

11KV STAGE 4, PORT OF LYTTTELTON, LYTTTELTON: REPORT ON ARCHAEOLOGICAL MONITORING

HNZPT AUTHORITY 2015/600EQ

LUKE TREMLETT, MARIA LILLO BERNABEU AND LYDIA MEARNS
UNDERGROUND OVERGROUND ARCHAEOLOGY LTD

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INTRODUCTION

As part of a post-earthquake repair and upgrade of the Lyttelton Port facilities, trenching was carried out in the port for an 11kV infrastructure roll-out. Stage 4 of these works involved the excavation for a substation at 7 Norwich Quay and a 50 m trench from 7 Norwich Quay southeast to the Oxford Street overbridge in November 2016 (Figure 1). This work was carried out under Heritage New Zealand authority 2015/600, as it had the potential to affect seven recorded archaeological sites. As per condition 2 of this authority, and in accordance with 'LPC CEMP Guidelines Archaeology Technical Chapter', these earthworks were monitored by an archaeologist. This report outlines the results of the monitoring, during which several archaeological sites were exposed.

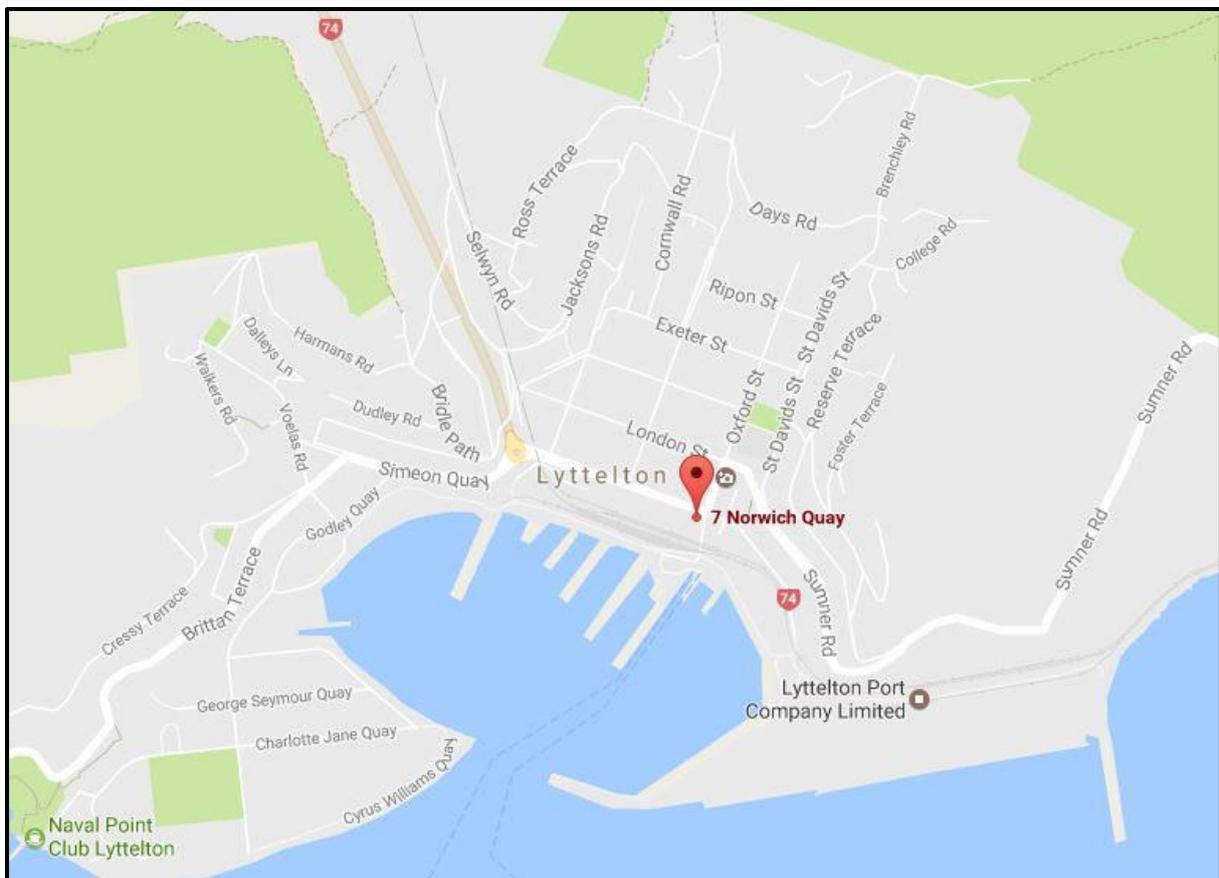


Figure 1. Lyttelton, showing the location of 7 Norwich Quay. Image: Google Maps.

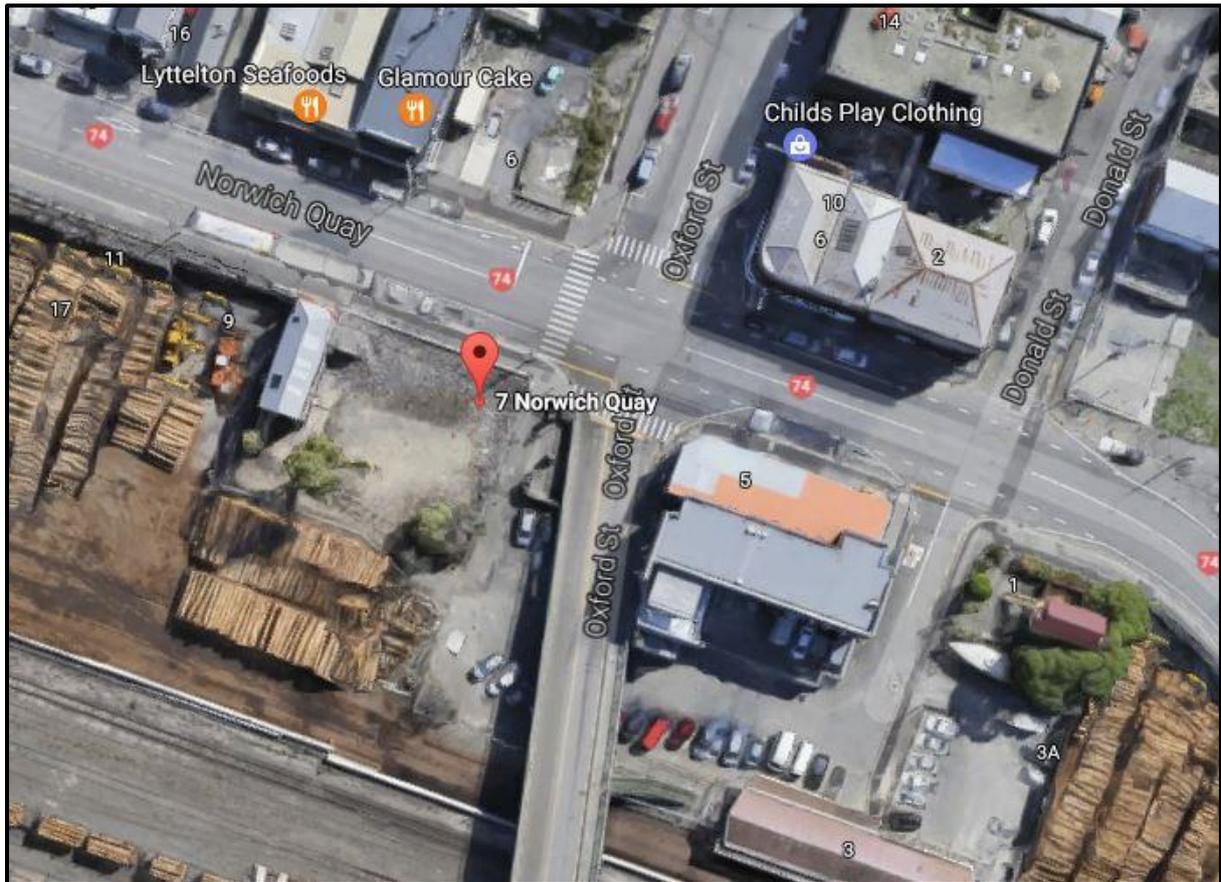


Figure 2. 7 Norwich Quay prior to the earthworks. Image: Google Earth.

HISTORY OF THE PORT¹

Formed from the remnants of an extinct volcano, Lyttelton harbour has been the site of human activity for over 800 years (Rice 2004:14).

Prior to European settlement the harbour was known as Whakaraupō, or harbour of raupō (Burgess 2009:7). The first occupants of the area were Waitaha, followed by Ngāti Mamoe in the 16th century (Anderson 1998:22-23). For Ngāti Mamoe the area surrounding Lyttelton, which they named Ōhinehou, was a mahinga kai. The pioki, or gummy shark, was hunted there on a seasonal basis (R. Couch, pers. comm., 2011). Ngāti Mamoe was eventually displaced in the 18th century by Ngāi Tahu, who established a settlement at Rapaki (Anderson 1998:38). Rapaki later became a native reserve and is today the site of a marae. Ōhinehou (now Lyttelton) is noted as the place where an early 18th century Ngāi Tahu war party fought and defeated the resident mana whenua Ngāti Mamoe (Jolly 2013: 34).

Māori travelled backwards and forwards across the Port Hills, between the settlements around Whakaraupō and the settlements and resources on the inland side of the hills. Both the Port Hills and Banks Peninsula provided access to forest-related resources, including a rich birdlife (Challis 1995). By the time the first Europeans arrived in the area the settlement at Ōhinehou appears to have been abandoned. Visiting French whalers described settlements at Whakaraupō as “a cluster of huts and some whata on which were stores of dried fish, sacks of kumara and cakes of roasted fern root” (Anderson 1998: 151). No Māori were recorded as living in this part of Whakaraupō between 1840 and 1861 (Anderson 1998: 151).

¹ This section is not a full outline of the history of the Lyttelton Port but a summary of the relevant information, from Carter 2014.

By the 1820s the Ngāi Tahu population of Banks Peninsula was on the decline due to the Kai Huanga feud. The population suffered a further decrease in the 1830s following the massacres of the Ngāti Toa war chief Te Rauparaha (Rice 2004:14). Lists of Māori settlement sites of the early 19th century have been compiled from traditional and historical sources (Anderson 1988: Figs. 14 and 15; Orchiston 1974: Table 2.5). By this stage there had been a migration of populations to the Horomaka harbours frequented by trading vessels and whaling ships, particularly to Akaroa, Koukourarata (Port Levy), and Whakaraupō (Anderson 1988: 34-35, 76).

Despite this, European vessels still visited the Banks Peninsula region in order to trade with the local inhabitants. It was a flax trader, Captain William Wiseman, working on behalf of Australian merchants Cooper and Levy, who gave Lyttelton its first European name: Port Cooper. Although British, French and American whaling vessels visited the harbour, Akaroa remained the main port of call for the Banks Peninsula region (Rice 2004: 14-17).

During this early period of Māori-European interaction, local Māori had a market area – and several whare – at the east end of Norwich Quay (now recorded as archaeological site M36/229). This was subsequently moved to the west end of the original foreshore, around the corner of Norwich Quay and Dublin Street, including Sutton Reserve and the area around the Moorhouse tunnel mouth. Both these areas were also the site of fishing villages before European arrival in the area (Burgess 2009: App. 4).

Following the establishment of a farm by the Deans family on the Canterbury plains, Port Cooper was used as a landing site for surveyors who were looking to establish a colony on the plains. The plan for a British colony at Whakaraupō was prepared in 1847 by Edward Gibbon Wakefield and John Robert Dudley. In 1848 they formed the Canterbury Association with the support of the Anglican church. Originally the main settlement in Canterbury was to be called Lyttelton, after the association's chairman, George William Lyttelton, 5th Baron Lyttelton. However, the association decided to name its first settlement, that which was established at Port Cooper, after Lyttelton instead (Rice 2004:17).

In 1848 Captain Joseph Thomas was sent by the association to survey the region and plan the new settlement. Initially Thomas suggested the establishment of a settlement at Teddington, but he later realised that the process of reclamation would prove to be too expensive (Rice 2004:17). With the main settlement being relocated to the plains, Thomas moved the site of the main port to what was then known as Erskine Bay in Port Cooper (Rice 2004:18).

There were, however, concerns that the harbour was unsuitable for a port. Engineers suggested that the neighbouring Gollans Bay would be a more appropriate location as it would allow larger vessels to dock and unload. Regardless, efforts were taken to ensure that Lyttelton could accommodate the growing number of vessels. One such progressive individual was the merchant, John Thomas Peacock, who in 1857 oversaw the construction of a second jetty on Norwich Quay (Scotter 1968:62). The construction of the second jetty led to an increase in shipping, which resulted in a rise in exports (Scotter 1968:63).

By 1859 a sea wall was built on either side of the government wharf (Rice 2004:26). However, criticism of the port continued, especially since many vessels were forced to berth further out in the harbour and be unloaded through the use of lightermen (Scotter 1968:67). Some cargo vessels took weeks to unload (Rice 2004:25).

Against the backdrop of these developments, plans were also being made to connect the port to Christchurch via railway. The concept of a railway linking the port town of Lyttelton with Christchurch

had been the hope of many early English settlers in Lyttelton, who had left their homeland at a time when the railway industry was rapidly expanding (Scotter 1968:63). However, it was not until an English engineer, G.R. Stephenson, had completed a report in 1859 that the idea was given official consideration. Work began on the tunnel in 1860 but was hindered by hard rock and the lack of available men due to the lure of the gold rush taking place on the West Coast. The tunnel was finally opened in 1867 (Rice 2004: 33). The railway contributed significantly to the development of Lyttelton and the tunnel became known as the “throat of the province” (Rice 2004:29).

During construction there were proposals for the railway to continue as far as Gollans Bay, which was still considered to be the more appropriate location for a port. However, Stephenson argued in favour of Lyttelton and suggested that land should be reclaimed (Scotter 1968:68). Edward Dobson, a member of the railway commission established by the council, suggested that the tunnel should be straightened in order for the railway line to continue as far as a jetty, which would extend out into the harbour (Scotter 1968:68).

This was accepted by the contractors, who felt that a straight tunnel was safer. The plans were also accepted by the provincial government when Dobson presented them in 1862 (Scotter 1968:68). However, the plans were opposed by some members of the council and this disagreement led to the establishment of the Lyttelton Wharf Commission in November of that year. The commission’s priority was to determine the most appropriate location for a wharf that would accommodate larger vessels. However, because the commission was largely composed of individuals who were merchants and vessel masters, the organisation favoured plans that emphasised the needs of shipping rather than rail (Scotter 1968:69).

Instead of Dobson’s plan of an extended wharf, the commission suggested that a breakwater, extending from Officers Point, with a wharf, should be formed. The submissions were put before an English commission, which dismissed them all save for that of the local commission. The English commission suggested that as well as a breakwater from Officers Point, a second breakwater extending from Naval Point should be constructed (Scotter 1968:71).

In July 1859 further work was undertaken on the government wharf that saw it extended with screw piles. An embankment with a wooden seawall was constructed between the jetty and the reclamation at the mouth of the tunnel. A short jetty was also built at the western end of this seawall (the lighter jetty). The seawall and the short jetty were contracted to E.G. Wright, an engineer, while the screw pile jetty was overseen by Alexander Cairns. Progress was slow, however, due to the peculiarities of the Lyttelton mud, and in October 1866 the government took over the work on the screw-pile jetty (Scotter 1968:74). Work was also undertaken on building the breakwater from Officers Point through the use of prison labour (Scotter 1968:75). The need for breakwaters was confirmed when a tsunami hit the port in August 1868 (Rice 2004:38).

With the completion of the railway tunnel in 1867 attention was once again focused on the need for adequate berthage (Scotter 1968:77). The 1870s saw an increase in grain production in Canterbury and therefore the port was forced to deal with a high volume of exports (Scotter 1968:80). John Marshman, the general manager of the Canterbury provincial railways, stressed the need for a third wharf in order to cope with the demands (Scotter 1968:81).

In 1872, in order to ensure that the plans for harbour development would meet government approval, Superintendent William Rolleston requested that the Minister of Public Works provide him with the services of John Carruthers, the engineer in chief for the New Zealand government, and his assistant, John Blackett. The report they produced recommended that the harbour be dredged, that the Officers Point breakwater be extended, that another wharf capable of carrying railway lines be built, along

with another breakwater and that a jetty for lighterage be erected at the tunnel mouth (Scotter 1968:84).

In December 1873 the firm Hawkins, Stock and Company signed the contracts for the Officers Point mole and wharf and the Naval Point breakwater. Another company, Connor and McKay, oversaw the construction of the lighterage jetty. The contracts were eventually taken over by a newly formed firm, that of Hawkins and Martindale (Scotter 1968:84).

The breakwater wharf was formally opened in February 1874 and was named Gladstone pier after the first ship to dock there, *W.E. Gladstone*. The breakwaters were completed in 1876 (Scotter 1968:84). The dredge, *Erskine*, started its work deepening the harbour in August of that year, accompanied by the hopper barges, *Sumner* and *Heathcote* (Rice 2004:42). Apart from sporadic work in 1887 and 1890 the dredge and barges were made redundant in 1886 (Rice 2004:51). As a result of this dredging the need for lighterage steadily began to decline (Scotter 1968:87). These developments led to an increase in shipping, both domestic and international (Rice 2004:42).

In 1876 the provincial government was disestablished and the Lyttelton Harbour Board took over the management of the port. The composition of the board represented the two groups that had vested interests in the growth of the port, businessmen and farmers (Rice 2004:43).

In 1878 the harbour board started on new projects, the first of which was the construction of a graving dock. The £92,000 contract for this was given to Ware and Jones and the firm was required to cut away the Naval Point hill and reclaim the land (Scotter 1968:136). There were delays, however, due to the need for the caisson (floating gateway) to be delivered from Glasgow. When it finally opened on 3 January 1883 there was a large celebration, with trains bringing guests to a ceremony held in the export shed (Scotter 1968:137). Although the graving dock allowed the Lyttelton Harbour Board to repair its own vessels, it was not used enough to recover the cost of its construction (Scotter 1968:138). The transition from sail to steam also meant that it was unable to accommodate new and larger vessels (Rice 2004:48).

Built in 1884 and situated next to the graving dock was a patent slip designed by C. Napier Bell and constructed by John Stinson (Scotter 1968:138). In 1885 Peacock's wharf was replaced by the new No. 7 ocean steamer wharf, which was also designed by Bell (Scotter, 1968:139).

As well as harbour improvements, the 1880s also saw the installation of military defences. The threat of war in Europe in 1878 resulted in the New Zealand government obtaining four guns from Britain (Scotter 1968:145). These were placed on Gladstone pier in 1879 and in the following year the naval brigade was formed (Rice 2004:53). The Russian incursion into Afghanistan in 1885 led to further defensive measures, with the installation of a 64 pounder gun at Officers Point and the formation of N Battery of the New Zealand Naval Volunteers (Rice 2004:53).

The 1880s also saw the formation of a union for the Lyttelton waterside workers (Rice 2004:51). Working conditions in the port were rough, with long hours and constant danger. Despite this, the men who worked the port were not the underclass found in other city ports, but rather men who lived and socialised together with their fellow workers and overseers (Scotter 1968:151). Although the 1880s was a time of economic depression for New Zealand, Lyttelton was fortunate, as the Canterbury wheat boom and the export of frozen meat to Britain kept the worst effects of the depression at bay (Rice 2004:44).

When the 1890 maritime strike, which had its origins in Australia, reached New Zealand, the workers of Lyttelton joined in August of that year. Although the strike only lasted until October, there were

still instances of disorder (Rice 2004:51). The Lyttelton Harbour Board was pressured by bodies representing Canterbury farmers and was forced to intervene and ensure that the work continued (Scotter 1968: 152). As a result of the strike the Canterbury Employers' Association prevented unionists from working at the Lyttelton docks (Rice 2004:52).

The 1890s saw the end of the depression and an increase in the number of ships (Rice 2004:60). One of the new developments was the formation in 1895 of an interisland ferry service to Wellington. The *Penguin* was the first vessel to offer such transport and this was expanded upon in the following year by the Union Steamship Company (Rice 2004:62). The impact of the ferry service meant that by the early 1900s the No. 2 wharf became known as the ferry wharf (Rice 2004:69).

The dawn of the 20th century was marked by Lyttelton being the port of operations for three expeditions to Antarctica, culminating in Robert Falcon Scott's ill-fated 1910-1912 voyage (Rice 2004:66). Lyttelton was chosen most likely due to its close proximity to the Ross Sea area and because R.J. Scott, the professor of engineering at Canterbury University College, was Scott's cousin (Scotter 1968:177).

