

7 NORWICH QUAY, LYTTELTON: REPORT ON ARCHAEOLOGICAL MONITORING

NZHPT AUTHORITIES 2012/108EQ & 2012/256EQ

ANDY DODD AND KATHARINE WATSON
UNDERGROUND OVERGROUND ARCHAEOLOGY LTD

NOVEMBER 2012

UNPUBLISHED REPORT FOR CERA

INTRODUCTION

Following the Canterbury earthquakes of 2011 the building at 7 Norwich Quay, Lyttelton, was demolished (Figures 1 and 2). On 21 July 2011 the New Zealand Historic Places Trust issued an emergency authority (2012/108eq) under section 11 of the Canterbury Earthquake (*Historic Places Act*) Order 2010 to CERA. This authority was issued to allow CERA to complete the demolition of the building and remove the concrete foundations. An authority was required as the building at the site (the former Lyttelton post office) was built prior to 1900 and was afforded the same status as a below ground archaeological site. As per the conditions of this authority, the demolition of the building and removal of the foundations was monitored. A second archaeological authority (2012/256eq) was required after a Māori archaeological site was discovered under the building.

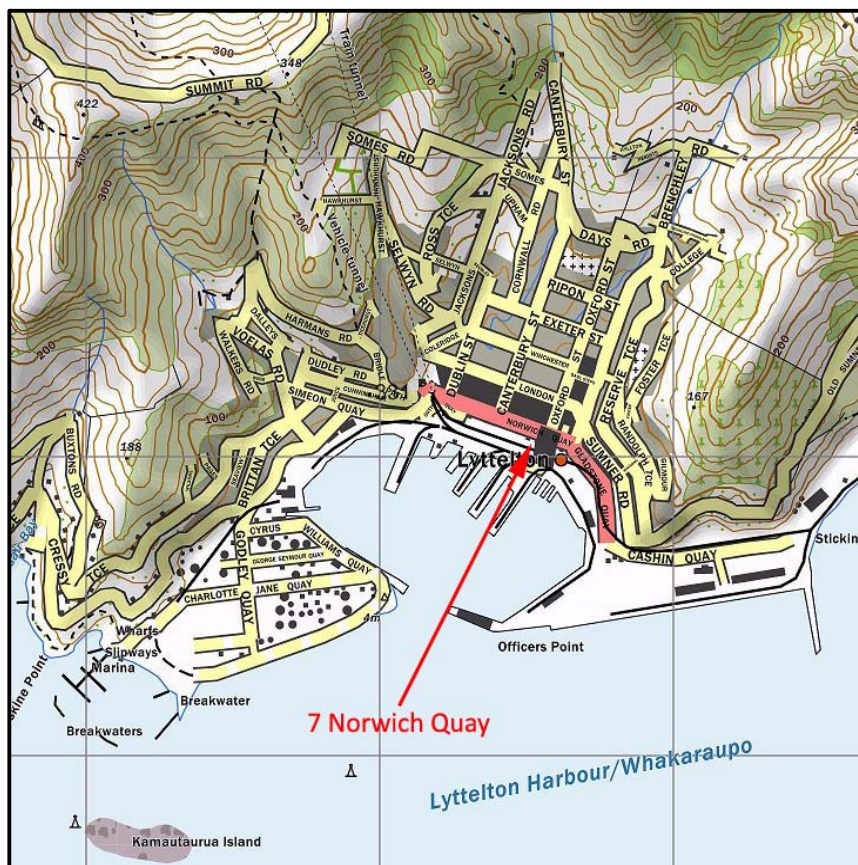


Figure 1. Lyttelton, showing the location of 7 Norwich Quay.

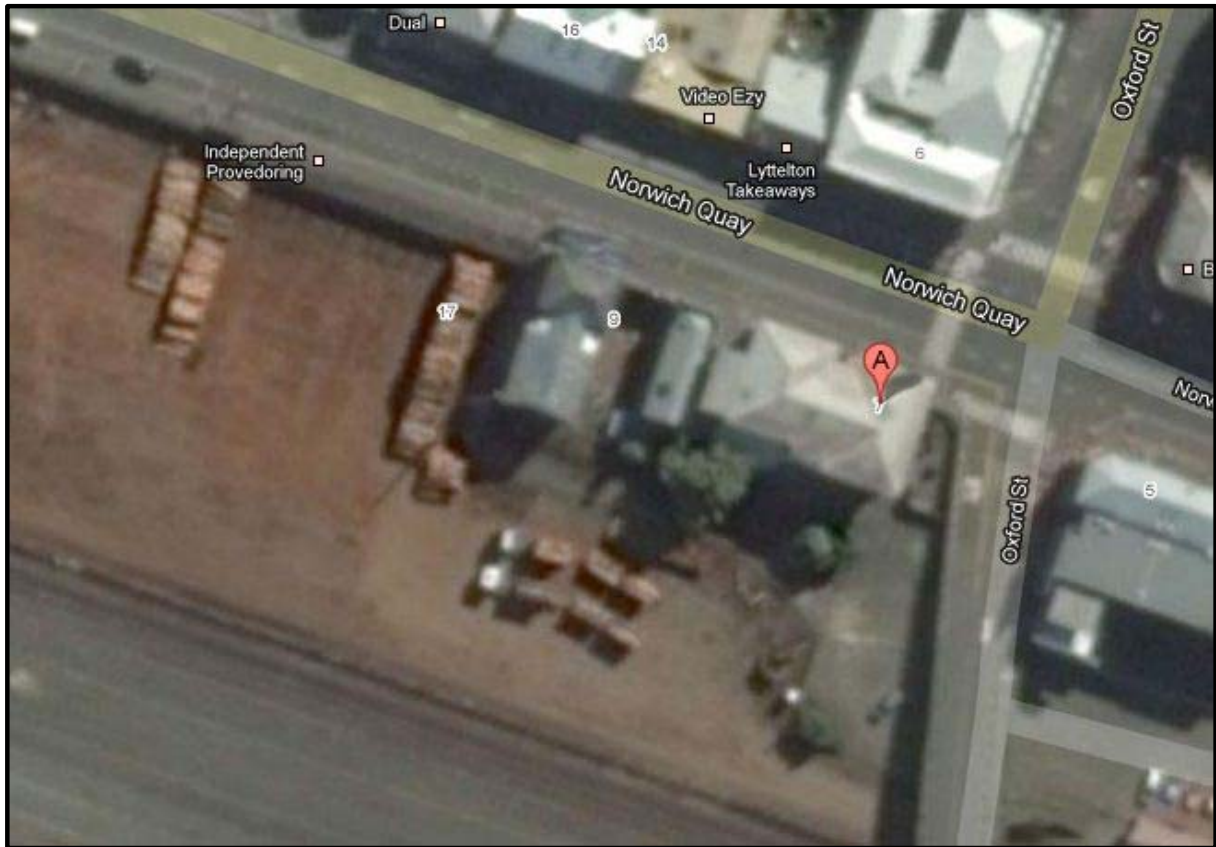


Figure 2. 7 Norwich Quay prior to the earthquake (marked with a red pin). Image: Google Maps.

HISTORICAL BACKGROUND

The first occupants of the Lyttelton area included Waitaha and, from about the 16th century, Ngāti Mamoe (Anderson 1998:22-23). The area around Lyttelton was the location of a Ngāti Mamoe village known as Ohinehou, and the wider harbour was referred to as Whangaraupo, or harbour of raupō (Burgess 2009:7). By the 18th century Ngāi Tahu had displaced Ngāti Mamoe at Lyttelton, and their principal settlement was located at Rapaki (Anderson 1998:38).

Lyttelton harbour was renowned for its seasonal shark fishing, and the settlement at Ohinehou was a mahinga kai, or resource gathering area, for the pioki or gummy shark, which was dried and traded (Rewi Couch, pers. comm. 2011). By the time the first Europeans arrived in the area the settlement at Ohinehou appears to have been abandoned. Visiting French whalers described settlements at Whangaraupo as “a cluster of huts and some whata on which were stores of dried fish, sacks of kumara and cakes of roasted fernroot” (Anderson 1998:151).

In December 1848, New Zealand Company principal agent William Fox and the Canterbury Association’s Captain Joseph Thomas arrived in Lyttelton harbour on board the cutter *Fly*. Survey of the land around the harbour commenced shortly after and by August 1849 the Crown purchase of the Port Cooper Block was concluded. Lyttelton was gazetted as a port of entry on 30 August 1849, and by January 1850 a jetty 150 feet in length and 15 feet wide had been erected on the foreshore. By 1851 Lyttelton was able to boast “wide streets, neat houses, shops and stores, sea wall and jetty...” (Scotter 1968:20-26).

Scotter (1968:31) continues:

...the esplanade behind the sea wall was divided into 'wharves' by the merchants who rented sections of it from the association, but discharging goods on to the wall involved beaching boats or lighters below it except possibly at full tide. An 'extensive wharf and warehouses adjoining the jetty' which a merchant, John Willoughby, advertised consisted apparently of 50 feet of sea wall together with the esplanade behind it, for which he paid rent of £25 a year. Longden and Le Cren asked permission to erect a small building on the 'wharf' they rented, while complaining that other firms were allowed to land and store timber at the 'wharf' at the other end of the beach without any charge being made for their doing so, which is hardly fair to those who pay a large rent for their portion of the sea wall. The damage to the wall in June 1851 could not have been a serious hindrance; its repair was undertaken a year later.

In 1865 four contracts were let for the construction of harbour improvements:

- 1) reconstructing 150 feet of the end of the government jetty;
- 2) continuing it on the screw pile principle;
- 3) building an embankment faced with a wooden sea wall 700 feet long from the reclamation at the tunnel mouth to the old jetty; and
- 4) erecting a short jetty at the western end of this wall (Scotter 1968:74).

The decision to position the railway yards at the water's edge necessitated the reclamation of new land subsequently referred to as the 'station-ground' (Pierre 1964:95). A new seawall running parallel to Norwich Quay some 100 metres further out into the harbour was constructed to contain the reclamation. The first stage of the reclamation used spoil from the excavation of the railway tunnel, which opened in 1867 (Figure 3 and Figure 4 show the development of the waterfront in the 1860s). By 1868 the Lyttelton jetty had been completely enclosed within the reclamation.

