ARCHAEOLOGY

AT

MACKAY'S CROSSING

Report to Transit New Zealand on
Archaeological Investigations arising from
Authority No. 2003/103
March 2005

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Report on Archaeological Investigations arising from Authority No. 2003/103, MacKay's Crossing Over-Bridge Construction and Road Realignment.

Summary of work carried out

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Introduction

MacKay's Crossing is a road and rail level crossing 50 km north of Wellington on State Highway 1 (SH1). Transit New Zealand proposes to construct an over-bridge, realign SH1, and improve access to adjacent properties including Queen Elizabeth Park and Whareroa Farm.

The proposed construction work directly affects two Second World War United States Military Camps, Camps Russell and MacKay, and an old stable. Neither military camp is an archaeological site within the meaning of the Historic Places Act 1993. Following discussions between Transit N Z and the New Zealand Historic Places Trust, however, Transit N Z agreed to monitor the stripping of topsoil and record the archaeological remains uncovered.

By mid-February 2005, the first stage of topsoil clearance was substantially complete. Construction work in five areas required archaeological monitoring or investigation, covering in total more than 4.5 ha of ground. The sites monitored and investigated are all historic. I found no prehistoric archaeological remains, nor any historic archaeological remains clearly older than about 1920 AD.

Sites investigated and results

Construction of an access road from Queen Elizabeth Park to SH1on the west side of the state highway required protection of the Kapuni gas pipeline; the clearance of vegetation and topsoil along the access route; and the removal of an old stable. Work to protect the Kapuni pipeline affected no archaeological remains. Archaeological work along the access route focused on a sand layer that topsoil clearance uncovered, and on the stable site.

The sand layer is probably less than 70-100 years old, and its deposition was probably to provide dry, level ground. It is adjacent to Camp Russell, to SH1, and to a playing field, any of which could provide sufficient reason for its presence. There were no cultural remains other than the layer itself.

Removal of the stable building exposed a hitherto unknown brick floor that appears to date from the 1920s or 1930s, and I describe this in detail. The stable building is currently at a temporary site in Queen Elizabeth Park, pending its refurbishment and re-erection in the park. It is probable, but not fully proven, that construction of the brick floor was concurrent with the construction of the stable building. Sometime later, possibly during or after World War 2, there was a modification to the stable building to provide a space inside large enough for a small truck or similar vehicle. Bricks and a slotted plank are the only artifacts retained, and the Wellington Regional Council expects to incorporate them in the refurbished building.

Relocation of the stable to a new permanent position in the park required the clearance of topsoil just inside the Camp Russell perimeter. On the other side of SH1, the construction of bridge approaches substantially lowered the ground surface on part of Camp MacKay. Although the demolition and cleaning up of Camps MacKay and Russell after the American occupation removed many of the traces of the camps, topsoil removal showed there are still remains present on the camp sites. It is likely that careful and detailed archaeological investigation of the camps at some future date would retrieve useful information about the American military occupation. I recovered artifacts dating from the American occupation (cartridge cases, and items of leather, china, and glass), and Porirua Museum has indicated its willingness to accept these.

Immediately northeast of Camp MacKay, road construction stripped topsoil from a small area of ground called here the Paddock, at the foot of the coastal hills. Clearance of topsoil from the Paddock uncovered no archaeological remains, or any evidence of cultural activity.

Approximate percentage of archaeological material remaining *in situ*.

Stable site: 0% remains on the ground. The building is relocated to elsewhere in Queen Elizabeth Park.

Camp MacKay: About 15% of the original area of Camp MacKay is in the area the construction work affects. The state of the untouched portion is unknown.

Camp Russell: Less than 10% of the original area of Camp Russell is in the area investigated. The state of the untouched portion is unknown.

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Introduction

MacKay's Crossing is a road and rail level crossing 50 km north of Wellington on State Highway 1 (SH1) (Figure 1). Transit New Zealand proposes to construct an over-bridge, realign SH1, and improve access to adjacent properties including Queen Elizabeth Park and Whareroa Farm. The New Zealand Historic Places Trust thought it likely that there were archaeological sites in the area of proposed development (NZHPT Authority 2003/103), and required archaeological monitoring of the work. The proposed construction work directly affects two Second World War United States Military Camps, Camps Russell and MacKay, and an old stable which Bowman (n.d.) considers to date from the early 1900s. Neither Camp Russell nor Camp MacKay is an archaeological site within the Historic Places Act 1993 definition. Following discussions between Transit New Zealand and the New Zealand Historic Places Trust, however, Transit New Zealand agreed to carry out archaeological monitoring of topsoil stripping within the confines of the camps, and to record any remains uncovered. By mid-February 2005, the first stage of topsoil clearance was substantially complete, and I describe below, the results of the archaeological monitoring and investigation of the five areas affected (A, B, C, D, and E Figure 1).

Construction of an access road from Queen Elizabeth Park to SH1on the west side of the state highway required the protection of the Kapuni gas pipeline, which the access road passes over; the clearance of vegetation and removal of topsoil along the route; and the removal of the stable building and clearance of the stable site. Work to protect the Kapuni pipeline affected an area of ground already disturbed during the original digging of the trench; my inspection found no evidence of archaeological remains, and I do not consider the trench any further in this report. Archaeological work along the route of the access road focused on a sand layer that topsoil clearance uncovered (A Figure 1), and on the stable site (B Figure 1). Under Authority 2003/103, an archaeologist was to monitor the stable removal and investigate the stable site, but the removal took place before the appointment of an archaeologist to the project. Consequently, only the investigation of the stable site took place. Relocation of the stable to a new permanent position in the park required the clearance of topsoil just inside the Camp Russell perimeter (D Figure 1).

The construction of bridge approaches east of SH1 stripped topsoil from the site of Camp MacKay, and substantially lowered the ground surface (C Figure 1) (Forbes 2001). Immediately northeast of Camp MacKay, road construction stripped topsoil from a small area of ground called here the Paddock, at the foot of the coastal hills (E Figure 1).

A second stage of topsoil clearance, proposed for later in the year, will be the subject of a separate report. The clearance will affect the northern part of Camp MacKay.

The investigation and monitoring described here uncovered no archaeological sites as defined by the Historic Places Act 1993. On the west side of SH1 the sand layer that topsoil stripping uncovered (A Figure 1), was possibly deposited during the Second World War as part of the construction of Camp Russell, but there were no significant cultural remains. Removal of the stable building exposed a hitherto unknown brick floor that appears to date from the 1920s or 1930s, and I describe this in detail. In Camp MacKay and Camp Russell, the few remains found are generally consistent with the American Military occupation. The Paddock was entirely lacking any cultural features.

Acknowledgements

Fieldwork was with the very able assistance of Christine Barnett, (PO Box 104, Martinborough), who provided excellent professional input at every stage of the work. I also thank the following people for their assistance. John Morrison, architect, for his identification of and comments about the stable bricks; Scott Little, Total Telecommunications for providing a boom truck for taking vertical photographs of the stable floor; and Sheila and Mandy Robinson, for their discussion about the recent history of the stable and for providing photographs of the stable building interior and exterior prior to removal. Ian Bowman discussed architectural features of the stable building and supplied me with his set of photographs. Peter Sannazzaro, Fulton Hogan Ltd. discussed in detail the removal of the stable; Phil Pirie, Pirie Surveying Ltd. provided GPS readings of archaeological features; and Tony Walzl, Wellington Regional Council supplied historical information about Queen Elizabeth Park. Betty McFadgen, formerly Ethnologist at the National Museum of New Zealand, provided field assistance from time to time, informed discussion and many useful suggestions about the history and layout of stables, and identified ceramics from Camps Russell and MacKay. Cliff Carrigan, a former Marine now living in Otaki, provided useful background details about the American occupation of Camp MacKay. I carried out the investigation under the provisions of NZ Historic Places Trust Authority 2003/103, with the excellent assistance of Fulton Hogan Ltd., their engineers Steve Findlay and Phil Chapman, and their sub-contractors John Ray Ltd, on behalf of Transit New Zealand and their engineers Montgomery Watson Harza NZ Ltd. Finally yet importantly, I thank Todd and Donny of John Ray contractors, for their very able and skilful operation of earthmoving machinery.

Geology

The areas investigated are located on stream fan alluvium deposited by a tributary of the Whareroa Stream on the Holocene coastal platform (Figure 2). Older fan alluvium is east (inland) of an old cliff, cut by the sea at the end of the post-glacial sea level rise (Adkin 1951, Te Punga 1962) about 6500 years ago (Gibb 1978); younger fan alluvium extends seaward of the sea cliff (Figure 2). Between the fan alluvium and sea are peat swamps and sand dunes that form the southern part of the Kapiti-Horowhenua dune belt. The edge of the peat overlies the lower parts of the younger fan alluvium, and on the lower parts of the fan the ground water table is close to the ground surface. The fan deposits form a distinctive surface for occupation, and in the case of the sand layer and stable site, are easily distinguishable from non-alluvial sediments that people brought to the sites.

Part I

Sand Layer (Area A)

Introduction

The sand layer in Area A is along the western boundary of SH1. It is about 320 m long; its exact width was not determined because it extends beyond the western boundary of the area cleared. Cores taken for a geotechnical appraisal indicate that its width is unlikely to be much more than 80 m (Anon 1999), and the sand probably covers less than about 2.5 ha. There is peat swamp to the north and west of the sand, and stream fan alluvium to the south.

A trench digger with a smooth-edged bucket stripped the topsoil from the sand (Figure 3). The subsoil showed no archaeological remains other than a small patch of broken shells about 20 cm in diameter sitting on the sand layer. The discussion of sand stratigraphy in the next paragraph shows that the sand is young, and the shells are probably modern and possibly deposited along with the sand. I attach no cultural significance to the shells.

Sand stratigraphy

A trench 120 m long near the western boundary of the sand shows the sand as a layer up to 0.8 m thick. To the south, the sand overlies stream fan alluvium; to the north, it overlies peat (Figure 4). The lower 20 cm of the sand is heavily gleyed and bluish in colour; the upper part is loose, oxidized sand of a medium brown colour (Figure 5). The sand contains the occasional isolated shell, sub-round stone, and lump of silt or mud, and shows no dune bedding.

The sand layer is near the inland edge of the Kapiti-Horowhenua dune belt. The closest sand dunes seawards of it are Foxton age (McFadgen 1997), more than 4000 years old (Muckersie and Shepherd 1995) and more than 500 m away. If the sand were a natural deposit, it would be several thousand years old. The soil at the ground surface, however, is slightly sandy peaty silt up to 10 cm thick that rests on raw sand showing no clear colour or structural change. The soil contrasts strongly with Foxton age dune soils that have a well-defined B-horizon.

Within the sand are lenses of organic matter usually less than 10 cm thick and 1.5 m long, more or less horizontal but occasionally contorted with tails and bulges (Figure 5) and showing internal layering. The upper and lower external boundaries and the internal layer boundaries are sharp and well-defined. Some lenses are hard to dig, and some appear to lie on tip lines.

Age and origin of the sand

The shells, stones, silt lumps and lack of dune bedding indicate the sand is not dune sand. The sharp boundaries, internal layering, contorted appearance, and tip lines indicate that the lenses of organic matter are not a result of soil formation *in situ*, but are material carried in from elsewhere. Their hardness is probably a result of artificial

compaction. From the general absence of subsoil development, I estimate that the soil on the sand is probably less than 70-100 years old. The deposition of the sand in a wet situation, the well-defined lenses and apparent tip lines strongly suggest that the sand is recent infilling, probably to provide dry, level ground. The sand is adjacent to Camp Russell, to SH1, and to a playing field, any of which could provide sufficient reason for the infilling.

Part II

MacKay Stable (Area B)

Introduction

Based on its physical appearance (Figure 6), Bowman (n.d.) dates the construction of the stable building to the early 1900s. Local knowledge records its use as a social gathering place by American Marines during the Second World War, and after the War, it stored farm machinery and implements. In the early 1990s, Ms Mandy Robinson (*pers com* February 2005) took over the stable, and removed the farm equipment.

Ms Robinson recalls that the rear (southwestern) part of the floor was wood, raised up (on piles) above the ground, and there was a doorway in the rear wall at the height of the floor (Figure 7). Covering the front (northeastern) part of the floor was a layer of rubble 10 to 15 cm thick comprising yellow weathered clay, silt and stones. The wooden floor did not extend along the entire rear wall of the stable; its centre part adjacent to the doorway was missing, leaving a gap about 3 m wide (Figure 8). To provide access to the doorway, Ms Robinson redistributed some of the rubble on the stable floor and built a ramp from the front part of the floor across to the doorway.

In November 2004, the project contractors removed the stable building to a temporary site in Queen Elizabeth Park, pending its refurbishment and re-erection in the park. The removal of the stable and partial clearance of the rubble exposed an earlier floor (Figure 9). The floor comprised a brick pavement that sloped inwards to a slightly off-centre longitudinal dish channel, alongside which were the remains of stall posts. The layout was very similar to stable floors illustrated by Thornton (1986). At this point, the site clearance stopped until the archaeological investigation described in this report began, in December 2004.

