

Preliminary report on the results of archaeological investigations at 99 Ngaruawahia Road

By Warren Gumbley

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Preamble

This report refers to preliminary results of the archaeological investigations at Lot 2 DPS 19658, Lot 2 DPS 19658, Allot 116 SBRS OF Newcastle South, Allot 117 SBRS OF Newcastle South. As well as describing the results of the field investigation the results will be contextualised within the wider body of understanding of sites belonging to the Waikato Horticultural Complex.

Method

Prior to field survey the following background resources were consulted:

- NZ Archaeological Association Site Recording Scheme (Archsite¹),
- Historic aerial photographs,
- 2008 LiDAR survey data,
- Soil survey data.
- Historic survey plans

Fieldwork entailed a detail survey of the high terrace with a soil auger (20 mm and 30 mm screw-type) to determine the nature of the local soils and the presence or absence of archaeological deposits. 80 soil auger samples were examined. In addition two spade dug test-pits were excavated to further explore the soil profile.

The lower terrace, between Ngaruawahia Road and the escarpment was not examined in detail (i.e. using a soil auger etc.)

¹ National database.

Results

NZAA site records

Two archaeological sites are recorded in the immediate vicinity of the project area. These are S14/382 and S14/383 (See attachments 1 and 2 for copies of the site records), which were recorded in 2016 relying on evidence from the WRAPS 2012 aerial imagery and the 2008 WRC LiDAR survey, along with evidence from soil survey data.

Both sites were identified clusters of borrow pits, associated with an area of anthropogenic soils identified during the soil bureau survey of Waipa County in the 1930s (Grange et al. 1939). These are typical diagnostic attributed of pre-European Māori horticultural sites belonging to the Waikato Horticultural Complex. See attachment 3 for a description of this class of archaeological site.

Historical Aerial Photographs

SN174/300/22 was flown on 16 April 1941. It shows the project area as a plain under pasture (the upper terrace) and a shallow swampy gully and stream between Ngaruawahia Road and the escarpment separating the upper terrace from the Waipa River. Evident in this image are a number of depressions over the wider landscape on the upper terrace. These depressions represent borrow pits associated with Māori horticulture. This includes seven clearly recognisable borrow pits within the project footprint. An earlier farm house surrounded by trees is present on much the same site as the existing house at 99 Ngaruawahia Road.

SN1401/H/5 was flown on 29 August 1961. This shows a largely unchanged landscape to 1941 except the earlier farm house has been demolished. This image covers the northern half of the development area only and shows seven depressions of varying sizes.

2008 WRC LiDAR survey data

A hillshade derived from the LiDAR data shows seven depressions presenting probable borrow pits. Notably some of the borrow pits that were clearly visible in the earlier aerial photography as no longer visible indicating that some borrow had been filled by this date. This practice is common across the Waikato.

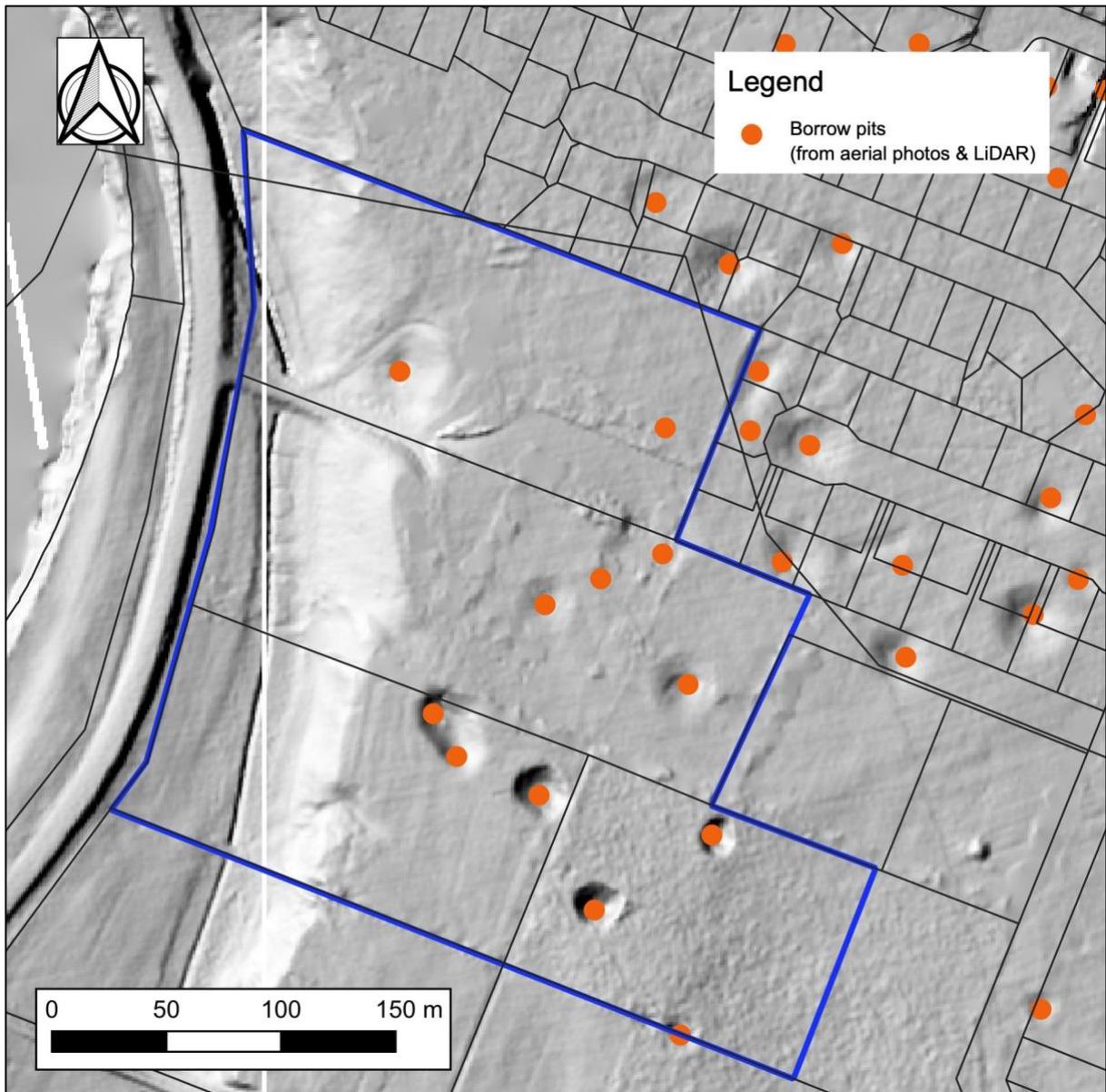


Figure 1: LiDAR derived hillshade showing the locations of borrow pit identified in LiDAR data and historic aerial photographs. Blue line indicates project foot print.

Soil Survey data

The 1930s survey by the Soil Bureau of the DSIR shows three soil classes within the development zone. On the lower terrace Waipa sandy loam is identified while on the upper terrace the anthropogenic Māori loam and the Whatawhata series are identified. The Māori loam series has been re-classified as the Tamahere series. This soil was created by Māori for the purposes of facilitating crop cultivation.

The soils on the upper terrace have formed on the Hinuera Formation which is characterised by largely tephrogenic soils forming on ancient alluvium (mainly sand and gravel). It is the

ancient alluvium which is being quarried by Māori to develop growing environments for raising crops. The resulting quarried (borrow pits) are visible a depression in the ground surface.

Historic survey plans

Three plans from the nineteenth century refer to this area.

SO 56/1 shows the area divided into a number of allotments including Allotments 116 and 117 (the balance of the development area lies within what were Allotments 112, 114 and 115). This plan is undated but probably dating to the 1870s since it shows a reserve for the railway line. The plans show nothing of interest except an area of vegetation (probably shrubland) extending into the southern edges of Allotments 116 and 117.

SO 1636 shows the same allotment information without the detail about the shrubland/vegetation and is dated to 1878.

SO 2465 shows the arrangement of allotments but without the railway reserve, although the railway line is shown crossing the Waikato river and terminating in the township. This plan is not dated but the earliest dated annotation is for 1876.

Fieldwork results

The soil auger survey of the upper terrace identified the dominant parent soil across the project was either Whatawhata or Bruntwood series soils. These soils series have very similar characteristics and without excavating a larger and deeper test pit(s) it was not possible to differentiate them. Both soils are credible in this location because of the nearby junction of the Waikato and Waipa Rivers. Secondary soils identified were from the Te Kowhai Series and the Horotiu Series. The former was found in the lowest part of the project footprint and the latter on a low ridge in Allotment 117.

