W GUMBLEY LTD.
ARCHAEOLOGISTS

Warren Gumbley
Principal/Director

PO Box 7108, Hamilton East, Hamilton 3247
cell 027 471 2165 **landline** 07 856 9071
email warren@archaeologist.co.nz

Addendum: Amberfield – Assessment of Archaeological Values and Effects

By Warren Gumbley, Mana Laumea ***23/07/2018***

1.0 Introduction

The following addendum report provides amendments to two sections of the Amberfield – Assessment of Archaeological Values and Effects document dated 10 April 2018. This addendum makes changes based on recommendations made in a peer review document prepared by Dr Alexandra Simmons on behalf of Hamilton City Council dated 27 June 2018. This addendum is prepared in response to a S92 request for further information.

2.0 HCC S92 request

A summary of the S92 request for further information is listed below:

Section 4.2 Geotechnical monitoring

1. Overlay Figure 29 with archaeological site outlines and numbers.
2. When appropriate, add site numbers to respective geotechnical test pit headings.
3. When appropriate, add site numbers to test pits listed in Table 3.

6.1 Proposed heritage reserve

4. Assess historic and cultural heritage values against WRAPS Table 10-1 criteria.
5. Make direct reference to archaeological site S14/318 in text and in caption for Figure 32.
6. Clarification that the reserve will be transferred to Hamilton City Council for future curation.
7. Construct an Amberfield Reserve Management Plan based on the ICOMOS principles of conservation.

The outlined requests have been addressed in amended versions of Sections 4.2 and 6.1 (see Sections 3.0 and 4.0 below).

3.0 Geotechnical Monitoring (response to HCC requests 1-3)

A series of test pits were excavated across the Amberfield development area for geotechnical investigations in December 2017. Select test pits were monitored for the presence of archaeological materials. The results of this monitoring are outlined below.

