper alloy spike (#2056) was also likely used for the hull of a vessel.

Figure 3.5: Iron and copper alloy nails from contexts associated with Dibbs wharf (031, 072, 063, 058). Top to bottom, first column: hand-forged iron nail 063/#2052. Second column: copper alloy spike #2056, WD sq tack 058/#2049. Middle: WD sq boat nail 031/#2039. Fourth column: sheathing nails 072/#2055, 072/#2057. Last column: unidentified iron tool 063/#2051. 100mm scale. IMG_5439. Russell Workman.

3.3 AREA W

Area W is situated to the south of Area X (Figure 1.1). It is the largest of the areas within the study area, however was only partially excavated. The area included a portion of land owned by Dibbs and a portion of land owned by Osborne (later McLean). Wharf structures, surfacing, and infill was present along with harbour deposits and beach sands. No metal artefacts were recovered from the excavation within this Area.

3.4 AREA X

Area X was to the north of Area W and northeast of Area R (Figure 1.1). The area contained Langford's House c.1830-c.1880 (Figure 3.6), a pre-1855 wharf wall attributed to Langford, a pre-1865 sawshed structure, post-1880 Clyde Street. The artefacts found in contexts associated with the boat (140 - UDHB1) have not been tallied with Area X artefact counts and will be discussed in Section 4.0. Area X contained the largest assemblage of artefacts. A total of 156 MIC and 30 fragments making up 56% of the total site assemblage was recovered (Table 3.3). This is due to the presence of a possible underfloor or occupation deposit (109) that contained 104 MIC (22 fragments), as well as construction fill (126) (Table 2.1).

Table 3.3: Summary of general and specific functions of metal artefacts from Area X

General function	Specific function	Shape	MIC	Fragments
architectural	roof	flashing	1	1
		offcut	1	1
	structure	nail	14	5
	structure /non- structural	nail	1	1
		screw	1	0
household	container	lid	1	1
	furniture/fitting	screw	1	1
	structure/non-structure	nail	9	10
household/transport	furniture	tack	11	0
	furniture/fitting/vessel superstructure	brad/nail	1	0
		nail	3	0
		nail/tack	3	0
		tack	12	0
	furniture/vessel hull	sheet/sheathing	0	3
transport	vessel	rove	9	0
	vessel hull	nail	3	0
		sheathing	1	1
		sheathing nail	2	0
	vessel superstructure	nail	80	2
unidentified	unidentified	strip	1	1
		unidentified	1	3
		TOTAL	156	30

Figure 3.6: Sandstone foundations of Langford's House (1830s-1880s) at Barangaroo, Sydney. View to north, 1m scale. DSC_2585.

LANGFORD'S HOUSE (PHASE 3.2)

Context (119) was a sand fill within a crack in the bedrock below Langford's House. It contained a single copper alloy wire-drawn nail (#2138); this can be dated from c.1835.

Context (126) was a construction fill for Langford's House (c.1830's-1880's), above (124). It contained a total of 13 MIC (Table 2.1). Of these, 11 MIC were wiredrawn circular steel nails (#2163) where the heads had all been coarsely cut off to a similar length, possibly done where the nail was too long for the timber and excess was cut off. These nails are the only steel nails from the entire assemblage, and are in good condition with little fabric decay. They have been dated from c.1875 when steel nails were first imported into Australia, however common usage in Australia was closer to late 1880's/c.1890 when steel nails became cheaper, more widely available, and most people had transitioned from iron to steel nails.[11] The nails would have been used in later renovations or repairs in the later period of occupation of Langford's House, prior to its demolition in the 1880s. The only other metal artefacts from context (126) are one copper alloy hand forged nail (#2165), and one heavily encrusted possible nail (#2164), neither of which provide a date range.

Context (109) was a possible occupation deposit related to the occupation of Langford's House. A total of 104 MIC (22 fragments) were recovered across categories: transport, household, architectural, household/transport and a single unidentified object (Table 2.1). Seventy-five items out of the 104 recovered were wire-drawn square copper alloy nails, providing a date of c.1835 (Figure 3.7). These are primarily whole, vary in size, with low to moderate fabric decay and encrustation. Only two architectural iron nails were identified (#2130, #2131). Also identified were six copper alloy roves. A rove is a small metal plate

[11] Varman 1993, p. 167

with a central hole used to clench the point of a nail, primarily in shipbuilding (Figure 3.7).[12] These along with the high proportion of copper alloy nails, indicates that items associated with shipbuilding were brought into the building over a period of time due to day-to-day activities, not because they were related to construction. Larger types of boat nails, spikes, and bolts were also necessary in boat building and transport activities, though shorter nails and tacks would be easier to misplace and make their way into the occupation deposit, hence the prevalence of shorter nails and nail types. One fragment of copper alloy sheathing (#2132) was identified either for use as sheathing on a vessel or decoratively on furniture.

Figure 3.7: Metal transport nails and roves from (109) (l-r). Top row: chisel point nails #2123 (5), Rose head wire drawn nails #2122 (6). Second row: boat spikes #2126, #2125. Third row: Rose head nails with blunt point #2113 (12), three nails #2111. Fourth row: three tacks #2100, three tacks #2101, screw #2102, sheathing tack #2105 (top), nail #2103 (bottom). Bottom row: diamond-shaped rove #2129, four diamond roves from the same strip #2127, small diamond rove #2128. 100mm scale. IMG_3031. Russell Workman.

[12] Varman 1993, p. 192

Context (124) was another occupation deposit that contained 32 MIC, with similar artefacts to deposit (109). Multiple architectural items were present including lead roof flashing (#2141) and a lead offcut (#2142). These would have been used to seal the edges and joins of roofs to waterproof any exposed seams particularly for slate roofs. The deposit contained one household item, a fragmentary copper alloy container lid (#2139), and 15 MIC of household/transport copper alloy nails and tacks. The nails were all WD sq apart from a single cut brad nail (#2146), which dates from c.1805 onwards. Cut brad nails are stamped out from a sheet of metal, with the head and point formed in the one motion. Brad nails are designed so that the head sinks down into the material creating a flush surface. These are often used on floors when iron, or window or door frames were made from copper alloy, as this one is. Additionally, another 9 WD sq transport nails were identified, that date from c.1835 and a single HF nail. A single square rove (#2144) with a countersunk nail hole was the only other transport item in the context.

Figure 3.8: Copper alloy household/transport and transport nails from context 124. (l-r) Top row: WD sq nails #2149 and #2148, Cut Brad nail #2146, WD sq nails #2150. Second row: small tacks #2160, HF nail #2147, Wd sq nails #2162 and #2154. Bottom row: WD sq nails and tacks #2153, #2161, #2159, #2158. 100mm scale. IMG_5438. R. Workman.

Context (108) (Phase 5.1) was the demolition material of Langford's House. It contains seven MIC and one fragment (Table 2.1). Six of the seven items are copper alloy nail/tacks that have mostly been identified with a general function of household/transport, for use in furniture or fittings. As all are copper alloy, and due to their small size, it is unlikely that they were directly related to the house construction. Out of the six nails recovered, four copper alloy wire-drawn square nails were identified providing a date of c.1835. The only other metal item was a fragment of copper alloy sheathing (#2098) (Figure 3.8). Copper or copper alloy sheets were used in shipbuilding, fastened onto the hull of the vessel throughout the 18th and 19th century in Britain and America, to reduce damage from ship worm.[13]

Figure 3.9: Sheathing and sheathing nails from (108). Left side: sheathing #2098. (l-r) Top row: tacks #2093, #2092. Second row: WD sq tacks #2094, #2095. Bottom row: WD sq nails #2096, #2097. 100mm scale. IMG_5430. Russell Workman.

[13] Staniforth 1985, pp. 21-31

3.5 AREA Y

Area Y was located to the north of Area X (Figure 1.1). It contained several phases of construction that followed the natural sloping topography of the site, including sandstone walls, the back portion of Cuthbert's sawshed (pre-1865), retaining walls, and possible machine foundations. Area Y had 21 MIC (five fragments), making up 7% of the total site assemblage (Table 2.2). Only two of these are from fill contexts, all other items are from clean-up context numbers (164, 165). Thirteen MIC (one fragment) of the metal artefact related to transport, with few other architectural, food, household, and unidentified items (Table 3.4).

Table 3.4: Summary of general and specific functions of metal artefacts from Area Y

General function	Specific function	Shape	MIC	Fragments
architectural	roof	sheet/sheathing	1	1
	structural	nail	1	0
food	container	can	1	0
household/architectural	unidentified	unidentified	1	1
transport	horse	horseshoe	1	0
	vessel	bolt	1	1
		screw	1	0
	vessel hull	nail	3	0
		nail/tack	1	0
		sheathing nail	5	0
		sheathing tack	1	0
unidentified	unidentified	strap	1	0
		strip	1	0
		unidentified	2	2
		TOTAL	21	5

CUTHBERT'S SAWSHED (PHASE 4)

Context (184) is a construction fill associated with Cuthbert's sawshed (1850-1860's). The context contained only one metal artefact, a horseshoe (#2211). This is the only horseshoe recovered from the entire site.

Context (174) is the fill or use accumulation associated with a sandstone-constructed machine-base (173) in Cuthbert's sawshed (c.1860s-c.1880s). It contains one architectural iron nail (#2210), which was unable to be typed.

All other artefacts from Area Y have been recovered from clean-up contexts, (164, 165), and are a mix of architectural and transport nails, sheathing, and fragments of unidentified function (Table 3.4).

3.6 AREA Z

Area Z was the northern most area (Figure 1.1). A 20th-century sandstone and brick building with multiple phases was identified, disturbed by large modern services, and a cistern (context 206) cut into bedrock. The area contained 33 MIC and 36 fragments (12% of metal from the total site), the majority of which came from the three fills within cistern (206) (Table 2.1). This area had the greatest variety of general functions identified, 11 general functions, including food, yard, and work, which had not been identified in other

areas (Table 2.3). Twelve MIC were of unidentified function. Only two MIC were identified as transport related items, contrary to other areas where transport items dominated the assemblage (Table 3.5). The location of the area to the north away from the waterfront and closer to housing, explains the variety of functions including food and yard that were not seen in other areas, as well as the lack of transport items.

Table 3.5: Summary of general and specific functions of metal artefacts from Area Z

General function	Specific function	Shape	MIC	Fragments
architectural	door	hinge	1	0
	roof	washer	1	0
	structural	bolt	2	2
		bolt & nut	1	1
		nail	2	2
		nail/spike	1	0
architectural /transport	vessel/fitting/unidentified	eyebolt	1	1
food	cooking	pot/cauldron	1	1
household		pan	1	1
household/transport	unidentified	ring	1	0
service	gas	pipe	1	1
store	store	barrel hoop	3	6
		lid/seal	1	2
transport	vessel hull	sheathing nail	2	0
unidentified	container	pail	4	3
		unidentified	1	1
	unidentified	bar	1	1
		ring	1	0
		strip	1	1
		unidentified	3	4
		wire	1	1
work	tool	file	1	1
yard	tool	spade	1	7
		TOTAL	33	36

CISTERN (PHASE 3.2)

Context (206) was a cistern cut into bedrock that is possibly associated with a pre-1860s house on Wentworth Street (Figure 3.9). The cut contained fills (207, 208, 215). Of the 33 MIC and 36 fragments of metal artefacts from Area Z, 26 MIC (30 fragments) were from contexts within the cistern (Table 2.1). Of these artefacts only four MIC and one fragment are made from copper alloy, all others are iron or tinned material. The copper alloy items have low to moderate encrustation and fabric decay. The tinned items also have low to moderate fabric decay and encrustation. Almost all iron material from within the cistern has moderate to very high fabric decay and encrustation. Only two copper alloy sheathing nails remain whole, all other items are partial or fragmentary.

Figure 3.10: Cistern (206) cut into bedrock (199) shelf, to the north of the bedrock cut (231) and structure (196). View to south, 1m scale. DSC_4081.

Context (207) is the top and latest fill within the cistern (Phase 5.1). It contained two MIC (two fragments), two architectural iron nails, however due to the poor condition no type or date range can be given.

Context (208) is the middle fill of the cistern (Phase 5.1) and contained four MIC (four fragments). One hand-forged iron spike provides a date range of 1788-c.1950. One copper alloy wire-drawn square nail is datable from c.1835. Therefore, a date range of c.1835-c.1950 can be given to this context.

Context (215) is the lowest fill and earliest context (Phase 4) within the cistern (206) (Phase 3.2). It contained 20 MIC and 24 fragments (Figure 3.10). This context contained some of the largest items across the site, including multiple pails, a spade head, a pan, and a cauldron. The context was also the most indicative of household activities and contains the only cooking and food prep items found across the whole site. The presence of these large and partial items suggest that the fills were opportunistic dumps to discard of unused items. The pails (#2223, #2224, #2225, #2227), and pan (#2228) are noteworthy (Figure 3.10). These items could have possibly been used to collect water from the cistern, otherwise used inside the household, i.e., in the kitchen for food prep or cooking, or in the yard. A partial cauldron (#2229) was identified and would have been used for preparing food over an open hearth (Figure 3.11, Figure 3.12). An iron spade with a wooden handle (#2239) was identified as the only item associated with yard activities from the Barangaroo Station site, and one of only three tools (the others being one unidentified tool, and one file).

Figure 3.11: Metal artefacts from (215) (l-r). Top row: iron pail with flared rim #2227, iron pail with 4 rivets #2223, large iron pail with bent wire handle #2224, iron pail with rolled rim #2225. Bottom row: curved pan fragment #2228. 100mm scale. IMG_3030. Russell Workman.

Figure 3.12: Example of cast iron cooking pot/cauldron, showing, tripod legs, external horizontal ribbing, and handles for hanging.[14]

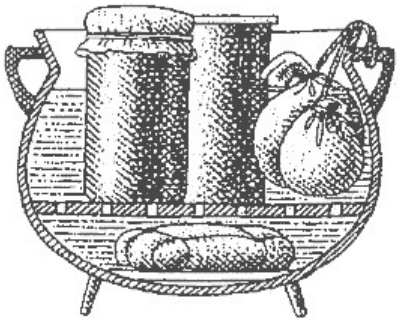

Figure 3.13: Example of use of cast iron cooking pot/cauldron, where an entire meal could be cooked in the one pot; meat and vegetables could be wrapped in linen or placed in earthenware jars, then suspended in water and placed over the open hearth.[15]

[14] Seymour 1987, p. 217

[15] Seymour 1987, p. 212

4.0 UDHB1 – BARANGAROO BOAT (140) METAL CONTEXTS

4.1 ASSEMBLAGE OVERVIEW

A total of 68 MIC items (46 fragments) were recovered from the Barangaroo boat (UDHB1) and related contexts in Area X. The archaeological contexts associated with the boat (140) that contained metal artefacts are listed below (Table 4.1). The two largest metal assemblages were from the mixed sediment (249) below the boat and the boat itself (140). The remaining contexts above and around the boat contained very few metal artefacts. The boat metal assemblage will be discussed based on the relationship of each context to the boat (Table 4.1).

Table 4.1: Boat (140) contexts containing metal artefacts

Context	Context Description	MIC	Fragments
132	Yellow intertidal sands overlying the wreck, observed above the high tide line. These sands were overlying the vessel as well as accumulating against the sides of the vessel and Langford's wharf wall 145.	1	1
133	Grey intertidal sands overlying the wreck, observed below the tide line. These sands were deposited over and around the vessel and built up against Langford's wharf wall 145.	5	1
140	Timber wreck (UDHB1).	16	12
142	Grey sand with organic lenses of silty material from within wreck and around loose timbers.	1	1
148	Loose timbers removed from above the wreck.	1	2
149	Grey sand with organic lenses of silty material, observed within and around the wreck and partially beneath the hull of the vessel. Interpreted as runoff deposit from historic termination of Clyde Street (pre-1900 termination), p.re and post-dating the wreck deposition. Same as 249.	6	5
151	Possibly disturbed or contaminated bilge deposits between hull & ceiling planks at outside of stern.	1	0
152	10-15mm thick layer of grey silty clay overlying ceiling planks of the wreck at midship.	2	2
153	10-15mm thick layer of grey silty clay overlying ceiling planks of the wreck at bow.	1	1
154	Possibly disturbed or contaminated bilge deposits between hull & ceiling planks at outside of midship.	5	5
158	Secure central bilge deposit between hull & ceiling planks at midship.	1	1
246	Thin dark silty deposit observed beneath frames and above the hull in the wreck.	1	0
249	Interface between deposit 149 and natural beach sands 134, observed beneath wreck. Same as 149.	27	20
	TOTAL	68	46

Transport (26 MIC), architecture (19 MIC) and unidentified (12 MIC) were the most frequently identified functions of the metal items associated with the boat (Table 4.2). The boat metal assemblage predominantly consisted of fastenings (i.e. nails, tacks, screws, bolts, roves) of varying functions and fabrics. Transport had the largest number of items and the largest variety of shapes, although the most common overall shape was architectural structural nails (11 MIC).

Table 4.2: General functions of the boat metal assemblage

General Function	MIC	Fragments
architecture	19	20
architecture/household	2	2
architecture/transport	3	0
household	1	0
household/industrial	3	3
household/transport	2	2
store	1	1
transport	26	7
unidentified	11	11
TOTAL	68	46

4.2 METAL ATTACHED TO THE BOAT ELEMENTS

Sixteen metal items were removed from the timber elements of the boat (140) during cleaning and conservation by Silentworld. Each artefact removed was given an individual sample number based on the element they were from. The samples numbers and functions of the 16 metal items from the boat are compiled in Table 4.3. These artefacts were presumably used in the construction or repair of UDHB1, although it is possible they became attached to the boat post deposition.

Table 4.3: Metal artefact samples from the boat (140) by element number and function

Element/ Sample number	General Function	Specific Function	Shape	MIC	Fragments
304/2	transport	vessel	tack	1	0
311/2	architecture	structural	strap	1	2
311/4	architecture	structural	strap	1	1
506/1	transport	vessel	tack	1	0
506/2	transport	vessel	tack	4	1
514/2	transport	vessel	nail	1	1
515	transport	vessel	tingle	1	0
516	transport	vessel	tingle	1	0
539/1	transport	vessel	tack	1	1
539/3	unidentified	unidentified	unidentified	1	3
601	transport	vessel	tingle	1	1
-	transport	unidentified	unidentified	1	1
-	unidentified	unidentified	unidentified	1	1
			TOTAL	16	12

Twelve of the metal items recovered from the boat were identified as transport, including seven tacks, three tingles, an iron nail (#2251) and an unidentified item (#2246). The tacks were all copper alloy with irregular square section shanks. In comparison with the machine produced wire-drawn nails from the rest of the Barangaroo Station site, the transport tacks from the boat appear hand-made. The three lead tingles (#2248, #2249 & #2256) were found in-situ during cleaning of the individual boat elements (140) and were each given their own element number. A tingle is a repair patch nailed or screwed to the timber hull

of a boat to stop leaks or cover damaged areas.[16] The recovered tingles have a step-down from where they were shaped around the overlapped hull timbers and contained several fastening holes for attachment. The iron nail (#2251) was removed from a fastening hole on Element (514), supporting the occasional use of regular iron nails in boat-building. Staining and encrustation on one of the leads tingles (#2249) suggested it was possibly also fastened with iron nails instead of copper alloy. The unidentified transport item (#2246) was a highly concreted iron lump attached to two of the timber boat elements.

The remaining metal artefacts recovered from the boat itself included two architectural iron straps (#2257 & 2258) and two unidentified copper alloy items (#2244 & #2259). The function of most of these items on the boat is unclear.

4.3 METAL FROM CONTEXTS INSIDE THE BOAT

A total of thirteen metal artefacts were recovered from eight contexts within the boat (Table 4.4). Each context contained only one or two items, except for one of the disturbed bilge deposits between the ceiling planks and the hull (154).

Table 4.4: Items from inside UDHB1

General Function	Specific Function	Shape	Items	Fragments
architecture	non-structural	tack	1	1
	structural	nail	4	3
	structural/non-structural	nail	2	3
household/industrial	by-product	slag	2	2
household/trans	furniture/fitting/vessel-superstructure	tack	1	1
transport	vessel-superstructure	nail	1	0
unidentified	unidentified	bolt/spike	1	1
		unidentified	1	1
		TOTAL	13	12

Only one metal transport item was included in this assemblage; a copper alloy vessel-superstructure nail (#2012) from a disturbed bilge deposit (151) between the hull and ceiling planks. This was the only item recovered from this deposit and was probably used to secure the ceiling planks or other interior attachments within the vessel. The other disturbed bilge deposit (154) within the boat contained an architectural tack, (#2016), two architectural iron nails (#2017 & #2018), a lump of slag (#2020) and a household or transport tack (#2019). One of the nails was identified as hand-forged (1788-c.1890). The secure bilge deposit (158) at the centre of midship contained only one item, a piece of slag (#2022).

The remaining items from the assemblage consisted of four architectural nails, a bolt or spike (152/#2014) and an unidentified iron item (142/#2006). None of the fastenings were able to be properly identified due to high fabric degradation. A single architectural iron nail (#2247) was removed from loose timber (148) Element (089) within the boat. The remaining nails were recovered from the silty deposit (246) between the frames and hull, and from the thin silty layer (152 & 153) above the ceiling planks. The bolt or spike was also recovered from the fill above the ceiling planks and was in a similar state of degradation to

[16] State Forests of New South Wales, https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/390299/Timber-in-Boatbuilding.pdf

the nails. The unidentified iron item latch or tool (#2006) was sitting in the fill (142) around the loose timbers and possibly was once attached to one of these elements or discarded amongst them.

4.4 METAL FROM CONTEXTS AROUND THE BOAT

Thirty-three metal items were recovered from the two mixed sand deposits (149, 249) that accumulated outside and below the boat (Table 4.5, Figure 4.1). The upper deposit (149), including runoff from the termination of Clyde Street, contained 6 metal artefacts. The lower deposit (249) that acted as an interface between (149) and the natural beach sands (134) contained the majority of the artefacts with 27 items recovered from this context.

Table 4.5: Metal artefacts recovered from contexts outside of the boat

General Function	Specific Function	Shape	Items	Fragments
architecture	structural	nail	7	7
	structural/non-structural	nail	1	1
architecture/ household	non-structural	nail/tack	2	2
architecture/ transport	structural/v fitting	bolt	1	0
		screw	1	0
	vessel/fitting/unidentified	nail	1	0
household	non-structural	nail	1	0
household/ industrial	by-product	slag	1	1
household/ transport	furniture/fitting/vessel-superstructure	nail	1	1
store	store	barrel hoop	1	1
transport	vessel	strap	1	1
	vessel-hull	nail	3	0
		sheathing nail	2	0
		sheathing tack	2	0
	vessel-superstructure	rove	1	1
		tack	1	0
unidentified	unidentified	disc	1	1
		offcut	1	1
		ring	1	0
		unidentified	2	2
		wire	1	1
		TOTAL	33	20

Figure 4.1: Artefacts from UDBH1 related contexts (l-r). Top: unidentified tin disc 249/#2188. Second row: sheathing nail 151/#2012, unidentified ring 149/#2011, strap 249/#2182, nail 249/#2181, screw 249/#2168, nail 249/#2167, sheathing tack 133/#2002, nail 133/#2003. Third row: sheathing tack 149/#2003, rove 149/#2009, bent nail 249/#2172, sheathing nails 249/#2177, 249/#2173, 249/#2476, HF iron nail 132#2245. Bottom: tube 133/#2004. 100mm scale. IMG_5448. Russell Workman.

Transport (10 MIC) and architectural (8 MIC) items were the most common from the contexts outside of the boat. Most of the items identified as transport were copper alloy fasteners specifically used in boat building. Five transport sheathing nails and tacks were identified as wire-drawn, dated from c.1835 onwards. The presence of these nails and tacks beneath the boat demonstrates a high level of mixing in the deposits around the abandoned vessel. A copper alloy nail possibly made using Cut Wrought production techniques (c.1815 to c.1870) was also recovered from the fill (249) beneath UDHB1,

although this nail possibly predated the proposed abandonment of the boat in the 1830s-1840s. Most of the fastenings are unlikely to be from UDHB1, suggesting instead that they were discarded from the general activities that occurred in the area.

The architectural items from the contexts around UDHB1 included seven iron structural nails and one structural or non-structural nail (#2174). The structural or non-structural nail was the only one typed as hand-forged (1788-c.1890). One of the nails (#2187) was encrusted to a piece of slate of a type which was first used in Australia from c.1840. The encrustation of these two items probably occurred post submersion, suggesting the date is not reflective of the nails deposition.

The rest of the assemblage from outside of the boat consisted predominantly of fastenings, representing a variety of functions, along with several unidentified items. One copper alloy nail (#2010) was classified as household or transport, possibly used for domestic furnishings or in the construction of boat superstructures. Three of the nails or tacks that served an architectural or household function were identified as Hand-Forged, dated between c.1788 and c.1890. This nail type is most commonly used before 1850, and were probably from the construction of the wharfs and ship-building sheds along the shoreline.[17] The only other typed fastening was a slot headed screw (#2168) from the mixed deposit below the boat (249). Six items were not properly identified due to considerable encrustation or degradation from the depositional conditions. The only other items of note from contexts outside the boat was a lump of slag (#2021), a tin disc with nail holes (#2188) and an iron barrel hoop fragment (#2192).

4.5 METAL FROM CONTEXTS COVERING THE BOAT

A total of six metal artefacts were recovered from the two intertidal sands (132 & 133) that covered the boat (Table 4.6). A single hand-forged iron architecture or transport nail (#2245), dated from 1788 to c.1890, was recovered during cleaning & conservation of the boat timbers. Although originally thought to be from boat Element (458), the item was actually from the high tidal sand (132) above the boat. The remaining five artefacts were recovered from the low tidal sands (133). Three of the items were identified as copper alloy transport fastenings, with one typed as a wire-drawn square (#2002), dated from c.1835.[18] The other copper alloy nails and tacks were also square sectioned, although appeared to be hand wrought. The other two items were an unidentified metal tube (#2004) (Figure 4.1), possibly made from zinc, and a heavily encrusted and degraded iron architectural tube (#2005).

Table 4.6: Items from contexts covering UDHB1

General Function	Specific Function	Shape	Items	Fragments
architecture	structural	tube	1	1
architecture/ transport	unidentified	nail	1	1
transport	vessel-hull	nail	1	0
		sheathing tack	1	0
	vessel-superstructure	tack	1	0
unidentified	unidentified	tube	1	0
		TOTAL	6	2

[17] Varman 1993: 146-147,181-182.

[18] Hebert 1836, pp. 187-188.

5.0 REPORT SUMMARY & RESULTS

The metal artefacts from the Barangaroo Station site are particularly indicative of maritime transport related activities. The majority of artefacts were copper alloy wire-drawn nails (c.1835) identified throughout multiple phases and areas across the site. These nails would have been required for use in maritime transport/shipbuilding activities. Other artefacts associated with shipbuilding activities were relatively sparse, however, some were still present including: copper alloy sheathing nails, copper alloy sheathing, and a few roves. The dominance of maritime transport and shipbuilding related artefacts at the Barangaroo Station site reflects the increased demand and localisation of the shipbuilding industry, and increased demand for coastal shipping throughout the 19th century. Contexts relating to Langford's House have the highest frequency of metal artefacts, and in particular demonstrate the types of shipbuilding fastenings recovered. Many of the copper alloy wire-drawn nails appear unused, and likely would not be reused due to the softness of the material. Furthermore, the occurrence of copper alloy sheathing nails, and few fragments of copper alloy sheathing are reflective of the increasing interest of copper sheathing to safeguard the hull of ships, a method that had been experimented with throughout the 18th and 19th centuries, but became truly successful with the replacement of iron fastenings with copper alloy fastenings.[19] However, the fragments of sheathing are very small and few.

Understanding consumption patterns outside of shipbuilding activities is more limited. Architectural items were the second most dominant function of artefact found. These were predominately identified for structural use, however were not consistently associated with specific structures on site. Given the minimal variety of types of iron nails, with only few examples of cut or machine wrought nails, little understanding of changing construction technologies can be identified. Furthermore, rare storage, household or food related metal artefacts were identified. The majority of which came from later occupation of the site, within Area Z. Aside from the cistern (206), no cesspits or rubbish dumps were identified which are typically the types of deposits that potentially indicates these themes.

The boat metal assemblage reflected a similar pattern to the rest of the metal assemblage from Barangaroo Station, with transport fastenings dominant. The transport nails & tacks from the boat appeared mostly hand-made, contrasting the machine-made wire-drawn nails frequent throughout the rest of the Barangaroo metal assemblage. This is reflective of the change in available ship-building technology and materials that began just after the abandonment of UDHB1. The other artefacts recovered from around the boat were architectural or household items carried in by run-off or intertidal events. These items provided limited information on local activities, primarily due to their high levels of degradation from submersion in a saline environment.

[19] Staniforth 1985, pp. 21-31

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

BUILDING MATERIALS REPORT

MARCH 2022

VOLUME 3, SECTION 3.9

A fragment of extruded pressed terracotta balustrade excavated from Barangaroo Station

FINAL REPORT | Report to **Sydney Metro**

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Report Status	Date Submitted	Purpose	Author	Reviewed
Draft Version 1	26.06.20	Internal Draft	Dr G.P. Marriner	Mike Hincks Holly Winter
Draft Version 2	07/07/21	Internal Draft	Dr G.P. Marriner	Holly Winter
Final Report	02.03.22	Final report	Dr G.P. Marriner	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

BUILDING MATERIALS REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

This report presents the results from the analysis of artefacts excavated by Casey & Lowe between July and December 2018 that relate to the construction, finishing and servicing of buildings at the Barangaroo Station Site, Sydney. For excavation and recording purposes the site was divided into six areas: Area R, Area T, Area W, Area X, Area Y and Area Z (Figure 1.1). Building materials were catalogued by Dr Gary Marriner, Senior Archaeologist, Casey & Lowe, who also wrote this report. All artefacts were added to a specially designed database in Heurist developed for Casey & Lowe, with each item assigned a three-step functional category. The brief historical timeline in Section 2.0 is based upon the historical background provided in Volume 1 of the Main Report. In addition, a brief study of historic plans and photographs was undertaken to examine structures on the site.

This report contains a brief historic timeline of the site (Section 2.0), followed by an examination of historic plans and records in Section 3.0. Section 4.0 consists of a description of the key types of building materials (BM) catalogued, and their historic context. Following this, an in-depth examination of the material is presented on an area-by-area basis (Section 5.0). Where no structures were discovered, or where the artefacts cannot be conclusively assigned to a structure, they are presented on a context specific or an area wide basis. The final section of this report (Section 6.0) discusses general trends that emerged as a result of the BM analysis. When discussing individual BM artefacts within the text they are identified by their context and catalogue number (e.g. 123/#15123). BM samples from specific contexts were also collected in the field and are noted when mentioned.

1.2 SITE LOCATION

The site is located in Barangaroo, an inner-city suburb of Sydney, the oldest British settlement in Australia and part of the territory of the Gadigal of the Eora Nation. Barangaroo is in the northwest of the Sydney CBD, on the western side of Millers Point with a coastline facing Darling Harbour. The area was utilised for maritime activities by the Aboriginal population prior to 1788 and by British from the 1820s onwards with various wharfs, seawalls and associated commercial and residential properties being erected and utilised from then on. Within Barangaroo the site is located within and to the west of Hickson Road which was removed as part of the excavations (Figure 1.1).

Figure 1.1: Location plan showing the site outlined in red with the excavation areas shaded. Google Maps 2019.

2.0 BRIEF HISTORICAL TIMELINE & SITE PHASING

2.1 TIMELINE

This timeline is summarised from the preliminary report prepared following the cessation of excavations at the site (Table 2.1).[1] The archaeological phases identified are summarised in Table 2.2.

Table 2.1: Historic Timeline

Date	Historic Event
1822	Harper's 1822 plan shows land grants made to Munn, Spark and Bryce but no buildings on this part of Darling Harbour.
1831	Terry Hughes acquires two neighbouring parcels of land, south of Bryce's grant and at the southern end of our study area.
c.1832	Arthur Martin and James Munn allegedly granted same parcel of land, Martin takes Munn to court and wins the case. Part of the land remains with Munn and part is awarded to Martin
1833	Alexander Brodie Spark sells his land to Frederick Wright Unwin in 1832 who in turn, sells the package to William Langford in 1833. Martin sells his land to Unwin. Langford's House first appears on 1833 City of Sydney Survey plan.
1840	Bryce is formally granted his land, although he appears to have occupied it before this.
1846	Plans show Hughes quarrying on his land.
1853	Hughes conveys his land to Henry Osborne and Bryce sells his land to James O'Neil.
1855	Sydney City Council Detail Survey plan shows a boatshed to the south of Langford's House.
1858	Munn's land is auctioned following his death and purchased by shipbuilder John Cuthbert. Osborne applies to reclaim land in the same year and builds a wharf on the harbour side of his property, including a seawall.
1859	Thomas Langford, brother of William Langford (junior) and son of William Langford, purchases a half share of the property.
1860s	Cuthbert constructs a slipway, wharfage and extends his land by reclamation into Darling Harbour. This included a dock.
1864	Langford is formally granted a parcel of land. An 1864 survey shows that he has already completed a house and boatshed on the grant.
1865	1865 Trigonometrical Survey Plan shows that Langford's wharf, marked on an 1855 plan, is no longer present. More structures are visible on his property. Cuthbert's saw shed is now also visible, orientated along the north-western side of Clyde Street.
1875	Osborne sells his land to Archibald McLean and O'Neil's land is sold at auction. The advertisement for O'Neil's auction does not mention buildings on the land. Five people purchase the land.
1876	Cuthbert dies in 1874 and his land, including cottages, sawmill, large workshops, sheds, stores and sail lofts is purchased by George Dibbs in 1876, who transfers it to Thomas Allwright Dibbs in 1876.
1877	Dibbs purchases what was formally O'Neil's land. He also extends jetties into Darling Harbour in and a Proposed Reclamations plan shows planned extension to Clyde Street and a provision for public jetty and landing steps at the termination of the street. This provision includes a Clyde Street waterway.
1879	A grant of reclaimed land is made to Dibbs.
1881	Dibbs purchased the Langford land following the death of the Langford sons, Thomas Langford in 1880 and William Langford in 1881.
1884	Dibbs is issued with a new Certificate of Title, including the land granted to Cuthbert, Martin and Munn

[1] Casey & Lowe 2018, *Sydney Metro City & Southwest – TSE Works Barangaroo Station SSI 15_7400 Preliminary Report,* report to John Holland CPB Ghella JV

Date	Historic Event
1900	Resumption plans show Dibbs' ownership extending from the north to the south of Clyde Street. Langford House and Boatshed have been demolished and Clyde Street extends to the water where a set of stairs are marked at the base.
1901	Darling Harbour foreshore land resumed by the Minister for Public Works.
1909	Construction of Hickson Road commenced in 1909, reshaping the topography of the area and resulting in a number of demolitions.
1913	Land leased to Dalgety and Co Ltd and finger wharf construction begun. Historic photos show the modernisation and rat-proofing of the wharves.
1960s	Existing finger wharves were infilled, creating a container terminal.
2006 to present	Container terminal shutdown and redevelopment of Barangaroo foreshore commenced.

Table 2.2: Summary of the Archaeological Phases identified for the Barangaroo site

Phase	Date	Description
1	-	Natural Landscape
2	-	Aboriginal Occupation
3	1788-1855	Early British Occupation
3.1	1788-1833	Early Grant Holders
3.2	1833-1855	Langford's House and Wharf
4	1855-1875	Shipbuilding and Wharfage, Cuthbert, and Osborne's Wharf
5	1875-1900	Commercial Wharves and Stores Expansion, Dibbs
5.1	1875-1890	Dibbs' Redevelopment of the Wharf, 1875-1890
5.2	1890-1900	Structural Modifications and Government Involvement, 1890-1900
6	1900-1960	Government Resumption of Land – Hickson Road, 20th-Century Stores and Finger Wharves
7	1960-2006	Containerisation and Hickson Road

3.0 EXAMINATION OF THE VISUAL HISTORY

3.1 BACKGROUND

The following is in part based upon the history section written for the Archaeological Method Statement produced by Casey & Lowe for Barangaroo Station.[2] Examinations of the visual history are focused primarily on the excavation area only.

3.2 HISTORIC PHOTOGRAPHS AND DRAWINGS

Of the historic images that exist for the study area, two provide a good level of detail regarding the buildings present in the study area during the later-19th century. Further, an undated painting shows good detail of the earlier 19th-century landscape. Broader historical discussion including photographs and drawings is contained in the AMS.

Figure 3.1 is an undated and unsigned painting of Miller's point that must have been done sometime after 1833 as Langford's House features prominently. The painting shows the main house as a two storey structure built from stone on substantial stilts with an open space beneath. Two brick built chimneys are constructed on the side of the house which features a hip roof coloured grey which could be slate or metal sheeting. The rest of the study area is shown as being undeveloped.

Figure 3.1: 'Miller's Pt.'. Watercolour. Unsigned (attributed to 'S.Elyard'). Undated. Views of Sydney, 1862-1873. SLNSW, DGD 5, IE650340. File No. FL650451

[2] Casey & Lowe 2017

Figure 3.2 is an extract from a panoramic photograph taken from Pyrmont, looking over at Darling Harbour in the early 1870s. It shows multiple buildings in the study area, many of which are identifiable on the 1875 plan discussed below. The leftmost building in the image isn't specifically shown on the 1875 plan but is indicated to be part of Cuthbert's Shipyard. It is a weatherboard structure built on stilts with a possible metal gable roof. Next to right are a collection of small buildings that are likely workshops which are obscured by the mast. They also appear to be stilted weatherboard structures. The large white building in the centre of the image is shown on the 1875 plan as being Cuthbert's sawshed with a jetty extending westward into Darling Harbour. The shed is partially suspended on stilts, with stonework on the corners providing greater strength. It appears to be built of weatherboard with regular sash windows spaced along its external walls, and a complex hip roof with small dormers. The roof again appears to be metal.

