


TECHNICAL REPORT 3

ARCHAEOLOGICAL ASSESSMENT

NOVEMBER 2016

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EXECUTIVE SUMMARY

1. The purpose of this assessment is to determine as far as possible potential archaeological effects of the Project, and to develop recommendations to address any such effects. It is noted that some recommendations developed are subject either to approval under other legislation, most notably the HNZPTA 2014, or are constrained by other legislation. The Protected Objects Act (POA 1975) provides a legal process regarding discoveries of protected objects including Tāonga Tūturu, and the Coroners act (CA 2006) specifies additional required procedure in the event of discovery of Kōiwi (historical human remains) or any human remains. The NZ Transport Agency have also developed an Accidental Archaeological Discovery Specification, and the decision version of the Auckland Unitary Plan has additional specification of Accidental Discovery Protocols for Archaeological Sites.
2. The scope of this assessment of archaeological effects was to assess the current design footprint. The recommendations developed here assume that detail design will eventually include a variety of earthworks such as trenching for relocation of underground services, that are not assessed in detail here, but are assumed in areas where there will be changes to road layout. It is assumed that there will not be major design changes to an extent that the overall conclusions or recommendations will be affected.
3. The methodology for this assessment relied principally on desktop research to develop archaeological assessment of effects for a heavily modified urban landscape. This necessitated a fairly lengthy analysis of existing environment, including historic landscape changes, as a predictive tool for assessing areas with potential for archaeological effects. This recognizes the importance of any potential effects on unrecorded archaeological sites, which are subject to the archaeological provisions of the HNZPTA 2014.
4. Description of existing environment reviews predictive factors that contribute to assessing the location, scale and value/importance of possible archaeological effects. The Project is located partly within the Auckland Volcanic Field, an environment in which Māori occupation, gardening and burial are known to have been widespread. Substantial areas of the Project footprint are also in locations that comprise recent landfill, and this part of the report also develops a distinction between areas where an archaeological authority from HNZPT would be required, and areas where measures such as accidental discovery protocols are appropriate.
5. Review of a number of previous archaeological investigations in close proximity to the Project Footprint contributed to developing an expectation of the likely nature of archaeological effects, and the most likely locations of these. The sorts of values most likely to be affected are outlined in Section 6.
6. Urbanisation of the Project area occurred to a great degree prior to the archaeological provisions of the HNZPTA 2014 being in place, and involved great loss of archaeological information, due to the limited scale of detailed archaeological recording and investigation prior to and during such works. This gap adds to the archaeological value of any remaining archaeological sites (mostly unrecorded within NZ's archaeological recording systems) within this urbanized landscape, which may be affected by the project.
7. The locations in which such effects are most likely are defined in Section 7. In general, effects are expected to be very limited in geographic scale, with the possible exception being the southern part of the Te Hōpua tuff ring, surrounding the former Te Hōpua crater lagoon. In this vicinity, Māori settlement remains and various colonial-era port installations and historic rail remains are likely to be affected, potentially at a greater geographic scale than effects in other areas. The rarity of surviving archaeological information, especially Māori archaeological sites, in such areas, and recent developments in archaeological method which allow more detailed information recovery, increase the value of any archaeological discoveries, and effects on such values may be more than minor due to the rarity and archaeological of any surviving archaeological material.

8. Recommendations are that:

- The Project continues to liaise with Mana Whenua and Council Heritage Staff with regard to developing a framework for management of Historic Heritage values during construction, in accordance with conditions of any HNZPTA 2014 Authority, and to identify opportunities for interpretive and commemorative material for any archaeological discoveries;
- For areas identified as having greater potential for archaeological discoveries, an Authority or Authorities should be sought from HNZPT under the HNZPTA 2014;
- For other areas of the project, NZTA Accidental Archaeological Discovery Specification and PAUP accidental discovery protocols should be applied, to ensure appropriate steps are taken in the event of archaeological discoveries.

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Glossary of Technical Terms/Abbreviations

Abbreviation	Term
ACRPS	Auckland Council Regional Policy Statement
ADP	Accidental Discovery Protocol
AEE	Assessment of Effects on the Environment
ALW Plan	Auckland Council Regional Plan: Air, Land and Water
ARP:C	Auckland Council Regional Plan: Coastal ARP:C
AMETI	Auckland-Manukau Eastern Transport Initiative
BCA	Burials and Cremations Act 1964
CA 2006	Coroners Act 2006
CHI	Auckland Council Cultural Heritage Inventory
CRA	Conventional Radiocarbon Age, derived from the probability distribution of carbon isotope ratio measurement
DOC	Department of Conservation
EPA	Environmental protection authority
EWL	East West Link
HNZPT	Heritage New Zealand Pouhere Taonga
HNZPTA 2014	Heritage New Zealand Pouhere Taonga Act 2014
NoR	Notice of Requirement
NZAA	New Zealand Archaeological Association
The NZ Transport Agency	New Zealand Transport Agency
PAUP	Proposed Auckland Unitary Plan
POA 1975	Protected Objects Act 1975
RMA	Resource Management Act 1991
SH(x)	State highway (number)
The Plan	The Auckland Plan
UDLF	Urban Design Landscape Plans

1 Introduction

1.1 Purpose and scope of this report

This report forms part of a suite of technical reports prepared for the NZ Transport Agency's East West Link project (the EWL or Project). Its purpose is to inform the Assessment of Effect on the Environment Report (AEE) and to support the resource consent applications, Notice of Requirement and an alteration to existing designations required for the EWL. A separate report covers built heritage. In the Auckland Plan Mana Whenua cultural heritage includes archaeology of Maori Origin. This report included assessment of archaeology of, Maori origin, but does not constitute an assessment of Maori Values.

This report assesses the archaeological effects of the proposed alignment of the Project as shown on the Project Drawings in *Volume 2: Drawing Set*.

The purpose of this report is to:

- Identify recorded archaeological sites in the vicinity of the Project;
- Identify areas with potential for unrecorded archaeological sites to be encountered during works;
- Assess values of these as far as is reasonably practical, and any likely adverse and positive effects on such values;
- Recommend any measures to avoid, remedy or mitigate adverse effects on archaeological sites; and
- Inform consultation with HNZPT regarding likely effects of the proposal on archaeological values and develop the scope of future Project authority applications under the HNZPTA 2014.

1.2 Project description

The EWL Project involves the construction, operation and maintenance of a new four lane arterial road from State highway 20 (SH20) at the Neilson Street Interchange in Onehunga, connecting to State highway 1 (SH1) at Mt Wellington as well as an upgrade to SH1 between the Mt Wellington Interchange and the Princes Street Interchange at Ōtāhuhu. New local road connections are provided at Galway Street, Captain Springs Road, the ports link road and Hugo Johnston Drive. Cycle and pedestrian facilities are provided along the alignment.

The primary objective of the Project is to address the current traffic congestion problems in the Onehunga, Penrose and Mt Wellington commercial areas which will improve freight efficiency and travel reliability for all road users. Improvements to public transport, cycling and walking facilities are also proposed.

For description purposes in this report, the Project has been divided into six sectors. These are:

- Sector 1. Neilson Street Interchange and Galway Street connections
- Sector 2. Foreshore works along the Māngere Inlet foreshore including dredging
- Sector 3. Anns Creek from the end of the reclamation to Great South Road
- Sector 4. Great South Road to SH1 at Mt Wellington
- Sector 5. SH1 at Mt Wellington to the Princes Street Interchange
- Sector 6. Onehunga local road works

A full description of the Project including its design, construction and operation is provided in *Part C: Description of the Project in the Assessment of Effects on the Environment* contained in *Volume 1: AEE* and shown on the Drawings in *Volume 2: Drawing Set*.

1.3 Study area

The study area for this assessment comprises principally the footprint of works, in regard to assessing effects. Full details of temporary construction areas, services trenching etc. are not yet available. It is also in the nature of archaeological assessments, which necessarily take a landscape approach to developing archaeological formation theory for a project area, to look beyond the immediate footprint of works and to understand broader landscape patterns of archaeological formation processes, where these are of relevance to the Project, including the patterns of human occupation in both pre-European times and after the arrival of European settlers. The study area, and sector divisions used in discussion, are defined as shown in Figure 1-1 and Figure 1-2, with the footprint of works shown in yellow.

Figure 1-1: The archaeological study area, sectors 1-3 and Sector 6

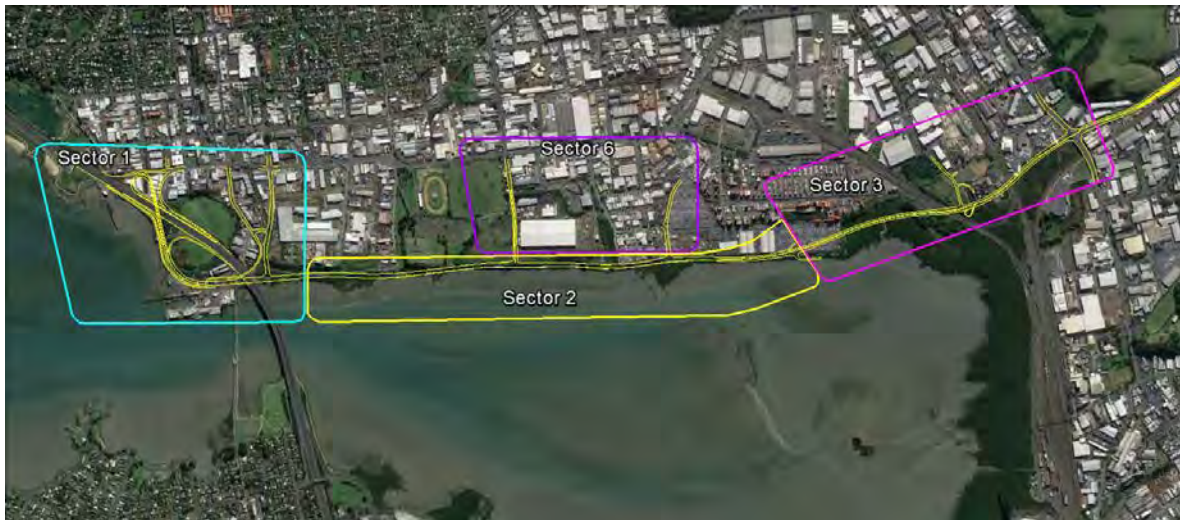
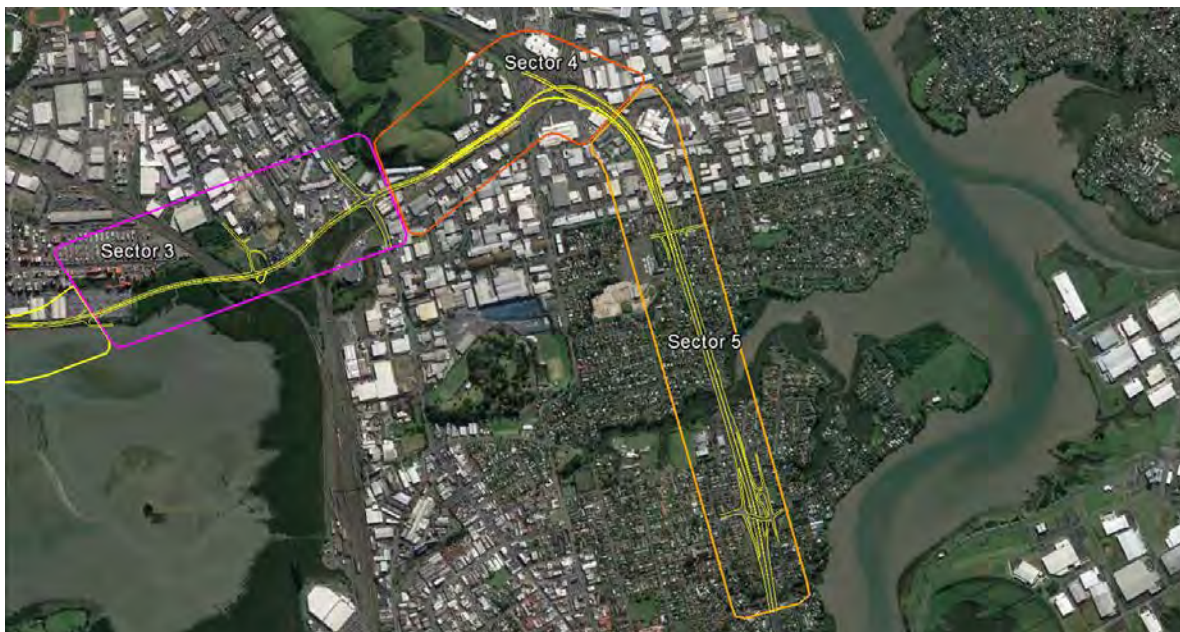


Figure 1-2: Sectors 4 and 5



2 Experience

2.1 Expertise

Dr Matthew Felgate is a professional archaeologist with 23 years' experience of providing archaeological services to development and infrastructure projects and to councils. He has a Master's Degree from the University of Auckland (1993) specialising in archaeology, and a PhD (2004) from the University of Auckland Specialising in Archaeology.

