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AN OPEN IN SETTLEMENT IN TAMAKI, AUCKLAND, NEW ZEALAND.
Excavation of sites R11/887, R11/888 and R11/899.

by

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AN OPEN SETTLEMENT IN TAMAKI, AUCKLAND, NEW ZEALAND

Excavation of sites R11/887, R11/888 and R11/899

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ABSTRACT

Prior to development of a block of land at Fisher Road, Tamaki, South Auckland, it was investigated archaeologically. Three main sites were excavated - R11/887, R11/888 and R11/899. Site R11/890 was also test excavated and other possible archaeological sites and features were tested. The excavations are described.

Evidence was found for houses, storage structures, cooking and specialised activity areas. The sites were interpreted as part of a settlement pattern consisting of undefended hamlets associated with the pa of Te Apunga o Tainui. The sites were probably occupied during the latter half of the sixteenth century.

1. INTRODUCTION

This report describes the results of salvage excavations at Fisher Road*, Tamaki City. They were undertaken by the authors, on behalf of the New Zealand Historic Places Trust in 1985 under N.Z. Historic Places Trust permit numbers 1985/18 and 1985/20 for thirteen weeks between May and October, 1985. The sites investigated were situated on a 20 ha block of land on the eastern side of Fisher Road (Fig.1). They lay about 1 km from the former volcanic cone pa of Te Apunga o Tainui (McLennan Hills) which has now been totally destroyed by quarrying. They are thought to have been associated with one period of occupation of the probably longer occupation sequence of the cone.

The block was to be developed as an industrial estate by Developments Ltd. They had applied for an Authority to Modify the archaeological sites on the block, under the terms of the Historic Places Act 1980, which was granted (Authority 1985/16) subject to an archaeological investigation.

The area was initially surveyed by Tippett and Molloy (1980) who recorded five archaeological sites including those described in this report. A further archaeological survey of the block (Veart, Rickard and Bulmer 1985) relocated these and recorded a number of other sites and possible sites. Investigation of these is discussed at the end of Section 2. Three sites at the western end of the block, close to Fisher Road (Fig. 2) were selected for excavation, on the basis of surface features, as the most likely to produce extensive evidence of prehistoric occupation in this area.

* Now Carbine Road

FIGURE 1 Location of sites , R11/887, R11/888 and R11/899, Fisher Road, and other sites in the area

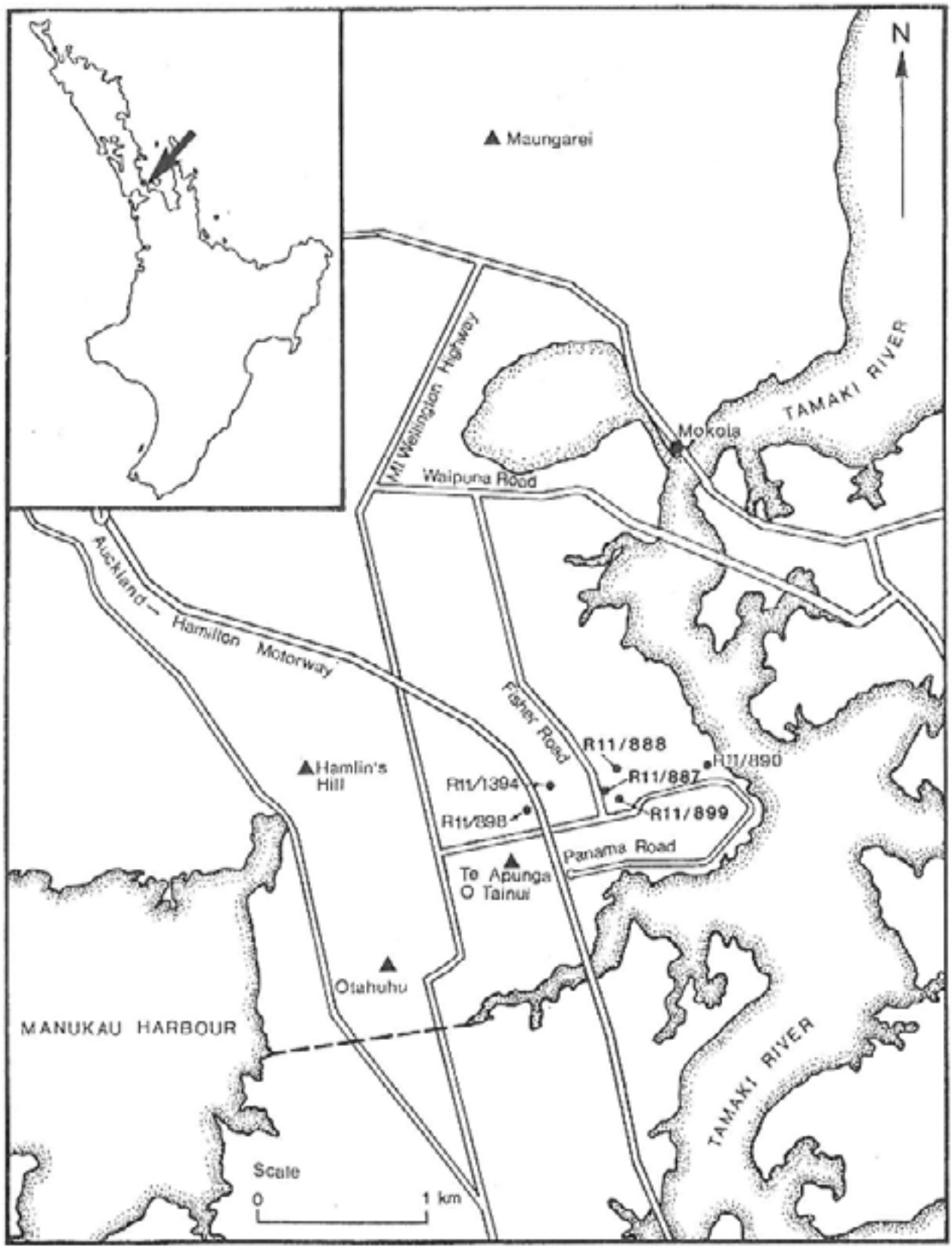
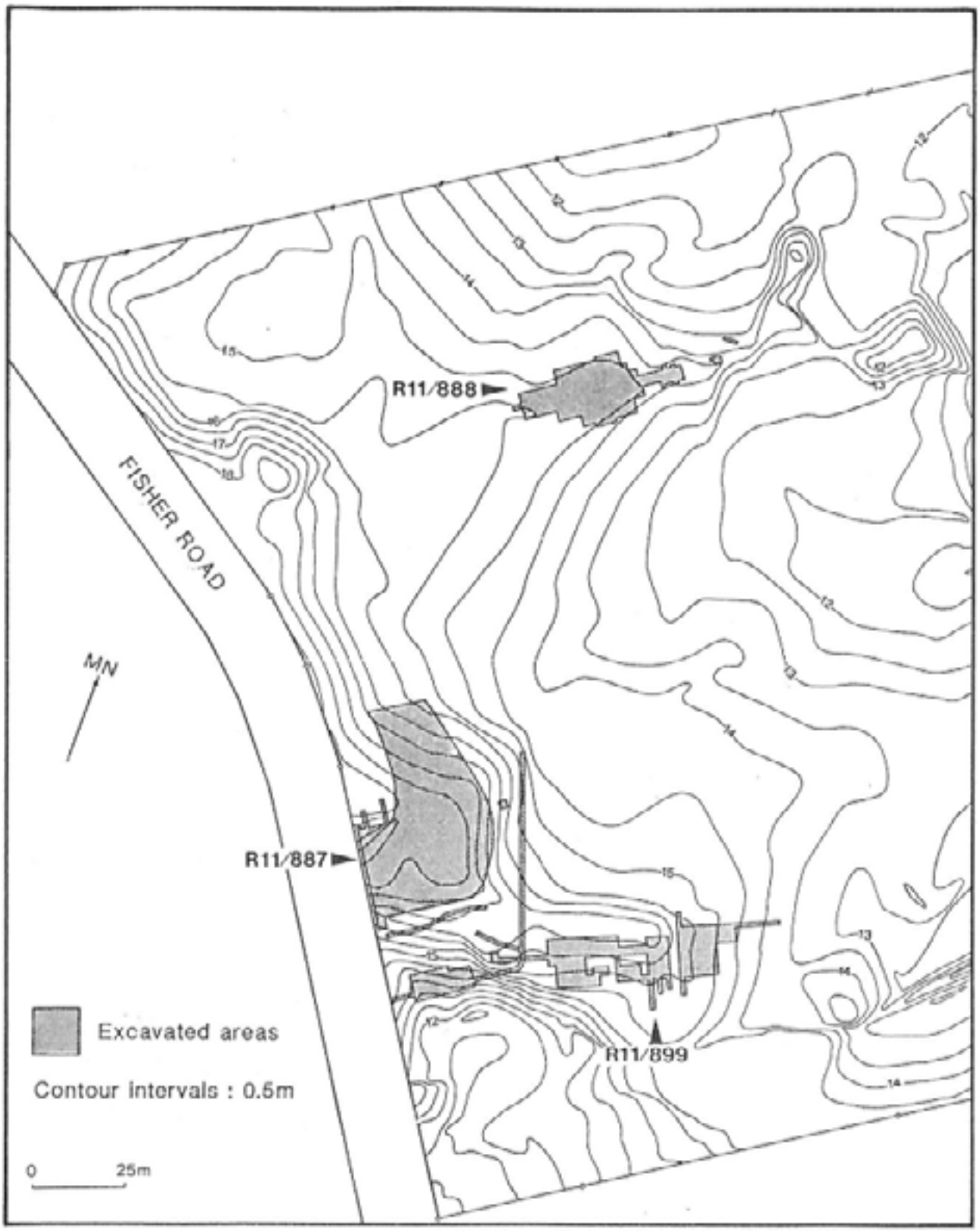


FIGURE 1 Sites R11/887, R11/888 and R11/899, Contour map showing areas excavated



S. Maingay, Regional Archaeology Unit, D.O.C, Auckland, 1988

The three sites excavated were:

R11.887: This site was initially recorded as Site N42/355 in the N.Z. Archaeological Association Site Recording Scheme. It was re-recorded as N42/930 by Tippett and Molloy (1980) as a shell midden in a road cutting. At the time of excavation the visible remains consisted of a shell midden, with a pit, earth oven and postholes in section in the road cutting.

R11/888: Recorded by Tippett and Molloy (N42/931) as an extensive area of shell midden on an exposed lava flow.

R11/899: This site was recorded by Tippett and Molloy (N42/931) as five pits and a wall (later shown to be a natural feature). In 1981 construction of the Maui Gas Pipeline intersected a pit to the south of the recorded site (Furey 1983a: Appendix VII). Veart *et al.* (1985) recorded two pits, shell midden and a stone edged hearth. When the site was revisited by one of the authors prior to excavation he noted the same hearth, three pits (see below Fig. 12: G, H & S) and shell midden eroding the edge of the level area containing the pits. Shortly before excavation began the construction of a storm-water drain revealed a further pit, near to the location of that described by Furey.

The presence of midden, pits, earth ovens, postholes and a stone-edged hearth indicated that these sites were the remains of an open settlement or settlements. Whilst pa are the most obvious prehistoric remains in New Zealand, it is clear that the less visible and harder to define "open" or "undefended settlement sites formed the larger part of the prehistoric cultural landscape (Irwin 1985:17). For example Davidson found over 200 undefended "hamlet" sites and only 11 pa sites in a survey of Motutapu Island (Davidson 1984: 167 & Fig. 109). A similar ratio of defended to undefended sites is likely to have existed on the mainland. In the Auckland area urban development has obliterated most of the undefended sites, leaving only a very few from which to interpret the past history of settlement surrounding the fortified volcanic cones of the Isthmus.

A number of sites close to the Tamaki River have been interpreted as open settlements. Excavations of these have taken place at Hamlins Hill (R11/142 *) [Davidson 1970a; Irwin 1975; Pearce 1975, 1977; Walton 1979; Nichol 1980a]), Westfield (R11/898 [Furey 1983a, 1986]) and Hawkins Hill (R11/1394 [Coates 1986]). At these sites evidence was found of houses, food storage and preparation, midden and stone tool use and manufacture. The general question of open settlements and their place in New Zealand prehistory has recently been reviewed by Green in Chapter 1, "The study of open settlements in New Zealand prehistory", of Sutton's forthcoming work "The Archaeology of the Kainga". Green commented on the fact that there had been few extensive area excavations of open settlements. Excavations at R11/887, 888 and 899 were designed to further our knowledge of this particular site type.

Sullivan (1981:11) suggested that the lava fields between Te Apunga o Tainui and the Tamaki River contained gardens, storage pits, temporary shelters and possibly house sites. The sites excavated at Westfield and Hill were parts of undefended settlements and indicated that widespread occupation occurred in this lava field. The sites described in this report appeared to be of a similar nature. These excavations were undertaken with two main objectives. These were to excavate as much as possible of an open settlement area in order to record the layout of a prehistoric undefended settlement and to try to determine specific activity areas within the sites. The Pouerua Archaeological Project looked at open settlements in the inland Bay of

* Sites referred to the Metric Number. Appendix 1 gives the Imperial equivalents.

Islands, centred around the volcanic cone of Pouerua. The results of this project are shortly to be published as two monographs edited by D G Sutton*, "The Archaeology of the Kainga" and "The Archaeology of Structures -Stratigraphical and Cultural". They will provide a useful comparison with the open settlement sites situated in the South Auckland area.

1.1 Historical background

Traditions of the people of the Aotea, Te Arawa, Tainui and Pane o Raiwa canoes all refer to their arrival at the Tamaki River (Sullivan 1981:3). The majority of place names are attributed to Tainui sources (Kelly 1949: 52, Sullivan 1981:3 - referring to an 1860 MS by Hoani Naahe of Ngati Maru). In 1854 Ngaapora of the Ngati Mahuta recounted that the Tainui canoe was beached at the head of the Otahuhu Creek (Simmons 1976: 173). This place was called Te Apunga o Tainui -the landing place of Tainui -and the volcanic hills close to the landing place (McLennans Hills) have since retained this name.

In the middle of the eighteenth century, following a period of warfare, the Ngati Whatua gained control of the Tamaki Isthmus, although they rarely used the South Auckland area and various Tainui tribes lived along the western shores of the Tamaki River. By 1820 the Ngati Paoa had a substantial settlement at Mokoia (Cruise 1974: 216). Mokoia and an adjacent settlement, Mauinaina, were attacked by Nga Puhi forces from the north in 1821 and 1823. The Ngati Paoa were defeated and the survivors fled, leaving the land deserted. In 1827 the French explorer D'Urville sent a party up the Tamaki River to find the passage to the western shores, but no mention was made of Mokoia or any other settlement further up the river. D'Urville's party found a well-used track leading to the Manukau with people living on the Manukau foreshore (Wright 1950:217).

The Otahuhu portage was the shortest and easiest route of all the Auckland portages for transporting canoes between the Waitemata and Manukau harbours. Sullivan recounts the use of this portage by the Tainui canoe (Sullivan 1981: 4). From the recorded traditions of various Hauraki, Waikato and Northland tribal groups the portage was in regular use from at least the seventeenth century onwards (Sullivan 1981:14).

1.2 Geology and soils

The Fisher Road sites are situated on the main lava flow running northeast from the pa site of Te Apunga o Tainui. This volcanic cone and nearby Otahuhu were active volcanoes at about the same time (L. Kermode ** pers. comm. 1985), some 20,000 to 25,000 years ago. The lava flow from Te Apunga o Tainui rests on Pleistocene silts associated with the ancestral Manukau River (Searle 1981:130).

Topographically the area presents a rough and broken landscape, consisting of a number of low basaltic ridges partially covered by, and surrounded by, layered tuff which is likely to have come from the Otahuhu volcanic centre (L. Kermode pers. comm. 1985). The tuff drains relatively easily but weathers rapidly when exposed.

Brown volcanic loam soils are characteristic of the district. These are fertile, well-drained, good horticultural soils.

* Anthropology Department, University of Auckland.
** DSIR Geologist.

1.3 Vegetation

At the time of human settlement the natural vegetation of the Auckland area is thought to have been broadleaf/podocarp forest (Millener 1979: 35). Remnant forest on the Maungarei lava fields suggested that northern coastal forest predominated in the volcanic stonefields (Millener 1979:40). Evidence from Wiri (Sullivan 1975: 16) and Puhinui (Lawlor 1981: 22) suggested that broadleaf/podocarp forest still covered parts of the South Auckland region when those sites were occupied. During the time of human settlement this forest was progressively cleared by the prehistoric settlers and was replaced by bracken fern (*Pteridium aquilinum var. esculentum*) (Sullivan 1975:35).

Charcoal identification from the Fisher Road sites (see Appendix 2) indicates the presence of a wide range of species from broadleaf/podocarp and coastal forest. This again suggests that areas of forest remained at the time these sites were occupied. However the landsnails identified (see Appendix 3) suggest that the sites themselves were in an area of open, scrubby vegetation. Thus it is likely that at the time these sites were occupied there had been clearance in the immediate vicinity for habitation and gardening. By the time of the first European visitors the area had been almost totally cleared and they commented on the lack of forest and the predominance of "brush and fern" (e.g. Rutherford 1940: 165), and the lack of trees (Cruise 1974: 216).

At the time of excavation the block had been used as a farm run-off for many years and the predominant vegetation was introduced pastoral grasses.

1.4 Method

The excavations were planned in two phases -initially by hand and then by machine excavation. The timing of the latter was governed by the availability of suitable machinery. Selected areas at each site were hand excavated by spade and trowel to provide details of the types of features present and their stratigraphic relationships. For this part of the project each site was gridded at ten metre intervals and was further subdivided into two metre squares for excavation and recording. Excavation was undertaken by stratigraphic layers. Recording was based on an eight figure co-ordinate system similar to that used on topographical maps with the grid origin in the southwest corner. On each site an initial two metre wide trench was excavated. These trenches were designed to intersect the known archaeological features and the excavations were extended as indicated by the location of features.

The second phase, the machine excavation, extended the areas already investigated in order to look at the fuller extent of each site. To this end extensive deep trenching and scraping of the surface in spits of approximately 0.1 m was undertaken using a traxcavator provided by the developer. An earth scraper was tried out on part of R11/887 but it was difficult to control the amount of earth removed and the results were unsatisfactory. Features discovered by these techniques were plotted onto the grid system using a plane-table and alidade and further hand excavated to obtain details of their structure. Figures 3, 8 and 11, accompanying the descriptions of each site, indicate the various methods of excavation used. At the thrr sites a total of some 3000 m^2 was investigated.

1.5 Terminology

With the exception of heating and cooking devices the terms used to describe features are those defied by Daniels (1979: 24-40). The definitions used in this report for the cooking and heating features are set out below:

Fireplace : The remains of a fire on the surface of the occupation layer consisting of charcoal, ash and occasionally rocks within a small discrete area, often with burnt soil beneath.

Firepit: A small rectangular shallow pit approximately 1.50 x 1.70 m and 0.25 m deep with burnt sides and base and no fired stones.

Earth oven (or *Hangi)*: Circular or oval shallow scoop pit containing fired stones and charcoal in a matrix of black greasy soil. These averaged 1 m in diameter and up to 0.20 m deep, although some examples of earth ovens of less than 0.50 m diameter were present. Earth ovens may also contain rocks with little or no charcoal or other evidence of fire, indicating that the rocks were heated elsewhere. No earth ovens of this latter type were identified at these sites.

Hearth: Similar to a fire but with rocks placed on the surface of the ground around all or part of the perimeter. Less "formal" than the stone-edged hearth described below.

Stone-edged Hearth : A rectangular hearth contained within rocks set into the subsoil. Approximately 0.40 x 0.50 m in size with lenses of ash and charcoal.

2. THE EXCAVATIONS

As the excavations took place on three spatially separated sites, each of which yielded different kinds of archaeological evidence, the features of each are discussed separately. The portable artefact assemblages from the sites are discussed in Section 3. The nature of the settlement, radiocarbon dating and the relationship between the three sites are discussed in Section 4.

2.1 Site R11/887

This site was situated on a level hill-top adjacent to Fisher Road. Figure 3 shows the area excavated and the techniques used. The hill formed the highest point of the block of land, being some 20 m a.s.l.. An archaeological deposit consisting of a shell midden with earth ovens, post holes and a pit was visible in the road cutting. Study of aerial photographs of 1940 and 1955 (Lands and Survey 139:30/9 & 583:1921/7) indicates that this hill was formerly a low ridge through which the road had been cut. It is clear that this site stretched across to the side of the road, where bulldozing had revealed the presence of shell midden. Material recovered from the general area of included obsidian and stone flakes, a sandstone abraider and a fragment of worked bone. These artefacts were recovered during excavation of the Hawkins Hill site (Coates 1986).

Initially a 26 x 2 m trench was hand excavated along the road fenceline to pick up the features visible in the road cutting. It was intended to extend the excavation with trenches running eastwards. Pressure of time meant that only one of these latter trenches was partially excavated by hand and the rest of this area was excavated entirely by machine trenches and scraping.

2.1.1 Stratigraphy

The stratigraphy of this site was simple, with four main layers. Cross-sections of the west baulk of the main trench and the eastern road cutting are shown in Figure 4. Their locations are shown in Figure 5.

Layer la: The turf and topsoil. This was characteristically a dark brown friable loam (10YR 4/4 on the Munsell Soil Colour Chart) between 50 and 100 mm in depth. The layer contained European material including broken glass bottles, iron straps and staples.