The rightmost building in the photograph corresponds to Langford's boatshed. It is constructed immediately atop the seawall and is built of weatherboard with a gable metal roof. Based on the image it appears to be built on piles set into rubble which indicates that the construction reclaimed a small amount of land in its immediate vicinity. Behind the sawshed and boatshed, Langford's House is partially visible. It appears to be built of stone with gable windows and a hip roof which has a single dormer window facing northwards.

Figure 3.2: Close up of the study area taken from a c.1870-1875 photograph. Looking across Darling Harbour to Observatory Hill, Sydney, 1870-1875. Digital no: a2825069, State Library of NSW, http://acms.sl.nsw.gov.au/_Zoomify/2011/D13950/a2825069.html

Figure 3.3 shows the study area from the south in January 1871. Cuthbert's sawshed is clearly visible and shows it as a weatherboard structure atop a sandstone foundation. The area in front of Langford's House has a different configuration to Figure 3.2. Instead of a single large boatshed, two smaller, seemingly poorly built structures are in its place. These are both made of weatherboard in a configuration more akin to the 1865 plan (Figure 3.6). This indicates that this photograph is earlier than Figure 3.2. More of Langford's House is visible in this image. Here it is identifiable as a two-storey stone house with a metal roof. Two chimneys are present attached to the southern wall.

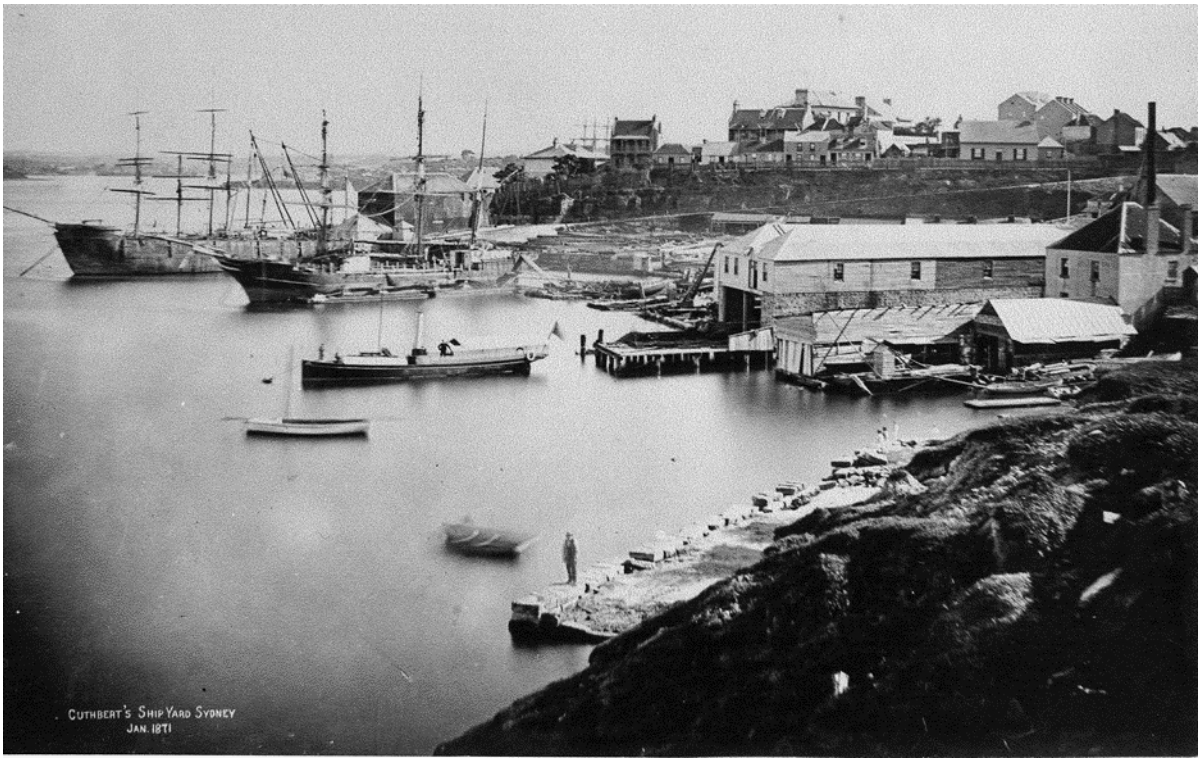

Figure 3.3: Cuthbert's shipyard in January 1871. ML, Small Picture File – Sydney – Harbour and Islands - Millers Point.

3.3 HISTORIC MAPS & PLANS

The first visual record of construction within the excavation area comes from the Sydney Section maps produced in the 1830s. Section 92 of this series indicates that multiple buildings had been erected on an allotment belonging to Alexander Brodie Spark (Figure 3.4) by this time. On his allotment within the excavation area is a square building that sits at the highwater mark which is likely to be Langford's House. None of the other surrounding land grants had buildings within the excavation area at this time. The plan provides no detail as to the construction materials or purpose of this square structure

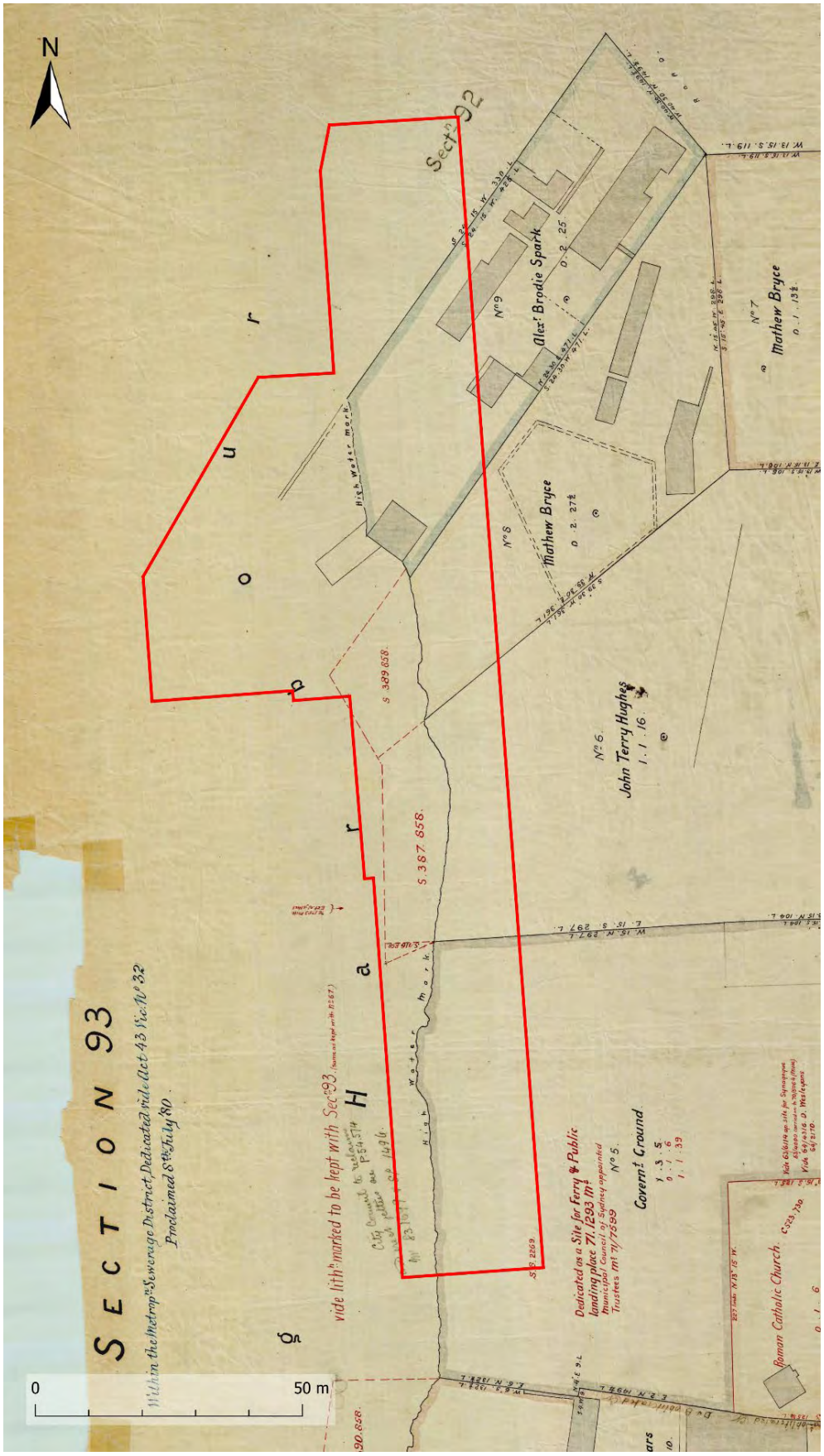

Figure 3.4: 1833 plan showing the study area and grants belonging to Spark, and others that shows the first construction within the excavation area. Section 93, c.1833, City of Sydney Survey Plans, Historical Atlas of Sydney, City of Sydney Archives.

The 1855 Sydney City Council Detail Survey map shows the construction of multiple new structures across the excavation area and the formalisation of Clyde Street in Area Y with the construction of semi-regular buildings along it, and of Wentworth Street in the very northern end of Area Z. Additionally, Langford's wharf is shown in Areas W, X and R (Figure 3.5). All main structures are shaded blue on the plan indicating that they are built in stone. The exception to this is a rectangular building on Langford's wharf which is shaded yellow indicating wood. The rectangular building shown on the 1833 plan remains and is shown as also being built from stone.

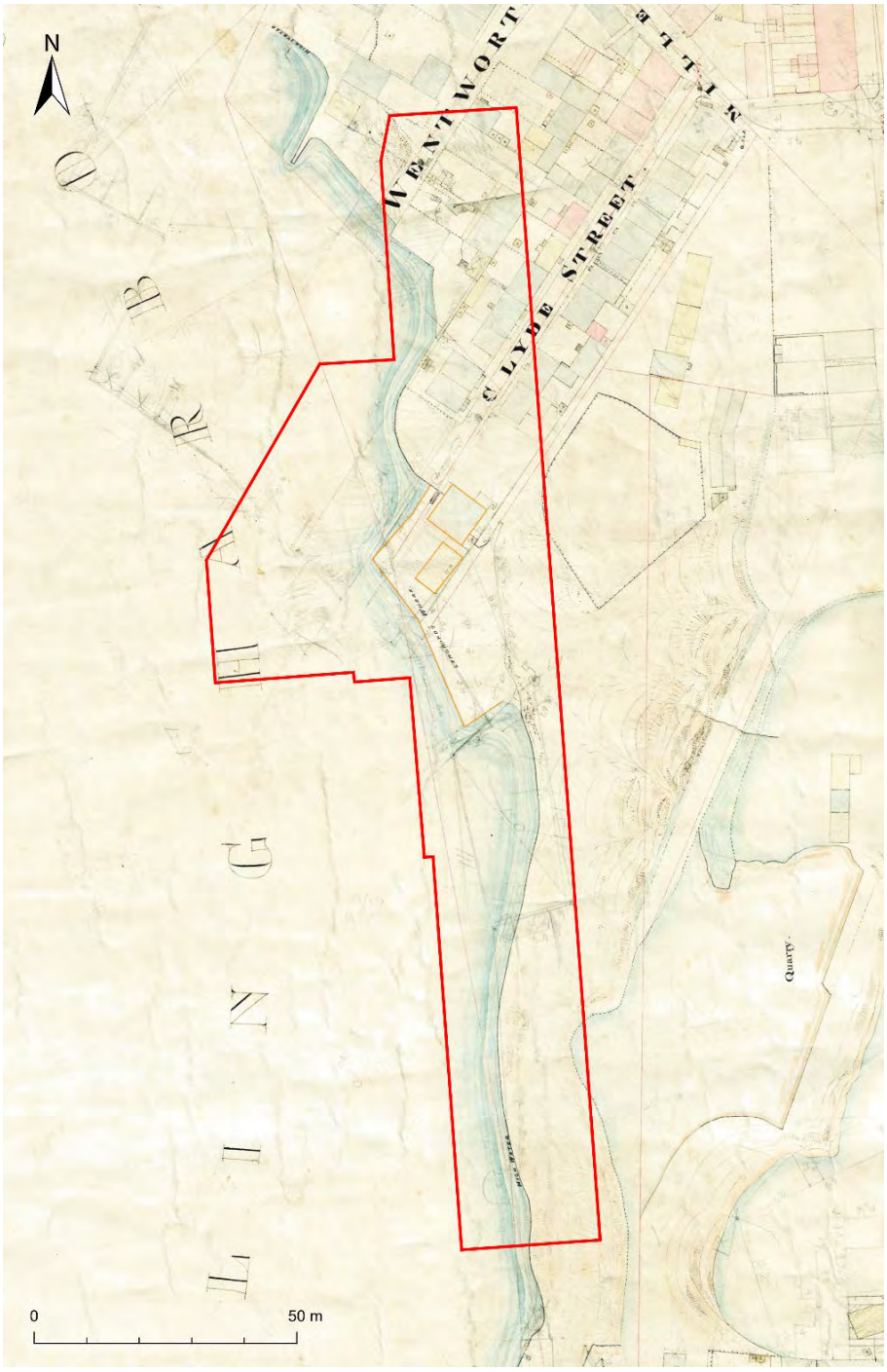

Figure 3.5: The 1855 Detail Survey showing Clyde Street, Langford's House, boatshed and short-lived wharf within the study area highlighted in orange. City of Sydney Survey Plans, Historical Atlas of Sydney, City of Sydney Archives.

Most of these buildings are still shown a decade later in the 1865 Trigonometric Survey (Figure 3.6) with a larger building, constructed of stone (shaded yellow) replacing the wooden structure on Langford's Wharf and new stone and wooden (shaded black) buildings to the south. The stone buildings along Clyde and Wentworth Streets remain.

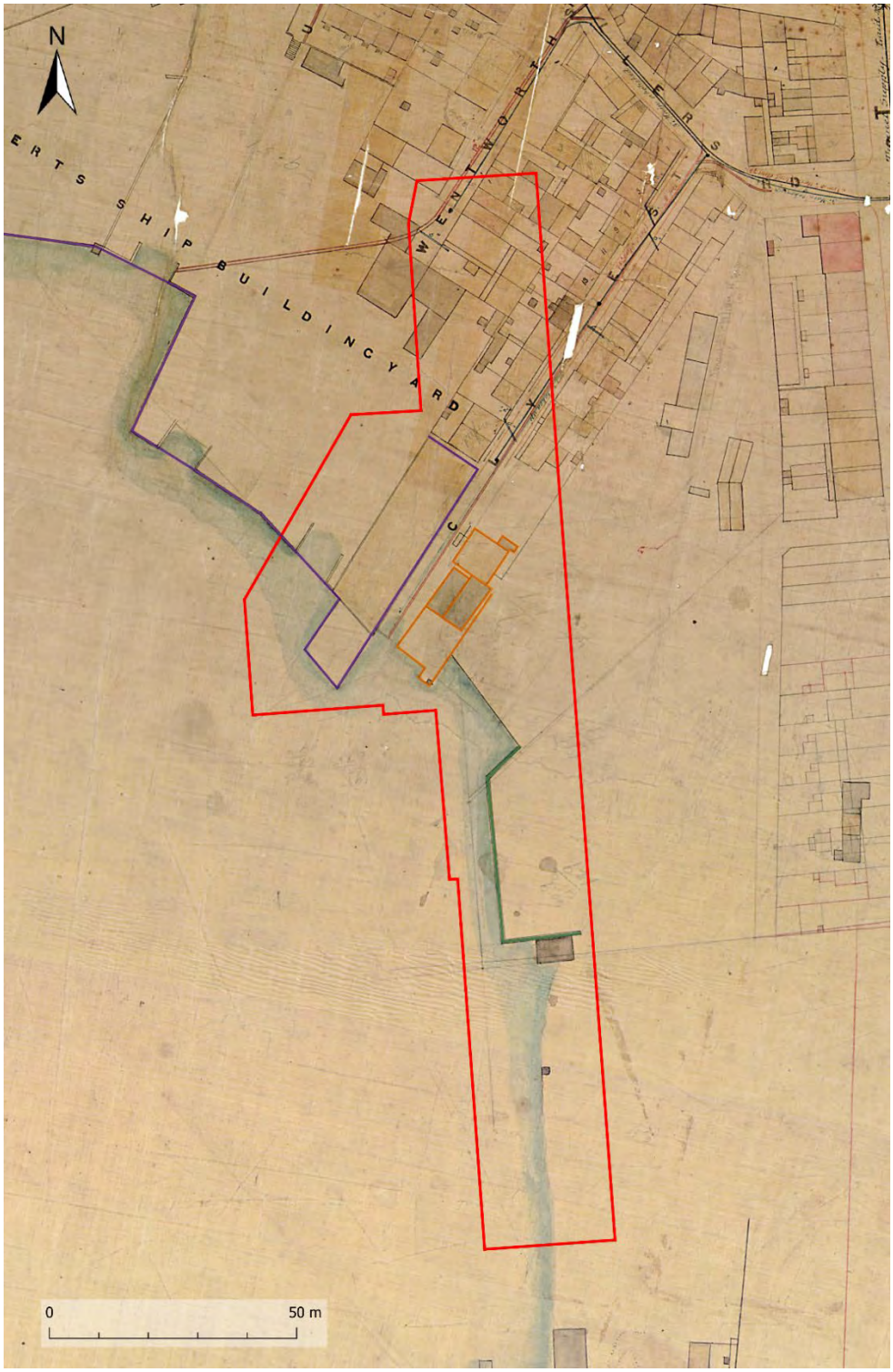

Figure 3.6: 1865 plan showing Langford's House and boat building structures (orange), Cuthbert's Ship Yard (purple) and Osborne's wharf (green). The Study Area is marked in red. Rygate & Co Surveyors, 1865 Trigonometrical Survey Plan, Historical Atlas of Sydney, City of Sydney Archives.

An 1875 survey, which focuses on detail of the shoreline provides insight into the function of some buildings within the study area at that time. Within Area Z it shows a workshop and identifies the large stone building in the centre of the excavation area as a sawshed, the colour coding on this plan suggests that the building is built of brick (shaded pink) which likely sat atop a sandstone foundation. Extending to the southwest of the sawshed is a "jetty on piles" which was presumably made of wood, and to the north west of the sawshed is a possible paved slipway. Two other structures, parallel to the sawshed to the south, are shown. Closest to the shore is a 'boatshed' built in bricks, and to the rear of the boatshed is a 'house' shown built in stone (shaded yellow). This is likely the same structure that has appeared on each plan since 1835. It is named here as 'Langford's'.

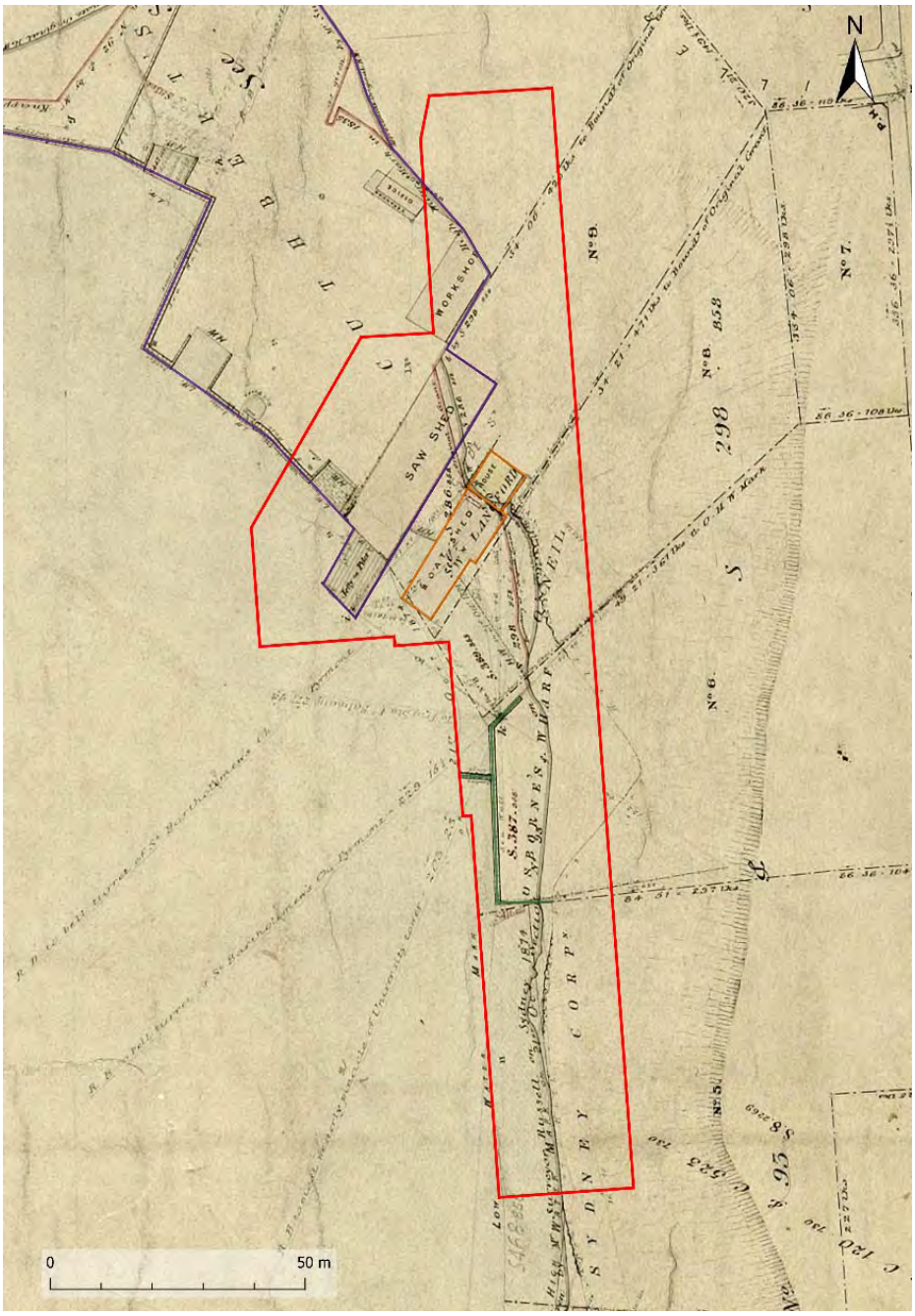

Figure 3.7: The 1875 survey of the eastern side of Darling Harbour shows buildings within the study area. Cuthbert's Wharf, sawshed and workshop is in the top left of the image. SA Map 4774.

Further survey of the area in 1880 provides detail on the nature of the structures at that time (Figure 3.8). A similar alignment of structures is shown although the function of some buildings is differently labelled and detail provided on construction material. The workshop in Area Z is shown as stores and being single storey and constructed from iron. The houses along Clyde Street are all shown being built of brick or stone, single storeyed and with windows to the rear. The sawshed is still standing but is listed as being stores also. It is likely that being labelled as stores is a general term and not specific to the function of these buildings. It is shown to consist of two storeys and to be constructed of multiple materials with the northeastern and southeastern corners being brick or stone, the southwest corner being wood and the remainder iron. Langford's boatshed is clearly shown on the plan, being constructed of wood and single storey. Langford's House is likewise still present, being shown as built of brick or stone. It is indicated that the building is single storey although this directly contradicts the photographs and drawings of the building which clearly show it is at least two storeys tall. To the rear of the house a small iron building has been built immediately adjacent to the northeast corner, and a second small building, built of wood with an iron frontage, has been constructed along the northwest edge of the yard.

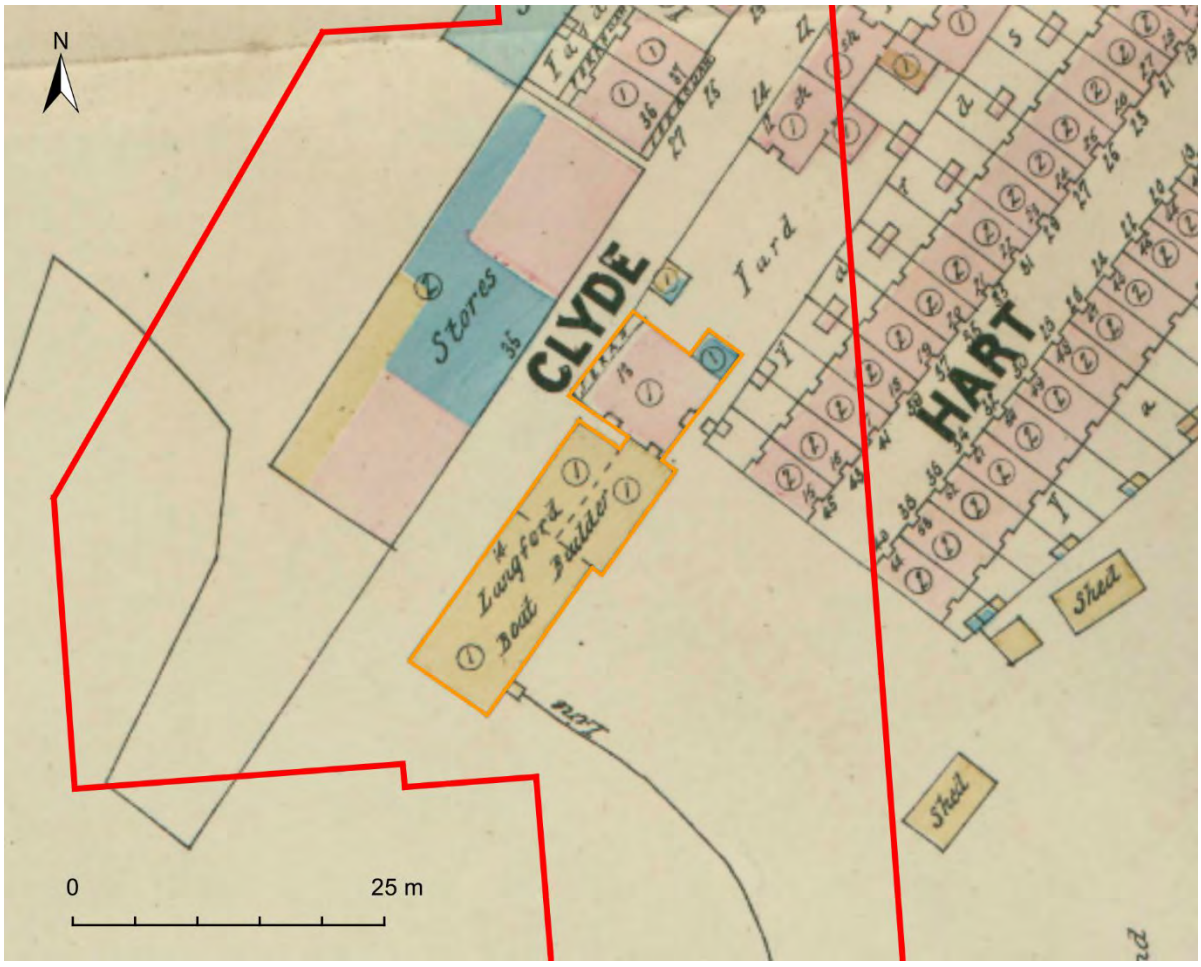

Figure 3.8: Detail of Dove 1880 plan showing the Langford House and boatshed (orange outline) extending into the harbour. Study area is outlined in red. A new and complete wharf, street and building plan directory of the City of Sydney, Historical Atlas of Sydney, City of Sydney Archives.

The construction of Hickson Road and resumptions following the outbreak of plague in 1900 led to the gradual demolition and re-construction of the study area. Figure 3.9 shows the configuration of the study area in 1948 demonstrating that much of it was under Hickson Road.

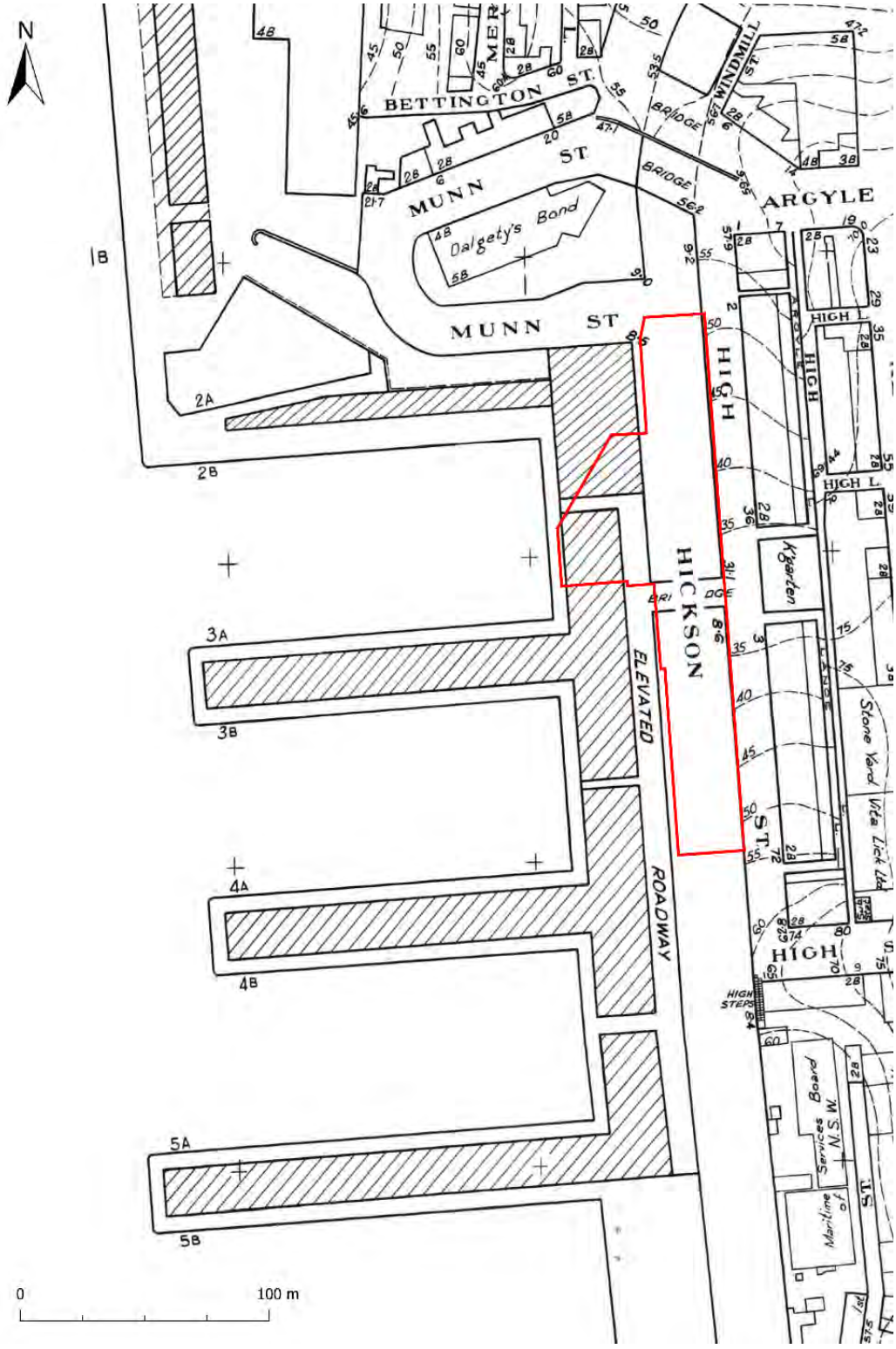

Figure 3.9: The new jetties in the study area were numbered 2B to 5A. Sydney Municipal Council Survey, City Proper 1948, 'Map 6, Circular Quay, Dawes Point', Historical Atlas of Sydney, City of Sydney Archives.

4.0 ARTEFACT ANALYSIS

A total of 45 examples of building materials, constituting 31 individual items were catalogued from Barangaroo Station (Table 4.1). Bricks (including bricks with mortar attached) constitute the majority of the assemblage (15 MIC, 48%) followed by slate (10 MIC, 32%). The remainder of the assemblage was made up of stone (MIC 2, 6%), tile (MIC 2, 6%), mortar (MIC 1, 3%) and vent tile (MIC 1, 3%) (Figure 4.1). The building materials catalogue is included in Volume 7, Section 7.3.

Artefacts were sampled from key structural contexts such as walls and footings in order to better understand the method and date of construction. Additionally, unusual or unique items were also recovered in order to better comprehend the overall nature of the site and its use through time.

Table 4.1: Summary of the BM artefacts catalogued from Barangaroo Station by general function, specific function, and shape. Frags refers to the number of individual fragments in the assemblage. MIC (Minimum Item Count) refers to the actual number of items accounting for conjoins

General Function	Specific Function	Shape	#Frags	%Frags	#MIC	%MIC
Architectural	structural	brick	8	17.8	8	25.8
		brick & mortar	6	13.3	6	19.4
		vent	1	2.2	1	3.2
		dressed stone	2	4.4	2	6.5
		mortar	1	2.2	1	3.2
	stru/finish	brick & render	1	2.2	1	3.2
	roof	slate	24	53.3	10	32.3
	floor	tile	1	2.2	1	3.2
	finish	tile	1	2.2	1	3.2
		TOTAL	**45**	**100**	**31**	**100**

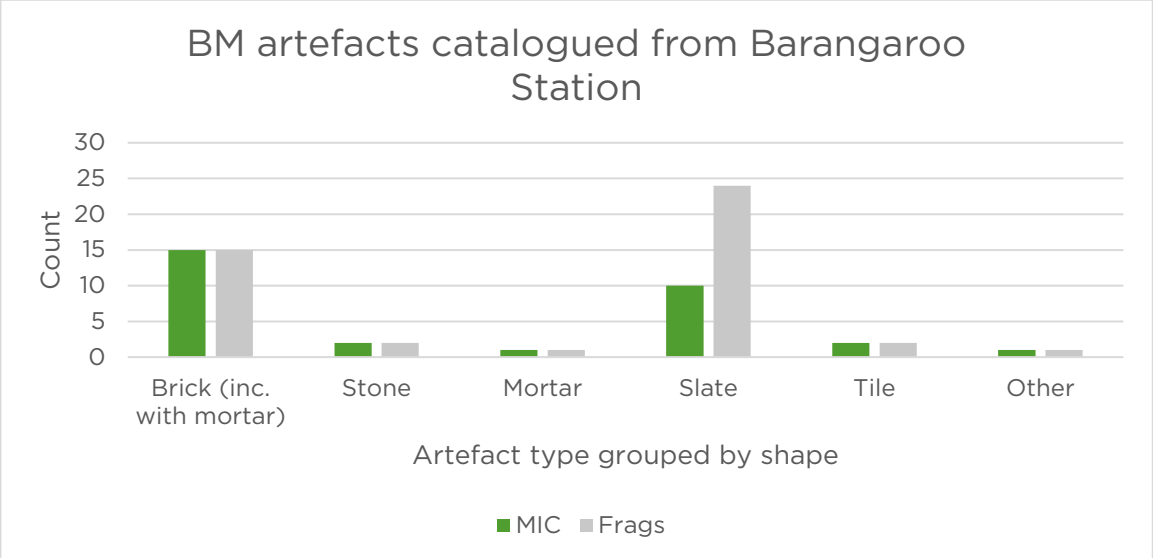

Figure 4.1: Summary of the BM artefacts catalogued from Barangaroo Station categorised and grouped by shape.

4.1 BRICKS

4.1.1 INTRODUCTION

Bricks are generally categorised first by production technology and secondarily by the type of frog used. In broad terms, for urban areas of NSW, bricks produced before 1890 tend to be hand-made sandstock and after 1890 machine-made either using the dry-pressed or extrusion methods. This date is not fixed, and examples exist of earlier machine made and later stock made bricks, especially in rural areas where sandstock bricks were still produced into the later 20th century.[3]

The introduction of frogged bricks occurs generally in Britain towards the end of the 17th century[4], and they were in common use by the mid-19th century.[5] In New South Wales early bricks (i.e. 1788-c.1820) were always unfrogged. The introduction of frogs begins with the broad or convict arrow (c.1817) indicating governmental ownership. The brick industry had expanded by the 1850s with multiple private companies engaged in production, most of who marked their bricks using a variety of different shaped frogs including the diamonds, rectangles, and hearts. Examples exist of more complex and unique frog shapes being used towards the end of the 19th century. The frogs on machine made bricks are more standardised and usually entail an inverted-hipped shape, occasionally with the name of the brickmaker impressed within the frog.

Both sandstock (Ss) and machine made (dry pressed (DP) and extruded pressed (EP)) bricks were catalogued from Barangaroo covering the entire temporal range of brick making in Australia.

4.1.2 SANDSTOCK BRICKS

The technology to facilitate sandstock brick production arrived in New South Wales on the First Fleet with brick moulds and 10,000 bricks being brought aboard the Scarborough.[6] By May 1788 bricks were being produced in the colony,[7] with kilns operating at an area to the south of the main settlement between present day Central and Town Hall. As early as April 1788 the area was referred to as 'Brick field'.[8] The brick making industry grew quickly. By July 1790,[9] 40 people were involved in brick production and by November 1790 70,000 bricks and tiles were being produced each month.[10] The end of convict transportation to NSW in 1840 led to the closure of government brickyards and the proliferation of independent brick producers. The industry prospered on Brickfield Hill until the 1840s when the government levelled the surrounding ground and the brick makers relocated to outer suburbs such as Newtown, Redfern and Waterloo.[11]

Eight of the bricks catalogued from the site were sandstocks (Table 4.2). Of these one had a rectangular frog (Ss rect), four had no frog (Ss flat), and three fragments were too small to form an accurate determination. The thickness of all bricks could be accurately determined and shows that the Ss flats had a range of thickness from 62 to 68mm and the rectangular frogged brick (170/#15019) was 68mm thick. The rectangular frogged brick (170/#15019), dating from 1850 to 1900, was poorly made featuring a badly mixed clay

[3] Gemmell 1986 p.15
[4] Varman 1993 p.18
[5] Tomlinson 1854 p.188
[6] HRNSW Vol. 2, Appendix 2 p.388
[7] Varman 1993 p. 58
[8] Fowkes 1789
[9] HRNSW Vol. 1, Pt. 2 p. 363
[10] Tench 1788 p. 153
[11] Gemmell 1986 p.4

which had been overfired to a dark pink colour with frequent partially exploded dark blue ironstone (Figure 4.2). The frog was an inverted hip shape which suggests that it was likely made closer to 1900 than 1850. This is further supported by its thickness (68mm) as bricks tended to become thicker towards the end of the 19th century.