He is currently employed as Director of Maatai Taonga Limited Historic Heritage and Archaeological Consultancy. His experience, commencing in 1993, includes a variety of projects pertaining to the archaeology of Māori society of the pre-Colonial era, as well as projects on the archaeology of industry and society in the colonial era.

Matt has a particular interest in refining the chronology of economic and landscape change during the formative period of Māori society in the Tāmaki area, and he has developed particular expertise in this field through urban archaeology projects in Tāmaki Makaurau.

3 Methodology

This report includes both desktop and field assessment to assess archaeological values in the existing environment, including assessment of potential for unrecorded archaeological material/sites to be present in the study area. The definition of archaeological sites in New Zealand legislation does not have regard to whether archaeological sites are already recorded or not, therefore the assessment of archaeological potential, or risk, of encountering previously unrecorded archaeological sites during works is essential.

3.1 Desktop research methodology

Sources utilised for desktop research included:

- Proposed Auckland Unitary Plan (PAUP) Historic Heritage schedules;
- Auckland District Plan, Isthmus section (ADP), Heritage schedules;
- Manukau District Plan (MDP) Heritage schedules;
- HNZPT List/Rārangī Kōrero (“the List”);
- HNZPT digital library of Archaeological Reports;
- Auckland Council’s Cultural Heritage Inventory (the CHI);
- Onehunga Heritage Survey (Auckland Council Heritage Unit, December 2013 Final);
- Available Heritage Assessments;
- Specialist Reports;
- Auckland Libraries Digital Resources;
- Alexander Turnbull Library Digital Resources;
- NZAA records (ArchSite online GIS index of records and full site documents reviewed);
- NZ Radiocarbon database and Arch.Research Spatial mapping of radiocarbon dates;
- Auckland Council Regional Plan: Air, Land and Water;
- Auckland Regional Plan: Coastal;
- Review of Historical archives, maps, plans, land title information;
- Previous archaeological reports in the area of the proposed project;
- Review of historical air photography, including the 1940 overlay in the Auckland Council GIS viewer as well as the library sources listed for oblique views;
- Review of published local histories;
- Auckland Art Gallery historical landscape paintings;
- LINZ historical land title information (Accessed via LINZ LandOnline);
- LINZ database of historical plans and maps of the area, accessed via QuickMap;
- Te Ara Encyclopaedia of New Zealand;
- Auckland University Library;
- Auckland Library Sir George Grey Special Collections;
- Unpublished archaeological reports; and
- Auckland Council online GIS Viewer.

3.2 Field assessment methodology

Field assessment methodology consisted primarily of drive-by inspection supplemented by pedestrian survey in some locations, principally by Brooke Jamieson, archaeologist, of Opus, 12 April 2016, with additional visits to selected areas by Dr. Felgate. Physical inspection of soil profiles was constrained by the developed nature of most of the land. Field inspections were primarily to obtain some sense of the degree of modification, with a view to assessing any potential for buried material. Such visits were supplemented by use of Google Earth Street view, a useful tool for assessing landscape modification. Field visit areas were also selected with reference to the digital elevation model accessible through Auckland Council's online GIS viewer, which provides a good indication of the scale and nature of previous landscape modifications.

The combined methodology in using these sources of information was to:

- Identify as far as possible past archaeological patterning in the landscape through identifying primary archaeological formation patterns from previous archaeological records combined with examination for surface traces in 1940 aerial photography;
- Assess landscape modifications and how these might have affected archaeological preservation and visibility;
- Identify areas which are likely to retain archaeological or heritage material that could impose design constraints;
- Assess the proposed design in more detail to determine the scale and significance of effects, as far as possible; and
- Develop recommendations for measures to avoid, remedy or mitigate such effects.

3.3 Evaluation methodology

The methodology used in this report for evaluating non-scheduled archaeological sites is as follows:

- For places that are or may be archaeological sites as defined in the HNZPTA 2014, the evaluation criteria for the HNZPT guidelines for archaeological assessments are applied (HNZPT, 2006). "Archaeological Site" now has the same meaning in the PAUP as in Heritage New Zealand Pouhere Taonga Act 2014.
- These evaluation criteria provide a succinct set of evaluation criteria for places that have archaeological protection under the HNZPTA 2014. Identification of any such places at the AEE stage can form the basis of appropriate liaison with HNZPT regarding application for Authority to carry out works that might affect archaeological sites and carry out information recovery where avoidance is not possible;
- Built heritage is assessed in a separate technical report in *Volume 3*.

The HNZPT criteria for assessing archaeological as per the HNZPT guidelines for archaeological assessment (HNZPT, 2006) are:

- Condition;
- Rarity/Uniqueness;
- Contextual Value;
- Information Potential;
- Amenity Value; and
- Cultural Associations (broad associations such as: is there information to suggest that a place a site of interest to Māori?).

HNZPT guidelines were followed in carrying out such evaluations.

The Project footprint extends marginally into the scheduled extent of Mutukāroa-Hamlins Hill (a very small area of the paved accessway from the Sylvia Park Road/Great South Road intersection), however this is a paved driveway and evaluation methodology specific to PAUP scheduled Historic Heritage is not applied due to the negligible extent of this Project effect.

4 Statutory Framework

This Section outlines the framework under the RMA and the HNZPTA 2014. The heritage provisions of the PAUP have legal effect at the time of writing. Relevant aspects of existing operative district and regional plans are reviewed in the main AEE document. There is also brief introduction of the POA 1975 in relation to management of discoveries of Tāonga Tuturu, and brief mention of provisions of the BCA 1964 regarding discovery procedures for human remains during earthworks.

4.1 Resource Management Act 1991

The RMA requires City, District and Regional Councils to manage the use, development, and protection of natural and physical resources. The protection of historic heritage from inappropriate subdivision, use, and development is identified as a matter of national importance (Section 6(f)).

Historic heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities.

Historic heritage is defined in Part 1 Section 2 (1) of the RMA to include:

- Historic sites, structures, places, and areas;
- Archaeological sites;
- Sites of significance to Māori, including wāhi tapu; and
- Surroundings associated with the natural and physical resources.

In Auckland, the RMA requirement for protection of historic heritage is given effect through the PAUP. These categories can involve considerable overlap regarding the material remains under consideration, and spatial extents of place. "Archaeological Site" in the decision version of the PAUP now has the same meaning as that in the HNZPTA 2014. "Mana Whenua cultural heritage" as defined in the PAUP includes archaeology of Maori origin and there are a range of objectives and policies to protect Mana Whenua cultural heritage.

4.2 Heritage New Zealand Pouhere Taonga Act 2014

The purpose of The HNZPTA is to promote the identification, protection, preservation, and conservation of the historical and cultural heritage of New Zealand. The Act is administered by HNZPT.

4.2.1 Archaeological Provisions of the HNZPTA 2014

Archaeological mitigation measures such as management plans must have regard to the archaeological provisions of the HNZPTA 2014. The HNZPTA 2014 contains a consent (authority) process for any work affecting archaeological sites, where an archaeological site is defined as:

Any place in New Zealand, including any building or structure (or part of a building or structure), that -

- a. Was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900;
- b. Provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and
- c. Includes a site for which a declaration is made under Section 43(1).

Any person who intends carrying out work that may modify or destroy an archaeological site, must first obtain an authority from HNZPT. The process applies to sites on land of all tenure including public, private and designated land. The HNZPTA 2014 contains penalties for unauthorised site damage or destruction.

In applying the archaeological provisions of the HNZPTA 2014, HNZPT have regard to avoidance of archaeological effects where feasible, and for this reason, applications for Authority to affect archaeological sites are assessed with regard to:

Whether the project has made provision, where feasible, for:

- Identification of historical and cultural heritage in the full sense, including archaeological sites;
- Protection and preservation where feasible; and
- Conservation, i.e. the ongoing management of historical and cultural heritage to prevent avoidable deterioration.

The archaeological authority process applies to all archaeological sites, regardless of whether:

- The site is recorded in the NZ Archaeological Association Site Recording Scheme or included in the Heritage New Zealand List,
- The site only becomes known about as a result of ground disturbance; and/or
- The activity is permitted under a district or regional plan, or a resource or building consent has been granted.

The HNZPT Authority process requires an archaeological works plan (often an Archaeological Management Plan) to accompany any application and where an authority is granted such plans generally become a lead document regarding works in areas covered by an archaeological Authority from HNZPT. Where granted, archaeological Authorities generally provide specific conditions regarding adherence to an archaeological management plan, and may include conditions such as monitoring of works, archaeological investigations, recording, analysis, reporting, publication and public dissemination of information.

The HNZPTA 2014 also includes an approval process for individuals nominated by applicants to undertake any archaeological work required as a condition of an Authority (Section 45). There is a requirement, for Authority applications where archaeological sites with Maori associations are involved, for the archaeologist nominated under section 45 to have appropriate cultural support from Tangata Whenua and to have requisite competencies for recognizing and respecting Maori values.

4.2.2 Heritage New Zealand Pouhere Taonga List

Heritage New Zealand also maintains the New Zealand Heritage List/ Rārangi Kōrero (the List) of Historic Places, Historic Areas, Wāhi Tupuna, Wāhi Tapu and Wāhi Tapu Areas.

The List identifies some of New Zealand's significant and valued historical and cultural heritage places and can include archaeological sites. "The List" replaces "the Register" established under the Historic Places Act 1993. In many cases district plan schedules etc. will refer to registration status rather than listing.

The List informs and notifies owners, the public, community organisations, government agencies and local authorities about significant heritage places, and is a source of information about such place and areas for the purposes of the Resource Management Act 1991.

The List is divided into five parts:

- Historic Places - such as archaeological sites, buildings, memorials;
 - Category 1 historic places are of special or outstanding historical or cultural significance or value;
 - Category 2 historic places are of historical or cultural significance or value.
- Historic Areas - groups of related historic places such as a geographical area with a number of properties or sites, a heritage precinct or a historical and cultural area;
- Wāhi Tūpuna - places important to Māori for ancestral significance and associated cultural and traditional values;

- Wāhi Tapu - places sacred to Māori in the traditional, spiritual, religious, ritual or mythological sense such as maunga tapu, urupā, funerary sites and punawai
- Wāhi Tapu Areas - areas that contain one or more wāhi tapu

One listed Wāhi Tapu is located in the vicinity of the Project, and the file record for this was accessed and contributed to assessment of potential archaeological effects in that vicinity.

4.3 Protected Objects Act 1975

Management Plans and protocols for mitigation measures must have regard to the POA 1975, which includes provision for official registration of any finds of Tāonga Tuturu within statutory timeframes, and includes statutory processes for assigning ownership of these.

4.4 Coroners Act 2006

Similarly, Management Plans and protocols for mitigation measures must have regard to the Coroners Act 2006. Section 14(1) of the Coroners Act 2006 requires that “a person who finds a body in New Zealand must report that finding to a member of the police as soon as practicable”. This requirement means that any discovery of human remains requires notification to the New Zealand Police. It is the responsibility of the police to establish whether or not the site is a crime scene.

5 Research Results Existing Environment

5.1 Location and landscape

Location and landscape are important predictive factors for assessing potential for unrecorded archaeological sites that may be affected by the Project. Location and landscape can also predict to some extent the types of material that might be expected, which in turn allows some assessment of archaeological values, or potential archaeological values, and potential archaeological effects. This contributes to assessing the potential scale and significance of such effects and how these might be best avoided, remedied or mitigated.