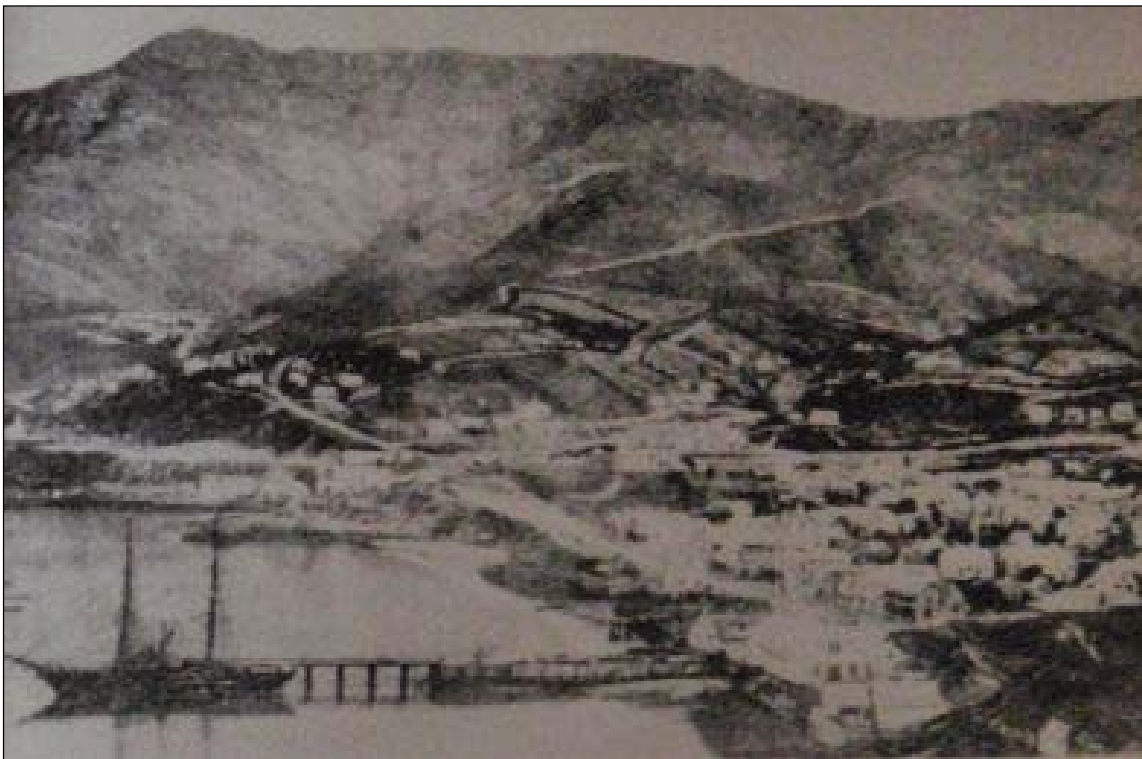


Figure 3. Lyttelton waterfront in 1862. Image: Pierre 1964:95.



Figure 4. Lyttelton waterfront in 1868. Image: Pierre 1964:96.

Lyttelton's first post office and customs house were established in an old building on Norwich Quay in 1849. This was subsequently replaced by a dedicated post office in 1851, located in the former market reserve at the east end of Norwich Quay. In 1875 a new post office was built on the corner of Oxford Terrace and Norwich Quay (i.e. 7 Norwich Quay), and operated there until 1976, when services were relocated to the corner of Canterbury and London streets (Figure 5). The building was still standing at the time of the February 22 earthquake but was later demolished as a result of earthquake damage.

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 southwest 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 abacus. Below the window sills is a moulded and dentiled string course 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 a 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 floor 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 department, 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. Further along the corridor is the harbor-master's room, fronting Oxford street, where he will be able to see the signals from the flag pole, and also part of the harbor. Opposite the harbor-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 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 Wm. 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 fittings 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.

Figure 5. A description of the post office when almost complete (*Press* 12/7/1875: 2).

BUILDINGS ARCHAEOLOGY

The building at 7 Norwich Quay (the former Lyttelton post office) was demolished by Paul Smith Earthmoving Ltd from 4-8 August 2011, with Katharine Watson monitoring the work.

The former post office was a two storey brick building, with Portland cement decorative detailing (which by 2011 was painted cream to look like Oamaru stone), that faced north onto Norwich Quay. The building had a basement underneath and a corrugated iron roof. The basement had been built into the bank on its north and east sides and thus the south elevation of the building was three-

storied (with the ground floor being the basement of the north elevation). For simplicity's sake, the floors are referred to as basement, ground floor and first floor. The basement was used as the holding cells for the Magistrate's Court from 1875 until the court moved to the Lyttelton Borough Council building when it opened in the late 1880s. A small lean-to had been built on the south end of the west elevation.

Construction techniques

Walls

As noted above, the building was brick and the walls on both the ground and first floors were quadruple brick, laid in English bond (Figure 6). This is unusual in 19th century brick buildings, as the number of bricks per course generally reduces with each floor of the building. It is tempting to suggest that this was not the case in the post office because it was a government building and thus well built, with no expense spared. The walls were reinforced with hoop iron (Figure 6). The bricks were 'S' bricks, and some of those used under the Portland cement were special shaped bricks (Figure 7 and Figure 8). These bricks were made by Smith and Stead (Bickler 2007).



Figure 6. The brick walls of the first floor of 7 Norwich Quay, showing the English bond brickwork and the hoop iron used as reinforcing. Note, however, that in the 16 courses of brickwork shown, there is only one layer of hoop iron reinforcing.



Figure 7. An 'S' brick, made by Smith and Stead.



Figure 8. A shaped brick from 7 Norwich Quay.

The bricks used in the lean-to were 'W' bricks, made by the Wigram brickworks, which operated from 1886 on (Figure 9; Bickler 2007). As such, the lean-to must have been built after 1886. The walls of the lean-to were double-brick and were laid in English bond (Figure 10).



Figure 9. A 'W' brick from the lean-to.



Figure 10. The north wall of the lean-to, showing the brickwork.

The observed internal walls were all brick (the scale and extent of demolitions in Christchurch at this time meant that it was not possible to observe the demolition of 7 Norwich Quay continuously). These walls were double brick and some appeared to have cavities in them (Figure 11). It is likely that these were related to the air flues mentioned in the *Press* (Figure 5; *Press* 12/7/1875: 2).



Figure 11. An interior wall on the first floor, showing a cavity that was probably related to the air flues used to ventilate the building.

Roof

Each wing of the main building had a hipped roof, and the roof trusses were king trusses (Figure 12). Additional bracing had been added to at least one of the trusses (Figure 13), and some construction marks were observed on this. The trusses were held together by a mixture of metal strapping and nails, with a system of gibs and cotters used to fasten the truss (Figure 14 and Figure 15). Sarking sat on top of the purlins and under the corrugated iron.



Figure 12. The roof trusses in the east bay of 7 Norwich Quay.



Figure 13. A roof truss, with additional bracing. Note also the staining on the king post, which could be from lath and plaster.



Figure 14. A cut nail used in the construction of a roof truss.



Figure 15. Construction marks and the system of gibs and cotters used to fasten the truss.

Floors/ceilings

Several I-beams were removed from the building, and probably came from the ceiling/floor between the ground and first floors (Figure 16). No I-beams were observed in any of the external walls, but the I-beams protruded down into the ground floor space and there were metal columns in this space that supported the I-beams (Figure 17). The beams bore the mark 'CARGO FLEET ENGLAND', indicating that they were made by Cargo Fleet Ironworks Company, an English company that operated from 1883-1928 (Grace's Guide 2012). As such, the I-beams were added to the post office after it was built. Cargo Fleet I-beams have also been recorded in a shop on Colombo Street in Christchurch (Watson 2012: 5).



Figure 16. Two Cargo Fleet I-beams that were bolted to a metal plate.



Figure 17. A metal column supporting an I-beam (the casing around the I-beam is visible) on the ground floor.

The floor joists of the ground floor had been left exposed in the basement, meaning that there was effectively no ceiling in this part of the building (Figure 18). Herring bone strutting had been used on the underside of this floor.



Figure 18. The basement, showing the form of the ground floor above. Note also the form of the arches above the doors.

Doorways and windows

A range of arch forms were observed in the building:

- the windows on the ground floor of the north and east elevations had segmental arches that were one course deep
- the windows on the first floor of the north and elevations had pointed arches that were two courses deep (Figure 19)
- the arches of the windows on the first floor of the south and west elevations were semi-circular arches that were three courses deep (Figure 20)
- the arch of the ground floor doors on the west elevation and the north elevation of the lean-to were three course deep segmental arches (Figure 21)
- the arches above the windows in the lean-to were two course segmental arches (Figure 21)
- the arches for the doors in the internal walls the arches on the internal walls of the basement were three course segmental arches (Figure 18) and the doorways were set into brick surrounds (Figure 22)
- the form of the arches over the internal doors varied, with some of the first floor having semi-circular arches that were two courses deep and some on the ground floor having arches that were three deep – not enough of the demolition was observed to know whether or not this was a consistent pattern



Figure 19. The first floor windows on the north elevation (these were the same as those on the east elevation).



Figure 20. The brick arches on the first floor of the west elevation (left) and the lean-to (right).



Figure 21. The form of the arches over the doors on the west elevation (left) and the lean-to (right).



Figure 22. Brick doorway in the basement.

Exterior

North elevation

The overall form of the north elevation had been modified little since 1875, although the clock tower that once stood on the northeast corner of the building was removed during the 20th century. The north elevation was divided into three bays, and the central bay, which contained the main entrance, was recessed (Figure 23). The main entrance consisted of double wooden doors (with glass panes in the upper half of the door) and two Corinthian columns on each side, complete with acanthus leaf capitals (Figure 24).



Figure 23. The north elevation of 7 Norwich Quay.



Figure 24. The main entrance to 7 Norwich Quay.

There were two other doors on the ground floor, one at the east end and the other in the centre of the west bay. The one at the east end was original but it is not clear if the other was also original. There were four sash windows (all with lugs), two each in the east and west bays. The doors and windows in the east and west bays were all set in the same Portland cement surrounds, with a

keystone at the apex. The doors and windows were connected by an acanthus leaf string course roughly half way up the windows (Figure 25). There was also a string course between the ground and first floors, which included dentils.



Figure 25. The acanthus leaf string course on the ground floor.

There were seven windows on the first floor, all of which were set in the same Portland cement surrounds. These were slightly pointed and had Corinthian columns on each side (Figure 19). The columns supported a vermiculated string course. There was a fourth string course immediately below the eaves of the building (Figure 26).



Figure 26. The string course immediately below the eaves of the building.

The north elevation had fake quoins on the corners of each bay, and those on the first floor were vermiculated.

East elevation

The east elevation was largely the same as the north elevation in terms of its appearance, with five windows on each floor (Figure 27). One of the windows on the first floor had been converted to a door, and a fire escape had been added to this elevation. The basement was also visible here, and there were no doors or windows in it.



Figure 27. The east elevation.

South elevation

The south elevation was very plain, with no decoration, and it is worth bearing in the mind that the 1875 description of the building notes that this elevation was covered in cement to prevent it from storm damage (Figure 5 and Figure 28). Further, this elevation would have been seen less by the public than the north or east elevations.