Table 4.2: Summary of the Sandstock bricks catalogued from the site. m/c refers to the mixing and crushing of the clay and other particulates contained within the fabric of the brick

Area	Cat/ Context	Type Name	Colour	Dimension (mm)	Fabric	Date
X	133/#15014	Ss	light pink 2.5YR 7/6	93+x71+x63	Medium m/c	1788-1880
X	149/#15016	Ss	dark orange 5YR 5/3	86+x79+x67	Well m, poor c	1788-1880
X	149/#15015	Ss	orange 5YR 7/4	73+x60+x73	Medium m/c	1788-1880
X	249/#15031	Ss flat	orange 5YR 5/6	90+x82+x62	Well m/c	1788-1880
T	53/#15004	Ss flat	pink orange 5YR 6/4	127+x106x62	Poor m/c	1788-1850
X	108/#15006	Ss flat	orange 2.5YR 6/6	221x109x67	Well m, poor c	1788-1850
X	108/#15007	Ss flat	orange 2.5YR 6/6	147+x106x68	Well m, poor c	1788-1850
Y	170/#15019	Ss rect	dark pink 2.5YR 4/4	237x112x68	Poor m/c	1850-1900

The four Ss flats were all better made than the Ss rect but three were still of relatively poor quality; one example was well made. Two (108/#15006 & 108/#15007) had a well-mixed clay fabric and were fired to an even orange colour (Figure 4.3), and the third (53/#15004) was poorly mixed and slightly overfired to a dark orange. Of these one (108/#15006) has faint hack marks along its strikeface.

The well-made example (249/#15031) was well mixed and fired to an even orange. This brick was broken and all surfaces, including the broken face, were well worn indicating that it had been subject to natural erosion. All Ss flat bricks featured multiple inclusions including ironstone and white clay lumps, and vegetation voids. The lack of frog dates these bricks to the late-18th and earlier-19th century, specifically 1788-1850. The remaining three fragments all had partially worn surfaces. Two of the fragments (149/#15015 & 149/#15016) both came from the same context and were very similar. In particular, both were fired to a slightly dark orange indicating slight overfiring and both had worn arrises (corners) indicating that they had been either reused or were in an exposed position or environment. The remaining fragment (133/#15014) likewise had worn arrises but was underfired to a light pink. With a lack of identifying features, these fragments can only be dated in general terms from 1788 to 1880.

Figure 4.2: 170/#15019, a sandstock brick with a rectangular frog dating from 1850 to 1900. 100mm scale. IMG_3917. R. Workman.

Figure 4.3: 108/#15006, a sandstock flat with the horizontal hack marks visible on the strikeface and crumbly buff shell sand mortar. 100mm scale. IMG_3919. R. Workman.

4.1.3 MACHINE MADE BRICKS.

Machine made bricks generally use two different technologies: dry-pressing and extrusion.

The first dry press (DP) machine in Australia was set up in Melbourne in the mid-1850s, imported from the USA. The adoption of DP machines was slow and sporadic in Australia, as well as the UK with hand moulding still being the predominant technology in some British cities in to the 1870s.[12] In Sydney, the lack of excavation machinery inhibited widespread exploitation of deep shales, more suited to the DP method.[13] A patent was secured for the production of DP in NSW by Goodlet and Smith around 1873. The first dry pressed machine works in Sydney was founded in St Peters by W.G. Collins in 1878; by 1884 there were 12 DP brickyards in Sydney and a further seven in Melbourne.[14] By the 1890s DP bricks dominate construction in urban Australia.

Brick extrusion machines were invented in 1836 by the Marquis of Tweeddale and were being advertised specifically to emigrants to Australia by 1839.[15] The earliest known extruded brick manufacture in Australia was in Adelaide in 1840.[16] Extruded bricks failed to gain popularity in Australia during the 19th century in part as they produced soft, moist bricks that required a long drying time.[17] To counter this, some extruded bricks were pressed after cutting in order to increase uniformity, add a frog, and increase compression.[18] The technology still didn't gain widespread use though and with the introduction of dry-pressing it largely ceased to be used for brick manufacture. It was used for other ceramic based items such as roof tiles and architectural ceramics such as balustrades and garden edging though. The same basic technology was reintroduced utilising modernised kiln techniques in the 1950s where it met with much greater success and continue to be made.[19]

A total of six dry-pressed and a single extruded brick were recovered from Barangaroo Station. In addition, a single example of extruded architectural ceramic was catalogued discussed in section 4.4.2. Five of the six DP bricks catalogued had an inverted hip frog and three of those with frogs were 72mm thick (Table 4.3) (Figure 4.4). All were fired evenly to a brownish colour. This is indicative of later-19th and early-20th century moves towards standardisation within the brick making industry, and a greater degree of manufacturing conformity.

[12] Lewis 2009 6.01.9
[13] Ringer 2008 pp. 42
[14] Ringer 2008 pp. 55
[15] Ringer 2008 p.48
[16] Ringer 2008 p. 265
[17] Lewis 2009 6.01.9
[18] Ringer 2008 p. 42
[19] Ringer 2008 p. 55

Figure 4.4: 200/#15021, a typical example of the inverted-hip frogged dry-pressed bricks catalogued from the site. 100mm scale. IMG_3925. R. Workman.

Table 4.3: Summary of the Dry-pressed bricks catalogued from the site. m/c refers to the mixing and crushing of the clay and other particulates contained within the fabric of the brick

Area	Cat/ Context	Type Name	Colour	Dimensions (mm)	Fabric	Date
R	029/#15003	DP Brick	2.5R 5/6 - light olive brown	93+x107x65	Well m, poor c	1880 onwards
X	248/#15027	DP rect	2.5YR 2.5/2 - dark reddish brown	134+x110x57+	Well m/c	1880 onwards
X	248/#15026	DP rect	2.5YR 4/6 - olive brown	93+x114x79	Well m/c	1880 onwards
Z	219/#15025	DP rect	2.5YR 5/3 - light olive brown	216x102x72	Well m/c	1880 onwards
Z	200/#15020	DP rect	2.5YR 7/3 - pale brown	230x105x72	Well m/c	1880 onwards
Z	200/#15021	DP rect	2.5YR 6/1 - pale brown	225x111x72	Well m/c	1880 onwards

The unfrogged dry-pressed brick (029/#15003) had a few unusual features (Figure 4.5). Within the clay fabric there were numerous narrow voids indicating that it had been poorly pressed in the machine. There was also a dark red slip or fine paint on some of the faces and a 33mm long thumb tally mark on one side. This indicates that the brick may have been early in the production history of dry pressed bricks likely dating to the late 19th century.

The single fragment of extruded brick (029/#15002) was poorly made with frequent inclusions and a poorly mixed fabric. It also featured an inverted hip frog indicating that it had been pressed following extrusion. The poor quality means it is likely a 19th century example dating from 1840-1900.

Figure 4.5: 029/#15003, an unfrogged dry-pressed brick with a thumb tally mark which has a red slip. 100mm scale. IMG_2929. R. Workman.

4.2 MORTAR & RENDER

Mortar refers to an aggregate-containing paste that is laid wet, but when dry bonds together various other building materials, most commonly bricks and sandstone. Render can often consist of the same material as mortar but refers to its use specifically as a wall or floor covering. Set and plaster both refer to a firm paste without aggregates that is applied as a finish to internal walls and ceilings of a structure. Mortar and render each consist of three basic ingredients: binder, aggregate (almost always sand) and water. Whilst the use of sand and water hasn't changed through time, the type of binder used has and as such, the type of mortar or render can provide an approximate date for a building.

For the majority of the 19th century, two sources of lime (Calcium oxide) were used as the primary mortar and render binder. Lime was initially procured from shells (quicklime) from 1788 onwards. These shells were collected from various riverine sources and from Aboriginal middens. Sporadic supplies of coral lime and limestone were also brought in from Norfolk Island (coral), Newcastle and Tasmania (rock lime) but these were rare. Shell mortar was therefore the dominant binder for the late-18th and early-19th century but was never in bountiful supply. Later rock lime became much more readily available following the introduction of country rail links in the 1870s with shell use dissipating by the 1880s. Mixtures of sandy silty or sandy clay were also occasionally used especially for non-governmental buildings due to the scarcity of lime, especially in the late-18th century.

Portland cement became the dominant binder by the 20th century. Portland cement, named after its apparent resemblance to stones found near Portland, Dorset, UK, was first invented in the early-19th century with a number of related materials being created contemporaneously. Its first known use in Australia was in Melbourne around 1857,[20] with importations steadily increasing throughout the 19th century with the majority of British brands being advertised by 1888,[21] in addition to a large number of German brands. During the 1880s a number of Australian companies attempted to produce Portland cement many of which struggled financially to compete with imported cement. The Cullen Bullen Company began to produce Portland cement in 1884 with commercial production occurring by 1889. By the start of the 20th century Portland dominated construction and the use of shell and rock lime mortar was restricted to rural and remote areas only.

Primarily examples of mortar and render from Barangaroo Station came attached to bricks with seven of the bricks having mortar adhering to them. A single sample of mortar on its own was also taken giving a total of eight mortar or render samples. Of these eight, three used rock lime as the binder, four used shell, and there was a single example of Portland.

Four examples of shell mortar were analysed. Three (105/#15006, 170/#15019 & 053/#15004 – BM Sample #01) were attached to sandstock bricks (Figure 4.3, Figure 4.6). They all featured buff coarse sand with rare 1-2mm burnt shell fragments. The other (128/#15009 – BM Sample #04) was taken from an area of sandstone paving. It had a similar consistency to those samples attached to the bricks being crumbly buff coloured sand with rare shell fragments and rare flecks of charcoal.

[20] Lewis 2000 pp7.04.07

[21] Lewis 2000 pp7.04.09

Figure 4.6: 053/#15004, shell sand mortar attached to a sandstock flat. 100mm scale. IMG_3931. R. Workman.

One of the examples of lime cement (108/#15007 – BM Sample #03) was found affix to sandstock bricks, whereas the other two (200/#15020 – BM Sample #07 & 219/#15025) were found adhering to dry-pressed bricks. This provides a clear example of the longevity of rock lime as a binder for construction. The example from (108) was a buff to grey sand with occasional small lime fragments utilised as a render. Mortar that had used brick bonding (108/#15006) was also sampled from the same context, but was found to be shell based, not rock lime based indicating possible selection of certain materials for varying purposes. This deposit was composed of demolition material however so was very mixed. The render example also had a thin (<5mm) white powdery plaster atop the render. The use of rock lime indicates that although the bricks themselves could date from 1788 onwards, they were likely used post 1840. The other two examples of rock lime cement were found attached to dry-pressed bricks (200#/15020 & 219/#15025). Both examples were very firm grey coarse sands with rare white flecks. The quality of the mortar and render, and its presence on a dry-pressed brick indicates that the construction dates from the very end of the 19th century.

The single example of Portland mortar (200/#15021 – BM Sample #08) was a very hard pale grey cement that had a float finish. It was found attached to a dry-pressed brick and was utilised as a floor surface.

4.3 SLATE

Slate is a natural occurring fine-grained metamorphic rock that can be easily split into flat sheets. It is most commonly used for roofing but can also be utilised as an early damp coursing at the base of brick or sandstone walls, and for flagging, steps and mantlepieces.

Slate has been used as a building material since at least the 16th century and was perceived as a good roofing material due to its water resistance and durability. It was not included in the materials imported with the First Fleet. It is unclear exactly when the first slate roofs were built in Australia, but it has been suggested that John Piper introduced slate in 1829. By the 1830s a regular (although likely small) supply of roofing slate was imported into Sydney.[22] Vaucluse House, built in stages from 1805 until the 1860s features slate roofs.[23] The north, south and western parts of Argyle Stores, The Rocks, built in 1840 have slate roofs.[24] Numerous suggestions that the original building, built in 1829 also had a slate roof including the SHR.[25] In addition to its construction uses, slates for writing were used in the colony from at least 1805 with 'slate and pencils' advertised for sale by E. Wills at this date.[26] Early uses of slate would have utilised material imported from England and Wales, with each quarrying area producing a varied product. Three common sizes of roof slates emerged in the 19th century with the larger tiles being necessarily thicker.[27]

Australian slate primarily comes from two regions of South Australia: Mintaro (near Burra) and Willunga (near Adelaide). Local slate was first discovered in SA in 1836,[28] with Kangaroo Island slate reported as being suitable for export.[29] By 1838 the Green Hill Stone, Slate and Flag Quarry (Beaumont) was operating,[30] although it is unclear whether they were mining slate at this time.

Willunga Slate was discovered in 1840 by Edward Loud adjacent to where the Delabole Quarry was later opened.[31] Loud's attempt to mine this slate didn't last long as it was discovered that the Delabole quarry had better quality. By August 1840, two quarries were in operation in the region and the slate was described as appearing "nearly as good as English slates".[32] By June 1840 slate from Willunga was being exported to Sydney, but the quality wasn't great as it was described as being fragile. In 1841, 150,000 roof slates were exported from Willunga to Port Adelaide, Melbourne, and Sydney.[33] In the 1850s, Port Willunga jetty was built to facilitate trade in slate from SA to the other colonies. By the

[22] Lewis 3.07.17

[23] SHR 00955 Gazette Number 27, p 1546

[24] Clive Lucas, Stapleton & Partners Pty Ltd 2008 Conservation Management Plan Argyle Stores 12-22 Argyle Street, The Rocks, prepared for the Sydney Harbour Foreshore Authority

[25] https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5053139

[26] Syd Gaz 01 Dec 1805 p.1

[27] 1979 Conservation and Restoration of Buildings, Conservation of roofs, Australian Council of National Trusts

[28] Lewis 3.07.12

[29] South Australia, Extracts from the official dispatches of Colonel Light, Surveyor General. P.31

[30] Southern Australian 01/12/1838 p2.

[31] Piddock 2007

[32] Adelaide Chronicle and South Australian Literary Record (SA : 1840 - 1842), Wednesday 26 August 1840, p 3

[33] Piddock 2007

1880s this slate had improved and was still used.[34] Willunga slate is described as mid grey.[35]

Twenty-four individual fragments, constituting 10 items of slate were catalogued from Barangaroo Station (Figure 4.7). No complete tiles or other whole artefacts were collected. All but two of the assemblage were blue grey slate, with a single example (132/#15011) where both colours were found and recorded together. Table 4.4 summarises the slate by colour most of which came from fill deposits and all are interpreted as being fragments of roof slate.

Table 4.4: Summary of slate artefacts sorted by colour

Blue grey	Purple
068/#15005, 157/#15017, 124/#15008, 133/#15012, 249/#15029, #249/15028, 164/#15018, 215/#15023, 215/#15022	249/#15029

Figure 4.7: 133/#15012, examples of slate catalogued from Barangaroo Station. 100mm scale. IMG_3935. R. Workman.

[34] Lewis 2009

[35] Early Roofing, Heritage South Australia.

4.4 OTHER

In addition to bricks, mortar, and slate, two other types of artefact classified as Building Materials were catalogued from Barangaroo Station: tiles and vent.

4.4.1 TILES

The use of tiles for finishing aspects of properties had largely fallen out of fashion in Britain by the 18th century. As part of the Gothic revival in the early 19th century tile manufacture and use recommenced in the UK and subsequently Australia. Based initially from technology to produce clay buttons, the dry-press method of manufacturing tiles was invented and developed by Herbert Minton in the 1840s following his successful rediscovery of inlaid encaustic tiles in the 1820s-30s. The dust press method allowed mass production of tiles that saw a boom in the later-19th century and established the technology that is still commonplace today.

Two fragments of dust-pressed tile were catalogued from the site. The first (249/#15030). was a small fragment of unglazed dark grey decorative wall tile with a slightly rounded edge. The other (024/#15001) was a small fragment of slightly worn, well-fired orange floor tile.

4.4.2 EXTRUDED CERAMIC

A single fragment of extruded terracotta (215/#15024) may have been part of a garden feature balustrade or generally an ornate architectural feature (Figure 4.8). It was catalogued from Area Z and is well made from well mixed clay that had been fired to an even orange and finished with a red slip and dates from after 1860.

Figure 4.8: 215/#15024, the small section of a balustrade brick. 100mm scale. IMG_3936. R. Workman.

5.0 SIGNIFCANT STRUCTURES & CONTEXTS

5.1 AREA R

BM artefacts catalogued come from two contexts in Area R, neither of which were structural elements (024, 029). Context (024) is a yellow brown coarse sand that was used as bedding for a series of bluestone setts (016). The presence of a piece of dry-pressed paver (#024/15001) within this fill indicates the setts were laid post 1880 after dry-press technology became commonplace. Context (029) is a brown sand used to reclaim the land behind seawall (011). Two brick samples were catalogued from this fill: an extruded and pressed brick (029/#15002) and a dry-pressed brick (029/#15003). This dates the fill to post 1880 and indicates that the seawall likely has a similar date. The presence of two different types of bricks within the fill suggests that it is imported to the site and is mixed from multiple sources.

5.2 AREA T

Artefacts catalogued as BM come from two contexts in Area T: (053) and (068). Context (053) is a brown sand reclamation fill that contained a large number of building material artefacts, primarily sandstock bricks. One brick and mortar sample (053/#15004) was catalogued from this fill. It was a poorly made unfrogged sandstock brick with buff sand lime mortar. This gives a date range of 1840 to 1850 for when the mortar was laid on to the brick, and post 1840 for the fill. The presence of multiple bricks within the fill indicates it primarily came from the demolition of a structure, but it is not clear if that structure was local to the site. Context (068) was a soft grey to black sand reclamation fill that was found within Cuthbert's Wharf believed constructed in the 1860s. The small fragment of roof slate (068/#15005) catalogued from this fill supports this construction date, being from 1840 onwards.

5.3 AREA X

The majority of BM catalogued from the site came from Area X with 18 items coming from nine different contexts. These include parts of Langford's House, Cuthbert's sawshed, and contexts related to the boat (140).

Context (108) is the demolition deposit from Langford's House, believed to have been constructed in the early 1830s. The deposit was a brownish yellow coarse silty sand and contained multiple sandstock bricks. During excavation it was confirmed that at least the ground floor of the house was constructed of sandstone which confirms to what is visible in the historic photos and plans. Whilst the upper storeys may have been built solely of brick this is an uncommon practice, therefore it is unlikely that the bricks were part of the main structure, instead they may have been internal walls or fireplaces, although they feature no discolouration due to heat or flame exposure. The examples catalogued (108/#15006 and 108/#15007) are unfrogged and reasonably made, being well-mixed but poorly crushed and fired to a slightly dark orange. One brick featured the use of shell sand mortar (15006/#108), whereas the other (108/#15007) had a lime sand render. The render was finished with a 1mm thick powder white plaster. The use of different cements for mortaring and rendering is noteworthy with two possible explanations. First, it may be deliberate selection of different cements for different purposes. Rock lime produces a harder finished product more useful for rendering. This would indicate that Langford's House was built sometime post-1840 when rock lime supplies became more available. A second scenario is that the house was rendered sometime after it was finished and lived in. Under this scenario the house could date from any time between 1788 and 1850 with the

render being applied from 1840 onwards. It is also possible that the bricks were reused although this is unlikely given the early date of the initial construction (c.1830) and the relative security of the demolition deposit they were found in. Either way, the house would have been solidly constructed and the application of plaster suggests sufficient wealth to make aesthetic choices. Within the structure a small fragment of slate (124/#15008) was found within a compact brown sand that abutted the footings of the building which formed as an underfloor deposit, accumulating during the use of the building. It is unlikely that the slate came from the building due to its stratigraphic location, but it does show that construction may have occurred before 1840 or at least the space was infilled after this date.

The foundations of Cuthbert's sawshed which is believed to be pre-1865 were also uncovered during excavations. They were built of roughly hewn sandstone blocks bonded with pale yellow coarse sand shell mortar (128/#15009). The use of shell dates the building to pre-1880. The historic plans and images show the sandstone construction used in the foundations did not encompass the entire structure, but instead were used only sparingly.

Multiple deposits, that contained BM artefacts were found in association with the boat (140), however none of these were directly related to the boat or its activities. Within the sandy intertidal deposits that accumulated above the boat (132) a fragment of worked sandstone (132/#15010) and two slate fragments (132/#15011) were found. This indicates a date of post-1840 for the deposit. Context (133), which is likely the same as (132) but stained a different colour due to tidal action, likewise contained worked stone (133/#15013) and slate (133/#15012), in addition to a corner of a sandstock brick (133/#15014). The brick fragment was too small to assess the frog and it was very worn indicating that it had been transported within the marine system causing localised erosion. Between the boat and Langford's wharf (145) an accumulation of dark silty sand (149) formed. This is below the sandy deposit that accumulated above the boat and postdates the construction of Langford's wharf (145). The deposit contained two small fragments of sandstock brick (149/#15016 & 149/#15015). Both had slightly chipped and worn arrises indicating that they had been transported, fitting with the interpretation of this deposit being an accumulation. They both predate 1880 but were too small for further interrogation. Within the boat, a silty bilge deposit found at the bow (157) contained a small fragment of slightly discoloured roof slate (157/#15017) which had one nibbled and one possibly saw-cut edge. It is unlikely the slate was directly related to boating activities but must have been deposited within the boat after 1840.

Context (248) was a clean-up context from around (132, 133, 149) which contained two whole dry-pressed bricks (248/#15026 and 248/#15027). Given the dates other evidence indicates for these deposits, it is highly unlikely that the bricks originated from any of these contexts and were intrusive.

Context (249) refers to the dark grey/black sand deposit that accumulated below the boat and elsewhere in the area. It contained multiple BM artefacts and has since been recognised as the same as (149), which was also an artefact-rich deposit. These included two fragments of roof slate which didn't contain evidence of working (249/#15028 & 249/#15029) and a fragment of unglazed dust-pressed tile (249/#15030). The tile was dark grey and had a slightly rounded edge indicating that it had been rolled around. Also present was a very worn and rounded piece of likely unfrogged sandstock brick (249/#15031) again indicating that it had been eroded by oceanic action.

5.4 AREA Y

Building Materials were catalogued from two contexts within Area Y: (164) and (170). Context (170) was a small brick structure, of an unknown purpose, at the rear of Cuthbert's sawshed. An example of brick and mortar were catalogued from this structure (170/#15019 – BM Sample #05). The sandstock brick was poorly made and featured multiple exploded ironstones within its poorly mixed, overfired dark pink clay fabric. The stockface of the brick featured a rectangular inverted hip frog. This dates the production of the brick broadly from c.1850 to around 1900. The presence of an inverted hip frog, more commonly seen on dry-pressed bricks, on a sandstock brick normally indicates that it postdates the introduction of DP technology and is hence post-1880. That said, it is possible that inverted hip frogs were used for sandstock bricks prior to this date and so broadly would date from 1850 onwards. The presence of crumbly, powdery white fine sandy shell mortar was found adhering to the stockface which indicates that the brick was laid pre-1880, and hence must have been made prior to this date. Context (164) is a clean-up context. It contained a single fragment of slate (164/#15018).

5.5 AREA Z

Three of the contexts in Area Z (200, 215, 219) featured building materials that were studied and catalogued. Context (200) was an area of brick paving within a substantial late-19th-century sandstone and brick structure (196). This dry-pressed brick paving was later enhanced with a two layer of floor render; first a layer hard grey Portland sand render (251) and above this a layer of very hard buff grey lime sand render (201). This suggests significant longevity for the building. Two dry-pressed bricks with mortar affixed were analysed from the paving.

The first (200/#15020) was a well-made brick with sharp edges and smooth surfaces. It had a very hard pale grey to buff lime sand render attached (201). The second brick (200/#15021) was also very well made but with slightly potted surfaces. The render on this brick was a very hard fine grey sand with Portland cement (251). This indicates that the paving was laid or repaired in two temporally separate occasions. Three brick pads which predate the surface (219) were made of dry-pressed bricks and partially rendered. An example of the brick and mortar was analysed (219/#15025 – BM Sample #06). The brick featured an inverted hip frog and two circular indents on the margins of the stockface. The mortar (222) above the brick pad (219) was a hard, grey coarse sand with rare white lime flecks.

Context (215), a grey clayey sand, included multiple BM artefacts and was one of several fills within a cistern (206). This fill included two slate fragments (206/#15022 & 206/#15023) neither of which had any discernible features. Slate was uncommon in Sydney prior to 1840 however was likely imported in very limited supplies from around 1805 onwards. The non-structural nature of this deposit and its location on the harbour means that the slate certainly dates from after 1840 and potentially from after 1805. The deposit (206) also contained a fragment of extruded architectural ceramic (215/#15024), likely a fragment of terracotta balustrade. This fragment was well made and part of a good quality finish to a structure. Extrusion technology was rarely used in the 19th century in Australia and so this balustrade may have been imported. It dates to after 1840 with certainty and potentially dates to post-1880. These items come from fills within the cistern and hence, correspond to the backfilling of the well after it had ceased to be used indicating that it was constructed certainly before 1880 but no earlier than 1840.

6.0 CONCLUSIONS

The building materials analysed and catalogued from Barangaroo Station indicate a changing cityscape throughout the 19th century and demonstrate the evolving nature of the site. The presence of bricks from a variety of periods and the use of different cements shows clearly that construction on the site was an ongoing process.

The bricks and cements from Langford's House in particular demonstrate how different materials can be incorporated into a single structure. Given the evidence from the historic plans and BM artefacts it appears that the house was constructed prior to 1835 and stood until the 1880s.

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THE 'BARANGAROO BOAT' (UDHB1)

What does the pollen evidence tell us?

Mike Macphail

March 2022

Volume 3, Section 3.10

Photograph of the 30 ft long, early Colonial period vessel **UDHB1** whose abandoned wreck was found buried in Darling Harbour during preparatory work for *Sydney Metro*'s Barangaroo railway station (image supplied by Casey & Lowe)

Report prepared 15 September 2020 for *Casey & Lowe Archaeology & Heritage* Pty. Ltd.

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SUMMARY

- Eight samples were submitted for pollen analysis – five from deposits within the abandoned wreck of **UDHB1** and three (control samples) from intertidal deposits on, around and under the boat.

- Except for a dark grey/black sand below UDHB1 (**CTX 249**), all samples yielded ±similar assemblages of fossil pollen, spores and animal microfossils in organic extracts dominated by plant detritus and carbon particles (including burnt wood).

  Most of these microfossils could have been deposited at any time between **UDHB1** being constructed and its burial under reclamation fill on the eastern foreshore of Darling Harbour. However, several exotic and native heath pollen are consistent with:

  (1) **UDHB1** being constructed after Dicksons Mill was established in 1815.

  (2) **UDHB1** being abandoned in the 1830s/40s and then exposed to tidal water on the eastern foreshore before its burial sometime prior to 1860.

  (3) **CTX 149** probably deposited in run-off from Clyde Street as well as silt deposited during high tides.

  (4) The intertidal grey sand (**CTX 133)** and the thin mixed clay deposit (**CTX 144**), are likely to be younger than the silty clay deposits **CTXs 149, 157**, **158**, and **159**, and may date to the 1860s.

- Microfossil evidence of the cargo has not been preserved but this might have included grain or coal if trace numbers of pollen predate the time **UDHB1** was abandoned.

- Weak evidence exists that the places visited when **UDHB1** was a working vessel included the rear (Cockle Bay) and the western foreshore of Darling Harbour.

- Darling Harbour was awash (literally) with human sewage during the time (*c* 1830s-1860s) when **UDHB1** was abandoned on the eastern foreshore.

1. INTRODUCTION

Archaeological excavations, undertaken by *Casey & Lowe Archaeology & Heritage* Pty Ltd on *Sydney Metro City and Southwest TSE* Barangaroo railway station site, uncovered the remains of an early Colonial period timber boat that had been abandoned on the eastern foreshore of Darling Harbour below Hickson Road, Barangaroo-Millers Point (Figs. 1-2).

Architectural details, artefacts and deposits within such vessels often provide useful information on past trading activities and routes. The same outcomes potentially are archived in sediments deposited on and within the wreck of the 'Barangaroo Boat', given this *c* 9 m (c 30 ft) long vessel was locally-built from native Australian timbers within the first four decades of European settlement in Sydney. For the same reasons, this vessel, labelled Unidentified Darling Harbor Barangaroo No. 1 (**UDHB1**), and informally the 'Barangaroo Boat', is of State Heritage significance.

1.1 This report

This report analyses and discusses the implications of plant and animal microfossils in deposits within **UDHB1** (5 samples) and three comparison (control) samples of beach sands, intertidal silts and clays deposited on, around and under the vessel and against Colonial period seawalls (Table 1).

Table 1: Samples from within and outside **UDHB1** are highlighted in green and blue, respectively. All samples come from Area X

Sample	CTX	Lithology	Archaeological context/inclusions
16	**144**	sandy clay on timber	Thin mixed clay deposit. Possible 'sub-floor'? Charcoal, clay pelletoids
*24	**154**	clay, silt, sandy loam	bilge deposit on side of boat. Clay pelletoids, ironstone concretions
*27	**159**	dark grey silty clay	bilge deposit in middle of stern. Coke, mica and rootlets. Estuarine smell.
*30	**158**	dark grey silty clay	bilge deposit in middle of bow. Coke, mica and rootlets. Estuarine smell.
*33	**157**	dark grey silty clay	bilge deposit at bow. Dark grey silty clay. Estuarine smell.
39	**249**	dark grey/black fine sand	beach sand underlying boat.
8	**133**	grey sand, clay pelletoids	inter-tidal (foreshore) deposits overlying vessel sides
36	**149**	dark grey sandy loam	inter-tidal (foreshore) deposits around boat (run-off from Clyde Street)

* Bilge samples below the floor ('ceiling planks') of **UDHB1**.

As with previous pollen analyses of Aboriginal and Colonial deposits in Darling Harbour, this study aimed to determine whether plant and animal microfossils are preserved in the above deposits, and if so, to use these assemblages (microfloras) to date the samples and reconstruct the environment prevailing at the time(s) of deposition.

A specific aim was to use the same data to interpret the cultural implications (if any) of the sampled deposits e.g., the type(s) cargo carried in **UDHB1** and the localities to which the vessel may have travelled.

1.2 Ancillary information

Ancillary information provided for this study includes the Preliminary Report and an unsubmitted draft report prepared by *Casey & Lowe Archaeology & Heritage* in 2019 and 2020, respectively.

The former details the Colonial history of the excavated portion of the Barangaroo site (#Area X); the latter focuses on the archaeological context of the boat (**UDHB1)** *per se*. References to sites that archive evidence of the vegetation growing around the foreshore of Darling Harbour (including the Pyrmont Peninsula) during the prehistoric and Colonial periods are given in Section 4 although not all are cited in the text. The majority of these sites are located towards the rear (Cockle Bay) and the western foreshore of the harbour but include a site on Merriman Street on Millers Point and sites on the eastern foreshore to the south of **UDHB1** (Macphail 1994a, 2004a, 2013a).

Fig. 1: General locality map showing Millers Point and the Pyrmont Peninsula at the entrance to Darling Harbour. Hickson Road is located below and west of High Street. Sydney Observatory (built 1858) occupies the site of the Fort Phillip (built 1804) on the northern crest of the ridge separating Darling Harbour and Sydney Cove. Merriman Street (red dot) is one of the earliest streets constructed on Millers Point.

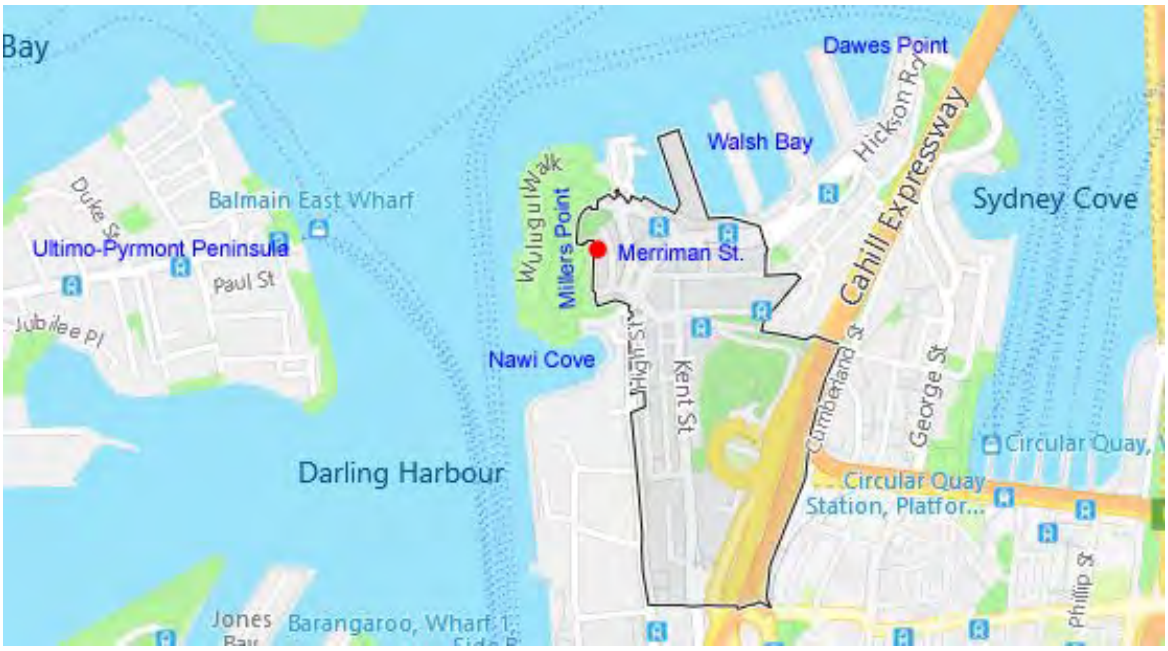


Fig. 2: Site of **UDHB1** (red spot) on the former foreshore of Darling Harbour. Hickson Road was constructed in 1909 (diagram supplied by Dr. Mary Casey, Casey & Lowe 2020)

2. SETTING

The geologic/geomorphic history, reconstructions of the prehistoric vegetation, and Indigenous and European activities (including boat-building) on Millers Point and the eastern foreshore of Darling Harbour, are reviewed in publications discussing the history of Sydney in general and Sydney Harbour in particular, e.g. Benson & Howell (1990), Hoskins (2009), Karskens (2009) and Casey & Lowe (2019). Changes to the waterfront landscape are illustrated in McCormick (1987) and documented in the sequences of maps published in Guides to Sydney, e.g. Burford's 1829 *Description of a View of the Town of Sydney* (Library of Australian History 1978a), *The New South Wales Calendar and General Post Office Directory 1832* (Trustees of the Public Library of NSW 1966), James Maclehose's *Picture of Sydney and Strangers' Guide in NSW for 1839* (John Ferguson Pty. Ltd 1977), James Fowles' *Sydney in 1848* (Ure Smith 1966), Gibbs, Shallard & Co's. *An Illustrated Guide to Sydney 1882* (Angus & Robertson Pty. Ltd. 1981), J.W. Waugh's *Strangers Guide to Sydney 1861* (Library of Australian History 1978b) and the *Official Handbook to the Port of Sydney* (Sydney Harbour Trust 1913). The progressive urbanization of Millers Point (formerly Cockle Bay Point) and around Walsh Bay separating Millers Point and Dawes Point are reproduced in *walshbayhistory.net/* and www.records.nsw.gov.au/archives...galleries/darling-harbour.

2.1 Timeline of developments on the Millers Point and Barangaroo foreshore

Before 1788 The eastern foreshore of Darling Harbour comprised several small sandy beaches, e.g. Nawi Cove, separated by laterally-extensive sandstone rock platforms abutting onto relatively deep water. The foreshore flora around Darling Harbour (then Cockle Bay) was not documented at the time of European settlement but fossil pollen and spores (microspores) support Benson & Howell (1990: 42) reconstruction that the pre-1788 vegetation growing on the sandstone ridge separating Darling Harbour from Sydney Cove was grassy *Eucalyptus* spp.–*Angophora* open woodland (Macphail 1999, 2004b) The same data show ferns and some sclerophyll shrubs were more common on sites closer to the foreshore than on the sandstone slopes to the rear. Casuarina (*Casuarina glauca*) swamp forest occupied swampy ground behind the mudflats exposed at low tide in Cockle Bay at the rear of the harbour. Mangroves (*Avicennia maritima*) were established on the same mudflats and probably also in crevices along the sandstone platforms elsewhere (Macphail 2013, 2018). Fires were prominent in the wider landscape.

c 1788-1815 The only fossil evidence of plant communities growing on Millers Point in the first decades of European settlement at Sydney Cove comes from soil infilling crevices in sandstone bedrock below the foundation of an 1820s timber cottage at 30 Merriman Street (Fig. 1). This soil preserved large numbers of broom heath (*Monotoca*) as well as casuarina (*Allocasuarina/Casuarina*), eucalypt (*Eucalyptus*) and grass (Poaceae) pollen (Macphail 1994a). Other woody shrubs were either rare or under-represented by pollen, possibly because of the high pollen influx from the regional pollen rain (see Section 3.1) or from locally-growing shrub casuarinas analogous to those that still remain common in coastal heath in Sydney e.g., the drooping she-oak *Allocasuarina verticillata*.

Few Europeans are known to have settled in the study area before *c* 1815, partly due to difficulty of access and partly because much of the sandstone ridge overlooking and foreshore of Darling Harbour was part of a military reserve (Fig 3). A flagstaff was erected on high ground overlooking Sydney Cove and Darling Harbour in 1788 and a fort (Fort Phillip) was built on the same site (now Observatory Hill) in 1804. By this time, sandstone outcrops were being quarried for building stone and post-windmills erected on summit of Millers Point by John Leighton. Milling of grain may or not have ceased before Leighton's death in an accident (falling off a ladder whilst drunk) in 1826 but the mill ruins survived into the 1840s (see de Vries-Evans 1983). An aquatint dated 1814 but possibly *c* 1816 (Fig. 4) shows the view looking westward over Darling Harbour from the ridge above Barangaroo. Depicted in the view are two of Leighton's three windmills on Millers Point, Nawi Cove

immediately to the south, a substantial two storey dwelling built on the foreshore, a Colonial fenced garden and Aboriginal camps (middle distance and foreground). Land to the south in Darling Harbour was reserved for Military use from 1788 into the 1820s-1830s.