An understanding of the historic landscape is especially necessary in the Project area, where there has been drastic historic landscape modification, including:

- Landscape alteration commencing during early Māori occupation, with alteration by fire, construction of garden systems, house platforms, fortifications etc., and burial of Kōiwi;
- Modification of these by subsequent Māori occupation and use and burial;
- Relatively drastic new landscape modifications commencing in the 1840s such as clearance of stone fields (including destruction or modification of extant Māori features) by surface quarrying of loose stone, construction of stone boundary walls, modification of remaining soil profiles by ploughing, vehicle road construction and construction of bridges;
- More intensive modification of parts of the landscape with the development of railways from the late 19th century through to the 20th century and the development of meat-processing industries; and
- Much more drastic machinery modification which accelerated circa WWII with the use of bulldozers and, later, hydraulic excavators, including construction of additional road and highways and intensive large-scale quarrying of scoria, and development of housing and industrial areas.

5.1.1 Topography and shorelines

Current topography and shorelines have been subject to major alterations in the 20th century. Current digital elevation model information from Auckland Council's online GIS viewer is shown for the study area in Figure 5-1 and Figure 5-2. Historic shorelines are also shown. Reclamation commenced prior to 1878 in the Waikaraka area on a very small scale, but large-scale reclamation was carried out in the 20th century along much of the Project route. Most of these reclamation areas do not have archaeological values. There are possible exceptions to this, such as:

- The Onehunga crater basin, Te Hōpua, where 1930s reclamation may have buried earlier pro-graded shorelines with archaeological values;
- The exterior shoreline of the Onehunga tuff ring, where an 1870s reclamation was carried out to establish one of Auckland's earliest rail links, between the port of Onehunga and the Port of Auckland; and
- At the Tāmaki crossing in Sector 5 there has been some reclamation to establish motorway culverts, which are to be replaced by a bridge structure. It is possible there is some former foreshore with potential for archaeological material to be present (this was an important waterway in ancient Māori society as well as in early colonial times).

Figure 5-1: Digital terrain information for the western part of the Project (source Auckland Council GIS)

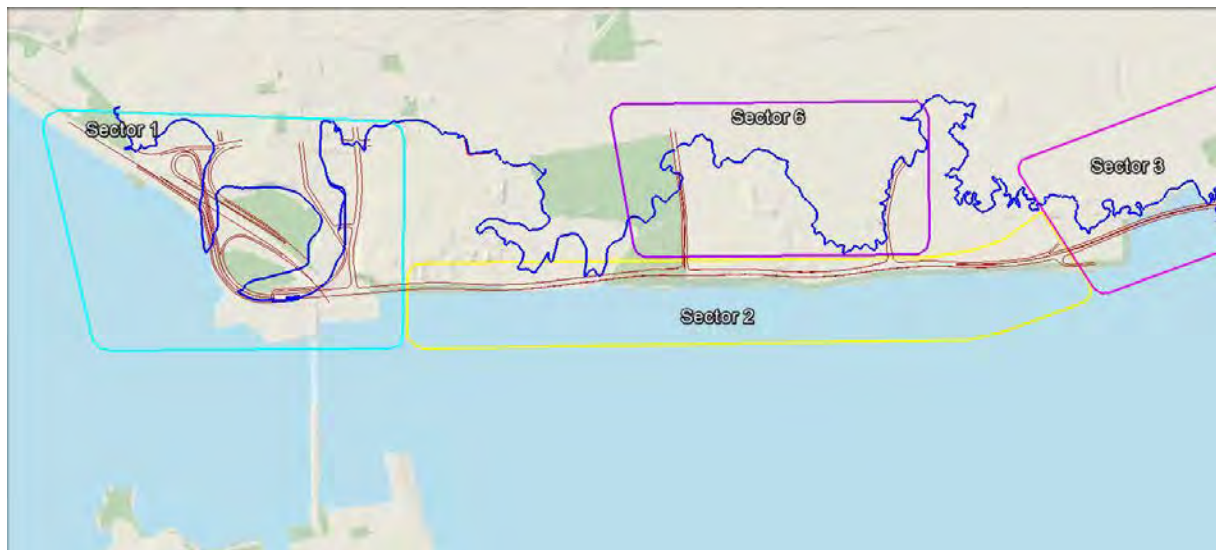
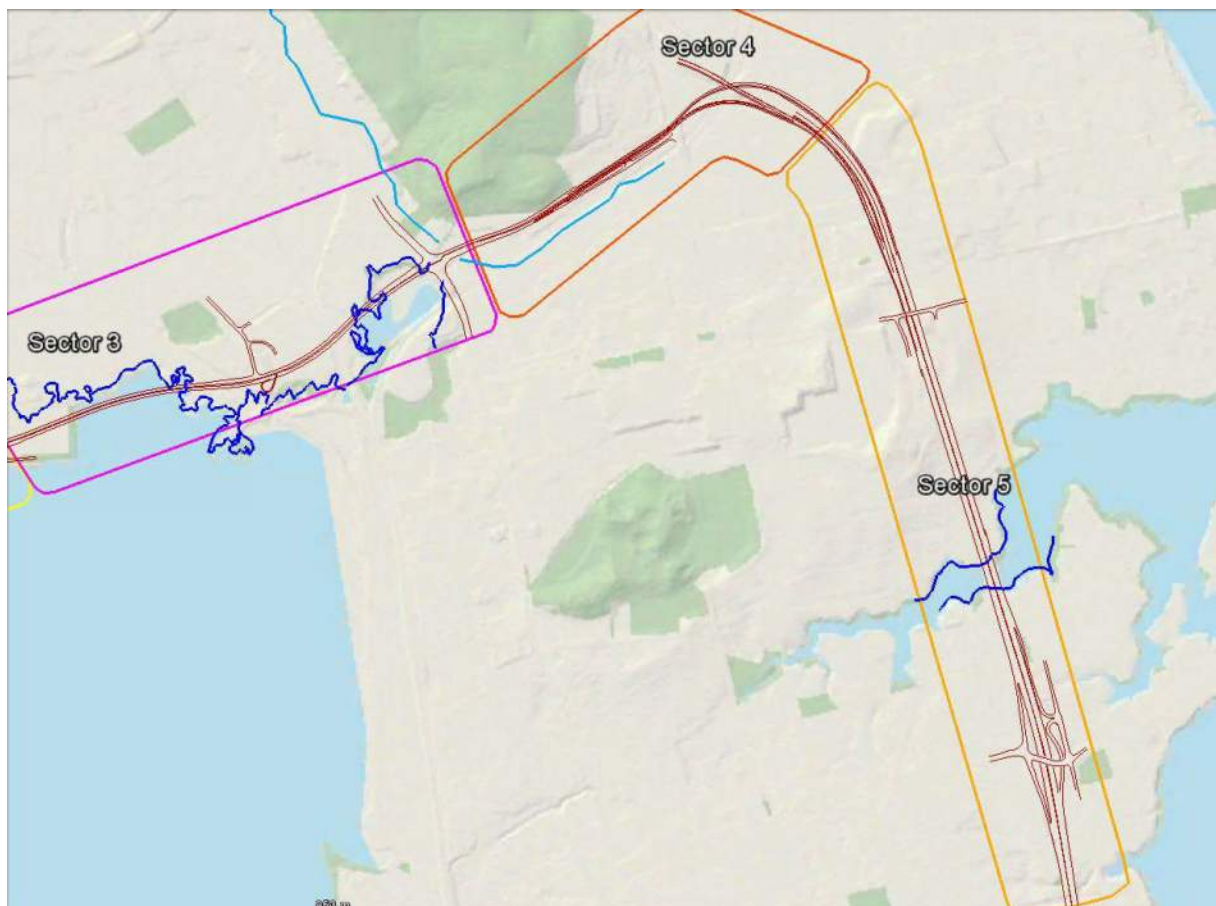


Figure 5-2: Digital Terrain, east (source Auckland Council Online GIS)



This data provides overview of modern altered terrain details and current shorelines. The vast majority of the study area has been subject to various cut or fill landscape modifications. The details of such modifications need to be considered in assessing archaeological values or potential for these to be present, and in assessing potential archaeological effects. Places that are the transition from cut to fill, and places that have been filled but where deep excavation earthworks are planned, are those where *in-situ* traces of earlier times may be discovered and/or affected.

Such places are considered in more detail in the assessment of effects section.

5.1.2 Geological Setting

The geological setting of the Project is fundamental to all archaeological assessment due to the predictive value of:

- Soil types suitable for Māori horticulture and settlement;
- Geological formation of sites suitable for major Māori settlement complexes; and
- Geological formation permitting the best portage route for portage of waka back and forth between the west coast harbour of the Manukau and the East Coast Tāmaki/Hauraki region.

Volcanic soils, in particular, were favoured for kumara horticulture. Volcanic stone field areas were also favoured for occupation, possibly as a result of creating local topography which was more elevated than surrounding areas, and dry in the winter months. Volcanic topography also provided free-draining areas for kumara storage structures, vital to the ancient Māori economy. Places of physical elevation in the landscape may also have been associated with societal rank of individuals.

Sector 1 is an area favourable for Māori settlement and horticulture as a result of its geology and other location factors. Sector 1 is dominated by the lithic tuff ring of Te Hōpua, with basalt and basanite lava plus lithic tuff inland of this (Kermode, 1992). The lava fields were “rocky and hummocky in valleys, on cones, and as small fans or aprons on flat ground throughout the Auckland urban area” (Kermode, 1992, p. 36). Scoria, ash and lapilli deposits are a feature of such systems, and in places scoria had weathered to soft cohesive brown sands by the time of Māori arrival, while lapilli would have weathered, depending on distance from the eruptive centre, to very soft red-brown sandy clay. There would thus have been a variety of soil textures and soil drainage characteristics within the lava fields, as well as ample supplies of basalt and scoria for some horticultural practices and building foundation work that used these materials. The Te Hōpua Tuff ring also would have provided a locally elevated settlement location, at an ecotone between the lava fields (and the garden and forest resources on these) and the Manukau, rich in seafood and suited for travel to a considerable area by canoe without venturing to sea. Freshwater springs are a characteristic of the area.

Sector 2 works are almost all on reclaimed land.

Sector 3 comprises lava flows in the Southdown area, modified by roads, rail, industrial development and landfill. Coastal survivals of the lava flows are evident, and some areas of this sector will include former stone field modified and buried during industrial development. The footprint of works deep enough to encounter this geology is expected to be limited mainly to the foundations for pylons supporting raised structures. The basaltic nature of the geology here means that these limited-area works have potential to encounter traces of Māori archaeological settlement. A small area of Sector 3 comprises the flysch of which Mutukāroa-Hamlins Hill is composed. This geology is not considered an overly strong predictor of Māori settlement, but the elevated location of Mutukāroa-Hamlins Hill and its location near to Anns Creek and surrounding volcanic soils may have been factors in the notable record on former Māori settlement on this hill. The Project will involve works at Great South Road and Sylvia Park Road intersection, in an area of former shoreline.

Sector 4 includes the junction between the flysch of Mutukāroa-Hamlins Hill (classified as part of the East Coast bays formation by Kermode) and the tuff and lava of the Ōtāhuhu eruptive centre. Works to widen Sylvia Park Road to the north along the Sector3-to-Sector 4 boundary are in an area already highly modified by previous earthworks but given that this is at the foot of Mutukāroa, geological considerations are probably not key.

Sector 5 returns to volcanic landscape, with Tip Top corner comprising the north-western lobe of the lava field from the McLennan Hills volcano (formerly located immediately to the east of sector 5 Project works and to the south of Panama Road, and now largely quarried away). This lava field occupied all the area from Tip Top corner to the Tāmaki estuary, and the remains of former Māori kumara storage pit complexes can be seen on the 1940 aerial photographs on many higher points in this landscape of complex lava topography.

South of Hōtunui Drive, there is a greater preponderance of ash, lapilli and tuff. These less stony soils would have been well drained in more elevated locations and by 1940 were mostly being used for market horticultural produce. The remains of Māori settlement are less visible by 1940 on this geology,

apart from steeper portions such as the Te Apunga o Tainui/ McLennan Hills volcanic cone itself. This is an instance where a considerable difference in archaeological preservation and visibility may have occurred because of less stony soils being less resistant to the plough and more suited to colonial-era horticultural production.

Sector 6 was formerly lava field with areas of volcanic ash formerly more prevalent. Areas of the Project footprint (excluding reclaimed land) therefore have considerable potential for traces of Māori settlement to be encountered during any deeper works such as trenching for services. Such areas are defined in more detail in the “effects” section.