The first floor had originally had at least six sash windows, which had curved heads. Some of these had subsequently been converted to doors, to provide access to an enclosed balcony that had been added to this elevation. The first floor had at least five sash windows, with round heads. The bottom panes of these sash windows were two-light windows. The basement had a number of casement windows and at least one door.



Figure 28. The south elevation.

West elevation

Most of the original west elevation had been obscured by a two-storey lean-to added in the 1880s or later (Figure 29). This elevation had a door on the ground floor (Figure 21) and a sash window above (Figure 20). This door appeared to be original and had one diamond-head pane on the lower third and a glass panel above. The window was a sash window. The two floors were visually separated by a plain string course. The only other detailing on this elevation was a plain Portland cement window sill on the first floor window and a metal downpipe embossed with a floral motif (Figure 30). This was probably original.



Figure 29. The west elevation.



Figure 30. The downpipe on the west elevation.

Lean-to

The two-storey lean-to had partly collapsed in the earthquakes (Figure 29). The north elevation of this had a door on the ground floor (Figure 21) and a window above (Figure 20). The door was a timber board door with a fanlight above and appeared to be wider than a typical door. The plain string course on the west elevation of the main building continued at least along the north elevation of the lean-to.

Interior

The walls of the interior of the main building were clad in plaster with lath and plaster ceilings, while the ceiling of the lean-to was match-lined. Those doors on the ground and first floors that were seen were standard 19th century four panel doors.

Basement

The basement was inspected only briefly prior to demolition and little of it could be observed after demolition began, as the building was essentially collapsed into it. Plans of the building, however, were drawn in 1999 and were accurate for this area (Figure 31). Further, this area appeared to have been little modified with the passage of time. There were eight rooms, each walled with Portland cement, which had been lined with stone and the doorways formed with bricks (Figure 18 and Figure 22). The doors were original and were batten doors, with a heavy bolt and a cross cut out of the door (Figure 32). Graffiti, which appeared to be relatively modern, remained on the exposed floor joists above (Figure 33).

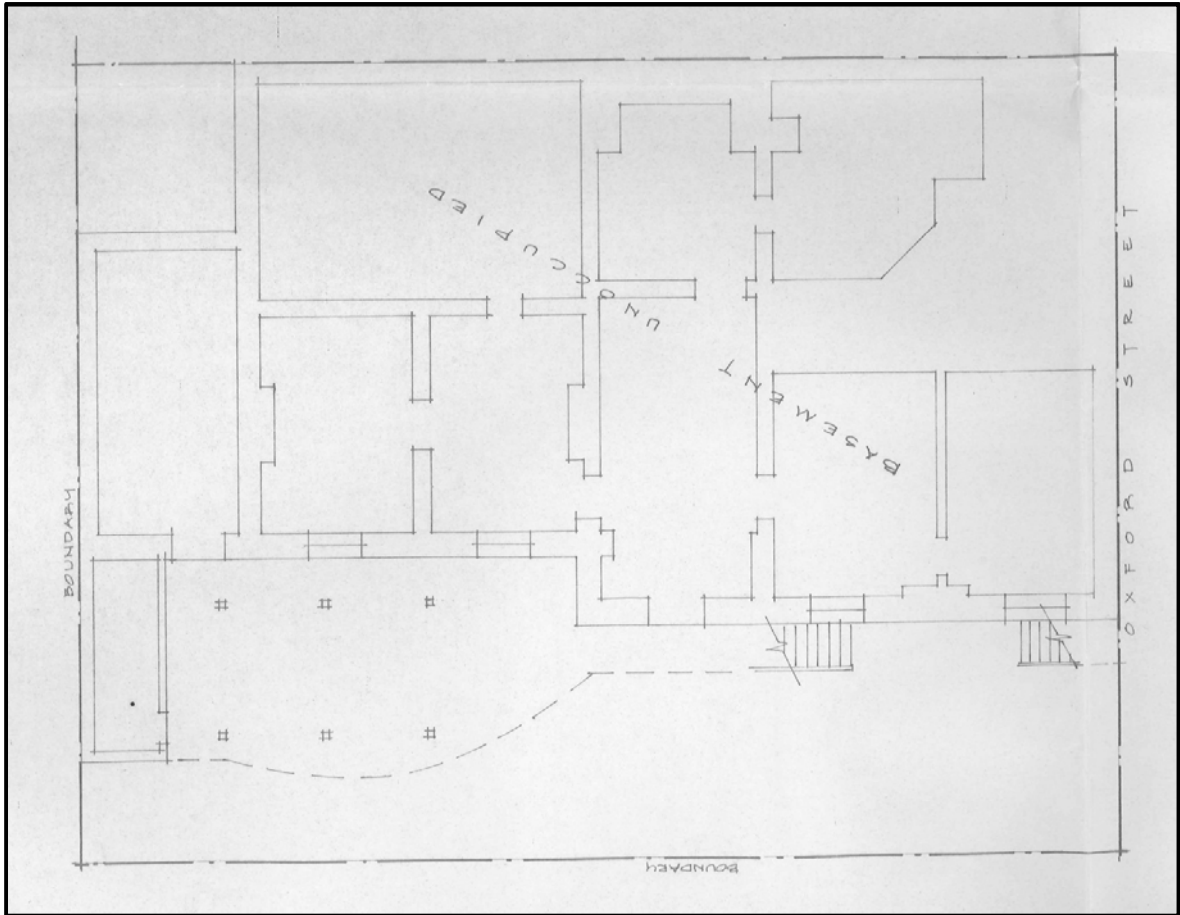


Figure 31. The floor plan of the basement (Hall & Mackenzie 1999).



Figure 32. A door in the basement area.



Figure 33. Graffiti on the ceiling of the basement.

Ground floor

The layout of the ground floor in 2011 was the same as shown in Figure 34, and this was broadly similar to what it had been in 1875 – while one wall had been removed, none had been added. The wall that had been removed was between the restaurant and the hall. Stairs remained in the entrance hall, which had a timber dado. The small room in the corner of the restaurant was in fact a safe, which bore the maker's plate 'S. WITHERS & CO./REGISTERED/TRADE MARK/WITHOUT WHICH NONE ARE GENUINE/WESTB BROMWICH' (Figure 35 and Figure 36). The room that this opened off (the 'restaurant' on Figure 35) had a timber dado and the metal columns discussed above. The capitals of these columns were decorated with acanthus leaves (Figure 37). The original fireplace remained on the south wall of the restaurant, complete with coal register (Figure 38). Fireplaces also remained in situ in the corner of the office, the bar and the room to the south of the bar (Figure 39). This last was different in design from that in the restaurant. The fireplace in the kitchen was not seen during the demolition.

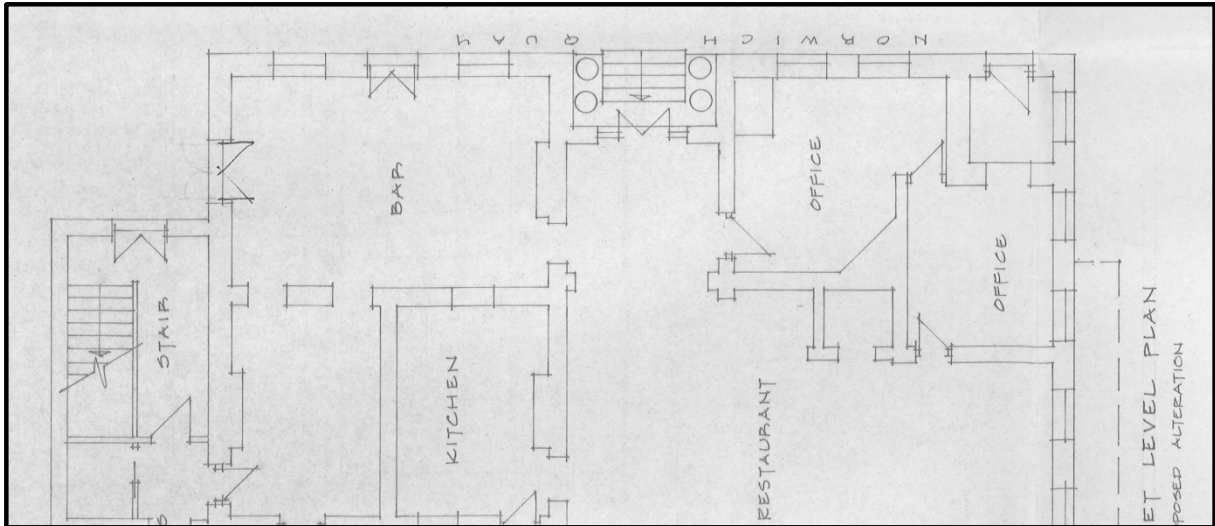


Figure 34. Alterations to the ground floor proposed in 1999 (Hall & Mackenzie 1999). The labels on this plan are used when discussing the rooms in the text. NB: The image quality is as supplied.



Figure 35. Left: The door into the safe. Note also the timber dado and the vermiculated quoins on either side of the door. Right: The safe.



Figure 36. The maker's plate on the safe.



Figure 37. The capital of one of the metal columns in the restaurant.



Figure 38. The restaurant fireplace.



Figure 39. The fireplace in the room to the south of the office. This did not have a coal register but the form of the fire surround was the same as that in the restaurant.

First floor

The first floor had been modified, but not as per the 1999 plans, and there was no indication that the space had been converted to apartments (i.e. there were no kitchens or bathrooms; Figure 40). The walls of the small room in the northeast corner had been removed, there was a wall in the north living space had not been removed and there were no internal walls in the south apartment (although there was evidence of where a wall had been removed – above the same wall that had been removed on the ground floor i.e. the east wall of the hall).

Three fireplaces remained in the building: a corner fireplace above the ground floor corner fireplace (Figure 41), a fireplace on the south wall above that in the ground floor office and a fireplace above that in the bar. The fireplace on the south wall was notable for being wider than the fireplace on the ground floor below (Figure 42).

Other features observed on the first floor were two arched doors in the hall (Figure 43).