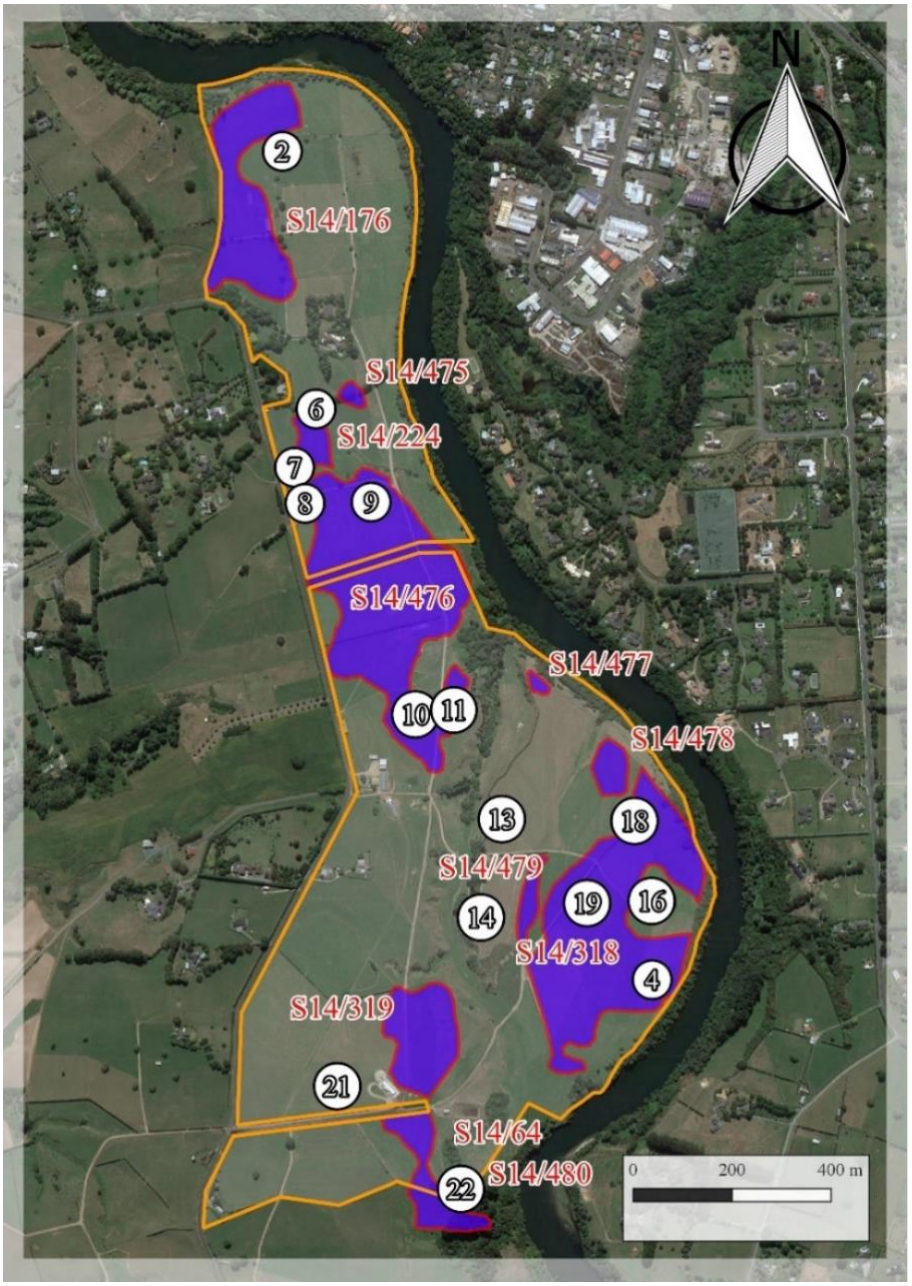

Figure 1: Overview of monitored Geotechnical test pit locations within investigation area. Orange polygon denotes boundary of investigation area, purple polygons show extent of respective archaeological sites. (Note: S14/480 is small and located under the symbol for Geotech test pit 20.)

Using a 12-tonne hydraulic digger, Geotechnical test pits were excavated at dimensions measuring approximately 1.5 x 0.75 metres in plan. While pits were dug to different depths in different areas, only the upper 0.5 m of the pits were monitored and examined for archaeological materials. Also, only a selection of the geotechnical pits was monitored – those within or close to known made soils or in locations where experience indicated there

was potential for archaeological deposits (n=15). Pits were initially examined by observing soil matrices during machine-stripping to identify the Māori horticultural soils, archaeological features or signs of ploughing and/or other 'modern' soil disturbance. With regard to the latter (ploughing/soil disturbance), initial emphasis was given to the interface between the A and B horizons. Following this, the excavation was deepened into the B horizon and the profiles were then hand-cleaned to observe and record stratigraphy, and to determine whether archaeological materials were present. The pits were documented using GPS points, photographs, notes and sketches.

Of the 31 excavated Geotechnical test pits, a total of 15 were monitored (see Figure 30 above). The 16 unmonitored Geotechnical test pits were not examined because the immediate topography and original soil map indicated a low likelihood of finding archaeological materials. Results from individual test pits are described below.

Test Pit 2 (Not within an archaeological site)

Test pit 2 was located at the northern end of the investigated area. The test pit contained a brown topsoil to a depth of 23 cm and a yellowish-brown B horizon. No archaeological materials were observed and no evidence of ploughing was present.

Figure 2: Profile of Geotechnical test pit 4 (S14/318). Note the anthropic sand and gravel between the topsoil and B-horizon.

Test Pit 4 (S14/318)

Test pit 4 was excavated on the lowest natural terrace/plateau near in the southeast margin of the investigated area, approx. 200 m south of test pit 16. Stratigraphically, the pit contained

13 cm deep greyish brown sandy and gravelly topsoil capping a layer of sand and gravel[1] measuring 10-17 cm thick. The B-horizon was a dark yellowish-brown sandy silt with charcoal present in its upper margins.

The sand and gravel deposits represent the remains of a Māori-made soil – Tamahere loam.

Test Pit 6 (S14/224)

Test pit 6 was located 200 m north of the second race cross-cutting the investigated area, and just south of the Peacockes' residence. The pit contained 18 cm of greyish brown topsoil and 8 to 10 cm of Tamahere loam soils. The subsoil graded from Bruntwood to Horotiu soil types and contained naturally occurring gravel.

The sand and gravel deposits represent the remains of a Māori-made soil – Tamahere loam.

Test Pit 7 (S14/224)

Test pit 7 was excavated 125 m southwest of test pit 6 and 50 m east of Peacockes Road. The pit contained 8 cm of topsoil, a 10 cm thick layer of gravel from road overburden, and a yellowish-brown B-horizon.

No archaeological materials were observed.