Another historically important aspect of the portage-area volcano complex was geological formation of the famous Ōtāhuhu portage itself. Sector 5 crosses an estuarine portion of this major strategic travel route. Here, the narrowest part of the North Island is formed by the southern arc of the low-lying annular crater surrounding the Ōtāhuhu eruptive centre. Erosion both to the east, to the Tāmaki, and to the west, to the Manukau, further narrowed this land, and the weathered tuff, which can form a fine clay, may have further aided the portaging of waka. Traditions recorded by Kelly, for example, suggest that this route was in common usage by the time of the arrival of the Tainui waka.

5.1.3 Vegetation

Vegetation can affect archaeological assessment by reducing or enhancing archaeological visibility, and some types of vegetation can also provide indications of former settlement. Karaka trees and Hawthorne on Mutukāroa-Hamlins Hill fall into this latter category, but the history of that scheduled historic heritage place is already well understood and these CHI records were not considered further in this assessment.

In Sector 1, vegetation was not a significant factor for the assessment, due to the highly modified terrain.

Trees on Captain Springs Road coinciding with the former shoreline are not present in the 1940 photographs. The area to the east of the new part of the Waikaraka Cemetery, part of the original cemetery reserve, was mostly in grass at the time of the assessment. There was no sign in this area of any former use as a colonial-era burial area, in contrast to the more northern parts of the old cemetery, which were densely packed with formal grave structures.

Field inspection of vegetation on the lava flow extending southwards into the Manukau, to the west of the Southdown line, found low shrubby vegetation and grass cover, with vegetation thinner and some soil exposure on informal foot tracks leading off the formal pedestrian/cycle path. This permitted a limited surface inspection. Soils were charcoal stained but no shell was seen.

Although most of the Anns Creek area was not accessible for field inspection, vegetation, as seen on recent air photographs, did allow geo-registration of historic survey plans to be cross checked against definition in growth patterns of lava flows constituting former or current shorelines.

The remainder of the study area was mostly either paved or motorway berm. These latter areas had either been covered in granulated bark, or had been grassed, with small trees in some cases. Vegetation cover in combination with current uses, such as motorway, did not permit visual inspection of any exposed soil profiles.

5.1.4 Current Land Use

Current land use can be highly relevant to archaeological assessment. In urban environments, it can be very difficult to assess with any certainty the potential for archaeological remains to be affected by works. Where structures or roading/railways comprise current land use, these may prevent physical assessment of archaeological values in the existing environment, and make it difficult to predict the effects of the Project in any detail. The EWL Project area is located in a developed city/urban landscape which consists of a mixture of established motorway and roading routes, industrial use land, open green reserve areas, residential housing, streets and the coastal marine environment (mostly comprising artificial shorelines).

Sector 1 current land use (Figure 5-3) includes road and motorway, port facilities, town allotments with buildings, a railway line, and one historic structure (the rail overbridge to the north of the Old Māngere Bridge). The latter may incorporate older pre-1900 archaeological remains of the earlier rail overbridge

bridge established in the 1870s. Current land use in Sector 1 at the time of the assessment did not provide opportunities for any substantive in-ground archaeological testing within the study area.

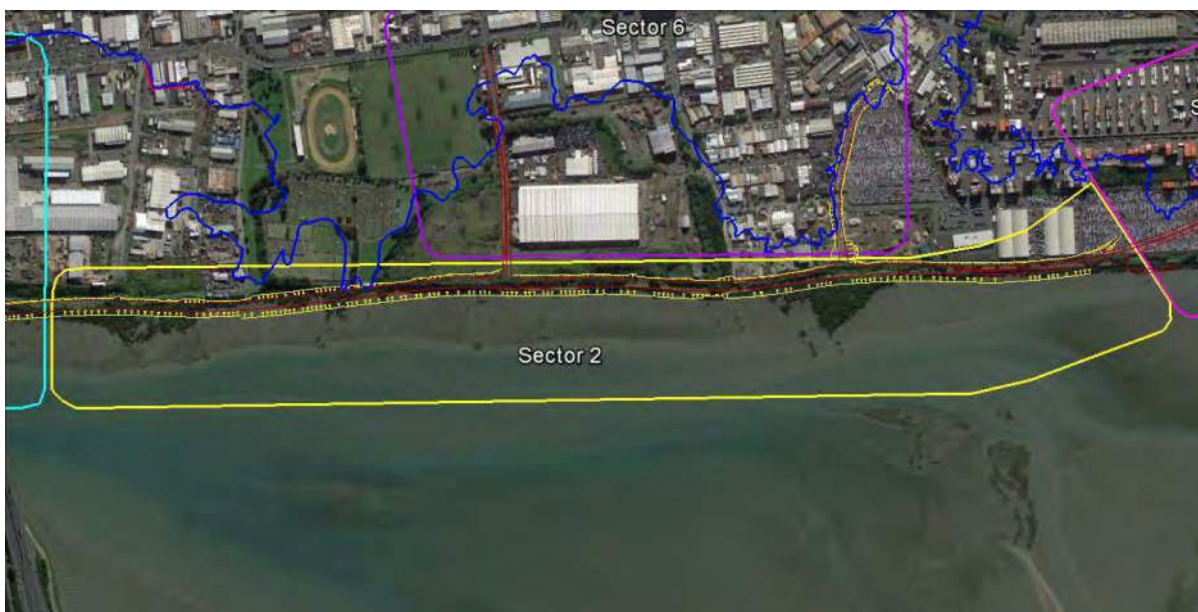
Sector 2 comprises almost exclusively harbour areas, but includes some reclaimed land (Figure 5-4).

Sector 3 proposed works are principally raised structure for the main arterial road, with an embanked feeder road. Sector 3 current land use (Figure 5-5) includes reclaimed land, harbour and foreshore areas, but no areas that were formerly 19th century land are to be affected by the current proposed Sector 3 works, with the possible exception of areas destined for structural foundations for the elevated structure. These latter areas are discussed in more detail in the effects section of this report.

Figure 5-3: Sector 1 current land use



Figure 5-4: Sector 2 current land use



Current land use in Sector 3 also includes the area where Great South Road crosses Anns Creek. Current land use in this area is mostly paved above landfill. This area was formerly a basalt quarry and also the location of the first “Ann’s Bridge”, built by the Fencibles who arrived on the “Ann”. Current land use precluded any detailed assessment looking for the old bridge abutment.

Sector 4 land use within the study area (Figure 5-6) was mostly paved roadway. An area of grassed road berm along the southern edge of Mutukāroa-Hamlins Hill, within the footprint of proposed works, was, at the time of writing, a smooth battered slope of grass, part of a large-scale cut-and-fill commercial development area. The road verge was grassed, with evidence of services present. The land to the south of Sylvia Park Road falls away to former rail yards to the north of the railway line. Works in this area would comprise added fill on the approaches to the Mt Wellington Highway, to provide a new intersection approach ramp.

Sector 5 study area (Figure 5-7) includes motorway shoulders/berms, intersection upgrade areas at Panama Road. and Princes Street, and reclamation areas where SH1 crosses the Ōtāhuhu Creek. These land uses precluded any systematic physical assessment of archaeological values or effects. Consideration was given to seeking an arrangement with the Auckland Motorway Alliance to carry out spade or probe prospection but this was deemed impractical, given the scale of the motorway system and the expectation based on preliminary assessment that archaeological remains are likely to be very restricted in geographic scale and thus difficult to locate without significant scale of subsurface prospection.

Consideration was also given to archaeological prospecting using non-invasive geophysical prospection techniques (both ground penetrating radar and fluxgate gradiometer) but it was thought that results would be very difficult to interpret and that the techniques were not warranted in this geological context.

Sector 6 current land use at the time of assessment, for areas affected by the Project, comprised road corridor and landfill, for the Captain Springs Road component, and predominantly landfill and paved reclamation for the proposed new access road at the eastern end of Sector 2.

Figure 5-5: Sector 3 current land use



Figure 5-6: Sector 4 current land use



Figure 5-7: Sector 5 current land use

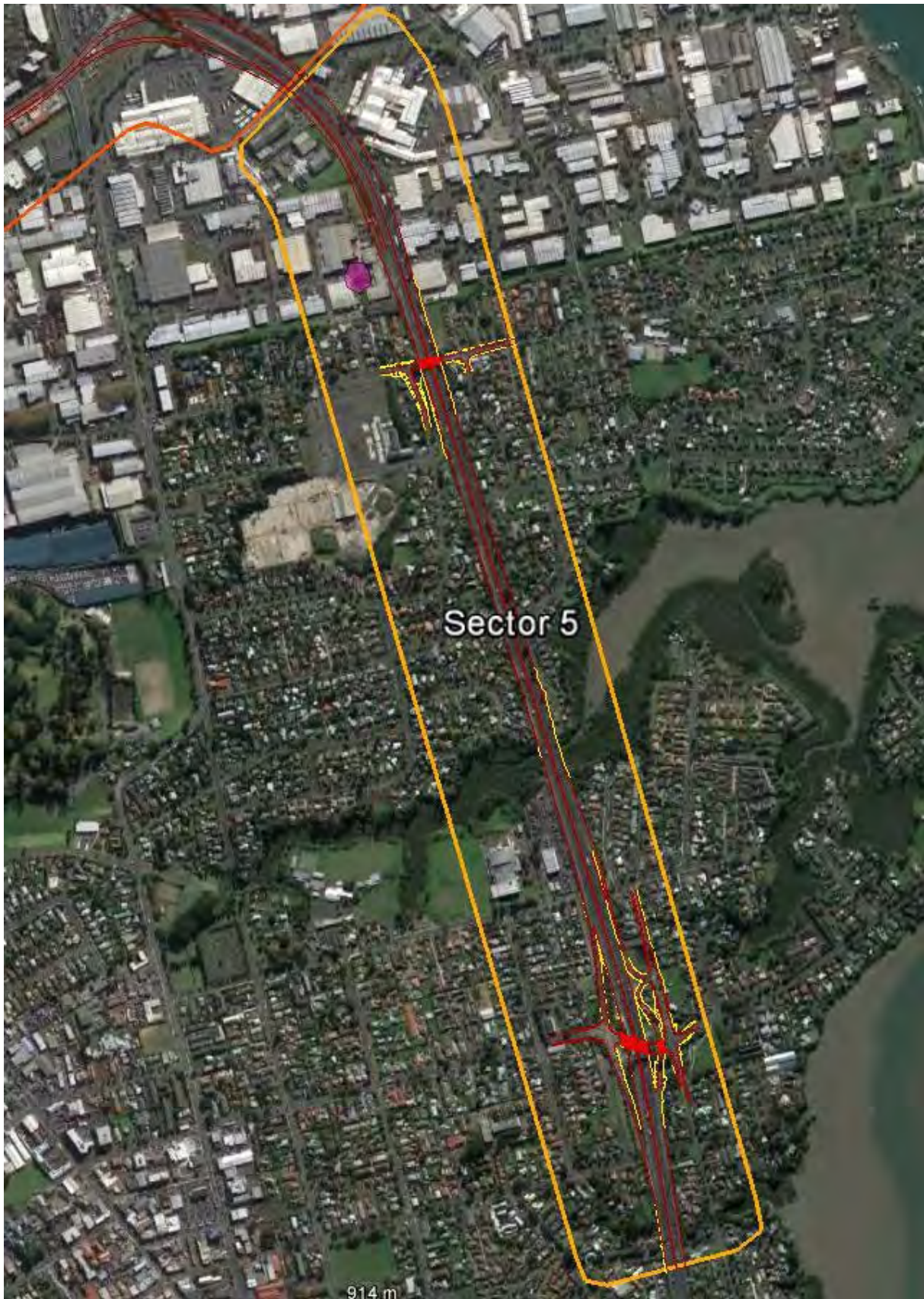


Figure 5-8: Sector 6 current land use



5.2 Historic land use

Analysis of historic land use provides information on the history of archaeological formation processes, and is highly relevant to assessing potential for archaeological material to be affected by the Project. It includes analysis of primary archaeological formation history, such as formation processes in the 19th century and earlier, as well as analysis of the modifying effects of subsequent land uses, which, in the case of the Project, have dramatically affected the archaeological landscape, and in many areas have reduced risk of archaeological effects.

Historically, parts of the Project area comprised lands used and occupied by Māori, with Pākeha arrivals in the 19th century bringing a further overlay of new types of settlement and archaeological formation processes, including substantial 19th century and modern modification of previous archaeological landscapes in Sector 1, and substantial modern modification in Sectors 3-6.

The 20th century saw widespread and rapid development of industry and suburban settlement, with increasingly drastic landscape modification after WWII and into recent decades. The aim of this analysis is to understand the sequence of archaeological formation processes for the Project study area, to identify areas without archaeological potential or with low risk of encountering archaeological material, and also to identify areas where there is greater risk of material remaining. This is especially important for this Project, because of the difficulty of physically assessing archaeological values across much of the study area.