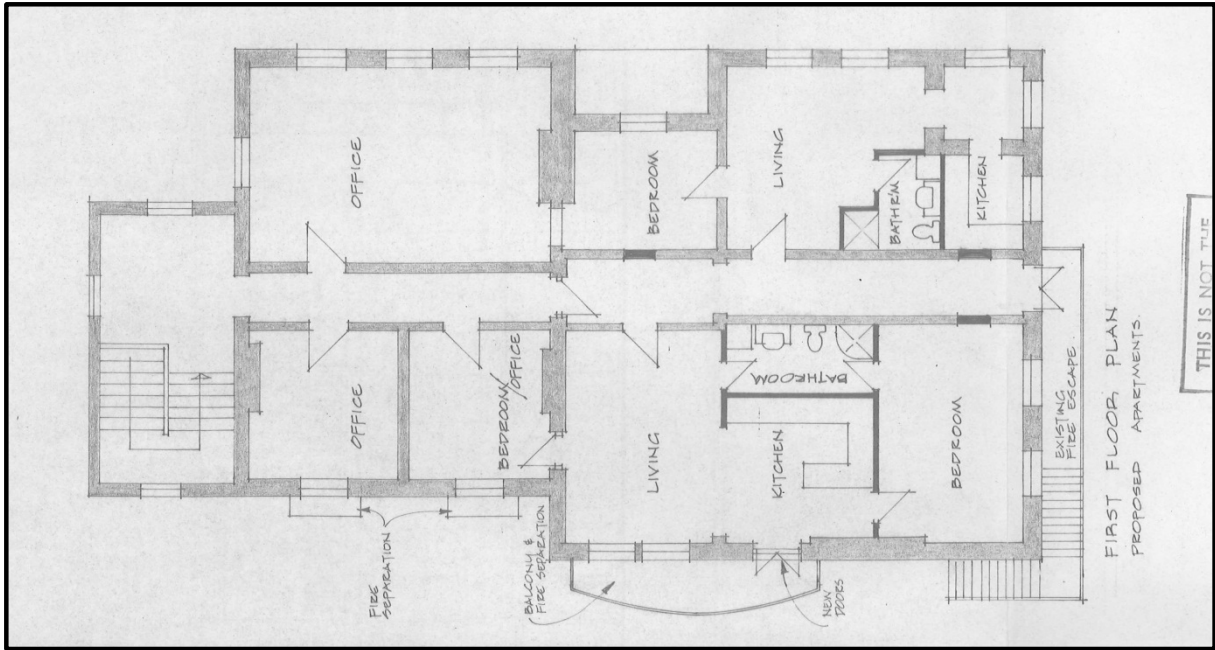


Figure 40. Alterations to the first floor proposed in 1999 (Hall & Mackenzie 1999). The labels on this plan are used when discussing the rooms in the text.



Figure 41. The first floor corner fireplace.



Figure 42. The ground and first floor fireplaces on the south wall of the building. Note the width of the first fireplace in relation to that on the ground floor.



Figure 43. An arched door in the first floor hallway.

Lean-to

The lean-to had two rooms on the ground floor and one on the first floor, and stairs that linked the two.

ARCHAEOLOGICAL INVESTIGATION

On 24 August 2011 the foundations of the building at 7 Norwich Quay were removed by Paul Smith Earthmoving Ltd using a 20 ton mechanical excavator fitted with a 1.2 metre wide ripping bucket, with Andy Dodd monitoring the work. The removal of the foundations uncovered the remains of a pre-contact Māori oven and midden deposits and a detailed archaeological investigation took place on 10-12 October 2011, with work undertaken by Andy Dodd and Rewi Couch (Ngāti Wheke). The removal of the foundations with periodic monitoring resumed once this was completed.

The foundations and concrete footings of the building were substantial and removal of these footings involved the excavation of a trench along the outside of the footings. It was during the excavation of this trench that Māori ovens were encountered. Surrounding the footings was a clay substrate with gravel inclusions.

The method of investigation involved recording the features exposed in the initial excavation trenches, scraping back the ground to the south of the area modified by the construction of the post office with a mechanical excavator using a straight-edged bucket to a level where individual features could be identified and investigated, and opening a 0.8 x 2 m wide trench along the line of the 1849 seawall. Features exposed were then excavated and samples taken for analysis, with the exception of Features 15 and 16, which were preserved under a concrete floor. Figure 44 and Figure 45 show the location of the features exposed during the archaeological investigation.

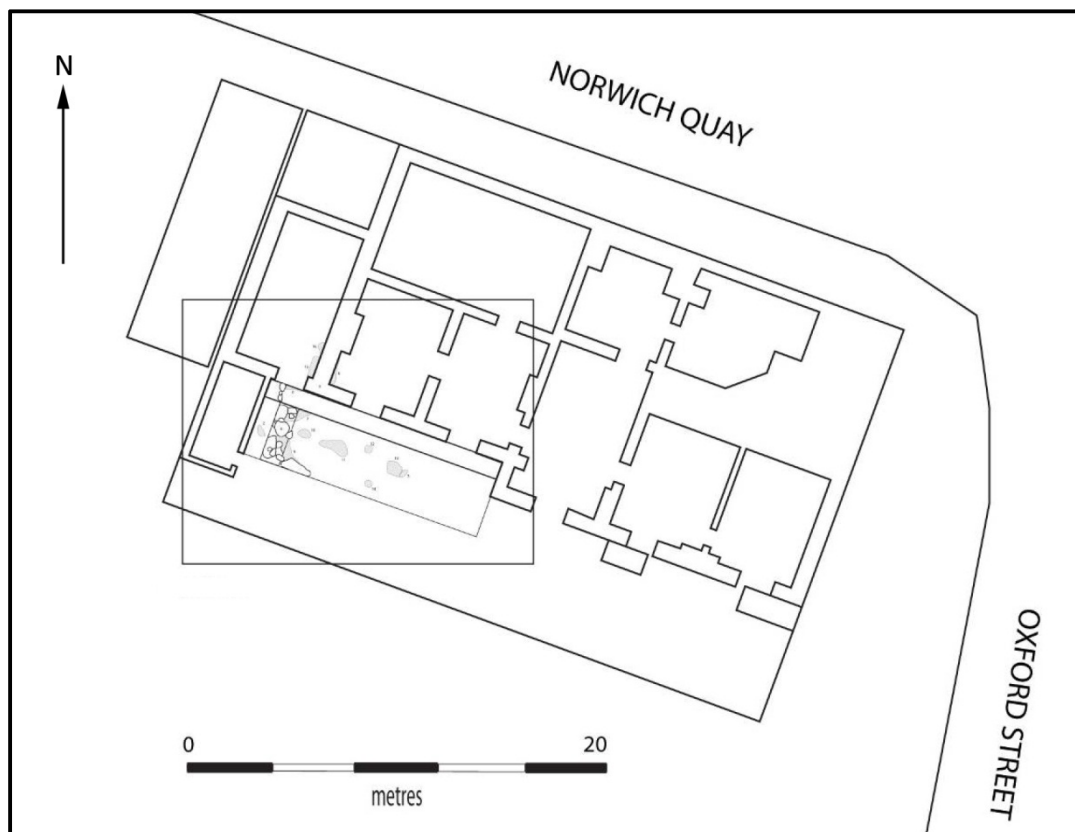


Figure 44. Plan of the foundations removed at 7 Norwich Quay. Figure 45 shows the features in more detail.

The removal of the foundations required excavation of the site to a depth of up to 2 m, and the site was subsequently battered back to the footpath on Norwich Quay to make the area safe for the public. Sixteen archaeological features were recorded during the removal of the foundations, and subsequent archaeological investigation at 7 Norwich Quay.

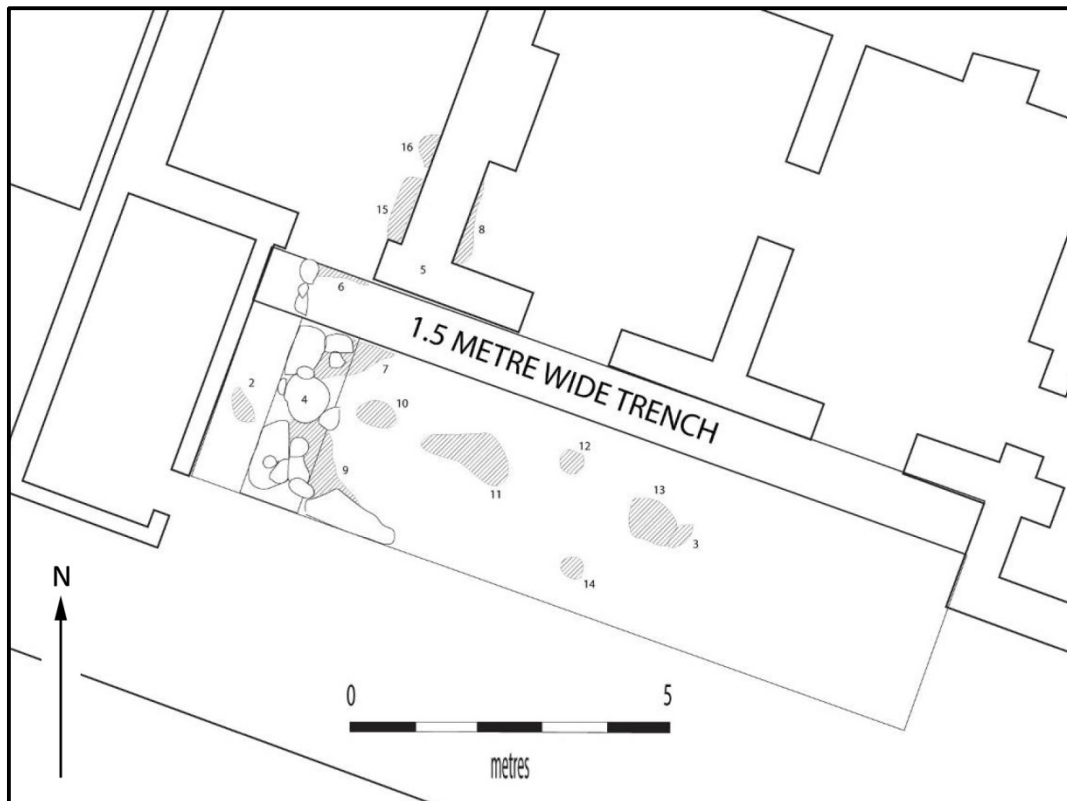


Figure 45. Detail of Figure 44, showing the features in more detail.

Feature 1

These were surface finds recovered during the initial phase of monitoring and were from insecure contexts, but were probably associated with the later historic phase of occupation during the late 19th and early 20th centuries. Artefacts included glass bottle bases, buff earthenware fragments, nails and a sheep bone.

Feature 2

Feature 2 was a discrete accumulation of historic artefacts found after the initial scrape down. It covered an area approximately 500 x 300 mm and contained artefacts indicative of 19th century archaeological deposits and likely date from the second or third phase of occupation on the site (the phases of occupations are outlined in the 'Discussion' below).

Feature 3

Feature 3 comprised a concentration of broken window glass in a shallow deposit of yellow grey sand near the east end of the initial scrape-down area. Feature 3 appears to have truncated Feature 13.