Test Pit 8 (S14/476)

Test pit 8 was located 15 m south of the same race, close to the Peacockes Road entrance/exit. The test pit contained 7 cm of topsoil, 3 cm of sand and gravel underneath, a yellowish-brown B-horizon. Of note, sand and gravel layer in this test pit was considerably thinner than in test pit 9 nearby (see below).

The sand and gravel deposits represent the remains of a Māori-made soil – Tamahere loam

Test Pit 9 (S14/476)

Test pit 9 was excavated 170 m to the east of test pit 8, just south of the same farm race. The pit contained 16 centimetres of topsoil, 4 centimetres of sand and gravel, and yellowish-brown B-horizon. The profile was undisturbed and no signs of ploughing were present in the pit.

Test Pit 10 (S14/476)

[1] Boundary with the underlying layer was diffuse.

Test pit 10 was located north of a group of implements and storage sheds and 65 m south of the northern quarry[2]. The soil profile contained a 14 cm deep topsoil layer, a 12 cm thick Tamahere loam layer, a 4 cm thick charcoal lens and a yellowish-brown subsoil.

Test Pit 11 (S14/476)

Test pit 11 was located 100 m directly east of test pit 10, on the eastern side of the main N-S race. The sand and gravel matrix was clearly present in the profile, but had been disturbed by extensive ploughing. The topsoil and sand and gravel soil elements were indistinguishable due to plough disturbance, and comprised the first 18 to 22 cm of the soil profile. The underlying B-horizon consisted of yellowish-brown sandy silt.

The sand and gravel deposits represent the remains of a Māori-made soil – Tamahere loam.

Test Pit 13 (Not within an archaeological site)

Geotech test pit 13 was excavated on a high natural terrace, directly east of the gully (palaeo-channel) that dominates the southern end of the investigation area. The pit profile consisted of topsoil to 23 cm of depth and a yellowish-brown sandy silt B-horizon. The sub-soil was locally rich in coarse gravel. No Māori horticultural soils were found in the pit.

Test Pit 14 (Not within an archaeological site)

Test pit 14 was similarly located to test pit 13, immediately east of the gully close to the summit of the ridge. It was located approximately 115 metres north of the second (southern) quarry. The soil profile had a 20-centimtre thick A-horizon on a Horotiu series soil which had been ploughed. No archaeological deposits were present.

Test Pit 16 (Not within an archaeological site)

Test pit 16 was excavated on the third natural terrace (i.e. the lowest flat area) near the Waikato River, on the eastern margins of the investigated area. The pit contained a 9 cm black (10YR 2/1), mottled sandy silt topsoil layer, directly capping a B-horizon which graded from light yellowish-brown to yellowish-brown. No archaeological deposits were present and no evidence of ploughing was present.

Test Pit 18 (S14/318)

Geotech test pit 18 was approximately 600 metres east of the milking shed. The soil profile contained an unmodified topsoil and a 20 cm thick A-horizon, which had been ploughed.

[2] Two modern alluvium quarries are present within the investigated area. The largest, which has been partially back-filled, is located 70 m north of test pit 10. The second is located 120 m south of test 14 and 500 north of test pit 22.

No archaeological deposits were present.

Test Pit 19 (S14/318)

Test pit 19 was located between pits 16 and 14, approximately 300 metres east of the Waikato River. The soil profile contained several distinct attributes:

1) a 17 cm sand and gravel layer
2) an underlying orangy-brown sand measuring 3 centimetres in thickness
3) a an underlying silt (70%) and sand (30%) loam and/or mixed interface, and
4) dish-shaped features filled with a greyish brown silt (50%) and sand (50%) loam.

The profile also contained 6 centimetres of topsoil and a Horotiu series subsoil. Features in the profile were only partially visible – it was not possible to determine the overall morphology of the features, or to distinguish whether they were natural or anthropogenic.

Test Pit 21 (Not within an archaeological site)

Test pit 21 was excavated 100 metres west of the milking shed. The pit contained a 20 cm topsoil overlying a Te Kowhai series subsoil. No archaeological deposit was present in the pit.

Test Pit 22 (S14/480)

Test pit 22 was located adjacent to the investigation area's south-eastern boundary near Nukuhau Paa, and was excavated on the third (i.e. lowest) natural terrace. The pit had a distinct profile; two very gravelly layers were present under the topsoil. The first was a light greyish-brown layer measuring 14 centimetres in depth, while the second layer was 12 cm thick layer with a similar soil matrix and 10YR 2/1 (black) Munsell colour. The underlying greyish-yellow sand was 6 cm thick. The B horizon in this area consisted of the Te Kowhai series. It should be noted that a lot of natural sand and gravel was present within the pit, and it is possible that the gravel layers occurred naturally rather than representing made horticultural soils. Further investigation will be required in the area to determine the nature of these soils.