The 1900s also saw a renewal of dredging as none had taken place since 1895, resulting in a gradual accumulation of silt. The Lyttelton Harbour Board purchased the dredge *Manchester* to undertake this work in 1900 (Scotter 1968:159). However, the renewal of dredging led to disagreements among the harbour board as to where the spoil should be dumped (Scotter 1968: 162-163). In 1909 it was finally decided to start a process of reclamation behind the breakwater at Naval Point (Scotter 1968:163).

The Naval Point reclamation was eventually finished in 1925. After the land had settled railway lines and roads were laid across its surface. Oil companies such as Vacuum Oil and British Imperial Oil then used the land to construct their new storage facilities. Many of these oil tanks were constructed by the local engineering firm, Andersons' engineering works (Rice 2004:92).

With the economic downturn following World War I, the depression of the 1930s and then the outbreak of the World War II in 1939, there were no major construction projects at the port until the 1950s. In 1951 the Lyttelton Harbour Board Empowering Act was passed by parliament, granting a loan for the improvement of the No. 7 jetty. In the following year the loan was increased so that further repairs could be made to the ferry wharf. A second tunnel was also built during this period (Scotter 1968:289).

A new reclamation project, situated between Windy Point and Gladstone pier, started in 1957. This was designed by James A. Cashin, the former senior assistant engineer at the port of Liverpool. By creating a new eastern reclamation, Cashin aimed to create more room for cargo handling, as well as a new site for transit sheds (Rice 2004: 119). The construction was a lengthy process, as tests had to be carried out by a British hydraulic research station based at Wallingford in Berkshire. Because the liquid mud of Lyttelton harbour had to be overcome by unique methods of engineering, the construction of the reclamation was visited by many overseas experts (Rice 2004: 120).

The new eastern reclamation, named Cashin Quay, was opened in 1964 (Rice 2004:122). This quay provided the ample space required for the newly implemented cargo containers and in 1973 the container wharf was opened (Rice 2004:134). At the time Lyttelton, along with Port Chalmers, was one of only two cargo container ports in the South Island (Rice 2004:135).

The Lyttelton Harbour Board continued to manage the port until October 1989 when the organisation was disestablished by the Port Companies Act 1988 and taken over by the Lyttelton Port Company

(Rice 2004: 137-138). The 1980s also saw the removal of the oil storage tanks at Dampiers Bay following an explosion in 1985, and the replacement of the 1884 patent slip in 1987 (Rice 2004: 143). The changes implemented by the Lyttelton Harbour Board saw the formation of various heritage groups who sought to preserve the maritime history of the port. One such group, the Norwich Quay Preservation Society, assisted in the removal of the historic signal box from its original site to a new location opposite the Lyttelton Historical Museum (Rice 2004:149). Despite this, the historic crane *Rapaki* and the *Te Whaka* dredge were unable to remain in situ. Since they belonged to the company they were put up for sale, and then relocated to Auckland and Dunedin (Rice 2004:147). The last of the port's electric cranes were removed in 1994 and replaced by modern equivalents (Rice 2004: 147). Despite the damage caused by the 2010-2011 Canterbury earthquakes, the port of Lyttelton continues to operate in its original role as an export and import zone between the South Island and the rest of the world.

ARCHAEOLOGICAL MONITORING

Earthworks for the construction of the substation at 7 Norwich Quay and the service trenching to the Oxford Street overbridge was carried out by Fulton Hogan from 14-30 November 2016, with Angel Trendafilov and Luke Tremlett (Underground Overground Archaeology) monitoring the work. The construction of the substation at 7 Norwich Quay required excavation of an area 8.5 x 4 m. This excavation initially cut into material deposited there as shoring to support Norwich Quay after the post office demolition in 2011. As such, excavation in the north of this area, near Norwich Quay, extended to approximately 3 m deep while excavation in the south extended to a depth of less than 500 mm. Remnants of the 1875 post office foundations were found just below this and just above the base of excavation and required removal (see below). The service trench, which extended south and curved towards the Oxford Street overbridge, measured 1-1.5 m across and 1 m deep.

Four features and one find spot were found during the work, associated with four of the seven recorded archaeological sites within the project area (Figure 3, Table 1, Figure 4).



Figure 3. The approximate location of the recorded archaeological sites within the project area. Image: Google Earth.

Table 1. Recorded archaeological sites within the project area and the archaeological features found during this project.

ArchSite	Site	Archaeological feature(s)	Description
M36/229	Ōhinehou	Feature 1 and 2	Cultural layer and oven feature.
M36/293	Erskine Bay sea wall	Sea wall and find spot 1	Stone feature and three artefacts from the fill associated with it.
M36/294	Government wharf	N/A	N/A
M36/291	Canterbury Association store	N/A	N/A
M36/295	First post office	N/A	N/A
M36/302	Railway reclamation	Feature 4	Scatter of artefacts in clay.
M36/230	Second post office	Foundations, north wall and Feature 3	Concrete foundations, stone wall and the 19th century fill behind it.

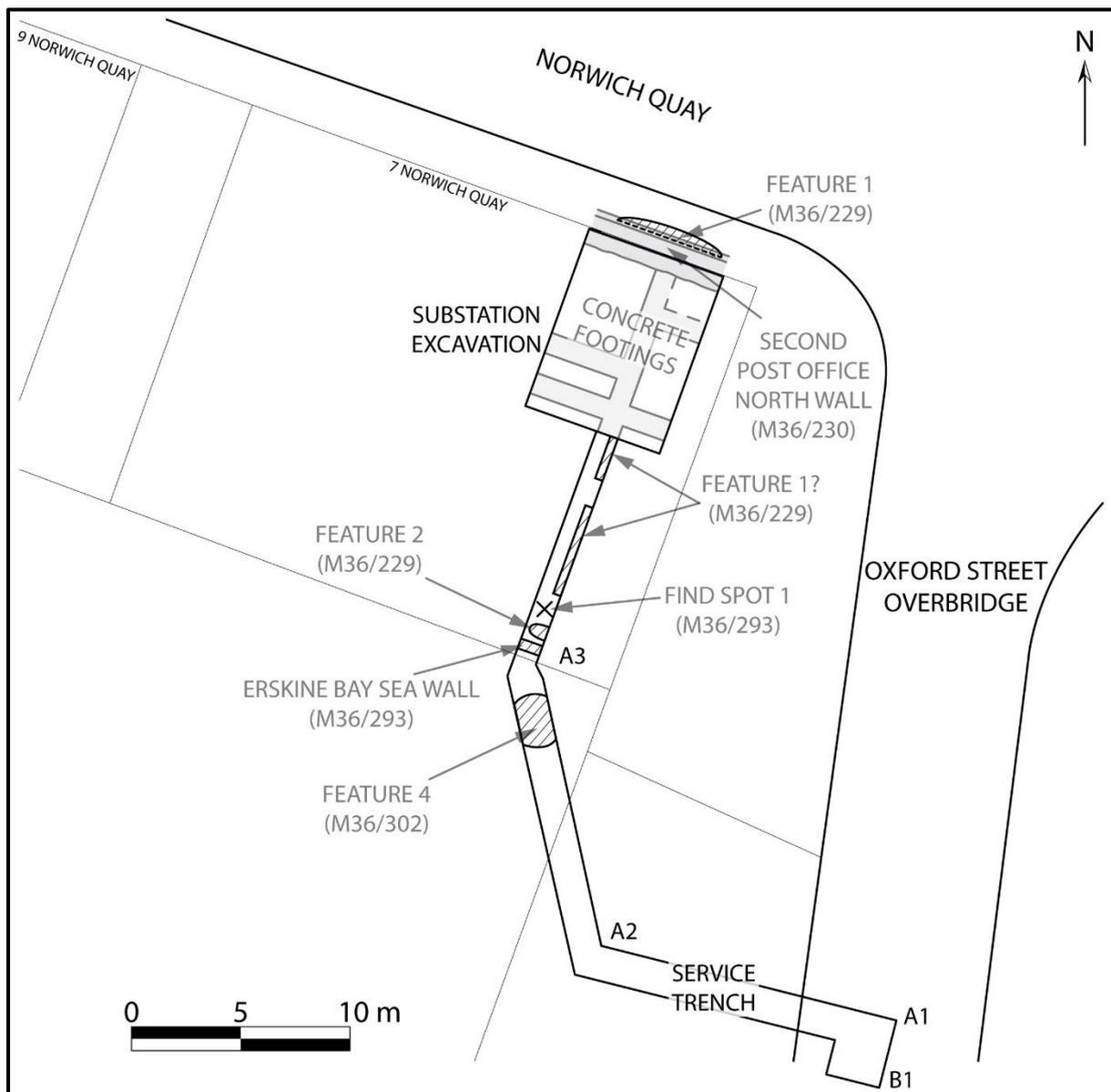


Figure 4. Site plan showing the extent of earthworks and the archaeological features exposed during the works. NB: Feature 1 is shown as being visible within the service trench so that it can be seen clearly on this drawing – it was not exposed in the trench, only in the baulk.

M36/229: ŌHINEHOU

Previous archaeological work

In August 2011, following the Canterbury earthquakes of 2011, the former Lyttelton post office building at 7 Norwich Quay was demolished. Amongst other things, removal of the foundations revealed the remains of a pre-contact Māori oven and midden deposits (Dodd and Watson 2012). This work was significant for providing the first archaeological evidence of Māori occupation in this area, and insights into the fishing and food gathering activities that took place there. A rich variety of food waste was recovered from the site, including the following shellfish: catseye (*Lunella smaragdus*), pāua (*Haliotis iris*), Bluff oyster (*Tiostrea chilensis lutaria*), blue mussel (*Mytilus edulis*), silver pāua (*Haliotis australis*), turret shell (*Maoriculpus roseus*), green lipped mussel (*Perna canaliculus*), mud snail (*Amphibola crenata*), pipi (*Paphies australis*), speckled whelk (*Cominella adpersa*), white rock shell (*Dicathais orbita*) and venus shell (*Dosinia anus*). Fish species included shark/ray, red cod

(*Pseudophycis bachus*), kahawai (*Arripis trutta*), and ling (*Genypterus blacodes*). Bird species included little shag (*Microcarbo melanoleucos*), spotted shag (*Phalacrocorax punctatus*), tūi (*Prothemadera novaeseelandiae*), New Zealand wood pigeon (*Hemiphaga novaeseelandiae*), blue penguin (*Eudyptula minor*), moa bone, New Zealand falcon (*Falco novaeseelandiae*), parakeet (*Cyanoramphus* sp.), kiwi (*Apteryx* sp.) and other unidentified species. The mammal remains included kiore/Polynesian rat (*Rattus exulans*) and kuri/Polynesian dog (*Canis familiaris*) bone. One of the oven features exposed during this work returned a radiocarbon date of AD 1465-1660 at 95% confidence. In addition, a small broken adze was found at the site. This site is significant for its association with Māori occupation of the area and for the information about that occupation that it has revealed.

Results of archaeological monitoring

Two features associated with M36/229 were found during the earthworks: a cultural layer (Feature 1) found during the earthworks for the substation) and an oven (Feature 2) found during the service trenching.

Feature 1

Feature 1 was a cultural layer characterised by claggy, dense, charcoal-stained black fill found approximately 2 m below Norwich Quay, at the northern edge of the substation excavation, behind the retaining wall and fill associated with the post office (see below; Figure 6, Figure 7 and Figure 8). This feature was exposed under Norwich Quay when benching of the area behind the retaining wall took place.

Within the exposed area, the layer appeared to slope down towards the south and east, giving an indication of the general land formation at the time of occupation. The layer contained large volcanic stones, bone and shell, and was exposed over the 4.8 m length of the excavated area – it is likely that more of this feature remains in situ to the north, east and west of the area exposed (Figure 9 and Figure 10). The layer contained a number of large volcanic stones, many of which appeared blackened and heat-fractured. While most of this layer was able to be left in situ, all that had to be removed was recovered for further analysis. Recording Feature 1 was difficult due to the instability of this exposed area.

The stratigraphy associated with Feature 1 was as follows (Figure 5):

1. Stratum 1 was approximately 900 mm of hard fill. Twentieth century services were located within this layer.
2. Stratum 2 was a layer of yellow clay and poorly sorted stone rubble. This was a light brown-slightly red fill in places – presumably where locally sourced volcanic tuff material was deposited to build this land up and form a smoother roading surface. Rounded stones no larger than 200 mm in diameter were mixed within fine rock dust and clay here.
3. Stratum 3 was a thin lens of dense charcoal no greater than 50 mm thick. This extended across the entire exposed face. No archaeological material was found in this layer.
4. Stratum 4 was a layer of yellow mottled clay. This contained no archaeological material.
5. Feature 1a (Stratum 5) was a faint dark brown fill containing fine fragments of undiagnostic shell. How and why this material was deposited remains unclear, although was most likely associated with Feature 1.
6. Feature 1 (Stratum 6). This was a black dense charcoal-stained clay containing whole and fragmented shell and bone. Two large stones were found in this layer and one of these was removed during benching.
7. Stratum 7 was a yellow/brown clay and was most likely natural. The base of this layer was not reached.

What appeared to be a continuation of Feature 1 was exposed when the service trench was excavated (Figure 11). Here, the layer was much thinner but was still characterised by the same black fill matrix and contained shell (Figure 12). This had been disturbed at the southern end by an earthenware pipe and by an area of dark brown fill containing bricks and stones, possibly from the 2011 demolition.

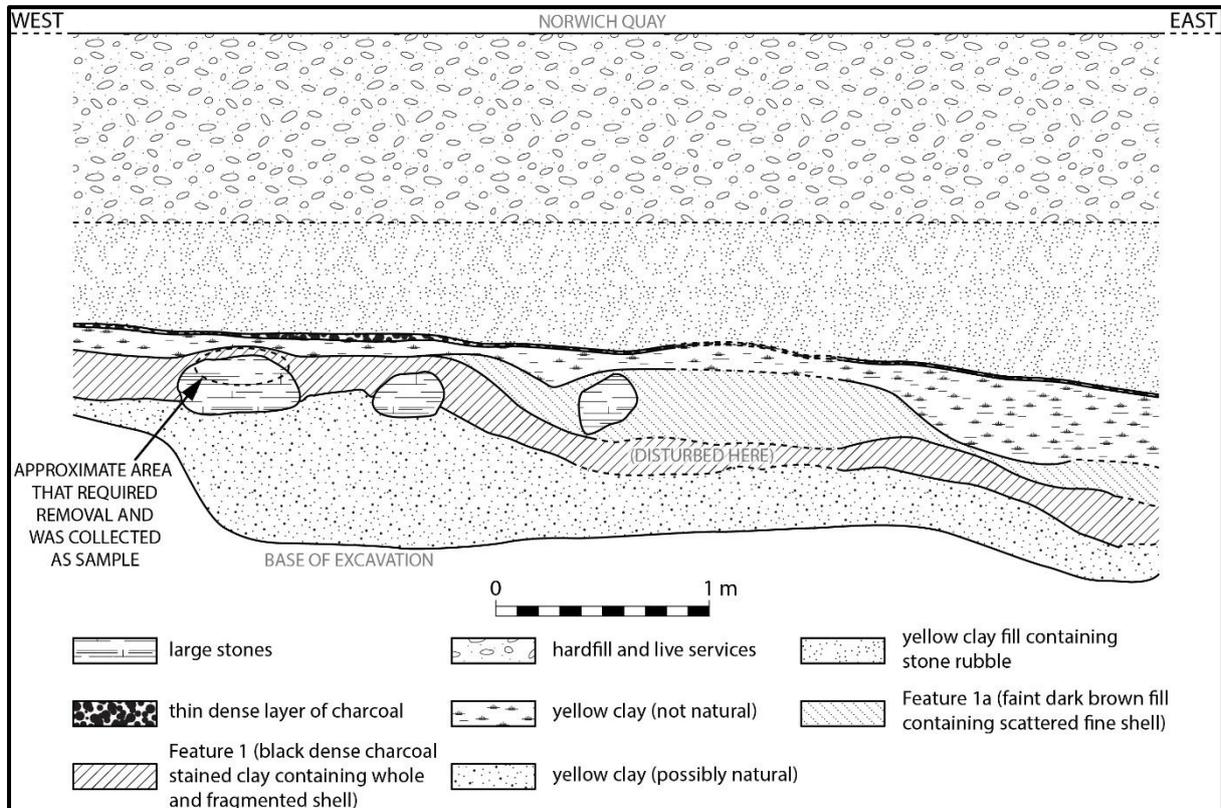


Figure 5. Stratigraphy exposed underneath Norwich Quay and behind the 19th century fill associated with the post office construction.



Figure 6. Approximate location of Feature 1, looking north to Norwich Quay. The metal props to which the live cables are tied indicate the level of Norwich Quay.



Figure 7. Feature 1 looking north.



Figure 8. Feature 1, looking north-northeast.



Figure 9. Feature 1 looking north.



Figure 10. Detail of Feature 1.

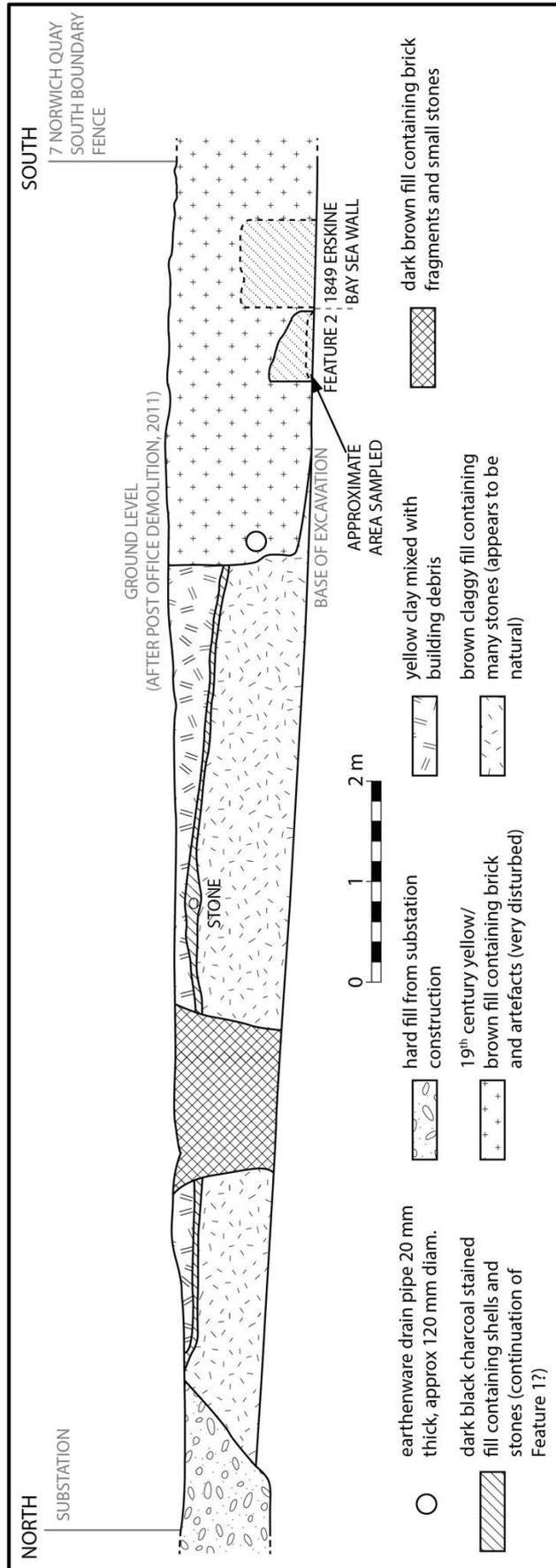


Figure 11. The east profile of the trench that extended south from the substation, where what may have been a continuation of Feature 1 was seen.



Figure 12. The continuation of Feature 1. Looking west.

Radiocarbon dating²

One cat's eye sample containing whole shell and operculum (turbo) was selected from the sample recovered for radiocarbon dating. This revealed that Feature 1 dates to between 1491 and 1713 with a 95.4% probability and between 1558 and 1672 with a 68.2% probability (Figure 13). This mid-16th to late 17th century date is slightly later than the early 16th to early 17th century date reported from Feature 7 during the 2011 excavation at M36/229, but there is considerable overlap between these dates.

² The sample was submitted to the University of Waikato Radiocarbon Dating Laboratory. The report on this is in Appendix 1.