FIGURE 3 R11/887 : Plan of excavation showing techniques used

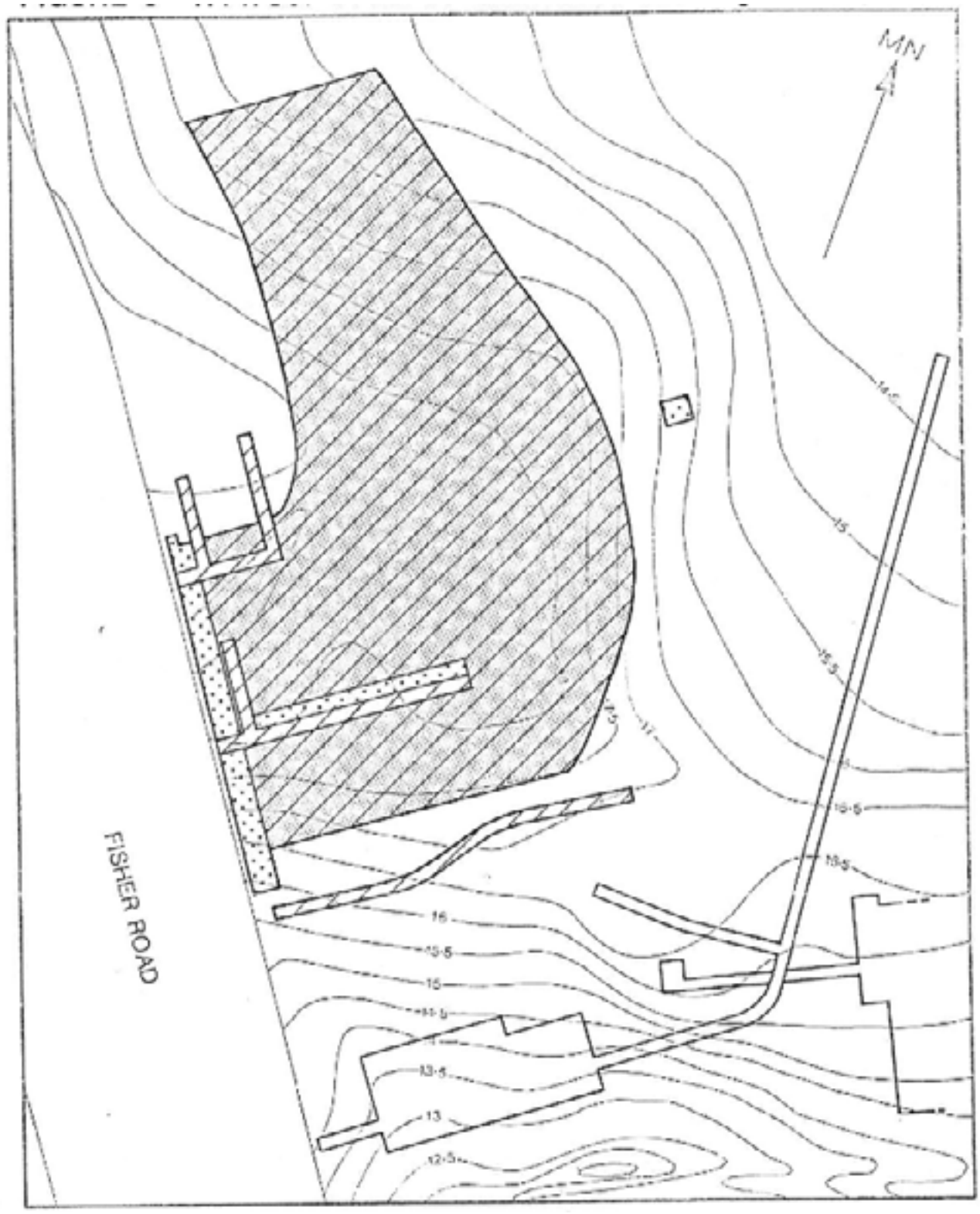
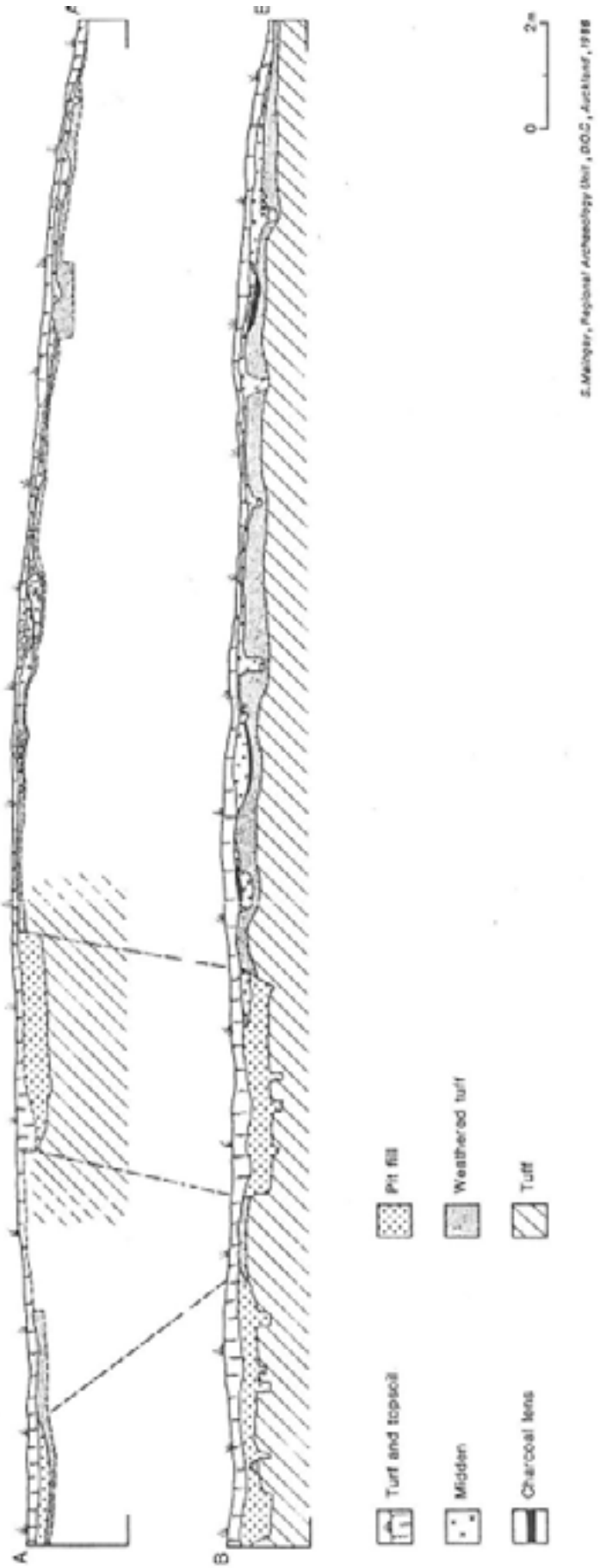


FIGURE 4 R11/887: Main cross-section of site



Layer lb: The midden layer. It was similar in colour and texture to layer la but contained shell midden and charcoal. Analysis of the midden is presented in Appendix 4. The layer was present only in the southwestern part of the site. It was up to 0.2 m deep in the road cutting but had petered out entirely some 2 m east of the fenceline, suggesting that the existing deposit was only the remnant edge of a larger deposit, which extended across the road to the west.

Layer 2a: The natural subsoil. A yellowish/brown weathered volcanic tuff (10YR 5/8). Features were cut into this layer. Where layer lb did not intrude this layer was separated from layer la by a mottled interface containing charcoal flecks.

Layer 2b: Banded yellow/brown tuff.

2.1.2 Excavation results

A number of structural features were excavated. In only one area were these features superimposed, where a probable house and a number of postholes were replaced by a cooking area/midden dump. Elsewhere there was no indication as to whether the features were contemporary. However as they appeared to be separated into groups, which may reflect different activity areas within the site, the more likely inference is that all should be assigned to a single short phase of occupation. All features excavated are shown in Figure 5.

2.1.2.1 Postholes

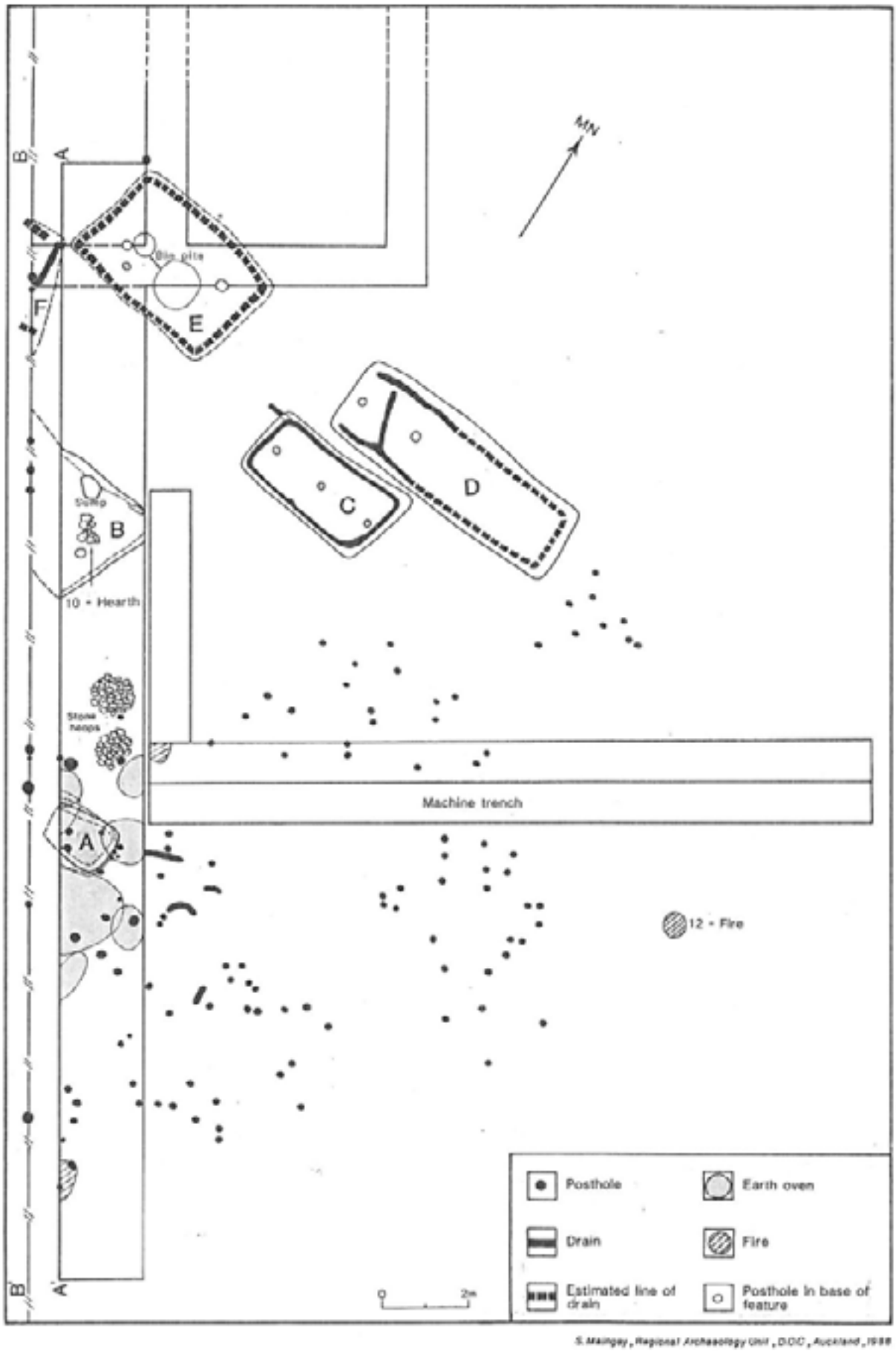
Over 100 postholes* were recorded. They ranged in size from small stakeholes such as those at the southeast end of Pit A (40 x 60 mm deep) to more substantial ones up to 0.3 m in diameter and up to 0.35 m deep. The fill of the postholes was generally a dark brown soil similar to the fill of the pits described below. The majority were concentrated in the half of the site.

Those in the road section and in the hand excavated trench were covered by, and often filled with, the lb midden layer and many had earth ovens superimposed over them. However, it is possible that some of these may relate to the earth ovens and represent cooking sheds or windbreaks, but there was no clear evidence to support this hypothesis. Many might represent structures present before the area was used for cooking.

The postholes fall into three distinct clusters, but there is no obvious correlation between location, size or depth that would allow for the identification of any particular structure. It is not uncommon to find numbers of postholes that do not clearly relate to any identifiable structure. For example this is the case at nearby Hill (Davidson 1970a; Irwin 1975) and Westfield (Furey 1986). Here it is likely that they represent a number of structures rebuilt in the same area over a period of time. Almost all the artefacts found at this site occurred in the same general area as the postholes and it is possible that the structures which the postholes represented may have been for tasks involving the use of stone tools, adze maintenance and possibly stone tool manufacture (See below - Section 3).

* Not including those relating to other features, eg. within pits.

FIGURE 5 R11/887: Plan of excavation : all features



2.1.2.2 Pits

Six pits were located and investigated at this site. They all had a similar southeast-northwest alignment which may indicate contemporaneity, or at least that they belonged to the same general occupation even if all were not in use at the same time. None of the pits showed any signs of natural in-filling and all would appear to have been filled deliberately.

Pit A : This small pit measured 1.75 x 1.25 x 0.26 m deep. The fill consisted of scoria rocks 30 - 60 mm in diameter in a matrix of black greasy soil with fragmentary shell and charcoal. At the base of the pit was a thin (5 mm), distinct layer of cherry-red ash.

Pit B : This pit was visible in the road cutting (Fig. 4). Only one end of the pit remained. Its estimated dimensions are 2.80 x 3.00 x 0.50 m deep. The fill consisted of a dark brown soil (10YR 4/2). On top of the fill was a hearth (Fig. 5:10). In the excavated portion there was a single posthole in the floor (0.24 m diameter and 0.50 m deep). Three further small postholes were visible in the road section. In addition a sump (0.50 m diameter by 0.50 m deep) was located against the northern wall of the pit. No external postholes were found.

Pit C (Fig. 6) : This shallow pit measured 2.10 x 3.60 m and had a dark brown fill similar to that of pit B. No exact measurement of depth is available as the top edge of the pit was destroyed when some 0.20 m of soil was scraped off. It was cut 0.25 m into the layer 2b tuff. In the floor of the pit were three post holes (0.10 to 0.12m in diameter and 0.20 m deep), forming a central row for the main roof support. Around the inside edge of the pit was a peripheral drain which measured 0.10 -0.15 m in width and was 0.10 - 0.15 m deep. In the northeast comer this deepened to 0.25 m and extended as a tunnel some 0.40 m outside the pit forming a small soak-away. As in the case of pit B there were no external postholes.

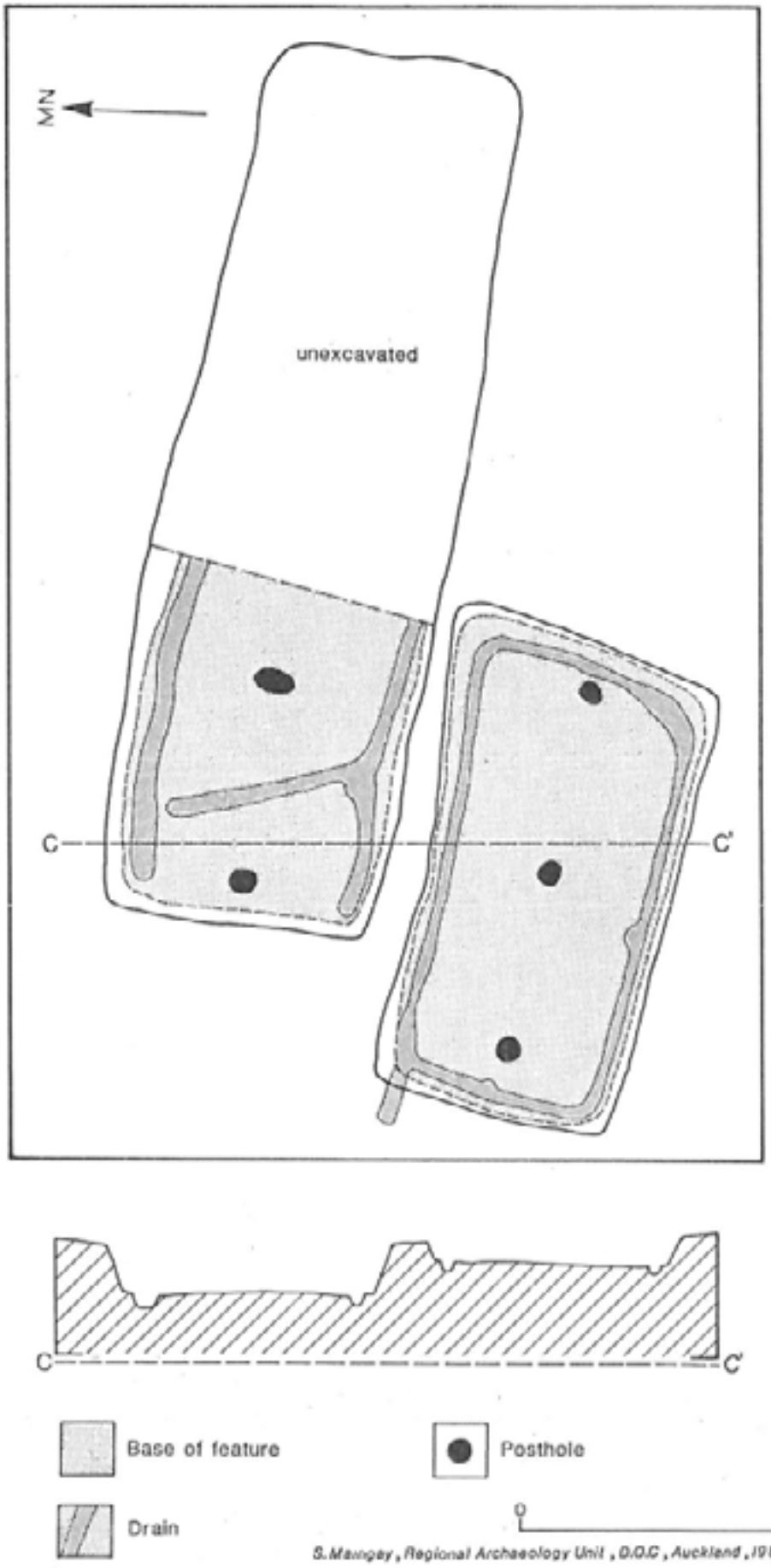
Pit D (Fig. 6) :This pit was similar to pit C and adjacent to it. It measured 1.90 x 6.20 m and was cut into the tuff for a depth of 0.35 m. Only the northwest end was fully excavated, revealing side drains and two of the central row postholes. These were of similar size to those described for pit C.

Pit E: This pit was located by machine trench and was not further excavated. Its estimated size was 2.80 x 4.12 m and was cut into the tuff for 0.35 m. The fill was similar to that of the previously described pits apart from a concentration of charcoal noted near its centre. It was similar in construction to C and D with a peripheral drain and three postholes. Cut into the floor of this pit were two circular bin pits. The more southerly measured 1 m in diameter and was 0.64 m deep. Its fill was similar to that of the main pit but was sealed from it by a 50 mm layer of clean subsoil. The second bin pit was essentially destroyed by the trenching but it would appear to have been of similar size. Its fill consisted of a number of largish rocks roughly 0.20 m in diameter

Pit F: Only the very end of this pit was visible in the road section and the southeast comer was found during the machine trenching. It would appear to be another pit of the same type as pits C, D and E, with a central row of postholes and a peripheral drain.

Pit A would appear to have been used for two separate purposes. The first of these was as a fire-pit, indicated by the red ash at its base. A pit of similar dimensions, also with evidence of intense heat, was excavated at R11/899, within a house where it clearly served as a firepit for heating (see below). It is probable that pit A served a similar function. If this interpretation holds then a number of the postholes surrounding it could be assigned to some form of house structure. Only a short period would appear to have elapsed between the abandonment of Pit A's original function as a fire-pit and its later use as an earth oven as there was no indication of any natural in-filling.

FIGURE 6. R11/887 : Plan of pits C & D



There are few indications to show whether any of the pits at this site were contemporary. However, the drain running out from pit C was dug into the uphill (western) side of the pit, which could indicate contemporaneity with pit D, as a drain dug into the lower (eastern) side would have tended to flood pit D. Shallow pits similar to C, D, E and F have been excavated in the Auckland area at Rahopara, Castor Bay (R10/21 [Green 1970:19]0, Hamlins Hill (Davidson 1970a:110; Walton 1979;107), R10/38, Mototapu Island (Davidson 1970b: 39) and Te Pane o Horoiwi (R11/357 [Sewell 1986: Fig5]). The function of such pits is unclear. Green (1970:19) argued that the pit at Rahopara most likely represented a sunken-floored "domestic unit" (ie: house) as it would not have provided the consistency of temperature or humidity thought to be decisive factors in the use of deep pits for storing kumara (Groube 1965:93).

Davidson discussed the function of the shallow pits at R10/38 (Davidson 1970b:56). She considered the criteria then currently accepted as useful in defining a house: these were the presence of a stone-lined hearth and "domestic litter". The former of these she discounted as a universal attribute of a house as recognisable houses at R10/31 and Hamlins Hill did not have them. This is also the case for the houses excavated at R11/899 (discussed below). She considered that the lack of any domestic litter (=stone material) was a strong argument against interpreting the structures at R10/38 as forms of houses. She concluded that these structures were for storage, although not completely discounting alternative uses (Davidson 1970b; 56).

The lack of any domestic litter in any of the structures that are houses at R11/899 queries this marker as a means of distinguishing between the use of a shallow pit as a house or for storage. The many ethnographic records (eg: Phillips and Thompson 1859) of small slightly sunken sleeping houses suggests that some shallow pits are likely to have been used for this purpose. Semi-subterranean structures excavated at N15/505, Lake Owhareiti (Marshall Y., Chapter 6, “A complex Open Settlement at Lake Owhareiti, N15/505” in Sutton’s forthcoming “The Archaeology of the Kainga") containing hearths and artefacts have been interpreted as houses. As far as the particular pit form under discussion at this site, and elsewhere in the Auckland area, is concerned, the criteria of defining a house as such because of the presence or absence of stone flakes would appear to be as unsatisfactory as the presence or absence of a hearth. However, by discarding such markers one is no closer to defining the attributes of a house. Further functional interpretation of this shallow pit form requires better constructed arguments based on additional and more persuasive evidence.

2.1.2.3 Earth ovens, fires and the hearth

Eight earth ovens (Fig. 7: 1-8) were excavated. One of these (4) was also visible in the road section, where two other separate earth ovens were also noted. Table 1 gives details of the size and fill of the excavated ovens. They were concentrated into one area of the site and although many were superimposed on each other they all originated in the layer lb midden and were cut through into the subsoil beneath. The rocks used for ovenstones were scoria, which, although not ideal for heat retention, would have been in plentiful supply. Many were fire-cracked. Beside the ovens were two small piles of ovenstones (Fig 7: 13, 14) neatly set aside as if for future use. These earth ovens formed a distinct activity area within the site dedicated to cooking. It is probable that this area originally extended much further to the west. One of the ovens (3) was built in and on top of pit A. There were also a number of postholes underlying the ovens. Whilst some may relate to earlier structures others may be contemporary with the ovens. Three fires (Fig. 7:9, 11, 12) and a hearth (Fig 5:10) were also excavated. The hearth was formed by a semi-circle of large scoria rocks up to 0.30 m in diameter constructed on top of the fill of pit B in the depression caused by the natural sinking of the fill of the pit. The depression formed a convenient hollow providing a certain amount of shelter, augmented by the rocks. A scatter of charcoal and charcoal-stained soil spilled eastwards from the open side of the hearth. It was not directly associated with any structure and would appear to have been an open-air hearth. The three fires (Fig. 5:12 & Fig. 7:9 & 11) were defined by areas of burnt soil and charcoal. The last fire (12) was situated at the southeastern edge of the site beyond the area of postholes.

FIGURE 7. R11/887 : Plan of cooking oven in hand-excavated trench

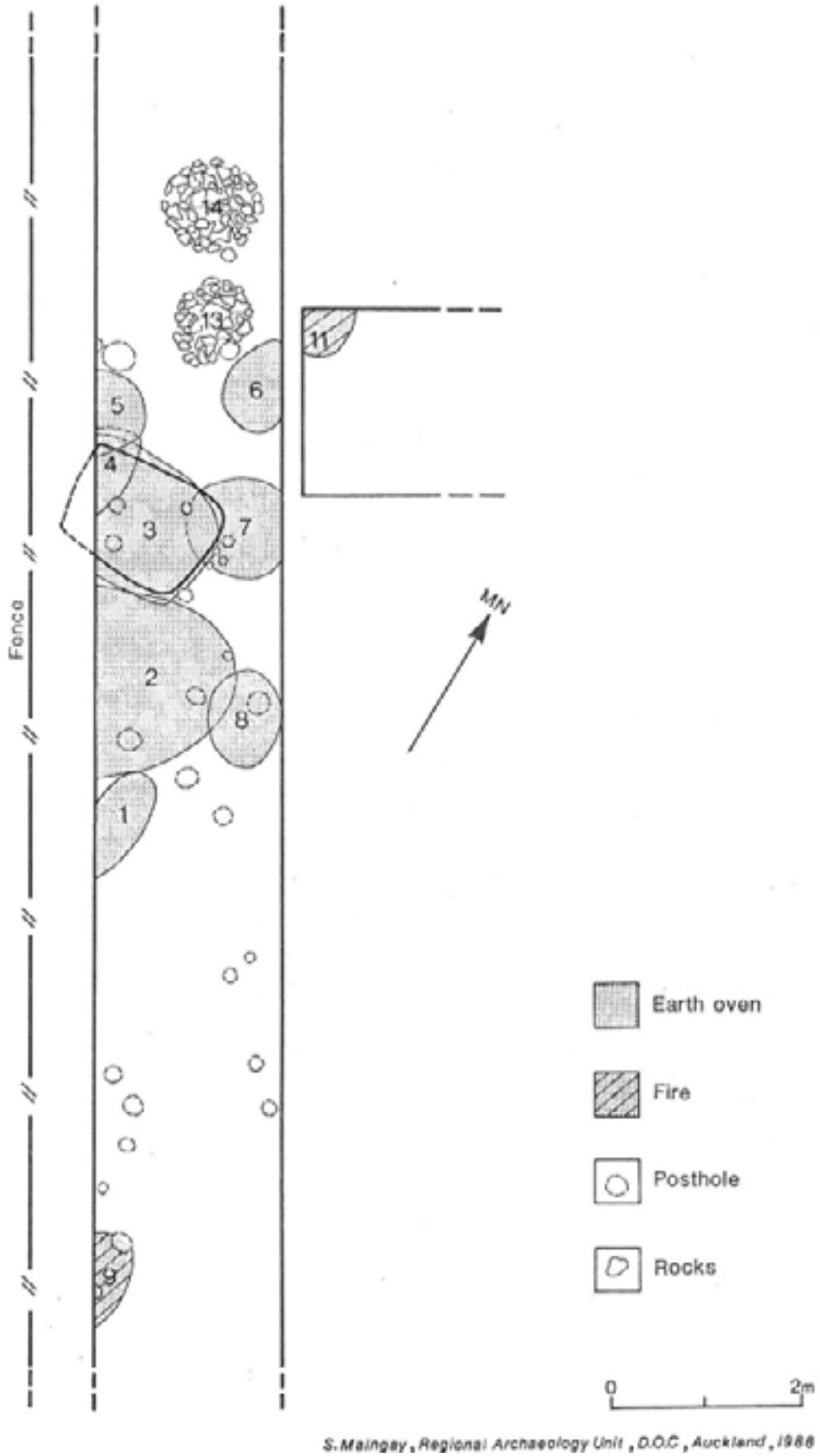


TABLE 1.