Summary

From the 15 monitored Geotechnical test pits, 8 contained Māori-made horticultural soils preserved to varying degrees of integrity. The best preserved and thickest archaeological soils were observed in test pits 4, 10, 19 and potentially 22. Test pits 6, 8 and 9 also contained well preserved horticultural soil layers ranging from 3 to 10 cm thick. Test pit 11, which also contained horticultural soils, exhibited extensive disturbance to the horticultural soil horizon due to ploughing. The remaining test pits did not show any evidence of archaeological materials.

Table 1: Nature and condition of archaeology within monitored test pits.

Geotech Test pit	Site	Horticultural soils (Tamahere loam)	Presence of modern disturbance (ploughing)	Notes
2	NA*	No	No	
4	S14/318	Yes	No	Made soils well-preserved
6	S14/224	Yes	No	
7	S14/224	No	No	
8	S14/476	Yes	No	
9	S14/476	Yes	No	
10	S14/476	Yes	No	Disturbance cutting B-horizon
11	NA*	Yes	Yes	Very disturbed made soil
13	NA*	No	No	
14	NA*	No	Yes	
16	NA*	No	No	
18	S14/318	No	Yes	
19	S14/318	Yes	No	Potential dish-shaped features noted in soil profile
21	NA*	No	Yes	
22	S14/480	Yes	No	Nature of gravelly soil not determined - potentially natural in origin

* = Geotechnical test pits which had no direct association with a recorded site.

6. Assessment of Effects On Archaeological Values And Recommendations

With the exception of the allocated reserve area, the development of the Amberfield will be extensive and relatively intensive with respect to the archaeological landscape within the project area. Therefore, the archaeological deposits represented by the identified archaeological sites S14/64, S14/176, S14/224, S14/318, S14/319, S14/475-S14/488 will be destroyed.

Because of the unique and non-renewable attributes of archaeological sites mitigation for the adverse effects will form the primary remedy.

This will take the following forms:

1. Identification of all archaeological sites. This process has been initiated through the archaeological survey described in this report. However, the sub-surface nature of archaeological sites means that there is potential for further archaeological deposits to be identified during the development phase. To accommodate this a discovery protocol will be developed in conjunction with the haapu, with manawhenua and with Heritage New Zealand.

2. A representative example of the Māori horticultural landscape has been proposed for exclusion from the development and protected within a reserve. A management plan consistent with the principles of ICOMOS and its relevant charters will be developed. Manawhenua will participate in the development of the conservation plan. Further description of the proposed reserve is presented in Section 6.1, below.

3. The principal form of mitigation will be thorough substantive archaeological investigation to record the archaeological deposits impacted. The nature and form of these will be determined by Heritage New Zealand through the statutory process prescribed by the Heritage New Zealand/Pouhere Taonga Act. (Note: An archaeological authority will be applied for from Heritage NZ.)

4. Cultural recognition will be expressed in place, trail and street names.

5. A series of interpretive records will be developed in conjunction with manawhenua. It is anticipated that these may take the form of interpretation panels, pou or other installations.

6.1 Proposed heritage reserve (response to HCC requests 4-7)

While the location of this reserve has been chosen primarily on archaeological grounds the term Heritage reserve is preferred here because this area includes a range of values of which archaeology forms one of the core associations.

The proposed reserve is located at the south-eastern corner of archaeological site S14/318 and sits on the lowest two river terraces, therefore directly overlooking the Waikato River. It also has good view lines up-river to nearby Nukuhau Paa. However, the primary reason for the

selection of this area is that it includes a group of borrow pits within a typical landform and so represents a typical example of a pre-European horticultural landscape. The results from a geotechnical test pit within this area also show that from an archaeological perspective it is well preserved. The reserve area is also notable for presence of a bank of material lying on the edge of the upper of the two terraces that was deposited when the lahar generated by the last eruption of Taupō moved down the river gorge. More generally the upper terrace is part of the older Hinuera Formation and the lower terrace is alluvium deposited by the lahar event and which is called Taupo Pumice Alluvium.

The area of the proposed reserve is approximately 12,580 square metres (subject to final design and survey) and its location is shown in Figures 3 and 4.