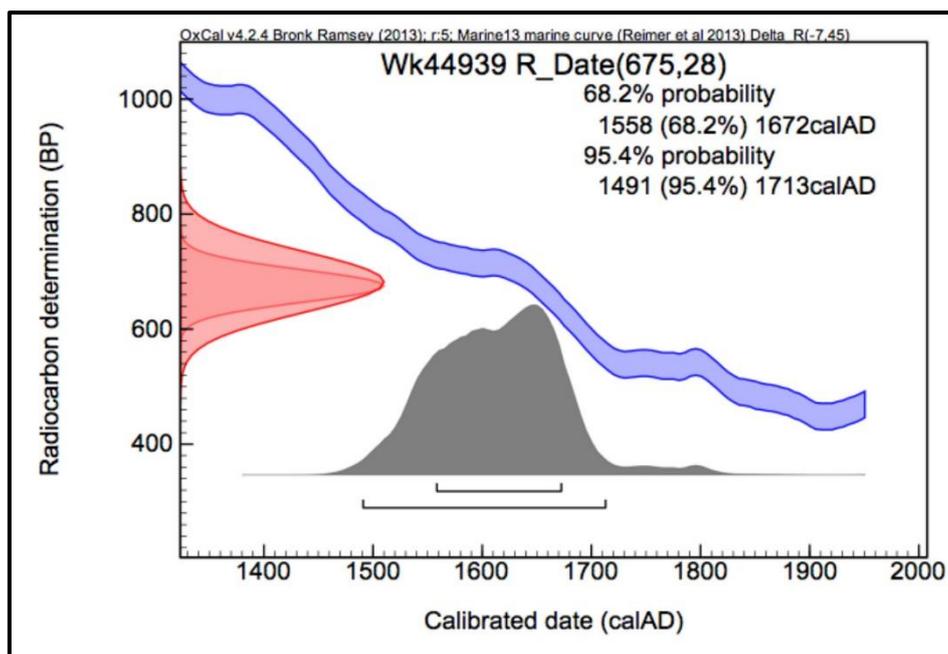


Figure 13. The results of the radiocarbon dating sample selected from Feature 1.

Microfossil analysis³

Feature 1 contained large amounts of microscopic fragments of charcoal, reflecting the burning of vegetation. The pollen and spore assemblages were dominated by the pollen of Cook's scurvy grass (*Lepidium oleraceum*), grasses (Poaceae), pūhā (*Sonchus* sp.), and spores of bracken fern (*Pteridium esculentum*; Figure 14). These components, together with negligible amounts of tree pollen types, reflect a disturbed local landscape largely cleared of forest by human fire activity. The leaves of Cook's scurvy grass (not a true grass) are edible and high in vitamin C, and can be eaten raw or cooked. The plant's common name derives from Captain Cook's use of it as a remedy for scurvy. Although Crowe (1997) considered that some reports of it used as a food plant of early Māori should be treated cautiously, large amounts of this pollen type in deposits associated with ovens, as in this case, suggest such use. Previously a very common coastal plant, Cook's scurvy grass is now rare. Large amounts of pūhā pollen in the samples similarly suggest its use as a food. The leaves and shoots of pūhā are known to have been widely cooked and eaten as greens by Māori (Best 1902, Colenso 1881). Bracken is a ground fern with widely dispersed spores, common in New Zealand pollen spectra since human settlement and almost always associated with large-scale repeated burning of forest by Māori. It may form dense stands, averaging 1-2 m tall over extensive areas, and its rhizome was commonly harvested as a starch-rich food by Māori (Best 1902). Hornwort (Anthocerotaceae) spores were also found in the sample. Hornworts are small inconspicuous plants that colonise freshly exposed soils.

The phytolith assemblage was dominated by grasses, which, coupled with a lack of tree phytoliths, supports the pollen evidence for major landscape disturbance (Figure 15). Some of the grass phytoliths could reflect the use of dried grasses as fuel for cooking fires. Other biosilicates identified in the samples, namely small amounts of sponge spicules, reflect the local coastal environment.

No convincing starch material was identified in the sample. As other types of plant material were present in the starch sample, this lack very strongly suggests that the sampled deposits were not associated with any of the starch-rich foods of Māori.

³ Microfossil analysis and report was completed by Dr. Mark Horrocks of Microfossil Research Ltd. The methods used are outlined in Appendix 2 and the text here is adapted from the original report.

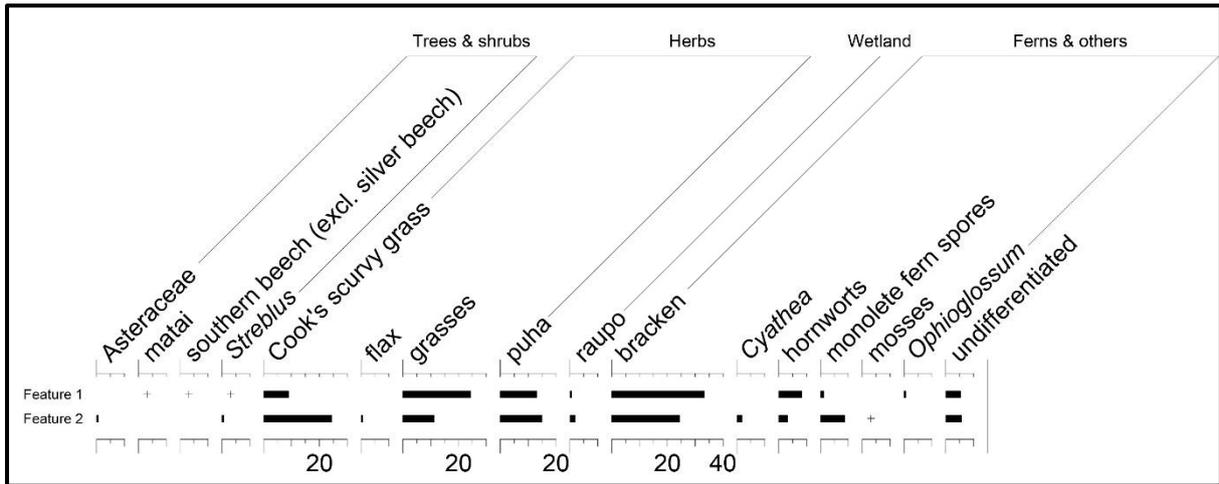


Figure 14. Pollen percentage diagram from Lyttelton Port of Christchurch (+ = found after count).

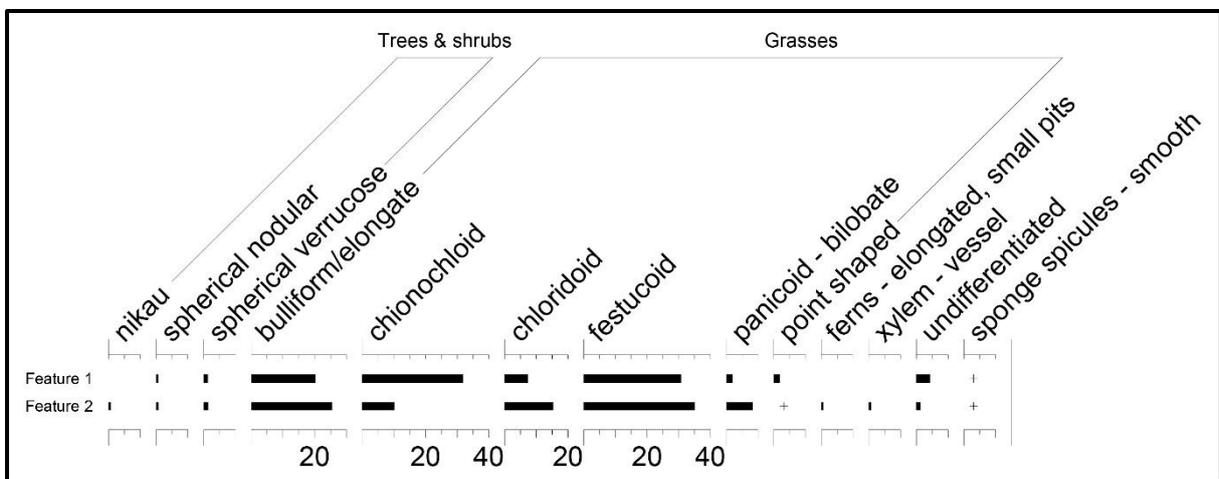


Figure 15. Phytolith percentage diagram from Lyttelton Port of Christchurch (+ = found after count).

Faunal analysis

Bird and fish bone

Feature 1 contained both bird and fish bone, along with one larger piece of bone that appeared to be mammal (Table 4). This piece of bone was very degraded, and was not able to be identified to element or species. At least two species of bird were present in Feature 1, although only one, spotted shag, was able to be identified to species. This feature also contained at least three species of fish: red cod shark, and a small unidentified fish. The only identifiable red cod bone was a single vertebra, though five small gill raker bones may also be from red cod. The shark identification is based on a small tooth, and it is likely that all the shark/ray vertebrae in the assemblage belong to this fish. The unidentified fish was represented by three very small vertebrae.

As with the results of previous investigations at the site, the species identified in Features 1 and 2 indicate harvesting of locally available resources.

Table 2. Faunal (bone) data from Feature 1.

Class	Species	Element	Side	NISP	MNE	MNI	Notes
Fish	Shark	Tooth	n/a	1	1	1	
Fish	Red cod	Vertebra	n/a	1	1	1	
Fish	Cf Red cod	Gill raker?	n/a	5	5		
Fish	Unidentified	Vertebra	n/a	3	3		Very small
Fish	Shark/ray	Vertebra	n/a	17	11		
Fish	Unidentified	Premaxilla	R	1	1		Too fragmented for positive id
Fish	Unidentified	Scale	n/a	1	1		
Fish	Unidentified	Fragments	n/a	155			
Bird	Unidentified	Femur	L	1	1		Proximal portion, no match found
Bird	Spotted shag	Humerus	R	2	2	2	Distal portion
Bird	Spotted shag	Articular	R	1	1	1	
Bird	Unidentified	Claw	n/a	1	1		
Bird	Unidentified	Fragments	n/a	40			
Mammal?	Unidentified	Unidentified	n/a	1			Very degraded
Total				230	28	5	

Shellfish

The shell found in Feature 1 was dominated by common cat's eye (Table 3). This shell assemblage seems to reflect food gathering from predominantly marine environments consistent with the local rocky and soft shore environments. Blue and green mussel as well as oyster and pāua were among the most highly represented species here. The turret shells represented by this sample, of which there were 10, were very small and would have produced very little meat (dried shell weight of 10 g). It is possible that the presence of these shells reflects resource gathering from the shoreline in bulk, with the shells being inadvertently captured during this process.

Table 3. Faunal (shell) data from Feature 1.

Species	Portion	NISP	MNE	MNI	Weight (g)	Notes
Undiagnostic					51	
Oyster	Shell	11	6	3	36	
Pāua	Dorsal end + shell	8	2	2	27	<i>Haliotis iris</i>
Shield limpet	Shell	1	1	1	4	<i>Scutus antipodes</i>
Cockle	Teeth	3	2	2	<1	
Mudsnail	Shell	3	3	3	3	
Common cat's eye	Whole shell and operculum	101	101	68	100	<i>Turbo smaragdus</i>
Turret shell	large end	12	10	10	<1	
Periwinkle?	Whole shell	1	1	1	<1	<i>Austrolittorina cincta</i>
Pipi	Hinge	2	2	1	<1	<i>Paphies australis</i>
Mussel?	Hinge	2	2	1	1	
Slipper shell		1	1	1	<1	
Blue mussel		1	1	1	1	<i>Mytilus edulis</i>
Green lipped mussel	Hinge	3	3	2	2	<i>Perna canaliculus</i>
Total		149	135	96		

Lithic analysis

A single stone artefact was recovered from Feature 1, a fragment of chert (Figure 16, Figure 17 and Figure 18). This was roughly triangular in cross-section and measured 11-12 mm long. The chert was dark grey in colour, with some remnant cortex. The source of the material is not known, but is similar

in appearance to material from deposits along the Kaikoura coast. It is possible that this chert fragment is debitage from the manufacture of stone tools at this site.



Figure 16. The fragment of chert found in Feature 1.



Figure 17. The fragment of chert found in Feature 1. Notice the cortex to the right.



Figure 18. The fragment of chert found in Feature 1.

Charcoal analysis⁴

In Feature 1, 18 pieces of charcoal provide the following results (Table 4). This sample is dominated by small shrub species representing open shrubland vegetation. These results are very similar to those from the microfossil analysis.

Table 4. The results of charcoal identification analysis.

Species	No. of samples
Keake	4
Olearia sp.	6
Mingimingi	3
Māpou	1
Māhoe	3
Mataī	1

Feature 2

Feature 2 was found during the trenching works south of the substation, near the southern boundary of 7 Norwich Quay, at the base of the excavation (Figure 11 and Figure 19). The feature was approximately 700 x 1000 mm, contained black ashy fill, and large volcanic stones, and is interpreted as being an oven. It was found immediately north/inland of the 1849 shoreline and the Erskine Bay sea wall. Only the top 200-400 mm of Feature 2 was removed during the works (by hand excavation) and the rest remains in situ at the base of the excavation. As such, the full extent of Feature 2 remains unknown..

⁴ Charcoal analysis was carried out by Dr. Rod Wallace of the University of Auckland.



Figure 19. Feature 2. Left: looking east. Right: detail of Feature 2.

Microfossil analysis

The make-up of the Feature 2 sample was very similar to that from Feature 1. It contained large amounts of microscopic fragments of charcoal, reflecting burning of vegetation and the pollen and spore assemblages were dominated by pollen of Cook's scurvy grass (*Lepidium oleraceum*), grasses (Poaceae) and pūhā (*Sonchus* sp.), and spores of bracken fern (*Pteridium esculentum*; Figure 14). The phytoliths were also largely the same, being dominated by grasses (Figure 15). No convincing starch material was identified in the sample.

Faunal analysis

Bird and fish bone

The bone assemblage from Feature 2 contained only fish, identified as red cod and shark/ray (Table 5). This assemblage contained a large number of vertebrae, with little other identifiable material. A small number (MNE: 3) of the vertebrae belonged to shark/ray and the rest (MNE: 82) belonged to red cod. Most of the bone had been burnt.

Table 5. Faunal (bone) data from Feature 2.

Class	Species	Element	Side	NISP	MNE	MNI	Notes
Fish	Red cod	Bassioccipital	n/a	2	2	2	Burnt white
Fish	Red cod	Premaxilla	L	1	1		Burnt white
Fish	Red cod	Quadrate	L	1	1		Burnt white
Fish	Red cod	Articular	L	1	1		Burnt white
Fish	Red cod	Vertebra	n/a	85	82		Most burnt white
Fish	Shark/ray	Vertebra	n/a	3	3	1	Burnt white
Fish	Unidentified	Fragments	n/a	46			Most burnt/burnt white
Total				139	90	3	

Shellfish

The shell recovered from Feature 2 consisted primarily of mudsnail and common cat's eye (Table 6). Oyster, pāua, cockle, pipi and mussel were also represented in this sample. This shell assemblage seems to reflect food gathering from marine environments consistent with the local rocky and soft shore environments.

Table 6. Faunal (shell) data from Feature 2.

Species	Portion	NISP	MNE	MNI	Weight (g)	Notes
Undiagnostic					8	
Oyster	Shell	2	2	1	5	
Mudsnail	>50% of shell	7	6	6	7	
Common cat's eye	>50% of shell + apex	7	7	5	6	<i>Turbo smaragdus</i>
Pāua	>50% of shell	1	1	1	1	<i>Haliotis iris</i>
Cockle	Hinge	3	3	2	2	
Pipi	Hinge	2	2	2	<1	
Mussel?	Hinge	4	4	2	7	
Total		26	25	19		

Charcoal analysis⁵

The charcoal recovered from Feature 2 was too small to provide useful samples.

Discussion

The earthworks for the substation and associated trench revealed further evidence of Māori occupation of the Lyttelton foreshore, in the form of an oven and cultural layer. Feature 1 (the cultural layer) was occupied sometime between 1558 and 1672 cal AD (1 σ), which overlaps but is slightly later than the earlier reported date for M36/229 at 1500-1617 cal AD (1 σ).

The faunal remains evident in Features 1 and 2 represent many of the species of fish and shellfish reported from the 2011 excavation at the site, but the range of species present was smaller. The features excavated in 2011 contained a greater variety of bird remains, including numerous forest birds: kererū/New Zealand pigeon, tūi, kākārīki/parakeets, kiwi, and kārearea/New Zealand falcon. Moa was also reported within the faunal assemblage from the 2011 excavations. These results indicate that Māori were gathering resources from remnant forest environments, as well as gathering marine resources, but it is not known whether these forested areas were within the greater Whakaraupō area or the Lyttelton bay itself. The features from the excavations covered in this report were smaller, and the smaller sample size may have limited the representation of more fragile or less common midden components, like bird and fish bone. However, the absence of any forest bird species from the assemblages from Feature 1 and 2 is notable. The slightly later radiocarbon date from Feature 1, combined with the results of pollen analysis from both features, which indicated an environment largely cleared of forest, may indicate that Features 1 and 2 date to a later phase of occupation, following the clearance of forest within the bay where Māori had previously engaged in fowling activities. There were few remnant stands of forest on the north slopes of Whakaraupō at the time of Pākehā settlement in the mid-19th century (Thomas, 1850).

The results of the faunal analysis indicate a diet and food gathering activity focused primarily on marine resources, specifically cat's eye, supplemented by other rocky-shore shellfish, shark/ray, red cod, and shags. The presence of sharks within the assemblage accords with traditional use of the area for the seasonal gathering of pioki/gummy shark. (R. Couch, pers. comm., 2011).

The location of Feature 1, and the fact that its full extent was not exposed, indicates that the site is larger than previously thought, and highlights the potential for archaeological remains to be found to the north of the substation, and under Norwich Quay.

⁵ Charcoal analysis was carried out by Dr. Rod Wallace of the University of Auckland.

The association between Features 1 and 2 is not clear. Although a thin layer interpreted as a continuation of Feature 1 was observed within the trench containing Feature 2, later disturbance in the area between the two features obscured the relationship between them. It is possible that the features were formed at the same time, but this cannot be stated with any certainty.

M36/293: ERSKINE BAY SEA WALL

Historical background

In 1849-50 the Canterbury Association erected a seawall east to west across Erskine Bay, in conjunction with the government wharf that extended into the harbour from the end of Oxford Street (Rice 2004:26; Figure 20). The seawall was used as a berthing place and for landing small goods (*Lyttelton Times* 12/4/1851:2). A severe southwest gale in June 1851 damaged the sea wall and tenders for repairs and additions to the sea wall were invited from carpenters and masons in July 1851 (*Lyttelton Times* 12/7/1851:1, Plowman 1941:39). Part of the seawall was rebuilt in 1852, authorised by the Canterbury Association, who invited tenders from masons (*Lyttelton Times* 26/6/1852:1). The contract was let to Lyttelton stonemason William Chaney, indicating that a section of the wall was rebuilt in stone. The alignment of the seawall is indicated by the comparison of Captain Thomas's 1849 plan of Lyttelton harbour with a plan of the Lyttelton reserves from 1853 (Figure 21 and Figure 22). Its form, extending either side of the Oxford Street jetty, is seen in a photograph taken by Daniel Louis Mundy in 1867 (Figure 22).

The wall reclaimed land south of Norwich Quay, which was incorporated into Reserve 32, leased by the Canterbury Association to Augustus James Alport in 1855 (LINZ c.1850: 632). Alport had previously worked with Captain Thomas on preparing the port for the arrival of Canterbury Association vessels and acted as an agent for the Canterbury Association (Macdonald n.d.: A142). Alport sub-let the land from 1860. He left Lyttelton around 1863 and his lease transferred to Alfred Richard Creyke (LINZ c.1850: 632; *Lyttelton Times* 26/9/1863:6).



Figure 20. Detail from “Plan of Lyttelton, Port Victoria”, September 1849, J. Thomas surveyor. Image: Archives New Zealand: ref. CH1031-180/297.