Site R11/887, Fisher Road: excavated earth overn, fires and hearth.

Type	Dimensions (m) L W D	Fill
1. Oven	1.00 x 0.60 x 0.08	Fill of scoria rocks50-100 mm in matrix of black soil and charcoal.
2. Oven	1.90 x 1.50 x 0.20	Scoria rocks as above in matrix of black greasy soil and midden.
3. Oven	1.50 x 1.60 x 0.20	Scoria rocks in matrix of black soil and charcoal.
4. Oven	1.10 x 0.60 x 0.15	Scoria rocks 70-150 mm in matrix of black greasy soil, midden and charcoal.
5. Oven	0.60 x 0.65 x 0.20	Scoria rocks as above in matrix of black soil, midden and charcoal.
6. Oven	1.00 x 0.40 x 0.15	Scoria rocks as above in matrix of black soil and charcoal.
7. Oven	0.50 x 0.50 x 0.15	Scoria rocks as above in of black soil and charcoal.
8. Oven	1.00 x 0.60 x 0.20	Scoria rocks as above in soil matrix with midden and charcoal.
9. Fire	0.32 x 0.26 -	Area of burnt soil and charcoal
10. Hearth	0.50 x 0.50 -	½ circle of rocks with dark soil and charcoal inside. Charcoal staining of soil to east. In depression over Pit B.
11. Fire	0.40 x 0.40 -	Area of burning with charcoal and small (10-12mm) burnt scoria pebbles.
12. Fire	0.90 x 0.60 -	Area of burnt soil and charcoal with a few scoria rocks.

2.2 Site R11/888

The surface evidence of this site was the presence of a quantity of very crushed shell eroding down the exposed sides of the lava flow. There was no visible evidence of any structural feature. Initially the lava ridge top in vicinity of the shell scatter was excavated by hand. Following this the remainder of the top of the lava flow was machine trenched and stripped (see Fig. 8). An additional trench 4 x 0.5 m was hand excavated in the lower ground to the north of the lava ridge. This was designed to discover if there had been modification to the soil which would suggest the use of this area as a garden and also to look for any other evidence of occupation. The soil profile was similar to other areas exposed during the development of the block without evidence of modification to the soil that might indicate gardening or of any habitation features in this trench on the lower ground.

2.2.1 Stratigraphy

A profile across the lava flow and a cross-section of the archaeological deposit are shown in Figure 9. The location of the profile and cross-section are marked on Figure 10. The stratigraphy was simple, as follows:

Layer la : Turf and topsoil 50-100 mm in depth.

Layer 1b: Cultural layer of dark brown friable soil similar in composition to Layer la but with the addition of flecks of charcoal and, in the north-easterly portion of the area excavated, containing large quantities of shells.

Layer 2: Buried topsoil, dark brown in colour -present only in the most north-easterly area beneath the layer of shells.

Layer 3: Subsoil -brownish yellow (10 YR 6/8 on the Munsell Soil Colour Chart).

Layer 4: Basaltic lava flow.

2.2.2 Excavation results

Figure 10 shows all the features excavated at this site. These were three structures, two earth ovens, a fire and two groups of postholes. A layer of shells covered most of the north-eastern portion of lava ridge, decreasing in depth and quantity to the south-west of the eastern group of postholes. With the exception of one obsidian flake all the artefactual material was found on the surface of the shell layer. Intermixed with the shells were small lenses of ash not directly associated with any *in situ* fire. The ash was deposited at the same time as the shells.

2.2.2.1 Earth ovens and hearth

Within the layer of shells there was a hearth (0.35 m in diameter), consisting of some small scoria rocks (50 -100 mm in size) and a quantity of ash. Beneath the hearth the subsoil had been to a red colour. An earth oven in the area to the south-west of the shell layer was 0.75 m in diameter and contained black charcoal-stained soil and scoria rocks between 70 and 100 mm in size. A second oven was cut into Structure A. This oven consisted of greasy black stained soil with some patches of midden and many fire-cracked rocks. It was not emptied; its asymmetrical measurements (2.30 x 1.65 m) included the charcoal smearing of the surrounding subsoil and its actual dimensions were estimated to be 1.50 x 1 m.

FIGURE 8 R11/888: Plan of area excavated showing techniques used

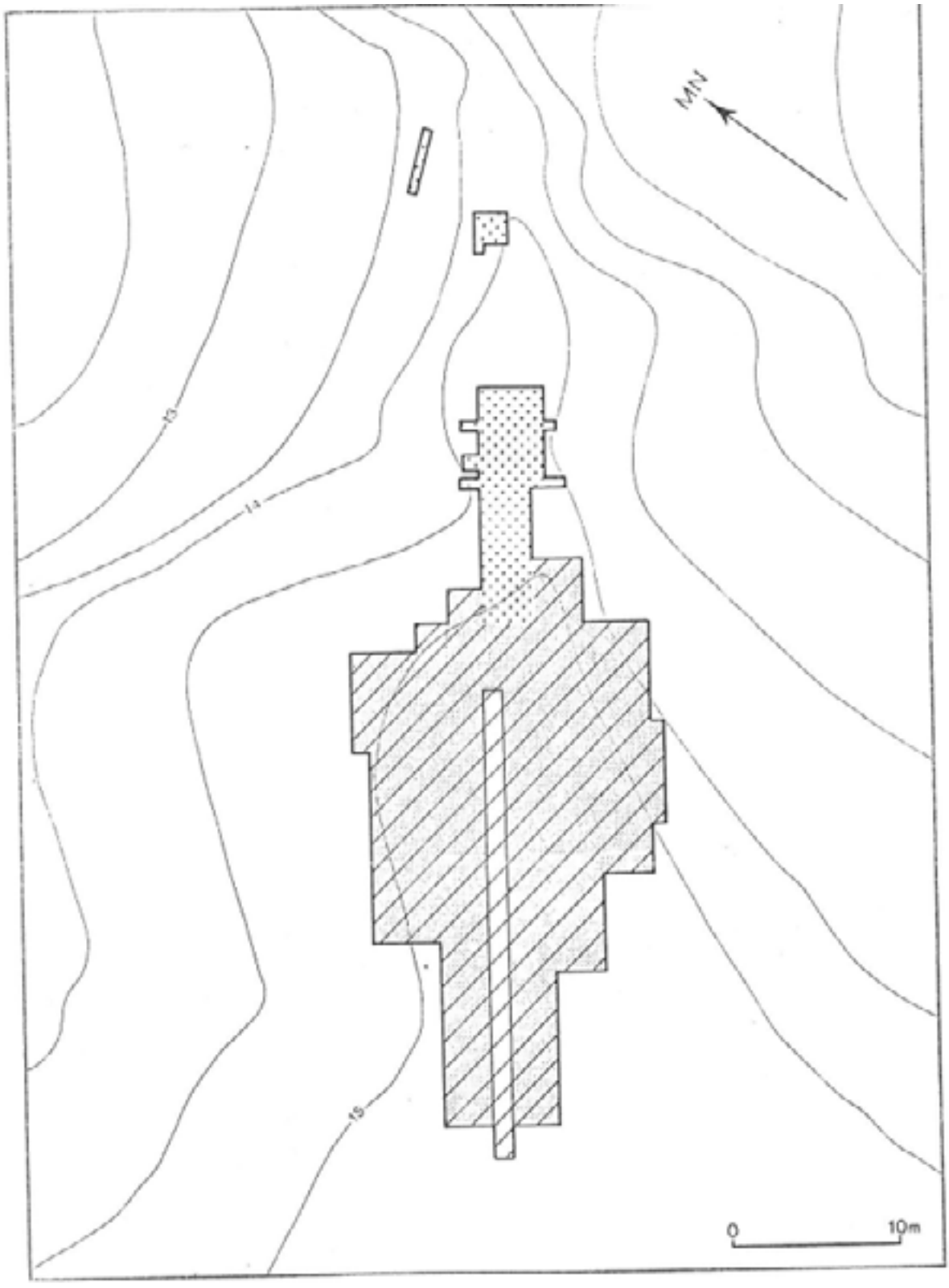


FIGURE 9 R11/888 : Main cross-section of site

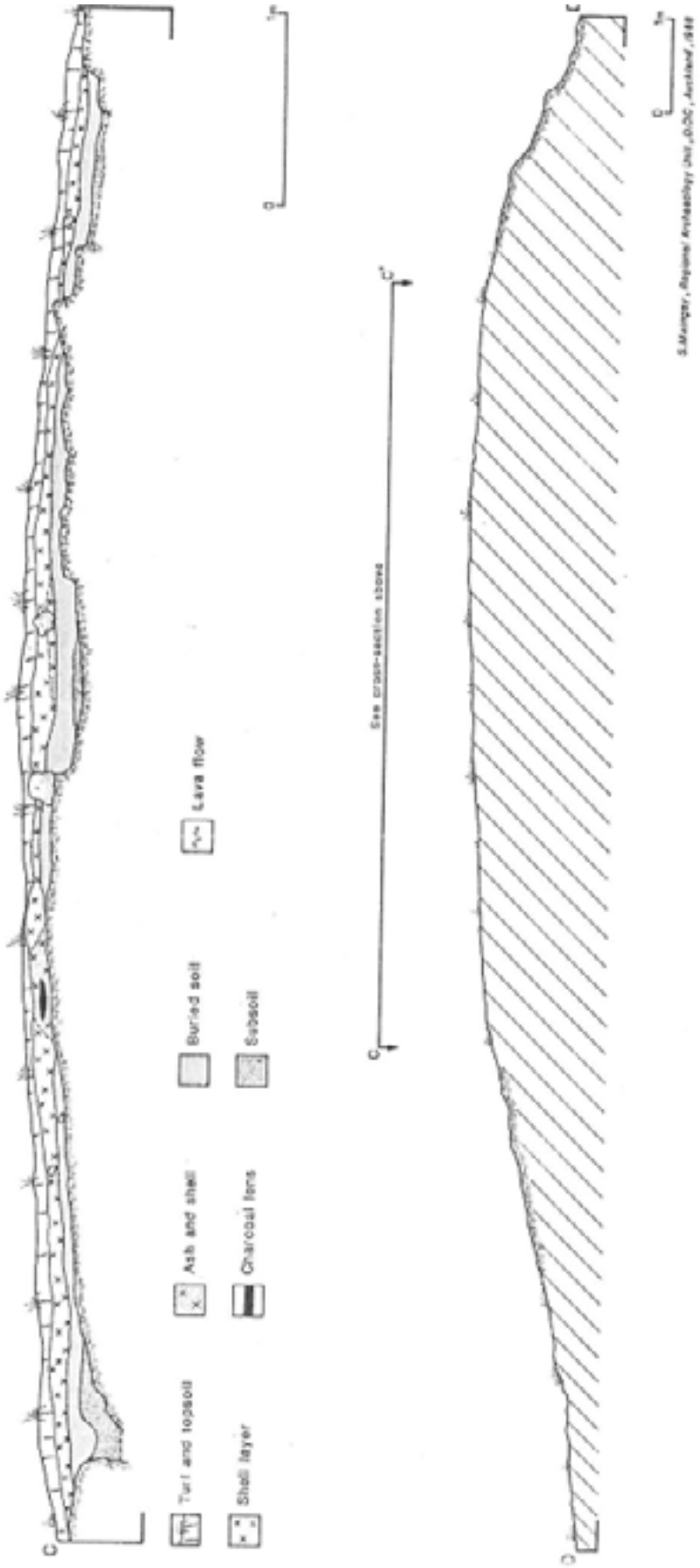
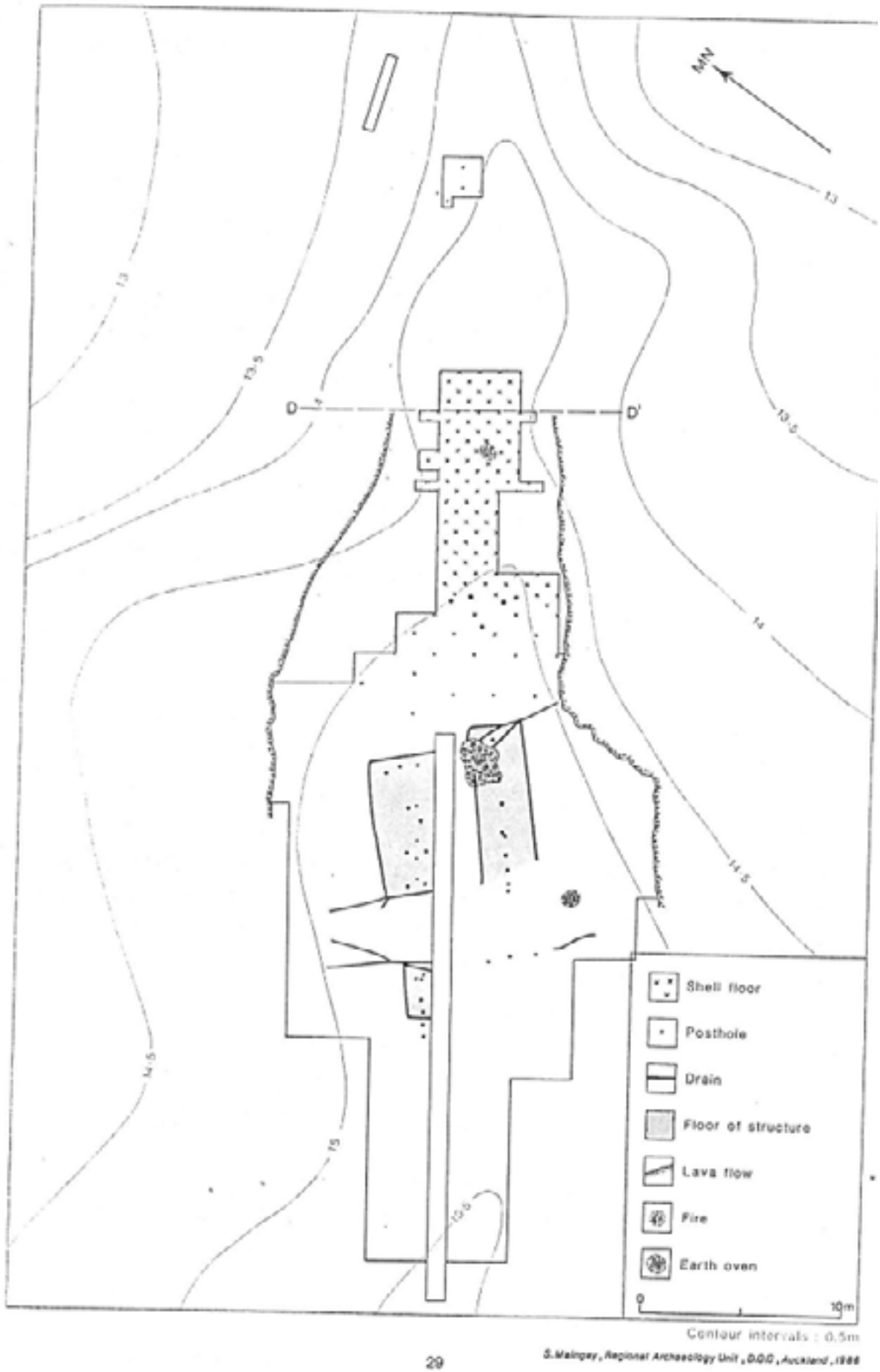


FIGURE 10 R11/888 : Plan of excavation : all features



2.2.2.2 Postholes

Five postholes were discovered underneath the shell layer; all were filled with shell. They were 0.15 - 0.17 m deep and ranged from 0.14 to 0.17 m in diameter. Three postholes occurred to the south-west of Structure A. These measured 0.25 - 0.33 m in depth. A further two postholes of similar size were found to the south west of Structure C.

2.2.2.3 Structures

The three structures were similar although they varied in size, each with a brownish/yellow fill (10 YR 5/6). No postholes around the perimeter of the structures were found. The interior postholes were cut through the subsoil until the lava flow was reached.

Structure A: This was rectangular, 8 x 3 m. There was a central row of eight postholes, 0.12 to 0.20 m in diameter and varying in depth from 50 to 150 mm. A peripheral drain was dug into the subsoil by 70 to 90 mm. There were additional internal drains which were of similar depth. This structure was cut into by a later oven. The three postholes to the south west of this structure may have formed part of it.

Structure B: This is estimated to have measured 7 x 3 m. The internal postholes, measuring 0.12 to 0.14 m in diameter and 0.15 to 0.35 m in depth, did not form a central row. The fill of the drain around the perimeter was not removed, but the dimensions were likely to have been similar to those at Structure A.

Structure C: This probably measured 2.5 x 1.5 m. The five intemal postholes, in a central line, were 0.12 to 0.22 m in diameter and varied from 0.13 to 0.19 m in depth. The largest posthole showed evidence of both posthole and postmould. The peripheral drain was 60 mm deep. There was a second drain, 0.20 m deep, beside the north end of this structure and which ran off to the north for 5 m to the edge of the level ridge top.

The shell layer extended across the north-western extremity of the lava ridge (see Fig. 10). It filled up all hollows and undulations, resulting in a levelled surface across the width of the lava flow. In places the old topsoil was visible beneath the shells (see Fig. 9). Whilst the presence of shell midden can be indicative of a dump, it is contended in this case that these shells were laid to produce a level living surface. The components of the midden were examined to determine, if possible, whether the shells were food wastes being re-utilised or whether they were beach wrecks brought to the site to construct a dry living floor. Following Nichol (1980b: 96), shells were inspected for holes made by predators, evidence of beach-rolling, the presence of encrustacions on their inner surfaces, the occurrence of water-rolled pebbles and shells of deposit feeders filled with sand. None of these indicators were observed, suggesting that the shells had not been gathered dead and that initially they had been collected for food and subsequently laid as a floor.

There are records of shells, together with spoil and rocks, being used as building materials in the construction of terraces in the Auckland area. At Maungataketake (R11/31 [Ellett's Mountain]) an artificial terrace with a depth of nearly 2 m of shells was recorded, [J. McKinlay, pers. comm. 1986] while at Maungarei (R11/12 [Mount Wellington]), Puketapapa (R11/19 [Mount Roskill]), Taurere (R11/16 [Taylor's Hill]) and Maungakiekie (R11/14 [One Tree Hill]) similar terraces were found (Davidson 1982:36). Sometimes shell scatters have been interpreted as living surfaces. Excavations at Crater Hill (R11/665 [Foster, Sewell and Veart 1985:22]) revealed a terrace built up with spoil and rocks with a continuous layer of shells on top of the fill. It is possible that the shells were part of a laid floor. However, the excavated test square at that site was too small to demonstrate this conclusively. At site T11/219 at the Brier's Block a rectangular deposit of shells and the artefact distribution was taken to be evidence of a house, although no actual postholes were discovered. The shells were considered to be a laid surface. [Furey 1987:121].

The shells on the lava flow at R11/888 produced a clean, well-drained and mud-free living surface. It was deliberately laid rather than a dispersed midden dump. The discrete lenses of ash support this interpretation and there was no evidence of any structure coinciding with the total area of shell. The distribution of the stone flakes at the surface of and coinciding with the shell floor suggests that they had been deposited after the floor had been laid, during its use as a working floor. The five postholes beneath the shells possibly related to a single structure. Although they were not located until the shell layer had been removed, it is probable that they were contemporary with the deposition of the shell layer.

The structures were above-ground buildings with slightly sunken floors dug into the subsoil to a depth of 80 mm. There were no hearths or fire-pits in any of these buildings. The lack of comer posts or any substantial posts around the perimeter suggests buildings with the eaves resting directly on the ground. Buildings of similar construction were depicted by some of the early visitors to New Zealand (e.g. Wright 1950: op. p. 176) and often referred to as storehouses. Crozet recorded that in one village in the Bay of Islands there were three kinds of storehouse -one for tools and spare weapons, one for food (kumara, dried shellfish, fernroot) and calabashes of water and the third for storage of nets, fishing gear, cordage and paddles (Ling Roth 1891:32). It is possible that the structures at this site were used for storage of similar equipment. The presence of a fishing sinker among the few artefacts found supports this interpretation. It is probable that the laid floor related to these structures and it would have functioned as an open-air working area. The five postholes under the shell floor could have served as for net manufacture or repair.

2.3 Site R11/899

The surface evidence of midden, large pits and a stone-edged hearth suggested that this site was a domestic unit consisting of a house, food storage and cooking arrangements. The visible features occurred on a flat terrace bounded to the north by a high and conspicuous lava flow (described as a "wall" in Tippett and Molloy 1980). The area around the previously noted pits to the south of the terrace (see Section 1.) was not investigated by hand as it had been severely disturbed by bulldozing, which would have destroyed any shallow features. Nor was it possible to trench by machine so close to the existing major storm-water drain (see Fig 20, below, for location of this drain easement). Fig. 11 shows the different methods used in excavating this site.

2.3.1 Stratigraphy

The stratigraphy of this site was simple and similar to R11/887 with the exception that one portion of the site was built up to form a terrace. Cross-sections through the main area of excavations are shown in Figure 12. The locations of these sections are marked on Figure 13 The layers were as follows:

Layer 1: Turf and topsoil 50 -100 mm in depth.

Layer 2: Redeposited brown friable soil with inclusions of charcoal, rocks, pieces of tuff and in places pockets of shell midden. It had been deposited to the south of the lava flow to form a terrace in order to increase the level living space. In other portions of the site where Layer 2 did not occur there was a mottled interface between layers 1 and 3a.

Layer 3a: The natural subsoil -a yellow brown (10 YR 5/8) weathered tuff.

Layer 3b: Banded tuff.