Fig. 3: Undated (*c* 1810) map showing military establishments on the eastern foreshore of Darling Harbour (then known as Cockle Bay). The area below the Fort Phillip comprises a series of low sandstone cliffs (Fig. 5). Land fronting onto the foreshore north and south of Nawi Cove is annotated 'open forest land' (adapted fom Macphail 1994a).

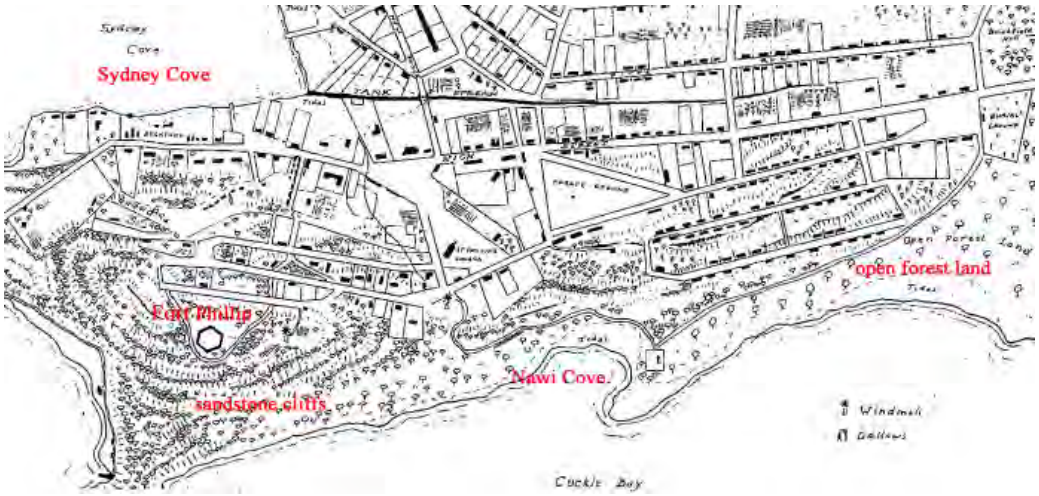


Fig. 4: View of Darling Harbour drawn from the ridge above Barangaroo in *c* 1814. Nawi Cove is the embayment immediately south of Millers Point. Two windmills had been erected on Millers Point and one on the tip of the Pyrmont Peninsula on the western side of Darling Harbour. Blues Point, which forms the northern end of the new *Sydney Metro* Harbour Tunnel, is just visible on the extreme left-hand side of the view (from McCormick 1987).

c 1815-1820 Stream-driven flour mills were established on the foreshore to the south of the UDHB1 site – Dicksons Mill in 1815 and Bakers Mills in 1827. Both had wharves extending into deep water for unloading grain as well as coal used to fire the boilers. The latter is circumstantial evidence that the ridge above the eastern foreshore of Darling Harbour had already been cleared of tall trees. Flour mills remained in operation around Darling Harbour into the 1870s and a sketch of Pyrmont Peninsula shows bushland still extended onto the foreshore and northwards to the point in *c* 1821 (Fig. 5).

Microfloras preserved in estuarine muds and silts on the Darling Quarter archaeological site (Macphail 2018) confirm that cereal pollen from these flour mills were dispersed by wind and water into Darling Harbour. By comparison, the native bush on the western side of Darling Harbour remained largely intact until the sale and breakup of the large early Colonial Ultimo Estate covering the Pyrmont Peninsula in the late 1850s, as did the bushland covering the North Shore (Milsons Point-Blue Point side) of the harbour (cf. Fig. 4).

Fig. 5: Sketch by Edward Mason showing Ultimo House with uncleared bushland extending onto the foreshore and up to the windmill on the tip of the Pyrmont Peninsula in 1821-1823 (from Library of Australian History 1978a)

1820s-1830s Only about 'half a dozen' houses were built on Millers Point during the 1820s. No buildings appear on the 1823 map of the study area despite several land grants encompassing the site (https://dictionaryofsydney.org/entry/millers_point, Casey & Lowe 2019). Limitations on the waterfront space within Sydney Cove led to wharves and warehouses being built alongside older boat building yards in Walsh Bay between Millers Point and Dawes Point (Fig. 6) and a whaling and sealing industry was established in this bay in the 1830s.

The 1831 map drawn for the NSW General Post Office Directory (Trustees, NSW Public Library 1966) shows numerous buildings inland of Soldiers Point, lining Kent Street, and scattered along the foreshore south of Millers Point. Tracks providing access to Millers Point (Fig. 6) were converted into streets running downhill onto the foreshore in the early 1830s, e.g., Clyde and Merriman Streets. The earliest 'enduring' ship-building yard in the area

was established by James Munn located at the foot of Wentworth (now Munn) and Clyde Streets in the mid to late 1820s (visitsydneyaustralia.com.au/lost-***clyde***-street.html).

Land grants encompassing the **UDHB1** site had been made as early as (although not built on) 1823. One parcel was sold to William Langford in 1833 and his house, which may have been already built (Figs. 7-8), first appears on the City of Sydney Survey Plan for 1833. The highest sample in a core of estuarine muds indicates pollution caused the inner reaches of Darling Harbour to become 'biological desert' in the 1830s and coal had replaced wood as the fuel used by industry (Macphail 2018).

Fig 6: Map showing streets and buildings constructed between on the foreshore between Dawes (lower RHS), Millers (upper RHS) and Soldiers (upper LHS) Points in 1831 (Trustees of the Public Library of New South Wales 1966).

Fig. 7: Undated view of Langford House (RHS) on the foreshore immediately south of Millers Point. If the (working?) windmill visible on densely-settled headland is one of those erected by John Leighton, the view is likely to date to the 1830s (SLNSW ML, DGD 5IE650340, File No. FL650451).

Fig. 8: Wrecks of vessels on the foreshore below Langford's house (SLNSW ML, DGD 5, IE650340, File No. FL650475).

1840s-1860s Numbers of residents inhabiting Millers Point were sufficient large to support the building of a local school in 1833, and a pub (Lord Nelson) and gasworks (*Australian Gaslight Company*) in 1842. By the 1850s, the area is described as being occupied by wharf owners, ship captains, merchants, artists and laborers, with the mercantile elite building fine homes on elevated streets and workers living in small cottages near the wharves with Millers Point described as the 'most intensely maritime area' in Sydney Harbour (https://dictionaryofsydney.org/entry/millers_point). During the same period, the tidal mudflats and sandstone shelves lining the foreshore were steadily reclaimed and buried beneath privately-owned wharves and other buildings linked to maritime commerce. For example, 'suspicion' existed that the *Australian Gas Light Company*, whose wharf was established on the foreshore in 1843, was illegally dumping waste coal, ash and other rubbish to extend their property (Hoskins 2009: 175).

Prior to the construction of an underground sewer system in Sydney between 1855 and 1857, disposal of human waste (and storm water) was usually via cesspits or and streets-drains, most of which eventually flowed into the harbour on the 'belief that the tides would carry the untreated sewage away' (cf. Wong 1999: 63, Macphail 2013b). Sewage and offal from slaughter houses polluted Darling Harbour, to the extent that in the 1860s the smell 'on a close morning [was] almost overpowering' (Hoskins ibid: 124). Similarly, huge amounts of refuse, sand and silt washing down local drains, were causing 'shoaling' of Darling Harbour at a rate of about 1 metre per year over the same period. By 1861 much of the native bushland had been cleared from the Pyrmont Peninsula and factories built on the western foreshore (Fig. 9)

Unravelling the pre- and post-abandonment history of the **UDHB1** site (Fig. 10) is complicated by a succession of sales, land grants and foreshore reclamations, several of which are critical to dating the period the boat was exposed to tidal water on the foreshore. Key events are (Casey & Lowe 2019: 5):

- 1843 – The *Australian Gaslight Company* (AGL) builds a wharf on the foreshore to the south of the study site.

- 1855 – A boatshed is shown on land to the south of Langford's House on the City of Sydney Council Detail Survey Plan.
- 1858 – An application is made to reclaim foreshore land and a wharf with a seawall built on the same land (Fig 9). A house and boatshed had been completed here by 1864.
- 1859 – The Argyle Cut is completed, joining Millers Point and industries on the Darling Harbour foreshore to the densely-populated Rocks on the western side of Sydney Cove.
- 1865 –A slipway, wharf and dock is built on reclaimed land on the adjoining allotment by the shipbuilder John Cuthbert. By the time (1876) this property was purchased by George Dibbs, amenities included cottages, a sawmill (Cuthbert's sawshed) and workshops/stores.

Fig. 9: View over Darling Harbour from (cleared) Observatory Hill in 1861. Native bushland still covers much of the northern side of Sydney Harbour (Library of Australian History 1978b)

Fig. 10: Photograph showing the location of the boat (**UDHB1)** on the foreshore below an overhanging sandstone outcrop and foundations wall of Langford's House. The remains of Cuthbert's sawshed are just visible on the upper LHS of the photograph (Casey & Lowe 2022)

1870s-1960s During this period, foreshore properties became amalgamated and their wharves (Figs. 11-12) progressively replaced by finger wharves (see Port of Sydney 1913). These were demolished and the remains and those of other Colonial wharves and seawalls buried under the 1960s-2000s container wharf. By *c* 1870s, Clyde Street had become one of the most densely populated streets in Sydney and, up to the outbreak of bubonic plagues in 1900-1901, houses here were in great demand due to their proximity to the Darling Harbour wharves and goods yards (Fig. 13). Boat-building was supported by local timber yards, coal depots, and iron works one of which was established on the Pyrmont Peninsula waterfront in *c* 1867. The harbour continued to be the dumping ground for sewage and offal (the latter supporting large numbers of shark), with the annual influx of human excrement per person estimated to be able to grow 363 kg (800 lbs) of wheat or barley if converted to agriculture manure (Hoskins 2009: 178-179). The discharge from the principal sewer outfalls in Darling Harbour, Sydney Cove and adjacent bays continued to cause serious pollution, with 'solid matter' forming 'banks' at low tide into the 1870s. The poet Henry Lawson recorded children collecting other 'waterborne mess' such as butter boxes, fruit cases and bottles dumped from ocean-going vessels in the 1890s (Hoskins ibid: 173). Events impacting on the **UDHB1** site include:

- 1877 – Dibbs extends his jetties into Darling Harbour. A Reclamation Plan proposes Clyde Street be extended onto the reclaimed waterfront.
- 1879 – Dibbs formally granted his reclaimed foreshore land.
- 1881 – Dibbs purchases the land formerly owned by Thomas Langford (and the half share thereof owned by his brother William).
- 1882 – A wharf belonging to Dibbs is shown on the western side of Millers Point (Fig. 12).
- 1880s –Langford's House and boatshed had been demolished. The end of Clyde Street is fenced off from the waterfront (cf. Fig. 13, 14).
- 1909 – Construction of Hickson Road along the foreshore east of Nawi Cove.

- 1960s –demolition of the late 1800s-1900s wharves to form the overseas container wharf.

Fig. 11: Map showing urban developments on the eastern and western foreshores of Darling Harbour in 1861. Wharves appear to line both sides of Nawi Cove (Library of Australian History 1978b).

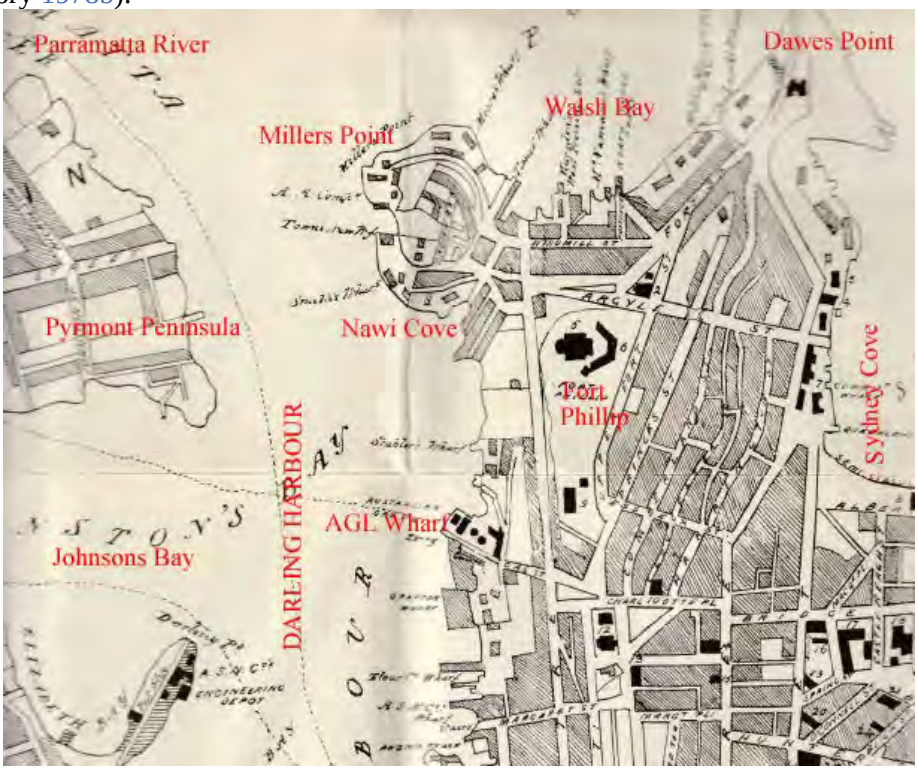


Fig. 12: Gibbs, Shallard & Co's map of Darling Harbour in 1882. Wharves 47 and 261 are listed as belonging to the *AGL* and Dibbs, respectively (Angus & Robertson 1981)

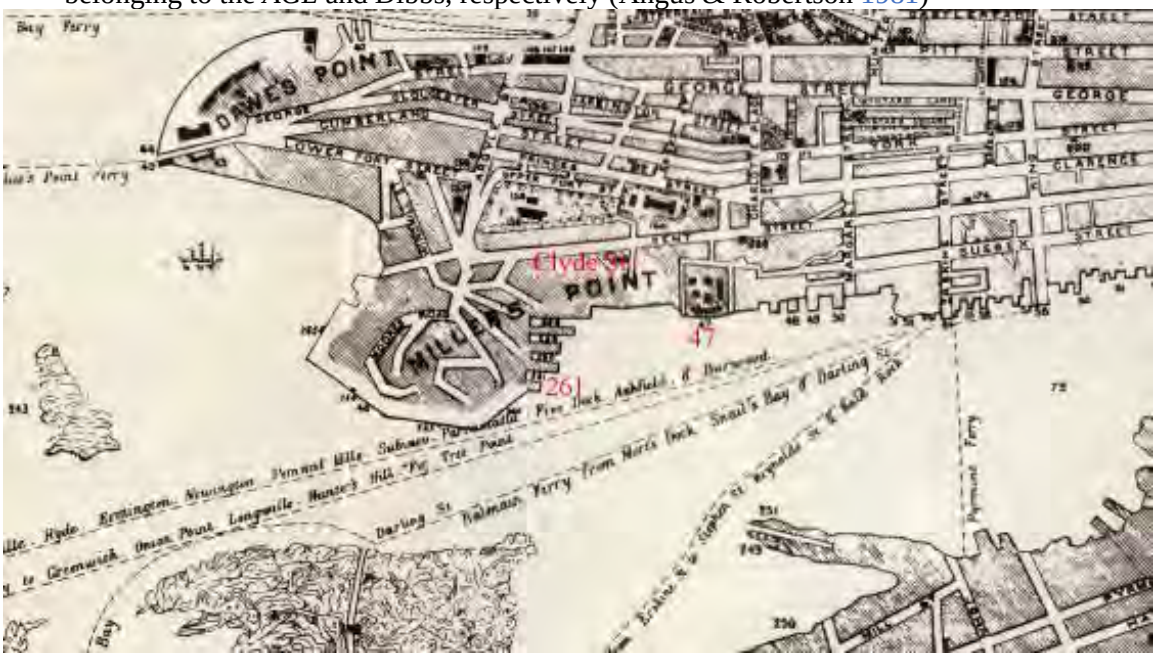


Fig. 13: Undated view looking down Clyde Street *c* 1890-1900 when the street was still lined by two-storey houses. The fenced-off waterfront end of the street terminates between wharves (i.pinimg.com/originals/28/52/05/285205acd7305d5c37c2fbfca7c2cd0d.jpg)

2.2 UDHB1: archaeological context and age limits

The architecture, local materials used in, and the stratigraphic relationships of this clinker-built vessel (Table 2) are critical to determining when and where **UDHB1** was constructed, its use as a working vessel, and subsequent history after being abandoned on the foreshore below Langford's House.

Table 2: Context numbers for sediments and archaeological remains within and around **UDHB1**.

CONTEXT	**Description** (from Casey & Lowe 2020)
107, 145	Sandstone blocks of Langford's House (**CTX 107**) and wharf (**CTX 145**)
112	Cut-back sandstone shelf overhanging the foreshore (Fig. 12)
114	Construction fill used to raise the level of the extension to Clyde Street in c. 1880s
127	Eastern wall of Cuthbert's sawshed built c 1860 (Fig. 12)
132, 133	Grey (**CTX 132**) and yellow (**CTX 133**) intertidal sands overlying Boat (see Figs. 14-16)
140, 148	Timbers forming UDHB1, including the hull, frames and decking (ceiling) (CTX 140) and those loose timbers dumped above the ceiling (CTX 148)
149	Grey sand with silty organic lenses (see Fig. 15) surrounding UDHB1

2.21 Architecture and use

Eucalypt (chiefly Sydney blue gum *Eucalyptus saligna*) and banksia (*Banksia*) wood were used in the construction of the vessel. A second layer of blue gum planking may have been added at a later date to prolong the working life of the vessel. Size (*c* 9 m), mode of propulsion (oars, not sails) and cargo capacity (*c* 10 tonnes) imply the vessel could have been used for fishing and/or as a lighter to transport cargo such as grain and shell from Aboriginal middens (used to make lime mortar) around the harbour. The lack of a mast is against **UDHB1** being used to pick up grain from Parramatta or voyaging outside Sydney Heads (C. Coroneous email 6/9/20).

2.22 Age limits based on archaeological evidence

UDHB1 could have been built in the 1790s despite the government ban on local boat-building in the first decades of European settlement. For example, the value of Australian trees for boat-building was recognized as early as 1796 when Capt. Henry Waterhouse (i) used local timbers to repair his 'decrepit' vessel, the *Reliance*, berthed in Sydney Cove and, in 1802 (ii) confirmed that eucalypt wood from trees felled in *c* 1788 and rolled into the harbour, remained unaffected despite immersion in saltwater for over a decade (Hoskins 2009: 61).

Maximum age limit: When **UDHB1** was constructed has yet to be confirmed. Reports of its age vary from *c* 180 to 200+ years i.e., placing its construction to any year between 1810 and 1840 in Sydney. The current consensus is the vessel dates to *c* 1810-1820 (cf. Coroneous *et al*. 2020).

Minimum age limits: Archaeological evidence indicates **UDHB1** was abandoned on the foreshore below Langford's House at about the time his shipyard started operation in the 1830s and then remained exposed to the elements up into the 1850s. This is based on: (1) the date when the eastern wall of Cuthbert's sawshed was built in *c* 1860 over foreshore sand that partly covered **UDHB1**'s bow and (2) the boat's proximity to the boundary wall of Langford's House (see Figs. 14-16). The 1880s extension of Clyde Street extended across yellow and grey intertidal sands which onlap (and therefore postdate) construction of a seawall for Langford's wharf in *c* 1830 (Fig. 17).

Fig. 14: Diagram showing the location of **UDHB1** relative to Cuthbert's saw shed and the 1830s sea wall marking the boundary of Langford's property (Historical Atlas of Sydney, City of Sydney Archive. Annotations by Casey & Lowe).

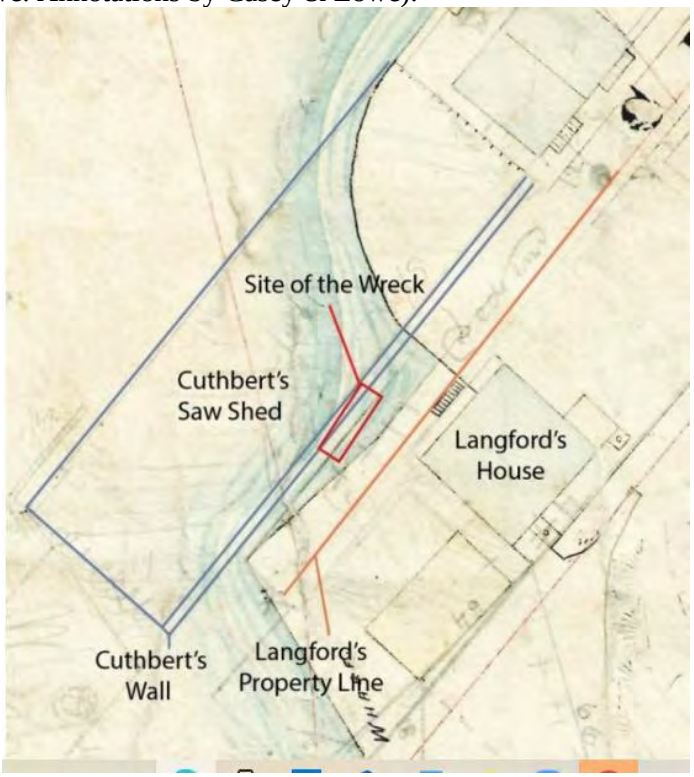


Fig. 15: Photograph showing the still partially -buried remains of **UDHB1** in relation to Cuthbert's sawshed and the 1830s sea wall marking the boundary of Langford's property (from Casey *et al*. 2020)

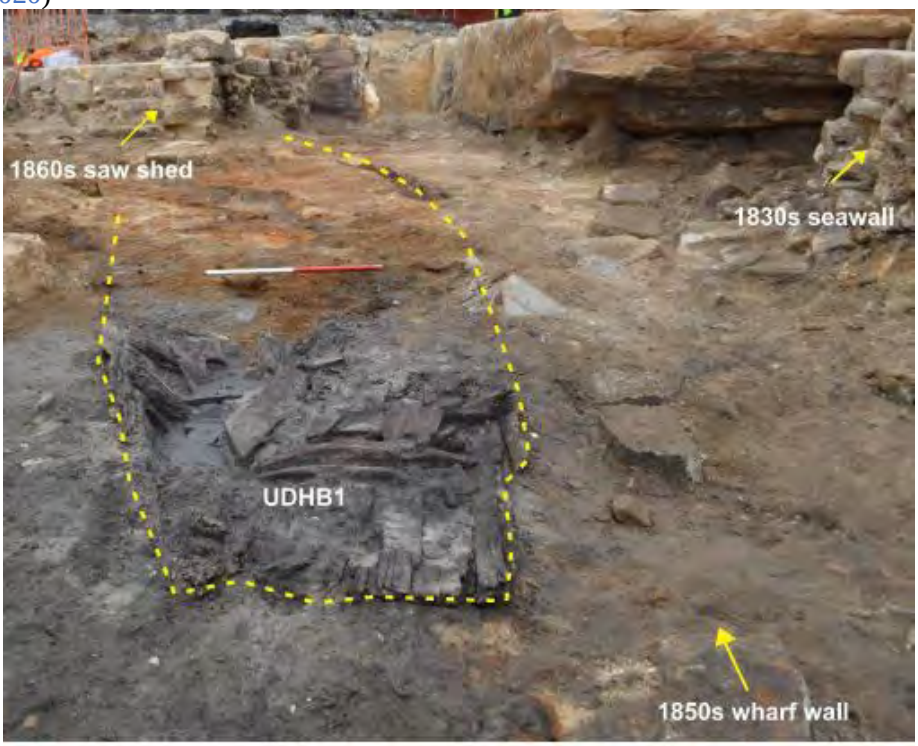


Fig. 16: Photograph showing the fully-exposed remains of **UDHB1** (**CTX 140**) and loose contents (**CTX 148)**, in relation to Langford's House (**CTX 107**), the wall of his wharf (**CTX 145**: yellow line), the eastern wall of Cuthbert's sawshed (**CTX 127**: red line) and the western curb of Clyde Street (**CTX 114**: blue line) (from Casey & Lowe 2018, reproduced in Casey & Lowe 2020)

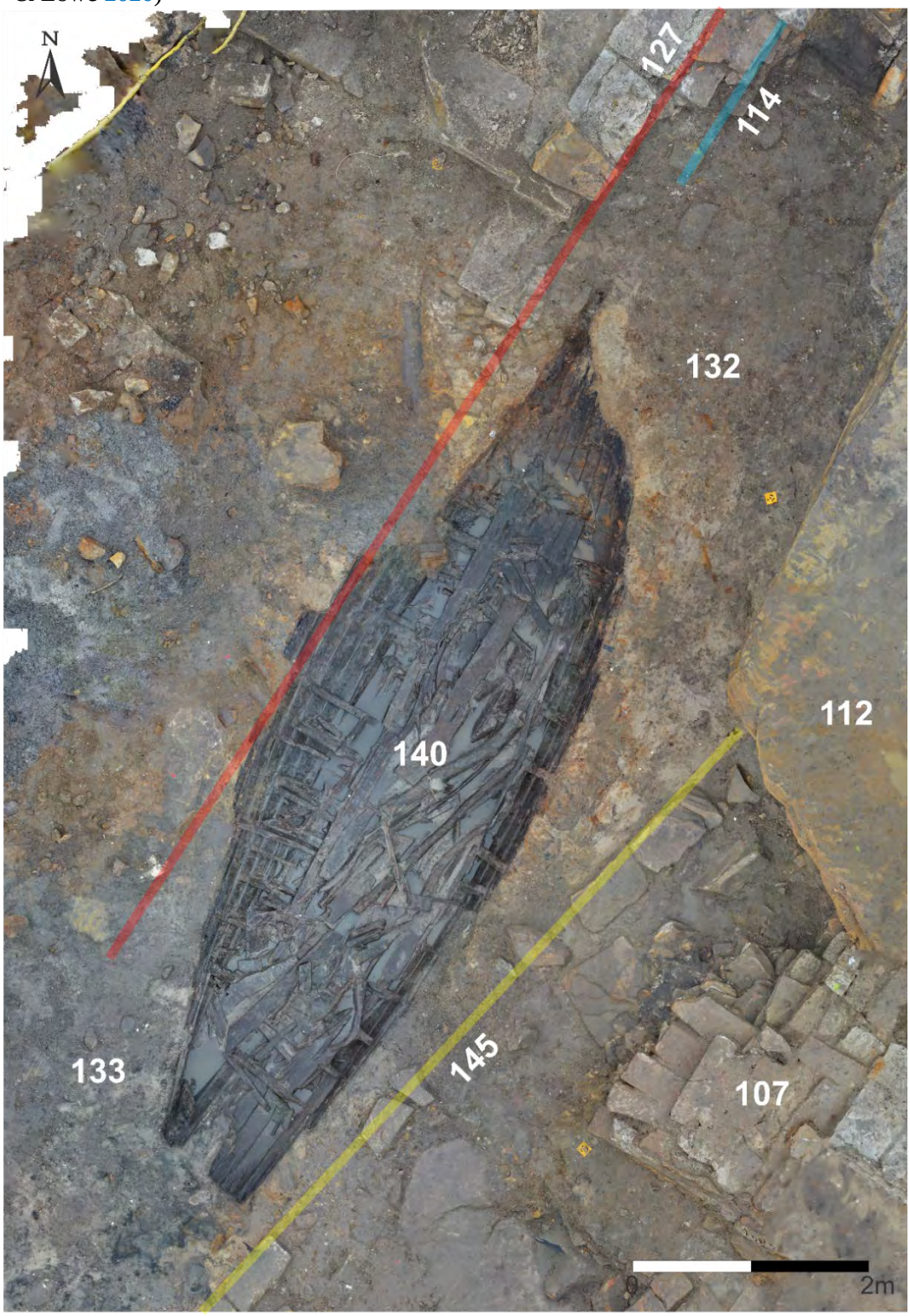


Fig. 17: View of the excavated area showing (i) the paved area at the end of Clyde Street terminating on the former foreshore of Darling Harbour and (ii) stone steps leading down onto the waterfront on the RHS of the photo (from Casey & Lowe 2019)

2.23 Stratigraphy

Relative level data (m AHD) indicate the exposed remains of **UDHB1** were inundated by tidal water twice daily after abandonment and also were subject to run-off from Clyde Street prior to the extension of this street in the *c* 1880s. Intertidal sediments deposited before **UDHB1** were finally buried under reclamation fill (1840s-1860s) comprised (a) yellow ('cleaned-up') quartz intertidal beach sands (**CTX 132**) contemporary with intertidal grey sands (**CTX 133**) overlying UDHB1 and built up against the seawalls, (b) artefact-rich grey sands with lenses of organic-rich silts (**CTX 149**) deposited around and partially beneath the boat (Figs. 18-19) and (c) organic-rich dark grey silty clays recovered from the bilge below the decking ('ceiling') planks (**CTXs 151, 154, 155 157, 158, 159**). The last deposits retained a distinct 'estuarine mud' smell due to their preservation in an anoxic environment. Bagged subsamples submitted for pollen analysis in August 2020 had oxidized from the original dark grey colour to a dark red-brown colour. "Foreign' material in these samples included rootlets, unidentified organic matter, wood slivers, mica, charcoal and coke fragments.

Fig. 18: Sequence of yellow and grey estuarine sands (**CTX 132**) and silt and grey, organic rich laminae (**CTX 149**) built up against the wall of Langford's wharf (Casey & Lowe 2020).

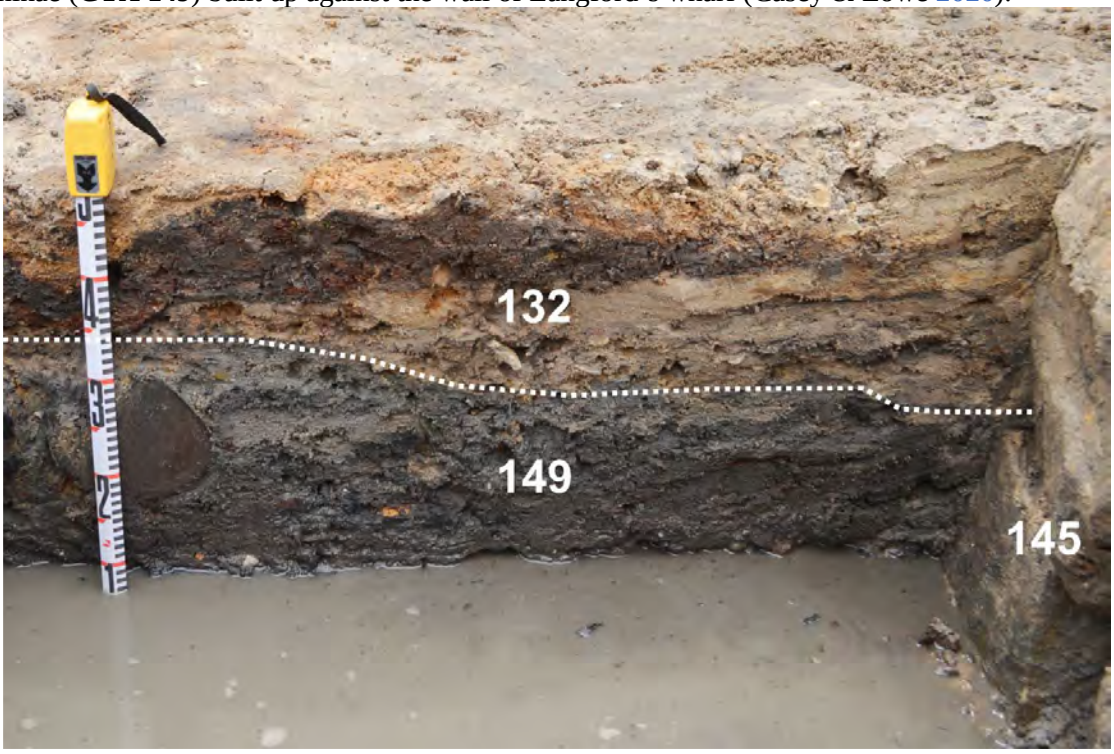
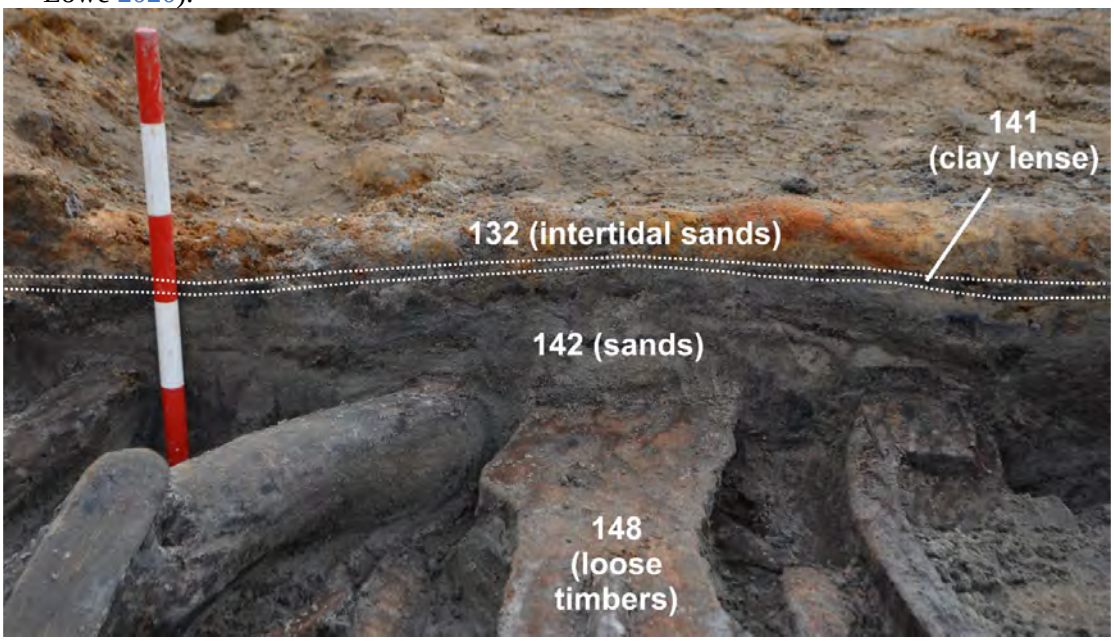


Fig. 19: Sequence of yellow intertidal sands (**CTX 132**) and grey sands with organic-rich silt laminae (**CTXs 141, 142**) overlying the loose timbers (**CTX 148**) within UDHB1 (Casey & Lowe 2020).



3. POLLEN ANALYSIS

All samples were processed for pollen spores and other acid-resistant organic microfossils by *Morgan Goodall Palaeo* Pty. Ltd., Perth. Estimates of the relative abundance of identifiable microfossils are given in Table 3. Individual samples are discussed and photomicrographs of the acid-resistant organic extracts and a selection of better-preserved miospores given in Appendix 1 and Appendix 2, respectively.

In this study, the key palynological criteria used to determine the age limits, depositional environment and cultural implication(s) of the samples are:

- The presence or absence of cereal and heath pollen, and the sewage indicator *Cloacasporites sydneyensis.*
- The probable time when native trees, shrubs and herbs forming native heath were finally extirpated from the eastern foreshore of, and ridge behind Darling Harbour.

3.1 Background

Age limits and inferred depositional environments of sediments and soils on Sydney archaeological sites are based on a combination of archaeological and stratigraphic evidence (Section 2.2), supported by the presence or absence of pollen of plants introduced by Europeans between 1788 and the 1850s.

In this study, distinguishing between sediments deposited when **UDHB1** was in use and after the vessel was abandoned on the foreshore, relies on finding (if preserved) (i) unequivocal pollen or other microfossil evidence of its cargo and (ii) being able to distinguish these from microfossils deposited in the boat from tidal water and/or runoff from street drains, domestic plumbing and (any) plantings around adjacent buildings such as Langford's House. Accordingly, limitations on interpreting the microfossil data from the **UDHB1** site are:

3.11 Depositional constraints

Only part of the flooring (ceiling) overlying the bilge deposits in **UDHB1** was intact and important *caveats* are: (1) Pollen of heath plants potentially might have come from any place visited up to the time the vessel was abandoned below Langford's House (see above) or transported by tidal water across Darling Harbour from the western foreshore. (2) The same microfloras almost certainly will incorporate pollen deposited between the time it was abandoned, and finally buried under intertidal silts, sands and reclamation fills.

3.12 Taxonomic and ecologic constraints: Most fossil pollen and spores can only be identified to living plant family or genus, although this is helped in some cases by only one or two species occurring in the Sydney flora e.g., broom spurge (*Amperea xiphoclada*), the native hop (*Dodonaea triquetra*) and rough tree-fern (*Dicksonia antarctica*). The ecological interpretation is helped by many genera and families typically occurring in a narrow range of habitats e.g., samphires (Amaranthaceae) in salt-marsh or on salinized soils.

A number of the unidentified angiosperm pollen types found in Sample 36 (**CTX 149**) and the four bilge samples potentially represent exotic plants (see Appendix 2). For example, a stephanocolpate grain recorded in Sample 33 (**CTX 157**) could represent a native Labiatae e.g., self-heal (*Prunella vulgaris*) or mint *(Mentha* sp.), or an exotic species of basil (*Clinopodium*). Cryptogam spores are of limited use on this site since many ferns grow equally well on damp sandstone outcrops as on sandstone foundation walls. Exceptions are spores of swamp selaginella *(Selaginella uliginosa*), which are likely to be carried onto the site in mud, and spores of the tree-fern genera *Cyathea* and *Dicksonia*, which are likely to come from Colonial gardens.