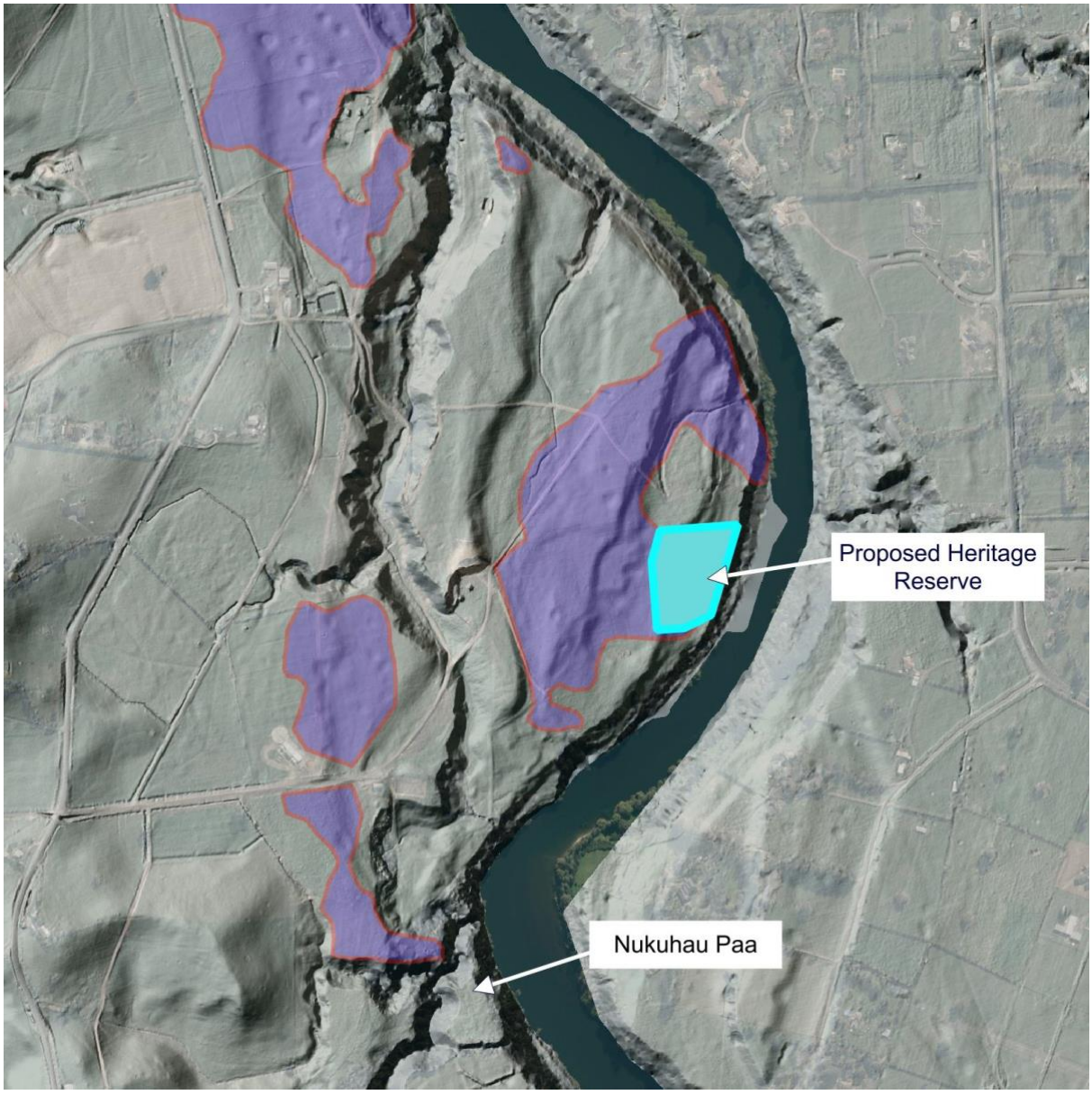

Figure 3: Map showing the location of the proposed Heritage Reserve.