Feature 4

Feature 4 was a seawall, which is believed to date from 1849 (Figure 46). The wall comprised an alignment of small to medium-sized rounded boulders on a roughly north-south orientation. Further investigation of the area under the concrete pad to the west of this feature, and of the unmodified ground to the south, may help to further define the orientation and extent of the wall. The second trench running roughly north-south was excavated to assist with the definition of this feature. Remnants of a seawall were also found during the archaeological monitoring of the section at 11 Norwich Quay to the west carried out by Opus International Consultants (N. Cable, pers. comm.).



Figure 46. Feature 4 exposed in excavation with Feature 6 in the background. Feature 6 was truncated by the 1849 seawall, and both were subsequently truncated by the 1875 concrete foundations (Feature 5; 11.10.11).

Feature 5

Feature 5 was the footings of the 1875 post office. At 2 m deep and 1 m wide, these were substantial, given the size of the building. It is possible that, being an early application of concrete technology in building, the architect and builders overcompensated with the volume required. Further examination of concrete foundations of similar period buildings around Christchurch and Lyttelton may be able to shed further light on this hypothesis.

Feature 6

Feature 6 was an oven exposed on the north side of the trench (Figure 49 and Figure 48). This feature was largely destroyed during the excavation of the trench (literally taken out with one bucket scoop). The form and profile of Feature 6 was able to be recorded because of the dark stain the oven deposit left on the south side of the concrete foundation. On the basis of form, appearance and stratigraphy it is probable that Features 6 and 7 are contemporary, and possibly even two ends of the same feature. Feature 6 had been truncated twice during the history of the site, the first time

being the construction of the 1849 seawall (Feature 4), and the second the excavation for the concrete foundations of the 1875 post office (Feature 5).



Figure 47. Feature 6, exposed on the south side of the concrete foundation (Feature 5; 11.10.11).

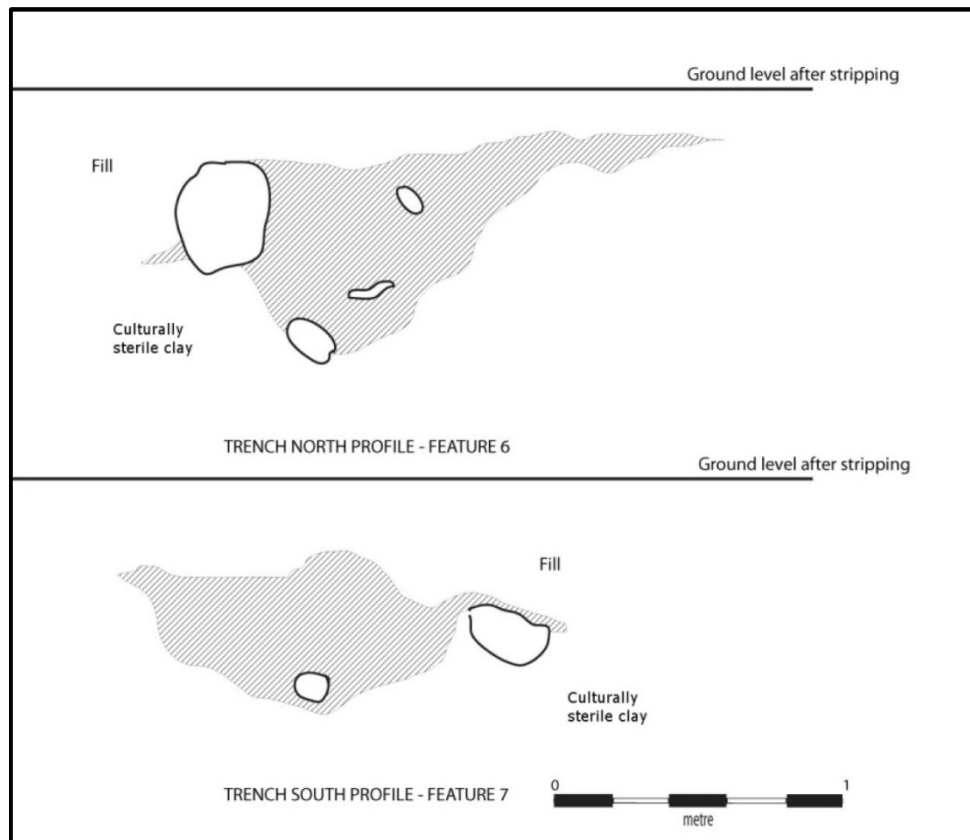


Figure 48. Profiles of Features 6 and 7 exposed in trench

Feature 6 was 1.5 m long and up to 600 mm thick, tapering away on the eastern end. The depth from the artificially reduced ground surface at the top of the concrete foundations was between 200 and 300 mm. Feature 6 contained the largest sample of shell of all the features, including catseye, pāua, Bluff oyster, blue mussel, silver pāua, turret shell, green lipped mussel, and speckled whelk (there is a full list of the faunal remains in Appendix 3). Fish species included shark/ray and red cod, and bird species included New Zealand wood pigeon and species that were not able to be identified from the Otago University reference collection. Rat and dog bone were also present in the sample.

Feature 7

As discussed above, Feature 7 may have been part of Feature 6, exposed on the south side of the west-east trench excavated to remove the concrete footing (Figure 49). The sample of cockle shell selected for radiocarbon dating was taken from this feature and returned a calibrated date of AD 1465-1660 at 95% confidence. As with Feature 6, Feature 7 was partially destroyed during the initial trench excavation, and had been truncated by the 1849 construction of the seawall (Figure 48 and Figure 50). Feature 7 was 1.2 m long and up to 500 mm thickness, tapering away on the eastern end. The depth from the artificially reduced ground surface at the same level as the top of the concrete foundations was between 200 and 300 mm. Feature 7 contained a reasonable quantity of shellfish fragments including remains of Bluff oyster, catseye, pāua, blue mussel, turret shell, mud snail and pipi. Bird bone recovered from this feature included little shag, spotted shag, tui, New Zealand wood pigeon, blue penguin, moa bone and parakeet. Fish bone included kahawai, red cod and ling. As with Feature 6, rat and dog bone were also present.



Figure 49. Rewi Couch excavates Feature 7 alongside the 1849 seawall (14.10.11).



Figure 50. Feature 7, truncated by the 1849 seawall.

Feature 8

Feature 8 was located on the opposite side of the 1875 concrete foundation from Feature 6. As a result, this feature had been truncated by the post office construction and only a small portion remained (Figure 51). This was a band of dark stained soil containing shellfish and fish bone, which was up to 250 mm thick and was 100 mm below the top of the foundations. Shellfish remains included blue mussel, catseye and pāua. Fish species were limited to sharks and rays. Bird species included New Zealand wood pigeon and moa bone, and rat bone was also present.



Figure 51. Feature 8 viewed from the east side (11.10.11).

Feature 9

Feature 9 was an oven rake-out, and contained fish and bird bone as well as a piece of 'Willow' pattern ceramic. The rake out comprised a deposit 100 to 250 mm thick. Shellfish species identified in Feature 9 included Bluff oyster, mud snail, catseye, turret shell, blue mussel, green lipped mussel, pipi, white rock shell, cockle, pāua and venus shell. Bird species included blue penguin, New Zealand falcon, parakeet, moa, tui, kiwi, and specimens which were not able to be identified from the Otago University reference collection. Fish species included shark and kahawai, and rat bone was also present. A small fragment of ceramic was also present in this feature, and is likely to be the result of post-depositional disturbance.

Feature 10

Feature 10 was a shallow scoop of heavily fragmented midden and blackened soil covering an area 200 x 300 mm containing a limited quantity of shell and bone. Features 10-15 were encountered during the initial scrape down of the site, and were probably a smearing of the upper parts of intact archaeological deposits created during the preparation of the site for the construction of the post office in 1875. Feature 10 included remains of tui, parakeet, New Zealand wood pigeon, Bluff oyster, blue mussel and catseye.

Feature 11

Like Feature 10, Feature 11 was a shallow smear of heavily fragmented midden and blackened soil, and was probably re-deposited in its present context during the preparation of the site in 1875. The shellfish were not able to be identified to species, being too heavily fragmented.

Feature 12

Feature 12 was also a shallow deposit of heavily fragmented shell and black stained soil covering an area about 300 mm in diameter. This feature contained crushed mussel, catseye and fish bone. Shellfish species present included pāua, blue mussel, cockle, catseye and Bluff oyster. Also present was a small quantity of foetal pig bone. This is possibly a post-depositional inclusion, but may also represent archaeological deposits from the contact period of New Zealand's history.

Feature 13

Feature 13 was a shallow deposit of black stained soil smeared over an area 800 x 500 mm (Figure 52). It included fragments of crushed mussel and catseye, as well as a broken stone adze, and a small amount of kōkōwai (red ochre).



Figure 52. The site after the initial scrape down, with the broken adze lying in situ next to the 1 m scale (10.10.11).

Feature 14

Feature 14 was a shallow scoop of heavily fragmented midden containing mussel shell and some fish bone in a dark stained soil covering an area 400 x 600 mm.

Feature 15

Feature 15 was encountered as a thin lens of midden in blackened soil up to 60 mm thick (Figure 54 and Figure 53). Shellfish from Feature 15 included Bluff oyster, blue mussel, catseye, chiton sp., pāua

and pipi. Bird bone from this feature included tui, as well as unidentified specimens that had been gnawed by rats. It was not necessary to excavate Feature 15 because the concrete pad above it was not being removed at this time.



Figure 53. Feature 15 exposed under the concrete slab on the west section boundary.

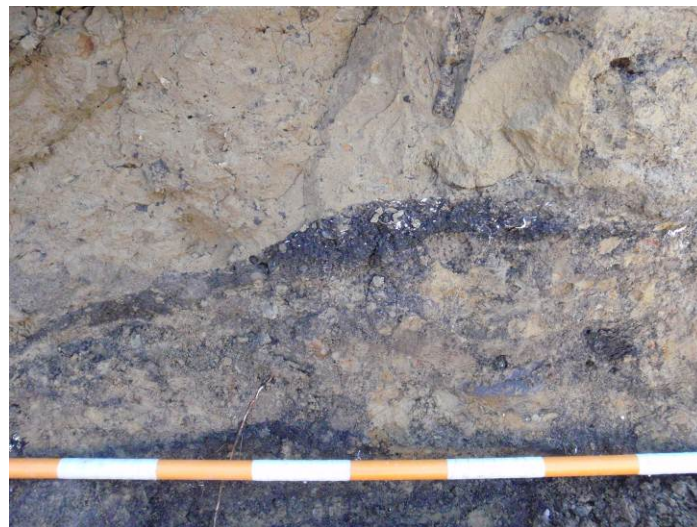


Figure 54. Close-up of Feature 15.

Feature 16

Feature 16 was located alongside Feature 15 and comprised a thin lens of midden in blackened soil. Fish species recovered from this feature included elephant fish and shark/ray. Shellfish species included catseye, mud snail and pipi. A medium-sized ulna from an unidentified bird species was also recovered. It was not necessary to excavate Feature 16 because the concrete pad above it was not being removed at this time.