Of the 80 auger sites 14 showed no evidence of anthropogenic soils and a further five produced ambiguous results. The remaining 61 auger sites showed high proportions sand and gravel enrichment of the topsoil typical of the anthropogenic soils that are the characteristic of the Waikato Horticultural Complex. This pattern adheres closely to the 1930s soil survey plans. As well as enrichment by sand and gravel some of the auger sites contained evidence for charcoal, another common attributed of these soils. In a few places there was an apparent veneer of recently deposited sediments a few centimetres thick over the topsoil.

A notable characteristic was the near complete invisibility of the borrow pits identifiable in the 1940s and 1960s aerial photography and the 2008 LiDAR data. It is assumed on that these have recently been filled. The results of some of the auger sites support this. Based on observations elsewhere it is also likely that the localised sediment veneers noted above relate to these events where the imported fill material has spilled over the pasture.

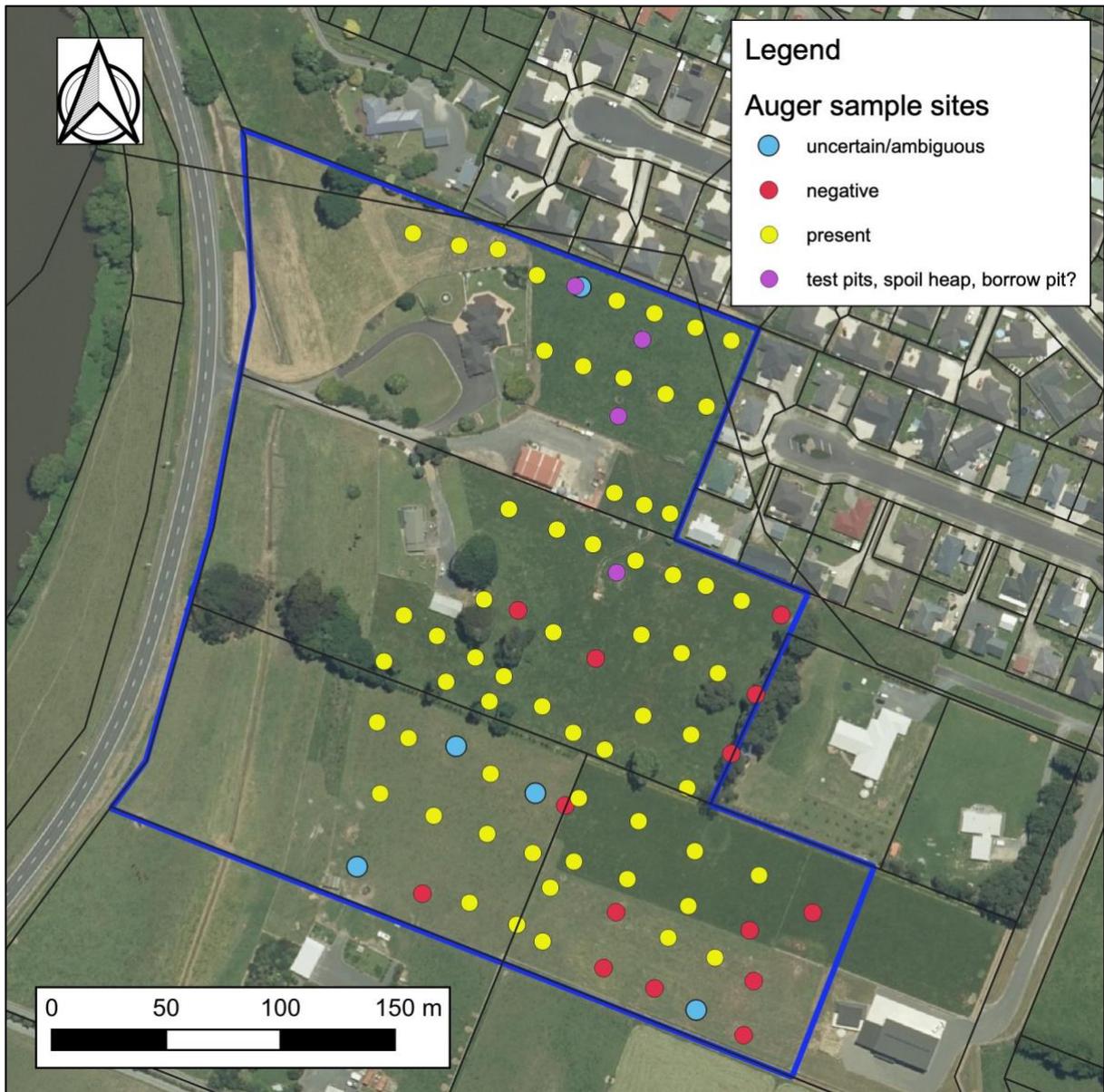


Figure 2: Results of field survey.

Conclusions

Most of the upper terrace within the project area contains archaeological deposits associated with the Waikato Horticultural Complex. As archaeological sites these are protected by the Heritage New Zealand Pouhere Taonga Act 2014 and may not be damaged or destroyed with an authority from Heritage New Zealand Pouhere Taonga (HNZPT). Until a field inspection of the lower terrace is completed the potential status of this area is uncertain. However, given this area contained an active stream on a flood terrace it is possible that taro was cultivated in this area. It would be wise to include this area in any application to HNZPT.

HNZPT will require salvage archaeological investigations to occur prior to earthworks commencing.

Recommendations

1. An application must be submitted to HNZPT and granted by them before any earthworks can commence.
2. As part of an application consultation with tangata whenua must be undertaken. I understand that Julian Williams is assisting with this.
3. A report assessment archaeological values and effects on those values will be required for an application to HNZPT. This will build on the current report.
4. Two further documents will need to be supplied as part of the application. An Archaeological sites management Plan (ASMP) is required by HNZPT to manage archaeological sites during construction work including providing protocols for such eventualities as the identification of human remains (koiwi). An archaeological Research and Mitigation Strategy (ARMS), which describes the archaeological investigation strategy and methodology.
5. A survey of the lower should be completed prior to the preparation of the archaeological assessment report.

Attachment 1: Waikato Horticultural Complex – Description

The Waikato Horticultural Complex: Pre-European Māori horticulture sites on the Waikato plains

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2020

In the Waikato pre-European Māori garden sites are identified by two defining features; the presence of borrow pits, and soils heavily modified by the addition of sand and gravel; as well as charcoal. The borrow pits are near circular depressions usually between 1 and 6 metres deep (archaeological investigations indicate they were typically 3–5 metres deep originally) and often 100-300 m². It is these two features that make these garden sites so visible compared to pre-European Māori gardens in most of the rest of New Zealand. Here, the archaeological evidence is principally found in both the middle and the lower Waikato basins (Selby & Lowe 1992).



Figure 1. Borrow pit (one of 34) at site S14/27 located at Tamahere. (photo: D Lowe).

In the middle Waikato Basin, pre-European Māori garden complexes are concentrated along the Waikato River from Arapuni to Taupiri, in areas on the Horotiu Plain and along the margins of the Waipa River and its tributaries. In the lower Waikato Basin, the resource is

more poorly understood but it is known to exist on raised levees along the banks of the Waikato River in the area of Huntly-Rangiriri and possibly in some places lower down the river (Grange et al. 1939; Taylor 1958; Clarke 1977; Law 1968). The total original area of these sites is unknown but Taylor (1958) proposed an estimate of 5000 acres (2000 hectares) based on the soil survey data available in 1958. Our analysis of the available soil survey data² using GIS, indicates that an estimated area of 4000 hectares is probably more accurate. The locations of the gardens are strictly associated with particular series of alluvial soils.

In the middle Waikato Basin these ‘made’ or ‘modified’ soils are classified in the Tamahere series, with the two named soil types being ‘Tamahere gravelly sand (on Horotiu soils) (TH)³’ or ‘Tamahere gravelly sand (on Waikato soils) (THw)’ (Bruce 1979; McLeod 1984). In the New Zealand Soil Classification (NZSC) (Hewitt 1998) the modified garden soils in the Waikato belong to the Artifact Fill Anthropic Soils class.

As well as modifying the well-drained Waikato series soils and Horotiu loams, the less well-drained Bruntwood silt loams were also modified. Less commonly the poorly-drained Te Kowhai silt loams are found to have been modified for gardening. This appears to have happened more commonly below Hamilton in areas where gardens expanded onto adjacent, poorer soils.

The Horotiu and Bruntwood loams (as well as the Te Kowhai soil) have formed on 18,000–20,000-year-old volcanogenic alluvium called the Hinuera Formation. The deposits of this formation have been overlain by a cover (500-700 millimetres) of thin multiple tephra-fall deposits since the Hinuera alluvium finished accumulating.