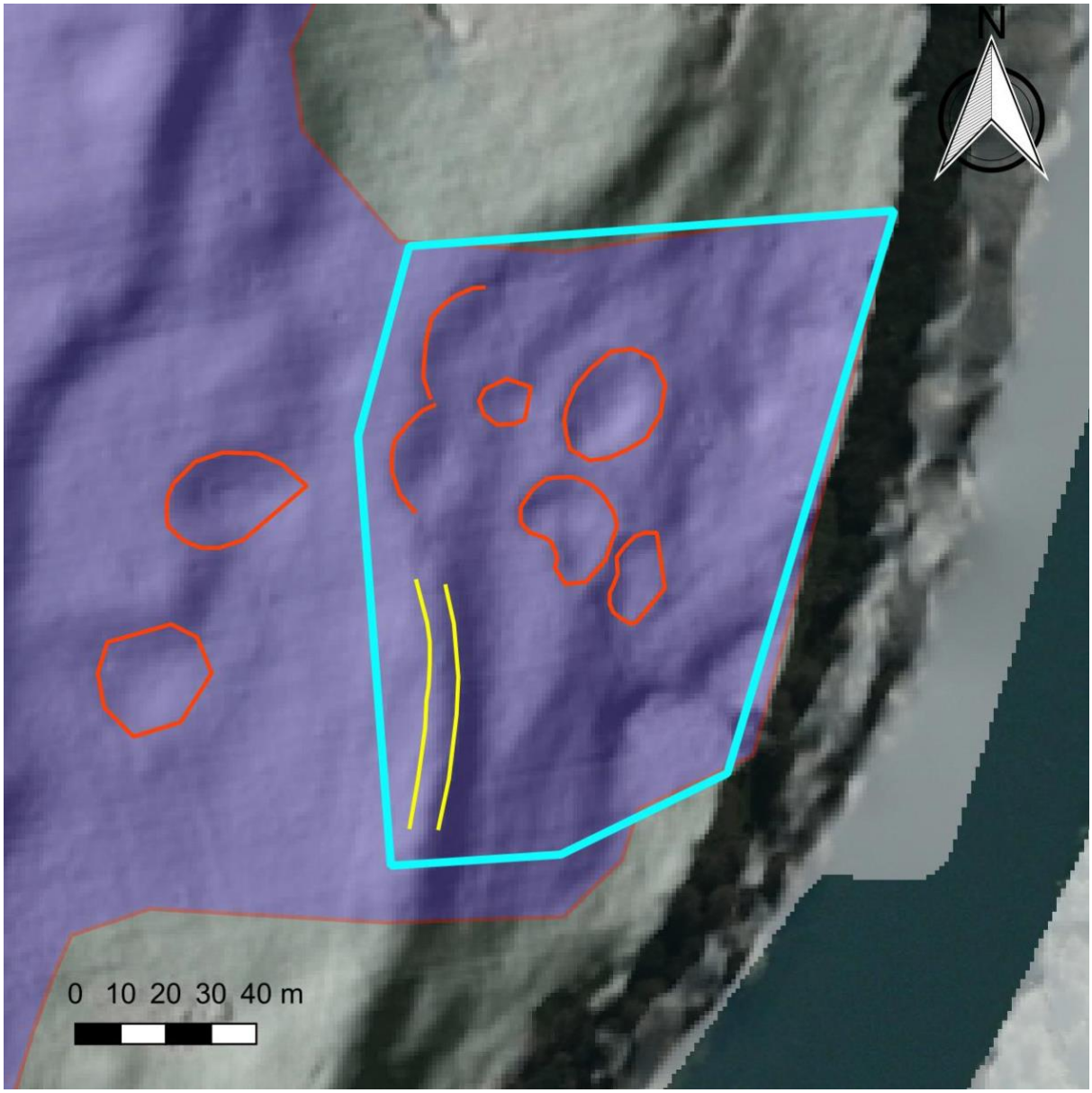

Figure 4: Map showing detail of the proposed reserve (pale blue outline) at south-eastern margins of S14/318. The red items indicate borrow pits and the yellow lines indicate the TPA lahar deposit.

Because the Heritage reserve is the single representative component of the Amberfield development area that will be preserved, the following is an assessment of its archaeological values. In specific terms, the reserve will serve to protect fundamental and representative archaeological attributes associated with the southern Hamilton/Tamahere landscape, specifically those reflecting pre-European Maaori horticultural activities. Given the limited research on this aspect of the cultural landscape and the moderate to extensive land-use history of the general area, the reserve aims to protect an important, well-preserved archaeological landscape in the context of the Hamilton area and the broader Waikato. Accordingly, the values of the reserve are outlined below using the Waikato RPS historic and cultural heritage assessment Table 10-1 criteria. The assessment against RPS criteria should be read in conjunction with Section 3 of the report.