A concrete rim surrounded the brick paving, and the foreman who oversaw the removal of the stable was clear that the walls rested on the concrete rim (Peter Sannazzaro *pers com*). The posts supporting trusses that held up the stable roof sat in the rubble on the brick pavement, but their location on the brick pavement was not apparent at the time of removal.

Authority 2003/103 points out that the exact age of the building is uncertain and that investigation of the site may provide further information as to its age and use. This report of the stable investigation describes the remains uncovered and addresses the issue of age and use.

Archaeological Investigation

The archaeological investigation focused on clearing away loose, disturbed material to define the extent and character of the brick paving, and on recording the full extent of the stable floor and associated features. Part of the rubble overlying the northwestern end of the paving was still intact, as was part of the ramp, and most of the bricks on the southwestern side of the channel (Figure 10), and I initially left these in place. After recording the stable floor, I had the remaining bricks and underlying bedding sand removed, and examined the ground surface beneath the floor for signs of any

earlier occupation. (Wellington Regional Council staff removed the bricks, for later use when Transit New Zealand re-erects the stables).

The remains of posts and piles outlining the stable walls and internal structures were visible as in-filled holes, usually containing pieces of rotted wood. I recorded their orientation, position and size, and looked for further postholes and pile holes by scraping the ground surface with a spade. After defining and recording the visible surface features, a trench digger equipped with a smooth-edge bucket scraped the ground surface around the paving down to undisturbed stream fan alluvium.

Because the removal of the stable building was without prior archaeological investigation or supervision, I did not know its exact relationship to the archaeological features. To establish that relationship, I measured the positions of posts and piles on the building to compare with the remains of the postholes and pile holes on the site. Nails and rebates in wall plates, floor bearers, and roof trusses marked the positions of piles and posts, which I measured with respect to building corners and walls to within ±2 cm using a tape.

Pirie Surveying Ltd. mapped the positions and heights of the stable floor, and the postholes and pile holes to within ±2 cm using a survey quality Sokkia Radian IS RTK GPS. I used Concord2 (Land Information New Zealand) to convert coordinates from Wellington circuit (NZ Geodetic Datum 1949) to New Zealand Map Grid.

Stable Floor

The stable floor covered a rectangular area approximately 14 m by 9 m (Figure 11). Pile holes outlined the perimeter, and formed internal rows within the building footprint. To the northeast is the brick pavement; to the southwest is a rectangular area that the raised wooden floor at the rear of the stable building covered.

The brick pavement was a rectangular structure almost 14 m long and 5 m wide, with its long axis oriented from southeast to northwest (Figure 9). Surrounding the bricks was a concrete rim 10 cm wide and 11.5 cm deep. The rim was intact around all but the eastern corner, and part of the northeastern side where it was out of position and overturned (Figure 10). An intact longitudinal dish-channel divided the pavement into two unequal parts: 2.69 m and 2.19 m wide (including the concrete rim). Both the concrete rim and channel preserved the marks of construction boxing, which was still present along a short outer section of the concrete rim.

When I began the investigation, many bricks were missing from the pavement. Almost a square metre was missing from the southwestern side of the channel (Figure 9), and about three quarters of the bricks were missing from the northeastern side. The only bricks left on the northwestern side were a single row alongside the rim at the northwestern end, and about a square metre of bricks at the southeastern end (Figure 10). Bedding sand covered all of the area between the rim and the channel, and I infer from the sand, from pieces of mortar embedded in the sand, and from the bricks remaining that bricks originally covered the whole area within the rim.

There was a lateral field drain across the southeastern end of the pavement about 20 cm outside the concrete rim (Figures 11 & 12). The drain extended about 4 m beyond the pavement to the northeast and southwest, apparently to protect the brick pavement

from subsurface water flow from higher up the stream fan. A longitudinal field drain intersected the transverse drain, and ran in a northwest direction along the northeast side of the pavement. At the northern corner of the pavement, the drain turned to the west and led in the direction of what today is an operating open drain about a metre deep.

Around the outside edge of the concrete rim were pile holes, some containing rotted wood. Pile molds in the rim (Figure 13), indicate that the piles were in place when the concrete rim was poured. Post butts and post holes from stall divisions were set at intervals of about 1.7 m along the southwestern side of the dish-channel.

Artifacts consisted mainly of plastic labels similar to those on bread bags, pieces of plastic string from hay bales, plastic bags, and occasional pieces of very rusty iron of unrecognizable origin. There were a few pieces of broken bottle of recent origin, and two horse shoes. Two planks, one 13 cm x 8 cm by 2.5 m long with slots cut in it (Figure 14), the other 15 cm by 8 cm by 3 m long without slots lay along the outer edge of the concrete rim on the northeast side of the pavement (Figure 11). Except for the planks and possibly the horseshoes, the artifacts were all clearly of very recent origin, and I therefore discarded all except for the slotted plank and the horse shoes. The absence of artifacts is probably due in large part to the efficient clearance of the site before I arrived.

The layout of the brick pavement and remains of posts is very similar to the stable at Cobblestones Museum in Greytown (Figures 15 & 16), constructed about 1857 to accommodate draft horses. At Cobblestones, the dish channel divides the floor into two unequal parts (*c.* 2m and 3m), the wider being the side where the stalls are located; the stalls are about 1.8 m apart.

Dish Channel
Width: 39-40 cm
Thickness: 1.7-2.4 cm
Length: 14.08 m (includes a discharge extension protruding 0.5 m beyond the northwest end of the brick paving (Figure 17)).
Distance cord to arc: 1.5-2.3 cm (height difference between centre and edges of channel cross section) (Figure 18)
Radius of curvature: 101 cm (assuming width = 40 cm, cord to arc = 2 cm)
Fall: 1:120 (approx)

The dish channel ran the full length of the brick paving with a fall of about 1:120 towards the northwestern end. The channel extended 35 cm beyond the concrete rim, its outer end forming a lip (Figure 17). There was no sign of a subsurface drain leading away from the lip, and the dish channel presumably discharged into a drain above ground level that either joined the field drain or discharged into the open drain.

The foundation for the dish channel was a layer of bricks held together with mortar and bedded in a thin layer of sand (Figures 18 & 19)). The sand used for the bedding and mortar contained shell fragments generally less than 1 mm in size, occasionally larger shell fragments up to 2 cm in size, and was un-weathered; it is probably from the nearby beach.

Concrete poured between boxing on either side of the bricks, formed the channel, and a cement coating 0.25 to 0.33 cm thick finished the channel surface (Figure 20). The

channel had a variable thickness of between about 1.7 and 2.4 cm, being thicker to the channel sides. The aggregate used in the concrete was angular, un-weathered, medium and coarse quarry gravel (the remains of the aggregate stockpile were still present outside the northern corner of the paving (Figure 11)).

Concrete Rim
Width: 10 - 12 cm
Height: 10 – *c.*11.5 cm
Fall: 1:25 (approx) towards the channel, 1:100 (approx) from southeast to northwest parallel with the channel

Construction of the concrete rim, which enclosed the brick pavement, followed construction of the channel, and it abutted the sides of the dish-channel at each end of the pavement. It was not level, but had a fall of about 1:25 towards the channel at each end, and a fall of about 1:100 towards the northwest along each side.

Concrete poured between boxing *c.*10 cm high and 10 cm apart formed the rim (Figure 21). In places, the boxing was 1 - 2 cm above the ground and the concrete rim had flowed beneath it forming a foot 10 – 12 cm wide (Figure 18). Wood used for boxing included old tongue and groove planks still containing nails. The aggregate used in the concrete included the angular quarry gravel used in the dish channel, but pieces of the broken rim showed that more than half of the aggregate was sub-round weathered medium and coarse gravel (probably from a nearby stream or river) (Figure 22). A cement coating covered the surface of the rim and part of the outer edge.

Brick Pavement
Length: 13.53 m
Width: 2.09 m (northeast side), 2.59 m (southwest side)
Fall: as for concrete rim

Layout of the bricks was honeycomb fashion, frog side up, with their long axis parallel to the ends of the pavement, and mortared into position. Bedding sand beneath the bricks was dark olive brown (10YR 3/3) weathered dune sand, somewhat finer than the beach sand beneath the dish channel and containing the occasional piece of round gravel and shell (the remains of the sand stockpile were still present outside the southern corner of the paving (Figure 11)). There was no topsoil under the bedding sand, which rested directly on the fan gravels, and no sign of an earlier structure.

The pavement included glazed and unglazed bricks, most with an embedded WW pattern (Figure 23). A few bricks from the pavement, and a higher proportion from the channel, were wire-cut extruded bricks. According to John Morrison (*pers com*, 12 December 2004), the glaze is a fire glaze, not a salt glaze, and is a result of the bricks being fired at a too high temperature. This and the presence of some curved and otherwise deformed bricks indicate that the bricks are all probably "seconds". The brick pattern and marks from bolts that held the pattern plates in the mold (Figure 23) indicates casting in a steel mold. Judging from the use of a steel mold, and the WW pattern which is similar to bricks produced in the Miramar brick kilns, the bricks post-date 1900 AD, and are probably no older than the 1920s or 1930s (John Morrison *pers com*).

The remains of a cement coating, similar to that on the channel and concrete rim, were on many of the bricks.

Field drain
Width: 40 cm
Depth: 40 cm
Length: 30 m (approx)
Cross-section: Shape trapezoidal wider at the top (Figure 24).
Fill: Stones, sub-round to sub-angular, small, medium and large (3 - 20 cm diameter) (Figure 24).

The field drain was an excavated trench, trapezoidal in cross-section (Figure 18) with its greatest width at the top and filled with stones (Figures 24 &12). The stones were all water worn and probably collected from a nearby stream or river. The drain was *c*.0.2 m outside the concrete rim along the southeast end of the pavement, and 0.2 – 0.3 m outside the rim along the northeast side. The remains of piles around the northeastern and southeastern perimeter of the pavement were between the drain and the concrete rim, and the edge of the pile at the south corner of the floor was visible in the side of the drain.

Pile Holes and Piles
Pile holes, and rotted piles where measurement was possible, were generally about 20 cm by 12 cm in size, which translates into a standard sized pile of 8" by 5" in imperial measure. Visual identification of the wood suggests the piles were totara. Those around the perimeter of the stable building were along the southeast, northeast, and northwest sides of the concrete rim, and around a rectangular area of ground 13.9 m by 3.8 m southwest of the paved area (Figure 11); their alignment was generally with the long axis parallel to the building wall. Within the building perimeter was a row of pile holes along the southwest side of the concrete rim; and a row offset 1.7 m to the southwest of the paved area; their alignment was generally with the long axis parallel with the rear wall of the stables and concrete rim.

The investigation did not locate all pile positions (Figure 11); there were gaps along the southwestern side of the floor between the ramp and the field drain, and along the southwestern side of the paved area near the ramp and south corner. I made a careful search for pile holes where the ramp abuts the brick pavement, but found none. The ground was firm, dry at this point, and would preserve pile holes well, although I acknowledge that a pile hole filled with local fan material would effectively disappear. Between the ramp and south corner, the ground was soft and damp, and any holes would probably have filled in when trench digging machinery moved over the ground. There were pile holes at the south and west corners of the brick pavement, but none at the southeastern end. The dislodgement of the rim at the southeast end of the pavement may have obscured or removed the holes.

Stall Posts
The stall postholes, alongside the dish channel, were all about 20 cm by 12 cm in cross section. Of the seven postholes, six contained the rotted remains of posts. The centre posthole (4, Figure 11) contained a reasonably intact post-butt with a sawn surface just below the level of the surrounding bricks (Figure 25). The alignment of the long axis of the postholes was perpendicular to the dish channel, and the posts were about 1.7 m apart. The postholes did not align with the pile holes on either side of the brick pavement (Figure 11).

The cut surface of the centre post was cleanly done and showed in addition to saw marks, two cut circles each about 2 cm diameter similar to the mark left by a brace and bit but without the centre hole. There were drops of white paint on the surface of the cut post, but no sign of any of the cement plaster applied to the dish channel and brick pavement.

Stable Building

The stable building is a rectangular structure about 14 m across the front, 9 m from front to rear, and nearly 6 m high (Figure 6). Its timbers include reused wood from an earlier building, and many pieces show the remains of former joinery and paint stains (Figure 26). Before its removal, the rear 3.75 m was a raised floor set on piles about 45 cm above the ground (Figure 8); the eastern 1/3 of the floor was wide boards (13.5 cm x 2 cm thick), the western 2/3, narrow boards (10 cm x 3 cm thick). Between the wall studs is a floor board set at 45°, presumably to make it easier to keep the floor clean (Photo 27). The bottom wall plate below the raised floor is 23 cm higher than the bottom of the wall plate in front of the floor (Figure 28), which would seem to indicate that the floor was an integral part of the original building and did not extend further than 3.75 m from the rear wall.