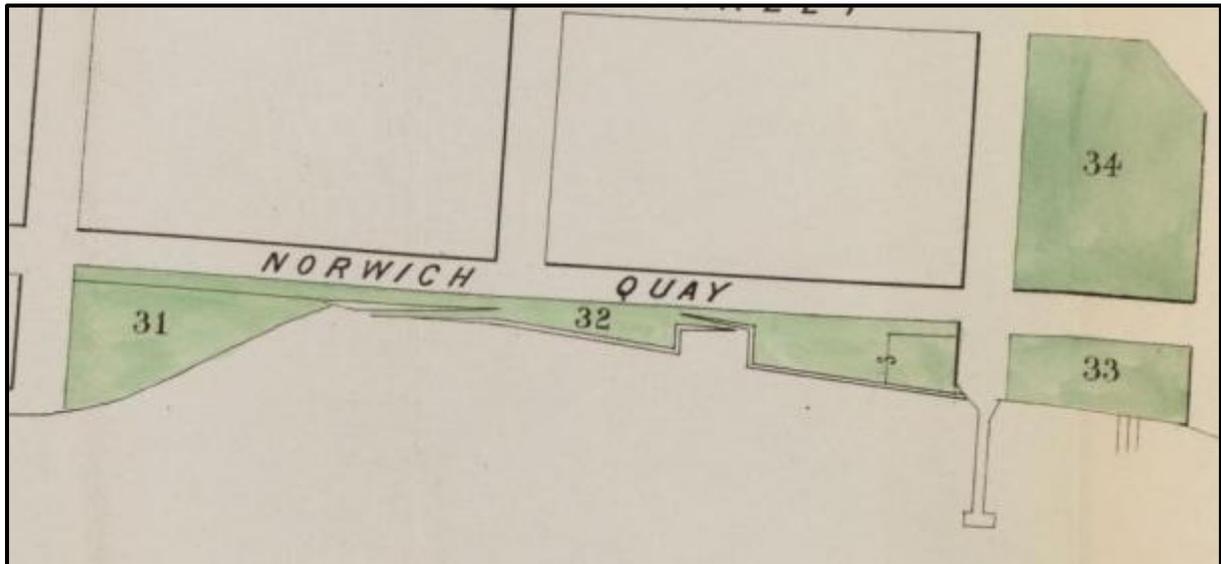


Figure 21. Detail from “Association reserves at Port Lyttelton and Sumner”, 1853-64 (Provincial Council. Ordinances, Session IV, no. 6, 1855). Probable seawall at southern boundary of Reserve 32.



Figure 22. The port, 1867, looking northwest. The Erskine Bay sea wall is immediately in front of the buildings. Image: detail from photograph of Lyttelton, 1867. D. L. Mundy photograph (Alexander Turnbull Library: ref. Mundy album 2, PA1-f-040).

Previous archaeological work

Archaeological evidence of the sea wall was found further to the west when the inner harbour log yard was repaired in 2015-16. The remains exposed then consisted of wooden posts and timbers (Bennett et al. 2016). Possible remains of the sea wall were also found when the post office (M36/230) was demolished, also to the west of the remains found during the current work. These were stone and ran on a north-south alignment, rather than east-west, which is the alignment on which the sea wall was built (Dodd and Watson 2012). This feature was also at some distance from the known location of the sea wall and thus it is not entirely clear that that it was related.

Results of archaeological monitoring

A substantial wall of stone found immediately south of Feature 2 (M36/229; Figure 11) was interpreted as being part of the Erskine bay sea wall. This was found running east-west approximately 500 mm below ground level, and the exposed section was stone and measured 900 mm wide by 700 mm high (Figure 23, Figure 24 and Figure 25). It was removed where the trench intersected it but remains in situ to the east and west. As this section of wall was stone, unlike the timber part recorded to the west, it is possible that it was the section repaired in stone in 1851, following the storm in 1852.

Three artefacts – a button, a coin/token and the stem of a clay smoking pipe – were found in the mottled yellow fill to the north of the sea wall (a location recorded as Find Spot 1). These artefacts were not found in a rubbish pit, but mixed in with the fill.



Figure 23. The Erskine Bay sea wall. Left: Looking south. Right: Looking roughly west.



Figure 24. The sea wall during removal, looking south.



Figure 25. The east trench profile, looking east, showing the approximate location of the Erskine Bay sea wall.

Artefact analysis

The token is from the firm of Jones and Williamson, dated to 1858 (Figure 26). Jones and Williamson were grocers, wholesalers and provision merchants based in Dunedin. James Jones and Alex Williamson “entered into partnership under the firm of Jones & Williamson as bakers and general storekeepers” in 1853 and were based in premises on Princes Street (*Otago Witness* 18/6/1853: 2). The dissolution of partnership was recorded in the newspaper in 1863, after which date “the business will be carried on by Alexander Williamson, under the name and style of Jones and Williamson” (*Otago Daily Times* 8/1/1863: 8). Tokens like this were used as legal currency in various cities in New Zealand during the 19th century, due to the lack of small tender available at the time (Garland 2014). For that reason, local businesses and settlers created their own money, known as ‘trade tokens’ and produced between 1857 and 1881. These were usually made of bronze and copper in place of smaller coin denominations and were used as small change as well as functioning as an advertisement for the trader (Te Ara The Encyclopaedia of New Zealand 2017). Tokens were recognised as legal tender in Christchurch and other cities and used as currency in the city from 1857 until 1897, when they were demonetised by the government (Thomas and Dale 1950: 11). It is unlikely, however, that a Dunedin token like this one would have been accepted in Christchurch.



Figure 26. Artefacts from find spot 1 from top: token/coin (UO127-M-9), military button (UO127-M-8) and stem of a white clay smoking pipe (OU127-MC-7).

The button was identified as military button from the mark on the back. The mark read [H. G]ORDIER . FILS / [A.] PARIS. It was not possible to trace the manufacturer although the presence of the word Paris indicates that the button originated in France. The front surface of the button measured 22 mm in diameter and displayed the number 20 surrounded by stylised leaves. Collectors' sources suggest that this number was associated with the part of the army to which the wearer belonged. In this case, '20' would indicate 20th 'Regiment de line'. Collectors' sources also suggest that this type of button was associated with the Napoleonic wars of the first decades of the 19th century (Ebay 2017, Military Heritage 1995-2016).

The clay pipe stem was unmarked and thus could not be dated.

M36/302: RAILWAY RECLAMATION (NORTHERN)

Historical background

In 1864 Provincial Engineer Edward Dobson reported to the Provincial Government on a plan for the railway terminus at Lyttelton. Dobson's report was principally concerned with providing sufficient wharfage to connect the railway with the port and to overcome the shallowness of the water in Erskine Bay, the easterly swell and southwest gale (*Lyttelton Times* 20/8/1864:3). The final plan included the construction of two moles (or breakwaters), the construction of a stone embankment from Officers' Point to the "existing railway embankment", reclamation of land between Norwich Quay and the new stone embankment, extension of the existing Oxford Street wharf and construction of a new wharf (*Lyttelton Times* 20/8/1864:3; Figure 45).

The land for the railway terminus was reclaimed by building a seawall and filling the space between the wall and Norwich Quay. In February 1865 the Secretary of Public Works invited tenders from contractors for construction of a 700 feet (213 metre) sea wall in front of the site of the Lyttelton Railway Station (*Press* 23/2/1865:2). The contract was awarded to E. G. Wright in May 1865 (*Lyttelton Times* 13/5/1865:6). The sea wall was not a stone embankment as Dobson had originally recommended, but was constructed from timber framing with stone backing and clay filling behind (Canterbury Provincial Government 1867:148, 154-155). The wall was intended for completion in March 1866, but was delayed due to the late delivery of the timber required (Canterbury Provincial Government 1867:148). The unfinished structure was exposed to the weather and the sea, causing part of the stone and timber structure to collapse (Canterbury Provincial Government 1867:154). Further, the shifting mud at the bed of the harbour caused prominent bulges in the wall (*Lyttelton Times* 7/1/1867:3, Scotter 1968:74-75). In response to this failure, Dobson altered the design "giving the stone backing a wider base, and driving the sheet piling down to a greater depth" (Canterbury Provincial Government 1867:154). He also recommended that once the wall had settled in position an additional row of "iron bark piles" be driven in front of the wall. The work was expected to be completed by the end of 1866. However, by February 1867 a "cesspool" had formed between the sea wall and Norwich Quay and Lyttelton residents called for it to be immediately filled (*Lyttelton Times* 20/2/1867:2).

In February 1867 tenders were invited for "72,000 cubic yards [55,048 cubic metres] of Embankment for the reclamation of the space between Norwich quay and the Sea-wall" (*Press* 20/2/1867:1). James. M. Balfour, Dobson's successor, specified that the land be filled in by constructing a causeway of rubble behind the sea wall and another parallel causeway thirty feet inland from it. Balfour specified that these causeways be constructed of "clay merely faced with stone". From these "roadways" the "earth" should be tipped towards the land then left to settle and finally filled with "rubble" (*Press* 9/4/1867:2).

It has been presumed that the fill for the reclamation was from material excavated from the railway tunnel, and this was apparently the intention of the Canterbury Provincial Government (*Lyttelton Times* 8/6/1865:4, Rice 2004:35, Scotter 1968:75). Dobson did not specify this in his proposal and the documentary record contains conflicting evidence in this regard. The contract for the tunnel excavation did not secure the Provincial Council's ownership of the spoil, and so this was not available for use in land reclamation (*Lyttelton Times* 11/4/1867:2). The contractors for the tunnel excavation, George Holmes and Co., tendered for the railway reclamation work, but their estimate was "extravagant" considering their access to spoil from tunnel excavation (*Lyttelton Times* 11/4/1867:2). An alternative tender was accepted, presumably from E. G. Wright, who sourced stone quarried from "the other side of the harbour" for the purpose (*Lyttelton Times* 11/4/1867:2). However, following completion of the tunnel contract, Holmes and Co. filed a claim against the Provincial Government for unpaid work in "filling up a large and valuable piece of land with material from the tunnel by direction

of the Engineer from time to time” (*Lyttelton Times* 28/11/1868:2). Holmes and Co. claimed payment for reclamation of land at Lyttelton undertaken in December 1865 (30,000 cubic yards), 1866 (8,000 cubic feet) and 1867 (6,450 cubic yards; *Lyttelton Times* 28/11/1868:2). This area of reclamation was located at the south end of the tunnel and was additional to that specified in the engineer’s plan. It is probable that land was the eastern reclamation (M36/311) situated at the tunnel mouth.

By late March 1867 the railway reclamation was being “filled in” (*Lyttelton Times* 30/3/1867:2). In July 1867 the land reclamation behind the sea wall was complete but was settling before it could bear the weight of a locomotive (*Press* 1/7/1867:2; Figure 27). By March 1868 the railway reclamation was in use for locomotives and had sufficiently settled to allow the completion of the face of the sea wall (*Lyttelton Times* 4/3/1868:6).

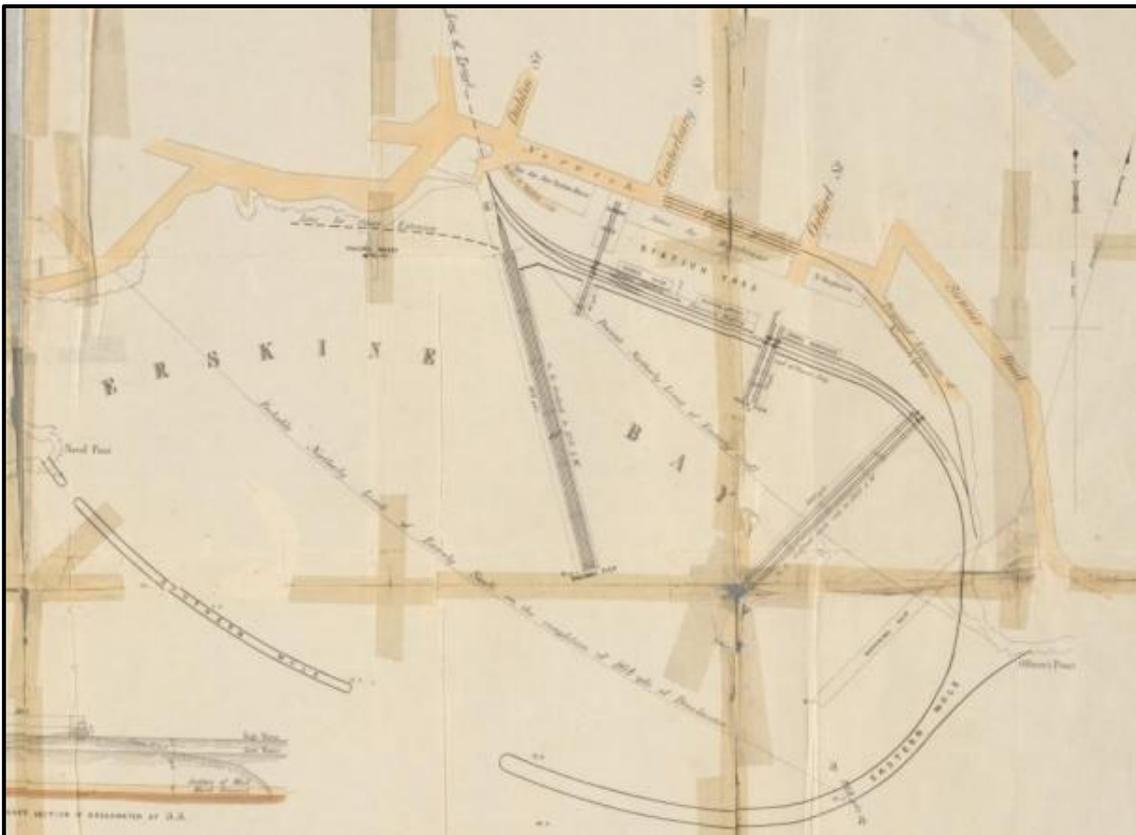


Figure 27. Plan of the proposed Lyttelton terminus of the Lyttelton and Christchurch railway, 1864. Image: Christchurch City Libraries: CCLMaps 543223.

Previous archaeological work

Archaeological work carried out as part of the inner harbour log yard project revealed that the types of fill used in the reclamation in this area were clay-based soils and basalt rock, and that there were numerous artefacts scattered within this fill (Bennett et al. 2016).

Results of archaeological monitoring

The stratigraphy observed in this part of the railway reclamation was relatively simple. Underneath asphalt and modern roading surfaces, either redeposited yellow clay or red scoria rubble was found extending to the depth of the excavation (Figure 28). A disturbed area of soil and hard fill within the reclamation contained a number of 20th/21st century services. One feature was found in the north of the area excavated (Feature 4).

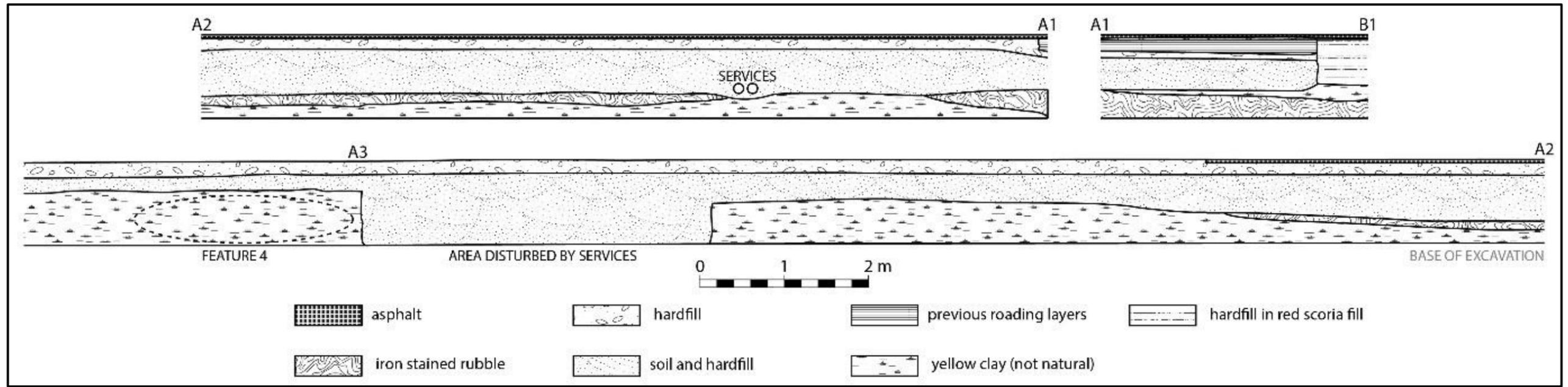


Figure 28. The stratigraphy in the railway reclamation. The number/letter codes refer to locations on the site plan (Figure 28).

Artefact analysis

Feature 4 was a dense artefact scatter within the 1867 land reclamation. A total of 147 individual artefacts represented by 267 fragments were collected. This assemblage included ceramic, faunal, glass metal and other items (Table 7).

Table 7. Total NISP and MN of artefacts from Feature 4, listed according to material.

Material	NISP	MN
Ceramic	85	49
Faunal	65	42
Glass	101	44
Metal	11	8
Miscellaneous	6	4
Total	267	147

Ceramic

The small size of the fragments recovered, all of which made up incomplete vessels, make it difficult to identify or interpret the ceramics. Generally, decorated tea and table wares were the most common, although household items and stoneware vessels were also well represented (

Table 8 and

Table 9).

Tea wares were split between whiteware teacups and saucers with a range of decorative techniques identified (Figure 29). Almost all of them were blue, black and grey transfer prints featuring floral and romantic themes. Additionally, Chinese decorative styles were identified on at least two teacups, one of which displayed a pagoda and the other a scene with two sailors. One flown blue decorated vessel and one moulded saucer were also recovered.

One teacup was decorated with the Rhine pattern (Figure 30). Along with the Asiatic Pheasants and Willow patterns, the Rhine pattern is one of the most common ceramic decorations found in 19th century assemblages in New Zealand. It is a typical romantic pattern and features a castle or towers in the background, as well as a source of water, trees and foliage elements at the edges of the vessel and people in a boat. The Rhine pattern was made by a large number of manufacturers during the latter half of the 19th century and would have been inspired by the Rhine river in Europe.

Table 8. Ceramic artefacts from Feature 4, listed according to body type, ware type, functional class and artefact form.

Body Type	Ware	Function	Form	MNI
ew-c	rre	household/storage?	unid	1
	ww	table ware/household	chamber pot/bowl?	1
ew-r	ww	household	chamber pot	2
			cylindrical vessel?	1
		household/table ware	unid hollow-ware	1
			unid hollow-ware/chamber pot?	1
		table ware	jug?	1
			plate	2
			plate/platter?	1
			platter?	1
			side/small plate	2
			small plate	1
			soup plate?	1
			unid	1
			unid hollow-ware	1
			tea ware	saucer
		teacup		8
		tea ware?	teacup?	1
			unid hollow-ware	2
unid	unid hollow-ware	2		
hpp	porc-h	tea ware	teacup	1
		tea/table ware	unid flat ware	1
		tea/table/household	unid	1
spp	bc	tea ware	saucer	1
st	bgst	household/storage	bottle	1
		pgst	household	spout bottle
	household/storage		bottle	3
			wide mouth jar	1
	sgst	household	penny ink bottle	1
		household/storage	bottle	4
			container?	1
Total				49

Table 9. Decorated vessels, listed according to decorative technique, pattern name/motif, ware type and artefact form.