FIGURE 11 R11/899 : Plan of area excavated showing techniques used

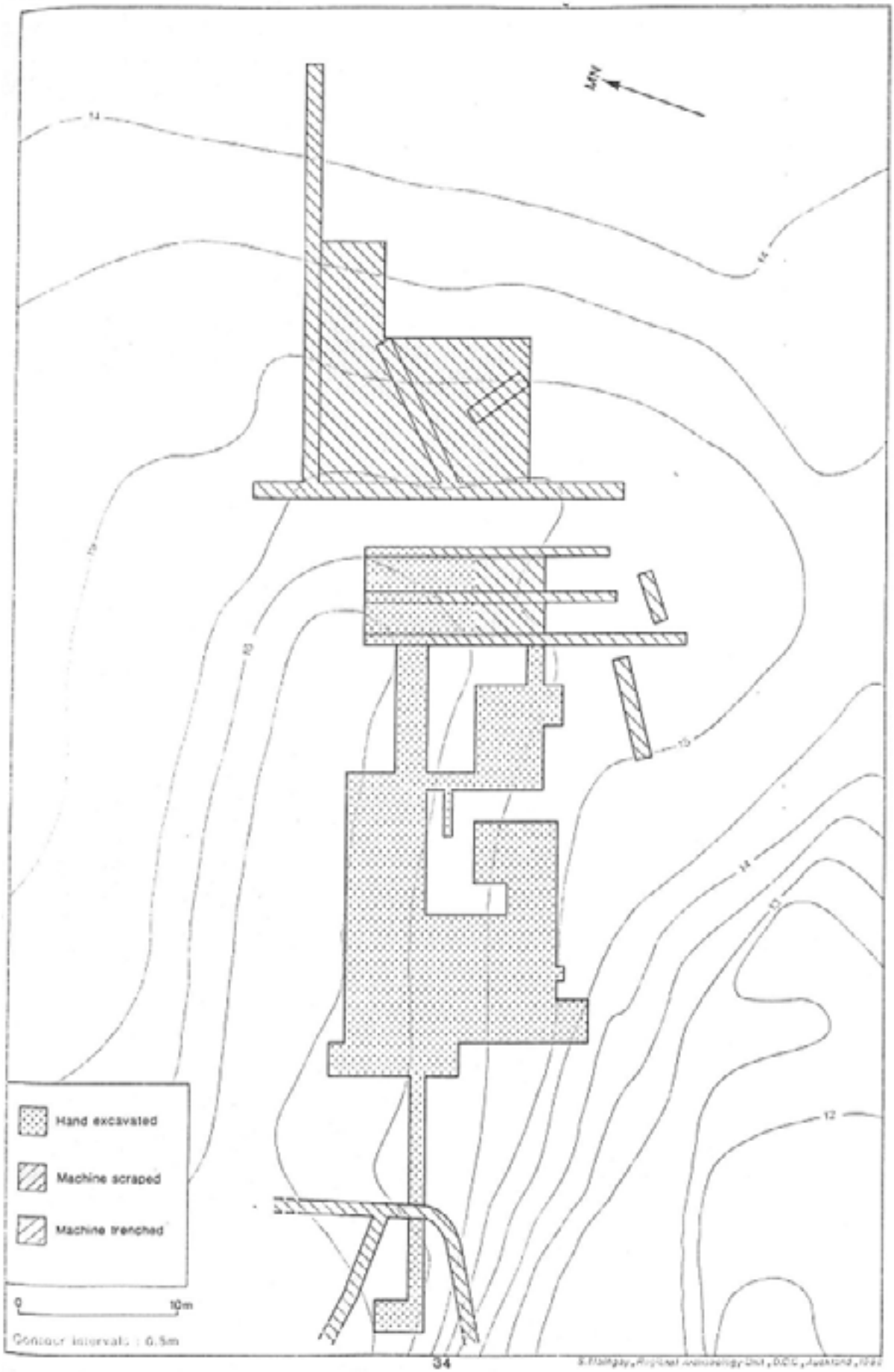
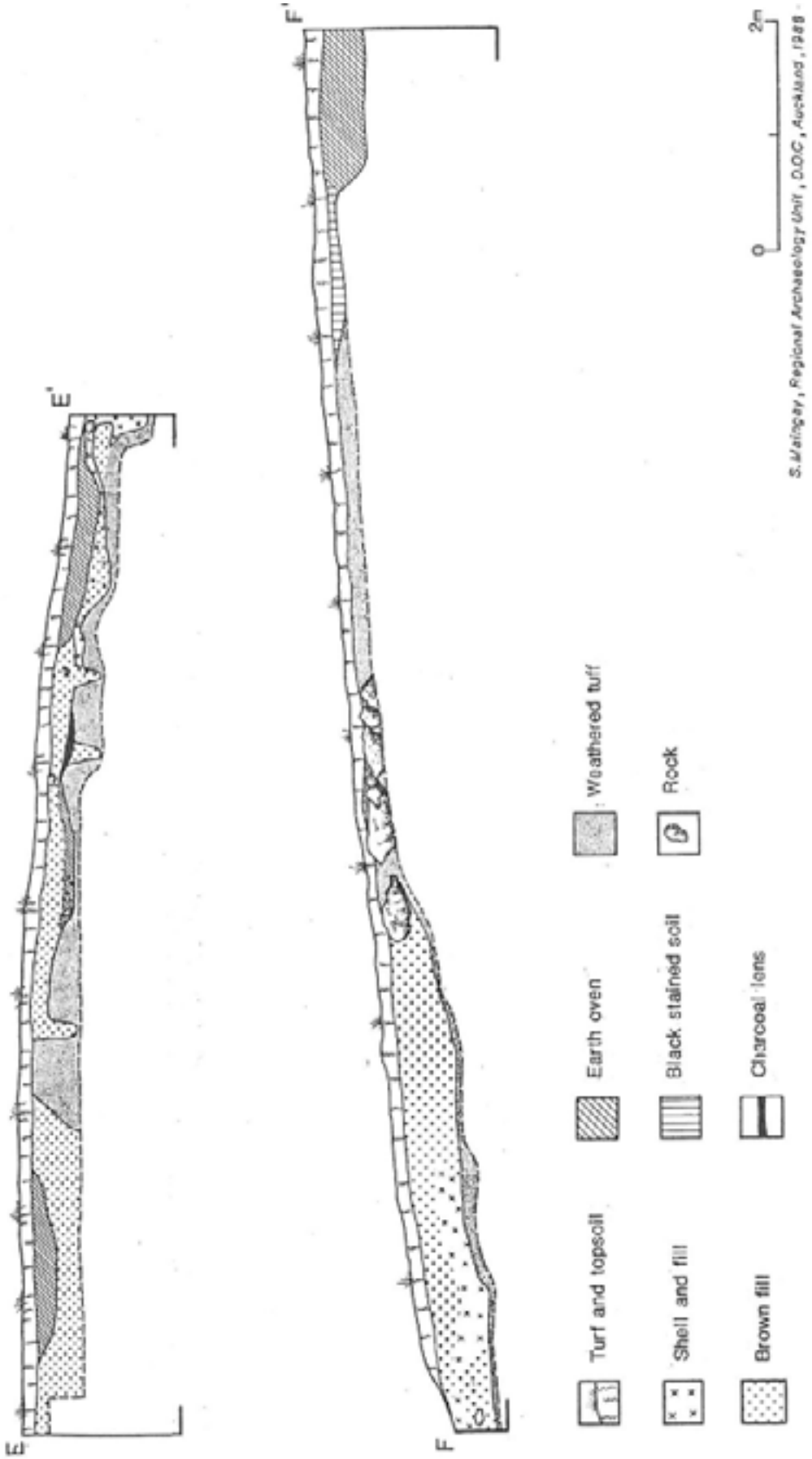


FIGURE 12 R11/899 : Cross-sections of site



Features were dug prior to deposition of Layer 2 in Area B (see below). After the terrace had been built up several houses were constructed (not all of which were contemporary) and other features were found representing use of the area after some of the houses had been abandoned. The evidence suggests continuous use of the site over a period of time when houses were built and rebuilt rather than two or three separate occupations. With the exception of this portion of the site it was not possible, on stratigraphic grounds, to relate the majority of features to a particular phase of occupation and while some were earlier than others, most could not be placed in any tight chronological sequence.

2.3.2 Excavation results

The site can be subdivided into three areas - A, B and C*. The major focus of activity in Area A was the construction of pits and food storage?; two stone-edged hearths were also located in this Area. Area B contained superimposed features including inter-cutting houses on a partially built-up terrace and one separate house. In the more sheltered location of Area C cooking, evidenced by earth ovens, was the main activity on a terrace enlarged by cutting back into the natural slope to the north. Fig. 13 shows all the features from Areas A and B and Fig. 21 shows the features excavated in Area C.

2.3.2.1 Pits

G, H, M and N (Fig. 13) were totally excavated. Pits L and Q were partially emptied. The remaining pits (I, O, P, & R to Y) were either recorded but not excavated or were located by machine trenching. Following the original use of the pits during the site's occupation, all pits had been deliberately filled. There was no evidence of natural infilling. The majority of the excavated pits contained an earth oven or the remains of a fire within the hollow caused by the sinking of the original fill. Their estimated sizes and depths are shown in Table 2.

Pit G (Fig. 14) : This pit measured 4.60 x 2.70 m with its wall close to the exposed lava flow. The floor was level and the pit cut through the tuff which appeared 0.20 mm from the surface. There were twelve postholes in the floor forming a double row. The postholes were between 0.24 and 0.50 m deep. There was a large circular bin pit cut into the floor with a slightly sloping base and a maximum depth of 0.90 m. The upper edge of the bin pit was eroded and broken lumps of tuff were found in its base beneath the fill indicating that it had been left open for some time after use and the upper edges had broken away. The more intact portion suggests that it was originally bell-shaped.

The buttress in the western comer of the pit extended from the base to the top. There was a step 0.10 m high in the opposite comer. There was a layer of compacted tuff and clay along the southern wall of the pit forming a ledge of the same height and width as the step. Beneath this ledge there were patches of charcoal and the floor was worn.

The homogeneous fill had little definite stratigraphy. It was predominantly a dark brown friable soil (10 YR 5/6) within which were inclusions of charcoal, pieces of tuff and small basalt nodules. At a depth of 0.23 m from the surface there was an earth oven in the natural hollow of the fill consisting of a concentration of charcoal and clusters of fire-cracked rocks. From the pit fill 12 stone and obsidian flakes and a broken hammerstone were recovered. One greywacke flake was retrieved from near the base of the bin pit.

* In this descriptive part of the report Area C has been included with Site R11/899, although it could relate to R11/887 as the sites were almost contiguous.

Pit H (Fig. 15) : This large pit measured 5.80 x 2.30 m. It was cut through the tuff to a depth of 1 m. The floor was very worn and crumbled easily. The internal arrangements were very complex, reflecting use and re-use and also re-roofing of the pit. There were seven probably circular bin pits cut from the floor, some of them inter-cutting and indicating successive use. A considerable amount of weathering and erosion was evident around their upper edges. The bin pits ranged from 0.40 to 0.80 m deep. They were filled with a dark brown soil and the majority had lumps of tuff at their base. One of them (marked vi on Fig. 15) had been filled with rocks. A fire had been made on top of the fill in bin pit iii. There were 14 postholes and three stakeholes in the floor of the pit. One posthole was dug into the fill of bin pit iii.

A curious feature was present at the eastern end of the floor; it appeared to be a long narrow trench, ranging from 80 to 180 mm deep with two postholes, 40 mm deep, at the southern end. There was no buttress in this pit, nor clear evidence as to point of entry. There were six postholes and a slot-like feature around its upper edges, probably relating to roof supports.

The fill of Pit H was similar in colour to Pit G. In addition to the dark brown soil and lumps of tuff and charcoal several very large rocks (up to 0.90 m in diameter) formed part of the fill. Within this pit at a depth of 0.45 m there were the remains of a fire made in the natural hollow. A second fire and a lens of shell midden were found at a depth of 0.60 m from the surface. Twelve stone and obsidian flakes and an adze (Fig 25) were recovered from the fill; one piece of obsidian was found at the base of floor pit vii.

Pits L and M :Two thirds of pit L were excavated. This pit, pit M and two earth ovens beneath the stone wall (marked X on Fig. 17) were the earliest features in this area. Pit L cut through one end of the earliest pit (M). Both pits L and M were dug prior to the deposition of the fill and midden layer (2) and predated the superimposed house structures. Pit L measured 4 x 1.75 m and was 0.48 m deep. The base of the pit was dug through the natural tuff, with two postholes in the floor, both 0.10 m in diameter and 0.20 m deep. They were aligned with the long axis of the pit but were not along the central line. The pit was filled with layer 2 fill and midden. An adze (Fig 25) was found within the fill. Pit M was 1.90 x 1 x 0.25 m deep. It had no features and was filled with a dark brown soil. Three intercutting earth ovens were dug into the fill of these pits.

Pit N: This very small pit measured 1.4 x 0.9 m and was 0.25 m deep. It contained no internal features and was filled with brown soil, some charcoal and four rocks. Although the pit was dug into the yellow brown subsoil its base was of an orange colour.

Pit Q (Fig. 16): One third of this pit was excavated; its full extent was 4.5 x 2.2 m. It was 0.94 m deep and was dug into the underlying tuff. There was 0.40 m of fill on top of this feature. The fill contained no cultural material and consisted of redeposited weathered tuff. It is probable that it originated from the initial digging and removal of spoil from a later pit. There was an internal ledge, 0.26 m wide, at a depth of 0.40 m from the top of the pit running along the northern and western walls. A buttress on the end wall, constructed after the pit had been dug, formed two steps. The steps presented a very worn appearance and began slightly below the level of the ledge.

FIGURE 13 R11/899 : Plan of excavations : all features

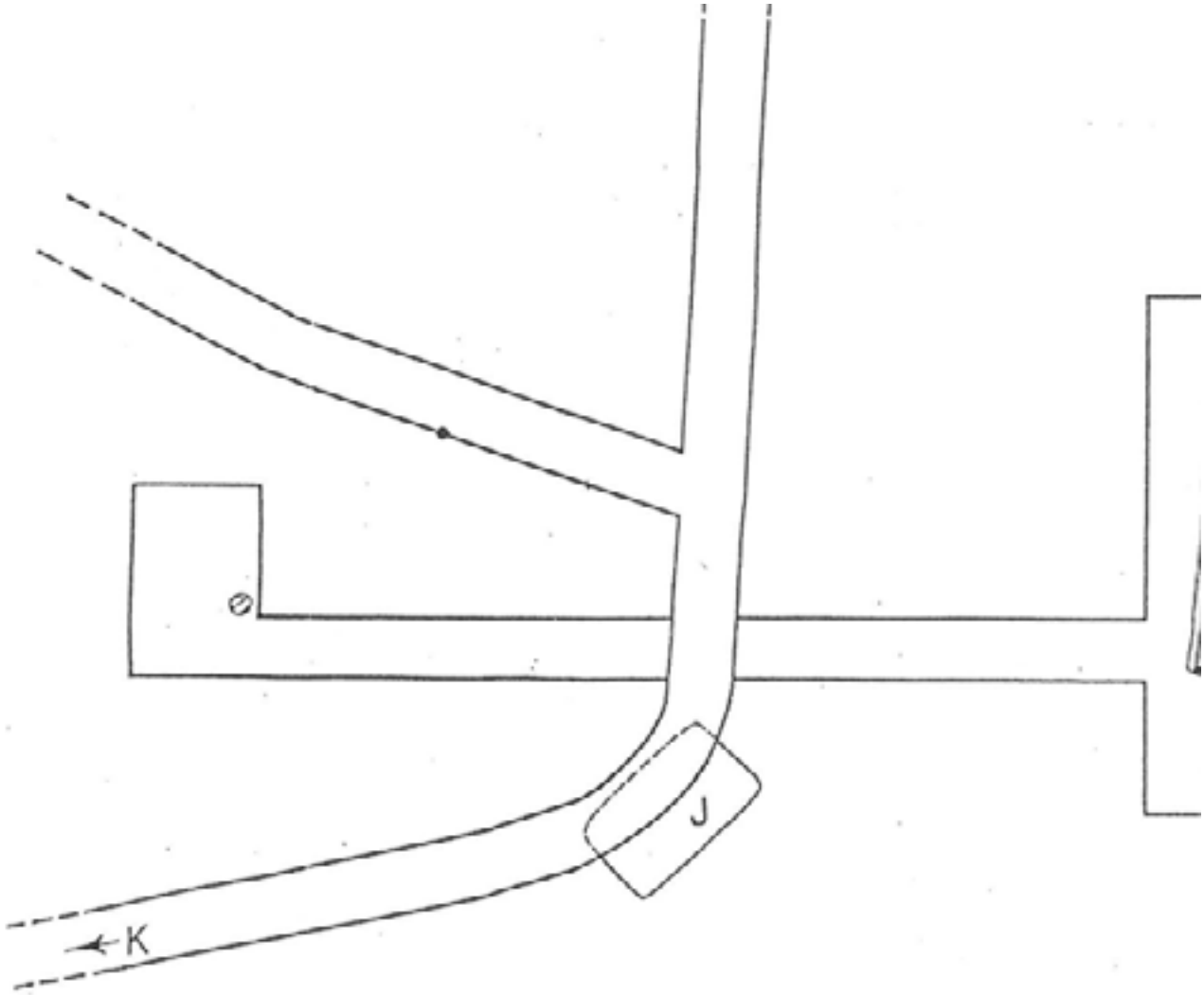


FIGURE 13 R11/899 : Plan of excavations : all features (cont.)

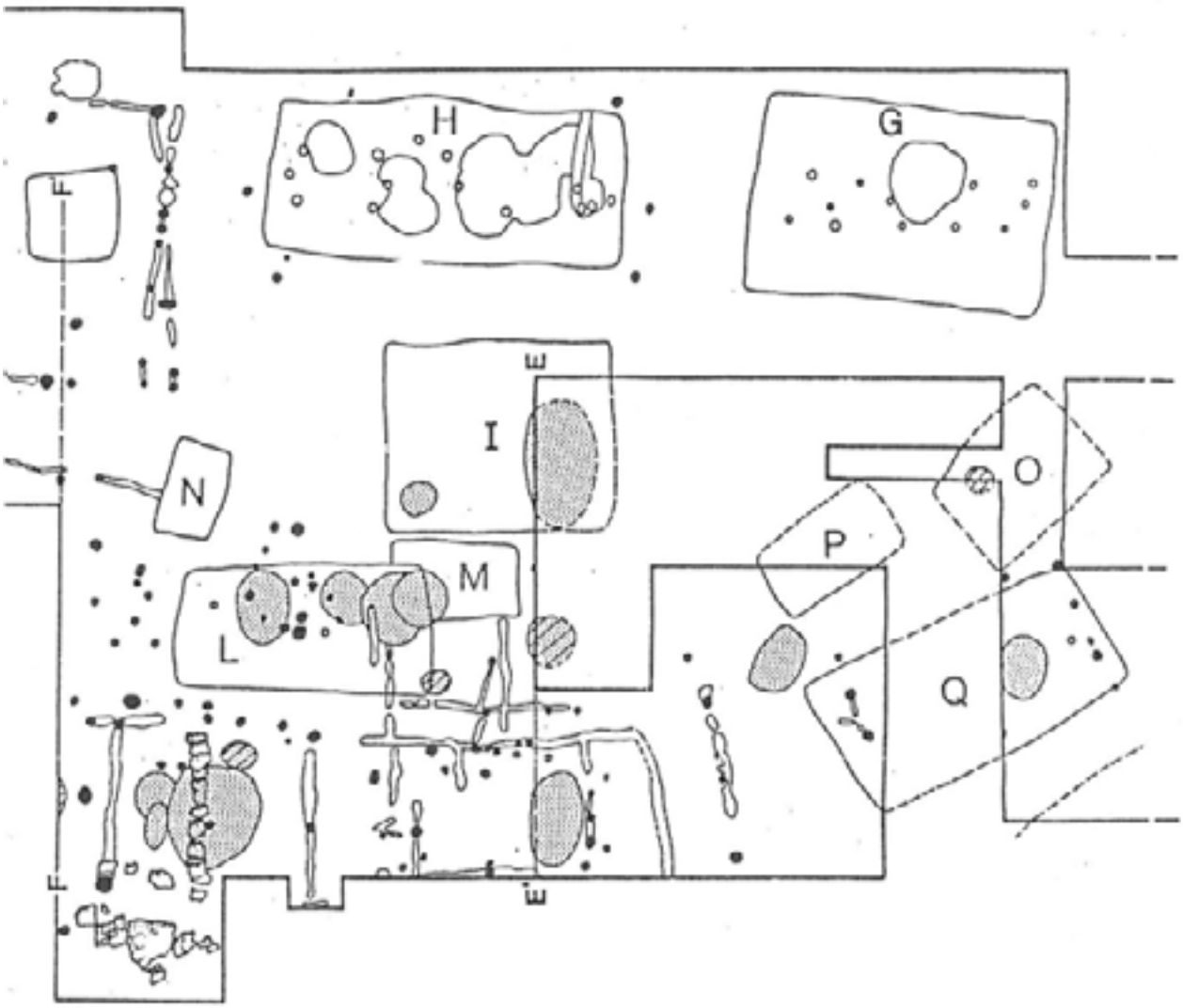


FIGURE 13 R11/899 : Plan of excavations : all features (cont)

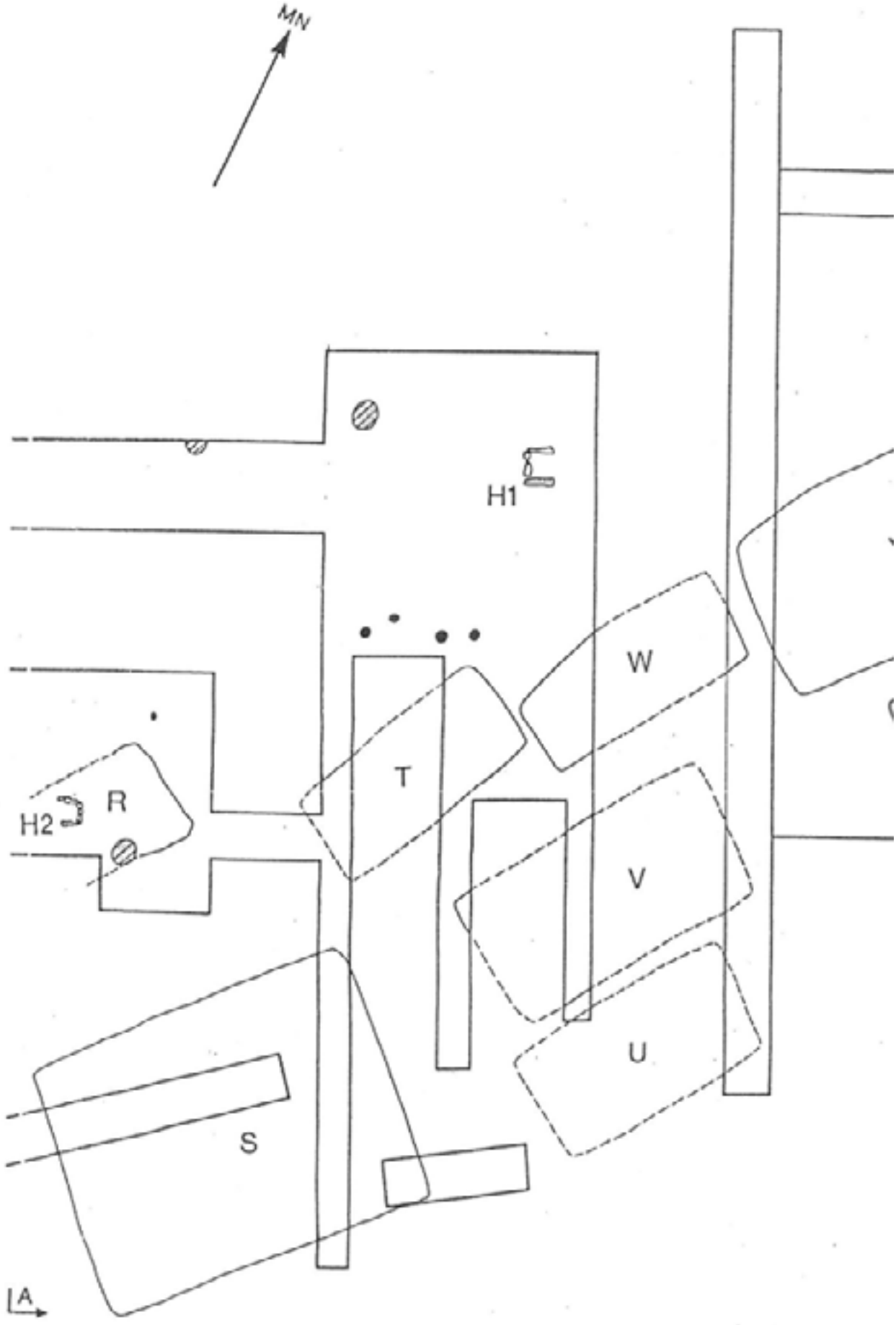


FIGURE 13 R11/899 : Plan of excavations : all features (cont).