The Waikato series soils have formed on 1800-year old course pumiceous alluvium (Taupo Pumice Alluvium) which formed low terraces near the Waikato River (Grange et al. 1939; Taylor 1958; Lowe 1988; Singleton 1988; McCraw 2002).

Specifically, it was the sand and gravel alluvium substrate from the Hinuera and Waikato formations that was quarried from the borrow pits and used to modify the upper soil horizons (Figure 2).

Although active research is now being carried out it remains difficult to be confident of how the material quarried from borrow pits was applied to or mixed with the parent soils to form the modified soils (Tamahere loam). Until 1999 it had been assumed that this quarried material was either; (1) added to the surface of the parent soil as mulch or puke (mounds), or (2) was well mixed into upper part of the soil (i.e. topsoil and upper subsoil parts of the profile) (Figure 3).

² It must be noted that the soil survey data is incomplete and does not include areas where borrow pits have been identified south of Cambridge and along the banks of the Waikato River above Cambridge.

³ Also sometimes annotated as Mh and Mw respectively.

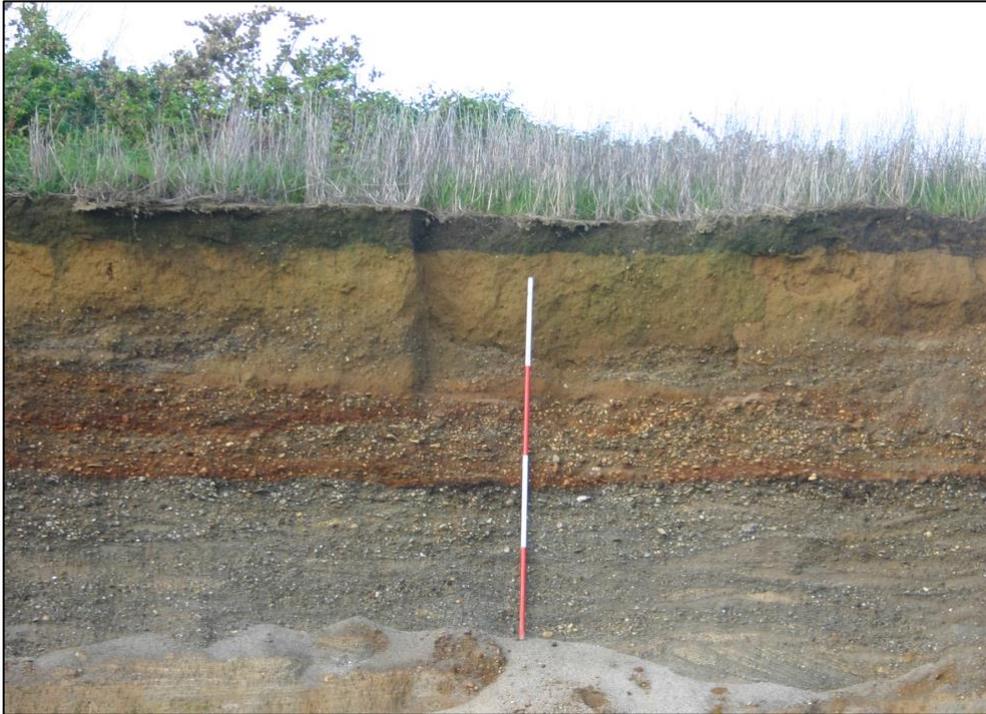


Figure 2. A photograph showing the upper horizons of Horotiu sandy loam. The upper 700-800 mm of yellowish-brown material is the accumulated volcanic tephra that overlies the Hinuera Formation alluvium. It is this alluvium that was quarried and added to the gardens. (Scale is 2 m.) (photo: W. Gumbley)

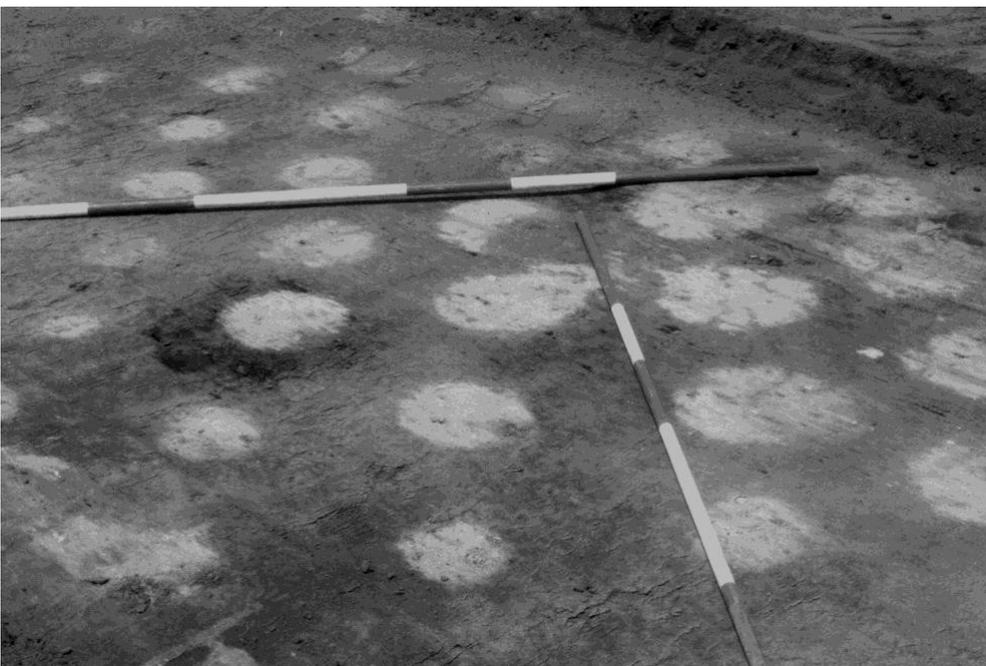


Figure 3. Photograph from S14/201 (Chartwell, Hamilton) showing the sand-filled bases of puke dug into the subsoil. (Scale intervals: 0.5 and 0.25 m.) (photo: Gumbley).



Figure 4. Photograph from S14/195 (Horotiu) showing bowl-shaped hollows forming bases for growing mounds, with the sand and gravel removed (Scales are 1 m.) (photo: Gumbley).

Archaeological investigations at an area of Tamahere soils and borrow pits (S14/201) at Chartwell in Hamilton (Gumbley & Higham 2000; Gumbley et al. 2004) revealed two adjacent areas where circular sand-filled bowls were identified at the topsoil-subsoil interface (Figure 3). Both sets of bowls, although slightly differently oriented, had similar internal organisation of the depressions where they were arranged in quincunx fashion (a form of off-set rows where four bowls are arranged around a central bowl). This conformed closely to historical references, which describe orderly gardens where kumara were grown in mounds organised in this fashion (Best 1925; Colenso 1880).

Since 1999 these sand-filled bowls, in similar arrangements, have also been found at Riverton Estate subdivision, on the northern edge of Hamilton on the east side of the Waikato River, when part of a large body of garden soils (S14/165) was investigated (Simmons 2008). The same type of feature has been found at several other sites: S14/158 and S14/198 at Taupiri (Campbell & Harris 2011; Gumbley & Gainsford 2020a) S14/468 at Ngaruawahia (Gumbley and Gainsford 2018), at S14/164 (Simmons 2013) and S14/194 (Gumbley & Hoffmann 2013) at Horotiu, S15/465 (Gumbley & Laumea 2019) and at S14/248 (Keith in prep) at Tamahere. Outside the Waikato similar features have been identified at Whangaruru Bay in Northland (J Carpenter, pers comm.); at Mahia Peninsula (Jones 2012) and, less convincingly, in Golden Bay (Barber 2004).

In a handful of sites, a distinct pattern in the upper soil horizon has been identified (S14/194, S15/424, S15/421⁴), which appears to reflect the absence or near absence of modern cultivation. The A-horizon is strongly enriched by sand and/or gravel and 25–40 cm thick. It is found with three units; the uppermost is the turf layer which is dark greyish-brown and includes organic material and, in terms of its particle size range, is well-sorted with a preponderance of material grading from medium sand size and finer. The middle unit is dark greyish-brown or black and includes organic matter (Figure 5). Texturally the middle unit is not sorted with a range of particle sizes represented up to coarse gravel. The lower unit contains the same range of particle sizes but has a paler matrix, yellowish-brown, reflective of the underlying B-horizon. This unit contains relatively low quantities of charcoal. The contact between the A- and B-horizons is irregular with an almost wavy appearance in places (Figure 6). The upper element (top ~ 20 cm) of the B-horizon is usually distinctly darker than the underlying material, with obvious enrichment with charcoal. It is possible that this is a buried remnant topsoil. While it is tempting to suggest that sandy and gravelly A-horizon represents the remains of sand and gravel mulch, experimental gardening carried out by Gumbley indicates an alternative explanation; that this layer represents the demolished and decayed remains of sand and gravel growing mounds that have weathered to appear like a continuous layer. Importantly, when the A-horizon material is removed by hand and the interface between the A- and B-horizons is examined with care it is clear that the irregularity visible in profile reflects the dimpled or undulating surface of the B-horizon. This dimpling appears to be an artefact of the working of the soil with tools and from the castes of tubers (of kumara?).