The following historical background is a summary of the wider area surrounding the Project, focusing on key historical events of archaeological relevance.

5.2.1 Māori use of the land before 1820

5.2.1.1 Māori accounts of historic land use

No attempt is made here to synthesise the rich and detailed record of Māori oral traditions and whakapapa concerning the area, or the various perspectives of the Tangata Whenua representative organisations involved. Cultural Values/Māori Values reports (CVAs/MVAs) should be referred to for such information.

This is at the express request of Tangata Whenua involved in the project. The material, mostly from Pākeha accounts, which follows is not intended to supplant Māori accounts. It has been pointed out to the author that inexperienced synthesis of information based on traditions and whakapapa can be damaging to Māori interests, therefore such material is omitted.

Dr Malcolm Paterson reviewed Māori heritage for Onehunga (Sector 1 of the Project) for the HNZPT City@Risk Onehunga heritage study (NZHPT, 2012). He noted the importance of considering Māori settlement and use of Onehunga in the context of the broader network of Māori settlement of the region. In reference to numerous NZAA records of shell midden in the Onehunga area, he noted the importance of Manukau kai moana in sustaining generations of Tangata Whenua. Reviews of previous interpretations of the name “Onehunga” suggest several possible meanings:

- “Friable earth”;
- “Place of burials”; and
- “Landing or disembarking beach”.

5.2.1.2 Māori land use as evidenced by the 1940 air photograph series

The Project falls within a widely acknowledged archaeological landscape which testifies to a long period of human settlement (Baker, 1987; Campbell, 2013; Lennard, 1986; NZHPT, 2012; Opus & Felgate, 2015; Sullivan, 1986; Auckland Council’s Heritage Unit, 2013). Archaeological records listed in the NZAA Database (ArchSite) reflect reported archaeological values in this landscape in part, but review of more detailed archaeological reports, with reference also to the 1940 air photograph series, is necessary, in order to understand the former extent and nature of Māori settlement and use, and the potential for unrecorded material to be affected by works.

The 1940 air photograph series, accessed via the Auckland Council online GIS viewer, provides additional insight into ancient Māori Settlement in Sectors 3-5 (Figure 5-9 provides an overview, but the detail can only be seen by referring to the information in the Auckland Council online GIS). Sector 1 had been quite modified from its ancient landscape by 1940. Sector 3 includes the Southdown early 20th century industrial complex, which does not, however, obscure any large area of existing landforms etc. at that time. Reference to the 1940 photographs in more detail does not show any obvious signs of Māori settlement in the area of proposed works in Sector 3. Sectors 4 and 5 had been modified by swamp drainage and agriculture by 1940, but landforms and traces of former Māori settlement were still plentiful in Sectors 4 and 5 1940, and are informative. The data from these is discussed more fully in sections reviewing previous archaeological work. The yellow lines in Figure 5-9 indicate areas where conspicuous archaeological evidence relating to the Te Apunga o Tainui area is identifiable with reference to the 1940 air photograph coverage in Auckland Council’s online GIS viewer.

Figure 5-9: 1940 aerial photography sourced from the Auckland Council GIS Viewer



5.2.2 1810-1841

In 1820 the Hauraki area was visited by Admiralty vessels in search of Kauri spars for naval use as topmasts for sailing warships (Elder, 1932; McNab, 1914; Rutherford, 1940). The Church Mission Society (CMS) missionaries led by Reverend Samuel Marsden (1765-1838) visited the area at that time to inspect mission establishments, review trade opportunities for the CMS, and scout for new locations suitable for additional mission establishments. The Reverend Samuel Marsden was interested to confirm the presence of the Manukau Harbour and is said to have visited Onehunga (Mogford J., 1977, p. 12).

The accounts by the missionaries and Major Richard Cruise (military commander of the colonial ship “Coromandel”), of the Whāngai Mākau /Otāhuhu Creek area, describe a major complex of villages of the Tāmaki River catchment at that time. Additional descriptions by Marsden and his companion, the Reverend Butler, describe extensive settlements and gardens, the largest and richest they had seen in New Zealand. These descriptions are relevant to Sector 5 of the Project.

The decades from 1815-1835 saw a series of Māori tribal battles often referred to as the Musket Wars, in which the Northland Ngāpuhi, better armed with muskets campaigned against other groups, initially with devastating results, until muskets became more widely available. In 1821, significant conflict between the northern tribes and Tāmaki residents took place at Mokoia Pā, after which survivors sought refuge in the Waikato for a time.

From 1824 there is some evidence to suggest people began to return in a cautious manner and reoccupied the area (Smith, 1910).

In the period 1827-1837 there was significant trade along the west coast of the North Island, shipping Māori produce to Port Jackson (Sydney).

Two mission stations were established by James Hamlin at Manukau, in 1836 with headquarters at Awhitu, and James Fairburn’s mission was established at Maraetai at a similar time. Fairburn claimed to have purchased most of the land to the east of the Tāmaki, from Maraetai to the Manukau. Sector 5 extends into what was formerly Fairburn’s grant, but land use by the Maraetai mission was not intensive, consisting mainly of pastoral farming on burnt-over fern lands.

5.2.3 1842 - 1850s

During the 1830s period, and through to the late 1840s, the Ōtāhuhu portage remained an important route for Māori trade, initially with the Bay of Islands whaling port, and later with Auckland. Felton Mathew was appointed Surveyor General to lay out the new town of Auckland and visited the area in 1840 to evaluate sites for the new capital. Felton Mathew described pigs being moved via the portage and awaiting embarkation to the Bay on the upper reaches of the Tāmaki, in the Project Sector 5 general area. He also described the area as thickly covered in brush, fern and scrub (Rutherford, 1940, p. 139).

A detail of his survey of the region in the early 1840s is shown in Figure 5-10. This records the presence of the Māori settlement at Onehunga, and “Fairburn’s”, the latter sketched as a group of buildings, well to the south of the Project area.

Figure 5-10: Detail from an 1842 print of the early 1840s survey by Felton Mathew (Sir George Grey Special Collections, Auckland Libraries, NZ Map 6601)

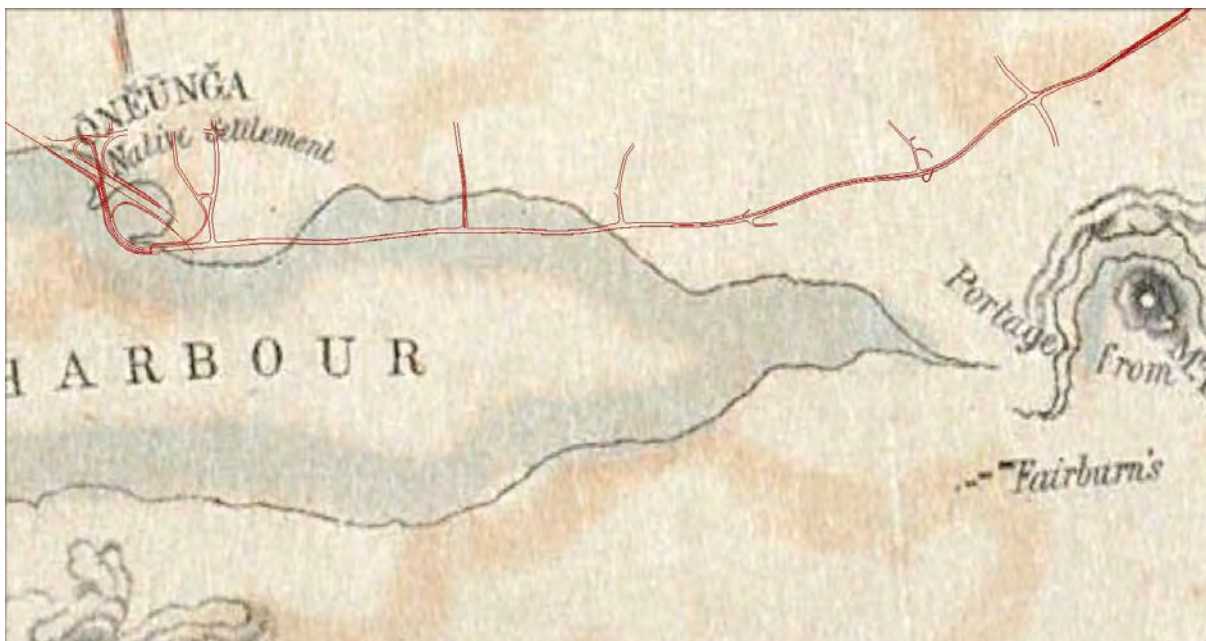


Figure 5-11: Detail from SO 672, possibly surveyed 1840s by John (Logan) Campbell



In 1838 another CMS missionary, James Hamlin, brought the land adjoining Fairburn’s grant (Claim 904, OLC 62 and Figure 5-11). Historic Survey Plan SO 672 (Figure 5-11) was surveyed by John Campbell, so was probably an early 1840s survey plan, or a plan prepared for land commission hearings some years later. The road layout shown may well postdate the original survey, and may be the road layout of the Fencibles years. It shows a “Church Lot” bordering the south side of Portage Road, and what is either a cart track or a foot track linking the portage with the Tāmaki in the vicinity of Mokoia headland Pā, from where deeper-draft trading vessels such as cutters maintained water trade with Auckland. The track skirts the hill at Tip Top corner (Sector 5). Roads shown on the plan probably postdate 1849, because the street Anne’s Bridge is thought to have been built as a road link from Ōtāhuhu north about then.

This information is relevant to works in the vicinity of the former “Ann’s Bridge” at the intersection of Great South Road and Sylvia Park Road, where remains of the bridge, especially the northern abutment, may be encountered during works. It is also relevant to works at Tip Top Corner, which may expose remains of the old track. These would be of archaeological interest, and would be subject to the archaeological provisions of the HNZPTA, and to historic heritage management objectives and policies of the PAUP for non-scheduled historic heritage if archaeological remains are in fact discovered during works.

This plan also identifies the Mt Wellington Highway as an early road, but the nature of Project works where these intersect with the Mt Wellington Highway are unlikely to expose the early road formation if it still exists.

5.2.4 Historic accounts of Māori portages

The former portages, which connected the Waitematā and Manukau Harbours, are historically important in the region. The Ōtāhuhu portage is identified in the PAUP as a place of significance to Mana Whenua.

The western estuarine approach to the Ōtāhuhu portage is located in the proposed EWL route link in sector 5.

Sullivan refers briefly to another portage along Anns Creek, which is mentioned in CHI record 361 (Sullivan, 1986, p. 11). There is no supporting citation given and this seems like a somewhat arduous route compared with the Ōtāhuhu portage. Furey cites Bob Brown as identifying this in 1954 as a 2km long portage between Anns Creek and the Tāmaki River (Furey, 1986, p. 3).

5.2.5 Onehunga in the early 1840s

Onehunga in the early 1840s was a busy Māori trading settlement supplying the Auckland market. John Logan Campbell, who dealt extensively with Apihai te Kawau in his land dealings, described the Māori settlement at Onehunga as: “the Ngatiwhatua’s *kumera* grounds and fishing station” (NZHPT, 2012).

Pōtatau te Wherowero also maintained a house at Onehunga, although resident at Māngere. Pākeha settlement at Onehunga in 1844 was said to have consisted of little more than a single raupo whare and a saw pit (NZHPT, 2012).