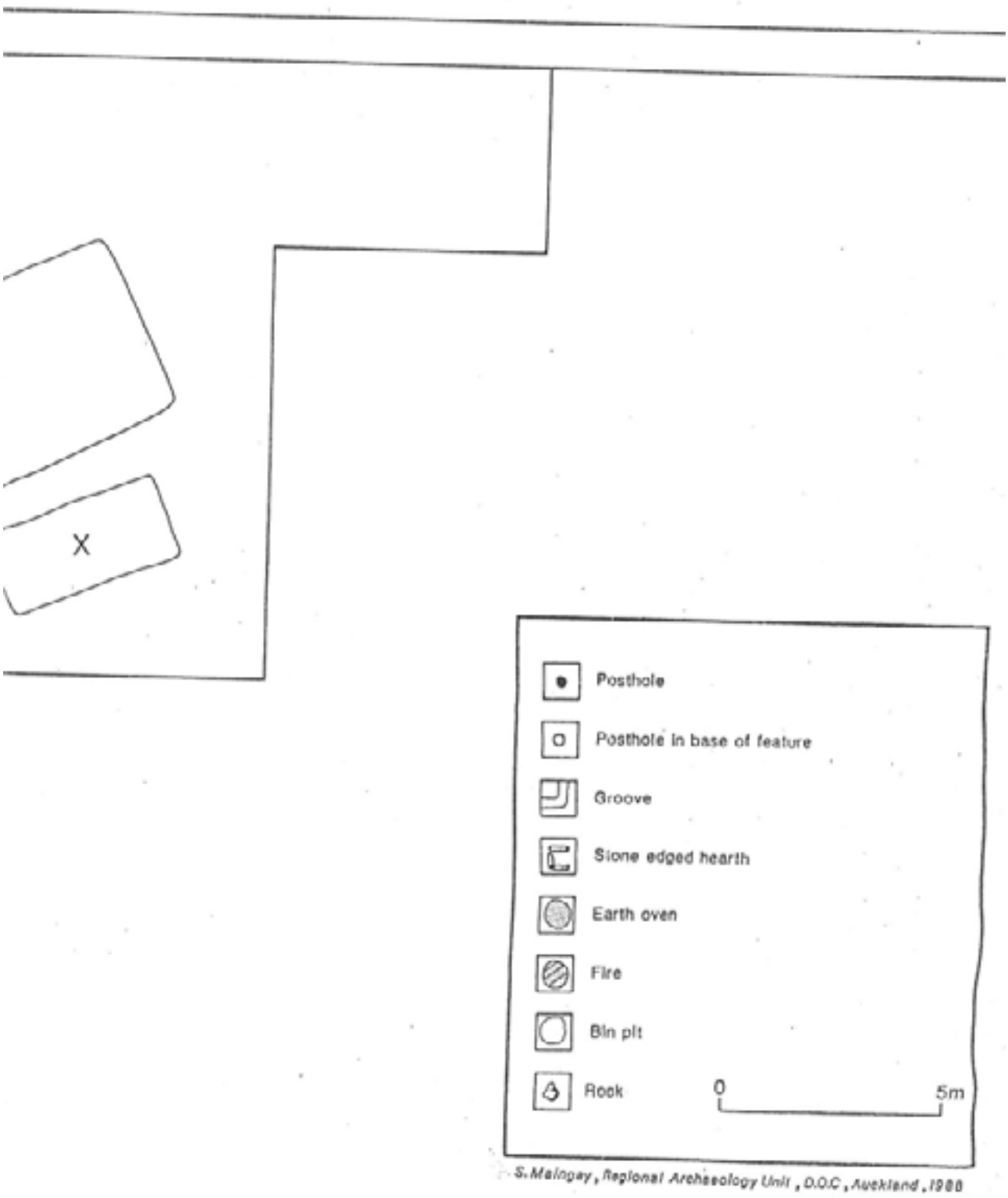


FIGURE 14 R11/899 : Plan of pit G

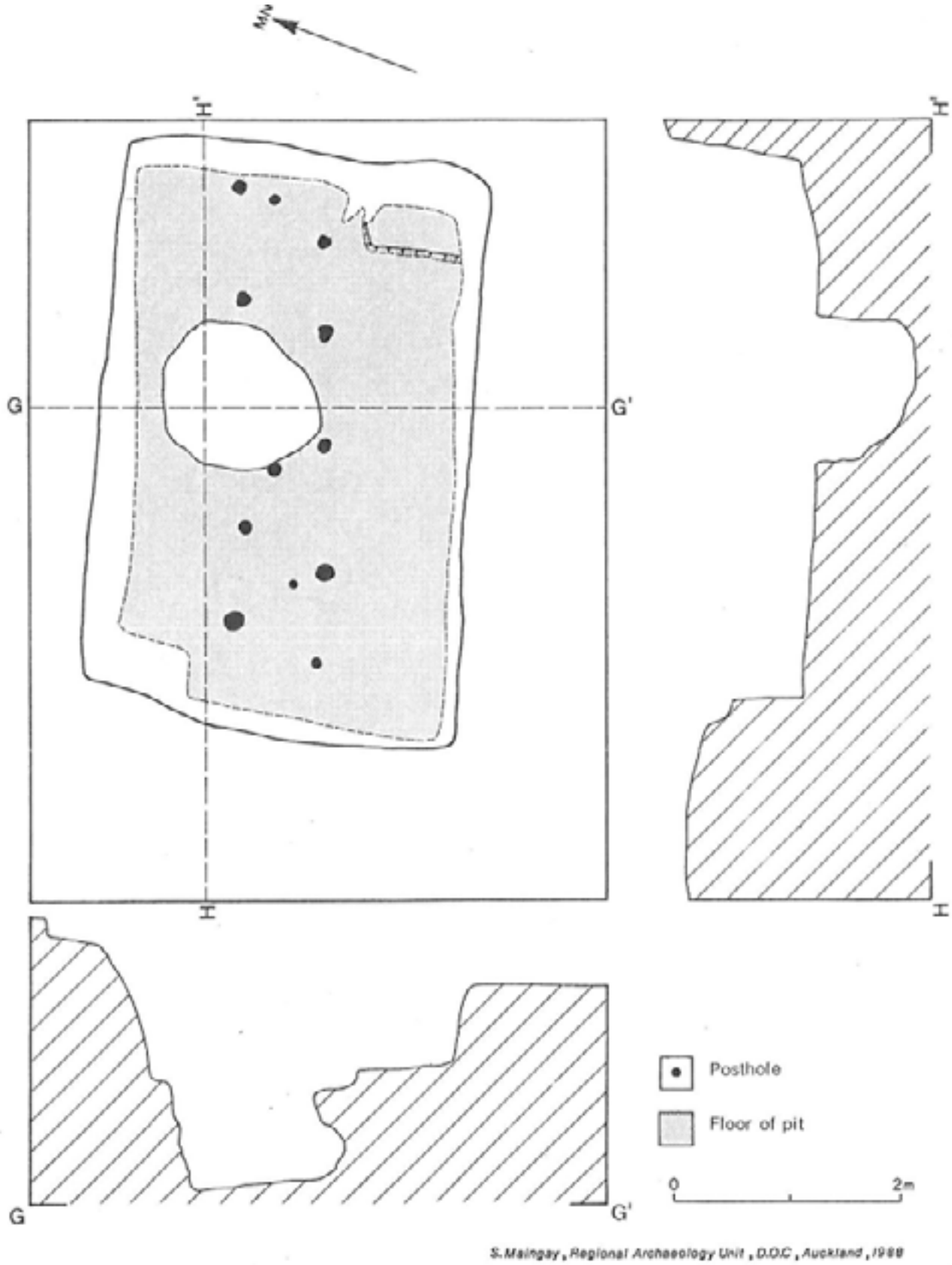


FIGURE 15 R11/899 : Plan of pit H

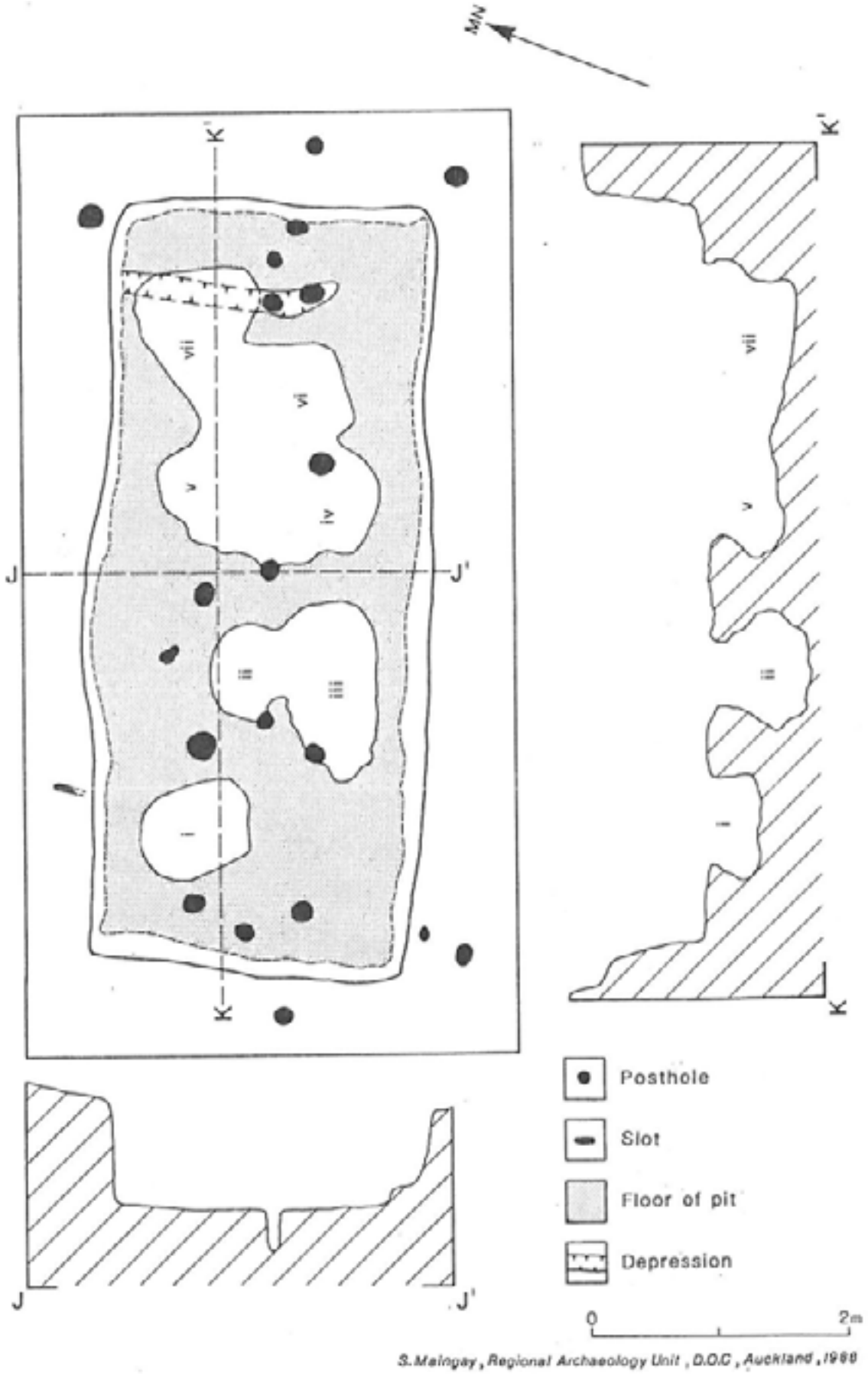
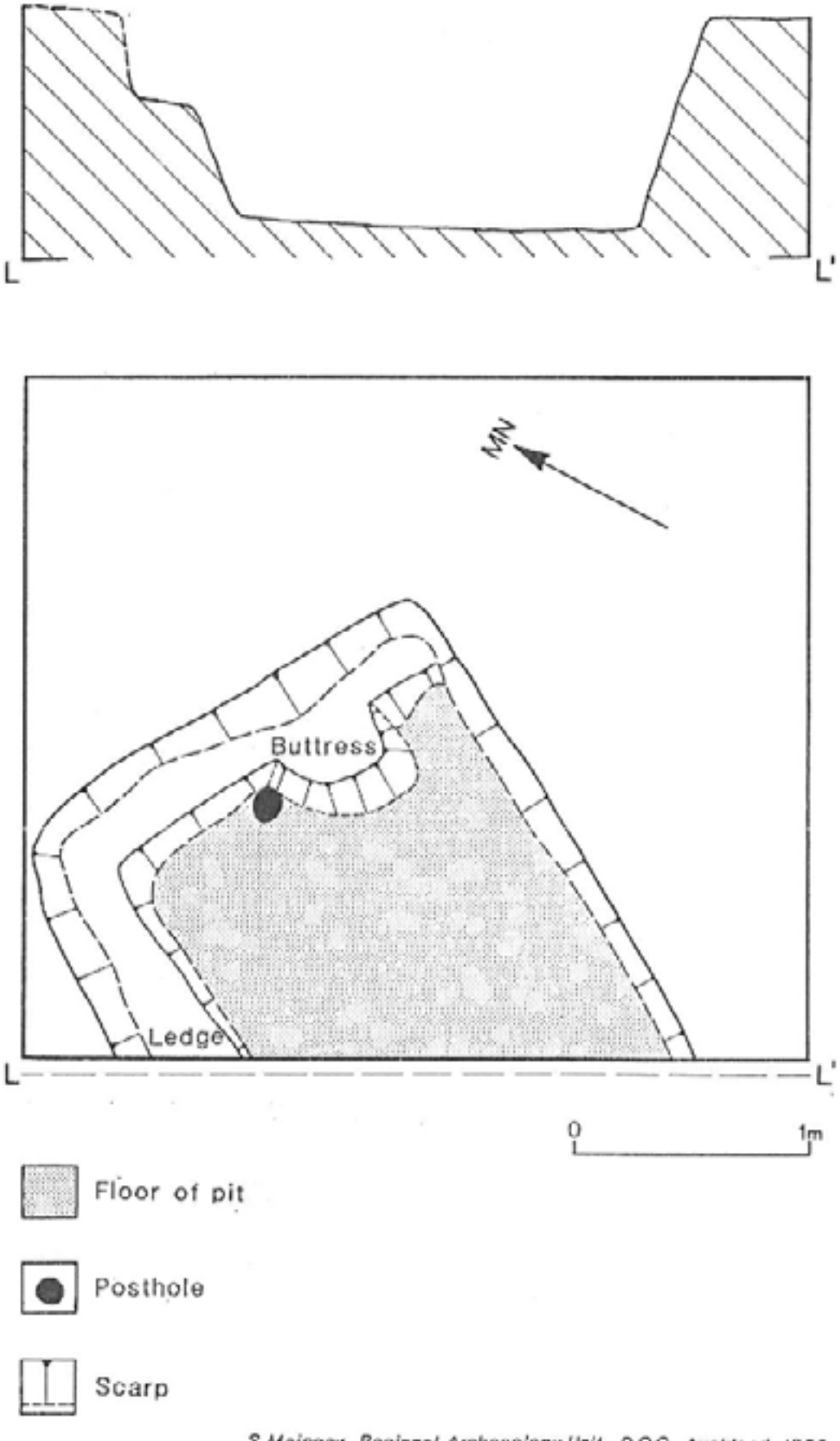


FIGURE 16 R11/899 : Plan of pit Q



There was only one posthole in the excavated part of the floor. This was alongside the buttress and was cut into the floor by 0.19 m. It was first observed in the fill of the pit at a depth of 0.45 m from the top of the pit - at the same level as the top of the buttress. It is possible that the post was left in position when the pit was filled and rotted there. The pit fill was of the same brown soil as found in the other pits and there was a large earth oven dug into the fill at a depth of 0.40 m from the surface.

A line of postholes follows the northern edge of Pit Q. These were dug into the fill of the pit and were filled with shells. They clearly postdate the use of the pit.

The dimensions of the pits are set out in Table 2 below.

The six pits excavated to floor level (G, H, L, M, N and Q) demonstrated considerable variety in size, depth and internal features. Some factors were common to most of the pits excavated. The fills were a dark brown friable soil (either 10 YR 5/6 or 10 YR 4/4); and earth ovens were present at various levels in the fills, with the exception of Pits M and N. Internal drains were not found in any of the pits from this site.

The use to which pits M and N were put is unknown. It is possible that Pit N could have been a little-used fire-pit. Bin pits were present in Pits G and H and the trenched pit K (Area C). Although uncommon in the Auckland region pits of this type have been recorded from Puketapapa (Fox 1980: Fig 10) and R10/26 on Motutapu where multiple floor pits were present in the excavated quadrants (Sullivan 1972:32). Sullivan (1972:42) suggested that they were used as respositories for seed kumara. Other bin pits have been recorded from further afield, from Skipper's Ridge (T10/165), Coromandel (Davidson 1975:11), Kauri Point (U13/45 [Green 1963:154]) and Kotare Pa (R14/8), Raglan (Pos 1964:112). The floor pits from this site are of similar size and depth to those at R10/26. Pit vi was filed with rocks; the remainder of the floor pits were filled with a dark brown soil which was not compacted down and it is possible that lids or planks were placed over the abandoned bin pits after use.

The arrangement of postholes in the base of Pit G suggests that the roof was supported on a double row of posts upon which horizontal beams rested. The apex of the roof could have been tied or the roof constructed on a cantilever principle as discussed by Fox (1974:144). The internal posts would not need to be paired in such a system and in fact a staggered post line might give added strength to the roof. The postholes in pit H suggest that this pit was re-roofed at least once. Some of the postholes cut into the fill or sides of some of the floor pits and it is probable that a single postline was replaced by a double line.

Pit G also contained a buttress, an entry step and a ledge running along the length of the pit. The ledge represented a later event than the original digging of the pit and use of the entry step. However, its purpose is not known; it could be related to specialised storage or, like the pit at R10/31 on Motutapu (Leahy 1970:81), could have been the beginning of reflooring. Its straight edge and finished appearance suggests that the former is the more likely. End buttresses are frequent in many pits - sometimes associated with roof supports or as an entry step (Fox 1974: 149). A corner buttress, as found here in Pit G, possibly in Pit F at Hamlins Hill (Davidson 1970a:110), pit J at Kauri Point Open Settlement (Green 1963: 154) and at Skipper's Ridge (Davidson 1975:11), is more unusual. There was no buttress or entry step in Pit H. However, the very worn upper edge of the south-east comer of this pit suggests that the entrance may have been from that end.

A final feature of note in Pit H was the small shallow drain-like trench cut into the floor at the eastern end with two small postholes at its extremity. Such a feature has not been reported from any other pit in the Auckland area and its purpose is not known. It may have acted as a restraint for an entry ladder. The replacement of roof supports may have necessitated a change in point of entry.

TABLE 2

Site R11/899: Estimated sizes of Pits
(measurements in metres)

Pit	Length	Width	Depth	Fill
G	4.60	2.70	1.0	Dark brown friable soil and charcoal and lumps of tuff
H	5.80	2.30	1.0	Dark brown friable soil and charcoal and lumps of tuff
I	3.88	3.08	?	Mottled brown soil
J	2.60	1.50	1.50	Dark brown friable soil and charcoal and lumps of tuff
K	4.30	2.0	1.50	Dark brown friable soil and charcoal and lumps of tuff
L	4.10	2.0	0.48	Mottled brown soil and lumps of tuff
M	2.0	1.20	0.25	Dark brown soil
N	1.40	0.90	0.25	Black/orange mottled soil
O	2.50	2.0	?	Dark brown soil
P	2.30	1.30	?	Dark brown soil
Q	5.0	2.30	0.94	Mottled brown soil
R	5.0	2.40	?	Mottled brown soil and charcoal
S	7.60	5.90	1.10	Mottled brown soil, tuff and shells
T	5.0	2.40	1.0	Yellow brown soil with inclusions of charcoal, grey and orange tuff
U	5.10	2.80	1.40	Yellow brown soil and yellow/red tuff
V	6.10	3.20	1.10	Yellow brown soil and lenses of charcoal and shells
W	5.08	2.28	0.64	Yellow brown soil
X	4.0	1.80		Yellow brown soil
Y	7.0	4.2	1.34	Yellow brown soil and yellow and red

Pit Q contained a different arrangement of internal features, although the single posthole found indicates a central line of roof supports. The end buttress in Pit Q - used as a step - was comparable to those in pit K at Hamlins Hill (Walton 1979: 108) and at three sites on Motutapu - pit 5 at R10/38 (Davidson 1970b:41), pit E at R10/26 (Sullivan 1972:56) and pit 2 at R10/31 (Leahy 1970:64). In composition the buttress closely resembled that in pit 4 at R10/31 (Leahy 1972:18); in both cases the buttress consisted of compacted clay placed in the pit after it had been dug. The internal ledge running along the end and one side wall in pit Q was an interesting attribute. A similar feature was encountered in pit T at Hamlins Hill (Walton 1979:111) and in pit B at R10/31 (Sullivan 1972:39) where Sullivan (1972:39) suggested that the ledge was used to facilitate entry into the pit. As the ledge in pit Q ran along two walls it would appear unlikely that it was dug primarily for that purpose. However, no other function is clear which could be offered as an alternative.

In summary, there was considerable range in size and probably in function of the pits at this site. It is usually accepted that deep pits were used for the storage of root crops. The use to which small, shallow pits, such as pits M and N, were put is unknown. At present a study of ethnographic literature has produced no examples that might assist further in their interpretation.

2.3.2.2 Houses

Postholes and grooves relating to several superimposed houses were found in Area B (Fig. 17). Initially this area had been used for cooking and it was then levelled to form a terrace by the addition of fill and midden (Fig. 12). The edge of the terrace consisted of a row of large rocks (marked W on Fig. 17). A number of houses were built on the terrace. Subsequently the area was again used for cooking.

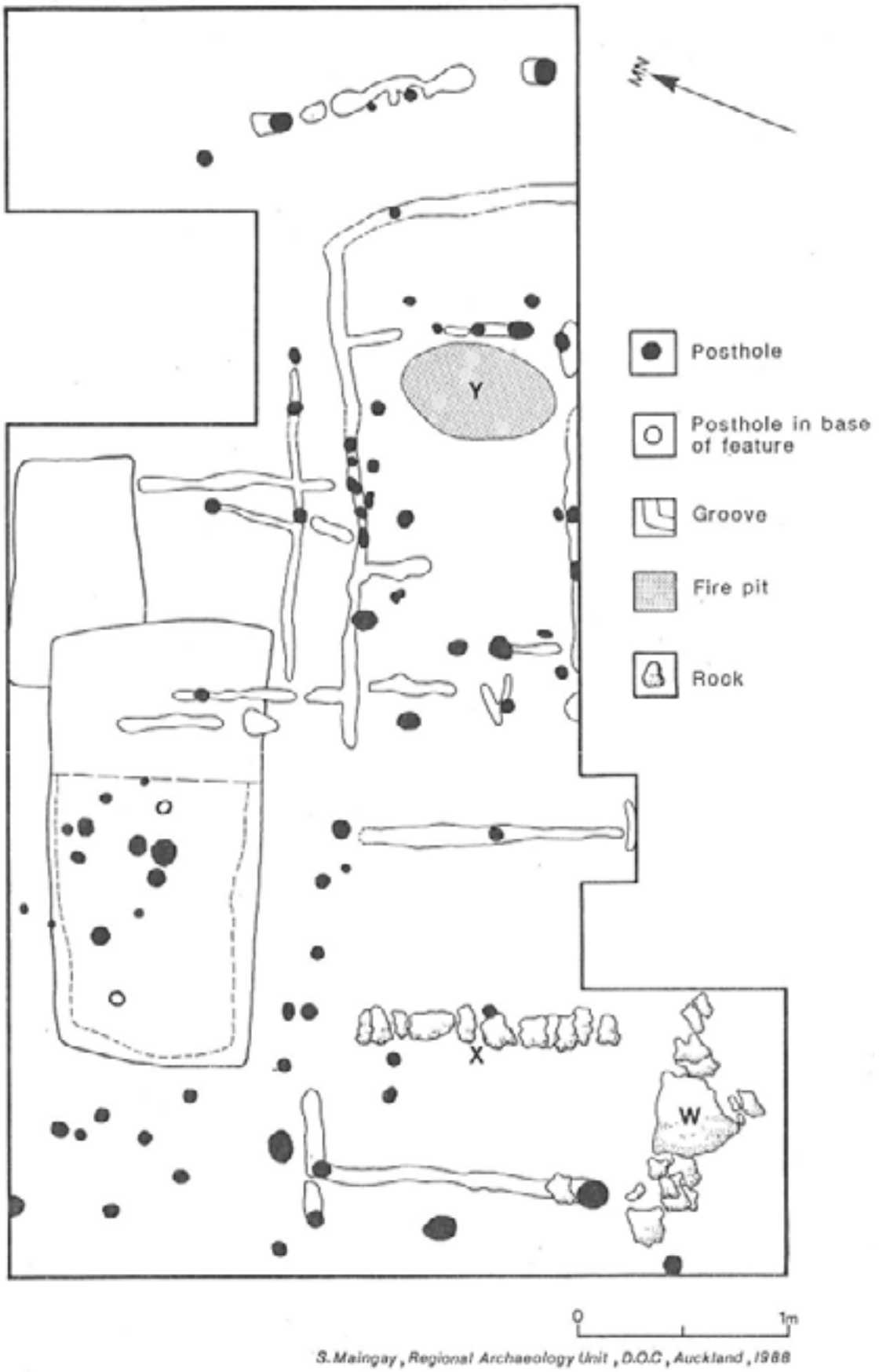
Superimposed Houses :The evidence for the superimposed houses consisted of grooves and postholes. The grooves were from 0.20 to 0.25 m deep and 0.15 -0.20 m wide; postholes were found within or alongside the grooves. These were often of similar depth to the grooves, although some were up to 0.34 m deep. In some cases the grooves and postholes were not recognised until the unstratified midden-fill layer had been removed and they were seen in the subsoil beneath. The outline of the houses was unclear in the fill of Pit L and to the west of this. Cross-section E-E1 (Fig 12) shows several of the grooves and postholes.

Not all features came from the top of the midden-fill layer and it is probable that as one was replaced by another more fill was spread over the living surface. The grooves and postholes indicated that a number of houses were constructed in this area, several with an east-west alignment and at least two on a north-south line.

A line of rocks (marked X on Fig. 17) was present on the same alignment as the north-south grooves. The rocks used were naturally squared and were laid so that their upper surfaces were level. It is likely that these rocks formed apart of the foundations for one of the houses.

Only one of these houses had any form of heating -an oval firepit (marked Y on Fig. 17). This firepit, together with the adjacent posthole and groove, belonged to one of the earliest houses.

FIGURE 17 R11/899 : Plan of houses



The Separate House : A separate house of similar posthole and groove construction was found to the north of the superimposed houses (see Fig. 13). A plan of the house is shown in Figure 18. It measured 2.8 x 6 m (including the porch of 1.4 m width). The postholes varied in depth from 0.10 to 0.26 m (averaging 0.18 m). The porch and entrance faced south, the deepest posthole being the one in the centre of the southern wall of the house. There was one posthole in the house, on the central line, which was 0.14 in deep. There was no posthole on the same line rear wall.