⁴ Refer Gumbley & Hoffmann 2013 re S14/194; Gumbley et al 2018 re S15/421; S15/424 in preparation.

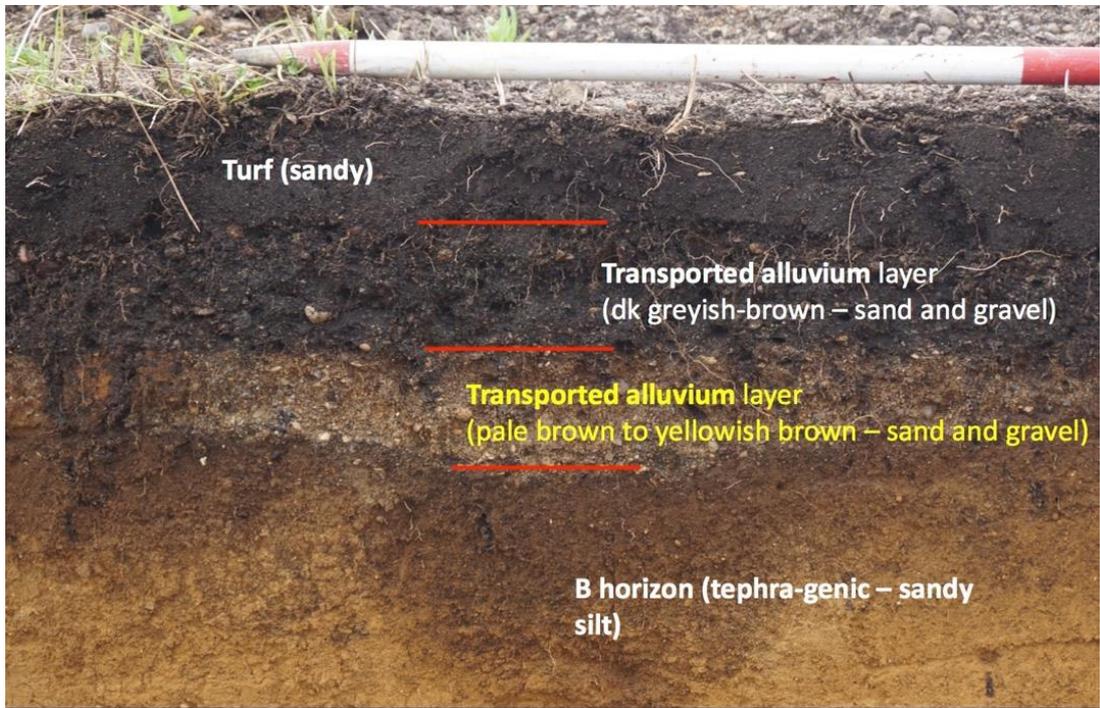


Figure 5. An example of an unmodified Māori-made soil horizon.



Figure 6. Example of the dimpled interface found at S15/374 at Ngaruawahia, garden site located on Waikato series soil (Gumbley & Gainsford 2018).

As well as the identification of the bowl-shaped hollows, other archaeological features have been found in association with gardens. These include drains where the gardens have encroached onto poorly drained soils, postholes for structures and the remains of fireplaces and umu.

We now also have direct evidence of what was grown in the gardens from the analysis of microfossils⁵ found in the fill of bowl-shaped hollows (BSHs) and oval depressions at several sites. These analyses have found abundant kumara starch grains and also taro remains (Campbell & Harris, 2011; Gumbley & Hoffmann 2013; Hoffmann, 2011 & 2013). At site S14/222 a single possible yam starch grain was identified (Hoffmann 2011). Yam/uwhi, a tropical cultigen, has very rarely been identified in New Zealand but this find shows that this plant was also grown in the Waikato despite its sensitivity to a temperate climate.

⁵ Microfossils are the microscopic remains of plants. Pollen, phytoliths and remains of vegetation such as starch grains and xylem cells are what is analysed.

While we now have an improving understanding of the anatomy of these sites this is based on the excavation of a handful of sites in any detail. Because of this there remains the potential that the understanding of that anatomy can be improved substantially. We do not understand how the features found so far actually function; i.e. what their purpose was. A significant handicap lies in the lack of archaeological remains that tell us about what was present above the ground surface since this aspect of the gardens has disappeared. For example, from the presence of the bowl-shaped hollows we can safely infer that the material quarried from borrow pits was deposited in the hollows after the soil had been removed. However, it is unclear whether the sand and gravel were used to form a mound. Volumetric analysis of the modified soils for S14/201 suggests this was possible (Gumbley et al. 2004) but without similar research from other sites this evidence is weak.

In much the same way that we are unsure about how the sand and gravel were used, we remain unsure about what function the process had. Several writers have suggested that the addition of alluvial material improved the friability and heat retention of the soil, reduced the likelihood of frost damage, improved fertility, provided a disease-free growing medium, and created a sharp interface between the added materials and buried horizons to encourage larger tuber formation (Best 1925; Challis 1976; Singleton 1988). Together, it is assumed, these modifications made soils more suitable for growing the subtropical kumara in New Zealand's temperate environment (Taylor 1958).

One effect we do know occurred was that soil drainage was changed by the addition of sand and gravel. The Tamahere series soils are described as "well to somewhat excessively drained" (McLeod 1984:24), often increasing drainage in already well-drained soils (i.e. Horotiu loam and Waikato loam). Best (1925) and others remark on the desirability of free drainage for Māori when growing kumara. However, free drainage seems to have been desirable with such soil preferred, not only in the Waikato but more generally where kumara were grown in New Zealand (Best 1925). The addition of ash from burning the existing vegetation growing on the garden site probably improved nutrient levels (Grange et al. 1939; Taylor 1958), particularly potassium and nitrogen, which, together with phosphorus, are important nutrients for kumara growth (Singleton 1988).

These gardens were a major part of the economy for Waikato Māori. Their construction was part of a complex, time-consuming process and energy intensive process. First, the area where the garden was to be established had to be cleared from forest, which would have begun well in advance of the planting season (possibly 1–2 years). Then the garden had to be prepared. This stage in the process would have begun with the making of tools and baskets for digging and carrying the sand and gravel. The sand and gravel had to be quarried from the borrow pits but only after the tephra deposit (B-horizon) had been removed. Then the material had to be carried to the plots and the plots laid out and mounds formed. Following this planting could occur, followed several months after by the harvest and construction of the kumara stores.

While even the development one garden was an energy intensive activity when we also consider there were over 3000 hectares of these gardens in the inland Waikato, we can gain some understanding of the importance of these sites for tangata whenua.

Features of the Waikato Horticultural Complex

The following provides a brief description of relevant feature types associated with the Waikato horticultural complex to contextualise results from this report. The base attributes and characteristics of different features are outlined to enable an understanding of how phenomena contribute to the formation and manifestation of horticultural site in the Waikato.

Borrow pits

Borrow pits are large and readily identifiable features in the landscape. The larger borrow pits can be up to 40 metres across and they are generally 3–4 metres deep. However, the larger ones can be over 5 metres deep. Essentially, they are quarries used to access alluvial sands and gravels in the underlying substrate utilised to make gardening soils. Medium to large borrow pits are commonly an aggregation of multiple ‘shafts’. This process is also illustrated by the identification of borrow pits ~ 2 metres wide by ~ 2 metres deep as individual features⁶. These, presumably, are borrow pits in their ‘youth’. Examples of quarries dug into river banks (S14/249) and into the toes of escarpment (S14/194) have also been found (Gumbley & Gainsford 2020b; Gumbley & Hoffmann 2013). Notably excavation of the sand and gravel substrate was accompanied by the immediate back-filling of the quarry shafts with a mixture of the unwanted tephritic material (re-worked B-horizon) and the sand and gravel substrate. This measure seems to have been employed to stabilise the pits from collapse and also demonstrates clearly that the fertile tephritic material was unwanted.

Bowl-shaped hollows (BSH)

The term ‘bowl-shaped hollow’ reflects the in-ground morphology of these features. The hollows are, typically, 25–40 centimetres in diameter and 20–30 centimetres deep. They are characteristically filled with sand and gravel alluvium quarried from the Hinuera Formation alluvium (C horizon). Occasionally the remains of digging stick (kō) marks can be found at their base, evident as a ‘dimple’. BSHs are usually found in groups, laid out regularly in parallel rows, in either a grid or quincunx pattern. BSHs represent the remains of structures for the growing of individual plants. It is inferred that a mound was raised above, and in which the plants were grown.