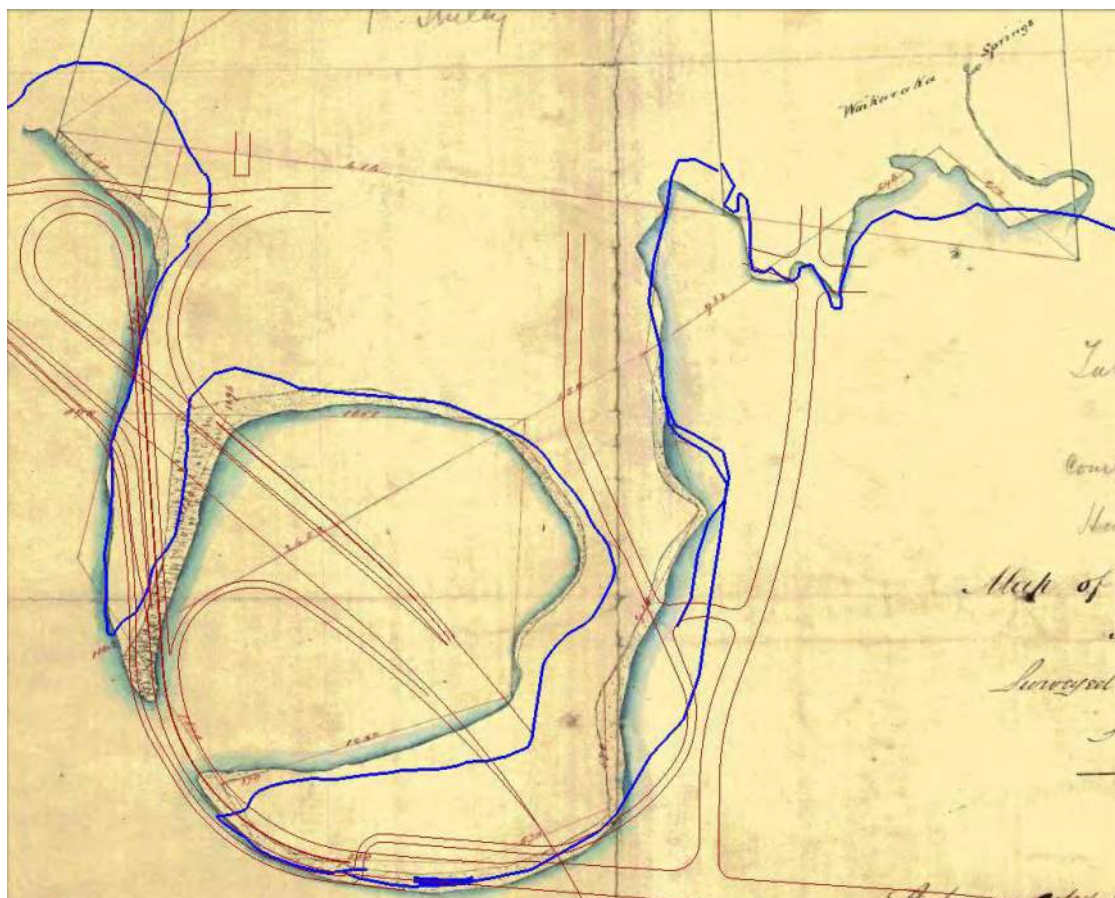
SO 680, Sheet 1 (Figure 5-12), appears to be a survey of “Penny-an Acre” waiver sales of 1844 (a stamp duty of one-penny per acre was payable to the Fitzroy government coffers). This early survey plan shows a spring at what later became “Captain Springs Road”. Fresh water sources at the coast attracted people to the area from the first settlement of New Zealand, and works in this area will need to have regard to archaeological potential here.

Various land purchases in the Onehunga hinterlands were made during Governor Fitzroy’s waiver of the Crown’s right to pre-emption of land purchase, during his brief administration. Samuel and Matilda Furley ran an early trading post at the foot of Princes Street (Sector 1, outside the Project footprint). OLC 339 (Figure 5-13) is a copy of a survey by O’Neill and Campbell, pertaining to old land claims heard after 1844. It is difficult to reconcile with other surveys of the coastline, and does not show any Māori settlement information. The coastline of the tuff ring, especially, is difficult to reconcile with coastlines professionally surveyed in detail in the 1870s, shown overlain in blue.

Figure 5-12: Detail from SO 680_1 showing a spring (part of the origin of the name of the road)



Figure 5-13: OLC 339 detail



In 1847 the settlement of Onehunga included a number of additional settler cottages, a more substantial residence belonging to George Ormsby, and an inn. None of were in are in areas affected by the Project works.

During the 1845-1846 Northern War in the Bay of Islands, Governor Grey established a scheme to protect the newly established capital of Auckland from perceived risk of Māori attacks on Auckland. This resulted in four garrisons of military pensioners being established between 1847 and 1848, at:

- Ōtāhuhu;
- Panmure;
- Onehunga; and
- Howick.

Of these, the former Onehunga and Ōtāhuhu Fencibles Pensioner Villages are of direct relevance to the Project, which passes through elements of these.

According to La Roche (La Roche, 2011) the settlement at Māngere was considered a Māori garrison, also for this purpose, commissioned by Governor Grey. The land acquired by the Crown as a result of hearing old land claims is thought to have formed the basis of the Onehunga Fencible town (NZHPT, 2012).

The earliest survey plan of the Onehunga Basin area, with pencil annotation of “1843”, similarly shows “one penny” grants alongside what appears to be the Fencibles town layout. It is likely to be an 1840s survey as it shows early street layout and the structure shown (the “New Leith Inn” was the earliest substantial building in Onehunga. A detail from this survey is shown in Figure 5-14 with coastlines and Project linework overlain. Works at the Gloucester Park Road/Neilson Street intersection are adjacent to an allotment annotated “*Temporary Royal Engineer Timber Yard*”, and works in the Galway Street area are on a small promontory which carries a road for the original town layout. A “*Fine Spring River*” is also shown.

In the early days of settlement, Onehunga's beach port was a busy trading, refitting and provisioning place (Auckland Council's Heritage Unit, 2013, p. 41).

Figure 5-14: Detail from SO 680 Sheet 3, an 1840s survey of the Onehunga Pensioner village



Figure 5-15: Detail from SO 683 of 1956-1878 shown to illustrate the later town plan, which preserves 1848 layout in places



The military town allotments comprised three settlements, the first of which formerly extended into the Project area. The first Fencibles settlement was founded in Onehunga in 1847, extending into Sector 1 of the Project, with subsequent settlements “top settlement” located to the north of Sector 1, away from the beach, and “back settlement” in the Te Papapa area between Alfred Street and Mt Smart, these latter well away from proposed works.

Figure 5-15 (an 1856 survey plan, by Fencibles surveyor Sergeant William Blackburn, with later amendments dated 1878) shows areas of town layout consistent with military grid layout of the period.

The settlement had a military parade ground, still present on the 1878 plan. This area is now occupied by a Lawn Bowls Club and various residential and commercial premises, directly to the north of Te Hōpua, within the Sector 1 study area, and will not be affected by works.

A Māori hostelry was formerly situated at the higher ground at the southern end of the Onehunga Beach. There is a block of very small lots to the east of this, possibly Māori allotments. None of these will be affected by works.

Minor works are planned at the southern end of Gloucester Park Road, with more substantial works at the western end of Neilson Street and the southern part of Onehunga Mall, extending onto the former tuff ring. Works at the intersection of Galway Street and Neilson Street are also planned. All of these have potential to encounter remains of either Fencibles works, or Fencibles settlement (on former town allotments) or even surviving traces of former Māori settlement.

Modifications to the former tuff ring will be more major in the southern part, with potential to encounter Māori settlement evidence, Fencibles-era evidence and more recent archaeological traces of Colonial-era settlement and infrastructure.

The military pensioners were employed on road and boundary wall construction duties. Quarrying of loose stone in the landscape would have commenced in the late 1840s, and may well have affected or removed traces of previous Māori use of stone for agricultural mounds, burial mounds, land boundary walls etc. They created structures in the landscape that may have formed unrecorded archaeological sites.

Figure 5-16: Proposed works at Captain Springs Road and Nielson Street intersection in relation to detail from SO 683



A former landing reserve is shown on what is now Captain Springs Road on SO 683. This area would have been the focus of some level of activity by the Fencibles military pensioner settlers, and was also a refugee area in the 1860s.

Figure 5-17: Detail from SO 678, “Pensioner's Village of Ōtāhuhu”, circa 1849, in the Princes Street Intersection area



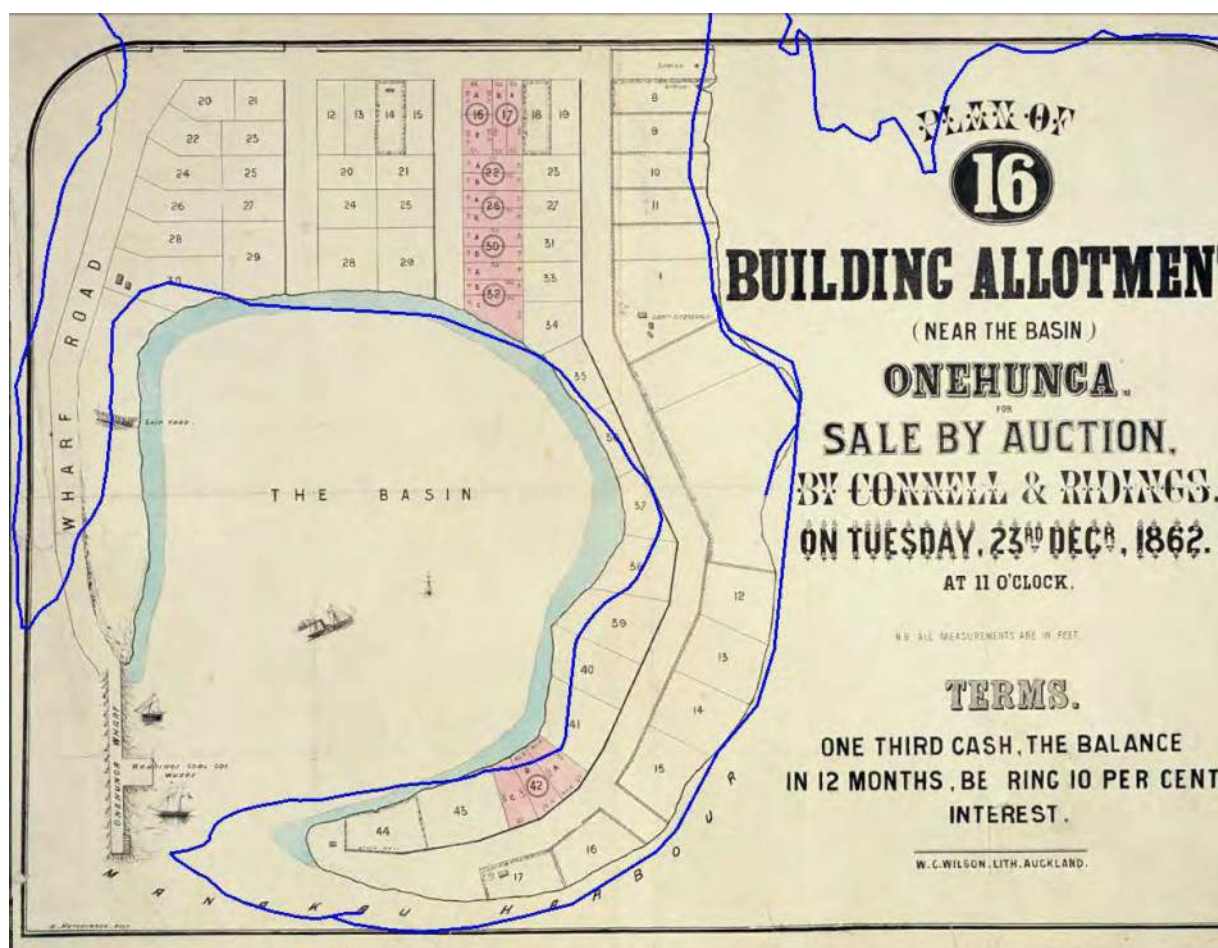
Such works include construction of Great South Road, and bridging of Anns Creek by Fencibles pensioner work groups who arrived on the “Ann”.

The men that came out in the “Ann” built many of the roads in the area. It was said to be a work group under a Sergeant McNulty who bridged the Creek to the north of Ōtāhuhu (Sector 3), and named it “Anne’s Bridge” (Ōtāhuhu Advocate, 5/2/1927, p. 4). There is reference in some accounts of this to this group residing at the town of Ōtāhuhu, and SO 678 (Figure 5-17) shows the layout of the “Pensioner’s Village of Ōtāhuhu”, with a town layout that forms the basis of the current Ōtāhuhu East. Sector 5 southern end terminates in what were formerly the 5-acre farm allotments of this Fencibles town layout. The surveyor’s signature and date in pencil are indistinct, but the year pencilled in may be “49” which would be consistent with other activity at that time. It is possible that remains of some road beds etc. dating from this early period of construction will be found during works. Pensioners generally lived in the town allotments and commuted to their farm allotments.

Commander Drury’s 1853 chart of the area provides some information for Sector 4 in that period, but the scale of the chart makes the information of limited utility; the extent of swamps shown, for example, can’t be reconciled with other more detailed information.