The grooves of this house were 0.12 -0.17 m wide and 0.15 m deep. Within the house there was a firepit measuring 1.50 x 1.48 by 0.25 m deep. Both the base and sides of the firepit were burnt. The eastern wall of this house would appear to have been replaced. A posthole was cut into the north-eastern corner of the firepit. This was filled with very dark brown soil and post-dated the house.

It is now accepted that structures such as these, with the outline defined by grooves and postholes, were houses. Similar examples have been found at Hamlins Hill (Davidson 1970a:116; Irwin 1975:52; Walton 1979;112; Nichol 1980a:221), Mangakaware II (S15/18 [Bellwood 1978:23]), Orakei (R11/87 [Illustrated in Davidson 1984: Fig 101] R10/31 Motutapu (Leahy 1970:62) and Hawkins Hill (Coates 1986:247).

The separate house appears to be one of the best examples of this type of construction found in Auckland to date, with evidence of almost a complete building present including a porch a feature either lacking or not excavated at other Auckland sites (Davidson 1984: 154). No definite posthole was found at the centre rear of the house. However, there was a depression here, filled with rocks, which could have served to hold a post. Apart from this house it was not possible to isolate any other individual house, but the evidence suggests that the superimposed houses were of similar size and design to the separate house.

2.3.2.3 Stone-edged hearths

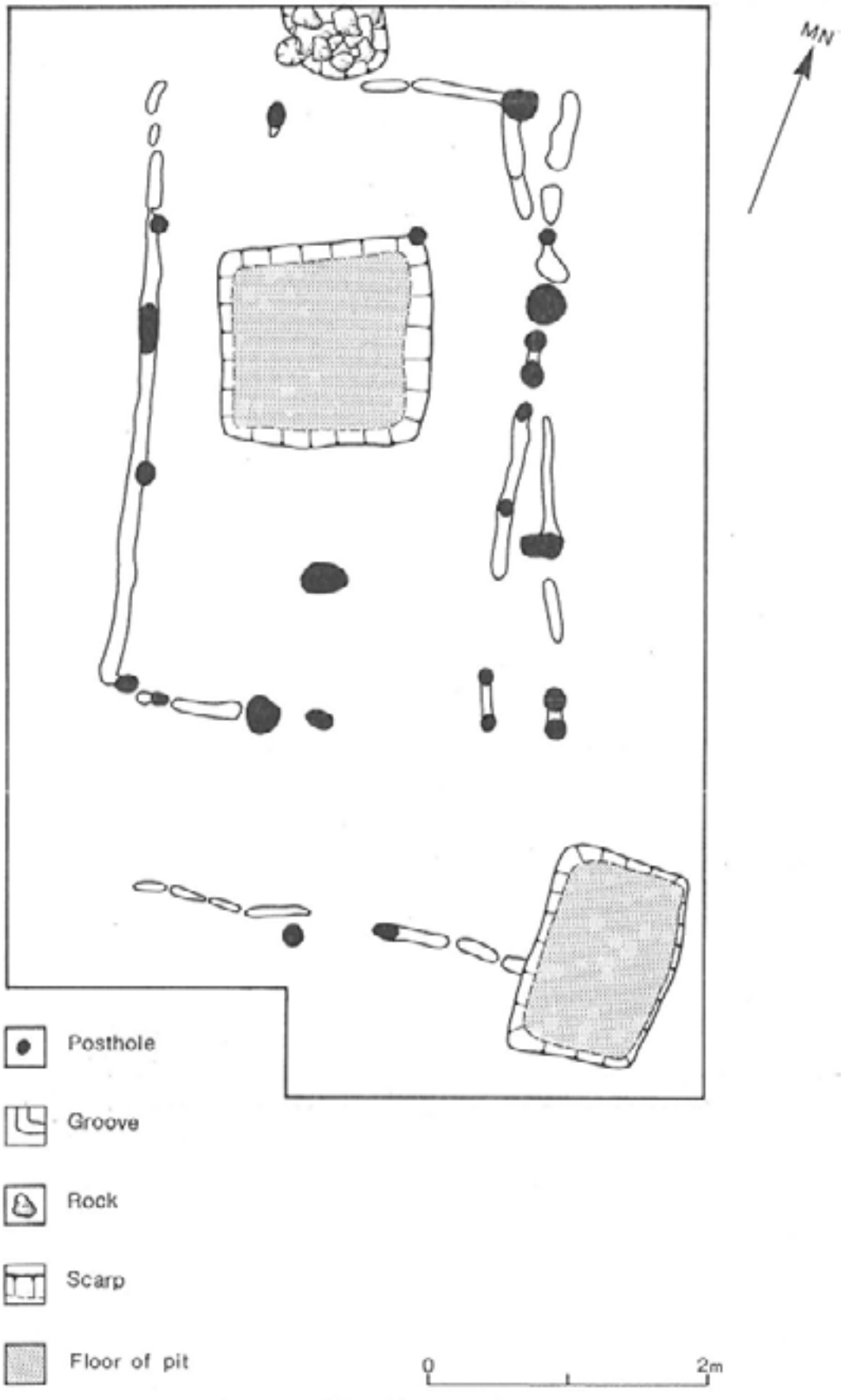
These features are marked H1 and H2 in Area A on Fig. 13. Hearth 1 was visible on the surface prior to excavation; hearth 2 was revealed when the turf was removed.

Hearth 1: This consisted of six naturally squared scoratious basalt rocks set into the subsoil and arranged to form three sides of a rectangle, the measurements of which were 0.50 x 0.45 m. There was no evidence to suggest that a fourth side was ever present. Within the hearth were lenses of ash and charcoal. A thin scatter of charcoal was present to the west of the hearth.

Hearth 2: The internal dimensions of the hearth 2 were 0.40 x 0.32 m. It was also three sided and made from scoratious basalt constructed on the compacted fill of Pit R. A semi-circle of small pebbles formed the western boundary. It was filled with many layers and lenses of white, grey and red ash and charcoal. Ash and a smear of charcoal spilled to the west of the hearth.

There were four postholes in a line 3 m south of hearth 1 and eight near Hearth 2. These few postholes in the same general area as the hearths do not appear to be directly associated with them and do not provide adequate evidence to postulate any structure related to either hearth.

FIGURE 18 R11/899 : Plan of the separate house



Rectangular stone-edged hearths have been used often as an indicator for the presence of a house (e.g. Groube 1965:44). Examples of houses with such hearths have been found at the Washpool Cross site (S28/56 [Leach 1979:122]), Moikau (S28/9 [Pricket 1979:44]), Tarata (R22/27 [Smart 1962:178]), Maruka (U16/220 [Lawlor 1984:243]) and Puketarata (Q21/44 [Walton 1982:147]). However, houses without such hearths have been found at Motutapu (R10/31 (Leahy 1970:62]), Tiromoana Pa, Te Awanga (W21/1 [Fox 1978:24]), Hamlins Hill (Nichol 1980a:221), Ruahihi (U14/38 [McFadgen and Sheppard 1984:20]), Wiri Oil Terminal (R11/1187 [Bulmer 1987:8]), Westfield (Furey 1986:7) and Whangapoua (T11/219 [Furey 1987:121]) and at Waiwhau [Phillips in press]), although at those latter sites they may have been present beyond the bounds of the excavation and in a disturbed portion of the site respectively.

In the course of Sutton's investigation of undefended settlements at Pouerua (Sutton [forthcoming] "The Archaeology of Structures -Stratigraphical and Cultural") there was a clear association of stone-edged hearths within houses, where nine of eleven excavated structures identified as houses contained such hearths. One house contained a scoop hearth and only one house was without a hearth. No stone-edged hearth was excavated without a surrounding house.

The association of stone-edged hearths with houses is less clear elsewhere. In Auckland Leach recorded such hearths at Puketapapa, Taurere and Maungakiekie with no definite evidence that they occurred within a structure. At recorded without evidence of a surrounding house (Leach Further afield in Polynesia stone-edged hearths are well documented both within and outside houses (Green 1979: 94). There is sufficient evidence from around New Zealand to suggest that stone-edged hearths without houses are not unusual and fall into the general Polynesian pattern. The hearths would appear to have been constructed in the open in the vicinity of houses and they could have formed an outdoor focal point of the settlement.

2.3.2.4 Earth ovens

Numerous earth ovens were found at this site. The majority were found in two distinct areas in the vicinity of the superimposed houses of Area B and in Area C.

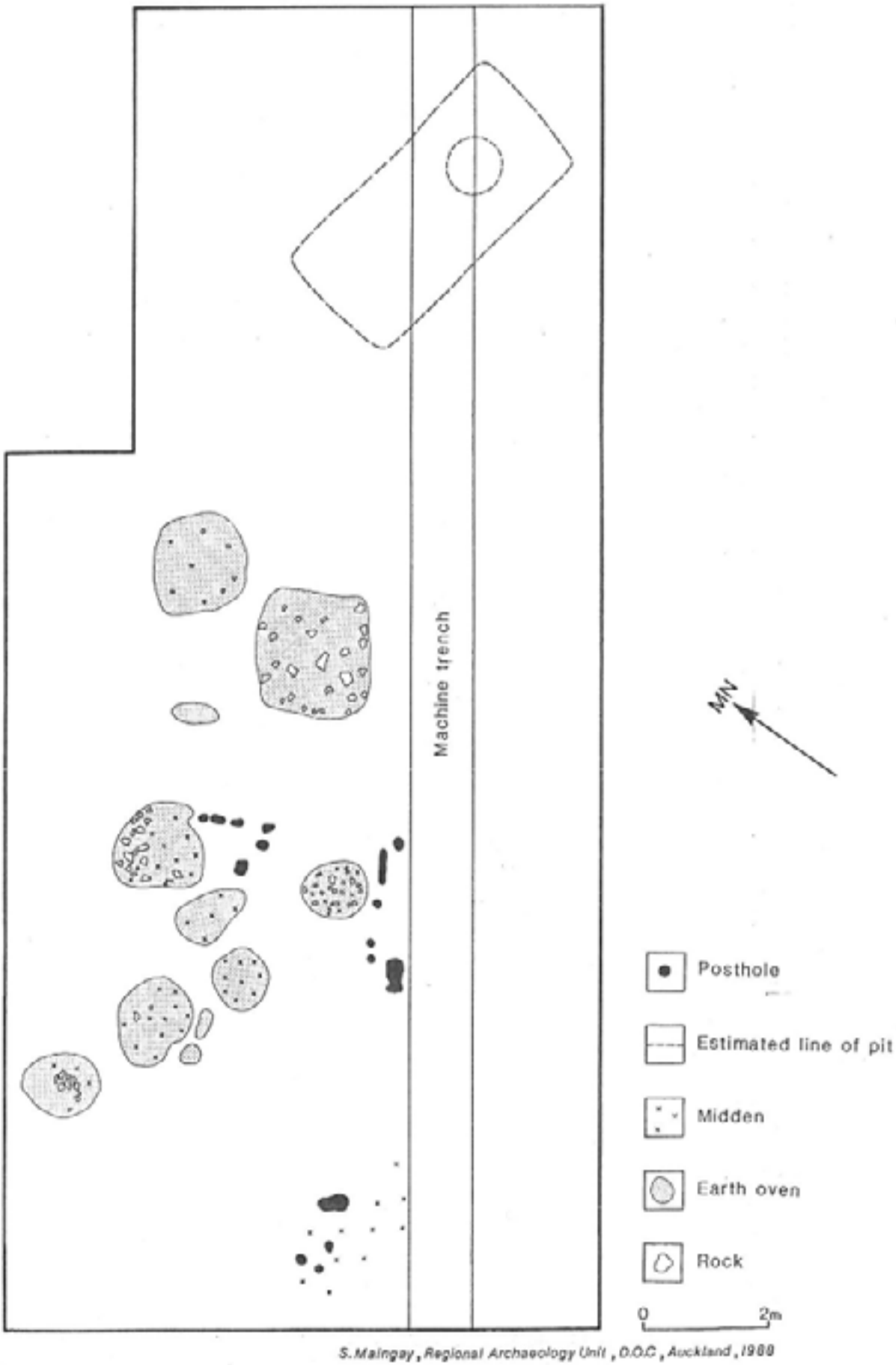
In Area B, before deposition of the midden/fill layer, two earth ovens were dug into the subsoil. These occurred beneath the rock wall marked X on Fig. 17. The remaining ovens came from the top of the midden/fill layer. In Area C (Fig 19) there were eight earth ovens recorded on the terrace to the west of Pit K. Pressure of time meant that this area was machine trenched and scraped only. The ovens were identified by areas of black greasy soil, charcoal and scoria oven stones. These stones were generally larger than those at R11/887, averaging some 0.20 m in diameter.

2.3.2.5 Postholes

In addition to the postholes relating to the houses a number of others were excavated. They occurred mainly in area B, dug into the fill of Pit L and to the west of this pit (Fig. 13). The Area B postholes varied in depth from 0.10 to 0.30 m and were dug through the midden/fill layer into the subsoil. Their fill consisted of dark brown soil and a few shells. These postholes appeared to bear no direct relationship to the houses. The majority formed two clusters - no particular structures are indicated by their arrangement although it is possible that they may have related to an above-ground structure or structures of the raised store-house type (*Pataka*)

The postholes in Area C formed three small clusters (Fig 19). Their position in relation to the earth ovens in this area suggests that they related to either cooking sheds or windbreaks.

FIGURE 19 Area C R11/899 : Plan of excavation : all features



2.4 Further archaeological investigation on the Fisher Road block

In addition to the excavation of the three main sites R11/887, 888, 899 the rest of the Fisher Road block (Fig. 20) was investigated to establish the nature of any further archaeological remains, before the whole block was developed. Three techniques were used -

a) Machine trenching of suspected archaeological sites.

b) Monitoring during earthworking for the development.

c) A test excavation on the river bank.

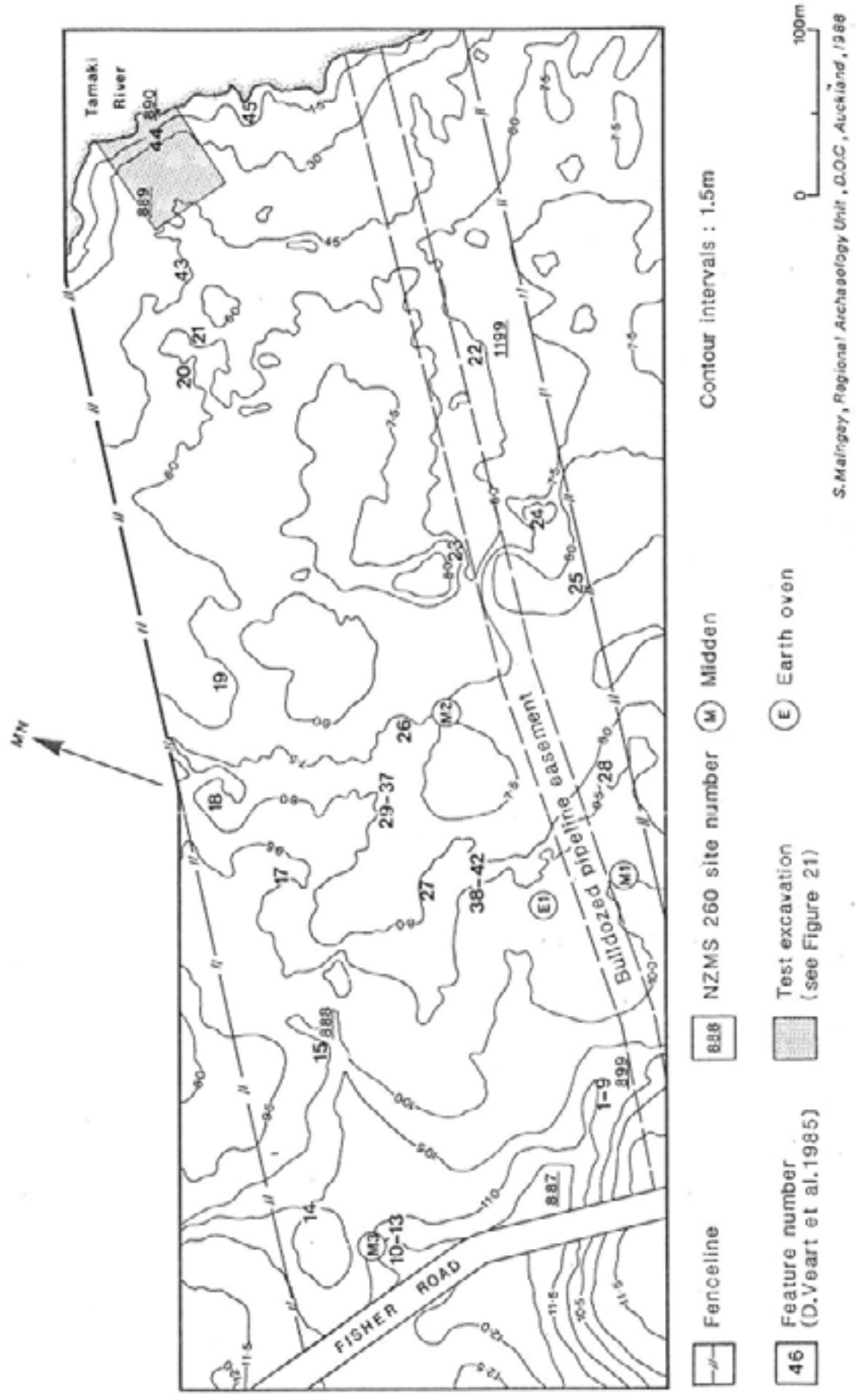
a) Veart *et al* (1985) carried out an intensive archaeological survey of the block. In order to try to understand the area as an archaeological landscape, they recorded not only the clear evidence of archaeological sites, such as pits and middens, but also other areas where it was thought possible that natural features may have been modified for prehistoric occupation and/or gardening, as the distinction between natural and man-made features is often difficult to make in the Auckland stonefields without excavation.

In all 45 "features" were identified by Veart *et al.* Many of the features formed clusters, for example site R11/899 was made up of features 1 – 9, whilst other feature numbers covered a whole site, for example feature 44 consisted of terraces and midden. Analysis suggested that the identified features made up 10 sites/possible sites and 11 areas which could have been used for gardening. Figure 20 shows all the features recorded by Veart *et al,* as well as further sites identified during the excavations.

As many as possible of the Veart features were machine trenched during the excavation of the three main sites. Exceptions were 1 -9, (site R11/899), 10 -13, 15 (site R11/888), 22 -25 and 44. Features 10 -13 were situated under the construction works depot and were unavailable. Features 22 -25 and 28 could not be relocated. Features 22 to 25 were probably destroyed during the construction of a major storm-water drain in this area. Feature 44 is discussed in c), below. Veart's features 14, 16 – 21, 26, 27 and 29 - 43 were trenched. With one exception (feature 27) no signs of prehistoric modification or positive evidence of garden soils were revealed at any of these locations. Feature 27 of a small scatter of shells on the edge of a lava flow. Feature 23, one of those thought to have been destroyed by the pipeline, was of more significance. This site had already been disturbed at the time of Veart's survey and was recorded as shell midden and blackened soil and charcoal in an area of about 10 m on the southern end of a lava flow.

b) Before the main excavations commenced trenches, dug by the quantity surveyors for the developers, in the areas where Veart *et al* had not recorded potential archaeological features were monitored. The soil profile was natural with no evidence of any significant prehistoric modification. The monitoring during the earthworking phase of the development produced evidence of three areas of shell midden (Fig 20: M1- M3) and a single earth oven (Fig 20: F1). It is probable that M1 was Veart's feature 28 (a midden). It is thought to have been inadvertently misplaced in Veart *et al,* Figure 3 (D Veart pers comm. 1987). This site consisted of a shell midden on the top of a lava flow and covered an area of approximately 3 m. There were no features associated with or near to this midden. M2 was a thin scatter of shells very similar to feature 27. M3 was a more substantial deposit, although not comparable in quantity to that of the three excavated sites, and was adjacent to features 10 -13.

FIGURE 20 Fisher Road block showing identified sites and possible sites.



C) Excavation of R11/890

Veart *et al,* feature 44, incorporated site R11/890 (shell midden) with a number of indistinct terraces not recorded by Tippett and Molloy (1980). Test excavation of this area was undertaken by the authors for 1 week in May 1985, prior to the main excavation, under N.Z. Historic Places Trust Permit 1985/18. This excavation was to establish whether there was any extensive occupation along this section of the River bank, close to the Otahuhu Portage. The site consisted of 3 -4 slight terraces and an area of midden about 10 m^2 eroding from the river bank.

Method: In order to examine as wide an area as possible a number of 1 x 1 m squares and 0.5 m wide trenches were dug across the whole area. In addition a further area directly the midden on one of the 'terraces' was machine-scraped. The areas excavated are shown on Figure 21.

Stratigraphy: The stratigraphy was similar to that found at the main sites excavated. A cross-section of the main test trench is shown in Figure 21.

Layer 1: Turf and topsoil, a dark brown friable loam 50 to 100 mm deep.

Layer lb: Black soil containing shell midden and soil up to 0.20 m deep. This layer was only present on the edge of the terrace above the river bank and on the bank itself. Where this layer was not present layer 1 was separated from layer 2 by a mottled interface. The midden covered an area of some 30 m.

Layer 2: Weathered yellow/brown tuff. In some areas small (10 mm) scoria pebbles were present. None of the areas excavated were dug below this layer.

The only archaeological features discovered were three small earth ovens underlying the midden in trench T1 (Fig 21) and cut into layer 2 (Fig 22). No evidence of any structures or garden soils was found. The slight terraces were caused by natural processes.

The evidence of the earth ovens and midden layer suggests some form of occupation on the riverbank. It is likely that this occupation was of an insubstantial nature as no evidence of any subsurface remains of structures was found. However, flimsy shelters leaving little or no trace could have been present but not observed.

Site M3 was likely to have been a habitation area of some size. This site, together with R11/888 and 899, suggests substantial occupation - perhaps of a permanent nature - in the western portion of the block. Although no positive evidence of gardening was found anywhere on this block, early ethnographic evidence (eg: Cruise 1974:216) indicates that there was gardening in this area in the early nineteenth century. The presence of deep storage pits and comparable dates for the Fisher Road, Hawkins Hill and Westfield sites (see Section 4, below), together with the fertile volcanic loam soils of the area, point to the development of earlier gardens than those of the nineteenth century.