3.13 Pollen transport constraints: Most of the commonly-occurring native pollen types are produced in very large numbers by the parent plants and transported over long distances by water and wind (well-represented taxa): The primary examples in this study are casuarinas (*Allocasuarina/Casuarina*) and eucalypts (*Eucalyptus*), which dominate the sclerophyll forests, woodlands and heath growing on sandstone in the Sydney region. For the same reason, their pollen dominate the regional pollen rain over Sydney. Accordingly, high relative abundances of these pollen types can indicate local-growing stands or distant forests and woodland if the pollen influx from other locally-growing plants is low or (cleared or built-on land) non-existent. In the same 'well-represented category' are the broom heath (*Monotoca* sp.), broom spurge (*Amperea xiphoclada*), the native hops (*Dodonaea* spp.) and raspworts (*Gonocarpus*), all of which are listed as widespread on old sand dunes and heath growing on sandy soils in Sydney (Fairley & Moore 1995).

Pollen of the broom heath genus *Monotoca* pollen are present in trace to low (≤ 1%) numbers in many Colonial deposits in Sydney, dating to the 1820s-1840s. Relative abundances greater than 4-5% are unusual, implying broom heath had a restricted distribution around Sydney (Macphail 1999; M.K. Macphail unpublished reports 1987-2020). Significantly, the only samples from Darling Harbour where pollen relative abundances exceed *c* 5% in contexts pre-dating the 1820s are at Barangaroo, Merriman Street on Millers Point, and the KENS site on Kent Street (Macphail 1997a, 2004a, 2013). In contrast the CSR and SICEEP SITES show the broom heath occurred on the Pyrmont Peninsula into the 1860s (Macphail 1997b, 2014).

Other native sclerophyll shrubs and herbs produce either limited amounts of pollen and/or disperse these only over small distances (under-represented taxa) and low (<2%) to trace numbers of their pollen are still evidence that the parent plants were growing locally. Examples in this study are epacrids (Ericaceae) producing pollen in obligate tetrads, proteaceae (Proteaceae) e.g., banksia (*Banksia*), and herbs except native grasses (Poaceae).

3.14 Imprecisely known sources of exotic pollen: Pollen of the cereal grasses represent a number of crop species and, empirically, are widely dispersed by water, stock and humans, although not usually by wind. Sources in the Colonial period include flour mills, plants established from spilled seed, and sewage (Macphail 2013a). Dandelions: All dandelions (Asteraceae subfamily Liguliflorae) are under-represented by pollen and sources include the native daisy yam (*Microseris lanceolata*). However, on almost all archaeological sites in Sydney, the sources will be the introduced weed genera *Taraxacum* (European dandelion) or *Sonchus* (sow- or milk-thistles). These 'weeds, silene (*Silene*) and wire-weed (*Polygonum aviculare*) appear to have become widely naturalized by the early 1800s e.g., by stock and from seeds imported in grain (Macphail 2013a, 2018).

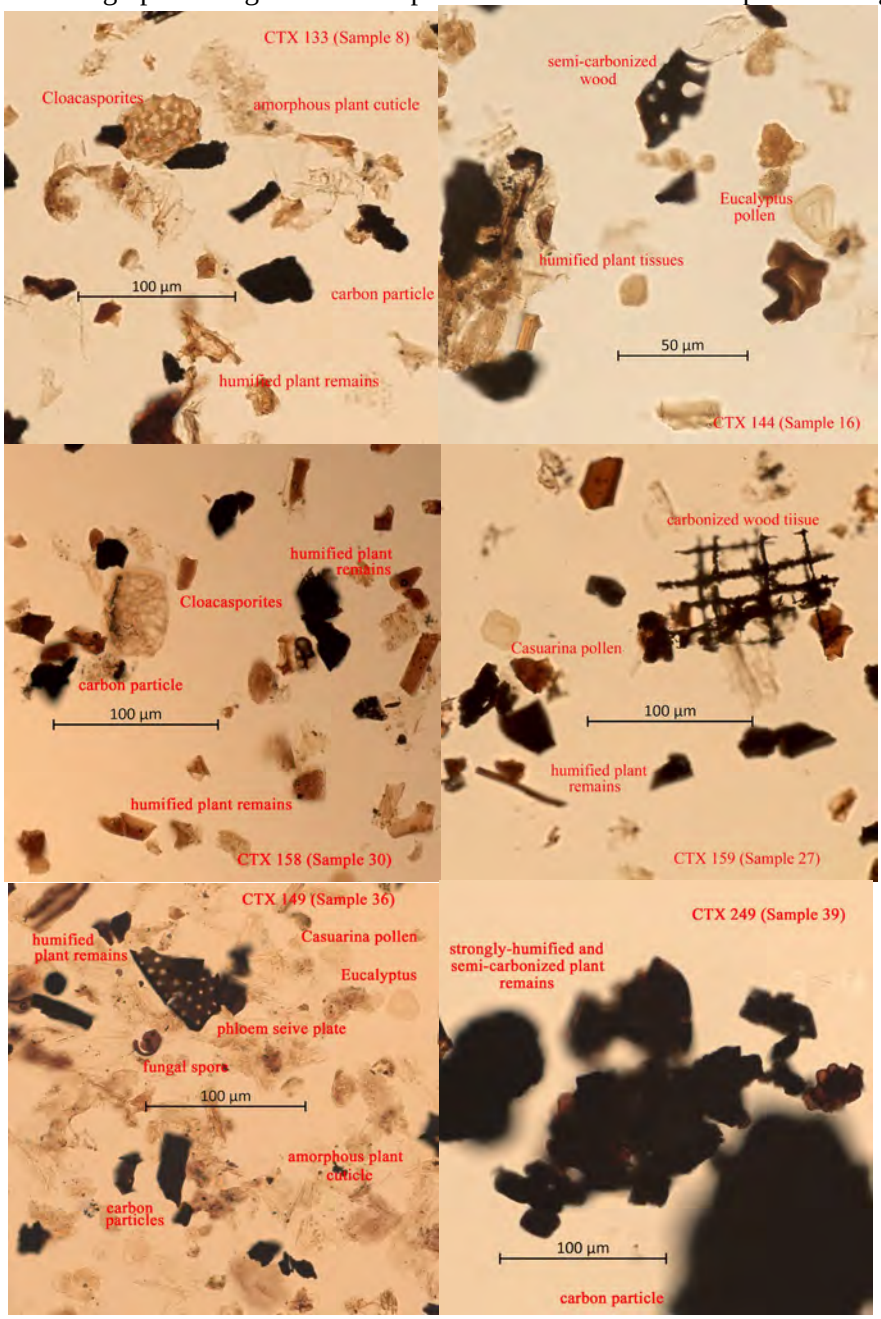
3.15 *Cloacasporites sydneyensis*:
The presence of human sewage can be indirectly inferred from the enigmatic microfossil *Cloacasporites sydneyensis*, presumed to be the egg case of a gut parasite or insect using faeces as part of its breeding cycle (Macphail *et al*. 2012). The microfossil has not been recorded in any confirmed prehistoric context elsewhere and, for the same reason, is useful indicator of a Colonial period age for historic archaeological deposits in the greater Sydney region. It is possible that the abandoned boat was used as a *de facto* latrine before being buried.

3.2 Results

3.21 Organic yield and preservation

All samples preserved abundant fungal spores in a matrix of strongly humified (dark brown) to well-preserved (mid-brown) plant detritus, including fragments of leaf cuticle, and semi-carbonized to carbonized (burnt) plant tissues (dark brown to black) (Fig. 20). Yields of fossil pollen and fern spores were ± low. Colour and preservation were variable, with the former ranging from white to dark brown, the latter from poor (ghosted) to good. Both phenomena are consistent with the fossil pollen and spore assemblages (microfloras) had accumulated over a prolonged period.

Fig. 20: Photomicrographs of organic detritus preserved in the control samples and bilge deposits



3.22 Depositional environment.

Two samples of intertidal sediment (Samples 8, 39) and one sample of clay deposited directly on the timber of the vessel (Sample 16) preserved the trochospiral liners of brackishwater to marine foraminifera. Otherwise, the microfloras comprised only terrestrially-sourced microfossils

3.23 Contamination, reworking and bioturbation

Unequivocal modern contaminants were not recorded. Trace numbers of a reworked Triassic? conifer pollen occur in 'run-off' Sample 36 (**CTX 149**) and the Permian conifer *Protohaploxypinus amplus* in bilge Samples 27 (**CTX 159**) and 30 (**CTX 158**). Sources include crushed Triassic Wianamatta Shale (used for making sandstock brick and paths), Triassic shales exposed by quarrying, and Permian coal, respectively.

Egg cases of unidentified soil microfauna occur in all samples but are common only in Sample 33 (**CTX 157**). Accordingly, it is probable cereal pollen in Sample 24 **(CTX 154)**, Sample 27 (**CTX 159**) and Sample 36 (**CTX 149)** and dandelion (Liguliflorae) in the first two of these (bilge) samples are *in situ* (Table 3).

3.24 Dominance and diversity.

Except for the dark grey/black sands (**CTX 249)** (palynologically barren), all samples yielded essentially the same microflora in which *Allocasuarina/Casuarina*, *Eucalyptus* and *Gonocarpus* were common to abundant and non-eucalypt Myrtaceae, and Asteraceae subfamily Tubuliflorae consistently frequent. *Calochlaena*, *Banksia*, Ericaceae, *Monotoca* Amaranthaceae, Apiaceae, Brassicaceae and Poaceae were sporadically frequent.

The miospores of other shrubs herbs and ferns were rare or absent. although the overall diversity is comparable to other historical archaeological sites in Sydney and Parramatta, except for the consistent presence of three genera (*Banksia*, Ericaceae, *Monotoca*) that are typically of heath communities growing on sandstone soils.

The microfloras fall into two subgroups:

- Samples with frequent (2-6%) *Monotoca* [Samples 36 (**CTX 149**), 24 (**CTX 154**), 27 (**CTX 159**), 30 (**CTX 158**) and 33 (**CTX 157**)]
- Samples lacking *Monotoca* [Samples 8 (**CTX 133**) and 16 (**CTX 144**)]

The latter (Samples 8, 16) represent intertidal or run-off deposits, while the others are clayey silts deposited around the boat or within the bilge of **UDHB1**.

3.3 Interpretation

In this study, the four criteria used to determine the maximum and minimum age limits and much less certain, the areas visited by the vessel when in use are:

- Depositional environment.
- The presence and implications of significant numbers of exotic types such as cereal pollen, the European dandelions (Liguliflorae) and wire-weed (*Polygonum aviculare*-type).
- The time when native trees, shrubs and herbs forming native heath were finally extirpated from the eastern foreshore of, and ridge behind Darling Harbour, in particular *Monotoca*.
- The time when Darling Harbour first became polluted by human sewage.

3.31 Depositional environment

Estuarine deposits comprise a mixture of sand, silts and organic matter whose local composition reflects the energy of the water transporting these sedimentary particles. For example, sands are

more likely to be transported by wave and stormwater and deposited close to the foreshore while silts and clays are more likely to be deposited in deep or still water e.g., during high tides, or at the rear of a sheltered embayment (cf. the mudflats in Cockle Bay).

These considerations indicate: (1) The mix of sands, silts and clays on and around **UDHB1** is more consistent with sediment being trapped in or against built structures, not deposited on an exposed foreshore near the entrance to Darling Harbour. (2) The dark silty clays deposited in the bilge and the possible subfloor deposit (**CTX 144**) accumulated in still or deep water, although not necessarily at the same time. (3) The grey sand (**CTX 133**) and artefact-rich silt/sand (**CTX 149**) were deposited under more energetic conditions e.g., in stormwater draining a built-up area.

Stratigraphic considerations confirm that intertidal sediments overlying and deposited above the ceiling planks of **UDHB1** (**CTXs 133**, **144**) will be co-eval with, or more likely younger than the bilge deposits (**CTXs 154**, **157, 158, 159**) and the 'run-off' deposits from Clyde Street (**CTXs 149, 249**).

3.32 Source vegetation

Pollen transport considerations imply microfloras with significant relative abundances of *Banksia*, Ericaceae and *Monotoca* pollen represent heath communities growing on the eastern foreshore of Darling Harbour although it is not possible to rule out sources on the western foreshore (and northern side of Sydney Harbour) if these date to the period before **UDHB1** was abandoned. Two of the rare under-represented herbs (*Epilobium*, *Typha*) recorded in **CTX 133** and swamp selaginella (*Selaginella uliginosa*) whose spores are found in three of the bilge samples (**CTX 154**, **158**, **159**) are restricted to wet heath and may have come from the inner reaches of Darling Harbour.

Samphires or, less likely, a salt-tolerant shrub in the same family (Amaranthaceae), almost certainly were growing locally on the foreshore or in the intertidal zone. The 'weed' herbs Asteraceae, Brassicaceae, Poaceae and *Stellaria* are typical of open or waste ground on the foreshore. The source of *Gonocarpus* pollen is uncertain since the two species in the Sydney flora occupy disparate habitats (open forests, scrub and heath *vs* wet ground and swamp margins).

3.33 Age limits

Except the yellow beach sand (**CTX 249**), all samples preserved trace to numbers of one or more exotic pollen types and as well as the sewage indicator *Cloacasporites sydneyensis*). Three of the bilge samples (**CTXs 154**, **159**, **158**) and one of the three samples of intertidal sediments overlying or around **UDHB1** (**CTX 149**), preserved trace numbers to 1% of cereal (Cerealia) and *Monotoca* pollen. All confirm the sampled deposits in and around **UDHB1** post-date European settlement around the foreshore of Darling Harbour. Pollen of wind-pollinated conifers such as Northern Hemisphere pines (*Pinus*), which typically first appear in the fossil pollen record in the Sydney CBD in the mid-1800s were not recorded, hinting the samples are older than *c* 1850s-1860s (cf. Macphail 1999, Macphail & Casey 2008).

Maximum age: Assuming that bioturbation has been minimal, cereal pollen in three of the four bilge samples (**CTXs 154**, **158**, **159**) indicate the vessel postdates construction of Dicksons Mill in 1815. Potential sources of these pollen are in order of decreasing probability: (a) flour mill (and other) waste discarded into the harbour, (b) human sewage (from coarse breads in the typical Colonial diet), and (c) grain being transported as cargo.

Accordingly, the preferred maximum age limit is the bilge deposits postdate the early 1830s when Darling Harbour first became awash (literally) with floating sewage.

Minimum age: At the time of writing, documented urban developments make it likely that *Monotoca* had been extirpated from Millers Point and less certain from the eastern foreshore of Darling Harbour by mid-1800s (smh.com.au/…millers-point/history.htm).

If correct, then (1) the bilge deposits and sample of artefact-rich sand/silt ('run off') deposit are no younger that the late 1840s-early 1850s and (2) other foreshore sediments and the clay lens deposited on the sides of the hull of the vessel e.g., **CTX 144,** are younger and may date to the 1850s-1860s.

3.6 Conclusions

The combined data are consistent with **UDHB1** being:

- Constructed after 1815.
- Abandoned on the foreshore where the boat wreck was exposed to tidal- and stormwater from the 1830s into the late 1840s-early 1850s.

Numbers of cereal pollen and *Protohaploxypinus amplus* are inadequate to deduce the cargo included grain or coal and, by extrapolation, none of the deposits date to the period when **UDHB1** was in use as a working vessel. However, there is nothing in the data against **UDHB1** having visited the inner regions and western foreshore of Darling Harbour or the Pyrmont Peninsula.

Table 3: Estimates of relative abundance, Barangaroo Boat samples expressed as a percentage of the pollen count excluding reworked pollen, hepatic and fungal spores, algal cysts, and microfaunal remains. '+' indicates values <1%; values in parentheses are raw counts

FOSSIL TAXON	Common name (Sample No. >) (Context No. >)	Control samples			Samples from within vessel				
		8	36	39	16	24	27	30	33
		133	149	249	144	154	159	158	157
Exotic taxa									
Asteraceae (Liguliflorae)	dandelion					+	+		
Cerealia (Poaceae >40µm)	cereal		+			+	1%	+	
Carduus-type	plumeless thistles		+		2%	1%			+
Cucurbitaceae	melon family					?			
Polygonum aviculare-type	wireweed	+	1%		+	1%	+	+	+
Silene-type	silene					+		+	
Native trees and shrubs									
Acacia	wattle	+						+	
Allocasuarina/Casuarina	casuarina	32%	27%		27%	31%	27%	35%	30%
Amperea xiphoclada	broom spurge		+		+	+		+	+
Banksia cf. *serrata*	old man banksia?	+	+		+	1%	1%	+	2%
Banksia spp.	banksia		+			+	+		+
Dodonaea triquetra	native hops	+						+	+
Ericaceae	heath	3%	1%			+	2%	+	1%
Eucalyptus	eucalypts	19%	26%	(2)	34%	32%	21%	29%	30%
Other Myrtaceae	(non-eucalypts)	1%	5%		2%	1%	4%	3%	3%
Micrantheum	-					+			
Monotoca	broom heath		5%			2%	6%	6%	2%
Grevillea/Hakea	grevillea/hakea		+		+	1%	+		
Petrophile sessilis	prickly cone sticks		+						+
Pimelea	rice flower					+	+	+	
Polygalaceae	milkworts		+						
Rutaceae	boronia family	?					?	?	
unassigned Proteaceae	protea family		+		+	+	+	+	+
Native herbs									
Amaranthaceae	samphires	3%	2%		1%	+	1%	1%	+
Asteraceae (Tubuliflorae)	daisy/daisy-bush	5%	2%		4%	1%	2%	2%	1%
Brassicaceae	crucifers	2%	3%		+	2%	+		
Cyperaceae	sedges						+		?
Epilobium	willow herbs	+							
Goodeniaceae	guinea flowers	+			+		+		
Gonocarpus	raspwort	17%	18%		20%	12%	25%	17%	21%
Liliaceae	lily family	+	+			+	+	+	
Poaceae	grasses	2%	+			4%	+	+	+
Stellaria	starwort		+				+		
Typha	bul-rush	+						+	
unassigned pollen types	-	+	2%+		2%	3%	4%	3%	2%
Ferns and other cryptogams									
Calochlaena	rainbow fern	2%	+		3%	+	+	+	
Cyathea	rough tree-fern		+				+		+
Histiopteris incisa	bats wing fern	+							
Phaeoceros	hornwort						+		
Pteridium-type	bracken						+	+	+
Selaginella uliginosa	swamp selaginella					+	+	+	
unassigned monoletes	incl. fishbone fern					+	+		+
unassigned triletes	incl. filmy ferns	1%				+	+	1%	+
POLLEN SUM		**106**	**358**	**2**	**270**	**322**	**364**	**332**	**279**
Fungal spores									
Mediaverrunites	(oil/fat)		+		+			+	
thalloid fungus	(rotten timber)	+			+	+			+
unassigned spores (est.)		1730%	740%	(41)	485%	225%	375%	260%	1000%
Algae									
dinocysts	dinoflagellates?	+			?	?			
Zygnemataceae	(soil algae)		+			+			
Oher plant microfossils									
Protohaploxypinus amplus	Palaeozoic pollen		?				+	+	
Carbonized xylem (burnt wood)	(estimate.)	1000%	25%	(49)	275%	33%	16%	33%	75%
Carbon particles (not counted)		abund	abund	low	abund	abund	abund	abund	abund
Sewage & microfaunal microfossils									
Cloacasporites sydneyensis		+	+		1%	+	+	+	+
Dental/feeding apparatus	(jaws)		+				+	+	+
egg cases	(soil algae)	5%			5%	5%	5%	5%	23%
other insect parts		+			+		+		+
dinocysts	(marine algae)	+			+	+			
foram trochospiral liners	(foraminifera)	2%		(3)	+				

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APPENDIX 1

Comment on individual samples

CONTROL SAMPLES

Sample 8: The microflora recovered from grey sands overlying **UDHB1**, the sides of this vessel and onlapping the adjacent wharf wall (**CTX 133**) lack exotic pollen and *Monotoca* pollen, but include frequent (3%) epacrid (Epacridaceae) and ±similar values of daisy (Asteraceae subfamily Tubuliferae), samphire (Amaranthaceae), crucifer (Brassicaceae) and grass (Poaceae) pollen in an organic matrix dominated by fungal spores and abundant carbonized plant fragments. Foraminiferal trochospiral liners (2%) confirm the intertidal depositional environment. The terrestrial component of the assemblage is likely to include miospores from run-off water from Clyde Street and represent weeds growing on vacant land on the adjacent foreshore. Samphires (3%) could represent either saltmarsh or plants growing on salinized soils onshore. *Calochlaena dubia* (2%) almost certainly came from populations of the rainbow fern growing on damp nearby stonework not directly exposed to saltwater spray, e.g. the foundation walls of Langford's house, or Cuthbert's saw shed.

Sample 36: The microflora recovered from this sample of artefact-rich but anaerobic dark grey sands and silts (**CTX 149**) is similar to those recovered from Sample 8 with several significant exceptions: (a) Cereal pollen is present in trace amounts. (b) Two other pollen types are likely to represent an introduced wire-weed (*Polygonum aviculare*-type) and the highly-invasive plumeless-thistle genus *Carduus*. (c) Pollen of sandstone shrubs occur in trace to frequent (*Monotoca*) numbers. The combined data indicate the age limits of the deposit are 1815 to *c* 1850 but are more likely to date to the 1830s-early 1840s, i.e. before sclerophyll heath had been extirpated from the foreshore or ridge above the UDHB1 site. If artefacts in the deposit postdate the 1840s, then the microflora is of 'mixed age'.

Sample 39: Pollen is seldom preserved in water-washed ('cleaned-up') beach sand and the sample (**CTX 249**) is significant only in that three specimens of the trochospiral liners of unidentified foraminifer confirm the sand was deposited within the intertidal zone.

SAMPLES FROM WITHIN THE WRECK OF UDHB1

Sample 16: The microflora from a 'clayey lens deposited directly on the timber of **UDHB1** (**CTX 144**: interpreted as a possible subfloor deposit) lacks *Monotoca* although *Banksia* and *Grevillea* occur in trace numbers. Otherwise, relative abundance values (and miospore diversity) are similar to those recorded in Sample 8 (**CTX 133**) – hinting that the deposits are correlatives despite the different depositional contexts. If so, low numbers of pollen resembling those produced by the plumeless thistle (*Carduus*-type) in **CTX 144** confirm a Colonial period age for **CTX 149**. The sample is likely to no older than *c* 1830s-1840s based on the significant relative abundance of the sewage indicator *Cloacasporites sydneyensis* (1%).

Sample 24: The sample (**CTX 154**) is the first of four samples recovered from the partly-sealed bilge of **UDHB1**. Pollen of a cereal, up to three exotic weeds, Banksia (1%), Grevillea (1%) and *Monotoca* (2%) preserved on one exposed? side of the bilge dates the microflora to the period before sclerophyll heath had been extirpated from the foreshores around Darling Harbour. As for the other bilge samples, spores of the swamp selaginella (*Selaginella uliginosa*) is weak circumstantial evidence that that some of the sediment in the bilge came from swampy areas on the foreshore and, by extrapolation, that places visited by the working vessel included Cockle Bay in the inner reaches of Darling Harbour.

Otherwise this microflora and those preserved in other bilge samples comprise a mix of native and introduced herbs (including dandelions) as well as sclerophyll shrubs. It is uncertain whether the frequent to high casuarina (*Allocasuarina/Casuarina*), eucalypt (*Eucalyptus*), raspwort (*Gonocarpus*) and grass (Poaceae) represent remnants of the open grassy woodland colonizing the foreshore in the early 1800s (Fig. 4) or come from the regional pollen rain.

Sample 27: The sample from **CTX 159**, preserved in the 'middle of the stern' includes the highest/equal-highest numbers recorded in this study of cereal (1%), *Gonocarpus* (25%) and *Monotoca* (6%). These data support of age limits of 1815 and *c* 1840s for this section of sediments infilling the bilge. This is based on the date Dicksons Mill was established and predicted time of extirpation of *Monotoca* from the eastern foreshore of Darling Harbour, respectively. The diversity of herbs and ferns is the highest in the study although grasses are rare.

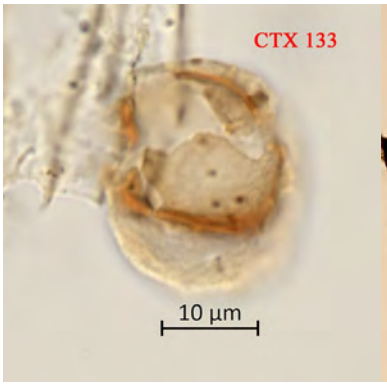
Sample 30: The sample recovered from bilge deposit (**CTX 158**) in the centre of the vessel, is considered to be the most 'secure' of all bilge deposits. The diversity of rare pollen types representing exotic and native plants is lower than for **CTX 159** (above) although the relative abundance of sclerophyll shrubs is equal to (*Monotoc*a) or commensurate with relative abundances recorded in other bilge microfloras.

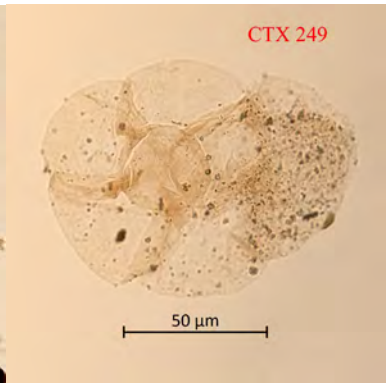
Sample 33: The microflora from a bilge deposit in the middle of the bow (the part of UDHB1 buried under the eastern wall of Cuthbert's saw shed) lacks exotic taxa but otherwise relative abundance of *Monotoca*, other Ericaceae and *Banksia* fall within the ranges recorded in other bilge and foreshore samples. Numbers of microfaunal egg cases (23%) and fungal spores (1000%), however, are significantly higher suggesting the deposit may have been more strongly bioturbated in the past or the grey silty clay incorporates e.g. top soil used to infill the foundations of the saw shed.

APPENDIX 2

PhotoShop ™ strengthened photomicrographs of plant and animal microfossils
(multiple specimens are included to illustrate the similarity of the microfloras)

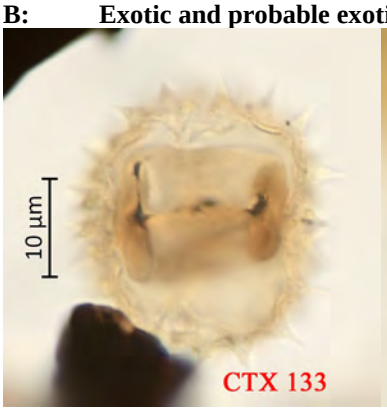
A: Marine indicators

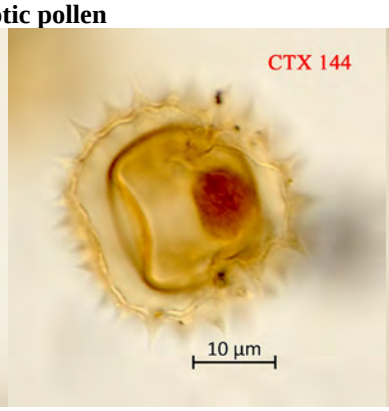


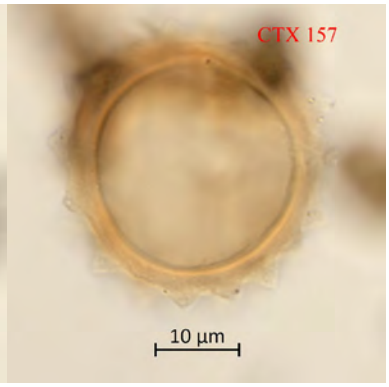


dinocysts (*Protoellipsodinium* sp?) foraminifera trochospiral liners

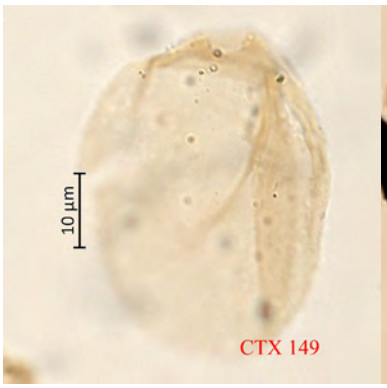
B: Exotic and probable exotic pollen

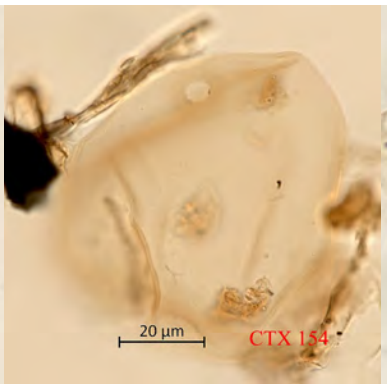


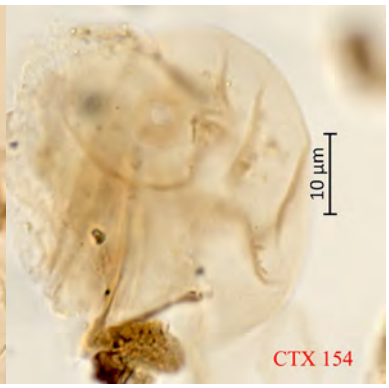




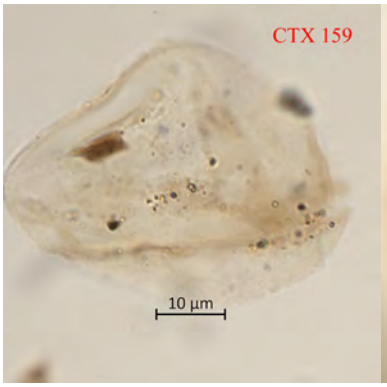
Sowthistle (*Carduus*-type) pollen

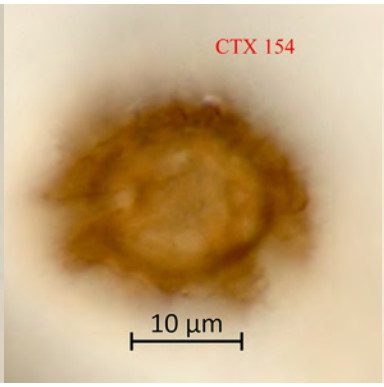


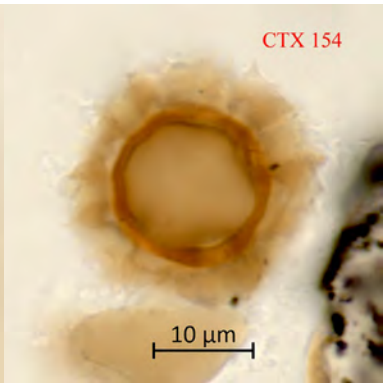




cereal (Cerealia) pollen

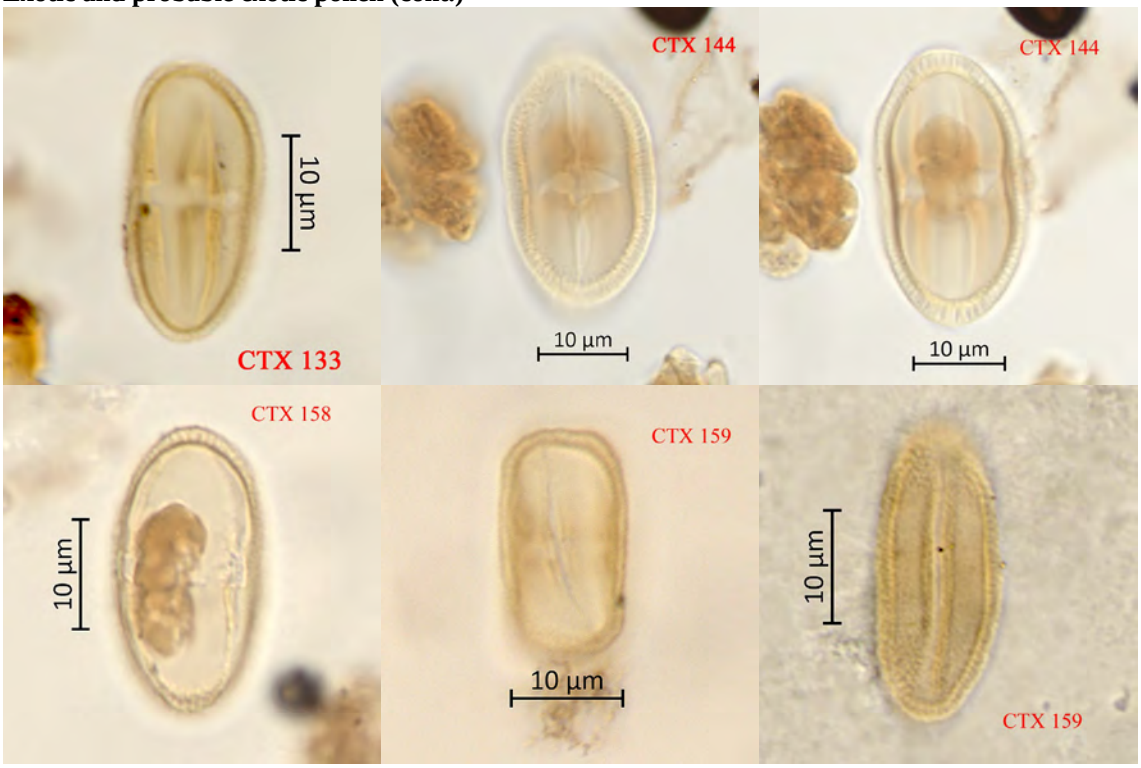




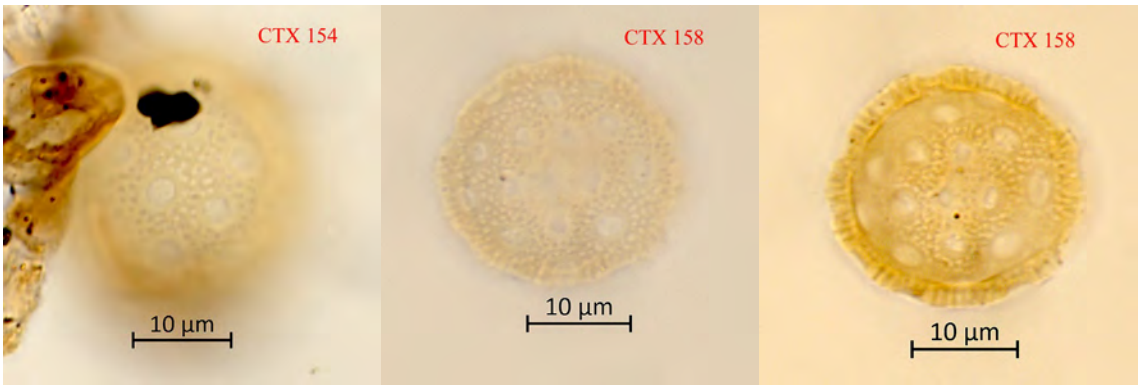


cereal (Cerealia) pollen dandelion (Asteraceae subfamily Liguliflorae) pollen

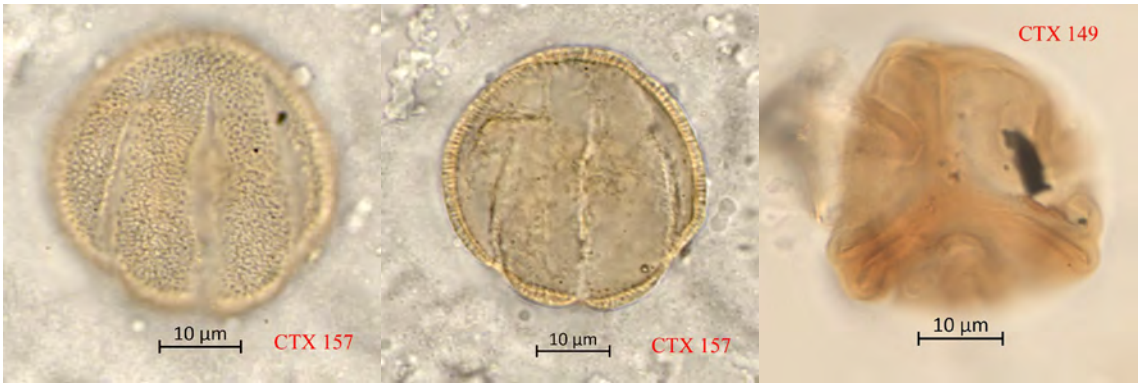
Exotic and probable exotic pollen (cont.)



wire-weed (*Polygonum aviculare*-type) pollen



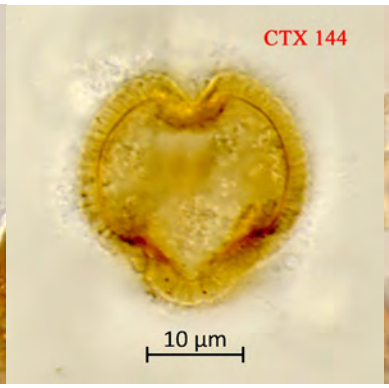
silene-type (*Silene*) pollen



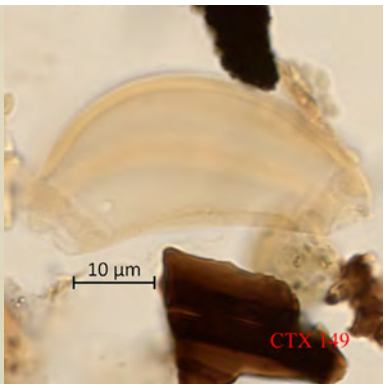
Stephanocolpate (Labiatae) pollen (cf. *Mentha*) cf. purple-top (*Verbena bonariensis*) pollen

C. Native trees & shrubs

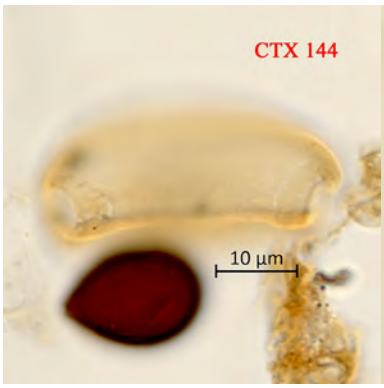
wattle (*Acacia*) pollen

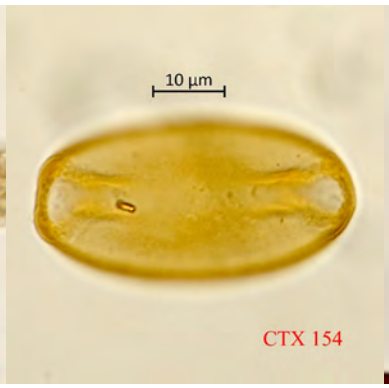


broom spurge (*Amperea xiphoclada*) pollen

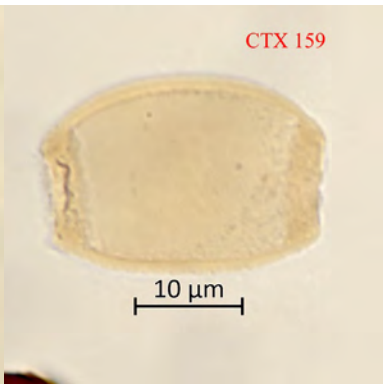


old man banksia (*B. serrata*) pollen

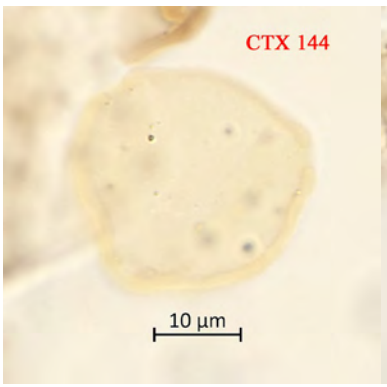




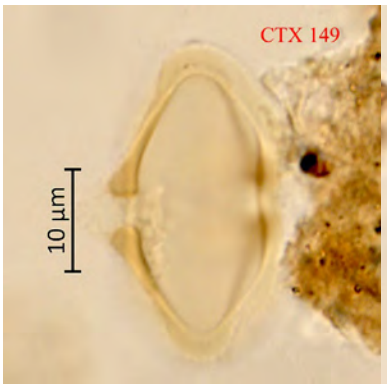
banksia (*Banksia*-type 1) pollen

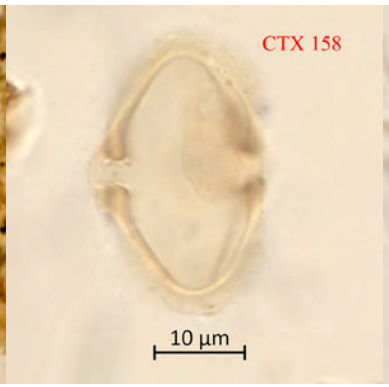


banksia *(Banksia*-type 2) pollen



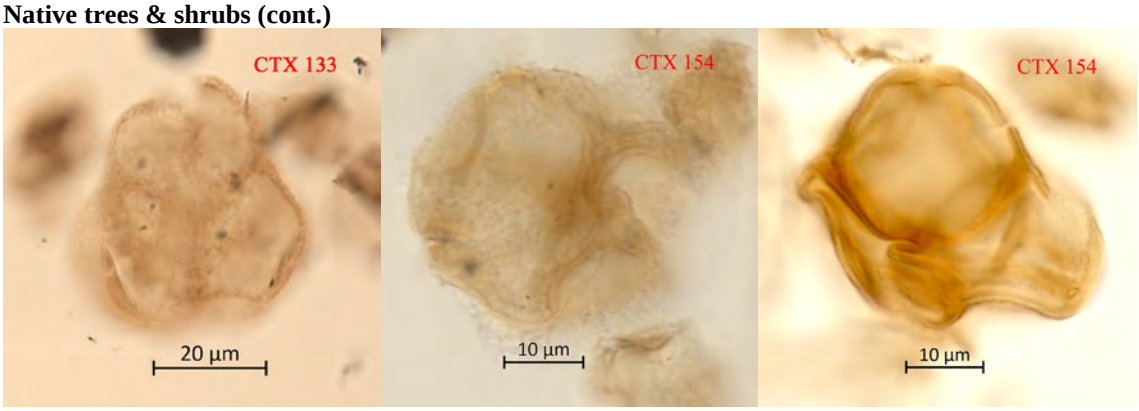
casuarina (*Allocasuarina/Casuarina*) pollen



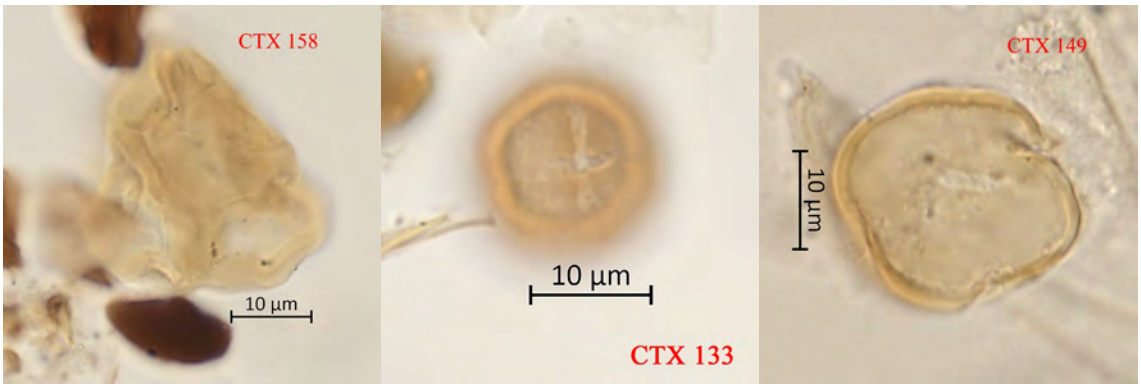


native hops (*Dodonaea triquetra*) pollen

Native trees & shrubs (cont.)