The Admiralty may have established a wharf off the south side of Te Hōpua as early as the mid-1850s (Auckland Council’s Heritage Unit, 2013). When the owners of the Waihoihoi Coal Company first took the lease on the Drury coalfields in May 1859, the company built its own private wharf at Te Hōpua 1 (Figure 5-18). An 1870s photograph (Sir George Grey Special Collections, Auckland Libraries, 7-A3423) shows a stone abutment road leading to a timber wharf extending southwards from the western arm of the Te Hōpua tuff ring, and it seems likely that the masonry structure still present to the west of Onehunga Harbour Road is related to this structure, with later alterations. The Onehunga Heritage Study concluded that this structure is the remains of the 1858 wharf (Auckland Council’s Heritage Unit, 2013, p. 45).

Figure 5-18: Detail from an 1862 sales brochure, geo-registered to cadastral information, with surveyed 1878 shorelines overlain in blue, showing the 1850s wharf (Sir George Grey Special Collections, Auckland Libraries, NZ Map 4496-33)



1 Daily Southern Cross, 3 May 1859: 3.

5.2.6 1860-1870

The 1860s brought significant changes to Onehunga, which became a military/industrial port for troops and equipment arriving from Britain, and also brought relevant changes to the southern part of Te Apunga o Tainui (Sector 5), which became the Ōtāhuhu military camp, a staging post for southern extension of Great South Road towards the Waikato.

The lands to the south of the Te Apunga o Tainui volcanic cone settlement complex were used as the site of one of largest military encampments associated with the Land Wars of the 1860s. By May 1861 2,000 soldiers were camped at Ōtāhuhu (see for example The Aucklander, 16/5/1861, p. 3, col. 2), with Auckland commentators at the time confident that the government was planning to invade the Waikato. Sector 5 of the Project crosses the land formerly known as “Camp Farm” (Campbell, 2013)(Figure 5-19).

The area is now mostly housing and SH1. Work to add lanes along the motorway berms may encounter material from this encampment. Tent lines crossing what is now the route of SH1 are visible in Figure 5-20.

Campbell and Ross-Sheppard cite several local histories with regard to buildings at the camp. These included tents, hutments sleeping 24 (dirt floored), a large mess tent and a hospital.

Figure 5-19: Extents of "Camp Farm" (after CFG Heritage 2012)



Figure 5-20: Tent lines on the flat stretching towards or across Sector 5 (PA1-q-250-28. Alexander Turnbull Library, Wellington, New Zealand)



Circa July 1863 the Onehunga and Auckland Naval Volunteers, a settler militia, combed the inlets of the Manukau, taking Māori canoes back to Onehunga. The canoe in the Auckland War Memorial Museum is the only survivor. Dr Paterson has suggested remains of the canoes destroyed might be present, and this is possible in areas such as Te Hōpua, relatively sheltered in places from strong south-westerly winds (Sector 1), however works within Te Hōpua are mostly embanked, with only an area near the Gloucester Park Road on-ramp cutting down into the crater rim. There does not seem to be much possibility of such works encountering canoe remains.

In the same month, the Governor ordered the arrest of Ihaka Takanini (who had been a party to the sale of the Papakura block to the Crown in 1842) together with his party, who were residing at Kirikiri. Campbell and Ross-Sheppard cite a number of authoritative sources in support of the information that the prisoners were transported to the Ōtāhuhu Camp via Drury and the Ōtāhuhu Stockade. Campbell and Ross-Sheppard state that, during the period of imprisonment, prior to 5 November 1863, Ihaka's father, Pepene, and two of his children, died.

Campbell and Ross-Sheppard note that the prisoners were held in a hut at the Ōtāhuhu camp, and conclude that:

“As to the location of the burials of those who died while imprisoned within the camp, no certain location has been found. One potential place could be within the Anglican Holy Trinity Memorial Park Cemetery located on Church Street immediately south of the camp. This cemetery was in operation during the Land Wars and has graves from that time period...”

In Onehunga through this period, the population nearly doubled. In addition to the influx of refugee homesteaders, Onehunga was a major west-coast port of arrival for British Imperial troop ships and supply ships.

In 1863, refugees evacuated from southern districts of Auckland and from the Waikato were housed in the Onehunga “Māori Market House” (possibly located in Sector 1 in the area shown in the 1878 map as “Native Hostelry”) (NZHPT, 2012) and other dilapidated buildings in Onehunga (Jones notes there is evidence that the hostelry was established prior to 1854). Jones notes references to tent camps of refugees and soldiers, such as in the Captain Springs Reserve (Sector 6). Archaeological potential in the vicinity of Captain Springs Road has already been noted, and it is added here that 1860s refugee camp remains might be encountered during works.

The Clyde Iron Works and Foundry was established in 1863 (NZHPT, 2012, p. 16). The military were shipping in kit sets of components for iron steam vessels disassembled, such as the “Pioneer” river

steamer, prominent in the Rangiri battle, and technological businesses such as these must have thrived on assembly work and engineering during the campaigns. Early wharves were rudimentary, with the improved wharf constructed with a stone abutment in the 1850s, and redevelopment of these structures occurred in 1865 to the south of Te Hōpua. Such installations and businesses were located to the south of the crater rim in Onehunga, where works proposed at the time of this assessment include a deep cut-and-cover operation. This aspect of Onehunga's history is therefore of archaeological importance for assessment of effects.

5.2.7 1870-1900

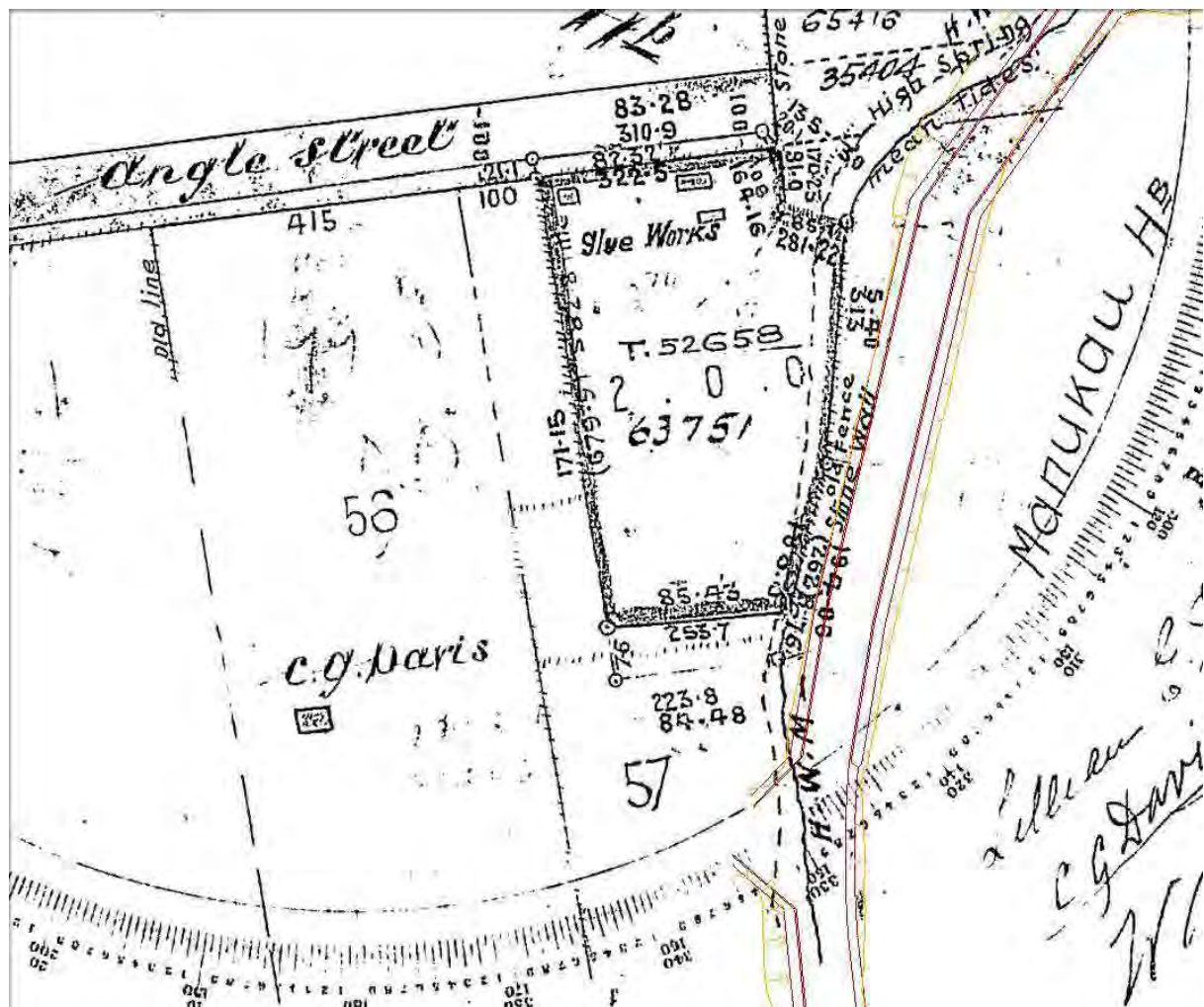
After the 1860s Onehunga became prominent in the kauri lumber industry. Kauri and kahikatea were brought down the Manukau Harbour to local sawmills situated along the Onehunga foreshore. The first direct railway connection between Auckland and Onehunga was established in 1873, including a substantial masonry embankment reclaiming the south-eastern coast of the tuff ring. Remains of this, in Sector 1, will also be affected by works to the south of the crater rim.

Such remains may include traces of the road overbridge which crossed the early railway line to the first bridge over the Manukau Harbour, from Onehunga to Māngere, constructed in 1875. Remains of the second Māngere Bridge rail overbridge are still present. These are covered by the built heritage assessment.

Due to recession, Onehunga did not develop much in the 1880s. A lot of economic activity such as heavy engineering shifted to the Thames Goldfields.

NZ entered a long economic boom in the 1890s, but kauri milling had to some extent relocated closer to the source of the timber, and was no longer a prominent export product from the port itself, much of it being shipped direct from the tramway terminus at Whatipu.

Figure 5-21: The glue works on the waterfront, Angle Street, 1899 survey plan DP 2249.



5.2.8 Late 19th Century and 20th Century

In the 19th century animal product processing operations such as tanning was a feature of the Onehunga economy, but in the 20th century, meat processing for frozen exports became a much larger part of NZ's economy. Anns Creek became surrounded by this activity, and associated operations prospered at Te Papapa. In addition to frozen meat for export there was production of leather, glue (see Figure 5-21), soap and fertiliser. Figure 5-21 illustrates that proposed works to the north of Miami Parade would not impact on an archaeological remains of the Angle Street Glue Works.

In the early 1900s, cheap flat land and easy access to ports, roads and railways made this an ideal area for heavy industry. Southdown freezing works, opened in 1905, were followed by Westfield and Hellaby's works, new railway workshops at Ōtāhuhu, and rubber, chemical and fertiliser companies ².

Although these comprised in some cases large building complexes, overlay of proposed works on the 1940 air photograph shows that there is unlikely to be any effect on any in-ground remains of such structures (Figure 5-22).

² Te Ara Encyclopaedia of NZ Auckland Places Page 14: Industrialisation.

A tram service ran to the Onehunga Wharf by 1903 (NZHPT, 2012). In-ground remains of the track bed for this may be found and affected during works in Sector 1.

Figure 5-22: Southdown and Westfield freezing works in 1940 in relation to proposed works, and the Saint Anne’s bridge



The 1920s and 1930s saw the draining and reclamation of wetlands in the area including Beresford Park, Street George’s Estate and Te Papapa. Construction of a concrete road between Auckland to the Onehunga Wharf commenced in 1922 (Auckland Council’s Heritage Unit, 2013, p. 47). Remains of this may be affected by the Project, in the area of the Port and southern part of the tuff ring.

The 1940s saw Waikaraka being used as a camp by the Army in the area north and west of the proposed Project route in Sectors 2 and 6. Typically the surroundings of such places acquired a lot of lost coins and Coca-Cola bottles; such items may be encountered during works on Captain Springs Road.

There was a boom in residential housing development post-WWII that meant surviving traces of NZ’s Māori past have become increasingly rare. This is relevant for assessment of values of any material that may be encountered during works. Most of this material was destroyed without recording or investigation. Scoria is an ideal material for laying concrete on, and with the rash of housing, the volcanic cones, the most prominent archaeological features in Auckland’s landscape, were increasingly quarried away.