There are two openings along the front wall: a double door 2.75 m wide, and an entrance normally with sliding doors (Peter Sannazzaro *pers com*) 3.3 m wide. Along the rear wall is a sliding door 1.5 m wide, with its sill at the height of the raised floor.

The floor did not extend right across the rear of the building, there is about 3 m missing from the centre, immediately in front of the sliding door (Figure 29). The missing part of the floor lines up with the 3.3 m wide opening in the front wall.

It was in the area of missing floor that Ms Robinson built the rubble ramp. Boards from the cut portion of floor nailed over the gap between the floor and ground prevented the rubble from spreading under the floor on one side of the ramp. The floor modification was before Ms Robinson took over the stables.

Two trusses, asymmetrically placed on each side of the roof peak, support the stable roof. The front truss plate shows rebates on its underside cut to fit the tops of posts (Figure 30). The rear truss plate has nails and discoloration of the wood where post and truss were in contact. According to Mrs. Sheila Robinson of Lindale Art Gallery (*pers com*), when her daughter used the stable building there were five stable stalls, and between the stalls were substantial posts between the floor and the trusses.

The stable building now rests on temporary supports that raise the wall plates a few cm above the ground. Before shifting the building, the removal crew cut a rectangular hole in its eastern side large enough to back in the trailer of a transporter (Figure 6 exterior), and they cut off the front 1.78 m of the wooden floor, just in front of the middle bearer, to transport separately. The lower part of the front wall is missing, having disintegrated due to rot, and there are two large openings in the front wall. Considering the age of the building, and the loss of so much of its structural integrity, even though the contractor added bracing to mitigate distortion, I would expect the building suffered some structural distortion because of moving. I do not know how

much structural distortion there is, and in the following comparison of pile positions between the building and ground, I assume that the building is truly rectangular.

Comparison of the stable building and brick pavement

Large nails, probably 15 cm or 20 cm (6" or 8") long, mark pile positions beneath the bottom wall plates. There are no rebates. Where it was possible to see under the wall plates, there was often discolouration of the wood that matched the pile sizes. Rot and the trauma of moving the building mean that not all wall plates survived the move. Almost the entire bottom wall plate along the front wall of the stable building, and the front end of the plate along the east wall, are missing. The bottom wall plate on the west wall, rear wall, and rear of the east wall, however, are largely intact. Measurements of pile positions are from the corners of the building.

Marks of piles on the floor bearers are similar to those beneath the wall plates. The floor bearers were parallel with the rear wall, and the removal crew cutting the floor in two just in front of the middle bearer made the pile positions very easy to see and measure (Figure 31). Measurements of pile positions are from each end of the floor.

On top of the front floor bearer on the eastern side of the stable building are nails driven through from the underside of the bearer. The nails coincide with small cut out squares of floor, and represent the positions of posts resting on the bearer. On the western side of the stable, the floor is minus the front bearer, and only the floor cut-outs mark the positions of the posts. Measurements of post positions are from the ends of the floor.

Rebates and nails in the undersides of the roof truss plates mark the tops of posts (Figure 30). Measurements of their positions are from the east and west walls. Measurements of the positions of the truss plates are from the front and rear walls.

Figure 29 compares a plot of pile and post positions on the stable building with a plot of pile hole and posthole positions on the ground. The comparison is a "best fit" obtained by laying one plot over the other. The match is not exact, probably for reasons of distortion mentioned above, and neither confirms nor disproves Peter Sannazzarro's observation mentioned above that the wall plates rested on the concrete rim. The match, however, is close enough to account for the pile holes and postholes.

Figure 29 shows the rebates in the front roof truss, directly above the postholes alongside the dish channel. The rebates are probably from the posts that Peter Sannazzaro (*pers com*) observed supporting the roof trusses just before he removed the stable building. Nails and discoloured patches in the rear roof truss are directly above the nail holes in the front floor bearer and small sections of floor cut out to allow the posts to sit on the bearer, and these too will be from roof support posts. The two sets of posts line up and define the stable stalls that Mrs. Robinson described.

Figure 32 shows my inferred reconstruction of a cross section of the stable building, based on the pile and post positions and my measurements of the building.

Age and use of the stable floor and stable building

The questions to address now are whether the construction of the brick pavement was before or after the construction of the stable building, and the use of the building. The

impressions of wooden piles in the concrete rim show that the piles were in place during the construction of the brick pavement. Peter Sannazzaro's observation that the wall plate rested on the concrete rim, suggests that construction of the stable walls was after the concrete rim. It is possible, however, that rotting of the piles and distortion of the stable walls shifted the bottom wall plate over the concrete rim, leading to the situation that Peter observed, in which case construction of the brick pavement could be later than the stable building.

The absence of any occupation remains beneath the brick pavement is not sufficient to show that the construction of the pavement and building were concurrent, because it would be reasonable to expect the removal of topsoil in order to provide a firm foundation. On the other hand, the configuration of the raised wooden floor, and offset end wall plates, indicates the intention to incorporate in the original building, the space taken up by the brick pavement. Furthermore, the asymmetric position of the roof trusses, and layout of the stable posts, appears to support the intention for a stable in this space. As far as I can ascertain, stables tended to have solid floors for reasons of horse welfare – either cobbles, concrete, or as at MacKay's, bricks. This point, however, needs further investigation to be certain. On balance, I think it is probable that the construction of the brick pavement and stable building was concurrent, but further clarification of this point requires an historical investigation that is outside the scope of this report.

Given that the manufacture of the bricks was probably in the 1920s or 1930s, this date indicates the age of the brick pavement and probably also the stable building. At this time, the building was a stable, with a raised floor behind the brick pavement accessed through a sliding door at the rear. There is, however, evidence for a later modification, at which point the use of the building possibly changed.

First is the evidence of the sawn off post (4, Figure 11). The sawing of the post, carefully executed, left the post with a level surface (within the limits of a line level laid on the post), set slightly below the level of the surrounding bricks. Significantly, the post shows no sign of the cement plaster wash applied to the dish channel or bricks, and I interpret this to mean that the sawing of the post took place sometime after the completion of the brick pavement.

If lines are drawn from the front corners of where the floor is cut, perpendicular to the front wall, they intersect the wall very close to the sides of the opening in the front wall, and the butt of post 4 lies almost midway between them (Figure 11). Also between the lines, the pile alongside the concrete rim was missing, despite a search for one, yet the spacing of the piles alongside the rim strongly suggests that one should be present. Nor was there a pile in the next row back, where again spacing suggests that one should be present. On the other hand, there was a pile in about the right position along the rear wall.

Second is the evidence of the cut floor. The sliding door at the height of the floor I interpret as evidence that the floor once extended across the gap in front of the door. In support of this, pieces of wood angled at 45° are still between the studs on either side of the door even though the floor is no longer there. The lining up of the cut edges of the floor with the sides of the stalls on each side of post 4 and the front opening (Figure 11), and the removal of post and piles, seems to indicate a deliberate intention to create a space about 3 m wide in the centre of the stable. Significantly, parallel "splints" on either side strengthen the trusses where the posts are missing, but

I do not know when the strengthening took place. The gap is wide enough for a moderate sized horse-drawn vehicle such as a cart or wagon, or possibly a light truck to pull into the stable alongside the raised floor. Local knowledge refers to the area being a market garden, which trucked produce out for sale. Whether or not this is true I do not know, but the development of such an activity could provide a reason for the alteration of the stable.

When the modification took place is not certain. An aerial photograph of Camp Russell taken during the Second World War (MWH n.d.) shows the stable, but at a very small scale. Enlargement of the image shows the stable with a door in front, but it looks too small be the present 3.3 m wide doorway. The evidence is far from conclusive.

If the inferred age of the bricks is correct, then construction of the stable floor and buildings on the site were during or after the 1920s or 1930s. There was a subsequent modification of the building, which, if my interpretation of the aerial photograph is correct, was during or after the Second World War. Further documentary research might shed some light on the issue.

The stable building is a style that Ian Bowman (n.d.) considers dates from about 1900 AD. Given the somewhat later date for the brick pavement, it is possible that the building is one moved onto the site from elsewhere.

Conclusions

Bricks in a brick-paved stable floor beneath the stable are younger than 1900 AD, and probably as late as the 1920s or 1930s. It is probable, but not proven, that construction of the brick pavement was concurrent with the stable building. Sometime later, possibly during or after World War 2, there was a modification to the stable building to provide a space inside large enough for a small truck or similar vehicle.

Part III

Camp MacKay (Area C)

Introduction

In April 1942, the New Zealand Public Works Department undertook the task of constructing camps in the greater Wellington area, to house 20,000 men of the United States armed forces (Bioletti 1989). The construction of three camps in the Paekakariki area included Camp MacKay south of MacKays Crossing, on the eastern side of State Highway 1 (Figure 33).

The camp, completed early in 1943, housed some 4650 marines of the Sixth and Second Infantry Regiments (Bioletti 1989, Carrigan *pers com*, MWH n.d.). It contained streets, paths, a water supply, drainage, sewerage, electric power, and vehicle parks. Housing for the men was mainly in tents on wooden decks. Some other buildings had concrete floors (Carrigan *pers com*). Demolition of the camp after the war left very little sign of the American occupation on the ground surface. Today the land is a farm.

Over-bridge construction and road realignment affects the western part of Camp MacKay, above the old sea cliff (A Figure 33). The aerial photograph of the camp (Figure 33) shows no building construction in the western part of the camp, and the ground crossed by roads and tracks. The Kapuni gas pipeline passes through the land, as does a Telecom fibre-optic cable; both are clearly marked on the ground. Although the camp is not an archaeological site as defined by the Historic Places Act 1993, Transit New Zealand agreed, after discussion with the NZ Historic Places Trust, to monitor the earthworks and record locations of archaeological features. (Stripping of topsoil at the northeastern end of Camp MacKay later in the project, will be the subject of a separate report).

Stratigraphy and recording

Grey coloured topsoil 20cm to 30 cm thick overlies light brown to yellow brown subsoil formed in the old stream fan deposits. Trench diggers with 1 m wide, smooth-edged buckets stripped the topsoil (Figure 34), exposing archaeological features in the underlying subsoil. The features showed as patches of grey to black soil or, in the case of some burnt areas, as reddish brown patches of soil, at the interface between the topsoil and subsoil. Each feature was marked with a pin and bright coloured tape and numbered, and its location later recorded with survey quality GPS. Unfortunately, an archaeologist was not always present during the taking of GPS measurements, and loss of labels due to wet weather and disturbance of markers by cows, meant the loss of details for several points.

Map of archaeological features

Because no map of the camp was available, I prepared a map of the affected area based on a perspective grid I constructed over the western part of Camp MacKay, using the oblique aerial photograph (Figure 33) (Williams 1969). The locations of

some camp buildings and streets showed on a vertical aerial photograph taken after the war (MWH n.d.), and these provided a check on the accuracy of the grid and resulting map. GPS measurements, of road intersections and buildings identifiable on both the vertical aerial photograph and ground today, provided reference points for relating the map to the New Zealand Map Grid. The map (Figure 35) is not highly accurate, but is sufficient to provide an indication of where archaeological features lie, and to indicate that some straight line features uncovered are probably along the edges of tracks and roads, and possibly trenches for pipes (Figure A1:4, Appendix 1).

Archaeological remains

Table A1:1 (Appendix 1) lists the 133 archaeological features found, and Figures A1:1-4 (Appendix 1) show their locations. Nearly half of the features were discoloured patches of soil that included charcoal, although less than a third of these showed signs of reddened soil indicating probable burning *in situ*. Less than 10% of the features contained shell, usually as fragments, and usually in the topsoil (Figure 36). Except for a few (rocky shore) mussels found with two old buried telephone poles, nearly all of the shells were sandy shore tuatua (*Paphies (Mesodesma) subtriangulata*), occasional triangle shells (*Spisula aequilateralis*), Dosinia (*Dosinia anus*), and a whelk.

The shells were patchy, in lenses up to 10 cm thick that usually covered areas up to about 1 m across. There was no evidence to indicate that the shells were prehistoric. On the contrary, there was rarely any charcoal with them, no bone, and rarely any heat-cracked or fire burnt stones; there were, however, two rusty iron nails well down in one lens. The Americans actively pursued both hunting and fishing (Bioletti 1989), and it is possible that locally they also gathered shellfish from the beach. More likely, however, is the story related to me by "Horse", a retired farm worker from Whareroa Station. He says that some years ago (this would be after the Second World War) there was a caravan parked near the shells. After a day's work, some of the farm hands would go down to the beach to collect a feed of shellfish that they cooked at the caravan, and after eating the shellfish, discarded the shells nearby.