Table 2: Waikato RPS historic and cultural heritage assessment criteria for the proposed Amberfield heritage reserve.

Archaeological Qualities	
Information	The outlined proposed heritage reserve (Figures 3 and 4 above) contains a representative component of the broader archaeological landscape surrounding Amberfield. A test trench (Geotech Trench 4) has demonstrated that the archaeological materials remain in good condition within the area encompassed by the reserve. Specifically the lower terrace, at least, has not been ploughed. An aggregate of borrow pits and unploughed made horticultural soils are known to be present inside the reserve and are situated on two river terraces. One of these terraces also contains a bank of naturally deposited Taupō Pumice Alluvium on its lip. Considering these attributes, the reserve area provides a good example of a typical pre-European Māori gardening landscape. Additionally, the reserve directly overlooks the Waikato River and has a clear line of sight to Nukuhau Paa upstream. In this sense, the Heritage reserve has a high potential for defining knowledge of earlier human occupation along this part of the Waikato River. The reserve area is part of a larger horticultural site (S14/318), represented by Maaori-made soils and borrow pits, which will be archaeologically investigated as part of the mitigation for the development of Amberfield. Information recovered during archaeological investigations will contribute to the information available about the site and will be able to be used in interpretation of the reserve for public education.
Research	General: In the history of the Polynesian settlement of New Zealand, and indeed the rest of Polynesia, the Waikato is unusual, possibly unique. The Waikato, and to some extent the Rotorua Lakes, constitutes an area of concentrated inland settlement not found in the rest of New Zealand, much less the rest of Polynesia. The concentration of archaeological sites in the Waikato relating to the pre-European history of New Zealand is similar to parts of coastal northern New Zealand. This is particularly so in the Middle Waikato Basin around the Waikato River and its tributaries. Here the archaeological landscape is dominated by paa and their associated horticultural sites. In this sense the Waikato is

	also unusual because the horticulture sites are explicitly visible in that landscape and therefore their physical relationships with paa are equally explicit. Consequently, the archaeology of the Waikato lends itself to examining themes that are regional, national, and with respect to the settlement of the Polynesia, international. In many ways horticulture sites, such as this one, are central to this. Specific: The reserve and its associated archaeological attributes are amenable to addressing questions regarding diachronic settlement patterns, occupation and landscape modification at multi-scalar levels (i.e. intra and inter-site, local and regional scales). Specifically, archaeology near the reserve will be archaeologically investigated and provide insight into settlement patterns and chronologies across a landscape which has seen limited substantive research. This relates to the establishment of a clearer understanding of when this landscape was formed, the subsurface archaeological phenomena present, and the nature of occupation - whether varied or uniform - across the Amberfield investigation area. Applicable research themes/questions: • The settlement of the inland Waikato represents a significant migration inland of people whose culture was primarily coastally oriented. What were the adaptations that resulted from this? • How does the archaeological data correspond to the traditional histories relating to the landscape and places within it? • Were similar settlement patterns to those on the coast replicated in the inland area? • Did the Waikato River and its tributaries become substitutes for the coast with settlement focused here or did it take other forms? • What was the process of this through time; i.e. did settlement first focus on the rivers and spread from there, or was another path followed? • Was settlement of the Middle Waikato Basin rapid with, for example, Cambridge and Taupiri being occupied at the same time or was it more gradual and systematic with settlement steadily radiating from one of more foci? • What was the inter-relationship between domestic activities and horticultural sites?

	• Evidence is developing for two manifestations of the soil-making phenomenon, one where bowl-shaped hollows filled with Hinuera alluvium (sand and gravel) and another which manifests archaeologically as a sand/gravel enriched topsoil (A horizon) over a manipulated upper element of the B horizon. Which of these were in use within the Amberfield development area? If both, what was their relationship spatially and temporally?
Recognition or protection	The proposed reserve comprises the south-eastern margins of archaeological site S14/318, which is recorded on the New Zealand Archaeological Association Site Recording Scheme as a cluster of 6 borrow pits covering an area of 10.5 ha. The site is protected by the archaeological provisions of the Heritage New Zealand Pouhere Taonga Act 2014.
Architectural Qualities	
Style or type	NA
Design	NA
Construction	NA
Designer or Builder	NA
Cultural Qualities	
Sentiment	This is a matter for iwi
Identity	This is a matter for iwi
Amenity or Education	The reserve has high potential for educational outcomes through on-site interpretation of the local and regional cultural landscape.
Historic Qualities	
Associative value	The reserve does not have a known direct relationship to an event of historical significance. However, it is within sight of Nukuhau Paa, 600 m upstream, which is an important cultural and historical landmark in the context of the broader region. This paa has a long traditional history and it is possible that the gardens of which the proposed reserve are part were directly associated with Nukuhau Paa. The reserve pertains to the same archaeological landscape as the paa and, in this regard, is indirectly linked to the oral traditions and recorded archaeological features of Nukuhau Paa. It should be noted that as well as Nukuhau Paa there are 6 other paa within 2 km of the proposed reserve. The horticultural origins of the archaeological deposits with in the proposed reserve mean that this area has explicit associative values with other site of this class, not only within the area to be affected by Amberfield but throughout the rest of the Waikato Region and arguably further afield in relation to both pre-European Maaori horticulture but that is also within the distinct