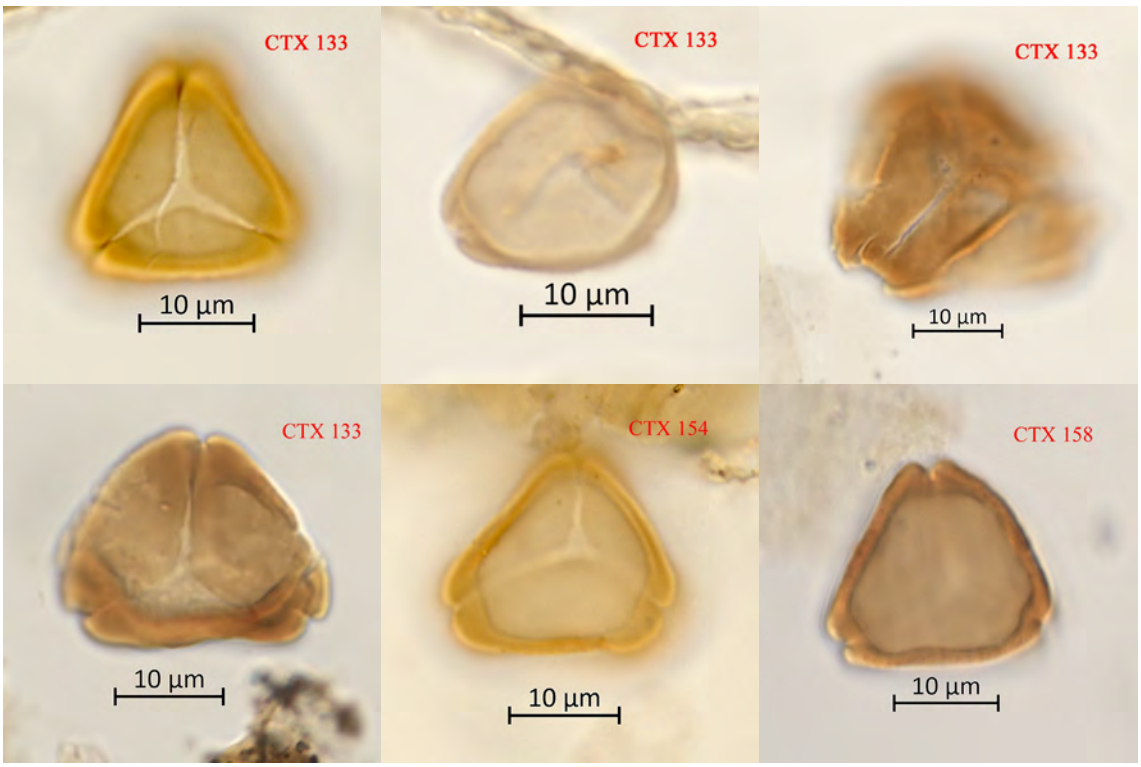


heath (Ericaceae) pollen



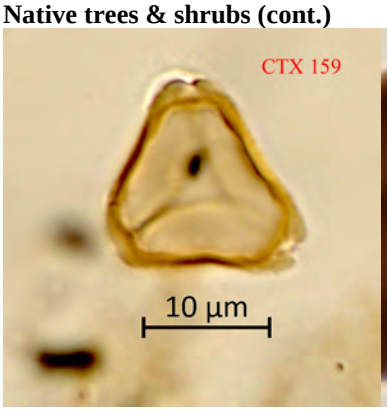
heath (Ericaceae) pollen

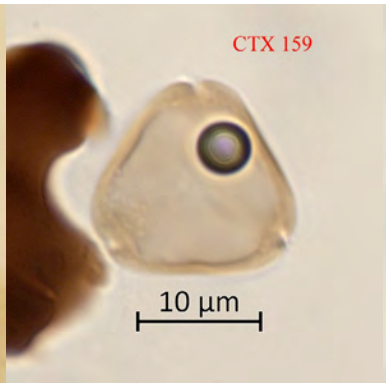
bearded heath-type (cf. *Leucopogon*) pollen

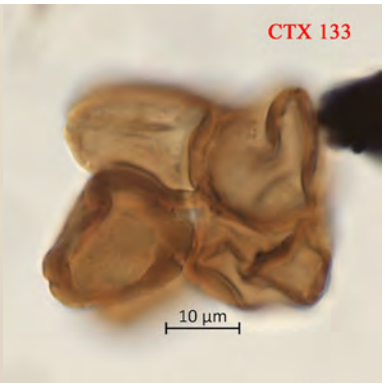


eucalypt (*Eucalyptus*) pollen

Native trees & shrubs (cont.)

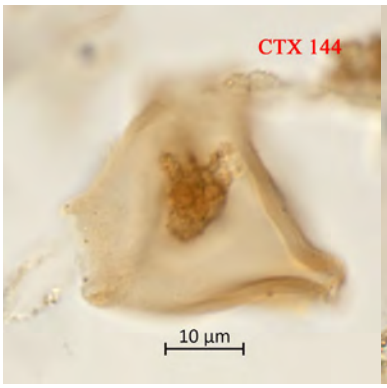


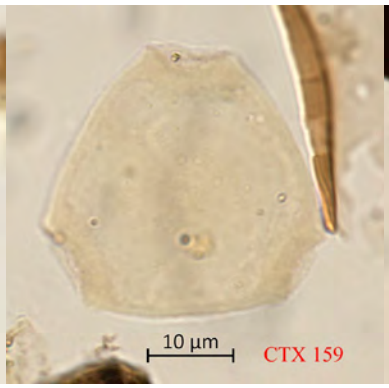




eucalypt (*Eucalyptus*) pollen

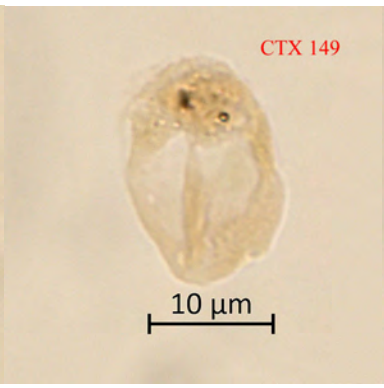
eucalypt (*Eucalyptus*) pollen tetrad



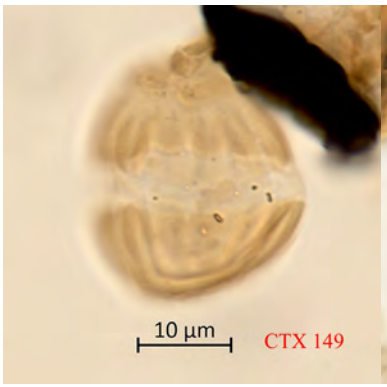


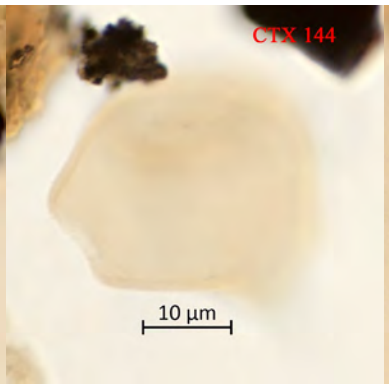
grevillea (*Grevillea*-type) pollen

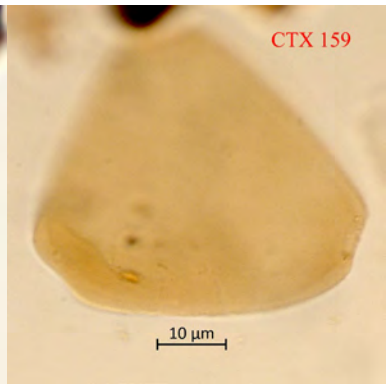
prickly cone-stick (*Petrophile sessilis*) pollen



broom heath *(Monotoca*) pollen





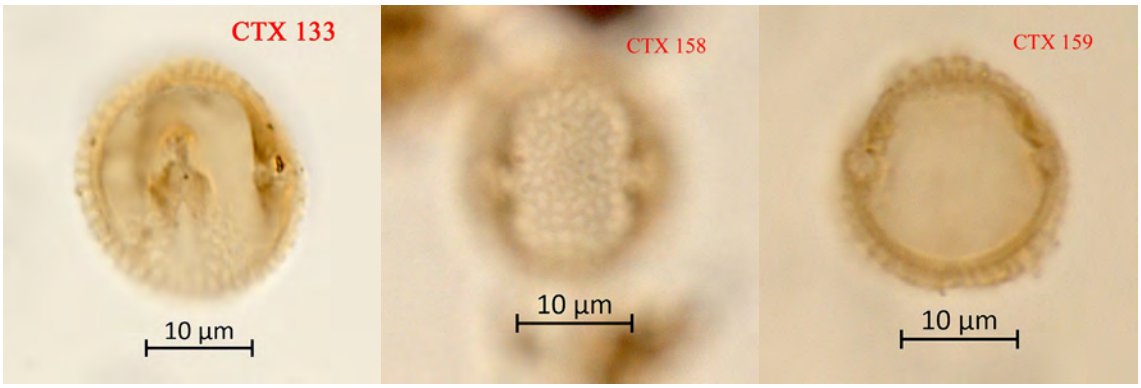


polygala (Polygalaceae) pollen

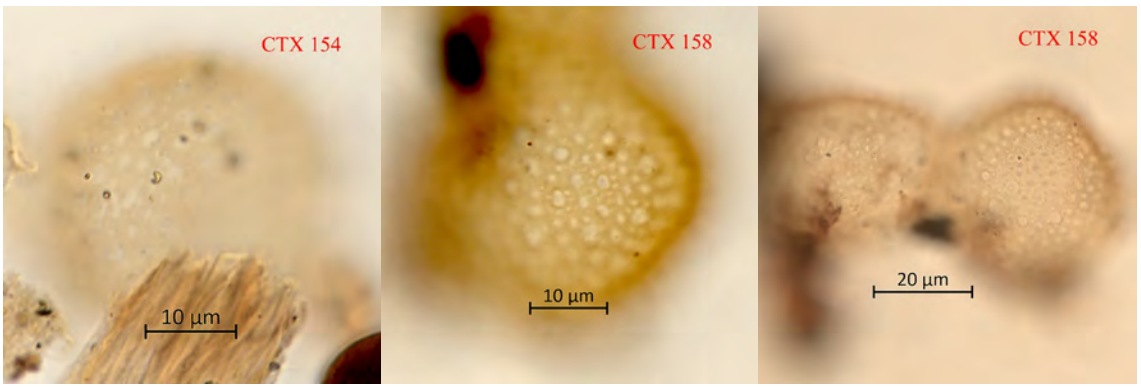
unidentified Proteaceae pollen (aff. *Orites*)

Native trees & shrubs (cont.)

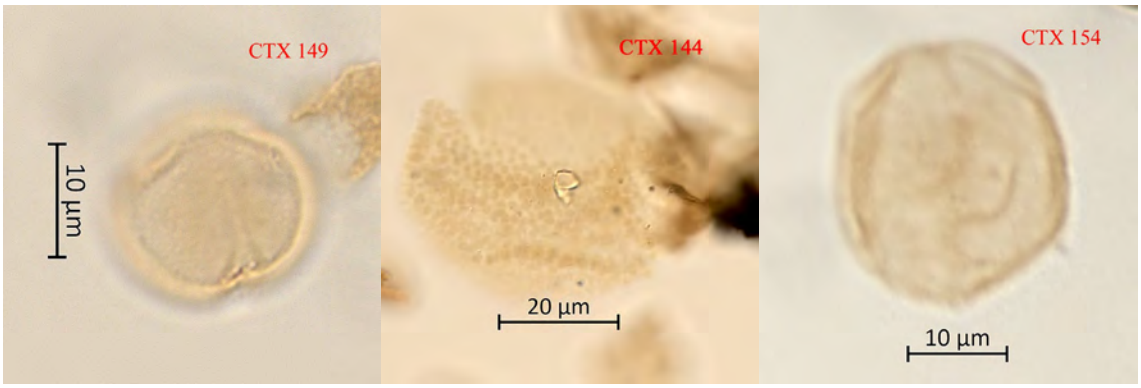
Myrtaceae (Leptospermoidae) pollen



tricolporate reticulate pollen cf. Rutaceae

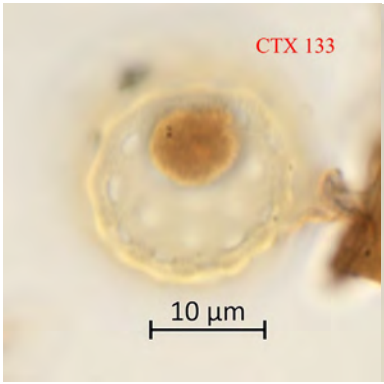


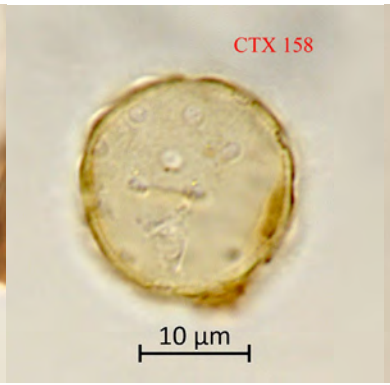
rice-flowers (*Pimelea*)



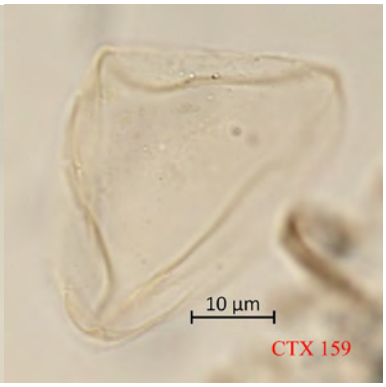
Rhamnaceae-type pollen | crotonoid pollen (cf. *Croton*) | unidentified tricolpate pollen

D: Herbs

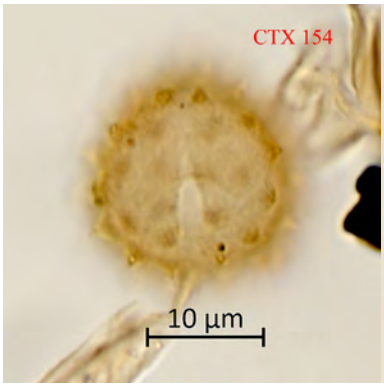


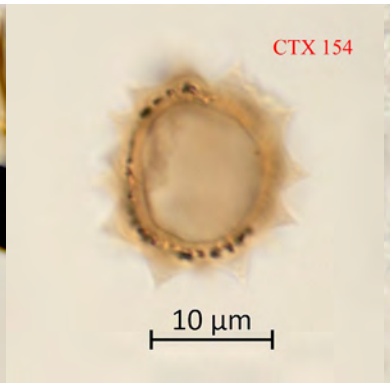


samphire (Amaranthaceae) pollen

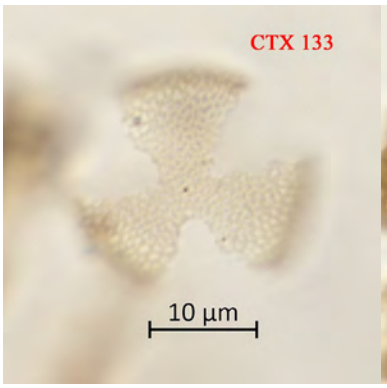


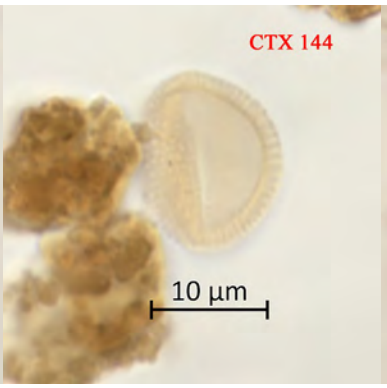
sedge (Cyperaceae) pollen



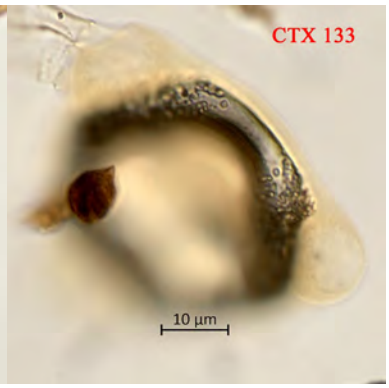


daisy/daisy-bush (Asteraceae subfamily Tubuliflorae) pollen

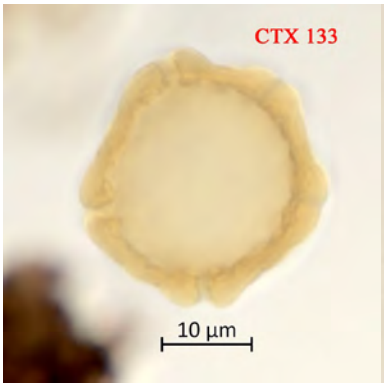


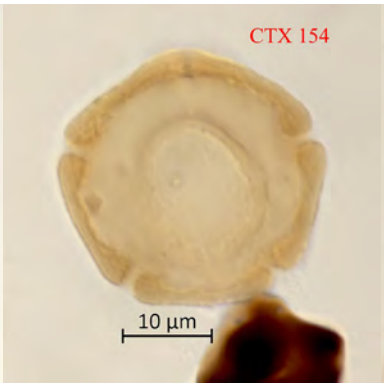


crucifer (Brassicaceae) pollen

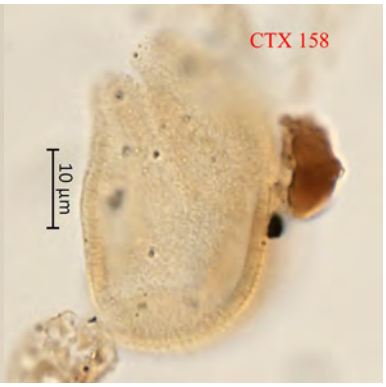


willow-herb (*Epilobium*) pollen





raspwort (*Gonocarpus*) pollen

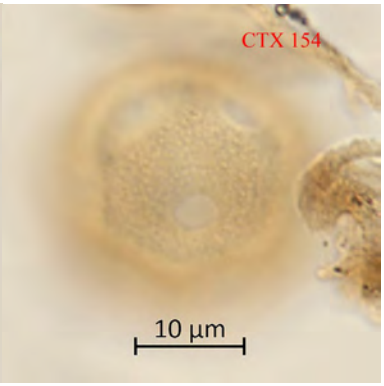


lily (Liliaceae) pollen

Herbs (cont.)

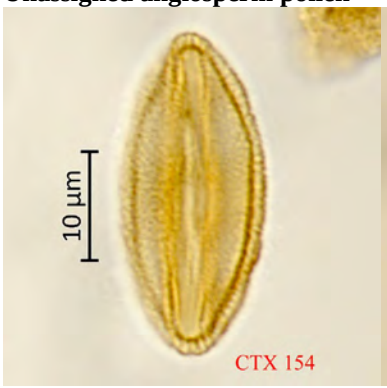
grass (Poaceae) pollen

wire-rush (Restionaceae) pollen

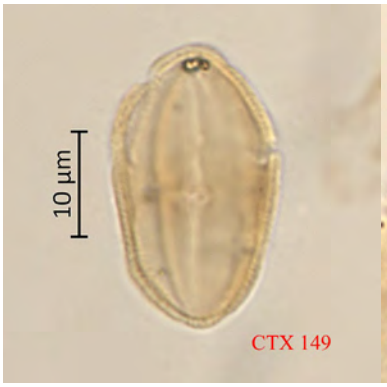


starwort (*Stellaria*) pollen

Unassigned angiosperm pollen

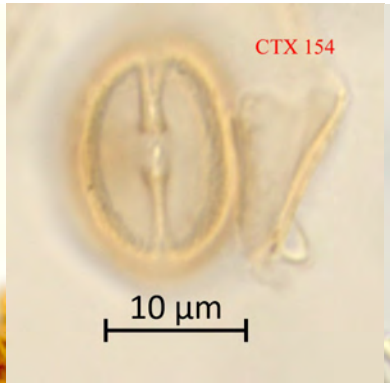


unidentified tricolporate pollen (micro-reticulate)



unidentified tricolporate pollen (fine-scabrate)

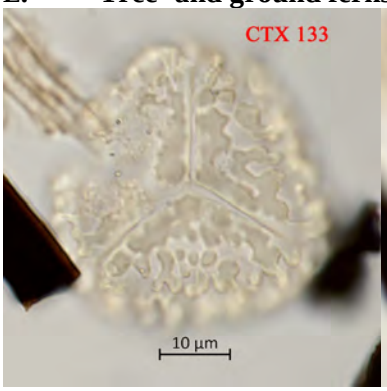
tricolporate pollen (cf. Fabaceae)

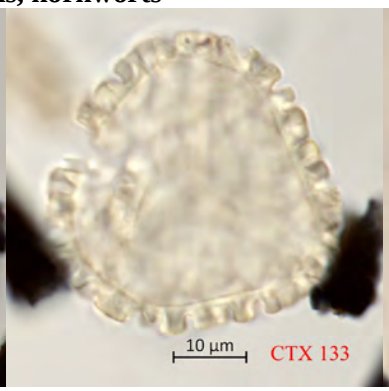


tricolporate pollen (cf. Anacardiaceae)

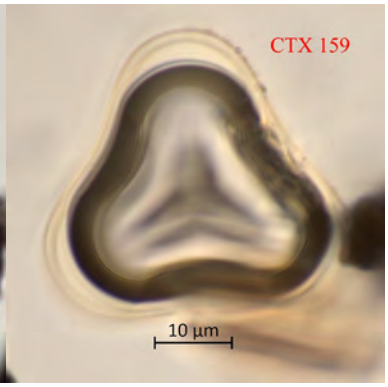
tricolporate oblate pollen type

E. Tree- and ground ferns, hornworts

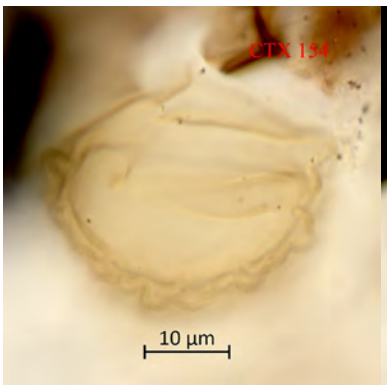


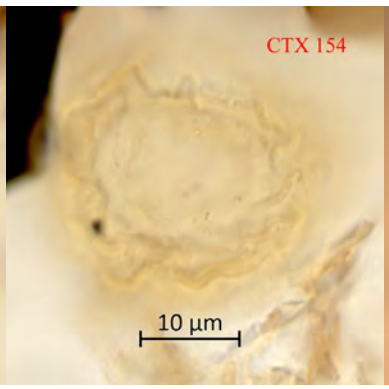


rainbow fern (*Calochlaena dubia*) spore

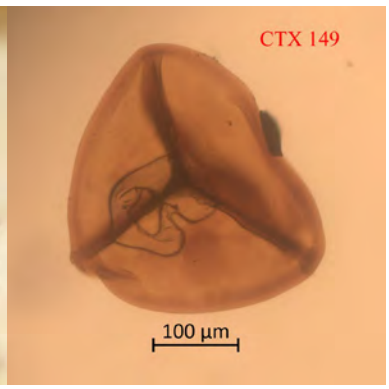


rough tree-fern (*Cyathea*) spore



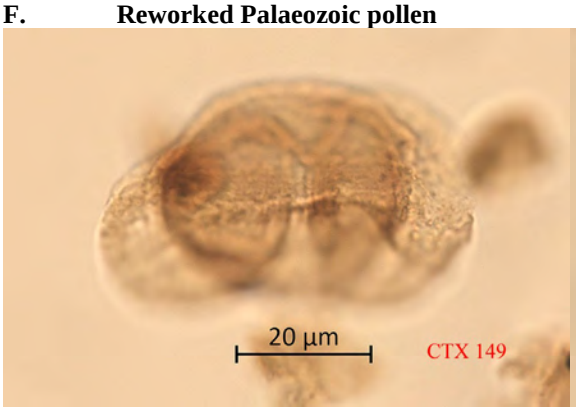


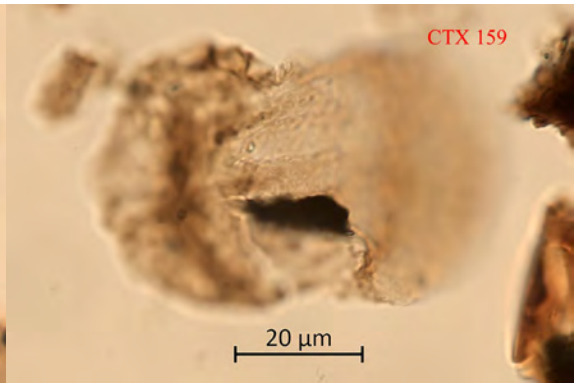
swamp selaginella (*Selaginella uliginosa*) spore



Palaeozoic spore (reworked from coal?)

F. Reworked Palaeozoic pollen

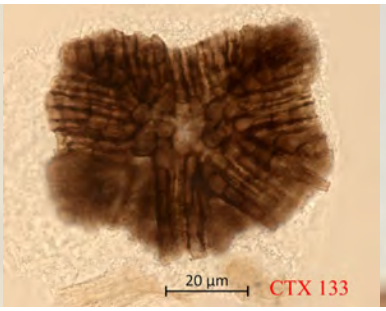




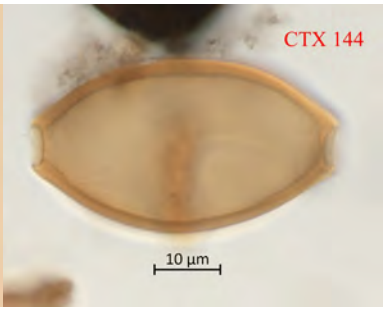
Protohaploxypinus amplus (reworked from Permian coal)

G. algae and fungal spores

Unidentified colonial alga

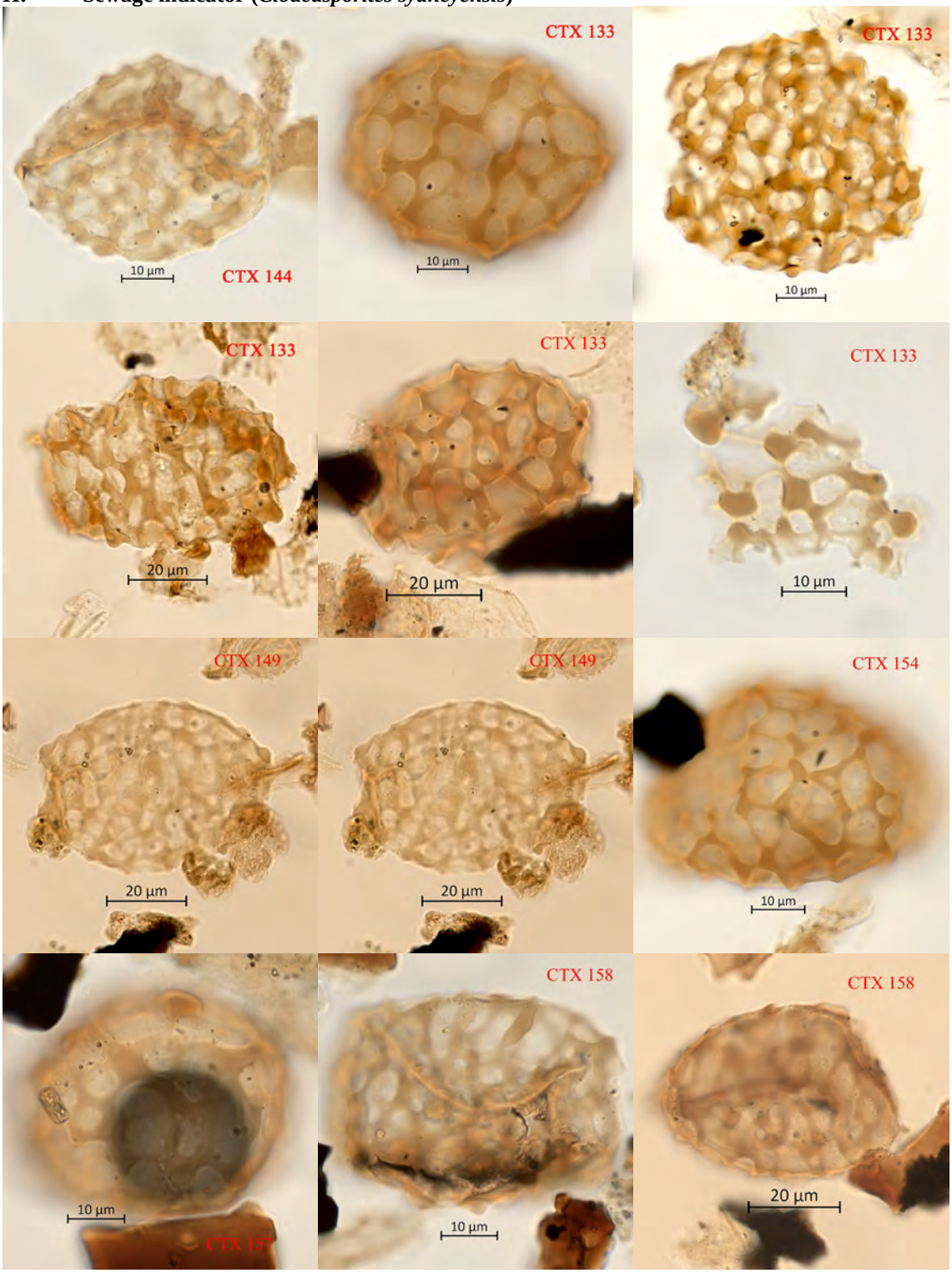


fungal thallus (rotted wood)

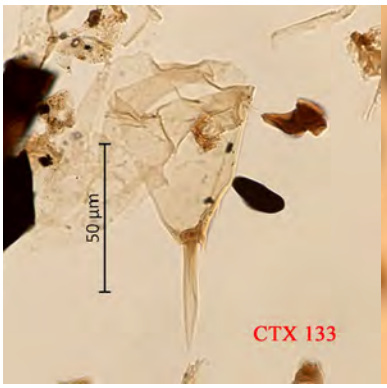


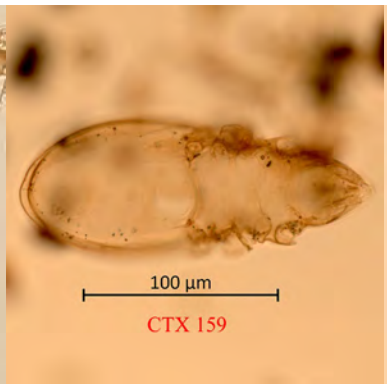
diporate fungal spore

H: Sewage indicator (*Cloacasporites sydneyensis*)

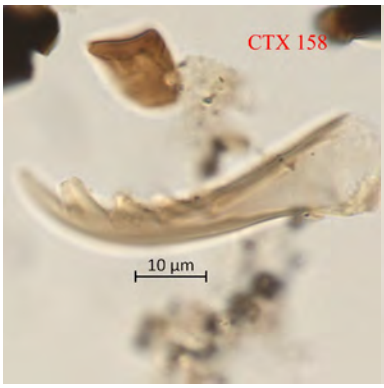


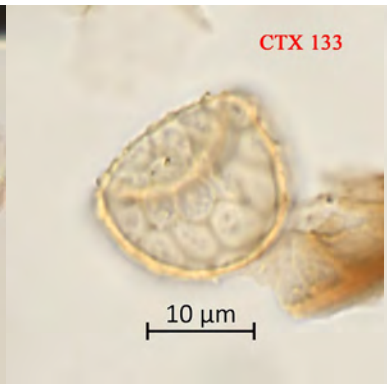
I: Microfaunal remains

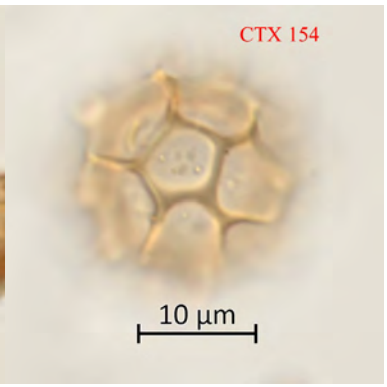




body parts of unidentified microfauna

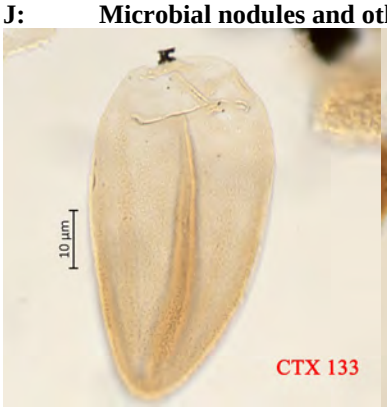




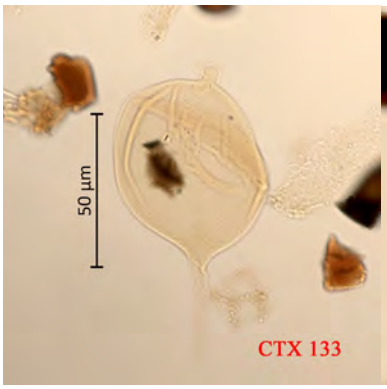


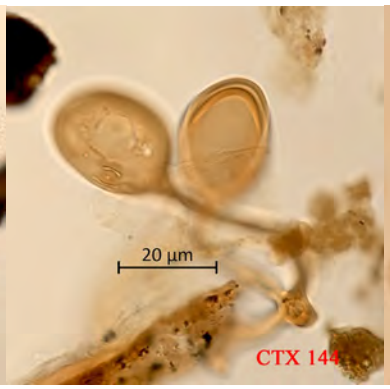
dental apparatus egg cases of unidentified microfauna

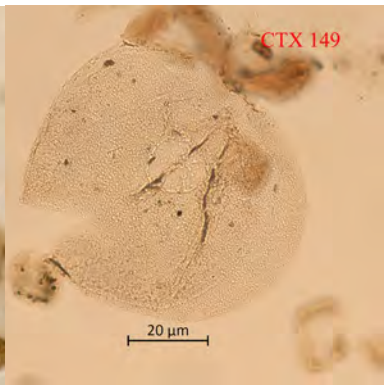
J: Microbial nodules and other microfossils



reticulate cysts







microbial nodules shield-like sporomorph

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

LOOSE TIMBERS REPORT

MARCH 2022

VOLUME 3, SECTION 3.11

Loose timbers were revealed in UDHB1 following the excavation of overlying deposits. View to northeast. 1m scale. DSC_2720.