The discoloured patches were generally of irregular shape (Figure 37), with some very clear circular patches 20 cm to 30 cm in diameter containing charcoal (Figure 38). Although charcoal was wide spread, its main concentration was in the northern half of the cleared area; the main concentration of shell was in the northwest corner (Figure 35). Rubble, common in the southwest corner, included bricks, concrete, mortar, glass, coal, pipes, nails and wood, some probably left over after the demolition of the buildings after the war. It was generally close to the edge of the old sea cliff, probably dumped there to get it off the pasture. Straight lines marking changes in soil colour (Figure 39) are possibly pipelines along edges of tracks (Figure 35).

Portable artifacts that might reasonably be from the American occupation were generally rare. They include a small brownish-orange glass marble (Figure 40), which may or may not be American, picked up in the general vicinity of the camp. In addition, just outside the area of stripped topsoil, I recovered a deposit of cartridge cases, leather items, bottles, ceramic, and metal eroding from the side of a shallow drain cut to divert surface water from the construction site (Figures 41 & 42, Table 1, Appendix 2). The drain items appear to be part of a much larger deposit, probably

from a rubbish dump disturbed by construction of the Kapuni gas pipeline, which passes nearby. Porirua Museum has indicated a willingness to accept them.

Table 1: Catalogue of items recovered from the side of the drain at Camp MacKay. (For illustrations of the items, see Appendix 2).

Material	Items
Metal	56 x 0.308 inch used cartridge cases in varying stages of corrosion, all showing dimple from a firing pin.
	1 x iron plug, possibly a sump plug, still partly covered with red and cream paint.
	1 x rusty padlock, locked, attached to hasp and remains of a corroded (metal) container.
	1 x partial base of a tin can badly rusted.
	1 x seat or saddle in a very rusty condition, that is probably from a tractor or similar vehicle.
Glass	3 x green bottles, 2 with short necks similar to modern "stubbies", 1 with a longer neck similar to an "Appletise" bottle.
	1 x brown bottle neck, similar to the short neck green "stubbie" bottles, with a circular ridge.
Ceramic	8 x fragments of white ceramic that fit together forming part of a saucer. On the base is part of a trade mark that reads "Grindley, England. Hercule Vitr..." On the upper side is part of a motif with a belt buckle and the letter N. Manufacture of Grindley-ware with this trademark was between 1936 and 1954 (Godden 1961). Pieces possibly from an old NZR saucer.
Leather	1 x boot or shoe with a hole worn in the sole.
	1 x heel of a boot or shoe.
	2 x soles, 1 boot, one shoe.
	2 x sides of a boot upper with metal lacing eyelets.
	1 x toe cap of a boot or shoe.
	1 x part of a shoe upper.
	2 x assorted pieces of leather, probably parts of a shoe.
	1 x glove.
	4 x parts of a leather strap with a rusty buckle.

Conclusion

Although the demolition and cleaning up of the camp after the American occupation removed many of the traces of Camp MacKay, there are remains present from which careful and detailed archaeological investigation at some future date, would probably retrieve useful information about the occupation.

Part IV

Camp Russell (Area D)

Introduction

Included in the three camps the Public Works Department constructed at Paekakariki was Camp Russell, on the west side of MacKays Crossing, just inside the present Queen Elizabeth Park entrance (Figure 43). The camp housed some 4850 marines of the Second Infantry Regiment (MWH n.d.) (Bioletti 1989). Like Camp MacKay, it contained streets, paths, a water supply, drainage and sewerage pipelines, electric power, and vehicle parks. Housing for the men was mainly in tents on wooden decks, some other buildings had concrete floors. Demolition of the camp after the war left very little sign of the American occupation on the ground surface. Today the land is part of Queen Elizabeth Park.

The relocation site of the stable building is the old north corner of Camp Russell (Figure 43). Site preparation required stripping of the topsoil, and deposition of a base course of compacted gravel to provide a firm foundation for the building and its approaches. Because the depth of excavation did not generally exceed the topsoil thickness, and the burial of remains uncovered was almost immediate, monitoring focused on recording the positions of features only – the nature of the remains found required no excavation, and I therefore carried out none. Artifacts were rare, and generally consisted of rusty nails, a bolt, and pieces of concrete. With one exception, I made no collection of artifacts. The exception was broken crockery found at the top of a rubbish pit. Site clearance uncovered a road intersection that was formerly part of Camp Russell, and a small area of built-up ground littered with pieces of concrete that was probably the location of buildings (Figures 43 and 44).

Stratigraphy and recording

A trench digger with a metre-wide smooth edged bucket removed the topsoil over the entire site. Pirie Surveying mapped, under my supervision, the positions and heights of all features uncovered, using a survey quality, Sokkia Radian IS RTK GPS. I used Concord2 (Land Information New Zealand) to convert coordinates from Wellington meridional circuit NZ Geodetic Datum 1949 to New Zealand Map Grid (Table A3:1, Appendix 3).

Natural stratigraphy is brown slightly peaty silt topsoil overlying grey silt subsoil. On top of the silt is a discontinuous layer of yellow angular to sub-angular gravel, silt and clay rubble, up to about 30 cm thick that provided a firm and dry foundation for the roads and adjacent structures. In places, grey sub-round gravel replaced the yellow rubble, but there appears to be no significance to the distribution of the two types of material except that the small distance of road way uncovered comprised only the yellow rubble. A small test pit showed the yellow rubble resting directly on the silt topsoil, but I do not know whether this applied over the whole site. Overlying the rubble was thin grey topsoil.

A trench for water reticulation, still in use (Peter Sannazzaro *pers com*), ran along the centre of one of the roads; its fill of grey gravel clearly defined the route (Figure 45).

Deposits up to a metre or so across of blue-grey angular quarried rock defined what are probably soak pits dug into the silt.

Archaeological remains

Figure 44 shows the layout of features that the topsoil stripping uncovered. Table 2 lists the features along with a brief description; Figures 46 to 51 illustrates selected features. Ironically, some of the broken crockery recovered from the top of the rubbish pit (5 Figure 44) is Japanese-made. Pieces, from a broken hand-painted cup (Appendix 2, Figures A2:8, A2:9), showed a trade mark indicating Japanese manufacture; other pieces showed no trade mark but Betty McFadgen (*pers com*) identifies some of them as pieces of Japanese porcelain. There are no dates of manufacture, although the wording "Trade Mark" and "Made in Japan" indicate a 20th Century date (Cushion 1980). Further determination of dates is outside the scope of this report.

Table 2. Archaeological features that topsoil stripping exposed in Camp Russell. For location of features, see Figure 44. Northings and eastings are GPS-measured New Zealand map grid coordinates (Table A3:1, Appendix 3).

Feature	Northing	Easting	Description	Photo ref
1	2676611.4	6024523.6	Roughly rectangular deposit of blue-grey angular quarried greywacke rock 0.9 m x 0.9 m. Aligned parallel to adjacent road. Rocks up to 20 cm long on longest dimension.	Fig. 46
2	2676608.7	6024523.1	Roughly triangular deposit of blue-grey angular quarried greywacke rock 1 m x 1 m x 1 m. Aligned parallel to adjacent road. Rocks as for Feature 1.	Fig. 47
2a	2676596.9	6024520.4	Roughly oval deposit of blue-grey angular quarried greywacke rock. 0.9 m x 1.4 m. Long axis is perpendicular to the road. Rocks as for Feature 1.	
2b	2676594.7	6024519.4	Roughly oval deposit of blue-grey angular quarried greywacke rock 0.9 m x 1.1 m. Long axis is perpendicular to the road. Rocks as for Feature 1.	
3	2676601.1	6024494.9	Piece of broken concrete 1 m long x 0.25 m wide x 0.22 m deep. Aggregate = sub-round pebbles up to 6 cm long, but mostly less than 3 cm long; some weathered. Next to a piece of asbestos 12 cm long and a rusty nail. Other concrete pieces of smaller size nearby (see Figure plan).	Fig. 48

4	2676608.7	6024499.8	Piece of broken concrete roughly rectangular 48 cm x 59 cm. Aggregate = subround gravel up to 3 cm, plus weathered angular gravel up to 6 cm.	Fig. 49
5	2676591.3	6024483.9	Irregular patch of rubbish; edge is reddened and blackened, indicating burning *in situ*. Probably a pit. Contents include broken ceramic (see text), rusty nails, burnt wood, and 2 large boulders (up to 40 cm on long axis) and several smaller stones of angular unweathered blue-grey greywacke. 0.75 m x 0.80 m. Crockery collected.	Fig. 50
6	2676548.6	6024456.6	Oval patch of concrete, 0.9 m x 0.6 m, with two postholes 11 cm square. Aggregate = sub-round gravel up to 3.5 cm, but most less than 1 cm.	Fig. 51
7	2676600.1	6024530.3	Discoloured burnt silt (from *in situ* fire) 2 m x 1 m.	
8	2676594.8	6024525.3	Yellow rubble patch 1.5 m x 0.8 m.	

Conclusion

Although the demolition and cleaning up of the camp after the American occupation removed many of the traces of Camp Russell, there are remains present from which careful and detailed archaeological investigation at some future date, would probably retrieve useful information about the occupation.

Part V

The Paddock (Area E)

Introduction

The paddock is at the foot of the hillside on the eastern side of SH1, on the north bank of the small stream that flows along the north boundary of Camp MacKay (E Figure 1). It is on part of the stream fan. The location, flat well-drained land at the mouth of a small stream, is where one might reasonably expect archaeological activity. There was, however, no surface indication of any archaeological remains, and I monitored clearance of the site as a precautionary measure. There were no archaeological remains found.

Methods

A trench digger with a smooth-edged bucket stripped the topsoil, clearing an area about 56 m long and 16 m wide (Figure 52), exposing stream deposited silt and gravel. Because the site contained no archaeological remains, it did not justify calling in the project surveyors to provide accurate GPS recording of the cleared area. I mapped the boundary of the cleared area using a handheld Garmin GPS 76 (Table 3), and the delineation of the boundary (Figure 52) is therefore only approximate.

Table 3. NZ Map grid coordinates outlining the area of cleared topsoil at the Paddock. Coordinates using hand held Garmin GPS76, with no differential correction.

East m	North m
2676951	6024305
2676965	6024285
2676967	6024266
2676961	6024250
2676954	6024252
2676950	6024245
2676944	6024245
2676951	6024276
2676944	6024298
2676940	6024291
2676935	6024293

Results and Discussion

To the south of the area, the silt and gravel was a grey colour and overlay an older yellow-coloured silt and gravel that covered the remainder of the site. The yellow silt contained occasional isolated flecks of charcoal. The site clearance uncovered no archaeological remains, or any evidence of cultural activity.

Part VI

Conclusions

Archaeological Sites at MacKay's Crossing

The sites monitored are all historic. Although I monitored the stripping of topsoil at five locations, covering in total more than 4.5 ha of ground, I found no prehistoric archaeological remains, nor any historic archaeological remains older than about 1920 AD. Archaeological remains older than the 1920s were possibly never present in the areas investigated, or people using the sites since the 1920s obliterated them.

I estimate that the sand layer on the western side of SH1 north of MacKay's Crossing is less than 70-100 years old. Its deposition was probably to provide dry, level ground. The sand is adjacent to Camp Russell, to SH1, and to a playing field, any of which could provide sufficient reason for the infilling.

The stable floor uncovered during the removal of the stable building is younger than 1900 AD, and probably as late as the 1920s or 1930s. It is very likely, but not fully proven, that construction of the brick pavement was concurrent with the construction of the stable building. Sometime later, possibly during or after World War 2, there was a modification to the stable building to provide a space inside large enough for a small truck or similar vehicle.

Although the demolition and cleaning up of Camps MacKay and Russell after the American occupation removed many of the traces of the camps, there are remains present from which careful and detailed archaeological investigation at some future date, would probably retrieve useful information about the occupation.

Clearance of topsoil from the Paddock uncovered no archaeological remains, or any evidence of cultural activity.