Decorative Technique	Pattern Name/Motif	Ware	Form	MNI
flow blue/ogp	unid: foliage/chinoiserie?	ww	teacup	1
incised	unid: geometric	ww	cylindrical vessel?	1
moulding	unid: geometric	ww	saucer	1
			unid hollow-ware	1
ugtp	Festoon	ww	unid hollow-ware	1
	Rhine	ww	teacup	2
	unid: chinoiserie	ww	plate	1
	unid: chinoiserie?	ww	teacup	1
	unid: floral	porc-h	unid flat ware	1
		ww	chamber pot	1
	unid: floral/foilage	ww	jug?	1
			side/small plate	2
			teacup	2
	unid: floral/foilage/romantic	ww	unid hollow-ware	1
	unid: floral/foilage?	ww	unid hollow-ware	1
	unid: foliage	ww	saucer	1
			teacup?	1
			unid	1
	unid: foliage/birds	ww	chamber pot/bowl?	1
	unid: geometric	ww	soup plate?	1
	unid: geometric/crosses	ww	chamber pot	1
	unid: romantic	ww	teacup	1
	unid: see plants	ww	unid hollow-ware	1
	Willow	ww	plate	1
plate/platter?			1	
platter?			1	
small plate			1	
unid hollow-ware			1	
Total				31

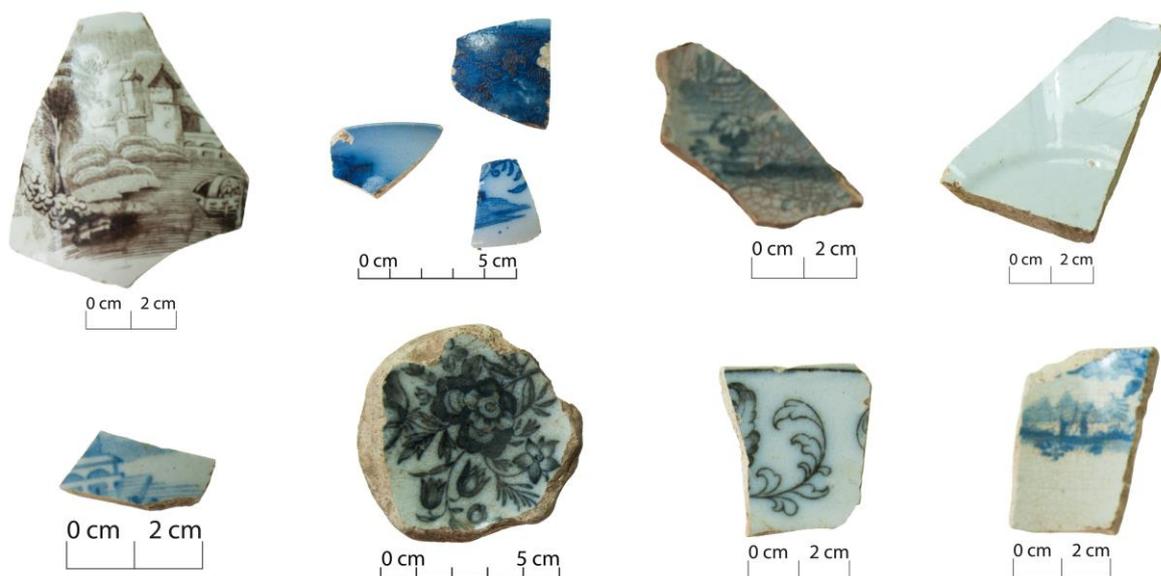


Figure 29. Tea wares found in Feature 4. Top row from left: Rhine patterned teacup (UO127-C-1), flown blue teacup (UO127-C-11), romantic patterned teacup (UO127-C-15) and moulded saucer (UO127-C-35). Bottom row: small fragment with a pagoda motif (UO127-C-46), black floral decorated teacup (UO127-C-42), foliage transfer printed saucer (UO127-C-43) and Chinese style teacup (UO127-C-52).

Table wares included plates in several sizes (Figure 30). A number of Willow patterned vessels were identified, including one platter, one small plate and one bigger plate, likely to be a dinner plate or serving dish. The Willow pattern is probably the most ubiquitous pattern encountered on 19th century archaeological sites. It was developed at the end of the 18th century in response to the popularity of Asiatic designs during this period. At least one Chinese influenced design was also noted on a plate through the combination of geometric and foliage elements, such as orange trees and junks. Although most of the decoration was in blue and white, green and purple colour palettes were also used featuring primarily floral elements. Other decorative techniques consisted of moulding in the form of vertical panels across the inner surface of one vessel and diamond patterned incisions covering the body of the hollow-ware vessel.

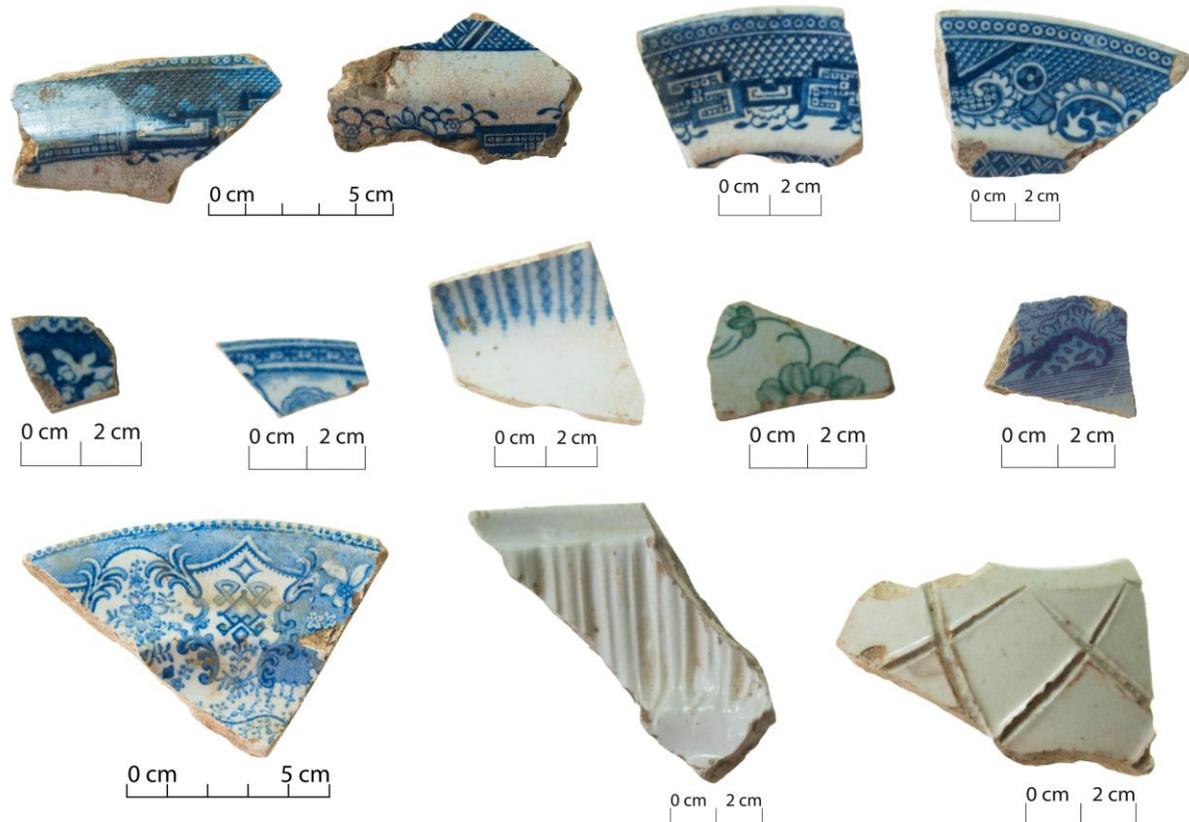


Figure 30. Decorated table wares from Feature 4. Top row from left: Willow patterned vessels including a platter (UO127-C-5), a small plate (UO127-C-6) and a plate (UO127-C-7). Middle row: small fragments of blue transfer printed plates (UO127-C-12 and C-13), geometric decorated soup plate (UO127-C-14) and green and purple vessels featuring floral elements (UO127-C-45 and C-49). Bottom row: blue decorated plate displaying Chinese motifs (UO127-C-28), moulded hollow-ware vessel (UO127-C-26) and incised ceramic (OU127-C-25).

Household items comprised several hollow-ware fragments, likely to have been part of chamber pots, all of which were transfer printed (Figure 31). The Festoon pattern was identified on one of them. Other patterns included a floral and foliage design, a pattern featuring birds on the rim and another with repetitive crosses in a band on the rim.

Stoneware vessels consisted mainly of salt-glazed vessels, including several bottles, one penny ink bottle, one wide mouth jar and one pouring bottle (Figure 31). The latter was identified by the presence of a pouring spout, indicative of its being used to fill inkwells and ink bottles (Lindsey 2017). The Bristol-glazed ceramic was distinguishable by its two-tone industrial slip glaze, originally developed by the William Powell firm of Bristol in c. 1835, but soon taken up by other stoneware

makers (Godden 1991: 509). By the second half of the 19th century, Bristol-glaze was commonly produced in the form of jugs, bottles and jars (Brooks 2005: 28). One cream slip-glazed fragment from an unidentified container was also recovered.



Figure 31. Household items. Top row from left: salt-glazed bottle base (UO127-C-3), penny ink bottle (UO127-C-29), and Bristol-glazed bottle (UO127-C-28). Middle row: salt-glazed bottle (UO127-C-34), pouring bottle (UO127-C-31), wide mouth jar (UO127-C-30), slip glazed fragment (UO127-C-50). Bottom row: turquoise decorated hollow-ware (UO127-C-21), Festoon patterned vessel (UO127-C-9), blue transfer printed chamber pots featuring birds on the rim (UO127-C-51) and crosses (UO127-C-24).

Faunal

A minimum of 42 faunal elements were exposed within Feature 4, most of which were shellfish. These encompassed a range of species such as oysters, mussels, bluish top shell, ribbed slipper shell and rounded wedge shell, small ostrich foot and turret shells. The animal bones consisted primarily of sheep and cow bones, although pig and chicken were also present (Table 10). Twelve butchery units were represented (Table 11). The foreshank, hindshank and leg were the most common cuts, all of which were relatively inexpensive and often used for soups, stock and stews (Colley 2004). Loin was also a cheap cut of meat. Evidence of butchery was identified in the form of saw marks on the bones, indicative of the butchery units having been processed into smaller units. It was not possible to establish the age of death of any of the animals represented in this assemblage.

Table 10. Faunal material, listed according to species common name and element.

Species common name	Element	MNE
bluish top shell?	gastropod	1
cattle	unid	1
chicken	femur	1
cow	humerus	1
	sacrum	1
	tibia	1
mussel?	bivalve	1
oyster	bivalve	8
pig	rib	3
ribbed slipper shell?	bivalve	1
ro wedge shell?	bivalve	1
sheep	femur	1
	humerus	2
	lumbar vertebra	1
	metacarpal	2
	metatarsal	1
	radius	2
	rib	3
	scapula	1
	skull	1
tibia	1	
small ostrich foot	gastropod	1
turret shell	gastropod	3
unid	gastropod	1
	mandibula	1
	teeth	1
Total		42

Table 11. Faunal material, listed according to species common name, butchery unit and element.

Species common name	Butchery unit	MNE	MNBU
cow	foreshank	1	1
	loin/rump	1	1
	hindshank	1	1
pig	ribs	3	1
sheep	leg	3	1
	forequarter	6	3
	loin	4	3
	skull	2	1
Total		21	12

Glass

Forty-four glass artefacts were recovered from Feature 4, most of which were alcohol bottles, including black beer, ring seal and case gin bottles. Black beers dominated the assemblage and were mainly represented by bases. One bottle finish was present with the cork wired in position (Table 12).

Table 12. Glass artefacts from Feature 4, listed according to functional class and common name.

Class	Common name	MNV
alcohol	black beer	9
	black beer (large squat)	1
	black beer (pint)	1
	black beer (quart)	9
	case gin	4
	ring seal	5
	ring seal (squat)	1
alcohol?	beer?	1
foodstuff	wide mouth jar	1
non-alcoholic	torpedo	1
pharmaceutical	Castor oil?	1
pharmaceutical/personal	bevelled pharmaceutical	1
structural	window glass	1
table ware?	unid hollow-ware	1
unid	unid	5
unid/alcohol?	unid	1
unid/foodstuff	unid/pickle jar?	1
Total		44

Several sizes were represented among the alcohol bottles, including the small ‘pint’ size (c. 60-70 mm base diameter) and the large ‘quart’ size (c. 75-88 mm base diameter). Such differences in size were directly related to the quantities in which beer was sold, both wholesale and in a retail context (Illinois Glass Catalogue 1906: 250; Lindsey 2017). For example, the quarts of beer cost approximately 6-9 pence per bottle between the 1870s and 1880s according to contemporary newspaper advertisements, while pint bottles would have cost roughly half that of quarts (*Evening Post* 8/6/1871: 3; 10/5/1880: 4). Generally, black beer bottles are known to have contained a variety of beers and spirits such as whisky and gin, while ring seal shapes were commonly associated with beer and wine. However, the lack of labelling or embossing makes impossible to identify the contents and it is likely that the bottles were reused for a variety of products during their uselives.

Manufacturing evidence indicated that these alcohol bottles were made using turn-moulds in the case of ring seal shapes and dip-moulds for the black beers and case gin bottles. These methods are consistent with the mid-late 19th century period of glass manufacture (Figure 32).



Figure 32. Alcohol shapes from Feature 4. Top row from left: 'quart' sized black beer bottles (UO127-G-3), black beer body-base (UO127-G-7) and 'pint' sized black beer (UO127-G-18). Middle row: black beer body-base (G-6), 'large squat' black beer bottle (UO127-G-21) and top with the wire and cork in situ (UO127-G-16). Bottom row: 'squat' ring seal bottle (UO127-G-36) and ring seal body-base (UO127-G-23) and case gin bottles (UO127-G-28).

Other glass artefacts included non-alcoholic bottles and unidentified or unclear items (Figure 33). Several square cross-sectioned vessels in light aqua green glass were found, probably related to foodstuffs. One of them has the embossing [...] CO [...], although this could not be associated with any known manufacturer. In addition, one cobalt blue bottle was also found, probably used to hold a pharmaceutical product. A few olive and amber glass fragments were recovered, the latter of which was embossed with the letters [...]LO. No manufacturers could be identified. The blob top collected is likely to have been part of a soda or aerated water bottle. One wide mouth colourless bottle or jar was also identified as well as one diamond patterned fragment of glass, which may have been part of a hollow-ware vessel. One window glass fragment was encountered.

Overall, the small size of the fragments and the predominance of incomplete vessels makes it difficult to draw further information about function and forms.



Figure 33. Other glass artefacts from Feature 4. Top row from left: light aqua green bases (UO127-G-10) and partial embossed bottle [...]CO[...] (UO127-G-32). Middle row: olive glass fragments (UO127-G-22), cobalt blue bottle (UO127-G-35), amber base with the partial embossing [...]LO (UO127-G-27), blob top (UO127-G-11), wide mouth jar or bottle (UO127-G-34), diamond patterned glass (UO127-G-39) and window glass fragment (OU127-G-37).

Metal

Eight metal artefacts were recovered from this feature. However, the rusted condition and the high level of accretion noted on almost all of them limited their ability to provide useful information. The assemblage consisted of a tin/brass container, three fasteners and a range of ferrous strip metal (Table 13 and Figure 34).

Table 13. Metal items from Feature 4, listed according to material, functional class and artefact form.

Material	Class	Form	MNI
tin/brass	container?	tin?	1
ferrous	fastener	cut spike	1
		wire nail	1
		wrought spike	1
	unid	bent strip	1
		unid	1
		strip	1
unid		1	
Total			8

The two fasteners were identified as spikes based on their length, which was more than 100 mm (145 mm and 160 mm respectively; Figure 34). One of the spikes was made using the cut method of manufacture with no discernible head and a chisel point, while the second was a wrought spike with a flat head and a broken point. The wrought spike was easily identified by the state of the metal and because it has a 'wood-like' grain lengthwise (Middleton 2005). Both wrought and cut nails were available in New Zealand during the 19th century and continued to be used well into the latter half of the 19th century (Cottrell 2006: 427-429, Middleton 2005, Varman 1987).

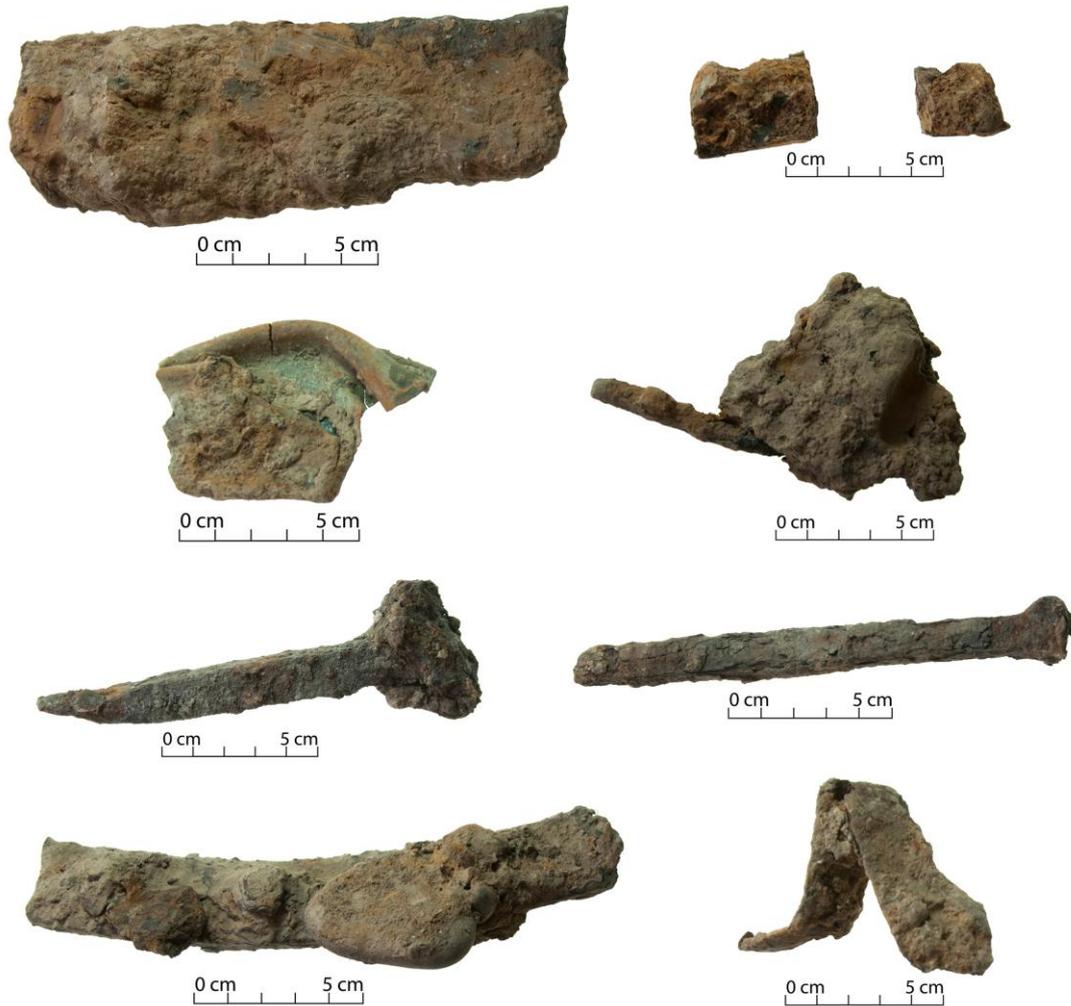


Figure 34. Metal artefacts from Feature 4. Clockwise from top left: wide ferrous strip (UO127-M-4), square sectioned ferrous items (UO127-MC-5), fastener with stuck accretion (UO127-M-7), wrought spike (UO127-M-6), bent strip (UO127-M-1), curved strip (OU127-M-3) and chisel pointed cut spike (UO127-M-5) and tin/brass (UO127-M-2).

Miscellaneous

Five other items were recovered from Feature 4. These artefacts included limestone, plaster and slate fragments. In addition, one incomplete smoking pipe bowl was also identified (Table 14 and Figure 35).

Table 14. Other items, listed according to material, functional class and artefact form.

Material	Class	Artefact	MNI
limestone	structural?	black limestone	1
plaster?	structural?	tile or part of a wall?	1
slate	structural	structural slate	1
clay	personal	smoking pipe	1
unid	unid	unid	1
Total			5



Figure 35. Other items from left: slate fragment (UO127-MC-1), limestone (UO127-MC-2), plaster fragment (UO127-MC-4) and clay smoking pipe bowl (UO127-MC-6).

Discussion

The artefacts consisted primarily of small ceramic fragments from tea and table wares, stoneware vessels, black beer bottle bases and shellfish. The fragmentary nature of the assemblage makes it difficult to interpret, but several observations can be made. The 19th century European artefacts found in Feature 4 were part of a fill layer within the reclamation formed in 1867. As such, they are likely to have been redeposited as part of the reclamation fill or scattered across the area while the reclamation was being undertaken. The fragmentary nature of many of the artefacts is consistent with this interpretation. This is supported by the ceramic assemblage, which was dominated by sheet floral patterns and romantic scenes, both of which were popular in the mid-19th century. Unfortunately, the associations between the material and the people to whom it belonged remain unknown.

M36/230: THE SECOND POST OFFICE

Historical background

The second post office was built at the address now known as 7 Norwich Quay. Prior to the post office being built here, this was the site of the Canterbury Association's store, which subsequently became the custom house (Jollie 1849). By 1858, the custom house was described as "shabby" and a "disgrace to the General Government" and the Provincial Council set aside a sum of £1,000 for the erection of a new custom house at Lyttelton (*Lyttelton Times* 14/7/1858: 4). These funds were considered insufficient for a new building and discussion about the need for new public buildings continued throughout the 1860s (*Lyttelton Times* 14/6/1862: 4, 17/5/1866: 2).