ARTEFACT ANALYSIS

In total, 92 artefacts, including one stone adze, were recovered during the archaeological monitoring at 7 Norwich Quay. All artefacts removed from the site were sorted into material categories (glass, ceramics, metal, faunal and miscellaneous). Artefacts in each category were then analysed and identified according to various attributes. Specific analytical methods used for each material category are described below (Appendix 1). In each category, the number of individual specimens present (NISP) was recorded, from which a minimum number of vessels (MNV) or individuals (MNI) was calculated. Artefacts taken for analysis have been summarised in the appendix attached to this report.

Adze

A single greywacke Type 2 stone adze was recovered during investigation (Figure 55). In the Duff classification, Type 2 adzes are of quadrangular cross-section, without a tang or lashing grip (Duff 1977:162-170). The adze retains its overall shape, dimensions and cross section towards the poll or butt of the adze, but has been heavily flaked. The flaking represents a failed attempt at shaping or reworking the adze, and the adze was probably discarded during this process. The adze has been notified to the Ministry of Culture and Heritage and given the number Z11102.



Figure 55. Stone adze recovered from Feature 13, 7 Norwich Quay.

Ceramics

Seven ceramic fragments representing a minimum of six vessels were recovered from the site. The ceramic fragments recovered are domestic tablewares such as bowls and plates, as well as earthenware jars or bottles. Two fragments of Willow pattern ceramics were recovered from the site.

Glass

A total of 64 glass fragments representing a minimum of 11 bottles and a number of window glass fragments was recovered from the site. The glassware forms present included 19th century alcohol and pharmaceutical bottles. Window glass was the most common glass artefact, accounting for 39 of the 64 fragments.

Metal

Five nails, a screw and an unidentified piece of copper were recovered from the site. The nails were of an earlier form, being square cut with rounded or square shaped heads (Figure 56).



Figure 56. Square nails with rounded heads.

Clay pipes

Five clay pipe fragments were recovered from the site. One pipe stem fragment was impressed with the mark "C.CROP" and "LONDON" on the reverse (Figure 57). Charles Crop & Sons was a London-based clay pipe manufacturer who operated between 1856 and 1924 (Oswald 1975:205). Another stem had the mark "DAV...". This was probably Davis, Davies or Davidson which were all manufacturers of clay pipes. Without more of the impressed mark it is not possible to determine an origin or date of manufacture for this fragment.



Figure 57. Clay smoking pipe stems recovered from Feature 2.

DISCUSSION

Prior to 2011 a number of midden/oven sites had been recorded around the coast of Lyttelton harbour, as well as in Sumner and Redcliffs, and elsewhere on Banks Peninsula, but no physical evidence of Māori occupation had been reported in the vicinity of Lyttelton township. The site of Ohinehou and other occupation areas in Lyttelton were known to Te Hapū o Ngāti Wheke, and the site at 7 Norwich Quay provided physical evidence of occupation in this area and a small insight into the fishing and subsistence activities that took place there.

The species in the midden were predominantly native, with the Māori introductions of dog and rat also present. The shellfish species are generally from a rocky muddy shore environment (which is common around Lyttelton harbour) and the fish species were generally inshore pelagic species (which live and feed near the ocean surface) and demersals (which generally live and feed on the sea bed). Similar species were found in each of the features associated with Māori occupation of the site. These species indicate that those living here were harvesting locally available resources.

Radiocarbon dating suggests that the site was occupied in 1465-1660. This is consistent with the faunal remains recovered from the site, and with information recovered from other archaeological sites in Canterbury. Anderson's 1989 study of archaeological evidence associated with the exploitation of moa concluded that moa hunting began c.900BP, peaked at c.650BP, and ceased around 400BP (Anderson 1989:190-191). This result was obtained using a set of data from sites which Anderson has subsequently reviewed on the basis of chronometric hygiene, and subsequently revised to 800-400BP (Anderson 2000:196). This result is broadly consistent with the chronology proposed by Schmidt's review of available radiocarbon dates for moa bone, which concluded that the exploitation of moa ceased sometime in the mid-17th century (Schmidt 2000:322).

With the exception of some statistical outliers, the majority of early Māori sites in Canterbury date to the 14th and 15th centuries (Challis 1995:8), and this is reflected in the results of Schmidt's analysis after applying a discard protocol (Schmidt 2000:322-324). The later date presently available from Norwich Quay (1660) is comparable with the dates obtained from deposits at Tumbledown Bay (NZ-7654) on the south side of Banks Peninsula, which is cited as a terminus post quem for the cessation of moa hunting in the South Island (Schmidt 2000:323). Submission of further samples for carbon dating from this deposit would assist in the refinement of the currently available date range.

It should be noted that parts of the site were heavily disturbed, and only a very small area contained intact pre-contact Māori archaeological deposits. The presence of historic material in layers which appear to be of prehistoric origin indicates there is likely to have been some mixing of cultural layers, so any interpretations concerning the age of the Māori archaeological deposits should be approached with caution.

No evidence of any structures or features beyond the oven was found at 7 Norwich Quay, but this is not surprising given the small area of intact archaeological deposits at the site. As such, it is not possible to say with any certainty whether the site reflects a temporary or more permanent occupation. Sites dating from the early period of Māori settlement of New Zealand tended to be occupied on a short-term or seasonal basis – it has been argued that this reflects temporary or seasonal exploitation of moa (Anderson 1989:140).

The coastal location of the site fits the known pattern of Māori occupation in Canterbury, which was typically coastal zone, and the recorded sites are characterised by midden/oven features (Challis 1995:6).

The features recorded above and the results of the analysis can be tentatively associated with a number of occupation phases at the site, as follows:

Phase 1

Pre-contact Māori occupation. The C14 date from the cockle shell, and presence of moa bone in the oven features suggests this dates to AD 1465-1660. It is not possible to ascertain a duration of occupation or a sequence of occupation layers because only one sample was submitted for C14 dating.

Features associated with Phase 1 were Features 6, 7 and 8, but Feature 7 was the only feature from which a sample was submitted for radiocarbon dating.

Phase 2

Contact period occupation. Layers which included historic material such as pig bone and limited quantities of ceramic are likely to date to the contact period (1792-1840). This period encompasses the time following initial contact between Māori and Pākehā when European goods and introduced species (such as pig) were starting to find their way into Māori settlements, but were still relatively uncommon. Where species such as moa bone are found in the same context as pig bone this suggests site disturbance, or that the moa bone fragments represent some industrial working of older bone tools, the former being the most likely scenario.

Features 9 and 12 were potentially associated with Phase 2 due to the presence of ceramic and pig bone fragments. Because they are small fragments not common in comparison with other material in the sample it is also possible that these items came from later historic era deposits and have been included with these layers as a result of post-depositional mixing.

Features that might be associated with either Phase 1 or 2 were Features 10, 11, 13, 14, 15 and 16.

Phase 3

Early historic occupation (1840-1868). This represents the first modifications of the foreshore embodied in the seawall. It is possible that the rocky shore species such as catseye found in the features that have been truncated by the seawall represent natural populations that colonised the seawall, rather than shellfish gathered for food.

Feature 4 is from Phase 3, and it possible that Features 1-3 may relate to this phase.

Phase 4

Phase 4 represents the phase between the reclamation in 1868 and the construction of the post office on the site in 1875. Little is known about the site during this period, and it is not possible to demonstrate any positive association between archaeological features documented during the excavation and the site use and structures that might have existed at this time. It cannot be ruled out that historic period archaeological deposits found at 7 Norwich Quay date to this time.

No features have been identified as specifically belonging to this phase, but it cannot be discounted that Features 1-3 may relate to this phase.

Phase 5

This period encompasses the occupation of the post office at 7 Norwich Quay, and dates from 1875 to the time of its removal in 2011. The most obvious feature associated with this period is the concrete foundations of the post office itself.

Feature 5 is part of this phase, and it is likely that Features 1-3 may to this phase also.

CONCLUSION

The removal of the concrete foundations from 7 Norwich Quay, Lyttelton, was monitored because the building on the site pre-dated 1900 and there was the potential for such work to affect subsurface archaeological remains. When pre-contact Māori occupation layers were encountered work was suspended. Following consultation an investigation was undertaken of the Māori archaeological features. Included among the finds was a broken stone adze, and analysis of the midden samples revealed the presence of moa bone. A radiocarbon sample from cockle shell in Feature 7 returned a calibrated date of AD1465-1660 at a 95% level of confidence. Approximately 70 per cent of the site was excavated to a depth of up to 2 metres to allow for the removal of the concrete footings. To ensure the cost of the excavation was kept to a minimum not all of the site was excavated. Two features were left in situ beneath a concrete floor, and additional archaeological deposits are likely to remain along the southern boundary of the section. As a result of this work the site of Ohinehou has been recorded as archaeological site M36/229, and the site of the 1875 Lyttelton post office has been recorded as M36/230. In accordance with the requirements of the Protected Objects Act 1975 the stone adze has been notified to the Ministry for Culture and Heritage and given the number Z11102.

REFERENCES

- Anderson, A., 2003. *Prodigious Birds: Moas and moa-hunting in prehistoric New Zealand*. Cambridge University Press, Cambridge.
- Anderson, A., 1998. *The Welcome of Strangers: An ethnohistory of southern Māori AD1650-1850*. Otago University Press, Dunedin.
- Antcliff, Veronica, 2002. Withers safes. In Evans, Jim (ed.), 'A Gazetteer of Lock and Key Makers'. [online] Available at: <http://www.localhistory.scit.wlv.ac.uk/Museum/locks/gazetteer/withers/withers.htm> [Accessed 26 November 2012].
- Anderson, A., 2000. Defining the period of moa extinction. *Archaeology in New Zealand* 43(3):195-201.
- Bickler, Simon, 2007. New Zealand brick database. [online] Available at: <http://bickler.co.nz/bricks/canterbury.php?row=5> [Accessed 28 November 2012].
- Burgess, R., 2009. New Zealand Historic Places Trust Registration report for a Historic Area: Lyttelton Township Historic Area (Register No.7784). Unpublished NZHPT report.
- Challis, A., 1995. *Ka Pakihi Whakatekateka o Waitaha: The archaeology of Canterbury in Māori times*. Science And Research Series No.89. Department of Conservation, Wellington.
- Duff, R., 1977. *The Moa-hunter Period of Māori Culture*. Canterbury Museum Bulletin No. 1 (3rd revised edition). E. C. Keating Government Printer, Wellington.
- Grace's Guide, 2012. Cargo Fleet Iron Co. [online] Available at: http://www.gracesguide.co.uk/Cargo_Fleet_Iron_Co [Accessed 20 November 2012].
- Hall & McKenzie, 1999. Proposed Fit out of 2 Apartments. First Floor. Old Lyttelton Post Office, Norwich Quay. Supplied by CERA.
- Press. Accessed via the Papers Past website.
- Pierre, W.A., 1964. *Canterbury Provincial Railways. Genesis of the N.Z.R. System*. New Zealand Railway and Locomotive Society, Wellington.
- Oswald, A., 1975. *Clay Pipes for the Archaeologist*. British Archaeological Reports 14, Oxford.
- Schmidt, M., 2000. Radiocarbon dating the end of moa-hunting in New Zealand prehistory. *Archaeology in New Zealand* 43(4):314-329.
- Scotter, W.H. 1968. *A History of Port Lyttelton*. The Lyttelton Harbour Board, Christchurch.
- Watson, Katharine, 2012. 683-687 Colombo Street, Christchurch: Report on archaeological monitoring. Unpublished report for CERA.