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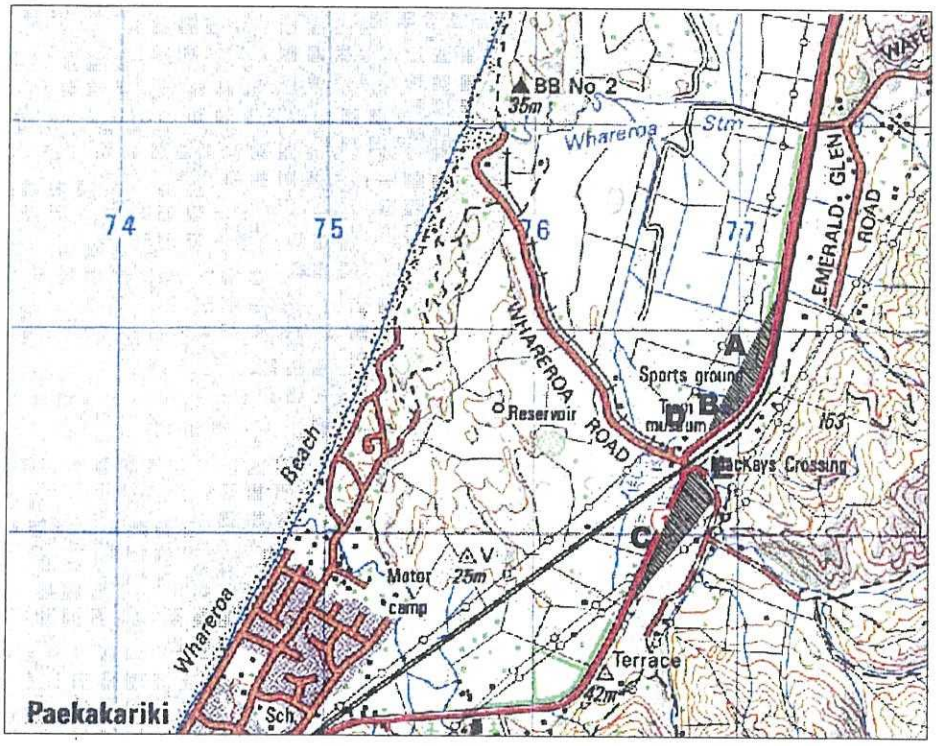

Figure 1. Locality map for MacKay's Crossing showing areas monitored for archaeological remains. A = sand sheet (shown cross-hatched), B = barn and stables (black dot), C = Camp MacKay (shown cross-hatched), D = Camp Russell, E = Paddock. (Topographic map is part of sheet R26, NZMS 260 series, Land Information New Zealand (LINZ)).

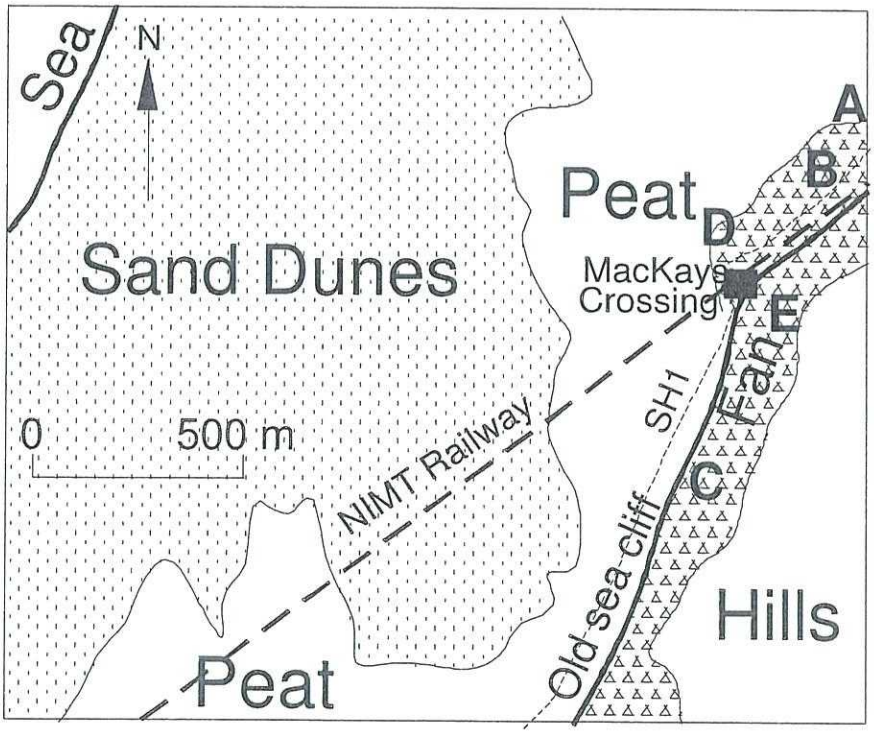

Figure 2. Sketch map of surface geology at MacKays Crossing, drawn from aerial photographs. A, B, C, D, E as for Figure 1.

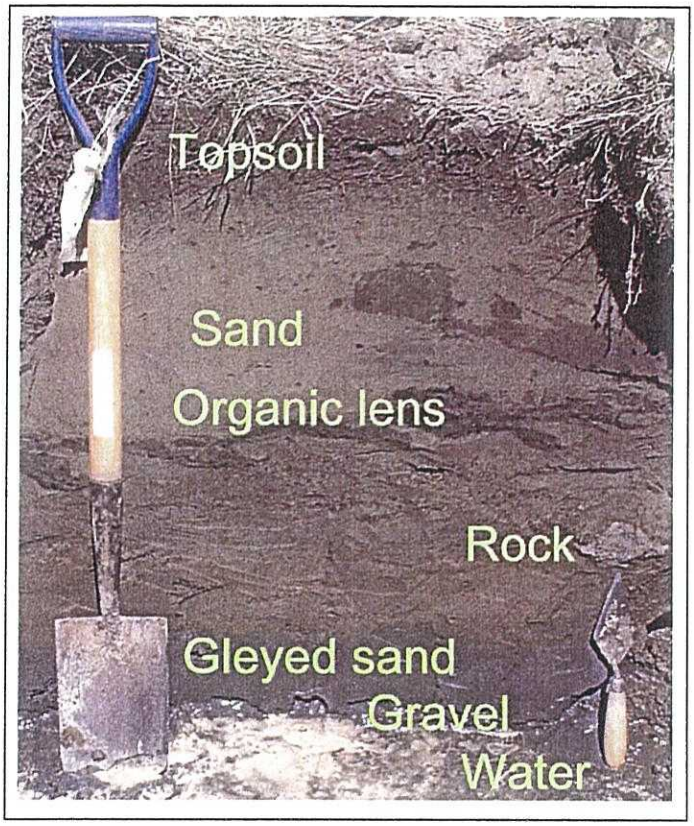

Figure 5. Section through sand sheet (= A, Figure 1).

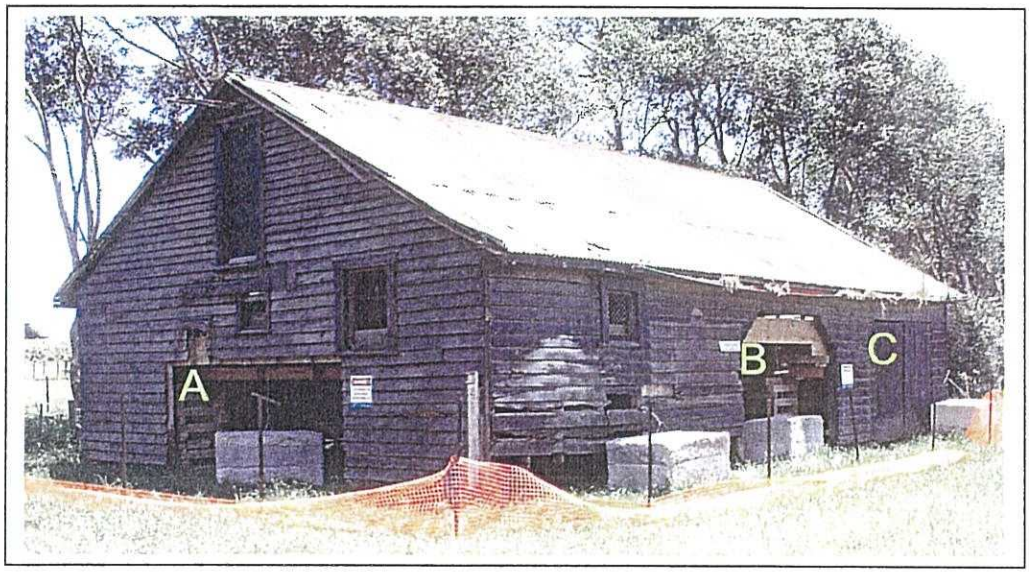

Figure 6. View of barn from north east corner. A = opening cut for removal trailer. B = barn doorway. C = barn doorway with door.

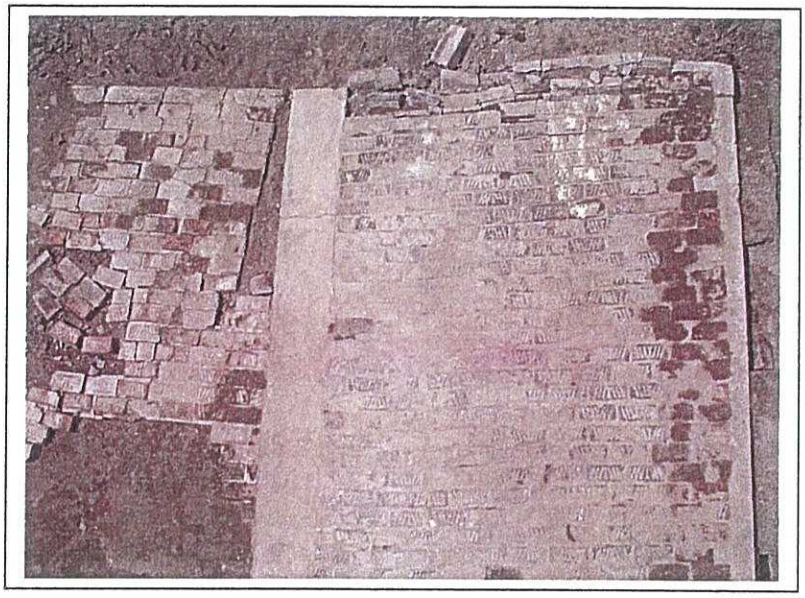

Figure 10. Detail of brick paving at southeast end. Note dislodged rim and bricks skewed out of position.

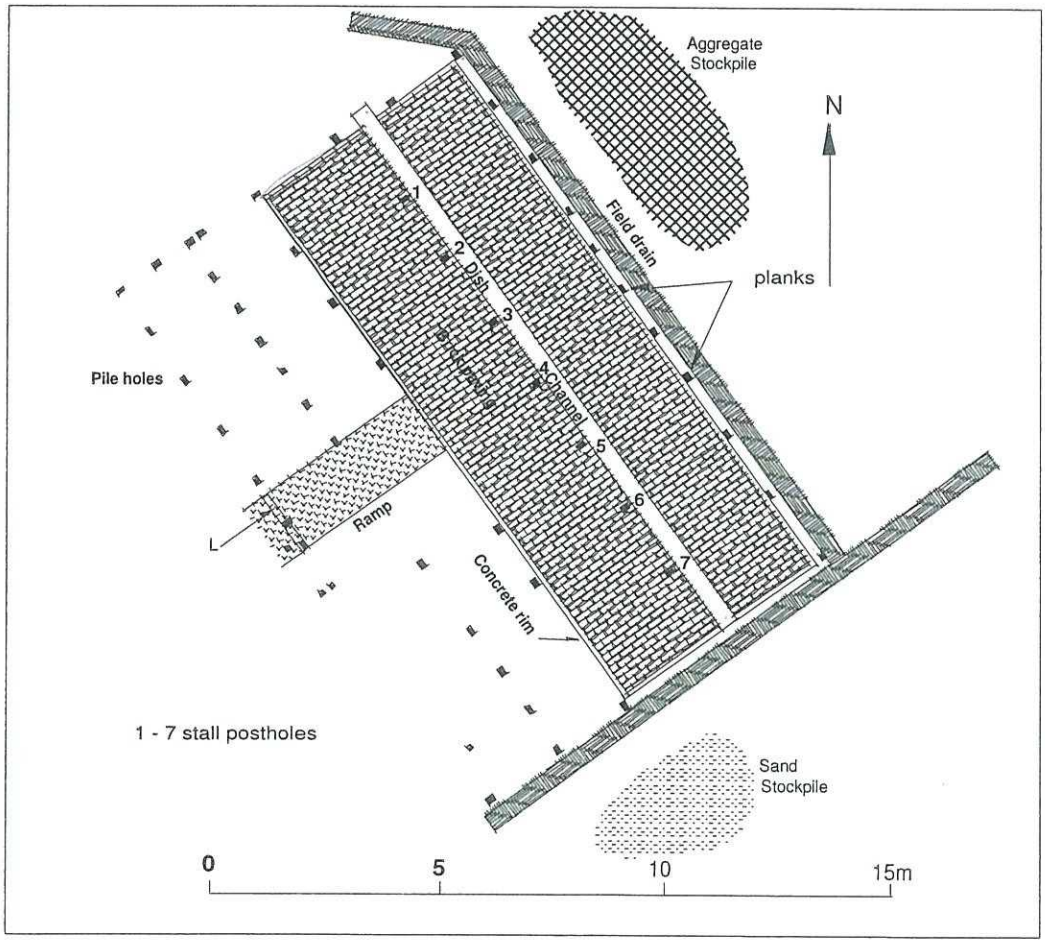

Figure 11. Plan of archaeological features uncovered beneath the barn site. Black rectangles are locations of piles, except those numbered 1 to 7, which are postholes. Arrows labelled "planks" point to opposite ends of two planks laid alongside the concrete rim (Figure 13). For explanation, see text. L = linear depression left by the barn wall in the ramp. Aggregate stockpile inferred from the presence of gravel similar to that in channel concrete. Sand stockpile inferred from the presence of sand similar to that used to bed bricks in the pavement.