FIGURE 21 R11/890 : Plan showing areas excavated

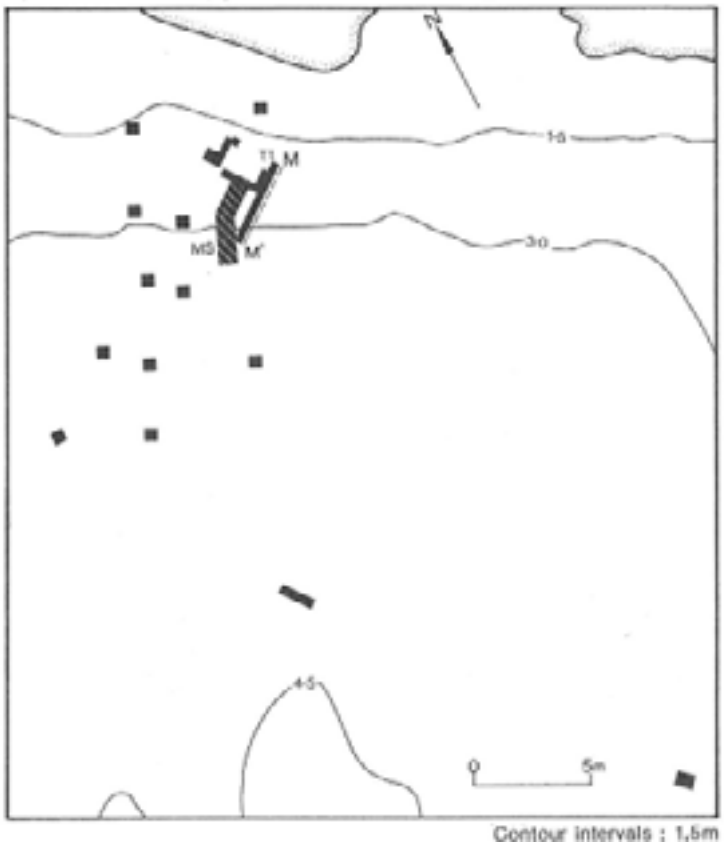
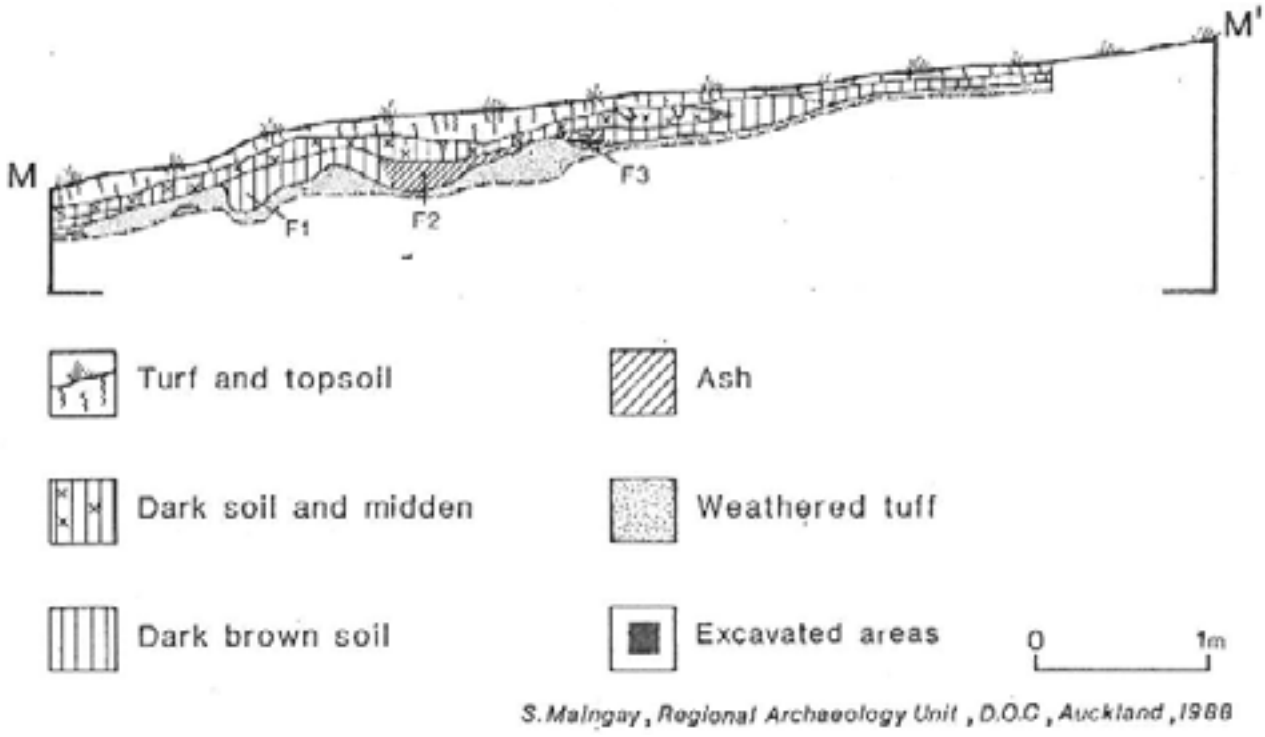


FIGURE 22 R11/890 : Cross-section of south baulk , Trench T1



3. PORTABLE ARTEFACTS FROM THE FISHER ROAD SITES

In common with most excavated Auckland sites only a relatively small number of artefacts were recovered from these sites. Table 3 lists all the portable artefacts from the three sites by site and category.

The formalised artefacts are typical of the Auckland area. Eight adzes and adze roughouts were recovered from the sites. They are illustrated in Figure 23 and described in Table 4. They are utilitarian and give little indication of the kinds of tasks they were employed for. An exception is Adze C (Fig. 23). This small adze was broken across the shaft and diagonally across the blade. The broken blade end had been reworked as a small chisel and was probably used for wood carving. The presence of roughouts and reworked adzes, together with adze flakes (particularly at R11/887 where clusters of adze flakes were found,) indicates that adze maintenance was undertaken.

At R11/888 a fishing sinker with a pecked lashing groove was also recovered (Fig 23: E).

The non-formalised artefacts consisted of obsidian flakes and cores, greywacke flakes and cores and a scattering of other stone material. The obsidian is analysed in Appendix 5 and the other stone material in Appendix 6.

A total of 263 pieces of obsidian was recovered. Most came from R11/887 (71%) with fewer from R11/899 (26%) and R11/888 (3%).36% of the obsidian was green, possibly from Mayor Island in the Bay of Plenty, although there is a green obsidian source at Kaeo in Northland. The remainder of the obsidian was grey, with possible sources on Great Barrier Island and from numerous locations on the Coromandel peninsula. No significant differences were noted in the relative percentages of green to grey obsidian between the three sites.

There were 197 other stone flakes from the sites - 64% from R11/887, 28% from R11/899 and 8% from R11/888. The material was essentially greywacke (95.5%) with a few chert (3%) and local volcanic stone (1%) pieces. Many of the greywacke flakes were struck from water-rolled cobbles and could have been collected from the shores of the Gulf, a major source being Motutapu Island.

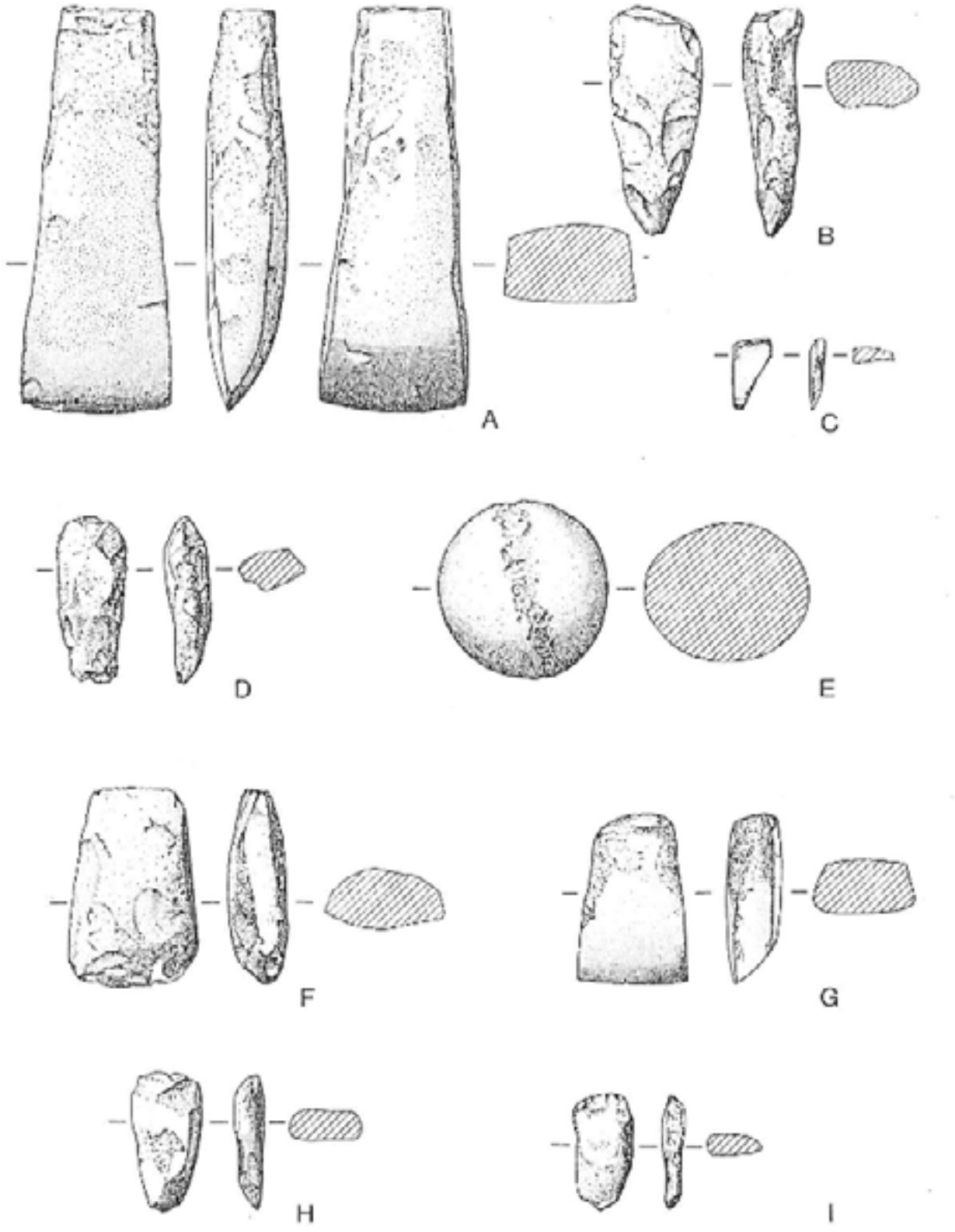
At R11/887 the greater part of the obsidian and other stone material was retrieved from the machine-scraped area. This affected the sample in two ways. Firstly very little of the material was *in situ.* Only the general observation that the flake distribution coincided with the area of postholes (Fig. 5, above) may be made as far as their distribution isconcerned. Secondly the sample is likely to have an unknown bias towards flakes of larger size, which are more easily seen. This presumed bias has been taken into account in the analysis of the flakes (Appendices 5 & 6). This analysis of the obsidian and other flakes indicates that tasks requiring the use of stone tools, such as scraping flax and other woven materials and possibly the cutting of fish and other soft-fleshed foodstuffs, are likely tasks undertaken in this area. There is only limited evidence that would indicate that the manufacture of stone tools was carried out here.

TABLE 3

Portable Artefacts from Sites R11/887, 88 & 899, Fisher Road

TYPES	SITE		
	R11/887	R11/888	R11/899
Adzes	2	1	4
Roughouts	1		
Polished flakes	13	1	3
Hammer stones	2		2
Obsidian pieces	187	8	68
Stone pieces	126	16	55
Fishing Sinker		1	

FIGURE 23 Portable artefacts from sites R11/997, 88 and 899, Fisher Road.



A: Adze (R11/887); B: Broken Adze Roughout (R11/887);
C: Reworked Chisel (R11/887); D: Adze (R11/888);
E: Fishing Sinker (R11/888); F-I: Adzes (R11/899)

0 10cm

S.Maltbey, Regional Archaeology Unit, D.O.C., Auckland, 1988

TABLE 4

Adzes from Sites R1/887, 888 and 889, Fisher Road (measurements in mm)

Fig 23/	Site No. R11/	Length	Width	Thickness	Blade width	Stone	Comment
A	887	156	58	31	58	Greywacke	Polished on all sides and blade. Butt reduced by flaking and hammer dressing. One flake chipped off blade. Width at butt end 36mm.
B	887	89	36	20	n.p.	Basalt	Broken roughout. Flaked. No blade.
C	887	25	15	5	3	Greywacke	Broken. Originally polished on all sides. Blade refinished for use as a very small chisel.
D	888	65	26	16.3	20	Greywacke	Reworked roughout. Polished on front. Flaked all over. Bevel struck.
F	899	76	48	23	41	Greywacke	Flaked all over. Hammer dressed front, back and poll. Polish front back and along one side at blade end. Blade broken.
G	899	65	40	18	41	Greywacke	Polished front back sides blade. Butt reduced by hammer-dressing for lashing.
H	899	53	25.5	12	N.P.	Greywacke	Broken. Polished front, back and both sides. Blade broken off. Hammer dressing.
I	899	43	22	9	N.P.	Greywacke	Polished front, back and blade. Sides flaked. Bevel broken. Hammer dressing one side.

At R11/888 only a very small amount of obsidian and other stone material was recovered. With the exception of one obsidian flake, found in the fill of the earth oven on top of Structure A, all the flake material was recovered from the surface of the shell working floor. It would seem to represent material discarded during use.

All the flake material from R11/899 was recovered by hand excavation. The distribution of flakes is shown in Figure 24. This indicates that there were some small areas of stoneworking. Whilst there was a concentration of lithic material around Hearth 2, there was no such concentration close to hearth 1. In that portion of the site flakes were clustered close to a small fire. Very few artefacts were found within the confines of the houses. At many sites concentrations of artefacts have been used as supporting evidence for the presence of a house: for example by Prickett at Moikau (1979:43) and Furey at the Briers Block (1987:121). The lack of such artefacts within the houses at this site and those at Hill and Motutapu indicates that the presence of artefacts is not a universal attribute of a house - at least in Auckland.

In general, while actual numbers of flakes recovered from each site showed considerable variation, the significant difference in the number of flakes at R11/887 compared with those at R11/888 and 899 suggests a more intensive activity with the use and flaking of stone. Fredericksen's analysis (Appendix 6) indicated that there was no significant difference in size or shape of obsidian flakes from the three sites. Fredericksen suggested that this material was debitage from tool manufacture with only two flakes showing any sign of use-wear. However it is possible that the flakes were used for some other function which left no recognisable use-wear patterns, as discussed above in relation to site R11/887. The number of flakes from was much smaller and was also categorised by Fredericksen as debitage. The clustered distribution of these flakes supports his hypothesis that they represent waste material which occurred during tool manufacture.

4. DISCUSSION AND CONCLUSION

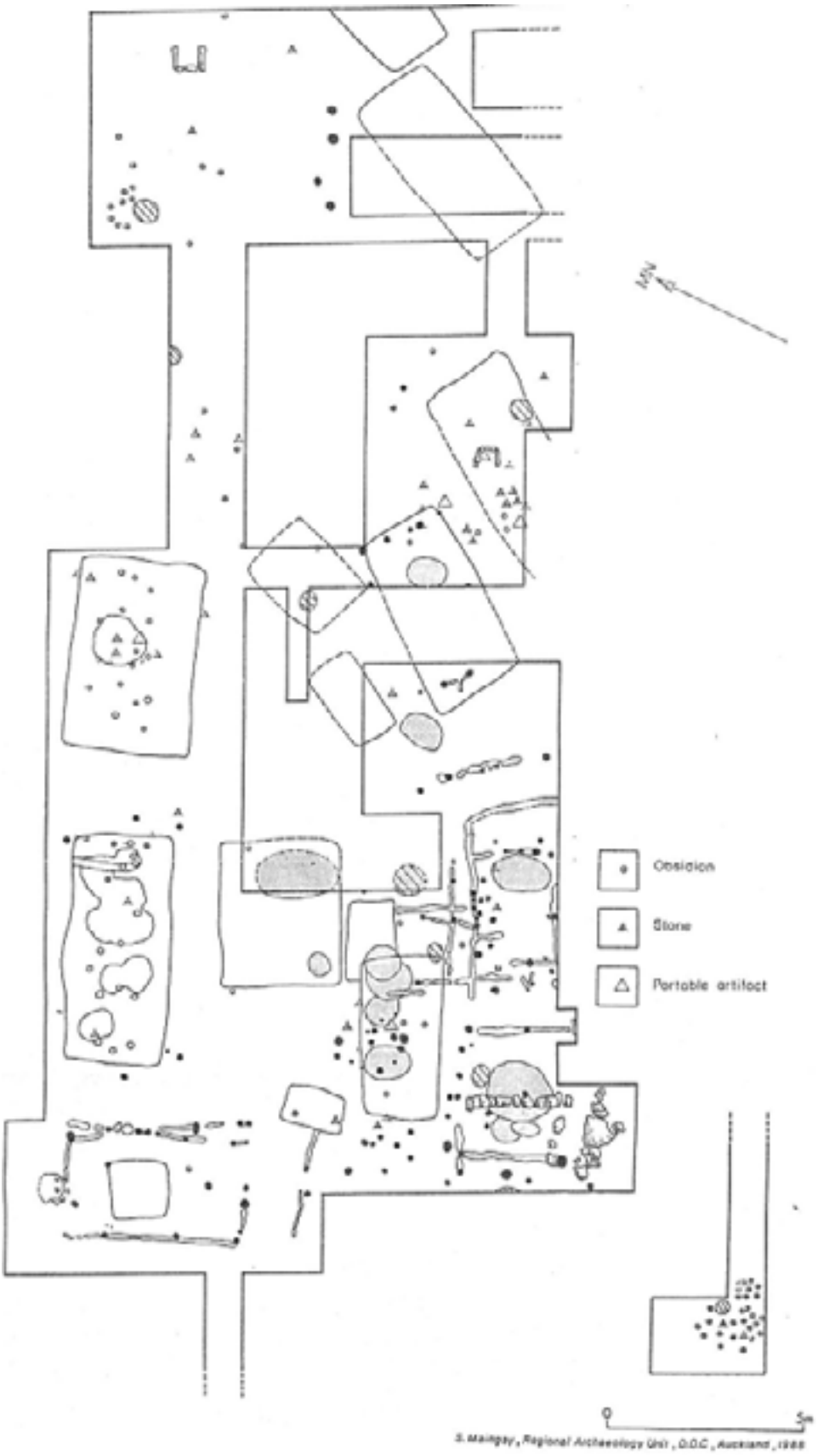
In this section of the report the radiocarbon dating of the sites and the evidence for the economy of the inhabitants are discussed and brought together with the structural evidence from the excavations to present an interpretation of the sites and their place in the settlement pattern of the upper Tamaki River.

4.1 Dating

The Radiocarbon dates obtained for the three sites are listed in Appendix 7.

The dates obtained represent the main occupation of all three sites in the mid to late sixteenth century. There is no stratigraphic link between the dated events, but the close similarity of the dates, together with the excavation evidence, suggests that the sites were likely to be contemporary. The significance of these dates in relation to each other and to the other dated sites in the area (Hawkins Hill, Westfield) has been discussed by Foster (1986), who concluded that the radio carbon dates of these sites could not be distinguished, statistically.

FIGURE 24 R11/899 : Portable artefact distribution



4.2 Economy

Evidence of the economic base of the inhabitants of these sites may be gained from the analysis of faunal remains (Appendix 4) and by inference from the excavated evidence.

Although no faunal samples that could be described as coming exclusively from a rubbish dump were found, there was sufficient material recovered to establish the range of animal sources exploited. The content of the faunal samples was similar to that of most other Auckland sites, containing a number of shellfish species, and fishbone, dog and other mammals. In particular there were similarities with the other excavated sites in the area (Hamlins Hill, Hawkins Hill, Westfield), where there were similar shellfish species, primarily cockle (*Chione stutchburyi*), a predominance of snapper (*Chrysophrys auratus*) amongst the fish species, and small quantities of dog (*Canis familiaris*) present. However, as all these sites had the same environment to exploit, the similarities cannot be seen as especially significant.

The shellfish present indicate the exploitation of several ecological zones (estuarine, rocky shore and open coastal). Estuarine species predominate with small quantities of rocky shore and open coastal species present. Cockle is the major species present, which, along with the other estuarine species, could have been collected from the nearby Tamaki River or the Manukau harbour a little further to the west. The rocky-shore and open-coastal species could have been collected from further afield in the Manukau or Waitemata harbours or from the islands of the Hauraki Gulf.

Generally the fish remains were few and fragmentary. The predominant species was snapper, although a number of other species were present, especially at site number of fishbones were recovered. A number of fishing techniques were indicated by the types of species present. The usual method of taking snapper and trevally (*Caranx geogianus*) was by bait-line, although seine nets were equally effective and the number of other small fish (small shark, mackeral [*Trachurus declivis*] stargazer [*Geniagnus monopterygius*] and mullet [*Aldrichetta forsteri*]) indicates that netting was a major method of capture. Barracouta (*Thyrsites atun*) was also identified in the midden from Westfield and Hill and the presence of this fish and kahawai (*Arripis trutta*) suggests the use of trolling lures.

The dog skeletal remains represented all body parts, suggesting that butchery of these animals took place at the site. One pelvis had cut-marks on the ilium. Similar cut-marks were also present on some dog bones from the Hawkins Hill site (R. Foster; pers. obs.) and are consistent with the flensing of the flesh off the bones, as discussed by Taylor (1984).

No direct evidence of gardening was found. However, the large number of storage pits suggests that considerable energy was expended in the production of root crops, even allowing that not all pits would have been in use at the same time. Despite attempts to identify areas where gardening took place, no specific evidence could be found that pointed to any particular areas of gardens. Clearly gardens must have been present somewhere in the vicinity. It is possible that they were present and not located or that the gardening activities practised left no visible trace. A third possibility could be that the gardens were located in some area beyond the block investigated, such as between the settlement and the Otahuhu Creek.

4.3 Structural Evidence

The structures and features from the three sites varied from site to site and not all contained the same range of components. The differences and similarities between the sites are discussed below.

There were at least three types of building present at the Fisher Road sites. At R11/899 there were groove and posthole houses similar in construction and size to those at Hamlins Hill and Mangakaware. The three structures at R11/888 contained postholes for roof support and peripheral drains, but with no postholes for wall supports. The evidence here suggests a building with an A-frame roof line, probably of a light construction. While these could have been used as houses, two of them would appear to be larger than most houses but of a less substantial construction. They have been interpreted as probable storage sheds.

At R11/887 there was sufficient evidence to suggest that one house of similar construction to those at R11/899 was present. In addition there were four other structures with sunken floors, central row of posts and peripheral drains. As discussed above, in Section 2, these structures were too shallow to have functioned efficiently for the storage of kumara and it is suggested here that they may have been another type of building such as that tentatively identified by Green at Rahopara. If this is so it is likely that similar shallow pits elsewhere may have served primarily as houses, particularly where other evidence of houses is lacking. For example, at R10/31, Motutapu, no houses were found and the shallow pits there were interpreted as storage structures based on the lack of litter within them. The houses at R11/899 demonstrated that domestic litter is not necessarily an attribute of a house. At both Motutapu and Fisher Road there is no reason to assume that these structures may not have been constructed as houses although obviously they could also have served for storage other than for kumara.

There is a further type of house not positively identified at the Fisher Road sites. This type of building is one defined by postholes only, for example at Ruahihi (McFadgen & Sheppard 1984) and Aotea (Fox & Cassels 1983). It is possible that some of the many postholes at R11/887 could have related to such a construction. However, no pattern of postholes which would clearly allow such an interpretation was obvious, leading to the inference that the postholes probably belonged to less substantial shelters.

At sites R11/887 and 899 there were three areas used for cooking in earth ovens. At R11/887 and in Area B of 899 the cooking areas were located on top of earlier features. Area C of was a discrete area separate from this site and R11/887 and was used almost exclusively for cooking. The arrangement of postholes close to some of the earth ovens in Area C suggests that shelters or windbreaks were constructed around them. The postholes in the vicinity of the other earth ovens in Area B and R11/887 may also relate to similar features. At R11/888 there was no specific area for cooking, although two earth ovens were found.

No deep storage pits were found at R11/887 or 888. At R11/899 the majority of the pits were large and deep, of a type usually interpreted as kumara stores. Most of the deep pits occurred in Area A, suggesting specific use of this part of the living site for storage. The alignment of all the pits in Area A could be taken as an indication of continuous use of this area by the same people. Similarly, some of the pits in Area B were on the same alignment as the houses, which could suggest their contemporaneity. The majority of pits indicated re-use of the hollow formed by the settling fill for cooking purposes. This is a common feature of many excavated pits.

4.4 The Nature of the Settlement

Although one of the most frequently encountered site types in New Zealand is the open settlement, characterised terraces and/or midden, excavation has been limited and generally has only involved segments of such sites. Consequently it is difficult to assess the nature of their settlement at these sites or to compare adequately one such site with another. One of Sutton's objectives in his recent work at Pouerua was to look at some open settlements in the vicinity of the Pouerua Pa with a view to understanding the range of sites and their inter-relationships. The research proposal for the Fisher Road sites envisaged that the results would be comparable and add to this general body of knowledge relating to open settlements.

The excavations reported here revealed a considerable portion of the three sites. They provided sufficient information to assess the nature of settlement of each site and to discuss their relationship to each other and other sites in the vicinity.

Groube's study (1964; 1965) of settlements still remains the basis for discussion of the nature of undefended sites. He ranked settlements on four levels starting with the "minimal domestic unit", which consisted of a number of structural components such as those for storage, dumping and cooking in addition to a house or site for sleeping (Groube 1964: 53). The second level - the communal - is comprised of a number of domestic units and sites of specific communal activities (Groube 1964:56). The third and fourth levels add the natural environment (economic level) and the wider political aspects of a larger unit consisting of clusters of communal units (political level) (Groube 1964:58).

Sites R11/887 and 899 fall into the first of Groube's categories. Both contained evidence of structures, storage and cooking. Midden was found at both sites, although no areas used exclusively for the dumping of rubbish were found. The evidence at R11/888 was less clear. It did not contain all the elements considered to be indicative of a domestic site, particularly in the lack of storage pits and a discrete cooking area. The most likely explanation for this site is that it was a specialised satellite area of the other sites. This is supported by radio-carbon evidence. The age estimates from the three sites are so close as to indicate their contemporaneity. Together they may be regarded as a single communal unit at Groube's second level - a hamlet. The sites within this hamlet encompassed a wide range of activities including living, the preparation and cooking of food and storage. In addition there were certain locations where specialised activities took place. These were an area where stone tools were used and possibly manufactured at R11/887 and an open working floor at R11/888 (possibly for manufacture and maintenance of nets).