FINAL REPORT | Report to **Sydney Metro**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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Leichhardt, NSW 2040

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CONTENTS

Report Status	Date Submitted	Purpose	Author	Reviewed
Draft Version 1	25.05.21	Cos to review	Jane Rooke/Ben Wharton	Cos Coroneos
Draft Version 2	01.12.21	Internal review	Jane Rooke/Ben Wharton	Holly Winter
Final Report	23.03.22	Final draft	Jane Rooke/Ben Wharton	Holly Winter

BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

LOOSE TIMBERS REPORT

1.0 INTRODUCTION

1.1 BACKGROUND

Casey & Lowe were commissioned by AMBS Ecology and Heritage to undertake historical archaeological investigations at the Barangaroo Station site, Sydney.

A timber boat wreck, labelled Unidentified Darling Harbour Barangaroo No. 1 (UDHB1), was uncovered in September 2018 while excavating Area X to the northeast of Area R and south of Area Y (Figure 1.1). It was found at the foot of the historical location of Clyde Street, less than 300mm east of Langford's c.1850s wharf wall. The boat was beached on a narrow strip of sand in amongst rising sandstone outcrops and alongside Langford's c.1850s wharf wall with the bow pointing shoreward, angled slightly towards the north west. The eastern wall of Cuthbert's c.1860s sawshed was built over the vessel (Figure 1.2).

The archaeological program at Barangaroo Station was staged, with the final stage involving the removal of the abandoned vessel, UDHB1. The abandoned vessel (UDHB1) was assessed as being of State Significance.[1] The final artefacts were recovered from the site in January 2019 when artefacts associated with the boat deposit were sieved.

Multiple historical phases of construction were identified in Area X:

- Langford's c.1830 House
- pre-1855 wharf wall attributed to Langford
- a pre-1865 sawshed structure
- c.1880s Clyde Street.

[1] Casey & Lowe, Cosmos Archaeology and ICS 2018: 25.

Figure 1.1: Location plan showing the Barangaroo Station site outlined in red and the excavation areas are shaded. Google Maps.

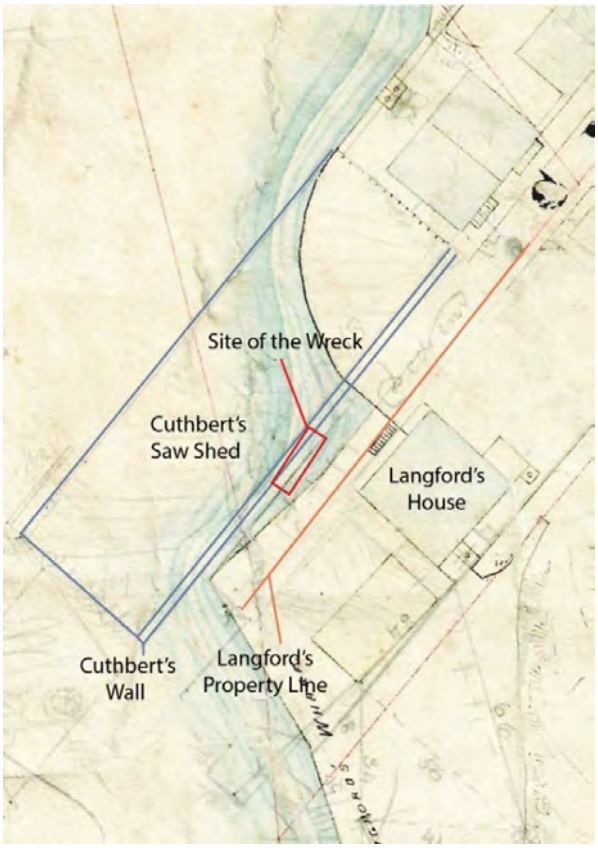

Figure 1.2: Detail of *City Detail Sheets* (1855), Sheet 2, showing the site of the boat relative to Langford's House and wharf, and the alignment of Cuthbert's sawshed and wall. City of Sydney Survey Plans, Historical Atlas of Sydney, City of Sydney Archives.

Post-excavation of the overlying tidal sands exposed the full extent of UDHB1. It became apparent that the vessel, from the time of its deposition to when it was covered, was used as a convenient and, relatively, dry area for keeping redundant or surplus timbers and other boat building paraphernalia (148) (Figure 1.3).

Figure 1.3: Fully uncovered UDHB1 showing loose timbers deposited within boat. View to north, 1m scale. DSC_2721.

1.2 METHODOLOGY

The methodology for the removal of the boat, including the loose timbers (148), was outlined in the Archaeological Relics Management Plan (ARMP) November 2018. [2] This was written with advice from Dr Fred Hocker, Dr James Delgado and Dr David Gregory, all acknowledged experts in the removal of timber boats.

The majority of the loose timbers (148) were removed and given an element number. Element is used in this report in relation to this system and refers to all wood, including planks, offcuts, pins etc, from (148). The elements were then photographed, surveyed, tagged, measured, described, wrapped in geofab to keep secure and wet, and stored in one of the two 40-foot refrigerated containers storing the boat elements. They were delivered to Sydney Metro at Rosebery before being transferred to a storage facility in Yennora.

Once removed from the cold storage and unwrapped, the loose timbers were cleaned, photographed, and stored in tanks of water under the supervision of Silentworld Foundation. During the cleaning process it became apparent that there were several artefacts attached to some of the elements. These were removed and recorded by the element they were attached to and given a sample number i.e. (142/1). Each of these artefacts will be addressed in its relevant artefact report.

Benjamin Wharton and Jane Rooke identified all loose timbers in the tank and removed each piece one at a time, preventing any deterioration during analysis, and carried out a detailed analysis, including working shots and measurements, and cataloguing of each piece, using the cataloguing system developed by Dr Mary Casey (Figure 1.4).[3]

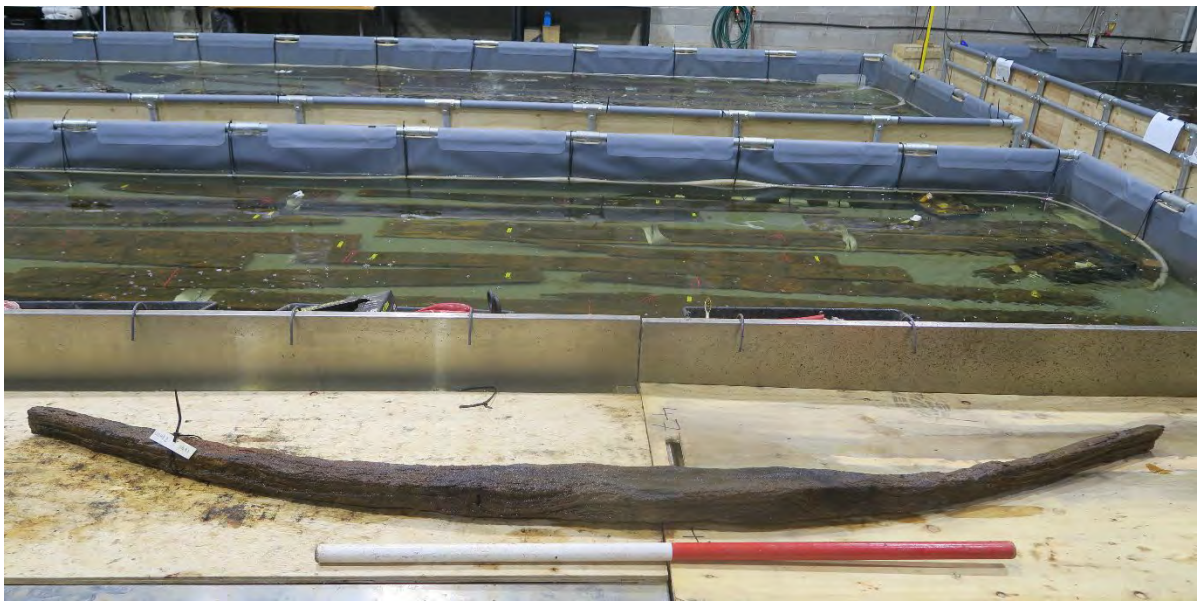

Figure 1.4: Working shot of a loose timber element during analysis with water tanks storing UDHB1 elements and loose timbers behind. 1m scale. IMG_2214.

[2] For the full report see *Archaeological Relics Management Plan*, Casey & Lowe, November 2018.

[3] Casey 2004.

The catalogue records:

- the catalogue numbers
- the context number where the item was found
- the shape of the item (i.e., plank)
- the general function (i.e., transport)
- specific function (i.e., vessel)
- fabric (i.e., wood)
- portion (i.e., whole)
- dimensions (in mm unless specified)
- Special find number (UDHB1 element numbers)
- brief description
- number of fragments
- minimum item count (MIC).

The main elements of this cataloguing system are the use of minimum item counts (MIC) to quantify the assemblages and the attribution of functional categories to the artefacts during cataloguing. Where the portion of the artefacts is whole the item is listed as having no fragments.

A numerical identifying system was specifically designed to document the association of each piece of timber with its function (Table 1.1). To identify the association of each loose timber several factors were considered:

- the style of manufacture, if any
- the size and shape of the elements
- the style and size of fasteners and fastener holes, if any
- identification of tools used
- position of the loose timbers in UDHB1

Table 1.1: Numerical type system to document association of loose timbers (148)

Group Number	Association	Description
1	UDHB1	A piece of timber or timber artefact that can be directly associated with UDHB1.
2	Any boat	A piece of timber or timber artefact that has been part of a boat that may or may not be associated with UDHB1.
3	Boat building	An artefact related to the boat building process. Including offcuts of frames, tools and equipment.
4	Other	Unidentified or generic pieces of timber that cannot exclusively be associated with boats or boat building. Possible wharf or boat yard structural elements.

During analysis, the positioning within the boat of each of the elements of the loose timbers was taken into consideration for the assignment of its group number referring to the plans that were taken at each stage of the removal of the loose timbers (Figure 1.5, Figure 1.6, Figure 1.7).

Figure 1.5: Plan 5.0. Initial Plan of Boat UDHB1 with loose timbers revealed.

Figure 1.6: Plan 5.1. Boat following first stage of loose timber removal.

Figure 1.7: Plan 5.2; Boat UDHB1 following second stage of loose timber removal.

1.3 GLOSSARY[4]

- **Cleat:** A T-shaped piece of metal or wood on a boat or ship, to which ropes are attached.
- **Clench:** To secure a nail or bolt by bending or flattening its projecting end over the surface it last penetrated
- **Dead eye:** A deadeye is an item used in the standing and running rigging of traditional sailing ships.
- **Fastening:** Any method used to hold planks in a wooden ship to its frames.
- **Frame:** A transverse timber, or line or assembly of timbers, that described the body shape of a vessel and to which the planking and ceiling were fastened. Frames were sometimes called timbers.
- **Gunwhale:** The topmost edge of the sides of a vessel. Pronounced 'gunnel'.
- **Inwhale:** A horizontal timber binding together the frames along the top strake.
- **Mast step or mast partner:** The block or recess onto or into which the mast is located.
- **Pin rail/rack:** A long rack, usually attached to the inside of bulwarks, for holding belaying pins; a short pin rail was called a pin rack.
- **Riser or Rising:** Also called the riser timber or rising timber. A horizontal length of timber on the inside of the frames of a wooden hull to form the ledge upon which the thwarts or the outer ends of the bearers.
- **Strake:** A continuous line of planks, running from bow to stern.
- **Tiller:** A wooden or metal level fitted into the rudder head, by which the rudder could be moved from side to side.

1.4 REPORT AUTHORSHIP

This report was written by Jane Rooke and Benjamin Wharton for Casey & Lowe.

[4] Pease. Modern Shipbuilding Terms https://www.iims.org.uk/wp-content/uploads/2014/03/Glossary-of-ship-and-boat-building-terms.pdf Accessed 12/03/21

Steffy. Illustrated Glossary of Ship and Boat Terms https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199336005.001.0001/oxfordhb-9780199336005-e-48 Accessed 12/03/21

2.0 OVERVIEW OF ASSEMBLAGE

A total of 146 items (52 fragments) were excavated as loose timbers (148) (Table 2.1). Loose timbers refer to all the timber artefacts retrieved from inside UDHB1, but not part of the boat. This includes planks, stakes, frames, dead eyes, cleats etc. Transport function had the highest percentage of timbers (49%) with items identified as part of the vessel, a vessel fitting or from the hull of a vessel. There are also seven timbers that are classed as transport/industrial. These timbers were identified as part of the boat building process but it was unclear how, or if, they were used on a vessel.

Table 2.1: Sum and percentage of loose timbers by function.

General Function	Specific Function	Shape	MIC	%	Fragments	%
architectural	structural	plank	1	*1*	1	*2*
industry	unidentified	stake	1	*1*	0	*0*
transport	vessel	frame	7	*5*	4	*8*
		offcut	26	*18*	5	*9*
		pin	1	*1*	1	*2*
		plank	12	*8*	4	*8*
		unidentified	7	*5*	2	*4*
	vessel-fitting	board	2	*1*	0	*0*
		cleat	1	*1*	0	*0*
		dead eye	2	*1*	0	*0*
		tiller	1	*1*	0	*0*
		pin rack	1	*1*	1	*2*
transport /industry	vessel/unidentified	offcut	7	*5*	0	*0*
unidentified	unidentified	block	2	*1*	1	*2*
		branch	8	*5*	5	*9*
		frame	5	*3*	3	*6*
		offcut	5	*3*	4	*8*
		pin	1	*1*	0	*0*
		plank	30	*21*	7	*13*
		slat	1	*1*	0	*0*
		timber	2	*1*	0	*0*
		unidentified	21	*14*	14	*28*
		wedge	2	*1*	0	*0*
		TOTAL	146		52	

To identify the timbers' function, four numerical groups were established (1-4) (Table 1.1), however with a number of artefacts associated with more than one group, three sub groups were formed (1/2/3, 2/3/4, 3/4) (Table 2.2).

Most groups had only one general function however the broad nature of Group 3 (artefacts associated with the boat building process) has six general functions which have been addressed separately below.

The general function of all the timbers in Group 4 (artefacts that cannot be associated with boats or the boat building process) are unidentified due to their generic nature or the state of erosion rendering them undiagnostic. Group 4 also contains 37 deaccessioned timbers.

Table 2.2: Sum of artefacts in each group

Type Name	MIC	Fragments
1	0	0
2	20	5
3	43	8
4 Including Deaccessioned Timbers	53	24
1/2/3	15	7
2/3/4	1	0
3/4	14	8
TOTAL	146	52

3.0 ELEMENT ANALYSIS

3.1 ELEMENT OVERVIEW

In this section of the report each element will be discussed within its allocated group (Table 3.1). Offcuts, planks and frames made up the majority of the loose timbers (Table 3.2).

Table 3.1: Overview of element shapes in each group

Group	Shape	MIC	Fragments
2	board	2	0
	cleat	1	0
	dead eye	2	0
	frame	2	2
	plank	8	3
	tiller	1	0
	unidentified	4	0
3	block	1	1
	branch	1	1
	frame	3	0
	offcut	32	5
	plank	3	1
	stake	1	0
	wedge	2	0
4	branch	5	3
	frame	5	3
	offcut	1	0
	pin	1	0
	plank	20	5
	slat	1	0
	unidentified	20	13
1/2/3	frame	2	2
	offcut	1	0
	pin	1	1
	pin rack	1	1
	plank	6	1
	timber	1	0
	unidentified	3	2
2/3/4	block	1	0
3/4	branch	2	1
	offcut	4	4
	timber	1	0
	unidentified	1	1
	plank	6	2
	TOTAL	146	52

Table 3.2: Sum and percentage of timbers by shape

Shape	MIC	%	Fragments	%
block	2	*1*	1	*2*
board	2	*1*	0	*0*
branch	8	*5*	5	*10*
cleat	1	*1*	0	*0*
dead eye	2	*1*	0	*0*
frame	12	*8*	7	*13*
offcut	38	*26*	9	*17*
pin	2	*1*	1	*2*
pin rack	1	*1*	1	*2*
plank	43	*29*	12	*23*
slat	1	*1*	0	*0*
stake	1	*1*	0	*0*
tiller	1	*1*	0	*0*
timber	2	*1*	0	*0*
unidentified	28	*19*	16	*31*
wedge	2	*1*	0	*0*
TOTAL	146		52	

3.2 GROUP 1

As it is difficult at this stage to ascertain whether or not any of the loose timbers were directly related or derived from the boat (UDHB1), no elements have been confidently attributed to this group. There are timber elements that share characteristics with the boat, such as fastener size and material, however, as these may have been common to the period, they cannot be definitive to originate from the boat itself.

3.3 GROUP 2

Elements in group 2 are timbers that have been used as part of a boat but it is unclear if they were from UDHB1 or another vessel. The 18 elements were identified with their general function being 'transport' and specific function being either part of the vessel, part of the vessel fitting (v-fitting) or part of the vessel hull (v-hull) (Table 3.3).

Table 3.3: Number of elements associated with UDBH1 Group 2

General Function	Specific Function	Shape	MIC	Fragments
transport	vessel	plank	8	3
		frames	2	2
	vessel-fitting	tiller	1	0
		cleat	1	0
		dead eye	2	0
		board	2	2
		pin rack	1	1
	vessel/unidentified	unidentified	4	1
		TOTAL	21	9

TRANSPORT/PLANKS

There are eight elements in Group 2 identified as planks from vessels (Table 3.4). A plank is a length of squared wood that form the outer lining, or shell, of a hull, ceiling planks or the deck.

Table 3.4: Plank elements in Group 2

Shape	Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
plank	25024	020	Longitudinally tapered rectangular section plank with several iron concretions. Two nail holes at the wide end causing splits with one nail extant at tapered end.	520x42-115x23-25	1	0
	25013	021	Rectangular plank, tapered in width. Evidence of ghost frames x 3. 1 fastener hole and 1 separate fastener 1/4" present. Split in 2 during cleaning process.	750x95x5-28	1	2
	25027	025	Rectangular section plank. Very eroded. Hand sawn marks. Timber split at nail holes along long edge. Large clench holes 11-12mm sq, other nail holes=4mm Sq.	1465x150-155x9-10	1	1
	25094	072	Rectangular section plank, cut one end, scarf joint at other end with 2 nail holes (4mm Sq)	500x115-120x18-20	1	0
	25014	075	Rectangular plank, one end with a bevelled rake at 15 deg angle. The other end with stealer piece cut out. 5 nails present.	820x95-110x19-21	1	0
	25026	078	Rectangular section plank. One live edge slightly curved. Very clear hand sawn marks. 1 end sawn and broken with remains protruding. Clenched nail holes-shank hole=6.5mm Sq. Tip hole=tapering 4-3 mm with distance between 46mm.	390-405x70-135x12-14	1	0
	25028	084	Rectangular section plank. Raked ends =25 deg angle. Possible thwart due to one tooled end showing curvature and shape. Clench nail insitu=6.5mm Sq. Rectangular notch 600 mm from raked end.	1465x150-155x9-10	1	0
	25008	087	Rectangular section plank with one end tapered with a chamfered and the other end with 4 fastening holes on a scarf joint. This plank had five notches.	2575x150x21-26	1	0

Element (020) (#25024) was excavated during the second stage of loose timber removal (Figure 3.1). It can be seen on Plan 5.1 (Figure 1.6) and Plan 5.2 (Figure 1.7) at the stern end of the vessel.

The plank is longitudinally tapered in width which is indicative of being platform decking, a horizontal working surface forming the deck surface. The nail holes were comparative to the main vessel being quarter inch (5 – 7 mm) in shank size. Ferrous concretions imply that the nails were iron. These two features suggest the elements origin being related to the vessel as opposed to being an offcut from the boatyard works.

Figure 3.1: Element (020). Rectangular tapered plank. 80mm Scale. Img_p020. Silent World Foundation. 800mm scale.

Element (025) (#25027) and (087) (#25008) have similar characteristics. Both possess regularly placed notches which could possibly indicate a riser (Figure 3.2, Figure 3.3, Figure 3.4, Figure 3.5). A riser is a longitudinal bracing inside the frames to support cross-running thwarts or beams.

Figure 3.2: Element (025) (#25027) after excavation. A rectangular plank with tool marks and large clench marks with regular notches. Scale.1m. Img_P025a. Silent World Foundation.

Figure 3.3: Element (087) (#25008) has tapered ends with scarf joints suggesting other pieces attached to achieve a longer final length. Scale 1m. Img_2161. Silent World Foundation.

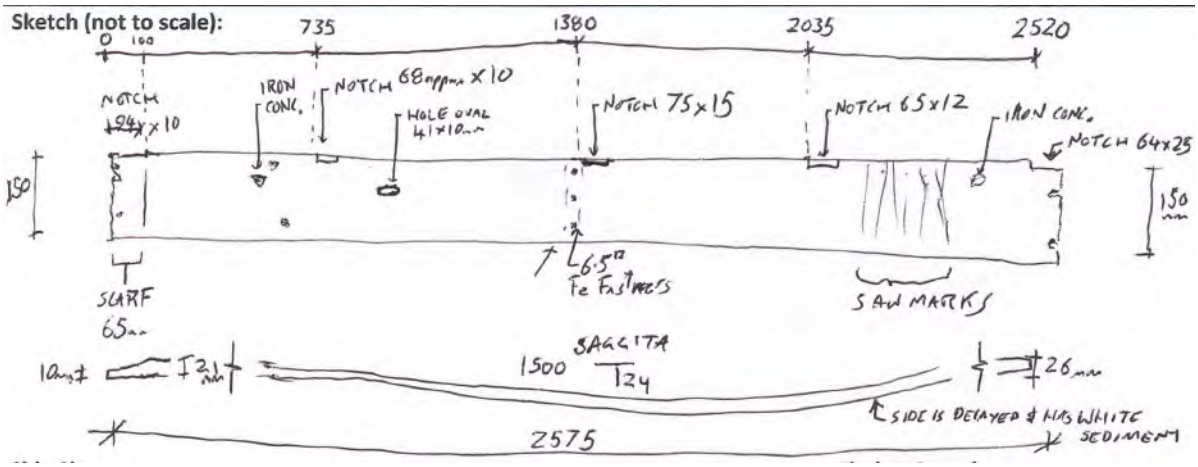

Figure 3.4: Working drawing by Ben Warton of Element (087) showing number of notches, iron (fe) fasteners and tool marks.

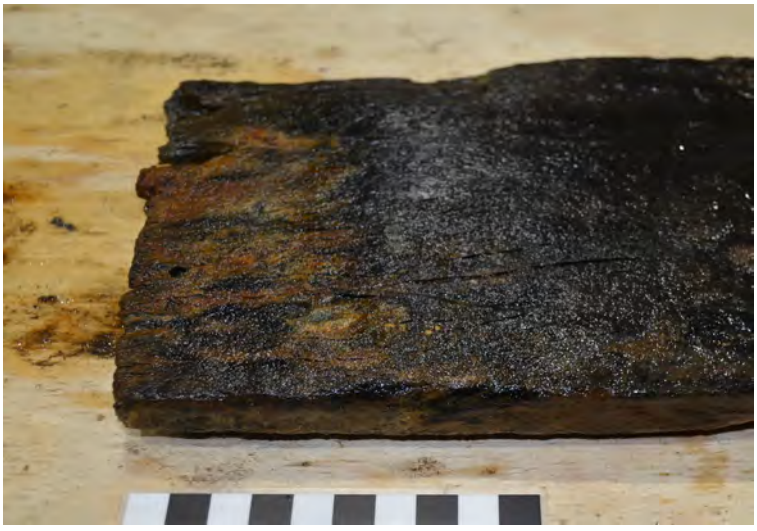

Figure 3.5: Detail of possible scarf joint on Element (087). 100mm scale. Img_DC6700.

Element (084) (#25028) has one notch just off centre of the plank (Figure 3.6, Figure 3.7). This plank is possibly deck or cockpit seating with notches to fit frames or a thwart due to one tooled end showing curvature and shape and a bevelled edge.

Figure 3.6: Element (084) (#25028). A notched plank. 1m scale. Img_2170

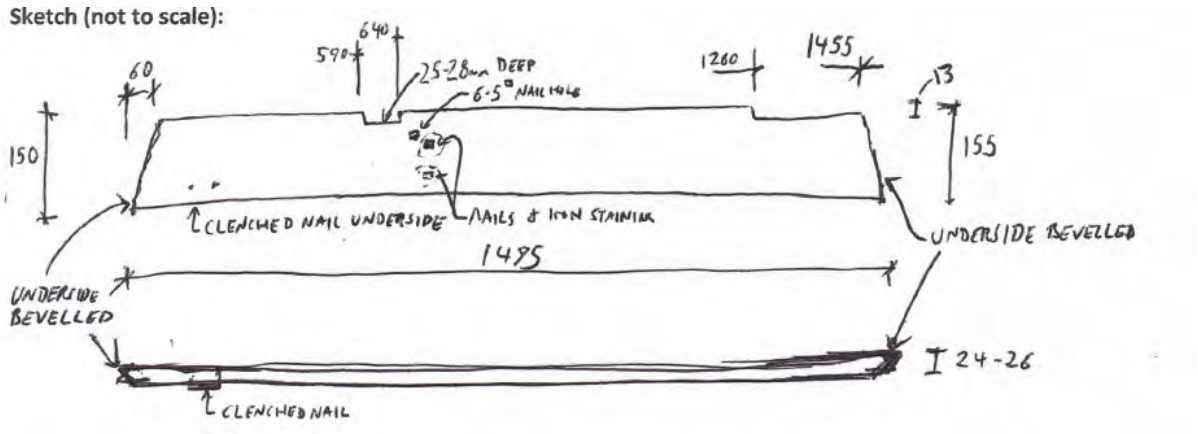

Figure 3.7: Working drawing of Element (084) noting bevelled edge, notch and clenched nail.

TRANSPORT/FRAMES

A frame in a vessel supports the hull planking and typically runs perpendicular to the keel centreline. These offcuts appear to have been from 'compass', or 'crooked', timber frames cut from branches of the necessary curve or angle required (Figure 3.8).[5]

[5] McKee. 1983 Working Boats of Britain. P.61

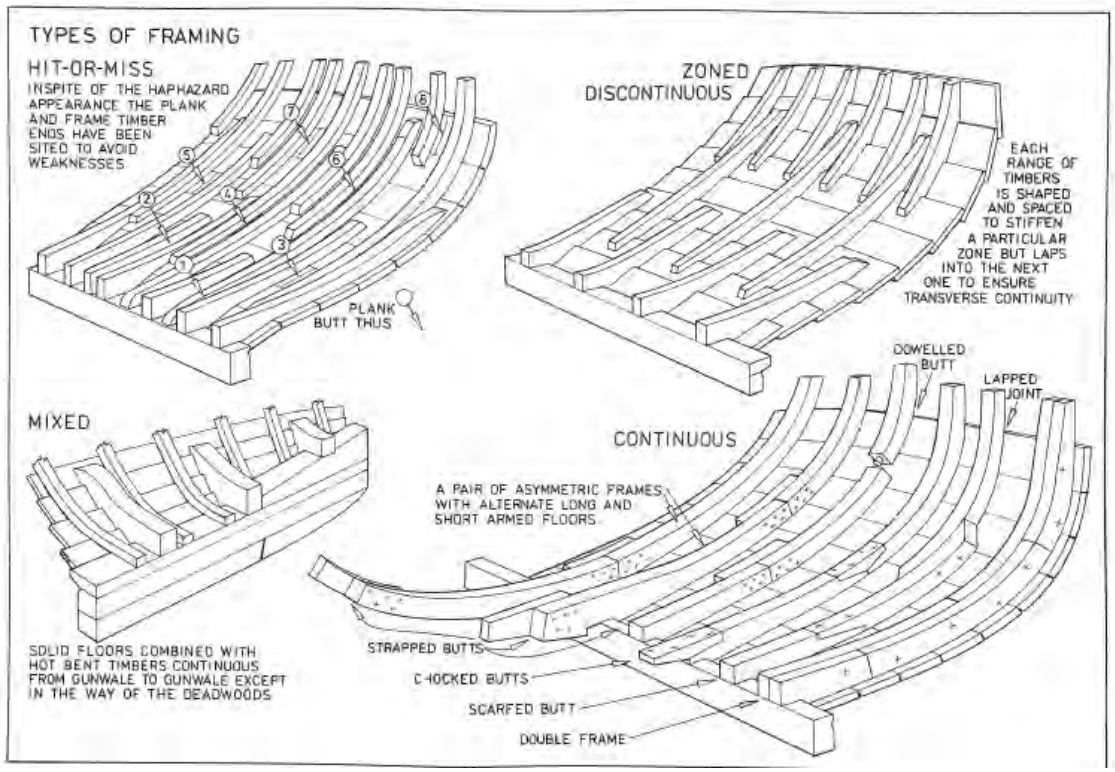

Figure 3.8: Example of frames in a wooden boat

The two frames from Group 2 show evidence of tool marks and both have a moulded face (Table 3.5, Figure 3.9, Figure 3.10, Figure 3.11).

Table 3.5: Frames in Group 2

Shape	Catalogue	Element	Brief Description	Dimension	MIC	Fragments
frame	25052	077	Frame fragment or offcut. Broken end showing trapezoidal cross section. Moulded face with distinct tool marks-adze? Moulded face 108 deg angle.	400x25-50x15-55.	1	1
frame	25054	023	Frame fragment. 4 worked sides, 1 moulded. 1 cut end, 1 end broken with heart wood evident.	325x65x45-60	1	1

Figure 3.9: Element (077). Fragment of frame. 500mm scale. Img_2144.

Figure 3.10: Element (023). fragment of frame. 500mm scale. Img_2149.

Figure 3.11: Element (023). Detail of frame fragment showing toolmarks and trapezoidal shape. 200mm scale. Img_2143.

TRANSPORT/VESSEL FITTINGS

Group 2 had six vessel fittings that have been used on a boat (Table 3.6).

Table 3.6: Vessel-fitting from Group 2

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
tiller	25063	048	Rectangular section tapering to cylindrical end. Slightly chamfered on top side	400x25-50x15-55.	1	0
cleat	25033	103	Running line cleat. 4 nail holes=6.5mm sq.	200x62x150	1	0
dead eye	25078	136	Heart shape dead eye. 3 circular holes. Heavy concretion. Some rope evident.	Total LxThxDia= 255x63x125; Holes Dia=15	1	0
	25096	065	Circular dead eye, 3 holes with carved in channel for rope. Some pitch on outside.	ThxDia=120x2; Hole Dia=19	1	0
board	25032	013	Rectangular section board. Bevelled lower edge with row of 3 nail holes. partial circ hole on long edge approx. 190mm from widest edge to centre of hole, Dia=110. 2 nail holes on centre line of hole.	470x270x23-26	1	1

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
	25040	014	Rectangular sect board. Rectangular cut out (L=245x D=60). Bevel on longest edge. Nail holes on split short edge.	475x90-195x25-27	0	1
pin rack	25041	073	Rectangular section piece of timber, one end broken and attached in a separate bag. 4-5 peg holes (1 partial). 1 sub rectangular mortice LxW=58x14x22 with one end circular all the way through.	645x65x32-34: Peg holes Dia=21-23.	1	1

Element (048) (#25063) is recognisable as a tiller used in a rudder to steer a boat (Figure 3.12, Figure 3.13, Figure 3.14). The rectangular end fits into a mortice in the top of the rudder and the round end is held by the helmsman.

Figure 3.12: Tiller. Element (048) (#25063). 1m scale. Img_2189.

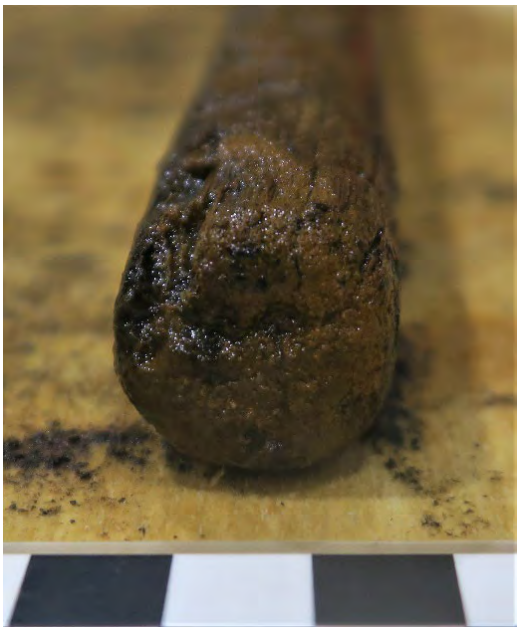

Figure 3.13: Element (048) Detail of cylindrical end of tiller. 100mm scale. Img_2190.

Figure 3.14: Element (048) Detail of rectangular end of tiller. 100mm scale. Img_2192.

Element (103) (#25033) is identified as being a cleat, more so for a line to run through as opposed to making it fast. A running line cleat allows a line or sheet to run freely through it providing both purchase and adjustment. It can then be made fast elsewhere on the vessel (Figure 3.15, Figure 3.16). An example of its possible use in a boat would be when it is attached to the outside of the hull at the boy to hold the bobstay in place to tension the bowsprit downwards.

Figure 3.15: Element (103). Running line cleat. 300mm scale. Img_6762.

Figure 3.16: Element (103). Running line cleat, reverse side. 300mm scale. Img_6763.

The loose timbers had two dead eyes that were classified as Group 2 (Table 3.6). Deadeyes are used to tension standing lines in rigging, such as shrouds, to stabilise masts in positions. Element (065) was made with the grain in the opposing direction to the rope, this has caused the dead eye to split across the centre (Figure 3.17, Figure 3.18).

A general rule of thumb for ship's deadeyes were that their overall diameter was half the diameter of the mast they were to support. For instance, if a mast was 24 inches in diameter, the deadeyes would be 12 inches in diameter. If this is the case then the deadeyes in the loose timbers supported masts of 240-250mm (approximately 9.5 inches) in diameter.

Figure 3.17: Element (136). Possible heart shape dead eye. Scale 100mm. Img_2230.

Figure 3.18: Element (065). Circular dead eye. Note this has been cut with the grain of the wood opposing the rope which caused the split. Scale 100mm. Img_2262.

Elements (013, 014) were excavated separately and given two element numbers (Figure 3.19, Figure 3.20). They were stored separately in the floating tanks and removed separately during the cataloguing stage when they were identified as one piece.

Both elements were found during the initial stage of excavation and can be seen in Plan 5.0 (Figure 1.5).

The elements, when put together as one board, can be either a mast step, or a mast partner (Figure 3.21). Nail holes are located at the corners of the board which would have fastened the board to another element, such as beams or floor timbers, to secure it in place while

nail holes around the central hole would most likely be indicative of the placement of leather sheathing in the hole where the mast would rub.

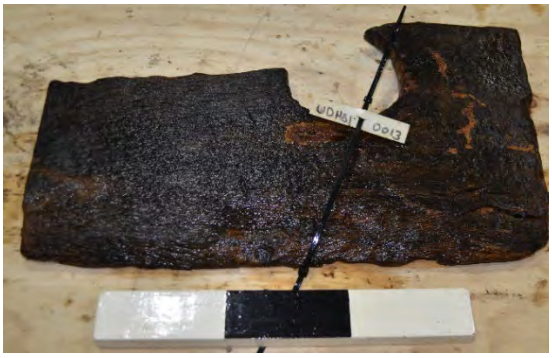

Figure 3.19: Element (013). 300mm scale. Img_6760

Figure 3.20: Element (014). 300mm scale. Img_6785.

Figure 3.21: Element (013) (bottom of photograph) and (014) (at the top). 500mm scale. Img_2176

Element (073) is a rectangular belaying pin rack with an overall number of six holes; five complete holes, and a broken sixth hole (Figure 3.22). A rectangular mortice is evident next to the third hole (Figure 3.23.). A partial belaying pin, or plug remained in a hole, however was removed for conservation purposes and is recorded and discussed in the Volume 3.7 Organics Report (73/2).

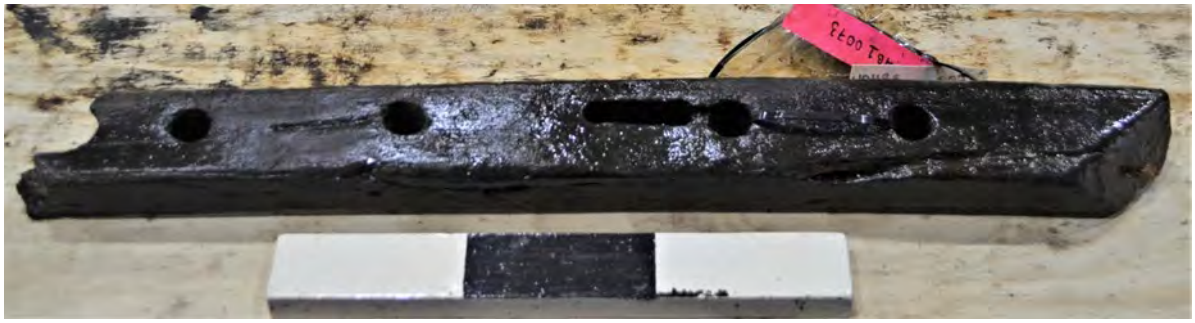

Figure 3.22: Element (073). Timber pin rack. 300mm scale. Img_6791.