It was not until 1873 that the council called for designs for new public offices for a custom House, post office and telegraph office, as well as a town clock (*Star* 12/11/1873: 2). Colonial architect William Clayton designed the new building, and was calling for tenders in January 1874 (*Evening Post* 8/1/1874: 3). T. Greig's tender for £4220 was accepted in June, and construction began on 10 September (*Globe* 12/9/1874: 2, *Press* 26/6/1874: 2). The building was nearing completion in July 1875, when the *Press* printed an article describing it:

This useful pile of buildings has been erected by the General Government at the junction corner of Norwich Quay and Oxford street, and contains the several departments of Post office, Custom

house, Telegraph office, Harbour Master's offices, and the Government annuities. The building is in the Italian style, and has a very pretty and pleasing appearance, the foundations below ground level are constructed of Portland cement and shingle concrete, with blue stone rubble walling in mortar from the concrete to the ground floor. The superstructure is composed of brickwork in mortar exterior face tuck pointed, with Portland cement dressings. The back front has been cemented down so as to protect it against the south-west storms. The external quoins of the upper storey are of Portland cement rusticated and vermiculated. The window openings to the upper storey are semi-circle heads with cement dressings of detached columns on each side with cap and label. Below the window sills is a moulded and dentled string coarse round the two main fronts. The window openings on the ground floor are constructed with segmental heads and Portland cement dressings, and around the piers that divide the window openings is a moulded band filled with acanthus leaves. The building is 69ft long by 45ft wide; the height of the front to Norwich Quay is about 28ft. This front is divided, by a recess of 11ft by 5ft, and is filled in with portico which stands on four columns, with caps enriched by acanthus, leaves the same as the moulded band before mentioned, and forms the principal entrance to the building. On the north-east corner of the building, fronting Norwich Quay and Oxford street, is formed a clock turret, which is to receive a clock with four dials, striking the hours on a bell hung for that purpose. The height of the clock turret above the main building is about 20ft. The principal entrance is from Norwich Quay. Inside the entrance is a vestibule with the different departments leading from it. The compartment on, the right hand is the customs department, containing long room, collector's room, and examination room. That on the left is the postmaster's room; fronting the entrance door in the vestibule are two pairs of swing doors, one gives access to the telegraph department, while the other affords entrance to a lobby, for the public to post or receive letters. Inside this lobby and fronting Oxford street and the harbor is the sorting room for letters, 26ft by 18ft. Adjoining the sorting room and fronting Oxford street are the private boxes for letters; the public will have access to these boxes by an entrance door at the north-east corner of the building, fronting Norwich quay. Admission to the different departments on the upper is attained by a fine large and easy staircase constructed of kauri with a spacious landing at top. On the left of this landing is the public room for the telegraph 26ft by 17ft this room will be divided across the centre, with a counter 4ft wide, for the public to write their messages on. Adjoining this room is the operators' apartment, 26ft x 17ft; it is directly over the long room, fronting Norwich quay. The messengers room adjoins the landing and operators rooms. On the right of the landing is a corridor leading east to Oxford street, and on the right and left of this corridor are two rooms set apart for the Government annuities, one fronting to Norwich Quay and the other towards the harbor. Farther along the corridor, is harbour master's room; fronting Oxford street, where he will be able to see the signals from the flagpole, and also part of the harbor. Opposite the harbour master's room, on the left of the corridor is a room set apart for the messengers of the harbor-master, through which access is gained to a small staircase, leading up to the clock chamber. The whole of the rooms are 12ft from floor to ceiling and are well ventilated through the insertion of iron air bricks just below the ceiling, and air flues carried up the walls into the roof and discharged. The partition walls throughout the building are 14in and 9in brickwork, and the external walls 18in brickwork. The whole of the interior of the rooms are plastered with lime and sand, three coats and well finished, the whole of them being provided with fireplaces, which are fitted with registered grates, and kauri wood mantelpieces. The whole of the timber in the interior of the building is of kauri varnished, and has a very nice appearance. This fine pile of buildings was designed by Mr W. H. Clayton, the Colonial Architect. The works have been carried out under the superintendence of Mr Hurrell, the clerk of works appointed by the General Government, who was sent from Auckland here for this purpose. We must congratulate this officer on the success which has attended his efforts. The contract was taken by Mr T. Greig, of Christchurch, and great credit is due to him for the way in which he has performed his contract. The brick and stone work was done by Mr William Greig, and the Portland dressings and interior plastering by Mr S Andrews, of Christchurch. Since the building has been finished the Government have thought proper to open up the cellars below the ground-floor, which will give a great deal of valuable room to the different departments habited in the building. Tenders have been sent in to the Government for the interior fitting for the different departments, and we should imagine that they will be in correspondence with the building. These fittings will probably be completed in about six weeks, and it is to be hoped that at the end of that time each department will be able to occupy their new quarters.

Press 12/7/1875: 2.

A photograph dating to the late 1870s shows the completed building (Figure 36). The post office continued to operate in the building until 1976, when services were relocated to the corner of Canterbury and London streets.

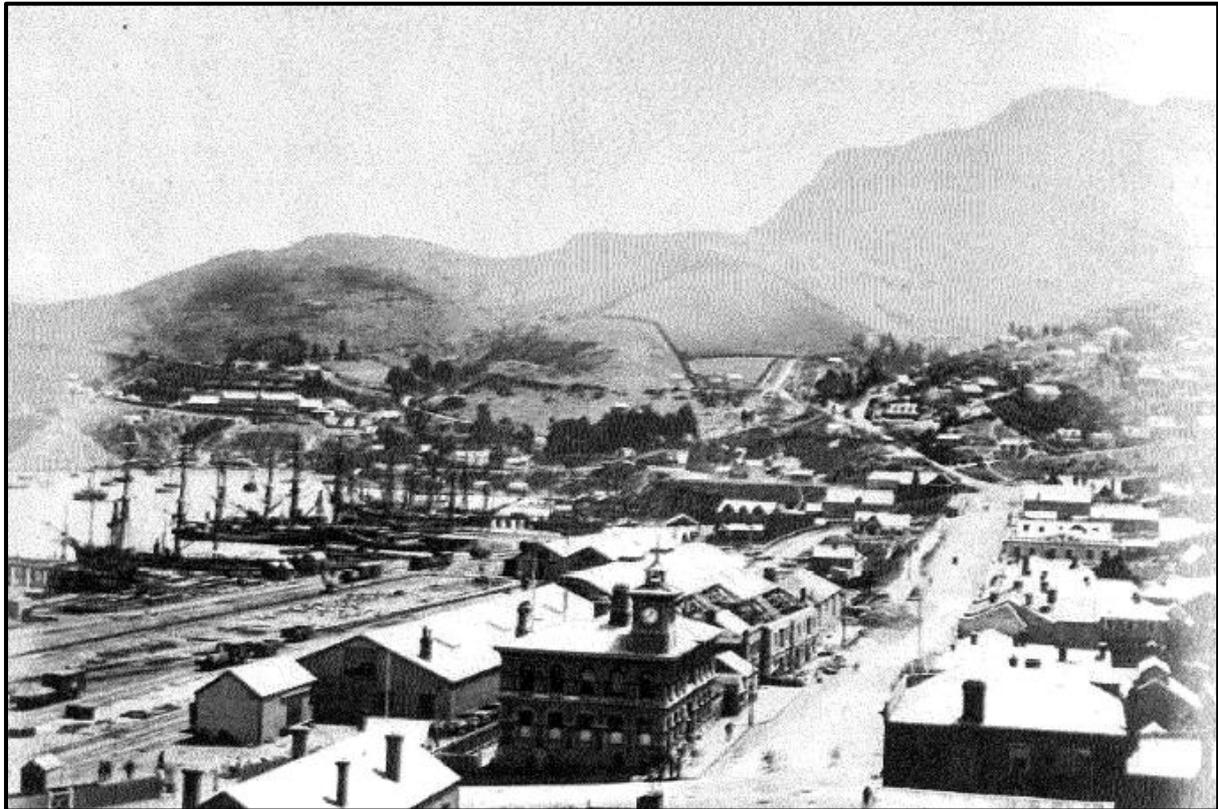


Figure 36. The second post office on the corner of Norwich Quay and Oxford Street, c.1875-1880, complete with clock tower. Image: Burgess, 2009.

Previous archaeological work

The post office was demolished in August 2011, following damage sustained during the Canterbury earthquakes. As it was built prior to 1900, the building was recorded prior to and during demolition by an archaeologist, and the removal of the foundations was monitored, revealing that the foundations of the building were concrete (Dodd and Watson 2012).

Results of archaeological monitoring

Two sections of the post office foundations were found during the earthworks: a retaining wall and foundations. The retaining wall was part of the north wall of post office basement and was removed in the area immediately north of the substation but left in situ to the west (Figure 37, Figure 38 and Figure 39). The retaining wall was 13 m long, formed from volcanic stone. It was constructed in the random rubble style, brought to course, and laid with mortar. The wall had been built against fill deposited against the natural ground behind it, as is commonly the case for 19th century retaining walls in Lyttelton (Figure 40). When this fill was removed, the natural ground (including Feature 1, M36/229) was exposed (how far the fill extended back was not recorded, but its extent can be seen in Figure 41).

The stratigraphy exposed immediately behind the wall consisted of the following stratum (Figure 42 and Figure 43):

1. Concrete curb and channel, approximately 350 mm thick.
2. Hard fill, approximately 200 mm thick.
3. Asphalt, from an earlier roading surface, approximately 100 mm thick.
4. Clay and brick rubble, approximately 130-350 mm thick.
5. A mixed clay fill (containing 19th century artefacts) probably contemporaneous with the post office construction in 1875 (Feature 3), at least 700-860 mm thick. The base of this was not exposed.

Layers 4 and 5 were fill deposited when the wall was constructed (c.1875). The matrix of Layer 5 was very similar to redeposited material recorded elsewhere in Lyttelton during archaeological work, and is likely to have been sourced locally. The artefacts recovered from Feature 3/Layer 5 are discussed in more detail below.

Some of the post office foundations were found near the base of the substation excavation and required removal from within the project area (Figure 44 and Figure 44). These foundations were concrete and 1 m wide. The full depth of the foundations was not exposed, but were recorded in 2011 as being 2 m deep (Dodd and Watson 2012). The top 200 mm of the foundations was removed using a concrete breaker but they were left in situ below this depth. It is likely that these foundations remain extant in other areas of 7 Norwich Quay.



Figure 37. The retaining wall associated with the post office, looking north.



Figure 38. The retaining wall during removal, looking north.

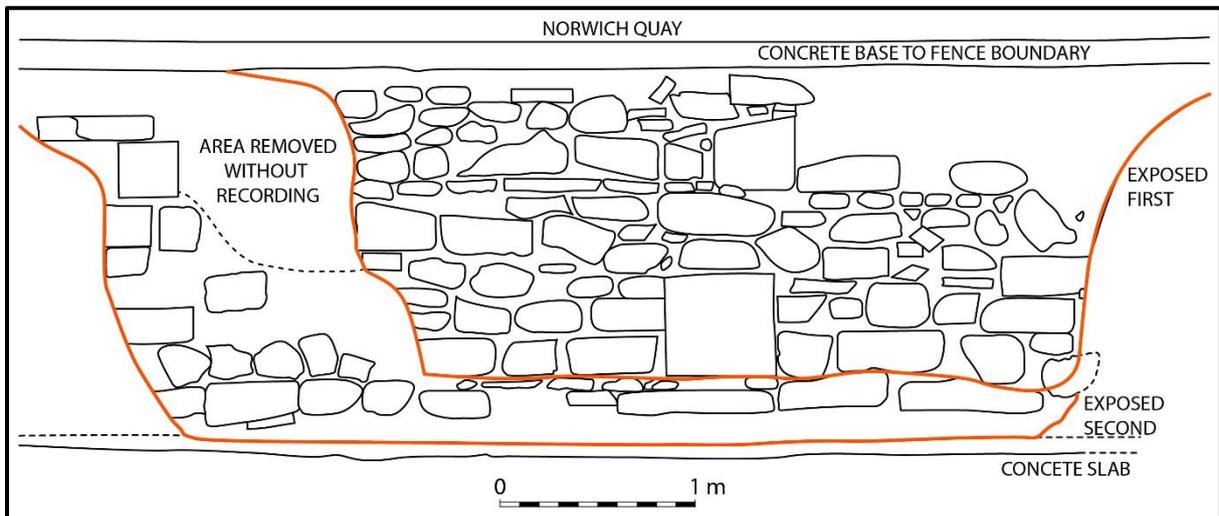


Figure 39. The retaining wall associated with the 1875 post office. All of the area drawn here was removed.



Figure 40. The north wall of the post office during deconstruction, with Feature 3 exposed immediately above the top of the wall, looking northeast.



Figure 41. The north post office wall (in cross-section, left of centre), Feature 1 and Feature 3, looking west.



Figure 42. The stratigraphy exposed immediately behind the retaining wall.

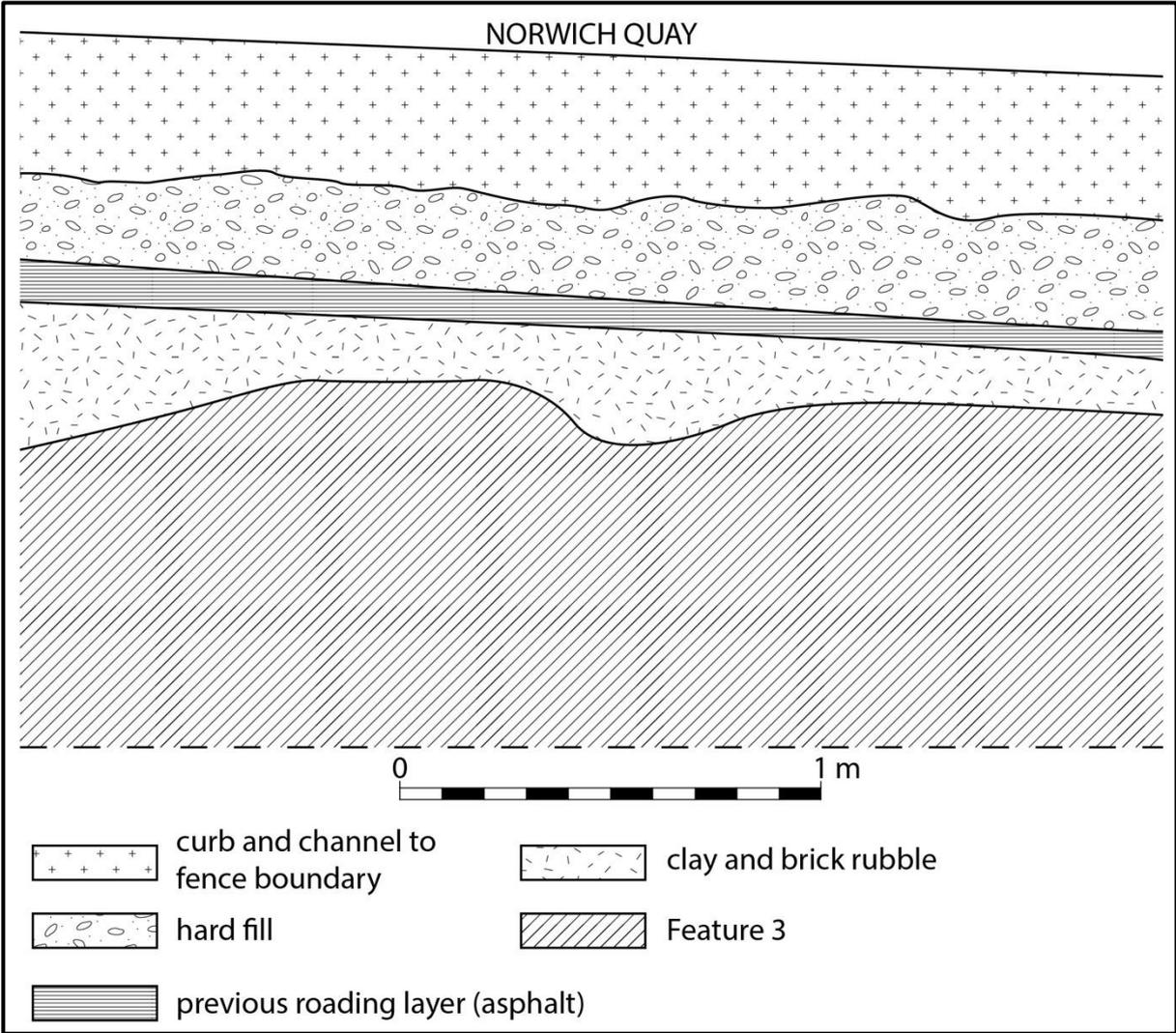


Figure 43. The profile exposed behind the north wall of the post office. Feature 3 is the lowest layer depicted here.



Figure 44. The footings associated with the 1875 post office, looking east.

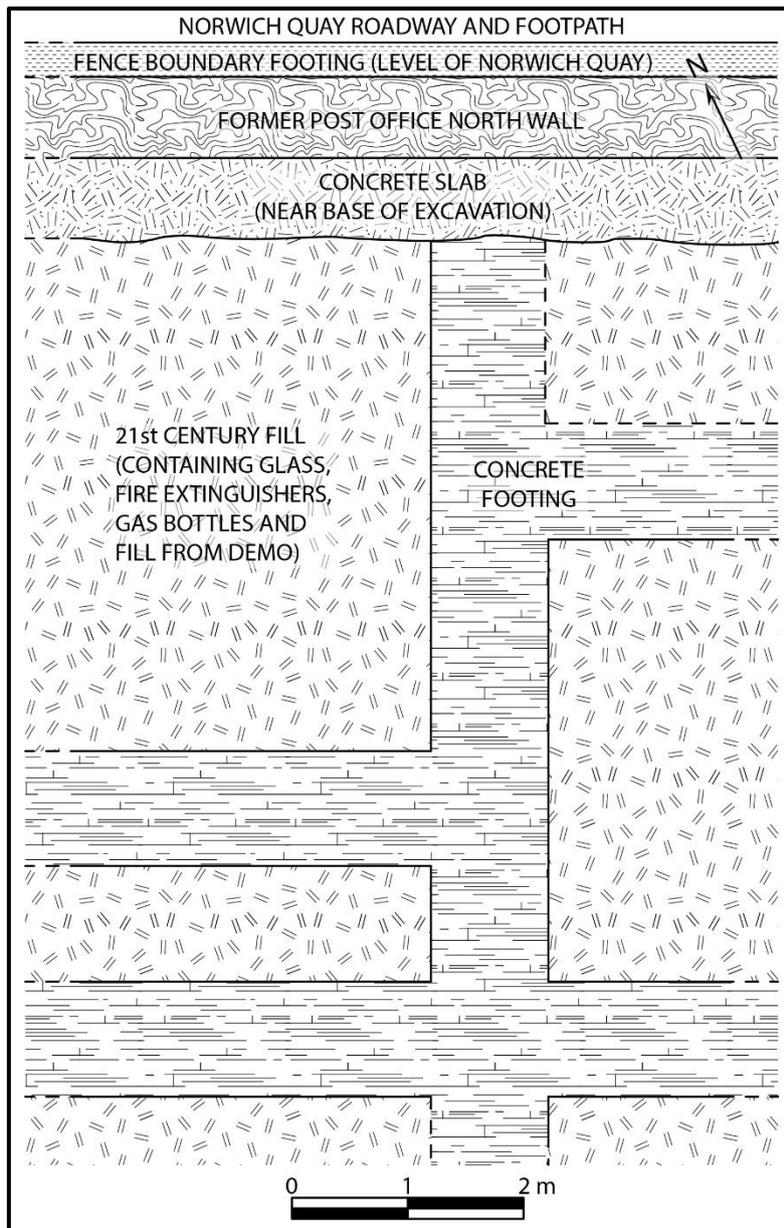


Figure 45. Plan view of the post office foundations exposed during the works.

Artefact analysis

Three individual artefacts, represented by four fragments, were found in Feature 3 (Table 15).

Table 15. Total NISP and MN of artefacts from Feature 3, listed according to material.

Material	NISP	MN
Ceramic	1	1
Glass	3	2
Total	4	3

Ceramic

One undecorated whiteware fragment from an unidentified vessel was collected. No marks or decoration were noted on it (Figure 46).



Figure 46. Undecorated ceramic vessel fragment (UO127-C-54).

Glass

Two alcohol bottles were recovered from behind the wall, consisting of one 'quart' sized black beer bottle (84 mm base diameter) and one case gin bottle (Table 16 and Figure 47). The latter has a cross in a circle embossed on the base, but it could not be associated with any known manufacturer.