APPENDIX 1: METHODS OF ARTEFACT ANALYSIS

Ceramic artefacts

Ceramic artefacts were analysed according to material type, ware type and form. Decorative features were also recorded. These included the decorative technique used on the artefact, the name of the pattern if identified, pattern motifs and pattern colour. Brooks (2005) was the principal reference used for the analysis of material ware, form and decorative technique. Sanford (1997) was consulted in reference to decorative patterns and colours.

Faunal material

The faunal material was cleaned and identified to taxonomic category. Mammals were identified by species. An MNI (minimum number of individuals) was generated from the MNE (minimum number of elements), which was in turn based on the NISP (number of individual specimen present). Skeletal element, side and portion present were also identified, as was age at death when possible. Any butchery marks on the material were recorded.

Glass artefacts

Glass vessels were sorted by provenance and analysed according to the process outlined in Smith (2004). This included recording glass colour, finish and base type, measurements 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) 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 occurrence 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.

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.

Miscellaneous artefacts

Miscellaneous artefacts from the site 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.

APPENDIX 2: HISTORIC ARTEFACTS

Artefact Class	NISP	MNI	Description	Feature	Notes
Ceramic	1	1	Buff stoneware - fragment	1	
	1	1	White earthenware with blue abstract design, bowl?, exaggerated footring - base fragment	1	
	2	1	Buff stoneware - side fragments	2	
	1	1	Grey stoneware - side fragment	2	
	1	1	White earthenware, undecorated - base fragment	2	
	1	1	Blue Willow pattern transfer-printed - rim fragment	2	
	1	1	White clay pipe stem with mouthpiece - fragment	2	
	1	1	White clay pipe stem - fragment	2	Impressed on side "... CROP" "LONDON..."
	1	1	White clay pipe stem - fragment	2	Impressed on side "DAV..."
	2	2	White clay pipe stem - fragments	2	
Glass	3	3	Dark olive bottle bases, rounded conical kickup - base fragments	1	
	1	1	Clear bottle base, elixer/handy cross section, curved dished base - base fragment	1	Embossed on base "P 705" "5"
	3	1	Dark olive flat bottle glass - side, corner fragments	1	
	14	3	Dark olive bottle glass - fragments	2	
	1	1	Dark olive bottle top, flat with band with trail - top fragment	2	
	2	1	Aqua green bottle top - top, neck fragments	2	
	1	1	Green bottle glass, embossed letters - side fragment	2	
	39	1	Aqua flat window glass - fragments	3	
Faunal	1	1	Sheep, radius - fragment	1	
	3	1	Sheep, lumbar vertebrae, ribs - fragments	2	
	3	1	Oyster - fragments	2	
Metal	2	2	Iron nails, round heads - rusted, but whole	1	
	1	1	Nail, copper content, square head - whole	2	
	2	2	Pieces metal, copper content, rectangular, hole punched in one	2	
	1	1	Iron nail, round head, rusted and concreted - whole	2	
	1	1	Iron nail, flat head, 13cm long, rusted and concreted - whole	2	
	1	1	Iron screw - ??	2	



100-001



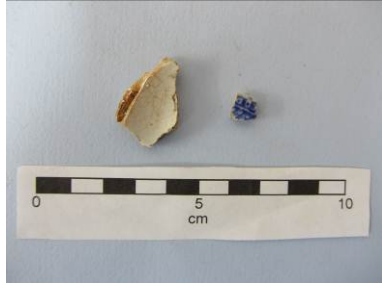
100-002



100-003



200-001



200-002



200-004



200-005



200-007



300-001

APPENDIX 3: FAUNAL REMAINS

Feature	Taxa	Species	Element	Side	Portion	NISP	MNE	Notes/ Weight
6	Bird	NZ pigeon	Humerus	L	Distal	1		
6	Bird	NZ pigeon	Humerus	R	complete	1		
6	Bird	NZ pigeon	Coracoid	L	Proximal	1		
6	Bird	NZ pigeon	Coracoid	R	Proximal	1		
6	Bird	Parakeet sp.	Sternum	n/a	NRP	1		
6	Bird	Unid	Vertebra	n/a	n/a	3		
6	Bird	Unid	Phalange	?	Complete	1		
6	Bird	Unid	Fragment	n/a	n/a	38		
6	Bird	Unid	Tarsometatarsus	?	Shaft	1		
6	Bird	Unid	Humerus	?	Fragment	1		
6	Bird	Unid	Humerus	R	Shaft	1		rat gnawing present
6	Bird	Unid	Scapula	?	NRP	1		small bird
6	Bird	Unid	Quadrata	?	NRP	1		burnt
6	Fish	Unid	Vertebra	n/a	n/a	14		2 burnt
6	Fish	Shark/ray	Vertebra	n/a	n/a	3		
6	Fish	Unid	Fragment	n/a	n/a	19		
6	Fish	Red cod	Premaxilla	L	Fragment	1		
6	Fish	Red cod	Dentary	L	NRP	2		burnt white
6	Mammal	Rat	Mandible	L	Complete	1		
6	Mammal	Dog	Rib	?	Shaft	1		
6	Mammal	Rat	Femur	R	Proximal	2		
6	Mammal	Rat	Femur	L	Complete	1		distal unfused
6	Mammal	Rat	Humerus	R	Complete	1		proximal unfused
6	Mammal	Rat	Ulna	R	Complete	1		
6	Mammal	Rat	Radius	R	Complete	1		proximal unfused
6	Mammal	Rat	Vertebra:axis	n/a	Complete	1		
6	Mammal	Rat	Scapula	?	NRP	2		
6	Mammal	Rat	Vertebra	n/a	Fragment	2		
6	Mammal	Rat	Femur	L	Proximal	1		
6	Shell	Common	Gastropod	n/a	Apex	22		Turbo smaragdus

		cat's eye						
6	Shell	Common cat's eye	Gastropod	n/a	Fragment	13		Turbo smaragdus
6	Shell	Common cat's eye	Operculum	n/a	Complete	2		Turbo smaragdus
6	Shell	Paua	Gastropod	n/a	NRP	2		Halotosis iris
6	Shell	Paua	Gastropod	n/a	Fragment	22		Halotosis iris
6	Shell	Bluff oyster	Bivalve	n/a	Hinge	7		
6	Shell	Silver paua	Gastropod	n/a	NRP	2		
6	Shell	Blue mussel	Bivalve	n/a	Hinge	74		cf mytilus edulis
6	Shell	Turret	Gastropod	n/a	Opercular	2		
6	Shell	Green lipped mussel	Bivalve	n/a	Hinge	1		
6	Shell	Speckled whelk	Gastropod	n/a	Apex	2		
6	Shell	Unid	Fragment	n/a	n/a	213 9		
6	Shell	Bluff oyster	Bivalve	n/a	Fragment	6		
6	Shell	Unid	Gastropod	n/a	Comenella	2		
6	Shell	cf Speckled whelk	Gastropod	n/a	Fragment	1		
6	Shell	Unid	Gastropod	n/a	Apex	1		
6	Shell	Blue mussel	Bivalve	n/a	Fragment	8		cf mytilus edulis
6	Shell	Pipi	Bivalve	n/a	Hinge	1		
6	Stone							147.39
6	Unid	Unid	Fragment	n/a	n/a	8		
7	Bird	Unid	Long bone	?	Shaft	7		1 deformed
7	Bird	Unid	Phalange	?	Complete	3		
7	Bird	Unid	Rib	?	Head	1		burnt
7	Bird	Unid	Vertebra	n/a	Complete	1		
7	Bird	Unid	Vertebra	n/a	Fragment	4		
7	Bird	Spotted shag	Coracoid	R	Proximal	1		
7	Bird	NZ pigeon	Pelvis	R	NRP	1		
7	Bird	Unid	Radius	R	Proximal	2	1	Extinct species?
7	Bird	Unid	Radius	L	Proximal	1		Extinct species?
7	Bird	Spotted shag	Scapula	?	Fragment	1		
7	Bird	Spotted shag	Tarsometatarsus	L	Complete	1		
7	Bird	Unid	Tarsometatarsus	L	Distal	1		burnt- small size like fairy prion
7	Bird	Tui	Tarsometatarsus	L	Distal	1		
7	Bird	Unid	Tibiotarsus	L	Shaft	2	1	
7	Bird	Unid	Ulna	?	Shaft	1		

7	Bird	Little blue penguin	Humerus	L	Fragment	1	burnt
7	Bird	Parakeet sp.	Humerus	L	Distal	1	
7	Bird	Little blue penguin	Sternum	n/a	NRP	1	
7	Bird	Cf NZ pigeon	Femur	R	Proximal	1	
7	Bird	Unid	Tarsometatarsus	L	Shaft	1	Extinct species?
7	Charcoal						5.66
7	Fish	Shark/ray	Vertebra	n/a	n/a	91	
7	Fish	Unid	Fragment	n/a	Fragment	73	
7	Fish	Unid	Vertebra	n/a	n/a	33	
7	Fish	Kahawai	Articular	R	NRP	1	
7	Fish	Ling	Otolith	?	Complete	1	
7	Fish	Red cod	Articular	L	NRP	1	
7	Fish	Red cod	Quadrate	n/a	Complete	1	
7	Fish	Red cod	Dentary	L	NRP	1	
7	Fish	Kahawai	Quadrate	R	NRP	1	
7	Mammal	Rat	Tibia	R	Complete	1	Fused
7	Mammal	Dog	Metacarpal 2	L	Complete	1	Small
7	Mammal	Rat	Femur	R	Complete	1	unfused
7	Mammal	Rat	Tibia	n/a	Complete	1	unfused
7	Mammal	Unid	Fragment	n/a	Fragment	3	
7	Mammal	Dog	Metacarpal / metatarsal	?	Fragment	1	
7	shell	Bluff oyster	Gastropod	n/a	Hinge	5	
7	shell	Bluff oyster	Gastropod	n/a	Fragment	3	
7	Shell	Blue mussel	Bivalve	n/a	Hinge	42	cf mytilus edulis
7	Shell	Cockle	Bivalve	n/a	Fragment	3	
7	Shell	Common cat's eye	Gastropod	n/a	Fragment	7	Turbo smaragdus
7	Shell	Common cat's eye	Gastropod	n/a	Apex	3	Turbo smaragdus
7	Shell	Common cat's eye	Gastropod	n/a	Comenella	4	Turbo smaragdus
7	shell	Common cat's eye	Operculum	n/a	Complete	25	Turbo smaragdus
7	shell	Common cat's eye	Operculum	n/a	Fragment	18	Turbo smaragdus
7	Shell	Paua	Gastropod	n/a	Fragment	10	Halotosis iris
7	Shell	Turret	Gastropod	n/a	Operculum	7	