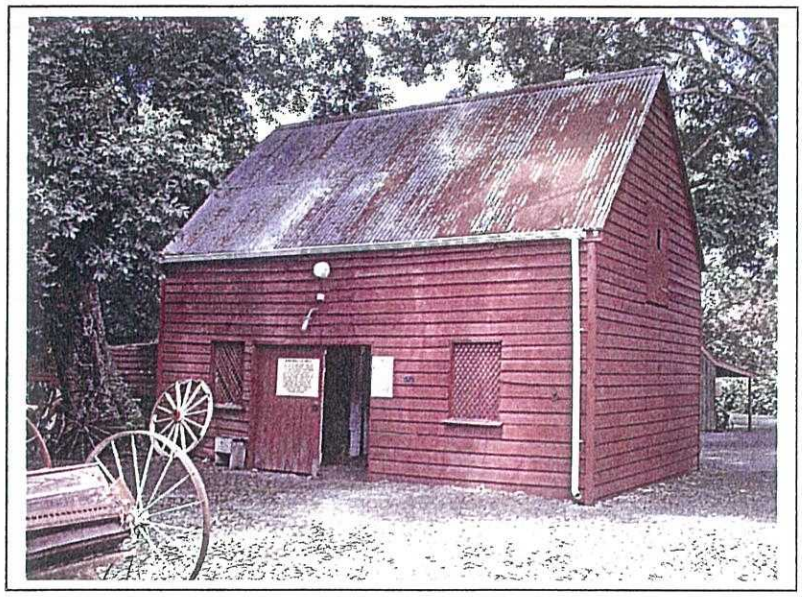

Figure 15. Exterior of stable at Cobblestones in Greytown.

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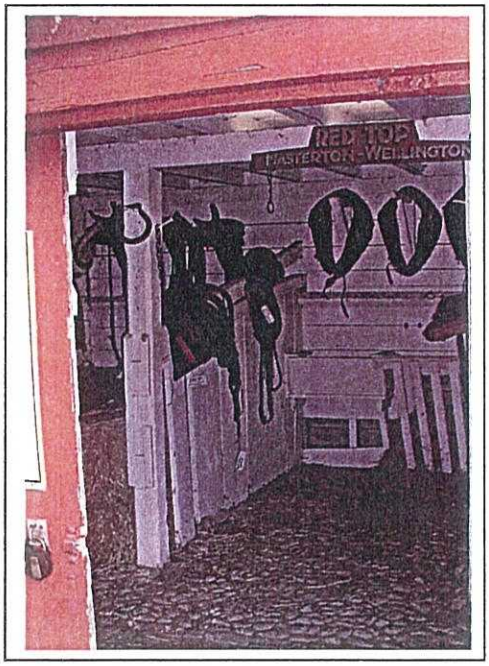

Figure 16. Interior of stable at Cobblestones Museum, Greytown. Note the dish channel and stall.

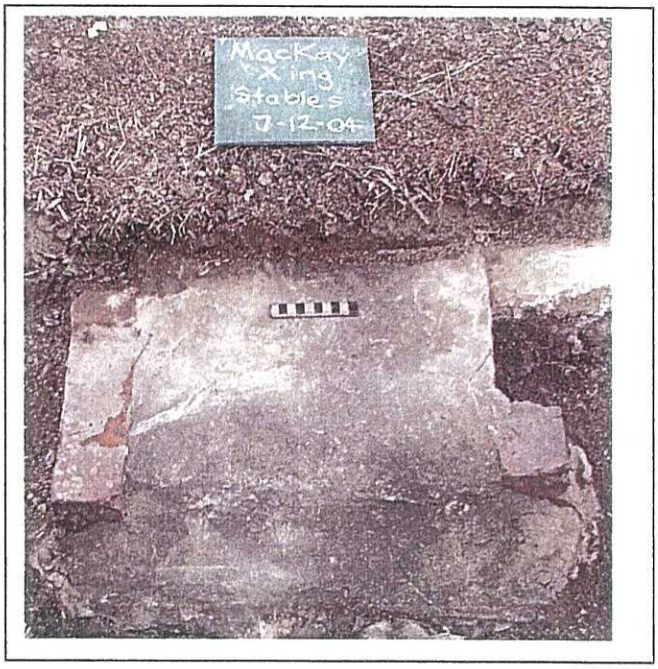

Figure 17. Channel discharge at northwest end of stable floor. Scale = 10 cm.

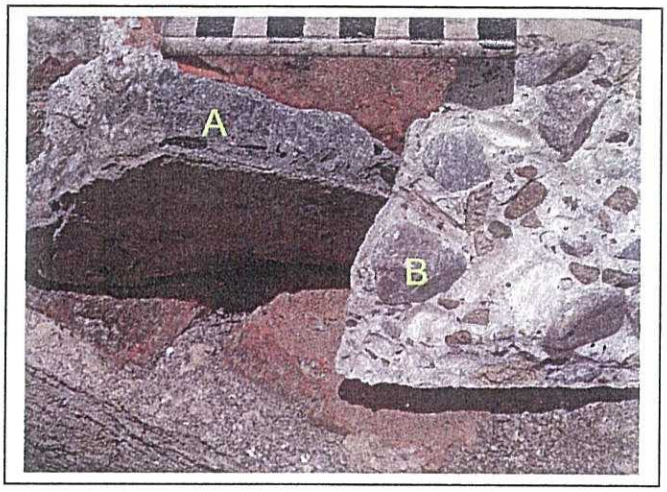

Figure 22. Comparison of the concrete forming the channel (=A) and that forming the rim around the brick paving (=B). Scale = 10 cm.

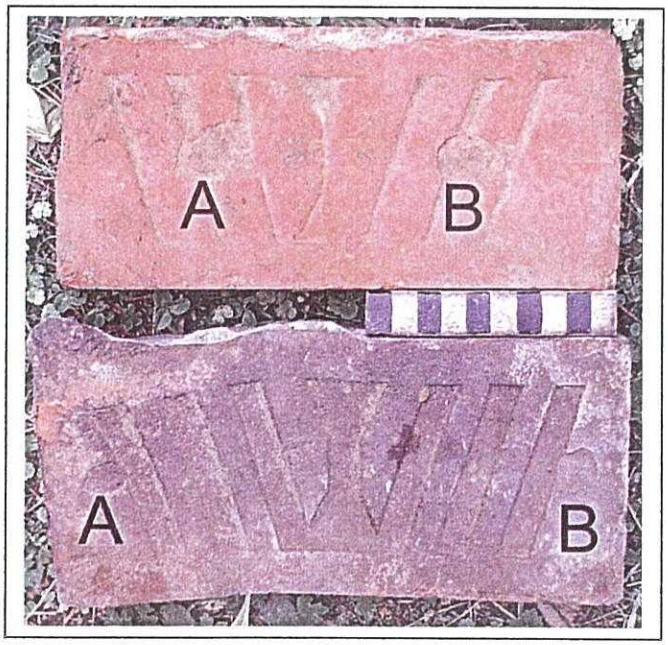

Figure 23. Bricks from pavement showing WW pattern and marks of bolts holding the pattern inside the steel mold (=A,B). Note deformation of lower brick from excess kiln heat. Scale = 10 cm.

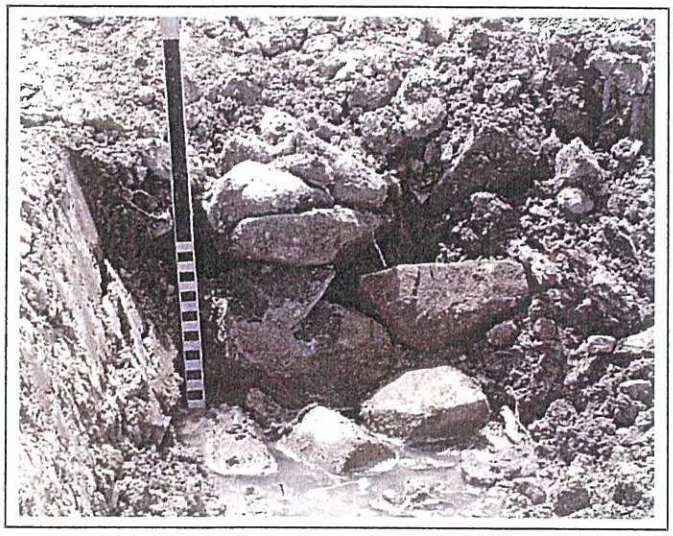

Figure 24. Cross section of stable field drain. Scale = 40 cm.

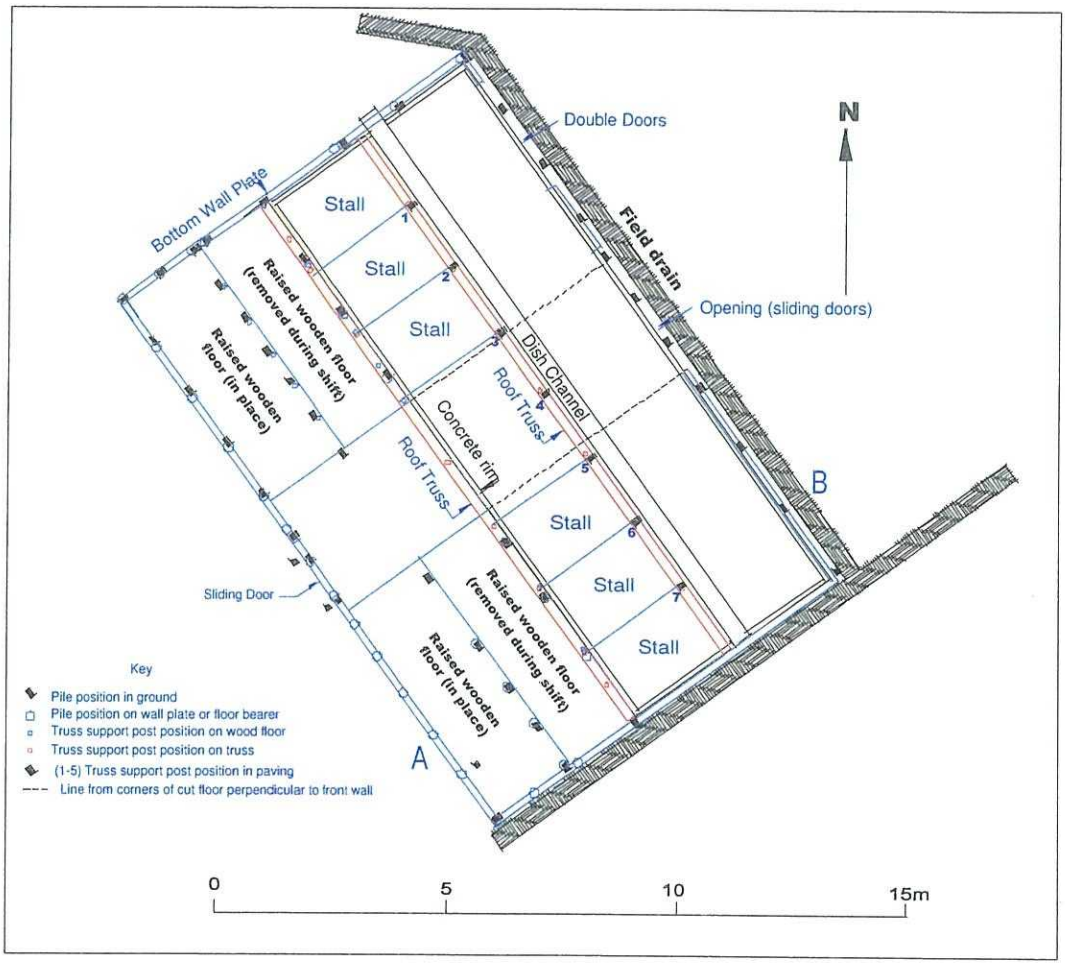

Figure 29. Plan of stable building superposed on plan of excavated pile holes. Note area of missing wooden floor along southwest wall. Dashed lines from edges of missing floor drawn perpendicular to front wall – note close correspondence with sides of front opening. A-B = cross section of stable building (Figure 31).