Table 16. Glass artefacts from Feature 3, listed according to functional class and common name.

Class	Common name	MNV
alcohol	black beer (quart)	1
	case gin	1
Total		2

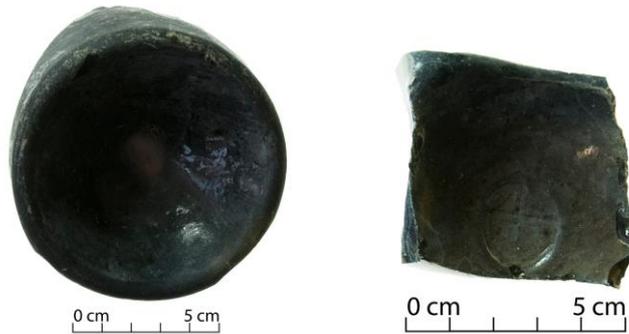


Figure 47. Glass artefacts found in Feature 3 from left: black beer bottle (UO127-G-41) and case gin bottle (UO127-G-42).

CONCLUSION

The earthworks carried out as part of the 11kV stage 4 upgrade at the Lyttelton port of Christchurch were monitored by an archaeologist due to the potential for the excavation to affect subsurface archaeological remains associated with the occupation of the section prior to 1900. Earthworks affected approximately 10-20% of 7 Norwich Quay, to a depth of approximately 1 m. Pre-contact Maori archaeological material (Features 1 and 2) and 19th century archaeological material was found during this work (Features 3 and 4, and find spot 1). This work has revealed more of the extent of the archaeological deposits associated with M36/229, as well as providing further evidence about when the site was occupied and the surrounding environment at the time, all of which enhances our archaeological knowledge of Māori occupation of this area. The earthworks also appear to have relocated the 1852 stone repairs to the Erskine Bay sea wall, which stand in contrast to the wooden remains of this structure. Parts of Features 1-4 remain in situ. As a result of this work, the following archaeological site record forms have been updated: M36/229 (Ōhinehou), M36/293 (Erskine Bay sea wall) M36/302 (railway reclamation) and M36/230 (the second post office).

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APPENDIX 1: RADIOCARBON DETERMINATION



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Private Bag 3105
Hamilton,
New Zealand.
Ph +64 7 838 4278
email c14@waikato.ac.nz

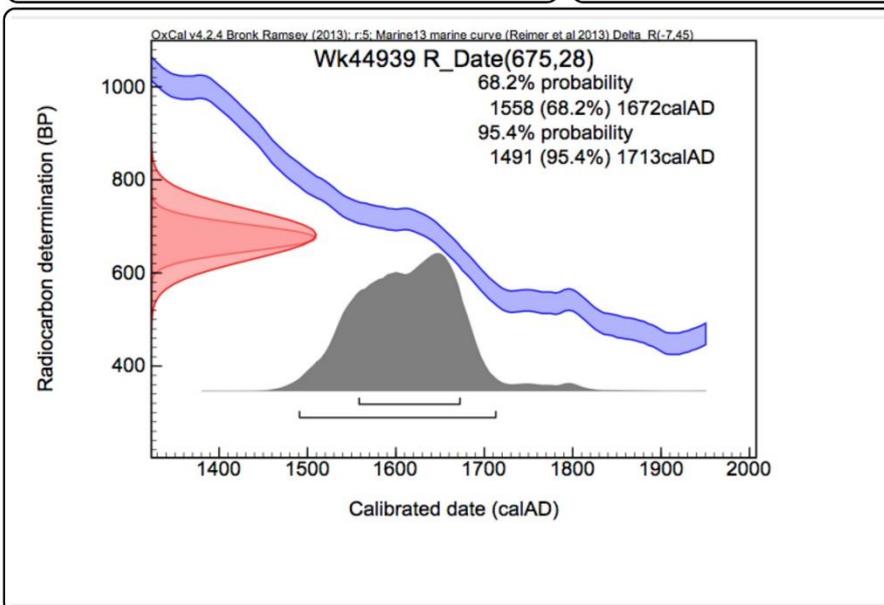
Radiocarbon Dating Laboratory

Wednesday, 22 February 201

Report on Radiocarbon Age Determination for Wk- 44939

Submitter	L Tremlett
Submitter's Code	LPC-NQ7-EQ746-F-20
Site & Location	Ohinehou, New Zealand
Sample Material	Turbo
Physical Pretreatment	Surfaces cleaned. Washed in an ultrasonic bath. Tested for recrystallization: aragonite.
Chemical Pretreatment	Sample acid washed using 2 M dil. HCl for 120 seconds, rinsed and dried.

$\delta^{13}\text{C}$	$2.4 \pm 0.3 \text{‰}$	Comments
D ¹⁴ C	$-80.6 \pm 3.2 \text{‰}$	
F ¹⁴ C%	$91.9 \pm 0.3 \%$	
Result	675 ± 28 BP	



- Explanation of the calibrated Oxcal plots can be found at the Oxford Radiocarbon Accelerator Unit's calibration web pages (<http://c14.arch.ox.ac.uk/embed.php?File=explanation.php>)
- Result is *Conventional Age or Percent Modern Carbon (pMC)* following Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier.
- The isotopic fractionation, $\delta^{13}\text{C}$, is expressed as ‰ wrt PDB and is measured on sample CO₂.
- F¹⁴C% is also known as *Percent Modern Carbon (pMC)*.

Alan Hogg

APPENDIX 2: METHODS OF ANALYSIS

Samples from M36/299

All material from Features 1 and 2 was cleaned and sorted by Luke Tremlett (Underground Overground Archaeology). Material from Feature 1 required wet sieving as it was so dense and claggy. This was done using a 3 mm sieve. Material from Feature 2 was dry sieved, also using a 3 mm sieve. Soil samples were collected for microfossil analysis prior to sieving.

Microfossil analysis

Samples were analysed for pollen, phytoliths and starch to provide a record of past vegetation, environments and human activity.

Pollen analysis

Pollen analysis includes pollen grains of seed plants and spores of ferns and other plants. It provides insight into past vegetation and environments and in New Zealand allows the differentiation of sediments deposited in pre-settlement, early Maori and European times (McGlone et al. 1993, Hayward et al. 2004). Pollen can also provide evidence for Maori-introduced plants, for example bottle gourd and paper mulberry, and European-introduced crops such as maize (Horrocks 2004, Horrocks et al. 2008).

The samples were prepared for pollen analysis by the standard acetolysis method (Moore et al. 1991). At least 150 pollen grains and spores were counted for each sample and slides were scanned for types not found during the counts. Microscopic fragments of charcoal are also extracted during pollen preparation, providing evidence for fire.

Phytolith analysis

Phytoliths are particles of silica formed in inflorescences, stems, leaves and roots of many plants (Piperno 2006). Phytolith analysis compliments pollen analysis and, like pollen, can provide evidence for bottle gourd and paper mulberry (Horrocks 2004). Other types of microscopic biosilicates, notably diatoms, radiolarians and sponge spicules, are extracted along with phytoliths during preparation. Diatoms are unicellular algae and have cell walls composed of silica; radiolarians are a type of amoeboid protozoa with siliceous skeletons; sponges are multi-cellular animals with skeletons often composed of siliceous spicules. Diatoms are found in aquatic and sub-aquatic environments; radiolarians and sponges are exclusively aquatic. Diatoms and sponges are found in both marine and freshwater environments; radiolarians are exclusively of marine origin.

The samples were prepared for phytolith analysis by density separation (Horrocks 2005). At least 150 phytoliths were counted for each sample and slides were scanned for types not found during the counts.

Analysis of starch and other plant material

This analysis includes starch grains and other plant material such as calcium oxalate crystals and xylem (Pearsall 2015). Starch is the main substance of food storage for plants and is mostly found in high concentrations of microscopic grains in underground stems (e.g. tubers, corms), and roots and seeds. The grains are synthesised and stored in amyloplasts, sub-cellular units specialised for this function. Calcium oxalate crystals, comprising raphides which are needle-like and druses which are compound, are found in both the aerial and underground parts of many plant taxa. Xylem is a vascular tissue comprising elongated cells through which most of the water and minerals of a plant are conducted. Starch analysis can provide evidence for Maori-introduced starch crops, such as kumara, taro and yam, and European-introduced crops such as potato (Horrocks et al. 2008).

A recent advance in this method is the use of Fourier Transform InfraRed spectroscopy to positively identify degraded starch, often uncertain due to loss of distinguishing features, collected from archaeological deposits (Horrocks et al. 2012, 2014; Kahn et al. 2014). Starch and other remains were prepared for analysis by density separation and presence/absence noted (Horrocks 2005).

Faunal analysis

*Bone*⁶

The material from each provenance was sorted and identified using standard methodology as outlined in Heritage New Zealand Pouhere Taonga (2014) Guidelines for Midden Sampling and Analysis (Archaeological Guidelines Series No. 9). Fishbone identifications were made using the author's personal reference collection, the archaeological fishbone reference collection at Museum of New Zealand Te Papa Tongarewa, and Leach (1997) 'A Guide to the Identification of Fish Remains from New Zealand Archaeological Sites'. Bird bone identifications were made with the assistance of Alan Tennyson, Vertebrate Curator at Museum of New Zealand Te Papa Tongarewa, utilising the museum's extensive bird bone reference collection. Once identified, material was re-bagged according to provenance, species, element and side (if applicable), and this information entered into an Excel spreadsheet along with NISP (Number of Identified Specimens) and MNE (Minimum Number of Elements) values. MNE values were then used to calculate MNI (Minimum Number of Individuals). MNI values for all fauna were calculated using the highest sided element count for each species. The bone assemblages recovered during the most recent work at M36/229 are very small, it is therefore difficult to draw many conclusions from the analysis of these remains.

*Shell*⁷

The material from each feature was also sorted and identified using standard methodology as outlined in Heritage New Zealand Pouhere Taonga (2014) Guidelines for Midden Sampling and Analysis (Archaeological Guidelines Series No. 9). Shell was sorted to diagnostic and non-diagnostic fragments. Diagnostic fragments, whenever possible, were then identified to species and portion. Two sources were used as a reference: *A Photographic Guide to Seashells of New Zealand* by Morley (2004) and *Which Seashell?* by Crowe (1999). The element, side and portion present were also identified when possible. From this, an MNI (minimum number of individuals) was generated from the MNE (minimum number of elements), which in turn was based on the NISP (number of individual specimens present). The undiagnostic shell and shell sorted to species was then bagged and weighed separately.

Historic artefacts

All data relating to artefacts was entered into a Microsoft Excel spreadsheet. Photographs were taken of notable, interesting and/or dateable artefacts, or artefacts crucial to understanding this site.

Dating: the TPQ method

Ceramic, glass and metal artefacts were commonly embossed or printed with information concerning the manufacture of the vessel or the product the vessel contained. These manufacturers can often be identified and the period of their operation dated. The specific sources used for this process are discussed above for each material category. This information allows for the calculation of a *terminus post quem* (limit after which) for each feature that is associated with a dated artefact. A *terminus post quem* (TPQ) is the earliest date at which an archaeological feature could have been deposited. It is derived from the date range of the youngest artefact in the feature. For example, if a manufacturer

⁶ Bone analysis and report was completed by Yolanda Vogel.

⁷ Shell analysis was carried out by Luke Tremlett (Underground Overground Archaeology).

identified on a ceramic vessel is known to have operated between 1865 and 1880, and this is the latest date range identified in the feature, the TPQ for that feature is 1865.

Establishing a TPQ is useful because it can be used to associate deposition with a specific period of a site's occupation. However, it should be emphasised that the TPQ is the earliest possible date for a feature, not the definite date at which deposition occurred. The time between the manufacture and disposal of an artefact must be taken into account. Various factors influence this period. For example, a ceramic vessel is likely to proceed through a number of stages between creation and disposal. These include the time it takes for a vessel to be packed and processed in Britain, then shipped to New Zealand, and then more time in retail before its eventual purchase. After this process, the vessel was most likely used for a period of time before its disposal. This period is termed a vessel's 'use-life'. Therefore, it could be many years between the date at which a vessel was produced and the date at which a vessel was added to an archaeological assemblage.

Ceramic artefacts

A number of references were consulted during the analysis of the ceramic assemblage. Brooks (2005) was the principle reference used for the analysis of material ware, form and decorative technique. Samford (1997) was consulted in relation to decorative patterns and colours and internet resources such as The Potteries website were also utilised. Maker's marks were identified using Godden (1991) and The Potteries website. These resources contribute to the internal database maintained by Underground Overground Archaeology Ltd which records both identified ceramic maker's marks and patterns recovered from previous archaeological sites in Canterbury.

Ceramics were analysed according to a standard set of attributes and the specific categories are listed below. Some of these attributes and categories have been removed from the spreadsheets in Appendix 2 due to the constraints of printing on an A4 page. The columns left out were those in which no data was entered during the analysis, or where the data was not crucial to this report. Photographs were taken of all unidentified ceramic patterns and have been retained on file. These are available on request.

Bag ID	Material	Quantity	Decoration	General information
Site	Body type	NISP	Technique	Notes
Code	Glaze	MNI	Colour	References
Box number	Ware		Pattern name/motif	Photo number
Bag number	Function		Maker's mark	
Provenance	Form			
	Portion			

Faunal material

Methods of analysing the faunal material drew on those outlined in Watson (2000). The faunal material was identified to taxonomic category and, where possible, mammal and bird bones were identified to species. Underground Overground Archaeology holds a reference collection of European mammal bones, and the bird bone reference collection at the Canterbury Museum was used to identify bird bones.

A MNE (minimum number of elements) was generated from the NISP (number of individual specimen present). The attributes recorded during the analysis of the faunal material are listed below and include skeletal details, taphonomic processes and, where possible, any butchery marks on the material were recorded. Minimum number of butchery units (MNBU) was also recorded to represent cuts of meat targeted (Watson 2000).

Bag ID	Description	Detailed analysis	General information
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Site	Species	Taphonomy	Notes
Code	Element	MNBU	Photo number
Box number	Side		
Bag number	Portion		
Provenance			

Glass artefacts

Glass vessels were sorted by provenance and analysed according to the process outlined in Smith (2004). This included recording glass colour, finish, base type and any marks present. Further information concerning the bottle and product manufacturers identified by marks was supplied when possible. Internet research provided the majority of this information but Donaldson et al. (1990) and Lindsey (2012) also proved useful.

Some glass vessels could be identified to type by their form or their embossing. This information identifies the original contents of the bottle. However, identification of the original contents of a bottle does not necessarily connect the occupants of a site with the consumption of that product. Reuse of glass bottles for different products was a common practice in New Zealand in the 19th century, as there was no glass bottle production in New Zealand until the 20th century. All bottles had to be imported, which resulted in a scarcity of glass containers. However, the identification of reuse in an archaeological context is difficult. As such, glass vessels are discussed in relation to their original contents.

Bag ID	General description	Quantity	Manufacture	Identification details
Site	Colour	NISP	Type	Embossing
Code	Portion	MNV	Marks	Notes
Box number	Class			Reference
Bag number	Common name			Photo ID
Provenance	Details			

Metal artefacts

Metal artefacts were analysed and recorded by their material type, form and measurements. If the artefact could not be identified by form a description of its appearance was included.

Bag ID	Description	Quantity	Identification details
Site	Material	Measurements	Notes
Code	Form	NISP	Reference
Box number	Details	MNI	Photo ID
Bag number	Portion		
Provenance			

Miscellaneous artefacts

Miscellaneous artefacts included building materials and all other recovered artefacts not relevant to the already established material categories. Artefacts were cleaned and then analysed according to material type. Those that could be identified to form were recorded as such.

Bag ID	Description	Quantity	Information
Site	Material	Measurement	Notes
Code	Artefact	NISP	ID
Box number	Portion	MNI	
Bag number	Description		
Provenance			

Discard protocol

Underground Overground Archaeology uses a discard protocol involving the discard of non-diagnostic artefact fragments. A note is made in the artefact spreadsheet if an artefact is discarded. Copies of the artefact discard protocol are available upon request.

Abbreviations

Ceramic

b & b plate	bread and butter plate
bbe	buff bodied earthenware
bc	bone china
bd	body
bgst	bristol glaze
bs	base
cl	clear
ew-c	coarse earthenware
dbw	dyed body ware
fb	flow blue
ew-r	refined earthenware
h	handle
porc-h	hard paste porcelain
porc-s	soft paste porcelain
pw	pearlware
r	rim
rre	red refined earthenware
rt	rockingham type
sgst	salt glaze
st	stoneware
svww	Semi-vitrified whiteware
ugtp	underglaze transfer print
unid	unidentified
wg	white granite
ww	whiteware
yw	yellowware

Faunal

C	complete
C*	complete, missing 1 epiphysis
C**	complete, missing 2 epiphyses
P	complete proximal portion of the bone
P*	complete proximal portion but missing the unfused epiphysis
PE	the unfused proximal epiphysis
PS	proximal shaft
MS	shaft
DS	distal shaft
D	complete distal portion of the bone
D*	complete distal portion but missing the unfused epiphysis
DE	the unfused distal epiphysis

Glass

1pc dm	one piece dip mould
2pc	two piece mould
2pc w cb	two piece mould with cup bottom
2pc w pb	two piece mould with post bottom
3pc dm	three piece dip mould
ab	amber brown
ag	aqua green
bd	body
bs	base
bv1	blake variant one
cb	cobalt
cc	concave
cl	colourless
cmpl	complete
c/s	cross section
cv	convex
-d	dark
dcc	dished curved
dft	dished flat
dm	dip mould

f
fg
eg
ft
hs
hs/vb
hs/vbs
hs/vs
hz
kbe
kcm
kcn
kdo
kpa
krc
-l
mm
n
nil
og
rcb c/s
ro
s
sc
st
sts
td
td/u/bead
td/v/skirt
tp
tu
tus
turn-b
turn-l
vh/hh
vh/tb
vh/tf/cb
v3h/t3f/cb
vbs
v3bs
vcn
v3cn
vpn
wrench-n

Metal

h
pt
s

finish
forest green
emerald green
flat
seams horizontal on shoulder
seams horizontal on shoulder, vertical on body
seams horizontal on shoulder, vertical on body and shoulder
seams horizontal on shoulder, vertical on shoulder
horizontal
kickup bell shaped
kickup conical with mamelon
kickup conical
kickup domed
kickup parabolic
kickup rounded cone
light
machine made
neck
nil seams
olive green
round cornered blake cross section
rounded
shoulder
scooped
straight
straight short
tapered down
tapered down/u-shaped groove/bead
tapered down/v-shaped groove/skirt
tapered
tapered up
tapered up short
turn marks on the body
turn marks on the lip
seams vertical on heel, horizontal on heel
seams vertical on heel, transverse on base
seams vertical on heel, horizontal on foot, circular on base
seams 3 vertical on heel, 3 transverse on foot, circular on base
seams vertical on body and shoulder
seams 3 vertical on body and shoulder
seams vertical complete on neck
seams 3vertical complete on neck
seams vertical partial on neck
wrench marks on the neck

head
point
shaft

APPENDIX 3: ARTEFACT SPREADSHEETS

Due to the constraints of printing on an A4 page, the following artefact spreadsheets have been condensed (as noted in the footnotes for each table). For full spreadsheets please contact Underground Overground Archaeology.

At the time of writing, the artefacts were stored at Underground Overground Ltd offices at 31 Stevens Street, Waltham, Christchurch.