	and highly adaptive array practices of the Oceanic horticultural tradition.
Historical Pattern	Traditional histories relating to the Tainui settlement of the inland Waikato provide an framework for understanding the process and motivations for the settlement of the region but these are typically framed with a political perspective on the activities and inter-relationships of eponymous ancestors. In this context the role of economic development is largely ignored within these histories other than as a motivator for political actions. This applies to the development of horticultural practice as much as any other economic activity. Archaeological evidence demonstrates that settlement in the form of paa and their associated horticultural landscape was closely focused on the Waikato River. Gumbley and Hutchinson (2013) have demonstrated that 80 % of the horticultural sites are within 1 km of the river. This pattern is equally apparent for paa. The Waikato River, and its tributaries served as an important conduit for settlement and transport in pre-European and historic times as well as a major source for staples such as fish, eels, shellfish and fresh-water shrimps.
Scientific Qualities	
Information	The Heritage reserve has the potential to maintain and protect phenomena which can inform on pre-European settlement chronologies along the Waikato River, occupation, land use practices and, more specifically, gardening practices (e.g. borrow pit morphology, puke and/or made soils).
Potential - Scientific Research	While it is not anticipated that the reserve will be subject to archaeological research, nonetheless it should be borne in mind that site of the Waikato horticultural complex are finite and fragile. As such , and although they are extensive, they are attrition through common land management practices such as sand quarrying and modern cultivation practices as well as extensive land-use change such as urban expansion and rural residential development. A recent study by Gumbley and Hutchinson (2013) has shown that between the 1940s and 2013 approximately 66% of the sites of this class within Waipa District have been destroyed or damaged to the degree that they are no longer visible within the landscape and that this degree of visible loss is probably accompanied by a similar loss of sub-surface archaeological evidence. The study also found that 80% of the sites of this class are found within 1 km of the Waikato River, where intensive

	development has been occurring over the last 50 years and where it is anticipated that this level of development will continue. In this context reserved places such as this proposed reserve are likely to form a lasting remnant of this class of site. Given the likelihood of this it is conceivable that future questions raised about aspects of this pre-European Maaori gardening practice will only be able to be addressed through examination of reserved places such as this.
Technological Qualities	
Technological Achievement	Horticultural sites such as this, which feature Maaori-made soils, represent the remains of a specific set of technological innovations developed to facilitate the adaptation of tropical cultigens and tropical horticultural practices to the temperate conditions of New Zealand. While similar technical innovations are found in localised patches in other parts of New Zealand these are relatively small and altogether equate to only a fraction of the area of made soils found in the Waikato. Specifically sites of the Waikato horticultural complex, such as this place, characterised by an intensive strategy involving the quarrying of large volumes of sand and gravel substrate which were employed manipulate the soil environment. It is assumed, but unconfirmed, that this was done to improve crop yield. Recent unpublished research indicates that over 400 ha of Maaori-made soils were created within the inland Waikato on suitable soils on the Hinuera and Taupo Pumice Alluvium formations. The sand and gravel was quarried from approximately 6300 borrow pits, which have been identified from remote sensing. The borrow pits measure up to 40 m in plan and up to 6.5 m deep. An estimated average based on archaeological investigation results indicates that each pit was the source of approximately 800 m^3 of material.

It is intended that the proposed heritage reserve will be transferred to the Hamilton City Council as an Historic Reserve for future management, curation and protection. The designation of the reserve as an Historic Reserve is considered important as this reflects both the nature and significance of the remains present but also helps to ensure appropriate management practices.