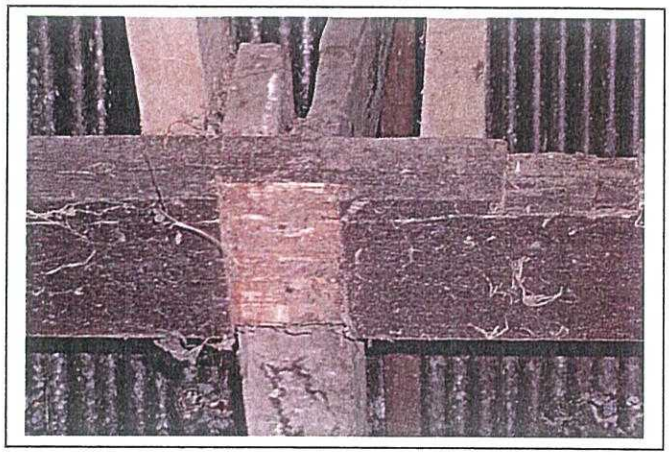

Figure 30. Bottom face of roof truss showing rebate for top of stall post. Note the earlier rebate in the side of the truss from an earlier use.

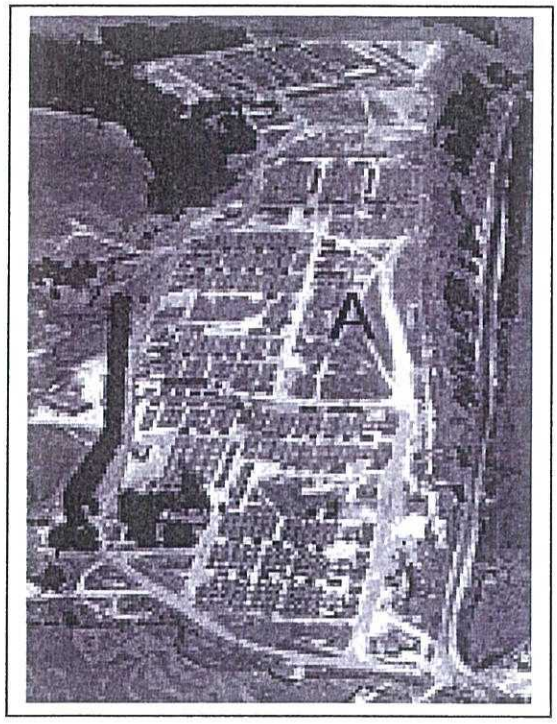

Figure 33. Oblique aerial view of Camp MacKay taken during the 2nd World War. Archaeological investigation in area marked A. MacKays road and rail crossing in bottom right corner, SH1 runs along right hand side of photo.

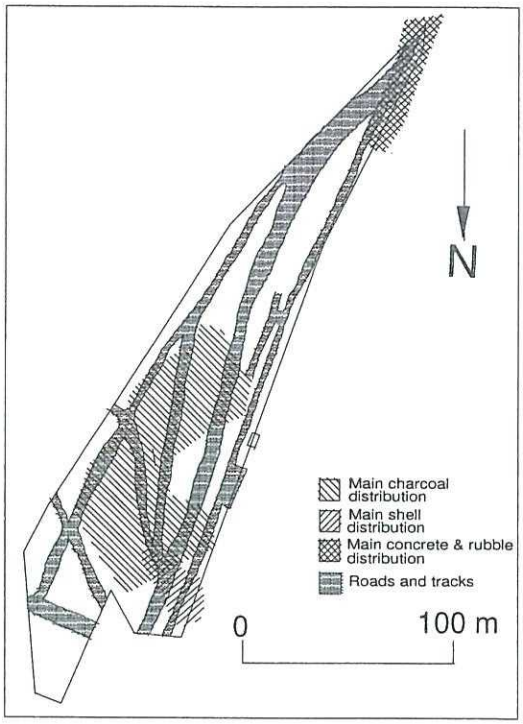

Figure 35. Map of area A showing distribution of main charcoal, shell, and concrete rubble deposits in area of stripped topsoil. Note that north is to bottom of plan for comparison with Figure 32.

Figure 34. Photograph looking south showing area of topsoil stripping (= A, Figure 33).

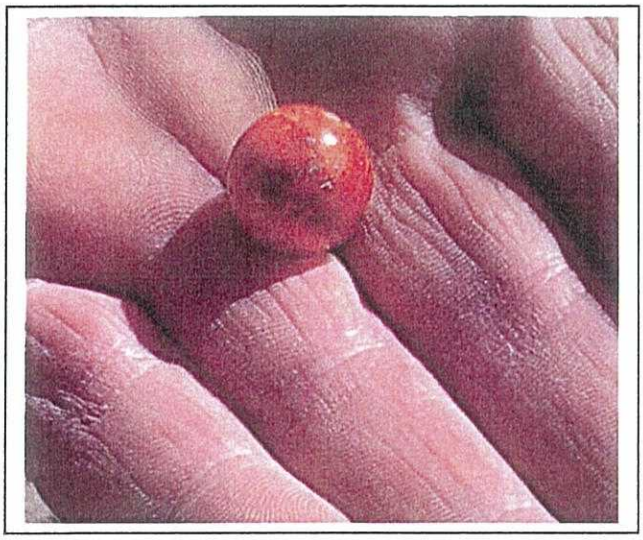

Figure 40. Small glass marble found at Camp MacKay.

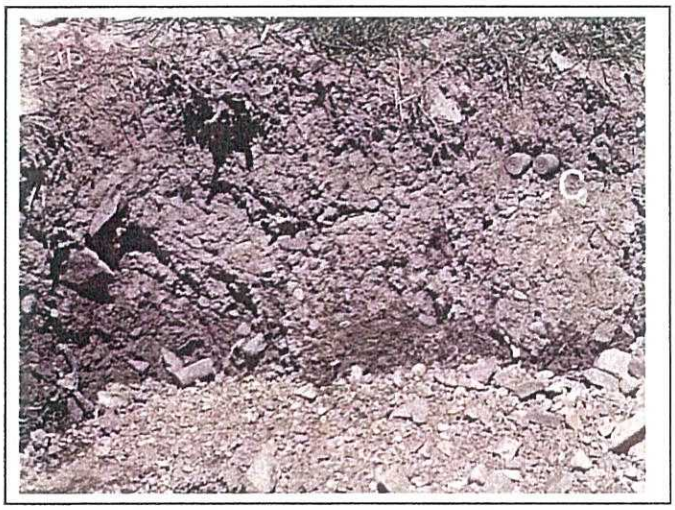

Figure 41. Cartridge Cases (=C), edge of drain, Camp MacKay.

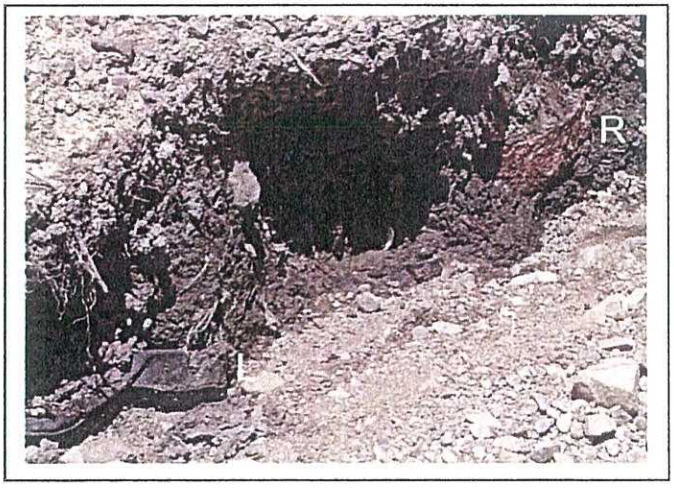

Figure 42. Rusty iron (=R) and leather glove (=L), edge of drain, Camp MacKay.

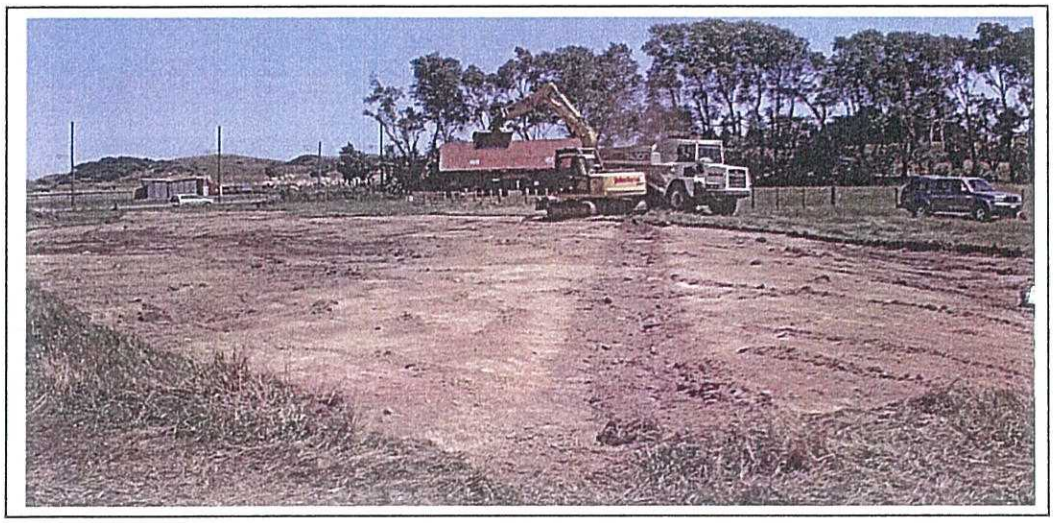

Figure 45. Camp Russell looking southwest showing road and trench with water pipe.

Figure 46. Feature 1, Camp Russell. For details see Table 2.

Figure 47. Feature 2, Camp Russell. For details see Table 2.

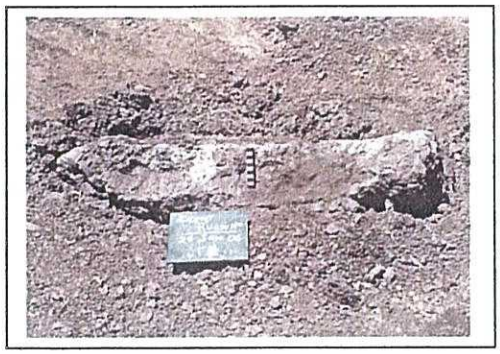

Figure 48. Feature 3 (concrete), Camp Russell. Scale = 10 cm. For details see Table 2.

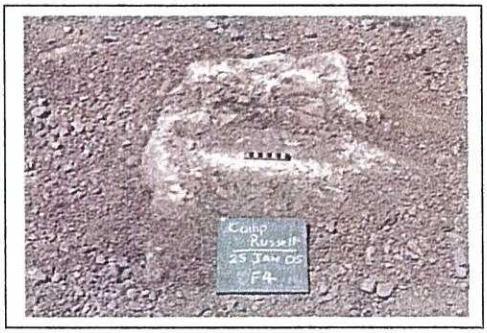

Figure 49. Feature 4, Camp Russell. Scale = 10 cm. For details see Table 2.

Appendix One

Camp MacKay Archaeology

Table A1:1. Archaeological features recorded at Camp MacKay. Coordinates for entries with * in the height column measured with hand held Garmin GPS76 unit. All other coordinates measured with a survey quality Sokkia Radian IS RTK GPS unit. "Lost Label" = label largely illegible, "Lost Tag" = tag totally illegible or missing. Plotting classification = categories used for plotting Figures A1:1-4.