The two other sites which have been excavated in the same lava field (Westfield and Hill) were also domestic units with evidence of houses, cooking, midden dumping and storage. In addition the Westfield site contained a specialised working area which was interpreted as a place where woodworking was undertaken (Furey 1986:21). These sites have features in common with the open settlement at Fisher Road and are of similar age. It is suggested that of these sites would have been occupied by contemporary, extended, and probably related, family groups.

The settlement on Hamlins Hill is very similar to the sites around Te Apunga o Tainui. All were occupied in the same general time range, were located close to one of the canoe portages and contained a similar range of features. At Hamlins Hill about 500 m^2 was excavated and the structures indicated that it was part of a large settlement with construction of consecutive buildings in the same locality. This is very like the pattern at Fisher Road, where occupation is interpreted as continuous over a period of time with houses being built and re-built and no indication of any significant breaks in occupation.

Groube (1965:52) argued that the pa was the focus of a more extensive settlement pattern with everyday economic activity undertaken in dispersed hamlets or huts. The use of the pa as a focal point in studying prehistoric settlement patterns in New Zealand has been used with success by later archaeologists, such as Irwin (1985) in understanding the settlement patterns of the Poutu peninsula, northwest of Auckland, and by Phillips in her study of the peninsula in Northland (Phillips 1987). In discussing the political unit Groube (1965: 14) pointed out the problem of interpreting such a unit without adequate time control. Within the settlements excavated around Te Apunga o Tainui the dates show occupation in the 16th century with no evidence of any earlier occupation. Although no dates are available for occupation of the cone, it would seem reasonable to assume that it was in use at the same time as these surrounding hamlets and was in fact the political centre of these settlements.

The Otahuhu portage was one of the major portages between the Waitemata and Harbours and the inhabitants of the pa at Te Apunga o Tainui and its associated open settlements must have had considerable control over its use. In this respect it is of note that the investigations of the remainder of the Fisher Road block did not indicate the presence of any significant habitation sites between those excavated and the Tamaki River. This can be seen as supporting the proposition that the focus of settlement in this area was on the pa and the portage rather than on the main Tamaki River.

The interpretation of the excavations at Fisher Road presented here suggests that sites R11/887, 888 and 899 formed parts of a single hamlet. Horticulture and food storage were major subsistence activities, although it is clear that fishing and shellfishing were also of significance. There is evidence suggesting that at least one specialised satellite area was part of the settlement and evidence for tool manufacture, use and maintenance. The settlement was of a pennanent nature, as evidenced by substantial houses and extensive storage facilities, and was probably occupied as a home base over an extended period of time by one group of people during the sixteenth century.

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APPENDIX 1: Checklist: Imperial and Metric Site Numbers

All recorded archaeological sites in New Zealand have a site number allocated under the NZ Archaeological Association Site Recording Scheme. This scheme was based on the NZMS (Imperial) topographical maps. With the introduction of the NZMS 260 (Metric) maps each site has been allocated a new Site Number. As many sites are best known by their old imperial number, all sites referred to in this report are listed with both their imperial and metric numbers.

Site Locality/Name	Imperial Site Number	Metric Site Number
Aotea	N64/25	R15/10
Brier's Block	N44/191	T11/219
Crater Hill	N42/692	R11/665
Hamlins Hill	N42/137	R11/142
Hawkins Hill	-	R11/1384
Kauri Pt open settlement	N53-4/6	U13/45
Kotare Pa, Raglan	N55/8	R14/8
Mangakaware II	N65/35	S15/18
Maruka, Kawerau	N77/588	U16/220
Maungakiekie (One Tree Hill)	N42/6	R11/14
Maungarei (Mt Wellington)	N42/4	R11/12
Maungataketake (Elletts Mt)	N42/23	R11/31
Moikau	N165/9	S28/9
Motutapu	N38/25	R10/26
Motutapu	N165/9	R10/31
Motutapu	N38/25	R10/38
Orakei	N42/80	R11/87
Owareiti	N15/505	-
-	N15/255	-
Pouerua	N15/5	P05/195
Puketapapa (Mt Roskill)	N42/11	R11/19
Puketarata	N129/46	Q21/44
Rahopara (Castor Bay)	N38/20	R10/21
Ruahihi	N67/72	U14/38
Skipper's Ridge	N40/7	T10/165
Tarata	N137/15	R22/27
Taurere (Taylors Hill)	N42/89	R11/96
Te Pane o Horoiwi	N42/365	R11/357
Tiromoana Pa, Te Awanga	N135/1	W21/1
Waiwhau	N53/37	T13/13
Westfield	N42/941	R11/898
Whangapoua	-	T11/644
Wiri Oil Terminal	N42/1224	R11/1187

APPENDIX 2: Charcoal Identification

Charcoal samples from each of the sites were identified by R. Wallace of the Anthropology Department, University of Auckland. Species of trees from both lowland and northern coastal forests were represented. The major species were Puriri, Pohutakawa, Rewarewa, Tawa and Totara, although no particular species predominated. Seventeen species were identified from R11/899 and nine and six from R11/887 and R11/888 respectively. This difference is thought to represent sample size and source rather than any specific variation between sites. For example, the bulk of the 899 came the unstratified midden/fill layer of area B and represented a number of depositions, whilst most of the 887 sample came from a single earth oven (3) and represented only one, or a very limited number of events. The 888 sample was considerably smaller than either of the other samples.

SPECIES NAME		SITE		
Common	Scientific	R11/887	R11/888	R11/899
Coprosma	*Coprosma sp.*	-	-	X
Karaka	*Corynocarpus laevigata*	-	-	X
Kohekohe	*Dysoxylum spectabile*	X	-	-
Mahoe	*Melicytus ramiflorus*	X	-	X
Mangaeo	*Litsea calicaris*	-	-	X
Manuka	*Leptospermum scoparium*	-	-	X
Mapau	*Myrsine australis*	X	-	-
Miro	*Prumnopitys taxifolia* *	X	X	X
Pate	*Schifflera digitala*	X	-	-
Pittosporum	*Pittosporum sp.*	-	-	X
Pohutakawa	*Metrosideros excelsa*	X	-	X
Pukatea	*Laurelia novaezealandiae*	-	-	X
Puriri	*Vitex lucens*	X	-	X
Ramarama	*Myrtus bullata*	-	X	-
Rewarewa	*Knightia excelsa*	X	-	X
Tarairi	*Beilschmiedia tawa*	X	X	X
Tawa	*Beilschmiedia tawa*	X	X	X
Totara	*Podocarpus totara*	-	X	X
Vine rata	*Metrosideros sp.*	-	X	X
Broadleaf spp.	-	-	-	X

X = species present

* New name : formerly *Podocarpus spicatus*

APPENDIX 3: Landsnail Identification.

Samples of from each of the three sites excavated were identified by Dr F Climo, Malacologist at the National Museum. The numbers of snails was relatively small but the presence of numerous examples of *Mocella eta* and *Paralaoma caputspinulae* indicate a disturbed, or open or dry scrubby habitat. The species and numbers identified from each site are listed below.

SPECIES	**SITE**		
	R11/887*	R11/888**	R11/899***
HYDROBIIIDAE (freshwater)			
Potamopyrgus antipodarum (Grey)	-	-	1
PUNCTIDAE			
Laoma erigone (Grey)	-	-	1
Paralaoma caputspinulae (Reeve)	188	18	86
CHAROPIDAE			
Mocella prestoni (Sykes)	-	-	4
Mocella eta (Pfeiffer)	12	14	18
Paracharopa chysaugeia (Webster)	-	13	13

* Midden/cooking area
** Shell working floor
*** Shell fill -Pit V

APPENDIX 4: Midden Analysis by Russell Foster

SHELLFISH

Grab samples of midden were collected from all three sites. From R11/887 two samples were analysed from the midden/cooking area, four samples from the shell floor at R11/888 and a total of seven samples from r11/899. These latter samples consisted of four from the layer 2 midden fill, one a total sample from a posthole near hearth 2, one from the fill of pit H and one from the fill of pit V. Identifications are listed in table 1, below. The samples at each site did not differ significantly in composition and in the table below they have been grouped by site.

The samples were sieved through a 4 mm mesh and sorted for species of shellfish and bone material. Minimum numbers of bivalves were estimated by counting the hinges and dividing by two. Gastropods were counted by the presence of the base of the columnella. Species which were identifiable but not countable were listed as present.

BONE

Fish: Fishbone was present in small quantities from all three sites. All parts of the body are represented (Head, vertebrae, ribs, spines and scales). The majority of the identifiable bones came from R11/899 with only small amounts from R11/887 and 888. Fishbone identifications were made by Mr. R. Nichol (Anthropology Dept, University of Auckland). Table 2 lists the species identified from each site. No numbers of fish have been calculated as no reasonable estimate could be made from the small number of bones present; however, snapper (*Chrysophrys auratus*) was the predominant species with other species often represented by a single identifiable bone.

Most of the other bone material came from the Layer 2 midden/fill of Area B at site R11/899. Small amounts came from the midden/cooking area of R11/887 and from the shell floor at R11/888.

Dog (*Canis familiaris*) :This was represented by 1 carnassial tooth, 1 fragment of maxilla and 1 left pelvis from R11/887; 1 carnassial, and 1 left humerus from R11/888; 1 crushed cranium and fragments,1 carnassial, and two canine teeth, 1 left humerus, rib fragments, 6 vertebrae, 1 right (juv) and 2 left pelves, 1 tibia (juv), 1 fibula and 9 metapodials from R11/899.

On the basis of the two left and one juvenile right pelves, a minimum number of three dogs are represented at 899, possibly four if the sites are considered as a whole.

Rat (*Rattus* sp.) : Very few rat bones were excavated at this site, in contrast with the large numbers that came from Westfield and Hamkins Hill. Two left mandibles and one right came from R11/899. It was not possible to speciate these, but it is probable that they are the native rat, *Rattus exulans*, rather than either of the two more recently introduced species (*R. rattus, R. norvegicus*)

Human (*Homo sapiens*) : One fragment of a very worn molar was found within the midden/fill layer of Area B, R11/899.

Pig (*Sus scrofa*) : The right mandibular condyle of a mature pig was found in the disturbed shell slope-wash below the rock edging of the terrace in Area B (Fig. 17:W), site R11/899. It is thought to be intrusive.

Table 1

Shellfish species from sites R11/887, 888 and 899, Fisher Road, Tamaki.

Species name		Site					
Common	Scientific	R11/887		R11/888		R11/899	
		No	%	No	%	No	%
Bivalves							
Cockle	*Chione stutchburyi*	1235	94.35	2690	94.09	3289	96.20
Pipi	*Paphies australis*	32	2.45	25	0.87	11	0.32
Mussel	*Perna canaliculus*	P	-	1	0.04	3	0.09
Scallop	*Pecten novaezelandiae*	1	0.08	1	0.04	1	0.03
Rock Oyster	*Crassostrea glomerata*	P	-	1	0.04	P	-
Mud Oyster	*Ostrea lutaria*	1	0.08	2	0.07	P	-
Mactra	*Mactra ovata*	5	0.35	-	-	2	0.06
Tuatua	*Paphies subtriangulata*	4	0.31	-	-	-	-
Gastropods							
Mudsnail	*Amphibola crenata*	3	0.23	119	4.16	94	2.75
Dark Rock Shell	*Haustrum haustorium*	1	0.23	3	0.15	-	-
Whelk	*Cominella adspersa*	5	0.38	2	0.07	1	0.03
Whelk	*Cominella sp.*	2	0.15	7	0.25	2	0.06
Turret Shell	*Maoricolpus roseus roseus*	3	0.23	P	-	4	0.12
Arabic Volute	*Alcithoe arabica*	4	0.31	2	0.07	2	0.06
Siphon Whelk	*Penion adustus*	-	-	P	-	2	0.06
Melagraphia	*Melagraphia aethiops*	-	-	5	0.18	-	-
Cat's Eye	*Turbo smaragdus*	3	0.23	1	0.04	1	0.03
Unidentified small gastropods		10	0.76	-	-	7	0.21

TABLE 2

Species name		Site		
Common	**Scientific**	**R11/887**	**R11/888**	**R11/899**
Barracouta	*Thrysites atun*	-	-	X
Blue Cod	*Parapercis colias*	-	-	X
Gurnard	*Chelidonichthys kumu*	-	X	-
Kahawai	*Arripis trutta*	X	-	-
Mackeral	*Trachurus declivis*	-	X	X
Shark (very small sp.)		-	-	X
Stargazer	*Geniagnus monopterygius*	-	-	X
Snapper	*Chrysophrys auratus*	X	X	X
Trevally	*Caranx geoganus*	-	-	X
Yellow-eyed mullet	*Aldrichetta forsteri*	-	-	X

X = species present

APPENDIX 5: Obsidian Artefact Analysis by Clayton Fredericksen

The obsidian artefacts recovered during the Fisher Road excavations totalled 263 pieces. When viewed in transmitted light 94 green and 169 grey obsidian artefacts were found to be present. This indicates that at least two sources of obsidian were utilised by the prehistoric inhabitants of the Fisher Road sites. Mayor Island, Northland, Great Barrier Island and Coromandel sources are among those most likely to have been exploited.
Many items of grey obsidian exhibit a weathered outer cortex with a combed appearance. This obsidian in all likelihood originated from a detrital deposit such as those which occur at Kaeo in Northland, Great Barrier Island in the Hauraki Gulf, and Cook's Bay on the Coromandel Peninsula (Sewell 1984:39).

METHODS OF ANALYSIS

Technological analysis

The technological analysis comprises a comparative study of the obsidian debitage between the three Fisher Road sites. This consists of:

(i) dividing the debitage at each site into distinct classes and comparing the proportion of artefacts in each class between the sites.

(ii) conducting an inter-site comparison of flake shape.

The four classes of debitage are cores, flakes, small shatter and large shatter. Items which are 'chunky' and possess more than two negative bulbs of percussion are identified as cores. The presence of a striking platform and a positive bulb of percussion is diagnostic of flakes. Shatter is all residual material which cannot be classified as cores or flakes. Small shatter comprises those items which weigh 0.2g or less, large shatter consists of items heavier than 0.2g.

The ratio of flake length to breadth is taken as an index of overall flake shape. The length of a flake is the measurement perpendicular to the striking platform. Breadth is measured parallel to the platform mid-way down the flake.

This form of technological analysis has proven successful in differentiating *in situ* obsidian knapping areas from those areas where obsidian artefacts were in secondary deposition (see Fredericksen 1987).

Functional analysis

The of tool function undertaken in this study involves three stages:

(i) defining those artefacts which may have been used as tools.
(ii) ascertaining the mode of tool use, ie: cutting or scraping.
(iii) inferring the nature of the worked material (in terms of resilient or pliable).

I
n distinguishing tools from waste, all artefacts were examined at X40 magnification for evidence of use-wear. The recognition of use-wear is necessarily somewhat subjective but can be differentiated from natural edge damage by the regular size and shape and occurrence of scars along the tool edge. Striations can also be useful indicators of whether an artefact is a tool or waste debitage. These should not, however, be confused with those linear scratches on the artefact surface which result from processes other than tool use (such as abrasion from soil movement, or contact between the hammerstone and the parent core).

The obsidian artefacts were not cleaned prior to use-wear analysis. This was to preserve organic residues from the worked material which may have survived on the working edges of tools (Fredericksen 1985: Shafer & Holloway 1979). This may have resulted in the masking of use-wear on some artefacts which were used as tools.

Ascertaining the mode of use involves noting whether use-wear occurs on one or both faces of the tool working edge. When more than approximately 80% of use-wear occurs on one face the tool is inferred to have been employed in a scraping mode. If use-wear is prevalent on both faces of the working edge the tool is considered to have been used in a cutting mode.

The nature of the worked material is inferred from the use-wear characteristics. For the present study use-wear is divided into the categories of 'light' and 'heavy'. Light use-wear is identified by the presence of small (<1.0mm in size) feather-terminated scars along the working edge; heavy use-wear by large (1.0mm or larger) feather or hinge-terminated scars. Light use-wear is considered to result from working pliable materials (such as light density wood) and heavy use-wear from working more resilient materials (such as bone or hard wood).

The angle of the working edge is also an indicator of the nature of the worked material (the edge angle referred to in this analysis is the same as the 'effective edge angle' of Jones [1972]). The edge angle is a measure of the degree of edge bevelling formed through use. High edge angles indicate that the tool was used on a resilient material which induced marked edge attrition. Low edge angles demonstrate that the tool was used to work a pliable material which did not greatly alter the edge profile. Working pliable materials may, however, result in the working edge becoming rounded, so a note was taken of whether tool edges exhibited this characteristic. Edge angles were measured using a plasticine template technique (for a description of this see Ferguson 1980).

It must be stressed that the method of determining tool function used in this study will not identify tools which were used for working pliable materials. Experimental work has ascertained that tasks such as scraping flax and cutting flesh will result in very little diagnostic use-wear on obsidian tools (see Fredericksen 1987). Studies of use-polishes (Keeley 1980) or organic residues (Shafer & Holloway 1979) may be the only reliable methods by which tools employed in such tasks may be identified.

THE ANALYSIS

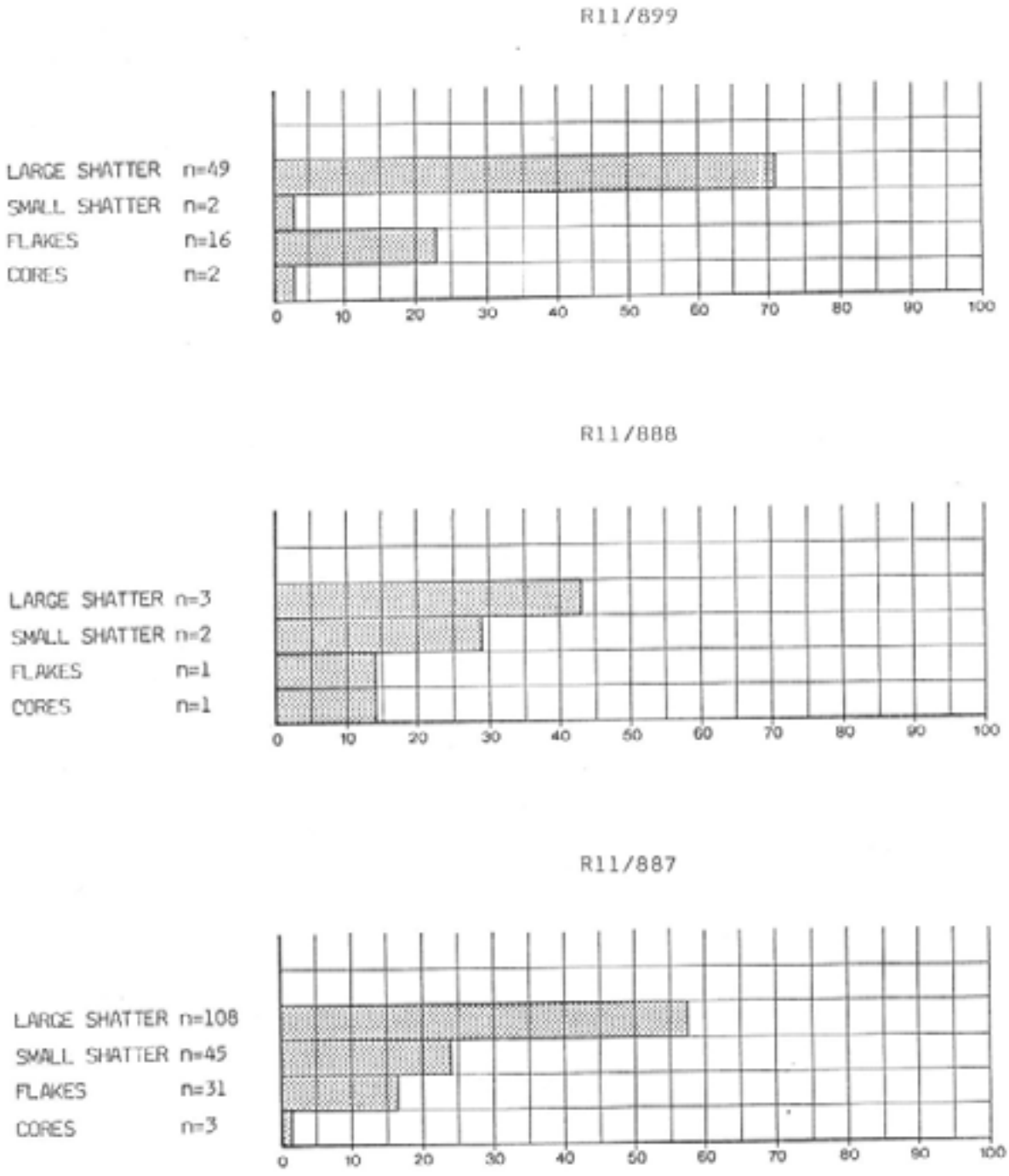
Technological analysis

With regard to the number of obsidian artefacts recovered during the Fisher Road excavations, 187 (71%) came from site r11/887, 68 (26%) from R11/899 and and 8 (3%) from R11/888. The very small number of obsidian items from the latter site is surprising given the size of the area excavated. This suggests that a degree of inter-site differentiation occurred in activities involving the manufacture of obsidian artefacts.

When the obsidian assemblages are compared for the three sites by the four categories of debitage (e.g. cores, flakes, small shatter and large shatter), it is apparent that the highest number of artefacts for each site fall within the category of large shatter (see Fig. 1). This may indicate that flaked tool manufacture was not a major activity at any of the sites as reducing cores by direct percussion (the most likely technique employed at these sites) will result in a very high percentage of small shatter by number.

On the other hand, sieving was not undertaken at R11/888 or 899 and the obsidian artefacts associated with R11/887 were recovered following machine scraping of the site. This sampling bias may be a reason for the low proportion of small shatter at these sites. Flaked tool manufacture may then have been carried out at some or all of them. The presence of cores from all three sites may be interpreted as an indication of obsidian knapping at these localities.

FIGURE 1 OBSIDIAN ARTEFACTS BY COUNT



The next stage in the technological analysis involved the study of flake shape. All flakes at the three sites are plotted by length and breadth in Figure 2. It is apparent that the only inter-site difference occurs with the presence of a number of very wide flakes at R11/887. This is probably a function of the large sample size from this site, with the possibility that large, wide flakes were removed from the other two sites (for use as tools ?). The differences in flake shape are, however, not great enough for this to be taken as evidence for inter-site diversity in the techniques of obsidian happing.

Functional analysis

All those items of obsidian which were bagged separately were viewed at X40 magnification in a search for use-wear. Only three artefacts (1%) were as possessing definite use-wear -two from 887 and one from 899. Artefact 57 (R11/887) has light bifacial edge damage and an edge angle of 50 degrees. This tool was probably employed in sawing a fairly pliable material such as light density wood. Artefact 102 (R11/887) displays light unifacial edge damage, unifacial striations oriented perpendicular to the working edge, and an edge angle of 68 degrees. This item may have been used for scraping light density wood. From R11/899 artefact 432 exhibits light unifacial damage and an edge angle of 62 degrees. This tool was probably used for a similar function as artefact 102. All three flaked tools are of grey obsidian and in the upper size range for the debitage recovered from the Fisher Road sites.

The very low proportion of tools at the three sites is surprising. Analyses of the obsidian assemblages at the nearby sites of Westfield (R11/898 [Sewell 1984]) and Hawkins Hill (R11/1394 [Fredericksen, C. "Stone material analysis", Appendix to Coates' forthcoming excavation report for site R11/1394]) have revealed that approximately 16 -60% of the debitage at these sites has evidence of use-wear. Some of this disparity between these two sites and those at Fisher Road may be due to the misidentification of some naturally induced edge damage characteristics as the result of tool use. This cannot, however, account for such a great discrepancy between the sites in the proportion of used to unused pieces. One possible explanation is that the Fisher Road excavations primarily uncovered flaked tool manufacturing areas and dumps for waste debitage. Actual tool use may have taken place elsewhere.

SUMMARY

The prehistoric inhabitants of R11/887, 888 and 899 utilised obsidian from a number of sources for the manufacture of flaked tools. At R11/887 some tool use and possibly obsidian knapping took place. The debitage at this locality appears to have been in situ, so tool manufacture and use was probably undertaken here. At sites R11/888 and 899 a high proportion of the occurs in midden deposits, which were purposefully made into level surfaces. On these sites knapping and some flaked tool use was in all likelihood undertaken.

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