Sand/gravel layers

These are extensive charcoal enriched layers of sand and gravel, 10–20 centimetres thick (Gumbley & Laumea 2017). This phenomenon presents as a topsoil enriched with transported sand and gravel quarried from borrow pits which has also deepened the topsoil. Generally, these soils overlie a darkened B(w) horizon that sits on the principal sediments of the B-horizon. This B(w) horizon has been interpreted as buried topsoil (Grange et al 1939; Bruce 1978 & 1979). Charcoal is often found in the B(w) horizon, sometimes as obvious remains of

⁶ S14/249, S14/195, S15/464, S15/641 and S15/757.

charred root systems. In other instances, the B(w) is missing and the sand and gravel layer wholly covers the B-horizon.

When the sand and gravel layer is well-preserved the topsoil divides into three elements; the turf layer ~15 centimetres thick with well-sorted medium sand and finer material; a very dark greyish brown to black layer of coarse material ~15 centimetres thick; a pale brown layer of coarse material ~ 15 centimetres thick. The darkening of the upper element is believed to be a product of soil formation processes but anthropogenic causes cannot be excluded. The uppermost element is a recent soil horizon developed under pasture turf with bioturbation accounting for the well-sorted nature of the sediments.

Fireplaces and domestic activities

Cooking and other domestic activities are found associated with horticultural sites. Fireplaces, including well-formed umu (earth ovens used to cook hāngi), are found both within and on the periphery of horticulture sites. Postholes and storage pits are also clustered with these collections of fireplaces. These have been documented at a number of sites; S14/195, S14/249, S15/757, S15/423, S15/424 (Gumbley & Hoffmann 2013; Gumbley & Gainsford 2020b); Gumbley & Laumea 2017; Gumbley et al in prep; Potts 2019).

Drains

Features relating to garden drainage have been identified at three sites in the inland Waikato, S14/194 (Gumbley and Hoffmann 2013), S14/250 (Gumbley and Gainsford 2020c), S14/203 (Gumbley & Higham 1999). In each case these have been found around the peripheries of all otherwise dry horticultural sites. By this it is meant, that most of the associated horticulture had taken place on adjacent, slightly higher and well-drained soils, in particular Horotiu loam but also Bruntwood loam. In each case the drainage features were situated on poorly drained Te Kowhai silt loam. At each site the drains have been relatively shallow, narrow and generally dendritic in pattern, with smaller 'limb' channels feeding a 'trunk' unit carrying the collected water away to a nearby gully or waterway. Altogether, the patterns suggest ad hoc solutions to episodic problems rather than as a planned element of the original garden design.



Figure 7: Drainage system identified at S14/250 (Taupiri) (Gumbley & Gainsford 2020c)

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- Taylor N.H. 1958. Soil science and prehistory. *New Zealand Science Review* 16: 71-79.

Attachment 2: SRFs



Site Record Form

NZAA SITE NUMBER: S14/382

SITE TYPE: Maori horticulture

SITE NAME(s):

DATE RECORDED:

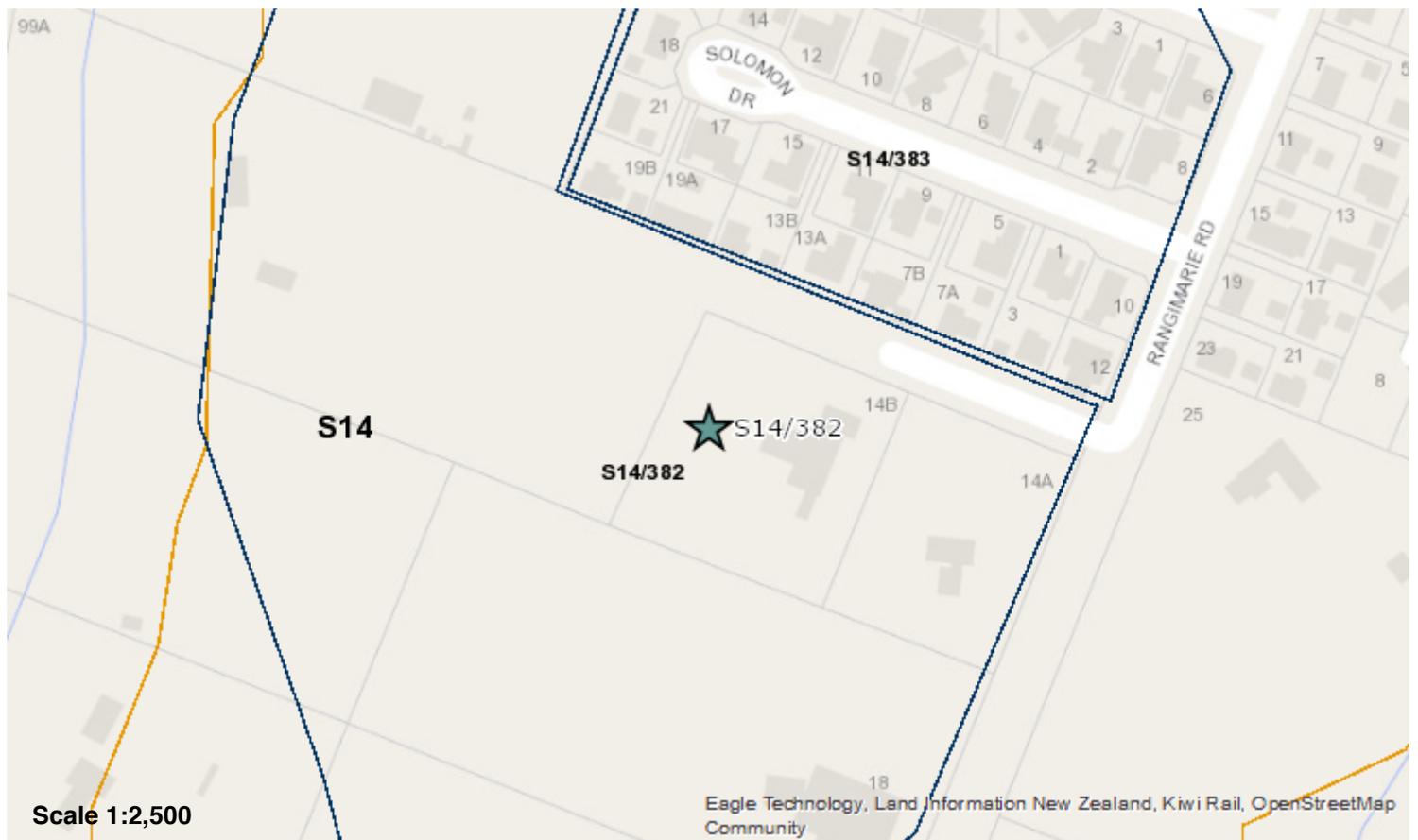
SITE COORDINATES (NZTM) Easting: 1790230

Northing: 5827281

Source: Handheld GPS

IMPERIAL SITE NUMBER:

METRIC SITE NUMBER: S14/382



Finding aids to the location of the site

On flats above the eastern bank of the Waipa River south of Rangimarie Road and Solomon Drive, Ngaruawahia.

Brief description

Thirteen borrow pits

Recorded features

Borrow pit, Soil - made

Other sites associated with this site

S14/383

SITE RECORD HISTORY

NZAA SITE NUMBER: S14/382

Site description

Note from Central Filekeeper 8 June 2021: Cruickshank's investigations of 3 Feb 2021 determined the depression was not archaeological in nature. However this site includes a wider landscape of borrow pits recorded by Hutchinson in 2016, so the site remains within ArchSite for these features.

Updated 09/02/2021 (Field visit), submitted by ardencruickshank , visited 03/02/2021 by Cruickshank, Arden
Grid reference (E1790230 / N5827281)

Archaeological investigation was undertaken on 3 February 2021 to determine if the depression identified in the southwest corner of 25 Rangimarie Road is archaeological in nature. A trench was excavated through it utilising a 5 tonne digger with a 1200 mm wide weed bucket to inspect the profile of the depression. This trench was extended to the width of the subdivision to see if any evidence of gardening soils or change in soil type could be determined; along with an additional two parallel trenches to see if the soil changes across the property.

This depression proved to not be archaeological in nature and may be associated with tree throw. the remaining soil on the property had no evidence of modified gardening soils. the site extent has been updated to exclude this property.