NZ Map Grid Coordinates		Height (m)	Plotting Classification	Archaeological Description	Field Code	Plot Number
East (m)	North (m)					
2676549.05	6023758.61	35.58	Charcoal	Charcoal patch (30 cm x 59 cm)	K4	1
2676559.89	6023791.77	34.05	Charcoal	Charcoal and charcoal-darkened soil (18 cm x 18 cm)	K11	2
2676560.41	6023791.61	34.06	Charcoal	Charcoal patch (10 cm x 10 cm)	K10	3
2676561.55	6023789.28	34.20	Charcoal	Charcoal and darkened soil line (running west to east 100 cm)	K9	4
2676567.37	6023769.45	35.30	Charcoal	Charcoal patch (6 cm x 6 cm)	K1	5
2676573.60	6023818.74	32.83	Charcoal	Charcoal and burnt soil (10 cm x 9 cm)	K15	6
2676573.78	6023818.50	32.87	Charcoal	Charcoal patch (2.5 cm x 2.5 cm)	K15A	7
2676592.24	6023807.03	33.85	Charcoal	Charcoal and patch of dark soil	O	8
2676594.15	6023814.38	33.55	Charcoal	Charcoal & wood	X	9
2676594.24	6023826.92	32.92	Charcoal	Charcoal and reddened soil	#	10
2676612.58	6023848.08	32.56	Charcoal	Charcoal and dark soil patch (80 cm x 40 cm)	9	11
2676613.00	6023931.00	27.73	Charcoal	Charred wood	M7	12
2676615.00	6023907.00	28.86	Charcoal	Charcoal patch (5 cm x 6 cm)	M5	13
2676622.35	6023897.80	29.75	Charcoal	Charcoal and wood (64 cm x 118 cm)	B14	14
2676629.84	6023905.22	29.24	Charcoal	Charcoal and wood (40 cm x 38 cm)	B12	15
2676630.00	6023976.00	24.95	Charcoal	Charcoal pieces in edge of stripped area	M20	16
2676631.20	6023876.22	31.00	Charcoal	Charcoal and reddened soil (40 cm x 40 cm)	E?	17
2676633.00	6023971.00	25.06	Charcoal	Charcoal pieces and charcoal-darkened soil	M21	18
2676633.99	6023889.63	30.16	Charcoal	Charcoal (12 cm x 12 cm)	Q	19
2676634.00	6023966.00	25.29	Charcoal	Charcoal patch (16 cm x 14 cm)	M14	20

2676667.22	6023937.87	26.10	Charcoal	Charcoal patch	K	52
2676668.34	6023982.91	24.08	Charcoal	Charcoal patch (135 cm x 71 cm)	B18	53
2676668.59	6023953.08	25.32	Charcoal	Charcoal patch (10 cm x 8 cm)	R	54
2676670.07	6023974.07	24.46	Charcoal	Charcoal patch (51 cm x 28 cm)	B19	55
2676670.32	6023993.33	23.64	Charcoal	Charcoal patch (? cm x 115 cm)	E2	56
2676671.28	6023940.92	25.83	Charcoal	Charcoal patch	J	57
2676671.60	6024000.65	23.33	Charcoal	Charcoal patch (55 cm x 20 cm)	B15	58
2676672.36	6023972.03	24.51	Charcoal	Charcoal piece (2 cm x 2 cm)	B1	59
2676677.68	6023939.28	25.88	Charcoal	charcoal and reddened soil (25 cm x 25 cm)	Ci	60
2676677.78	6023984.97	23.93	Charcoal	Charcoal patch (56 cm x 40 cm)	B16	61
2676678.10	6023990.57	23.78	Charcoal	Charcoal patch (50 cm x 24 cm)	B17	62
2676681.61	6023943.94	25.68	Charcoal	charcoal and reddened soil (42 cm x 50 cm)	C	63
2676681.70	6023959.9	25.02	Charcoal	charcoal and reddened soil (38 cm x 45 cm)	H	64
2676683.30	6023945.67	25.59	Charcoal	charcoal and reddened soil (41 cm x 28 cm)	G	65
2676687.36	6023968.12	24.56	Charcoal	charcoal and reddened soil (28 cm x 22 cm)	F	66
2676689.37	6023961.56	24.70	Charcoal	Charcoal and reddened soil (19 cm x 12 cm)	A?	67
2676632.00	6023973.00	24.94	Charcoal circle	Charcoal circle (30 cm diameter)	M16	68
2676633.00	6023969.00	25.13	Charcoal circle	Charcoal circle (30 cm diameter)	M15	69
2676633.00	6023970.00	25.17	Charcoal circle	Charcoal circle (25 cm diameter)	M17	70
2676641.00	6023976.00	24.61	Charcoal circle	Charcoal circle (26 cm diameter)	M22	71
2676658.60	6023982.81	24.19	Charcoal circle	Charcoal circle (25 cm diameter)	Q1	72
2676575.80	6023810.59	33.29	Dark soil	Line of darkened soil (3m long x 35 cm wide)	K14	73
2676599.04	6023827.96	32.90	Dark soil	Dark patch soil (45cmx35cm) (Figure black patch)	4	74
2676599.94	6023829.54	32.89	Dark soil	Circular patch dark soil (20cm diameter)	10	75
2676601.32	6023832.50	32.89	Dark soil	Circular patch dark soil (30cm diameter)	3	76
2676602.18	6023827.76	33.00	Dark soil	Dark patch soil (20cm diameter)	8	77
2676602.21	6023827.76	33.00	Dark soil	Dark patch soil (20cm diameter)	7	78
2676603.41	6023827.36	33.15	Dark soil	Dark patch soil (20cm diameter)	5	79
2676603.92	6023827.90	33.12	Dark soil	Dark patch soil (20cm diameter)	6	80
2676631.00	6023975.00	24.86	Dark soil	Grey soil patch (rectangular 28 cm x 28 cm)	M18	81
2676631.00	6023977.00	24.71	Dark soil	Grey soil patch (rectangular 30 cm x 43 cm)	M19	82

2676668.92	6023962.58	24.89	Wood	Wood piece (6 cm x 3 cm)	B6	114
2676680.47	6023958.85	25.02	Wood	Wood	I	115
2676591.28	6023846.45	31.70	Lost label	Lost label	Q7	116
2676592.62	6023807.24	33.81	Lost label	Lost label	HOLE2	117
2676611.75	6023885.13	30.69	Lost label	Lost label	K25	118
2676621.63	6023898.09	29.77	Lost label	Lost label	Q6	119
2676644.75	6023948.60	26.01	Lost label	Lost label	Q5	120
2676649.86	6023967.49	24.93	Lost label	Lost label	Q2	121
2676655.55	6023942.63	26.11	Lost label	Lost label	Q3	122
2676657.32	6023942.16	26.09	Lost label	Lost label	Q3	123
2676659.18	6023934.84	26.33	Lost label	Lost label	Q4	124
2676611.00	6023909.00	28.81	Lost tag	Lost tag	?	125
2676613.00	6023929.00	27.74	Lost tag	Lost tag	?	126
2676623.00	6023956.00	26.31	Lost tag	Lost tag	?	127
2676624.00	6023949.00	26.42	Lost tag	Lost tag	?	128
2676625.00	6023960.00	25.77	Lost tag	Lost tag	?	129
2676629.00	6023951.00	26.24	Lost tag	Lost tag	?	130
2676637.00	6023952.00	26.08	Lost tag	Lost tag	?	131
2676637.00	6023952.00	26.10	Lost tag	Lost tag	?	132
2676645.00	6023949.00	25.93	Lost tag	Lost tag	?	133
2676702.0*	6023935.0*	--------	Rubbish Dump	Rubbish Dump	---	134

* = coordinates measured with Garmin GPS76 handheld GPS unit.

Appendix Two

Illustrations of artifacts recovered from Camps MacKay and Russell.

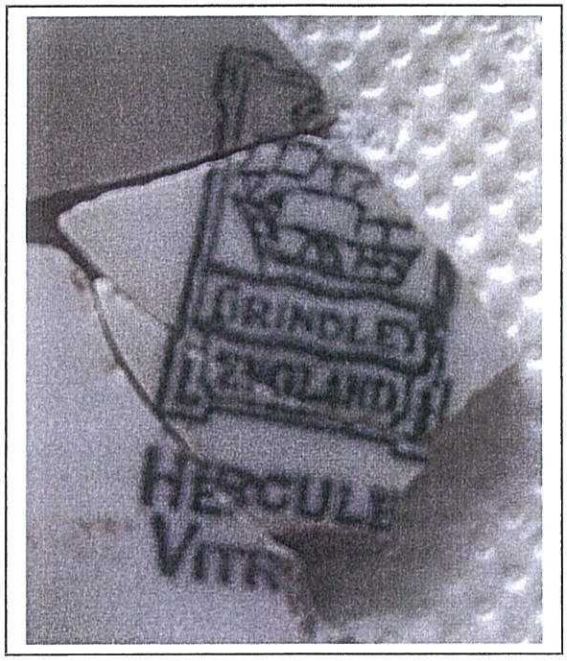

Figure A2:1. Ceramic pieces from drain at Camp MacKay. Underside showing trademark.

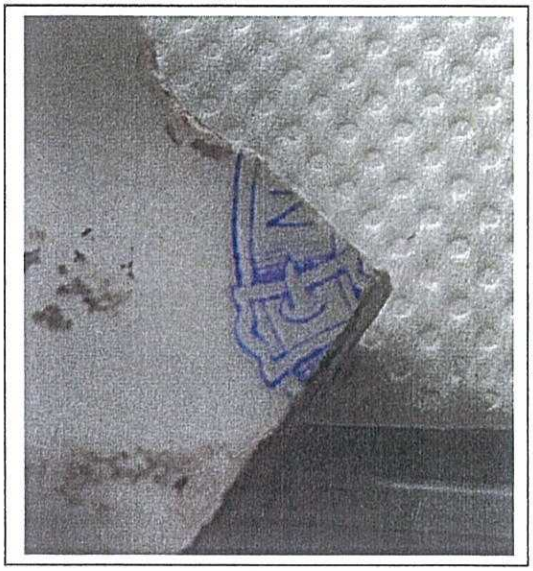

Figure A2:2. Topside of ceramic piece from drain at Camp MacKay.

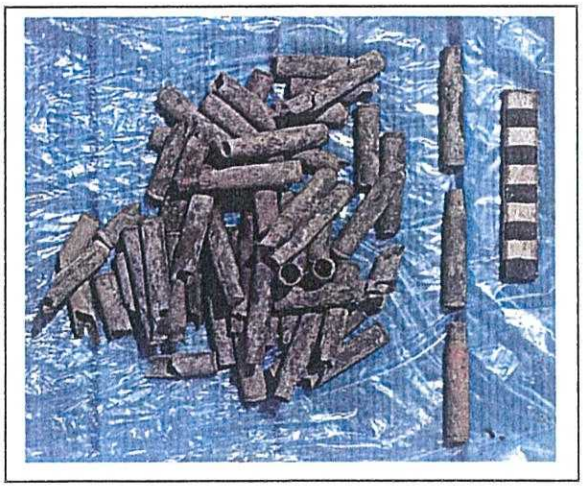

Figure A2:3. Cartridge cases from drain at Camp MacKay. Scale = 10 cm.

Figure A2:4. Metal objects from drain at Camp MacKay – in order clockwise, padlock, metal plug, base of container. Scale = 10 cm.

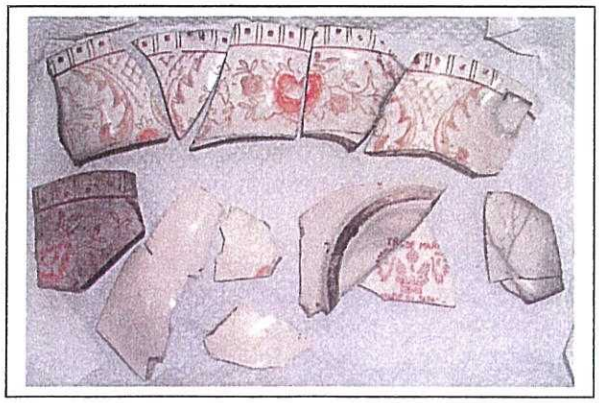

Figure A2:8. Pieces of a broken cup made in Japan found in Feature 5, Camp Russell.

Figure A2:9. Close-up of the trade mark on the base of the broken cup in Figure A2:8.

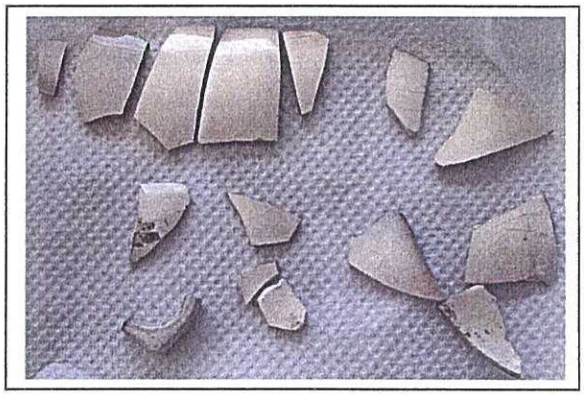

Figure A2:10. Pieces of ceramic from feature 5, Camp Russell. Probably Japanese ceramic.

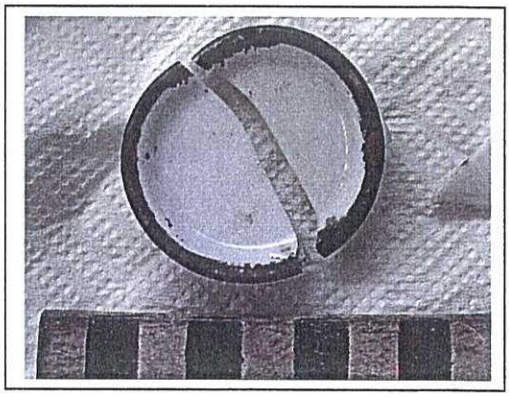

Figure A2:11. Base of a small broken ceramic vessel, Feature 5, Camp Russell. Probably Japanese ceramic. Scale = centimetres.

F7	2676600.10	6024530.30
F8	2676594.80	6024525.30
F4	2676608.70	6024499.80
F3	2676601.10	6024494.90
CONCRETE	2676601.50	6024493.90
CONCRETE	2676606.70	6024492.50
CONCRETE	2676609.10	6024491.70

CONCRETE	2676610.80	6024494.10
CONCRETE	2676609.90	6024495.60
CONCRETE	2676605.50	6024498.80
F5	2676591.30	6024483.90
Spot Height	2676585.80	6024478.90
F6	2676548.60	6024456.60