Ceramic⁸

Bag	Prov	Body Type	Glaze	Ware	Function	Form	Portion	NISP	MNI	Technique	Colour	Pattern Name/Motif	Maker's Mark	Date	Notes (incl date range)	Ref.
1	clay fill	ew-r	cl	ww	tea ware	teacup	r-bd	1	1	ugtp	brown	Rhine				
2	clay fill	st	plain	pgst	household /storage	bottle	bd-bs	8	2						85 mm in diameter base. Two horizontal parallel bands were noted on the fragment of a round shoulder identified.	
3	clay fill	st	salt	sgst	household /storage	bottle	bd-bs	2	1						70 mm in diameter base.	
4	clay fill	st	salt	sgst	household /storage	bottle	bd-bs	2	1						Around 50 mm in diameter base.	
5	clay fill	ew-r	cl	ww	table ware	platter?	r-m-sh-bs	3	1	ugtp	blue	Willow			It is considered a platter because of the thickness and size. It could be also another type of serving dish.	
6	clay fill	ew-r	cl	ww	table ware	small plate	r-m-sh	1	1	ugtp	blue	Willow				
7	clay fill	ew-r	cl	ww	table ware	plate	r-m-sh	1	1	ugtp	blue	Willow			It is identified as different from C-6 because it is bigger.	
8	clay fill	ew-r	cl	ww	table ware	plate	bs	1	0	ugtp	blue	Willow			MN is 0 because it could be part of one of the other Willow patterned vessels recovered.	
9	clay fill	ew-r	cl	ww	household /table ware	unid hollow-ware	bd-bs	1	1	ugtp	grey	Festoon				
10	clay fill	ew-r	cl	ww	table ware	jug?	mouth		1	ugtp	black	unid: floral/foilage			Inner and outer decoration. Designs look like laurel leaves and flowers although it was impossible to further identification.	
11	clay fill	ew-r	cl	ww	tea ware	teacup	r-bd	3	1	flow blue/ogp	blue	unid: foliage/chinoiserie?			They are small fragments and blurred surface. Only distinguishable stylised acanthus leaves on inner rim and other foliage elements on outer surface. On the flow blue there are lines as remains of over glazed painting or printing.	
12	clay fill	ew-r	cl	ww	table ware	side/sm all plate	r	1	1	ugtp	blue	unid: floral/foilage			It is a small fragment. Dark blue decorated marly with geometric repetitive motifs as waves on the rim and foliage or floral elements on the marly.	

⁸ The following columns have been removed from this table: Site, code, UO box # (all are stored in UO127), bag #, photo ID.

13	clay fill	ew-r	cl	ww	table ware	side/sm all plate	r	1	1	ugtp	blue	unid: floral/foilage			It is a small fragment. A geometric band on the top, below of which appears to be a vignette framed by acanthus leaves or similar. It is impossible to provide more details.	
14	clay fill	ew-r	cl	ww	table ware	soup plate?	bd-bs	1	1	ugtp	blue	unid: geometric			It is similar to Berlin wreath, consisting of vertical lines of repetitive diamonds shapes and parallel lines.	
15	clay fill	ew-r	cl	ww	tea ware	teacup	bs	1	1	ugtp	grey	unid: romantic			Pagoda and vase are visibles. It looks like a romantic scene similar to the Rhine, Neva, Athens, Medici patterns.	
16	clay fill	ew-r	cl	ww	tea ware?	teacup?	bd-bs	1	1	ugtp	purple	unid: foliage			It is a small fragment with pointed leaves and fibre patterned leaves as well.	
17	clay fill	ew-r	cl	ww	table ware	unid	bd-bs	1	1	ugtp	blue	unid: foliage			It looks like the Dragon or Seaweed patterns, although it is impossible to identify surely.	
18	clay fill	ew-r	cl	ww	tea ware	teacup	bd	1	1	ugtp	black	unid: floral/foilage			Black flowers and leaves were noted but no further information could be identify.	
19	clay fill	ew-r	cl	ww	tea/table/ household	unid	bd	5	0						DISCARDED. Part of the other whiteware vessels.	
20	clay fill	hpp	cl	porc-h	tea/table/ household	unid	bd	1	1						MN 1 because no other porc-h was identified among the assemblage.	
21	clay fill	ew-r	cl	ww	household	chamber pot	r-m-bd	1	1	ugtp	blue/green	unid: floral			Flowers similar to daisies were noted on the outer surface in turquoise colour.	
22	clay fill	ew-r	cl	ww	tea ware	teacup	bs	1	1							
23	clay fill	ew-r	cl	ww	unid	unid hollow-ware	bd-bs	2	1	ugtp	purple	unid: floral/foilage ?			Decoration is like blurred, so the motifs are unclear although they look like intertwined or seaweed leaves.	
24	clay fill	ew-r	cl	ww	household	chamber pot	r-bd	1	1	ugtp	blue	unid: geometric/crosses			It is similar to the Doric pattern. A band of crosses with curved sides, on the rim and another band on the middle of the outer body.	
25	clay fill	ew-r	cl	ww	household	cylindrical vessel?	r-bd	1	1	incised		unid: geometric			Incised geometric design, depicting like a net.	
26	clay fill	ew-r	cl	ww	unid	unid hollow-ware	r-bd	1	1	moulding		unid: geometric			Moulded decoration inside consisted of vertical panels and a groove that indicates that the vessel would have a lid.	
27	clay fill	ew-r	cl	ww	table ware	plate	r-m-sh-bd-bs	1	1	ugtp	blue	unid: chinoiserie			Annoying because I saw before.	
28	scatter (yc)	st	bristol	bgst	household /storage	bottle	n-sh	3	1							
29	scatter (yc)	st	salt	sgst	household	penny ink bottle	half part	1	1							
30	scatter (yc)	st	plain	pgst	household /storage	wide mouth jar	mouth	1	1						A little bit orange peel, darker than plain glaze but lighter than salt glaze.	
31	scatter (yc)	st	plain	pgst	household	spout bottle	finish	1	1							
32	scatter (yc)	st	plain	pgst	household /storage	bottle	bd-bs	10	1							

33	scatter (yc)	st	salt	sgst	household /storage	bottle	bs	2	2							
34	scatter (yc)	st	salt	sgst	household /storage	bottle	n-sh-bd	3	0							
35	scatter (yc)	ew-r	cl	ww	tea ware	saucer	bd-bs	1	1	moulding		unid: geometric				It appears to have at least two vertical moulded parallel lines from the ring to the top of the saucer.
36	scatter (yc)	ew-r	cl	ww	household /table ware	unid hollow-ware/chamber pot?	bs	1	1							
37	scatter (yc)	hpp	cl	porc-h	tea ware	teacup	r-bd	1	1							
38	scatter (yc)	ew-r	cl	ww	tea ware	teacup	handle	1	0							
39	scatter (yc)	st	salt	sgst	household /storage	container?	bd	1	1							
40	scatter (yc)	ew-r	cl	ww	table ware	plate/platter?	r-m	1	1	ugtp	blue	Willow				It is considered a plate but also possible a platter, because of the straight profile of the rim, which would indicate that it is a big vessel.
41	scatter (yc)	ew-r	cl	ww	tea/table ware	unid hollow-ware	bd	1	1	ugtp	blue	Willow				It is considered a different vessel from C-40 because of the shape.
42	scatter (yc)	ew-r	cl	ww	tea ware	teacup	bs	1	1	ugtp	black	unid: floral/foilage				It is a pattern very similar to the Asiatic Pheasants.
43	scatter (yc)	ew-r	cl	ww	tea ware	saucer	r-bd	1	1	ugtp	black	unid: foliage				Thin line on the top of the rim and several branches with rolled leaves.
44	scatter (yc)	spp	cl	bc	tea ware	saucer	r-bd	2	1							
45	scatter (yc)	ew-r	cl	ww	table ware	unid hollow-ware	bd	1	1	ugtp	green	unid: floral/foilage /romantic				Inner and outer decoration. Two flowers and a branch noted on the outer surface and remains of a tree and landscape on the inner surface.
46	scatter (yc)	ew-r	cl	ww	tea ware	teacup	bd	1	1	ugtp	blue	Rhine				It is a small fragment identified by the bordered that characterised this pattern. On the outer surface an unidentifiable building is transfer printed.
47	scatter (yc)	ew-r	cl	ww	tea/table ware	plate/saucer?	bd-bs	2	0							They are considered part of the other vessels, on of which has remains of blue transfer printed decoration.
48	scatter (yc)	hpp	cl	porc-h	tea/table ware	unid flat ware	bs	1	1	ugtp	blue	unid: floral				A flower is the only motifs visible on this small fragment.
49	scatter (yc)	ew-r	cl	ww	tea/table ware	unid hollow-ware		1	1	ugtp	purple	unid: see plants				It is a small fragment, in which plants like corals or similar sea plants were noted.
50	scatter (yc)	ew-c	slip	rre	household /storage?	unid	bd	1	1							Cream slip on inner surface. Red clay.
51	scatter (yc)	ew-c	cl	ww	table ware/household	chamber pot/bowl?	r	1	1	ugtp	blue	unid: foliage/birds				Failed transfer print. Inner border consisted of stylised leaves (scrolls) and vignettes in which birds were features: one bigger bird with a large peak and open wing and a small one, as a baby

															maybe. Flowers and branches with thorns were noted on the outer surface. There are some black marks as written with a pen on one part of the rim.	
52	scatter (yc)	ew-r	cl	ww	tea ware	teacup	r-bd	1	1	ugtp	blue	unid: chinoiserie?			Inner and outer decoration. The scene consisted of trees and mountains in the foreground, water and boat and two boaters.	
53	footpath	ew-r	cl	ww	tea/table ware	unid hollow-ware	bd	1	1	ugtp	green/blue/turquoise	unid: floral			Inner and outer decoration consisting of branches of flowers.	
54	wall fill	ew-r	cl	ww	tea/table/household	unid hollow-ware	bd	1	1						It is undecorated but it is a small fragment as well.	

Faunal

Site	Code	Box	Bag	Prov	Species	Element	Side	Portion	Butchery unit	Taphonomy	NISP	MNE	MNBU	NOTES
NQ7	F	UO127	1	clay fill	cattle	unid	unid	unid	unid	broken	4	0	0	Small fragments considered as part of the other faunal elements recovered.
NQ7	F	UO127	2	clay fill	sheep	scapula	right	cartilage	chuck	broken	1	1	1	
NQ7	F	UO127	3	clay fill	sheep	metacarpal	right	prox, med	hindshank	broken	1	1	1	
NQ7	F	UO127	4	clay fill	sheep	metatarsal	right	prox, med	foreshank	broken	1	1	1	
NQ7	F	UO127	5	clay fill	sheep	radius	right	med	foreshank	broken, chopped	1	1	0	
NQ7	F	UO127	6	clay fill	cow	humerus	right	coronoid fossa, epycondile	foreshank	sawn	1	1	1	
NQ7	F	UO127	7	clay fill	cow	unid	unid	med	unid	sawn	2	0	0	They are considered part of the other cow bones.
NQ7	F	UO127	8	clay fill	cattle	unid	unid	med	unid/hindshank	sawn	2	0	0	They were probably tibia because of the slightly triangular c/s.
NQ7	F	UO127	9	clay fill	cow	tibia	left	condyles	hindshank	sawn	2	1	1	
NQ7	F	UO127	10	clay fill	sheep	skull	unid	frontal part	skull	broken	3	1	1	
NQ7	F	UO127	11	clay fill	chicken	femur	right	collum, caput, trochanter		broken	1	1		
NQ7	F	UO127	12	clay fill	sheep	rib	unid	med	loin	sawn, broken	4	2	1	
NQ7	F	UO127	13	clay fill	pig	rib	unid	med	loin	broken	1	1		
NQ7	F	UO127	14	clay fill	small ostrich foot	gastropod	cmpl	cmpl			1	1		75 mm in length
NQ7	F	UO127	15	clay fill	oyster	bivalve	unid	top			2	2		56 mm in length
NQ7	F	UO127	16	clay fill	oyster	bivalve	unid	bottom		broken	6	3		63 mm in length the complete one.
NQ7	F	UO127	17	clay fill	ro wedge shell?	bivalve	unid	fragment		broken	1	1		It is unsure the species based on the small fragment present.
NQ7	F	UO127	18	clay fill	ribbed slipper shell?	bivalve	unid	top/bottom		broken	2	1		28 mm in length.
NQ7	F	UO127	19	clay fill	turret shell	gastropod	unid	unid		broken	1	1		

NQ7	F	UO127	20	clay fill	bluish top shell?	gastropod	unid	unid		broken	1	1		It is black
NQ7	F	UO127	21	scatter (yc)	sheep	lumbar vertebra	unid	cavity of post end of bd, part of one wing	loin	broken	1	1	1	
NQ7	F	UO127	22	scatter (yc)	cattle	unid	unid	unid	unid	broken, worn, chopped	2	1	0	These fragments are very worn, broken and with marks to have been chopped.
NQ7	F	UO127	23	scatter (yc)	sheep	humerus	left	med, distal	foreshank	broken	1	1	1	
NQ7	F	UO127	24	scatter (yc)	cow	sacrum	unid	median crest	loin/rump	sawn	1	1	1	
NQ7	F	UO127	25	scatter (yc)	sheep	humerus	unid	med, distal	foreshank	broken	2	1	1	
NQ7	F	UO127	26	scatter (yc)	unid	mandibula	unid	fragment	skull	broken	1	1	1	
NQ7	F	UO127	27	scatter (yc)	sheep	tibia	unid	med	hindshank	broken	2	1	1	It was identified as tibia because of the triangled cross section.
NQ7	F	UO127	28	scatter (yc)	sheep	radius	right	med	foreshank	broken	1	1	0	
NQ7	F	UO127	29	scatter (yc)	sheep	femur	left	lat supracondyloid cres	hindshank	broken	1	1	0	
NQ7	F	UO127	30	scatter (yc)	sheep	metacarpal	left	prox, med	hindshank	broken	1	1	0	
NQ7	F	UO127	31	scatter (yc)	sheep	rib	unid	head, med	loin	broken	1	1	1	
NQ7	F	UO127	32	scatter (yc)	pig?	rib	unid	head, med	loin	broken	2	2	1	
NQ7	F	UO127	33	scatter (yc)	turret shell	gastropod	unid	cmpl		broken	2	2		40 and 30 mm in length each one.
NQ7	F	UO127	34	scatter (yc)	mussel?	bivalve	unid	unid		broken	1	1		
NQ7	F	UO127	35	scatter (yc)	oyster	bivalve	unid	bottom		broken	4	2		
NQ7	F	UO127	36	scatter (yc)	oyster	bivalve	unid	top and bottom			2	1		85 mm x 76 mm
NQ7	F	UO127	37	scatter (yc)	unid	gastropod	unid			broken	1	1		27 mm
NQ7	F	UO127	38	clay fill	unid	teeth	unid	unid	skull	broken	1	1	1	

Glass⁹

Bag	Prove	Colour	Portion	Class	Common name	Details	NISP	MNE	MNV	Type	Marks	Embossing	Date	Notes	Reference
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⁹ The following columns have been removed from this table: Site, code, class, UO box# (all are stored in OU127), bag # and photo ID.

1	clay fill	og-d/black	bd	alcohol	black beer	bd fragments	19	0	0	dm	stippled			
2	clay fill	og-d/black	bs	alcohol	black beer	bs fragments	14	1	1	dm				It is impossible to determine the diameter.
3	clay fill	og-d/black	bs	alcohol	black beer (quart)	ro heel, krc bs	5	5	5	dm	stippled			85 mm in diameter base
4	clay fill	og-d/black	bs	alcohol	black beer (quart)	ab heel, kdo bs	2	2	2	dm				Probably they measured around 85 mm in diameter.
5	clay fill	og-d/black	bs	alcohol	black beer (quart)	ro heel, krc bs	1	1	1	dm				80 mm in diameter base.
6	clay fill	og-d/black	bs	alcohol	black beer	ro heel, krc bs	1	1	1	dm				70 mm in diameter base.
7	clay fill	og-d/black	bs	alcohol	black beer	ro heel, krc bs	1	1	1	dm	stippled			75 mm in diameter base.
8	clay fill	og-d	bd-bs	alcohol	case gin	ro heel	1	1	1	dm	hb, vb, stippled			
9	clay fill	og-d/black	bs	alcohol	black beer	ro heel, krc bs	1	1	1	dm				70 mm in diameter base more or less.
10	clay fill	ag-l	bs	unid	unid	kdo bs	4	4	4		air bubbles			
11	clay fill	ag-l	finish	non_alcoholic	torpedo	blob top	1	1	1	2 pc m	vn			
12	clay fill	ag-l	bd	condiment/food	sauce bottle?	bevelled body	1	1	0		stippled			
13	clay fill	fg	bd	alcohol	ring seal	bd fragments	3	0	0	turn-m	stippled, patina			
14	clay fill	fg	bs	alcohol	ring seal	kpa w m bs	3	2	2	turn-m	stippled			
15	clay fill	og-d/black	finish	alcohol	black beer	ap ft/u/bead	1	1	0					
16	clay fill	og-d/black	finish	alcohol	black beer	ap blob/v/skirt	1	1	0		wrench-n			Wire and cork remained as closure system in situ.
17	scatter (yc)	fg	bd	alcohol	ring seal		1	1	1	turn-m	patina			
18	scatter (yc)	bg	bd-bs	alcohol	black beer (pint)	st bd, ro heel, kdo bs	1	1	1	dm	pimple			57 mm in diameter base.
19	scatter (yc)	bg	bd-bs	alcohol	black beer (quart)	st bd, ro heel, krc bs	1	1	1	dm	hb			75 mm in diameter base. A big incision on the top of the base.
20	scatter (yc)	bg	bd-bs	alcohol	black beer	krc (some of the bases)	12	2	5	dm	stippled			At least 5 MN because of the number of bases.
21	scatter (yc)	bg	bd-bs	alcohol	black beer (large squat)	st bd, ro heel, krc bs	1	1	1	dm	stippled			82 mm in diameter base.
22	scatter (yc)	og-l	bd	unid/alcohol?	unid	fragments	2	1	1		stippled			It is impossible to determine the particular function or form, although it is clear that the glass is lighter, so it is not part of the other black beer or ring seal bottles recovered.

23	scatter (yc)	bg	n	alcohol	black beer (large squat)	cc n	1	1	0	dm	patina			It is considered part of the G-21	
24	scatter (yc)	bg	finish	alcohol	black beer	ap ft/v/skirt lip	2	1	0	dm					
25	scatter (yc)	bg	finish	alcohol	black beer	ap ft/u/bead lip	1	1	0	dm					
26	scatter (yc)	bg	finish	alcohol	black beer	ap ft/v/skirt lip	2	2	0	dm				The closure through the use of a wire remains in situ as well as another copper wire from another of the finishes.	
27	scatter (yc)	amb	bs	alcohol?	beer?	ro heel, dcc bs	1	1	1			[...]LO		PORTOBELLO? Unsure	
28	scatter (yc)	og-d	bd-bs	alcohol	case gin		5	2	3	dm	patina, air bubbles			At least MN 0 because of the number of bases.	
29	scatter (yc)	fg	mamelon	alcohol	ring seal	mamelon	1	1	1	turn-m	stippled				
30	scatter (yc)	ag-d	bd-bs	alcohol?	ring seal	st bd, ro heel, kpa w m bs	1	1	1	turn-m	patina, vb, hb			70 mm in diameter base.	
31	scatter (yc)	ag-l	bd-bs	unid/food stuff	unid/pickle jar?	square c/s, ab heel, kdo bs	2	1	1	2 pc m w c b	air bubbles				
32	scatter (yc)	ag-l	bs	unid	unid	kdo bs	1	1	1	2 pc m w c b?	patina	[...] GOI? Or GOL?			
33	scatter (yc)	fg	bd	alcohol	ring seal	st bd	1	1	0	turn-m					
34	scatter (yc)	cl	finish	foodstuff?	wide mouth jar	angled and wide lip, st and short n	1	1	1	turn-m?	hn				
35	scatter (yc)	cb	bd	pharmaceutical	Castor oil?		1	1	1	2 pc m	hb				
36	scatter (yc)	green	bd-bs	alcohol	ring seal (squat)	ro sh, st bd, ro heel, kpa w m bs	1	1	1	turn-m	hb, air bubbles			83 mm in diameter base.	
37	scatter (yc)	ag-l	bd	structural	window glass	fragment	1	1	1		patina			2 mm in thickness	
38	scatter (yc)	ab-l	bd	pharmaceutical/personal	bevelled pharmaceutical	bevelled body	1	1	1		patina				
39	scatter (yc)	cl	bd	tableware?	unid hollow-ware	press moulded body	1	1	1	press mould	stippled			It looks like diamond patterned. But the surface is very worn.	
40	footpath	fg	bd-bs	alcohol	ring seal (large)	st bd, ro heel, kpa w m bs	1	1	1	turn-m	patina, air bubbles			85 mm in diameter base.	
41	wall fill	bg	bd-bs	alcohol	black beer (quart)	st bd, ro heel, krc bs	2	1	1	dm	patina, stippled			84 mm in diameter base.	
42	wall fill	og-d	bs	alcohol	case gin		1	1	1	dm	stippled	slightly embossing consisting of a cercle			

NQ7	MC	UO127	6	clay fill	white clay	personal	smoking pipe	cutty?	bowl	2 pc	cutty	n/a	20 mm in diameter and 32 mm in length of bowl.	no decoration	n/a	unused	n/a		
NQ7	MC	UO127	7	spoil	white clay	personal	smoking pipe	n/a	stem	n/a	n/a	n/a	5 mm in diameter stem.	no decoration	n/a	unused	n/a		