Updated 09/05/2019 (Field visit), submitted by ardencruickshank , visited 18/01/2018 by Cruickshank, Arden.
Grid reference (E1790230 / N5827281)

Works in the vicinity of this site was monitored as part of stage 2 of the ultrafast fibre broadband national roll out (UFB2). No archaeological features or material was identified within the inspection buffer around this site. See attached map to see areas where archaeological inspections were undertaken in the vicinity of this site.
See final report, Cruickshank, A. 2019. Ngaruawahia UFB2 Build and Horotiu Backhaul Feeder (HNZPT authority 2018/185) final report. Unpublished CFG Heritage Ltd report to Ultrafast Fibre and HNZPT.
No archaeological evidence was identified, but due to the nature of directional drilling and the small areas that are opened up, it is entirely possible to avoid features that are associated with the site.

Updated 12/05/2016 (other), submitted by malcolmhutchinson
Grid reference (E1790230 / N5827281)

This site was recorded in April 2016 by M.G. Hutchinson as part of the Waikato District Plan Review Archaeological Heritage Project by Simmons & Associates. It was identified on remote sensing layers including aerial imagery from 2012, and lidar-derived elevation data flown in 2007-08.

Thirteen borrow pits and Maori-made soils on flats on the right bank of the Waipa River as it enters Ngaruawahia.

[[Grange_Ngaruawahia.jpg Figure 1: Detail from Grange et. al. (1935) showing extensive deposits of Maori-made soils in the areas around the south of Ngaruawahia.]]

This site is part of a cluster of Maori horticulture activity along the left bank of the Waikato River between Ngaruawahia and Horotiu.

Grange et. al. identified a deposit of Maori-made soil covering approx. 178.7 ha, over much of what is now the southern half of Ngaruawahia, encompassing the road and rail corridor and the Ngaruawahia Golf Club and extending along the banks of the Waipa River.

[[MGH-25_fig2.jpg Figure 2: Lidar-derived hillshade over an aerial image shows borrow pits as depressions in the flat surface above the Waipa River.]]

Remnants of this large gardening area can be seen as borrow pits south of Rangimarie Road, and in the urban area around Solomon Drive and Pharo Place in Ngaruawahia. This remnant comprises 23 borrow pits visible in lidar-derived elevation data. A 50 m buffer around this cluster encloses 12 ha.

For administrative purposes, this remnant has been described as two records, S14/383 for archaeological evidence in the developed urban zone, and S14/382 for that in remaining rural areas to the west and south.

This record describes the portion of this cluster which falls outside the current residential development bounded by properties on the south side of Solomon Drive. There are 13 borrow pits visible here. A 50 m buffer around these encloses an area of 7.51 ha. Parcels intersecting this buffer are:

Lot 2 DPS 19658, Lot 3 DP 380858, Lot 2 DP 380858, Lot 1 DP 380858, Allot 116 SBRS OF Newcastle South, Allot 117 SBRS OF Newcastle South, Allot 123 SBRS OF Newcastle South, Allot 119 SBRS OF Newcastle South and Part Allot 124 SBRS OF Newcastle South. On screen site extent is approximate only and is based on cadastral boundaries and extent of features visible on attached aerial imagery.

The NZTM coordinates for 13 borrow pits recorded as part of this site are listed below.

no | easting | northing

-----+-----+-----
1 | 1790144 | 5827200
2 | 1790120 | 5827251
3 | 1790193 | 5827066
4 | 1790182 | 5827439
5 | 1790182 | 5827145
6 | 1790280 | 5827312
7 | 1790339 | 5827157
8 | 1790185 | 5827300
9 | 1790084 | 5827268
10 | 1790074 | 5827287
11 | 1790123 | 5827335
12 | 1790059 | 5827437
13 | 1790196 | 5827233

This site is archaeologically contiguous with MGH/82 to the north and east.

[[MGH-25_fig3.jpg Figure 3: Detail from the Grange soil map (1935) showing Maori-made soils in the area where borrow pits are visible on lidar imagery.]]

There is a close correlation between areas of Maori-made soils shown on the DSIR survey and the area represented by a 50 m buffer around borrow pits visible in remote sensing data. An example of this is shown in Figure 3.

Condition of the site

Updated 09/02/2021 (Field visit), submitted by ardencruickshank , visited 03/02/2021 by Cruickshank, Arden

Updated 09/05/2019 (Field visit), submitted by ardencruickshank , visited 18/01/2018 by Cruickshank, Arden.

During these works, no evidence was found, so no condition value can be assigned. It shall remain the same as previously stated.

Updated 12/05/2016 (other), submitted by malcolmhutchinson

The site has not been visited. The following statement is an estimate made by examining remote sensing data, the latest of which is the 2012 WRAPS aerial photographic survey.

This part of the site appeared to be in pasture in 2012, which argues for a reasonable likelihood of archaeological preservation.

Statement of condition

Updated: 08/06/2021 - Not visible - Site obscured by vegetation or other material, condition not observable

Updated: 11/01/2021 - Below surface - Surface evidence has been obliterated, however, there is likely to be subsurface material present. Note that this is different from a destroyed site.

Current land use:

Updated: 08/06/2021 - Grazing, Urban residential

Updated: 19/09/2016 - Grazing

Threats:

Updated: 08/06/2021 - Residential activities, Road/ track formation or maintenance