7	Shell	Unid	Fragment	n/a	Fragment	161 8		
7	Shell	Unid	Gastropod	n/a	Comenella	7		
7	Shell	Mudsnail	Gastropod	n/a	Apex	4		
7	Shell	Mudsnail	Gastropod	n/a	Fragment	2		
7	Shell	Turret	Gastropod	n/a	Fragment	2		
7	Shell	Pipi	Bivalve	n/a	Fragment	14		
7	Shell	Pipi	Bivalve	n/a	Hinge	1		
7	Stone							55.09
7	Unid	Unid	Fragment	n/a	Fragment	2		
7	Unid	Unid	Unid	n/a	Fragment	1		?moa
7	Wood					2		burnt
8	Bird	Moa sp.	Cranium	n/a	Orbital fragment	2	1	Large moa sp.
8	Bird	NZ pigeon	Coracoid	L	Distal	1		
8	Bird	Unid	Ulna	R	Shaft	1		proximal end cut
8	Fish	Shark/ray	Vertebra	n/a	n/a	8		
8	Fish	Unid	Fragment	n/a	n/a	2		
8	Fish	Unid	Vertebra	n/a	n/a	2		1 large, 1 burnt white
8	Mam mal	Rat	Scapula	R	NRP	1		
8	Shell	Blue mussel	Bivalve	n/a	Hinge	7		cf mytilus edulis
8	Shell	Common cat's eye	Gastropod	n/a	Apex	5		Turbo smaragdus
8	Shell	Common cat's eye	Gastropod	n/a	Fragment	9		Turbo smaragdus
8	Shell	Bluff oyster	Bivalve	n/a	Hinge	2		
8	Shell	Paua	Gastropod	n/a	Fragment	8		Halotosis iris
8	Shell	Unid	Fragment	n/a	Fragment	128		
8	Shell	Unid	Gastropod	n/a	comenella	2		
8	Stone							38.14
9	Bird	Moa sp.	Fragment	?	Fragment	4		Partially burnt
9	Bird	Unid	Humerus	R	Distal	1		Extinct species?
9	Bird	Cf NZ falcon	Humerus	R	Complete	1		
9	Bird	Unid	Long bone	?	Shaft	16		3 burnt, 1 juvenile
9	Bird	Unid	Vertebra	n/a	Fragment	1		
9	Bird	Parakeet sp.	Coracoid	R	Proximal	1		
9	Bird	Unid	Coracoid	?	Fragment	1		
9	Bird	Cf NZ pigeon	Coracoid	L	Proximal	1		
9	Bird	Little blue penguin	Femur	L	Proximal	1		
9	Bird	Unid	Pelvis	?	Fragment	1		
9	Bird	Unid	Phalange	?	Complete	2		2 different birds

9	Bird	Cf NZ pigeon	Scapula	?	NRP	1	
9	Bird	Cf NZ pigeon	Humerus	R	Proximal	1	
9	Bird	Tui	Sternum	n/a	NRP	1	
9	Bird	Shag sp.	Coracoid	L	Proximal	1	burnt so could be spotted shag from bone shrinkage
9	Bird	Little blue penguin	Coracoid	?	Proximal	1	
9	Bird	Unid	Quadrate	L	Complete	1	Extinct species?
9	Bird	Unid	Tarsometatarsus	?	Fragment	1	
9	Bird	?kiwi sp.	Femur	R	Shaft	1	rat gnawing
9	Bird	Unid	Tarsometatarsus	?	Shaft	1	
9	Bird	Little blue penguin	Quadrate	?	Complete	1	
9	Bird	Unid	Tibiotarsus	R	Distal	1	Extinct species?
9	Ceramic						
9	Charcoal						3.08
9	Fish	Shark/ray	Vertebra	n/a	n/a	19	
9	Fish	Unid	Fragment	n/a	Fragment	65	5 burnt
9	Fish	Unid	Vertebra	n/a	n/a	41	
9	Fish	Kahawai	Dentary	L	NRP	1	
9	Fish	Kahawai	Articular	L	NRP	1	
9	Fish	Unid	Premaxilla	?	Fragment	1	
9	Mammal	Rat	Tibia	R	Complete	1	unfused
9	Shell	Bluff oyster	Bivalve	n/a	Hinge	8	
9	Shell	Blue mussel	Bivalve	n/a	Hinge	68	cf mytilus edulis
9	Shell	Blue mussel	Bivalve	n/a	Fragment	4	cf mytilus edulis
9	Shell	Cf white rock shell	Gastropod	n/a	Comenella	1	
9	Shell	Cockle	Bivalve	n/a	Hinge	2	
9	Shell	Common cat's eye	Gastropod	n/a	Fragment	5	Turbo smaragdus
9	Shell	Common cat's eye	Operculum	n/a	Complete	21	Turbo smaragdus
9	Shell	Common cat's eye	Operculum	n/a	Fragment	20	Turbo smaragdus
9	Shell	Mudsnail	Gastropod	n/a	Apex	13	
9	Shell	Mudsnail	Gastropod	n/a	Fragment	10	
9	Shell	Paua	Gastropod	n/a	Fragment	1	
9	Shell	Unid	Fragment	n/a	Fragment	780	
9	Shell	Unid	Gastropod	n/a	Comenella	13	
9	Shell	Unid	Gastropod	n/a	Fragment	1	

9	Shell	Turret	Gastropod	n/a	Opercular	3	
9	Shell	Turret	Gastropod	n/a	Fragment	1	
9	Shell	Common cat's eye	Gastropod	n/a	Apex	1	Turbo smaragdus
9	Shell	Unid	Bivalve	n/a	Fragment	13	
9	Shell	Venus sp.	Bivalve	n/a	Fragment	1	
9	Shell	Unid	Gastropod	n/a	Apex	1	
9	Shell	Cf green lipped mussel	Bivalve	n/a	Hinge	2	
9	Shell	Pipi	Bivalve	n/a	Hinge	3	
9	Shell	Bluff oyster	Bivalve	n/a	Fragment	5	
9	Stone						700.19
9	Unid	Unid	Fragment	n/a	Fragment	9	
10	Bird	Unid	Fragment	n/a	Fragment	1	
10	Bird	Tui	Carpometacarpus	L	Proximal	1	
10	Bird	Parakeet sp.	Carpometacarpus	L	Complete	2	
10	Bird	NZ pigeon	Coracoid	L	Proximal	1	
10	Bird	Parakeet sp.	Humerus	L	Shaft	1	
10	Shell	Bluff oyster	Bivalve	n/a	Hinge	1	
10	Shell	Blue mussel	Bivalve	n/a	Hinge	1	cf mytilus edulis
10	Shell	Common cat's eye	Operculum	n/a	Complete	1	Turbo smaragdus
10	Shell	Unid	Fragment	n/a	Fragment	40	
10	Stone						1.25
11	Shell	Unid	Fragment	n/a	Fragment	6	
11	Shell	Unid	Gastropod	n/a	Comenella	1	
12	Fish	Unid	Fragment	n/a	Fragment	2	
12	Mammal	Pig	Femur	L	Complete	1	foetal
12	Mammal	Pig	Scapula	R	Complete	1	foetal
12	Shell	?paua	Gastropod	n/a	Fragment	1	
12	Shell	Blue mussel	Bivalve	n/a	Fragment	1	cf mytilus edulis
12	Shell	Blue mussel	Bivalve	n/a	Hinge	1	cf mytilus edulis
12	Shell	Cockle	Bivalve	n/a	Hinge	1	
12	Shell	Common cat's eye	Operculum	n/a	Complete	2	Turbo smaragdus
12	Shell	Unid	Fragment	n/a	Fragment	17	
12	Shell	Bluff oyster	Bivalve	n/a	Fragment	1	
15	Bird	Unid	Fragment	n/a	n/a	1	Rat animal attrition
15	Bird	Tui	Ulna	R	Proximal	1	
15	Fish	Unid	Vertebra	n/a	n/a	1	

15	Shell	Blue mussel	Bivalve	n/a	Hinge	15		cf mytilus edulis
15	Shell	Blue mussel	Bivalve	n/a	Fragment	1		cf mytilus edulis
15	Shell	Chiton	other	n/a	Fragment	1		Sypharochiton pelliserpentis
15	Shell	Common cat's eye	Gastropod	n/a	Apex	10		Turbo smaragdus
15	Shell	Common cat's eye	Operculum	n/a	Complete	1		Turbo smaragdus
15	Shell	Common cat's eye	Operculum	n/a	Fragment	1		Turbo smaragdus
15	Shell	Bluff oyster	Bivalve	n/a	Hinge	1		
15	Shell	Bluff oyster	Bivalve	n/a	Fragment	2		
15	Shell	Paua	Gastropod	n/a	Apex	2	1	Halotosis iris
15	Shell	Pipi	Bivalve	n/a	Fragment	1		
15	Shell	Unid	Fragment	n/a	Fragment	486		
15	Shell	Unid	Gastropod	n/a	Comenella	2		
15	Stone							2.66
16	Bird	Unid	Ulna	L	Shaft	1		Medium bird size eg NZ pigeon or Little shag
16	Fish	Elephant fish	Palantine tooth plate	R	NRP	1		
16	Fish	Shark/ray	Vertebra	n/a	n/a	1		
16	Shell	Common cat's eye	Gastropod	n/a	Apex	1		Turbo smaragdus
16	Shell	Common cat's eye	Gastropod	n/a	Fragment	2		Turbo smaragdus
16	Shell	Common cat's eye	Operculum	n/a	Complete	2		Turbo smaragdus
16	Shell	Mudsnail	Gastropod	n/a	Fragment	3		
16	Shell	Mudsnail	Gastropod	n/a	Apex	2		
16	Shell	Pipi	Bivalve	n/a	Hinge	1		
16	Shell	Pipi	Bivalve	n/a	Fragment	1		
16	Shell	Unid	Fragment	n/a	Fragment	19		