Figure 3.23: Detail of peg holes and mortice. 100mm scale. Img_6792.

UNIDENTIFIED

Group 2 had four unidentified elements that possess characteristics of having been used on a boat (Table 3.7).

Table 3.7: Details of unidentified elements in Group 2

Shape	Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
unidentified	25059	066	Longitudinally tapered to scarf joint with square nail hole at tapered end. The nail's dimension is 6.5mm².	770x40-80x10-70	1	0
	25066	099	Rectangular section timbers, cut at both ends. Nail hole (6mm²) at one end with ferrous staining surrounding them. Tool marks at the other ends.	220x35-40x16	1	0
	25067	141	Rectangular section timbers, cut at both ends. Nail hole (6mm²) at one end with ferrous staining surrounding them. Tool marks at the other ends.	220x35-40x16	1	0

Shape	Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
	25262	028	Vessel component. One end rectangular section with scalloped chamfer on corner with perpendicular hole underneath (40mm from centre to Scarfed chamfer). Drops by cross cut shoulder to tapered half lap joint(tenon) which is triangular in cross section. Tool marks on chamfered adjacent face. Possibly a nail in end and at shoulder.	640x20-85x20-80. Hole Dia=19	1	0

Element (066) (#25024) was excavated during the first stage of loose timber removal (Figure 3.24). It can be seen on Plan 5.0 (Figure 1.5) at the stern end of the vessel.

This timber is a possible inwale component or a similar longitudinal timber scarfed into another with a square fastener (Figure 3.25). The dimension of the iron nail is the same as used on the boat.

Figure 3.24: Element (066). 1m scale. Img_2166

Figure 3.25: Detail of scarf edge and square nail hole on element (066). 100mm scale. Img_2162.

Elements (099) (#25066) (Figure 3.26) and (141) (#25067) (Figure 3.27) are discussed together as the two timbers are identical in size as well as having the square nail hole in almost the same position on each end. The nail holes are the same size as the fastenings used on UDHB1. Each element also has evidence of tool marks on the opposite end to the nail hole.

Element (099) was excavated during the second stage of the removal of the loose timbers and can be seen on the Plan 5.1 (Figure 1.6) on the starboard side of the boat.

Element (141) was excavated during the third stage of the removal of the loose timbers and can be seen on the Plan 5.2 (Figure 1.7) in the centre of the boat.

It is unknown, at this stage, what the possibly function or position of these elements were in relation to the vessel UDHB01, however, their nail holes and surface characteristics are comparative to the main vessel.

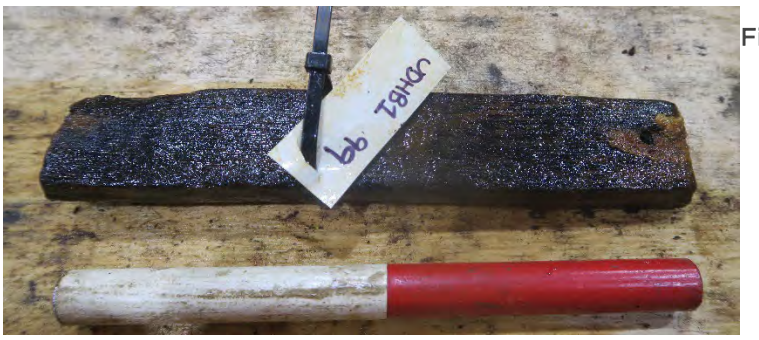

Figure 3.26: Element (099) (#25066) 200mm scale. Img_2197.

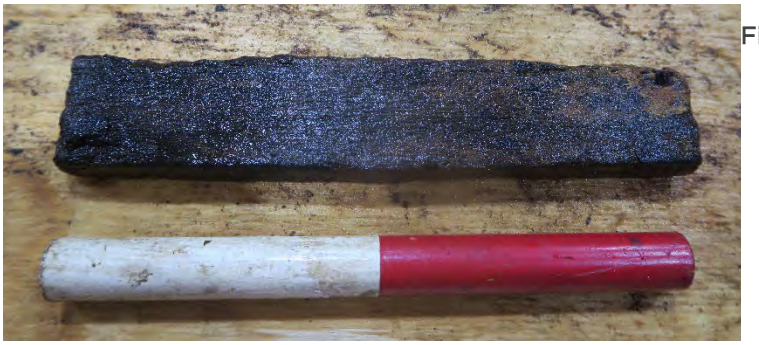

Figure 3.27: Element (141) (#25067) 200mm scale. Img_2200.

Element (028) (#25262) is an unidentified vessel component (Table 3.7, Figure 3.28, Figure 3.29,). The marks on the timber and the positioning of the hole suggests it could be used in rigging or for rope-work on a boat.

Figure 3.28: Element (084) (#25262). Unidentified vessel component. Tool marks and possible rope wear marks visible. 500mm scale. Img_2183.

Figure 3.29: Reverse side of Element (084). Circular hole visible, possibly for a pin or peg to wind rope around. Saw marks visible. 500mm scale. Img_2187.

3.4 GROUP 3

The loose timbers that relate to the boat building process are classified as Group 3. There are 42 MIC with eight fragments (Table 3.8). The architectural and industrial functions refer to timbers that would have been used in the boat yard, pivotal for the day-to-day boat building industry, for instance, supports for the boats or flooring for the yards. Although several elements are classified in the specific function of vessel they could not be classified as Groups 1 or 2 as it is unclear if they were used or not. Timbers will be discussed by the functional category they have been placed in.

Table 3.8: Sum of timbers classified in Group 3 by function

General Function	Specific Function	Shape	MIC	Fragments
architectural	structural	plank	1	1
industrial	unidentified	stake	1	0
transport	vessel	frame	3	0
		offcut	25	5
		plank	1	0
transport/ industrial	vessel/unidentified	offcut	7	0
unidentified	unidentified	block	1	1
		branch	1	1

General Function	Specific Function	Shape	MIC	Fragments
		plank	1	0
		wedge	2	0
		TOTAL	42	8

ARCHITECTURAL

The element (042) categorised as architectural refers to its possible purpose being attributed to the structural elements of a working boatyard such as decking and buildings (Table 3.9, Figure 3.30, Figure 3.31, Figure 3.32).

Table 3.9: Details of architectural elements in Group 3

Shape	Catalogue	Element	Brief Description	Dimension LxW (mm)	MIC	Fragments
plank	25010	042	A rectangular plank, cut one end with 2 or 3 nail holes. The other end is broken/damaged. Saw marks along 1 side.	740x145	1	1

Figure 3.30: Element (042). Image taken at Barangaroo Station before conservation. 500mm scale. Img_1416.

Figure 3.31: Element (042). Image showing nail holes in broken end. Img_6707.

Figure 3.32: Element (042). Image showing tool marks. 100mm scale. Img_6708.

INDUSTRIAL

Industrial components refer to those parts of the working boatyard that are not fixed structures or planks.

Element (033) (Table 3.10, Figure 3.33) is a long straight branch with pointed end and could have been used either as a post driven into the ground, or used as shoring to support the hull of a vessel during construction or maintenance.[6]

Table 3.10: Details of industrial elements in Group 3

Shape	Catalogue	Element	Brief Description	Dimensions (mm)	MID	Fragments
stake	25004	033	Cylindrical branch, very flaky bark on. One end with axe and saw marks where removed from parent tree. Other end worked to point, tool marks indicating axe/hatchet work.	L=1970 Dia=70	1	0

[6] Horsley, John E. 1978.

Figure 3.33: Element (033). Photograph taken when element was removed from cold storage before being cleaned and placed in water tanks. 2m Scale. Img_P033a. Silent World Foundation.

TRANSPORT/FRAME

There were two timbers (051, 071) in Group 3 that were classified as 'frame' but identified as unused (Table 3.11, Figure 3.34). The two elements were almost identical in size.

Table 3.11: Details of frames from Group 3

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
frame	25046	051	Crooked timber, possibly cut for framing, gunwales or inwale? But not used. Pith evident on both ends with heartwood rot.	1170x50-55x40-45	1	0
	25055	071	Crooked timber, possibly cut for framing, gunwales or inwale but not used. Very soft.	1120x45-50x40-50	1	0

Figure 3.34: Elements (051) (#25046) (nearest the scale) and element (071) (#25055). 1m Scale. IMG_2151.

TRANSPORT/OFFCUT

There are 25 offcuts that can be placed in the transport category due to their shape and moulded profiles (Table 3.12, Figure 3.35, Figure 3.36, Figure 3.37).

Table 3.12: Details of transport/offcuts from Group 3

Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
25080	007	Offcut of frame. 2 sided faces, 1 moulded profile, 1 live radial.	700x5-75x45	1	0
25076	009	Offcut of frame. 1 sided face, 1 moulded profile, 1 live edge. Possibly cut marks at narrow end and on sided face.	710x40-130x50-60	1	0
25057	026	Offcut from branch, frame. 2 sided faces, moulded profile cut opposite face to this is live.	800x10-60x45-60	1	0
25042	034	offcut of a frame, curved and moulded surface then cut . Curvature starting 400mm from lower rung end. Angle of sagita=15-20 deg. Possibly a template? Large borer holes.	LxW=750x35-55	1	1
25075	038	Offcut of frame. 2 sided faces, 1 moulded profile, 1 live edge that tapers out.	685x12-70x45-50	1	0
25056	044	Offcut from branch, frame? Slight curve of moulded profile. 1 end cut from parent branch with pith visible. Reverse angle =10deg.	1120x45-50x40-50	1	0
25089	046	Offcut of frame. 1 sided face, 1 moulded profile, 1 radial live face	110x50+-60x15-50	1	2
25053	056	Very thin offcut, long sweeping curve, possibly a tick stick. 3 sawn faces, tool marks evident. 1 live edge.	905x25-60x11-16	1	0

Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
25050	063	Offcut branch for frame. Compound curve. Moulded profile. Moulded profile. Cut after being sided.	1320x25-100x50-60; Dia=150-200.	1	0
25051	064	Offcut branch for frame. 2 sawn faces, 1 radial live face. Some concretion of stone/coal	550x25-75x25-35	1	0
25005	067	Offcut possibly used for knee or dead wood. Approx. angle 140 deg across central axis. Possibly tool (axe?) marks on one end.	780x20-220x15-140	1	0
25069	076	Offcut branch for frame or knee. 1 sided face, 1 radial live edge. Axe marks and break where dismembered from parent tree.	770x160-170x5-70	1	0
25073	083	Offcut of compound curve from stern?	680x6-55x30-40	1	0
25049	090	Offcut branch, 3 worked sides (if frame 1 moulded/2 sided) with internal curved live edge	640x40-45x30-55. Dia=~450	1	0
25072	091	Offcut of frame, possibly floor frame. Large sweeping curve with 400mm straight at centre. 2 sided faces, moulded profile face of inner curve of frame. ~ 270mm sagita at centre. ~10-20 deg to deadrise towards bilge.	2020x30-100x45-50	1	0
25048	104	Offcut of branch with sawn marks on one side. 2 cut sides, 1 live edge.	590x20-60x25-45	1	0
25064	107	Offcut of branch for frame. 1 sided, no clear marks. 1 moulded profile. 1 live edge.	500x10-60x20-45	1	0
25044	109	Triangular shape cross cut of trunk larger than 600mm dia. 26 deg angle cut with a bevel edge. Broken at pith suggesting this is half a profile. One small end cut for strengthening. Sub rectangular hole with 2 small holes-natural? Possibly from around the hull area.	LxW=280x150x49	1	1
25058	110	Offcut from branch, frame. 1 sided face, single curve moulded profile cut face. Live face is radial.	850x20-60x25-50	1	0

Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
25045	121	Unidentified worked timber, possibly an offcut being a negative shape of frame or tick stick. 1 live edge, sawn, with a single curve to right angled shoulder. Sawn ends cut from branch. Heartwood rot.	650x7-120x25-35	1	0
25031	142	Angled (130 deg) branch/offcut, bark on. Possibly cleaved(split) with possible tool marks evident.	LxWx Dia=380x80-100x120	1	0
25074	-	Offcut of frame. 2 sided faces, 1 moulded profile, 1 live edge.	715x5-65x40-45	1	0
25090 25091, 25092	122/1/2 sample	offcut of branch, samples taken by Silent World	625x45-55x25-45	1	3
25043	035/039	offcut of a frame, compound curve. Moulded then cut. Bark on. Borer holes.	LxW=1225x30-50x30-90	1	0
25087	054/1	Coated in pitch on 3 sides. Possible tip of a frame.	110x50+-60x15-50	1	1
			TOTAL	25	4

Figure 3.35: Element (109) (#25044) Triangular shape timber possibly used at hull area. 500mm scale. IMG_2125.

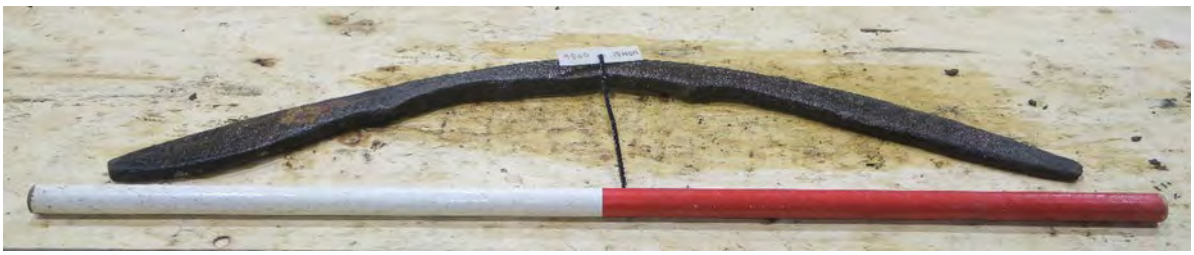

Figure 3.36: Element (056) (#25053). 1m scale. IMG_2145.

Figure 3.37: Element (064) (#25051). 500mm scale. IMG_2140.

Element (091) is an offcut of a frame, its large sweeping curve with a straight centre suggesting a floor frame (Figure 3.38).

Figure 3.38: Element (091) (#25072) is an offcut of a frame, its large sweeping curve with a straight centre suggesting a floor frame. 1m scale. Img_2214.

TRANSPORT/PLANK

The element (031) in this category possesses characteristics found on vessels such as the chamfered end for a scarf joint (Table 3.13, Figure 3.39, Figure 3.40).

Table 3.13: Details of the plank from Group 3

Catalogue	Element	Shape	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
25011	031	plank	Rectangular plank, both ends chamfered. One end with quarter of a cut circular hole remaining. Adze work on one end. Saw marks. 2 nail holes one on chamfered edge.	560x165x5-19	1	0

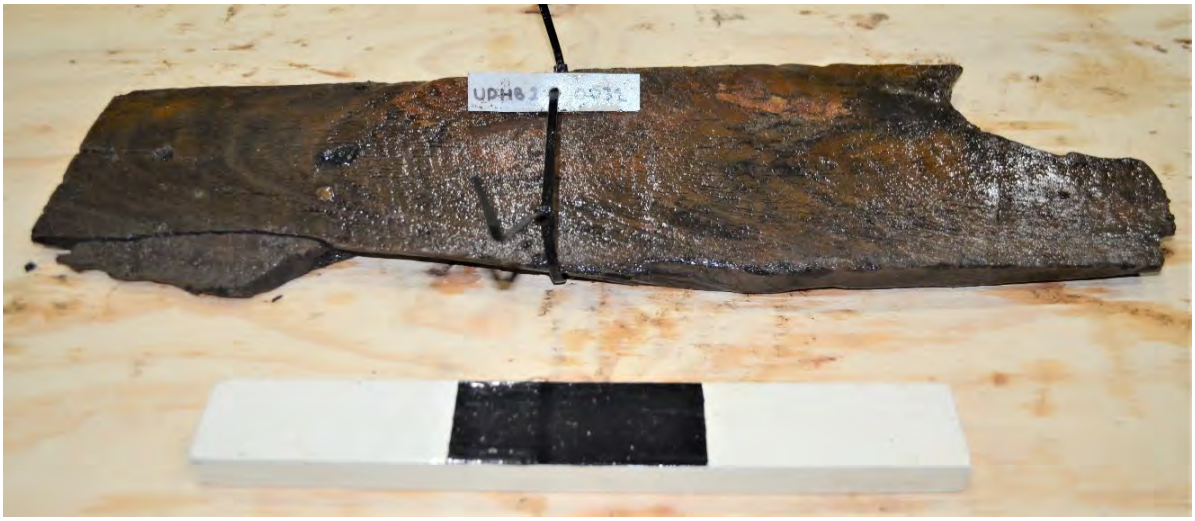

Figure 3.39: Element (031) (#25011). Chamfered plank. 300mm scale. IMG_6709.

Figure 3.40: Element (031) (#25011). Detail of tool marks and nail hole on the chamfered edge of plank. 100mm scale. Img_6712.

TRANSPORT/INDUSTRIAL

The seven timbers identified in the general function as transport/industrial were classified as offcuts (Table 3.14). It is unclear if they were used on a vessel or in the general boatbuilding industry. Elements (006, 105) are featured in Figure 3.41, Figure 3.42, and Figure 3.43, demonstrating the general characteristics of the offcuts in this category.

Table 3.14: Details of offcuts from Group 3

Shape	Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
offcut	25001	006	Offcut of branch possibly intended for use as frame/crooked timber. De barked. Cut on both ends to length before longitudinal cut. Possible use of draw knife. Sapwood evident, possibly stringy bark.	960x120-160; Dia=200	1	0

Shape	Catalogue	Element	Brief Description	Dimensions LxWxTh (mm)	MIC	Fragments
	25003	043	Offcut of branch intended for use as frame. De barked. Cut on both ends to length before longitudinal cut. No saw marks evident.	1080x60-120x30-45	1	0
	25047	104	Offcut of branch. 2 cut sides, sawn marks evident. 1 radial live edge.	590x60x6-40	1	0
	25009	105	Rectangular sect plank. Slight tapered at one end (chamfered) with 4 fastening holes on a possible scarf joint (L=65mm). 5 notches approximately 640mm distance apart from centre to centre. Notch L=63-70mm. Sub rectangular hole (41x10mm) 1000mm from scarf end. Evidence of fe fastening	890x110-130x40-45. Dia=140	1	0
	25060	113	Offcut of branch for frame. 1 sided face with sawn marks, 1 moulded profile face and 1 radial live edge.	785x10-40x45-55	1	0
	25079	144	Offcut of frame. Branch collar evident	350x60-70x30-50	1	0
	25002	049	Offcut of branch intended for use as frame. De barked. Cut on both ends to length before longitudinal cut. No saw marks evident.	1890x200x45-60	1	0

Figure 3.41: Element (006) (#25001), After excavation. 500mm scale. IMG_1851.

Figure 3.42: Element (006) (#25001) After cleaning. 300mm scale. IMG_6672.

Figure 3.43: Element (105) (#25009) After excavation. 500mm scale. Img_2012.

UNIDENTIFIED

There are five unidentified timbers in Group 3 (Table 3.15). These items can be associated with boats and boat building however will need more research in the future.

Table 3.15: Details of unidentified timbers from Group 3

Catalogue	Element	Shape	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
25035	059	block	Unidentified component with a cylindrical handle leading to squared section. Iron fasteners through width and thickness of squared section.	Total Lx Dia=200x22-34. Handle 100x50x35	1	1
25061	080	branch	Crooked branch possibly intended for use as thwart knee or breast hook. Angle on centre lines=~75 deg	LxDia=450x90; Arms=360x260	1	1
25025	126	plank	Rectangular section plank. Raked at both ends, 15 and 22. Hand sawn marks.	700-730x150-170x14-17	1	0
25038	133	wedge	Wedge or chock.	205x25-26x21-23	1	0

Catalogue	Element	Shape	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
25012	143	wedge	Wedge shape. Tapered to rounded end. Possibly a tool or a handle or a wedge.	155x30-45x8-11	1	0

Element (059) (Figure 3.44) has a cylindrical end, possibly a handle or pin, leading to a broken square section with longitudinal groove.

Figure 3.44: Element (059) (#25035). 100mm scale. IMG_6775.

3.5 GROUP 1/2/3

The 15 elements in this group are pieces that could have come from UDHB1, another boat or were used in the boat building process. During the excavation of Barangaroo Station certain pieces of timber were excavated from within UDHB1 before the element numbering system had been implemented. These pieces were recorded by the distance from the stern when they were excavated (Table 3.16, Figure 3.45, Figure 3.46, Figure 3.47, Figure 3.48, Figure 3.49).

Table 3.16: Number of timbers classified in group 1,2,3 by shape

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
frame	25109	N/A Excavated 3-6 meters from stern	Curved small branch, possibly a fragment of a cant frame. 1 cut end, the other end broken.	120x35x1-16	1	1

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
	25104	N/A Excavated 0-3m from stern	Possibly cut from cant frame. 1 or 2 sided edges, 1 live edge.	230x27-39x29	1	1
plank	25030	036	Rectangular section plank rake at one end=14deg with 1 nail hole=6.5mmsq. Hand sawn marks. Right angle cut out with wear on edge.	805x140-145x14-19	1	0
unidentified	25065	079	Rectangular sect tapering in width. Both ends with long chamfers (45 & 30mm). Tool marks evident. 1 nail hole at smaller end =6mmsq.	300x48-60x23-25	1	0
	25100	0-3m from stern	Possible cant framing. 1 or 2 sided edges, 2 or 3 live edges	170x26-30x29-33	1	1
	25105	6-12m from stern	Rectangular section with a finished chamfer with 1 split nail hole at one end. The other end is at an angle. Nail holes along long edge. Wide cut marks to approximately 6mm. Reciprocating power saw?	160x35x17	1	1
offcut	25068	135	Rectangular section timber. One nail (6.5mm²) at one end. Sliver of timber and 1 peach or nectarine stone attached	220x54-58x19-22	1	0
pin	25036	001, 002	Element (001): A cylindrical pin, (also known as a thole or treenail) tapering at 110mm. Heavy ferrous concretion with Element (002), a rectangular piece of timber, attached.	Pin LxDia=240x27-30Timber in concretion 200x60x20	2	1
plank	25029	145	A possible bulkhead with joggled notching. Tapered from centre to ends. Longest edge with 7 nail holes and sliver broken off.	1115x12-145x12-14	1	0
	25020	003	Rectangular section plank with straight rakes, 55 and 20 deg angles respectively. 3 nail holes along edge.	1250-1510x160-135x19-21	1	0
	25021	093	Rectangular section plank longitudinally tapered. Possibly a ghost frame evident. Cut on one end.	1195x25-135x12-14	1	0

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
	25023	134	Wedge shaped cross section rectangular plank. Hand sawn marks. 3 nail holes, 2 at one end and one at the other.	740x160-170x6-17	1	0
	25099	0-3m from stern	Rectangular plank, broken both ends. Saw marks evident. Ferrous staining. HFD.	360x10-35x27	1	1
timber	25098	0-3m from stern	Rectangular section tapering to one end with a step. Nail hole at thicker end. Axe/tool marks on one side.	360x10-35x27	1	0

Element (001) (#25036), the cylindrical timber pin, also called a thole or treenail, can be seen protruding out of ferrous concretion with element (002), the rectangular piece of timber, is attached by the concretion (Figure 3.45).

Figure 3.45: Element (001): Heavily concreted timber belaying pin; Element (002) rectangular timber attached to concretion. 300mm scale. IMG_6777.

Figure 3.46: Element (145) (#20029) Possible bulkhead with joggled notching. After Excavation. 1m scale. IMG_2355.

Figure 3.47: Element (036). Rectangular plank with a right angle cut out and evidence of wear on the edge. 1m scale. IMG_6755.

Figure 3.48: Element (036). Detail of right angle cut with slightly worn horizontal edge. 100mm scale. IMG_6756.

Figure 3.49: Element (093). 500mm scale. IMG_2138.

3.6 GROUP 4

Group 4 contains 16 timbers that could not be attributed to UDHB1, any boat or the boat building process. The timbers were all given the general and specific function of unidentified and categorized by their shape (Table 3.17). Three elements were excavated from 6-12 meters from the stern.

Table 3.17: Number of timbers classified in Group 4 by shape

Catalogue	Element	Shape	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
25110	6-12m from stern	branch	Curved small branch	LxDia=280x20	1	1
25007	045		Cylindrical branch sawn at both ends. No marks. Bark on, very soft	LxDia=1470x110-140	1	0
25071	125		Off cut of stake? Axe marks evident.	LxDia=95x20-60	1	0
25086	027		Possibly post or beam, radial splits.	WxTh=75x50	1	1
25006	029		Fragment of cylindrical branch. Evidence of sawing on one side. No cut marks on ends but multiple breaks.	LxDia=330x65-70	1	1
25077	098	pin	Cylindrical pin, larger section stepped to smaller section. Not turned on lathe. HFD/split.	L=315. Small portion LxDia=120x68-70. Large portion LxDia=195x95-98	1	0
25095	004	plank	Rectangular sect plank, broken with cut marks.	500x115-120x18-20	1	1
25088	082		Rectangular section plank. Saw marks. Broken at both ends. 2 sq nail holes 15 (4mm sq) and 19 mm (7mm sq) from long edge.	1130x160x8-9	1	0

Catalogue	Element	Shape	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
25093	085		Rectangular sect plank, irregular thickness due to erosion. HFD. Fragmented.	200x160x20	1	1
25107	6-12m from stern	unidentified	Fragment of wheel, split nail holes. One end angled; other end rounded. Sawn marks	280x11-18x7-9	1	0
25106	6-12m from stern		Various sized slivers. Broken at ends. Some sawn/cut marks	100-210+x10-18+3-10	5	5
25070	081		Ornate scroll end possibly for frame/turning saw? Modified with square mortice hole (19x15x24), and 4mm diameter hole through scroll. Beading on edge.	55x50x40. Scroll Dia=50	1	0

The use of the ornate scroll, element (081), is undetermined. It is possible it is finial for a tool, from a frame for a turning saw, or a piece of furniture from a nearby house (Figure 3.50, Figure 3.51).

Figure 3.50: Element (081). Ornate scroll end. 100mm scale. IMG_2207.

Figure 3.51: Element (081). Detail of mortice hole on ornate scroll end. 100mm scale. IMG_2209.

The pin, element (098), could have had a number of possible uses, from belaying lines or sheets, to being an oar chock/thole pin, or unrelated to boats or boat building (Figure 3.52).

Figure 3.52: Element (098). Cylindrical pin. 200mm scale. IMG_2228.

3.7 GROUP 2/3/4

One element was placed in Group 2,3,4 (Table 3.18). The stepped block, with pitch on the shoulder could have been used in many ways, on a boat, in the boat building process or for general industrial use (Figure 3.53).

Table 3.18: Element (019) classified in group 2/3/4

Shape	Catalogue	Element	Brief Description	Dimension LxWxTh (mm)	MIC	Fragments
block	25034	019	Block, one end roughly hand sawn other end with shoulder covered in pitch.	170x80x38-40, shoulder LxW=40x13	1	0

Figure 3.53: Unidentified wooden block with shoulder covered in pitch. 200mm scale. IMG_6768.

3.8 GROUP 3/4

Group 3/4 was created for timbers that could have been part of the boat building process or equally part of general wharf activities.

There were two branches catalogued before the elements were numbered. They were found 0-3 and 3-6 meters from the stern (Table 3.19). Both these branches could have been used as knee joints or may have been driftwood that floated into the boat at high tide. Some of the planks, for example element 128 (Table 3.19) had very clear hand saw marks as can be seen in Figure 3.54.

Table 3.19: Number of timbers classified in group 3/4 by shape

Cat #	Element	Shape	Brief Description	Dimensions LxWxTh (mm)	MIC	Frags
25101	0-3m from stern	branch	Branch with knot, node or joint at one end.	89x22-41x31-40	1	1
25112	3-6m from stern		Curved branch/driftwood	420x15-45x10-40	1	0
25085	062/1	offcut	Unidentified timber cut for sample from LT/element (062). Step at end -11mm deep/28, long) with radial shoulder.	WxTh=33x29	1	1
25083	010/1		Timber sample of deselected element (010). Tapered thickness, possibly moulded?	WxTh=111x20-48	1	1
25102	0-3m from stern		Thin cross section of offcut of plank. 1 live edge	156x27-46x7	1	1
25082	092/1		Timber sample of deselected element (092). Tapered thickness, chamfered at top	WxTh=52x9-11	1	1
25018	058	plank	Rectangular plank. Cut both ends. Very clear hand sawn marks 4-15mm apart.	1140x35-70x8-15	1	0
25015	101		Trapezoid plank longitudinally tapered. In good condition.	860x80-140x14	1	0
25016	108		Trapezoid plank longitudinally tapered. In good condition.	980x22-130x9-11	1	0
25017	128		Rectangular plank. Cut both ends. Very clear hand sawn marks 4-15mm apart.	1140x35-70x8-15	1	0
25039	138		Rectangular section plank. One end cut/sawn, other end broken.	610x130x10-11	1	1
25019	140		Narrow Rectangular section plank. 4 nail holes (6-8 mm sq) Bag of pitch removed during cleaning and attached in bag.	1220x30-40x10-15	1	0

Cat #	Element	Shape	Brief Description	Dimensions LxWxTh (mm)	MIC	Frags
25111	3-6m from stern		Convex and warped board/plank, rounded edges with rounded end. 2 nails at broken end. Nails look like they are applied from each side.	400x32+-60x3-12	1	1
25103	0-3m from stern	timber	Rectangular section, 1 nail hole. Split along edge at possible 2nd nail hole.	156x27-46x7	1	0
25108	6-12m from stern	unidentified	Tapered to one end. Nail hole at the other end. Pitch evident.	113x15-22x16	1	1

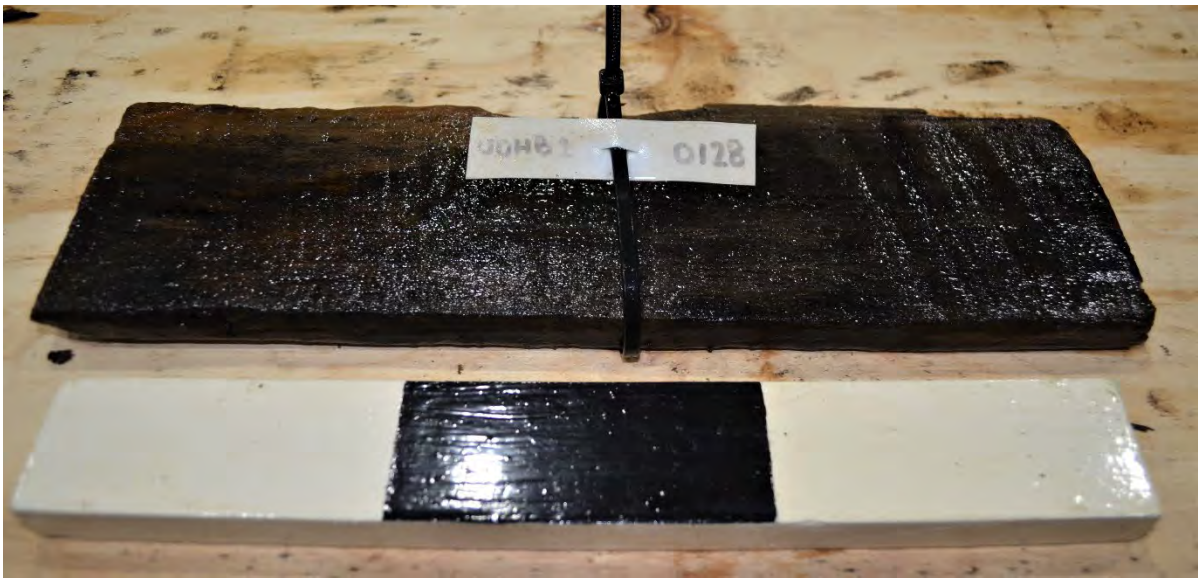

Figure 3.54: Rectangular plank. Cut both ends. Very clear hand sawn marks 4-15mm apart. 300mm scale. IMG_6728.

3.9 DEACCESSIONED TIMBERS

During the excavation and the cleaning process, due to erosion, size or characteristics, some timbers were identified as either undiagnostic or unlikely to survive the conservation process. Most of the timbers were measured and photographed on site and assessed by Silentworld before being deaccessioned (Table 3.20, Figure 3.55, Figure 3.56).

Table 3.20: Deaccessioned loose timbers

Element	Element Type	Brief Description	Dimensions LxWxTh (mm)	Number of items
005	Timber	Frame?	500x130x45	1
008	Timber	plank	505x540x15	1
010	Timber	plank	250x110x70	1
012	Timber	frame	430x90x50	1
015	Timber	plank	260x110x34	1
016	Not recorded	not recorded	270x55x55	1

Element	Element Type	Brief Description	Dimensions LxWxTh (mm)	Number of items
017	Timber	plank	550x50x30	1
018	Timber	plank	140x50x25	1
022	timber	plank	1210x180x5	1
024	timber	plank	1200x330x15	1
027	timber	Frame	330x85x55	1
030	?	?	198x45x15	1
032	Timber	frame	390x55x50	1
040	timber	plank	640x80x65	1
041	timber	plank	560x100x10	1
050	Timber	Plank	705x105x10	1
052	Timber	plank	1640x75x10	1
054	Timber	plank	470x70x30	1
062	Timber	?	160x45x33	1
086	Timber	Planking brace?	230x50x40	1
088	Timber	plank	340x60x10	1
089	Timber	Frags	460x50x2092	1
092	Timber	plank	860x55x12	1
094	Timber	plank	440x55x300	1
095	Timber	?	220x35	1
096	Timber	?	155x40x30	1
097	Timber	Frame?	470x40x15	1
100	Timber	slat?	370x50x10	1
102	Timber	?	645x30x25	1
106	Timber	plank	270x60x10	1
112	Timber	offcut	85x90x40	1
114	Timber	Fragment	400x75x20	1
115	Timber	plank	1130x17	1
116	Timber	Fragments	290x30x15	1
117	Timber	unidentified	500x55x8	1
118	Timber	Frame?	600x50x50	1
120	Timber	curved frame?	230x60x40	1
			TOTAL	37

Figure 3.55: Element (088). Example of deaccessioned timber that is undiagnostic and would not survive conservation. 800mm scale. Img_1260.

Figure 3.56: Element (057). 1cm increments on scale. Img_1430.

4.0 REPORT SUMMARY & RESULTS

4.1 CONTEXTUAL DISCUSSION

This timber assemblage, located loose in the boat, raises questions for further research, for example: did the timber fall from the boat and if not where is the rest of the boat? Future research involving species sampling may provide answers to this question as well as providing temporal answers to the colonial boat building industry.

The frame offcuts are valuable artefacts which provide vital information on the process of boat construction at the time of their disposal, with regard to stock timber selected, tools and methods used to achieve moulded profiles, and the size and shape of frames used.

Some of the elements are clearly broken and discarded, utilising the boat as a convenient dumping ground for unwanted pieces. However, other timbers appear whole and, despite sitting in the boat for over 150 years, in good condition. The variety of conditions leads to the discussion of need and supply and the timbers value, not only in price and availability, but in the time and skill put into them. The fact that the timbers were kept in a contained, dry, and easily accessible place, and not burnt for instance, suggests that their value for reuse in the boatbuilding industry was high.

5.0 REFERENCES

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BARANGAROO STATION ARCHAEOLOGICAL INVESTIGATION REPORT

CONSERVATION REPORT

JULY 2022

VOLUME 3, SECTION 3.12

FINAL REPORT | Report to **Sydney Metro**

CASEY & LOWE
ARCHAEOLOGY & HERITAGE

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HEIGHTS HERITAGE
conservation

Treatment Report

Date: 12.7.22
Ref No: 7809

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OBJECT	**Sydney Metro archaeological artifacts**
DESCRIPTION	66 acheological objects from the Sydney Metro Site, categorised under 2 main sections: Organics: Wool, Hemp, Leather and wood. And Metals: Iron, Copper alloy, Brass, Bronze Pewter, Gold, Iron and Lead. Plus Bone, and a Whale Tooth.
CONDITION	Varied condition. Some objects had been dried, others had been de salinated but remain wet, others still retained the salt water from their original location. There was evidence of mould on some of the organic items and corrosion of metals.
TREATMENTS	**ORGANICS:**
Dry objects	Surface cleaned using mechanical action, soft brush and conservation vacuum. Mould remediation using Steri-7Heritage® Heights Heritage Conservation Air dried. Microcrystaline wax treatment.
De salinated/wet objects	Mould remediation using Steri-7Heritage* Heights Heritage Conservation preparation Freeze dried Surface cleaned using mechanical action, soft brush and conservation vacuum. Microcrystaline wax treatment
Waterlogged objects	Soaked in successive clean water baths to remove salts. Mould remediation using Steri-7Heritage® Heights Heritage Conservation preparation. Freeze dried. Surface cleaned using mechanical action, soft brush and conservation vacuum. Microcrystaline wax treatment.
	METALS:
	Surface cleaned using mechanical action, soft brush and conservation vacuum. Mechanical removal of corrosion products Mould remediation using Steri-7Heritage® Heights Heritage Conservation preparation. Microcrystaline wax treatment
	BONE and TOOTH:
	Surface cleaned using mechanical action, soft brush and conservation vacuum. Mould remediation using Steri-7Heritage® Heights Heritage Conservation preparation. Microcrystalline wax treatment
NOTES	Fragile and multiple part objects such as shoes were supported on Coreflute boards secured with cotton tape.
It is recommended to remove the objects from their plastic bags for long term storage	

Before, during and after treatment photos

Catalogue No; 25425

Catalogue no: 25407

conservation and restoration of historic textiles and mixed media objects

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