Supporting documentation held in ArchSite

Extent of UFB2 build in Ngaruawahia. Cruickshank, 2019

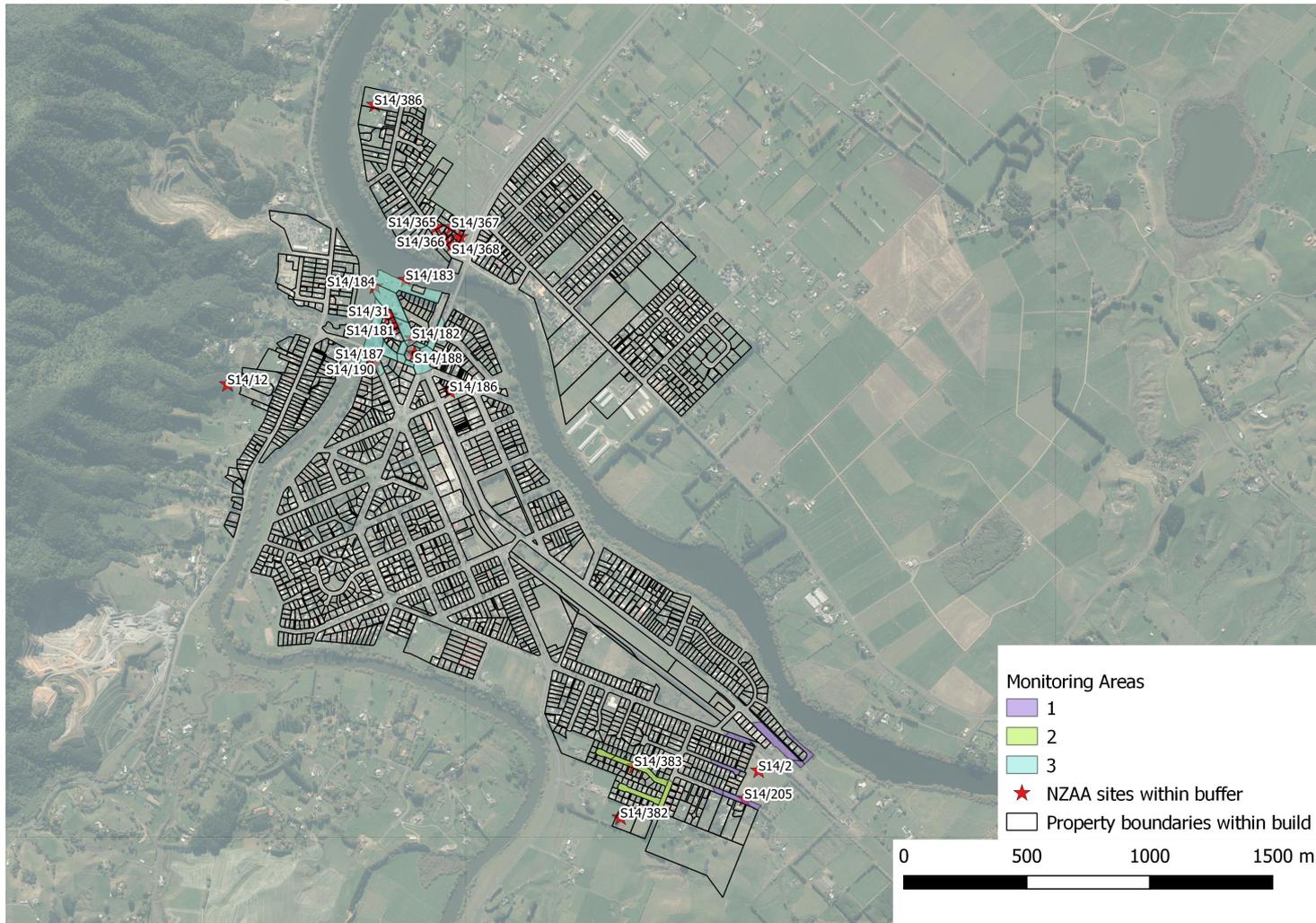
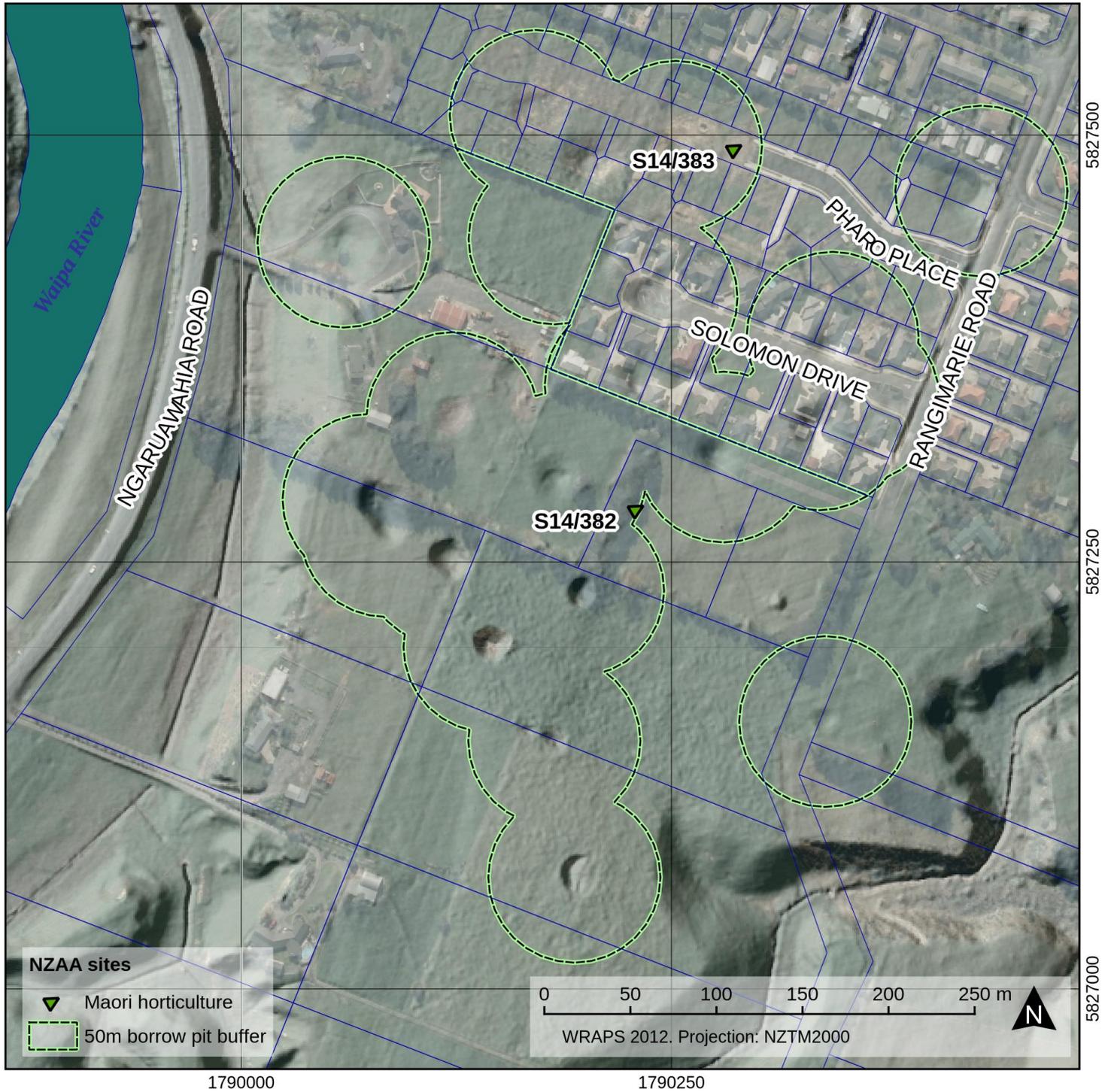
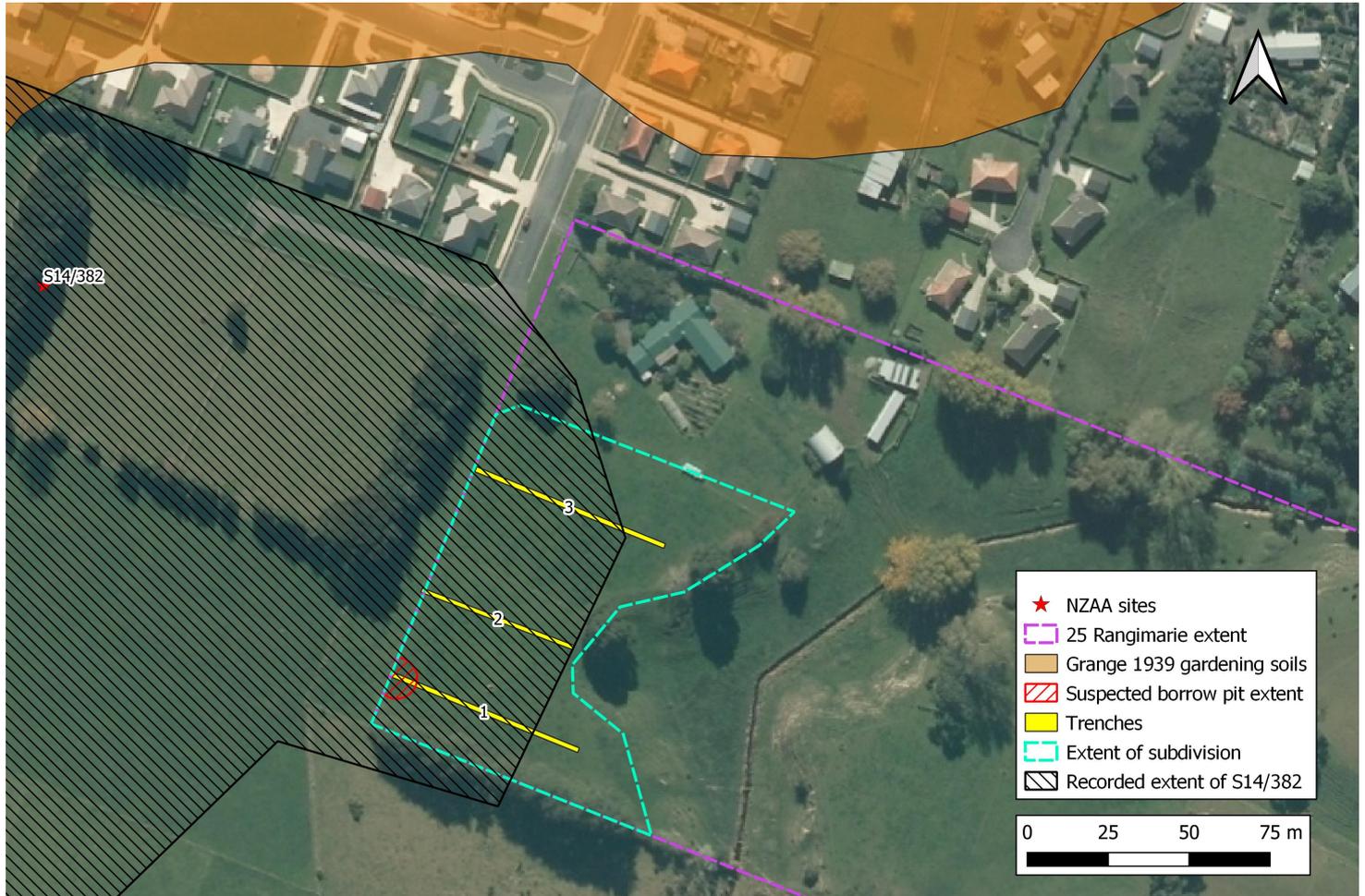


Figure 2









Site Record Form

NZAA SITE NUMBER: S14/383

SITE TYPE: Maori horticulture

SITE NAME(s):

DATE RECORDED:

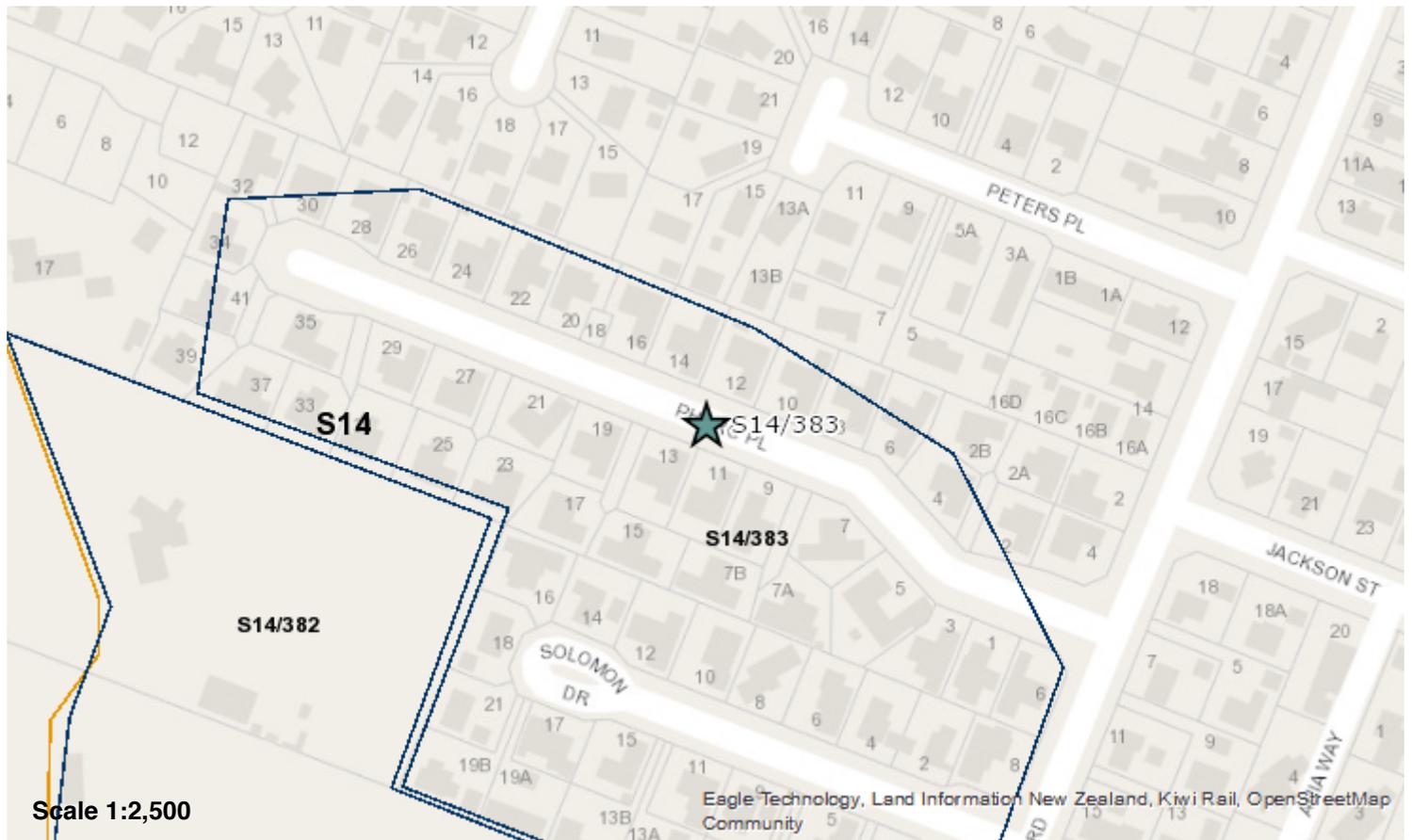
SITE COORDINATES (NZTM) Easting: 1790287

Northing: 5827492

Source: On Screen

IMPERIAL SITE NUMBER:

METRIC SITE NUMBER: S14/383



Finding aids to the location of the site

On flats above the eastern bank of the Waipa River south of Rangimarie Road and Solomon Drive, Ngaruawahia.

Brief description

Ten borrow pits and associated made soils recorded from 2012 aerial photography, lidar-derived elevation data and soil surveys.

Recorded features

Borrow pit, Soil - made

Other sites associated with this site

SITE RECORD HISTORY

NZAA SITE NUMBER: S14/383

Site description

Updated 09/05/2019 (Field visit), submitted by ardencruickshank , visited 18/01/2018 by Cruickshank, Arden.
Grid reference (E1790287 / N5827492)

Works in the vicinity of this site was monitored as part of stage 2 of the ultrafast fibre broadband national roll out (UFB2). No archaeological features or material was identified within the inspection buffer around this site. See attached map to see areas where archaeological inspections were undertaken in the vicinity of this site. See final report, Cruickshank, A. 2019. Ngaruawahia UFB2 Build and Horotiu Backhaul Feeder (HNZPT authority 2018/185) final report. Unpublished CFG Heritage Ltd report to Ultrafast Fibre and HNZPT. No archaeological evidence was identified, but due to the nature of directional drilling and the small areas that are opened up, it is entirely possible to avoid features that are associated with the site.

Updated 12/05/2016 (other), submitted by malcolmhutchinson
Grid reference (E1790287 / N5827492)

This site was recorded in April 2016 by M.G. Hutchinson as part of the Waikato District Plan Review Archaeological Heritage Project by Simmons & Associates. It was identified on remote sensing layers including aerial imagery from 2012, and lidar-derived elevation data flown in 2007-08.

Ten borrow pits and Maori-made soils on flats on the right bank of the Waipa River as it enters Ngaruawahia.

[[Grange_Ngaruawahia.jpg Figure 1: Detail from Grange et. al. (1935) showing extensive deposits of Maori-made soils in the areas around the south of Ngaruawahia.]]

This site is part of a cluster of Maori horticulture activity along the left bank of the Waikato River between Ngaruawahia and Horotiu.

Grange et. al. identified a deposit of Maori-made soil covering approx. 178.7 ha, over much of what is now the southern half of Ngaruawahia, encompassing the road and rail corridor and the Ngaruawahia Golf Club and extending along the banks of the Waipa River.

[[MGH-25_fig2.jpg Figure 2: Lidar-derived hillshade over an aerial image shows borrow pits as depressions in the flat surface above the Waipa River.]]

Remnants of this large gardening area can be seen as borrow pits south of Rangimarie Road, and in the urban area around Solomon Drive and Pharo Place in Ngaruawahia. This remnant comprises 23 borrow pits visible in lidar-derived elevation data. A 50 m buffer around this cluster encloses 12 ha.

For administrative purposes, this remnant has been described as two records, S14/383 for archaeological evidence in the developed urban zone, and S14/383 for that in remaining rural areas to the west and south.

This record describes the portion of this cluster which falls inside the current residential development bounded by properties on the south side of Solomon Drive. There are 10 borrow pits visible here. A 50 m buffer around these encloses an area of 4.5 ha. On screen site extent is approximate only and is based on cadastral boundaries and the extent of features visible in aerial imagery attached as Figures 2 and 3.

The NZTM coordinates for 10 borrow pits recorded as part of this site are listed below.

no | easting | northing

-----+-----+-----

1	1790238	5827405
2	1790226	5827353
3	1790171	5827512
4	1790336	5827330
5	1790343	5827382
6	1790430	5827467
7	1790216	5827437
8	1790355	5827346
9	1790203	5827485
10	1790252	5827494

This site is archaeologically contiguous with S14/383 to the south and west.

[[MGH-25_fig3.jpg Figure 3: Detail from the Grange soil map (1935) showing Maori-made soils in the area where borrow pits are visible on lidar imagery.]]

There is a close correlation between areas of Maori-made soils shown on the DSIR survey and the area represented by a 50 m buffer around borrow pits visible in remote sensing data. An example of this is shown in Figure 3.

Condition of the site

Updated 09/05/2019 (Field visit), submitted by ardenruickshank , visited 18/01/2018 by Cruickshank, Arden.

During these works, no evidence was found, so no condition value can be assigned. It shall remain the same as previously stated.

Updated 12/05/2016 (other), submitted by malcolmhutchinson

The site has not been visited. The following statement is an estimate made by examining remote sensing data, the latest of which is the 2012 WRAPS aerial photographic survey.

This part of the site has been subjected to residential development of moderate density, with roading, houses and other buildings, and associated services all likely to have had an adverse effect on surviving archaeological evidence.

Statement of condition

Updated: 11/01/2021 - Below surface - Surface evidence has been obliterated, however, there is likely to be subsurface material present. Note that this is different from a destroyed site.

Current land use:

Updated: 26/09/2016 - Urban residential

Threats:

Updated: 26/09/2016 - Property development

Supporting documentation held in ArchSite

extent of UFB2 build in Ngaruawahia. Cruickshank 2019



Figure 3



Figure 2: Lidar-derived hillshade over an aerial image shows borrow pits as depressions in the flat surface above the Waipa River.