Along with industrial development and housing development came infrastructure. There was substantial further development of the rail system to service industrial operations in the early 20th century, and development of the SH1 southern motorway in the 1950s.

By 1959 the southern motorway had been constructed, amid a landscape drastically changed from that of 1940 (Figure 5-23). Camp Farm had been developed for housing, along with other large blocks of land, with more land under development at that time. The terraced volcanic cone component of the Te Apunga o Tainui complex was by this time largely destroyed as an archaeological site. The southern motorway had been cut and filled through this landscape to a greater degree than the modifications which had occurred for housing.

Figure 5-23: Residential and motorway development, and quarrying, in Sector 5 by 1959



The lands adjacent to SH1, although developed for housing, were visibly subject to a much lesser degree of modification than the motorway itself. This means that land to be affected by installation of retaining walls etc. for Sector 5 widening and addition of extra lanes may be relatively unmodified in places, although these are expected to be very limited in extent. Some specific areas would thus warrant careful monitoring for archaeological remains.

More recently there have been drastic alterations to some of the land which had remained relatively unmodified in the 1950s. Adjacent areas of motorway berm may retain archaeological values, through having been subject to lesser degrees of modification than lands outside the road reserve. An example is the development in the 1980s of land to the north of the Te Apunga o Tainui complex, at Westfield.

5.2.9 Other Miscellaneous Historic Survey Plans

Map SO 1769, dated October 1878 shows a proposed plan for a road across the mouth of the water access into the basin.

Roll 71 (dated 1911) shows land taken for a new wharf.

DP 9034 (dated 1912) shows various buildings on the southern part of the tuff ring.

SO 17224 shows shorelines in Waikaraka Bay, of an area proposed for reclamation in the early 1910s. A tannery is shown on the former Spring Street, which is now under reclamation and to the north-east of Sector 1. This would have utilised water from the Waikaraka Springs shown on OLC 339.

5.3 Recorded historic heritage and archaeological places

5.3.1 HNZPT List

A wāhi tapu is Listed by HNZPT at R11/898. The “List” file for this at HNZPT was reviewed and includes court records of oral evidence, provided by kaumatua, that numerous Māori burials were affected by construction of the southern motorway portion of SH1. The locations of NZAA records such as R11/898 are provided in Section 0.

5.3.2 ARP:C Schedules

Cultural Heritage Schedules 1 and 2 were reviewed and found to contain no listings within the study area.

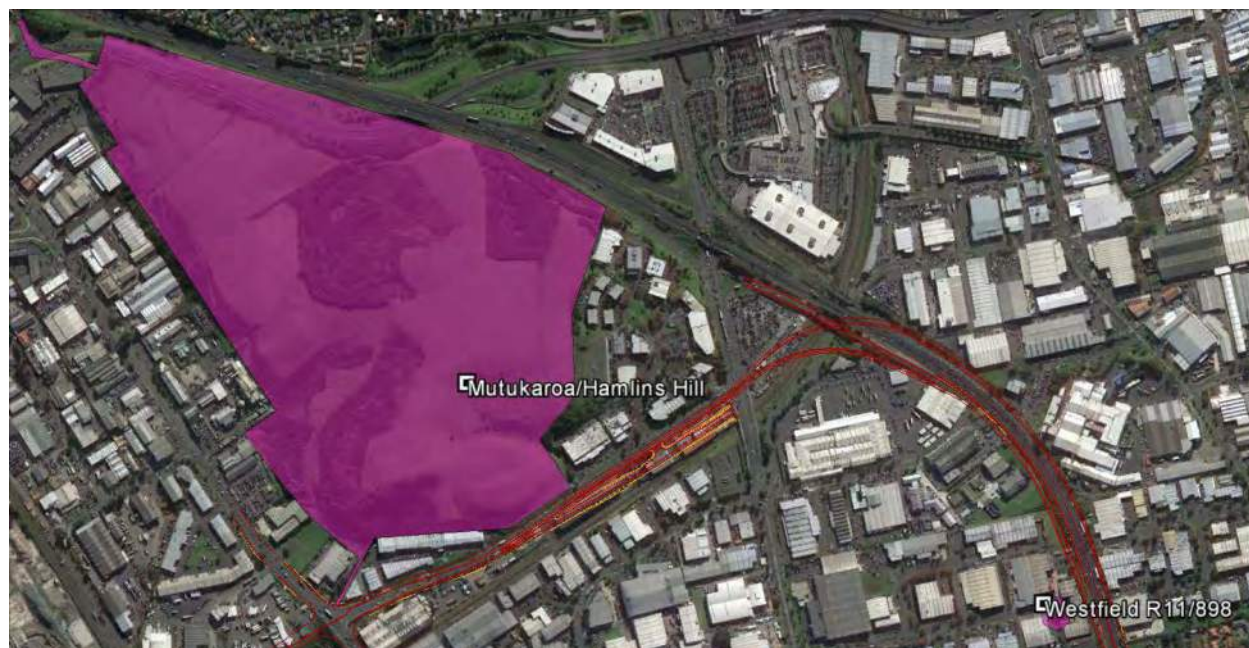
PAUP Schedules Table 5-1 lists scheduled Historic Heritage archaeological places within or in close proximity to the Project footprint of works as per Schedule 14.1 of the PAUP.

Table 5-1: PAUP, scheduled archaeological items

Sector of EWL Route	Schedule	Name	Address	Principal Criteria For Scheduling	Feature	Category/additional rules	Map Reference
4	Schedule 14.1 item 01572	Mutukāroa-Hamllins Hill R11_142 Pa site, terrace/s, pit/s and midden	Hamllins Hill - Southern Motorway, Sylvia Park, Great South Road, Mt Wellington	Historical, knowledge, aesthetic	Hill top Māori village and associated habitation sites	A, archaeological rules apply, Place of Significance to Mana Whenua	Refer Planning maps

The extent of the Mutukāroa-Hamllins Hill archaeological features is shown Figure 5-24. A small part of the Scheduled extents of the entrance to the access drive is within the Project footprint.

Figure 5-24: Extent of Mutukāroa-Hamllins Hill, and George Bourke Drive Wāhi Tapu (extents in the PAUP Mana Whenua overlay are the same)



5.3.3 PAUP Historic Heritage Overlays

Mutukāroa-Hamllins Hill is protected in the PAUP Historic heritage overlay. (extents in the PAUP Mana Whenua overlay are as shown in Figure 5-24).

5.3.3.1 Sites and places of significance to Mana Whenua

There are three Sites of Significance that, from the information provided in Appendix 4.1 of the PAUP (Table 5-2) are near to or within the Project. Extents of item 048 are defined in the PAUP overlay and do not fall within the Project works footprint. Extents of Item 055, the Ōtāhuhu Portage, are not defined in the PAUP overlay. The areas in which these are situated are considered from an archaeological point of view in this assessment and such matters are covered separately in Cultural Values Assessments for the Project. Item 063, a Wahi Tapu at George Bourke Drive, is near to the Project but does not fall within the Project footprint. Its location and extents are shown in Figure 5-24.

Table 5-2: PAUP sites of significance to Mana Whenua

Schedule ID	Name	Location	Description	Nominated by
048	Onehunga (especially the location of a 19th Century village at the foot of Princes Street);	Bottom of Princes Street	Waahi whakahirahira Historic Te Taou, Nga Oho, Te Uringutu (Ngati Whatua o Ōrākei) village site. Village was in extensive use by Ngati Whatua o Ōrākei and their allies in early Auckland. John Logan Campbell is recorded as visiting NWO chief, Te Kawau here to negotiate the purchase of land.	Ngati Whatua o Ōrākei
055	Te Tō Waka Ōtāhuhu portage Ōtāhuhu portage	Head of Tāmaki River at Ōtāhuhu, near Canal Reserve and Portage Road, Ōtāhuhu	Ōtāhuhu portage Waahi tapu, Wai tapu Head of Tamaki River at Ōtāhuhu. May be nationally Significant portage for waka including ancestral waka.	Ngati Whatua o Ōrākei
063	Urupā	16 George Bourke Drive. Mt Wellington	Urupā for the fallen from a battle.	Ngāti Paoa

Sites and places of value to Mana Whenua are listed in the Section 16.5, Part G of the Assessment of Effects on the Environment. These are not considered from a cultural point of view in this assessment, and the reader is referred to the Cultural Values assessments for the Project. The Archaeological records which form the basis for these aspects of the PAUP protection of Cultural values are considered separately to the cultural aspects.

5.3.4 CHI and NZAA Records

The NZAA database is a national inventory of archaeological site records managed and maintained by NZAA in the form of Archsite. The CHI is the Auckland Cultural heritage Inventory of historic heritage items managed and maintained by Council. These inventories were formerly regularly integrated under the former Auckland Regional Council, but integration of these data sets has lapsed more recently. Locational accuracy of indicative grid references is very variable, and it is important to drill down into the detail records in making archaeological assessments. Relevant index locations for Items in the CHI and NZAA indicative grid reference locations are shown in relation to the study area for Sector 1 in Figure 5-25. Additional details on former extents of some items are shown in Figure 5-26. Sector 6 information is shown in Figure 5-27. Detail for Sectors 3 and 4 is shown in Figure 5-28 and Figure 5-29. NZAA radiocarbon database grid references and laboratory numbers are also shown. Blue connecting lines indicate relationships between these data sets. Sector 5 information is shown in Figure 5-30. Summary information regarding these items is provided in Table 5-3.

Figure 5-25: Sector 1 NZAA and CHI index locations

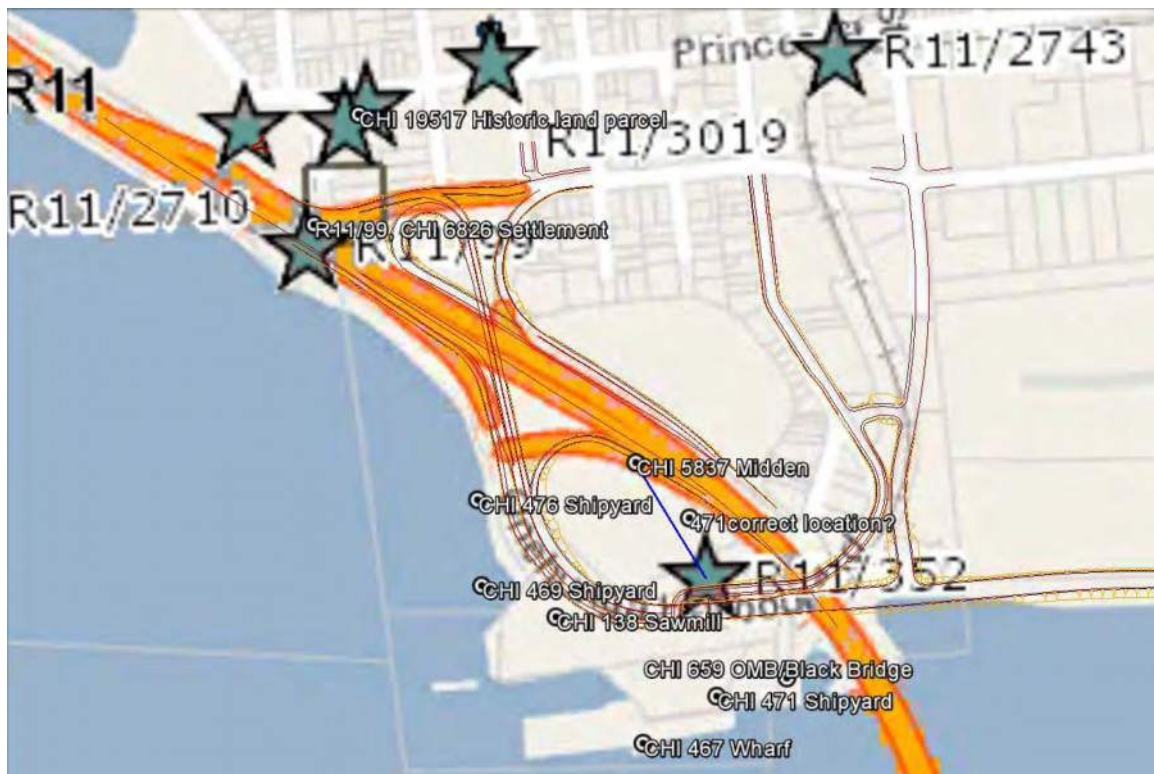


Figure 5-26: Sector 1 additional detail, former wharves, railway etc

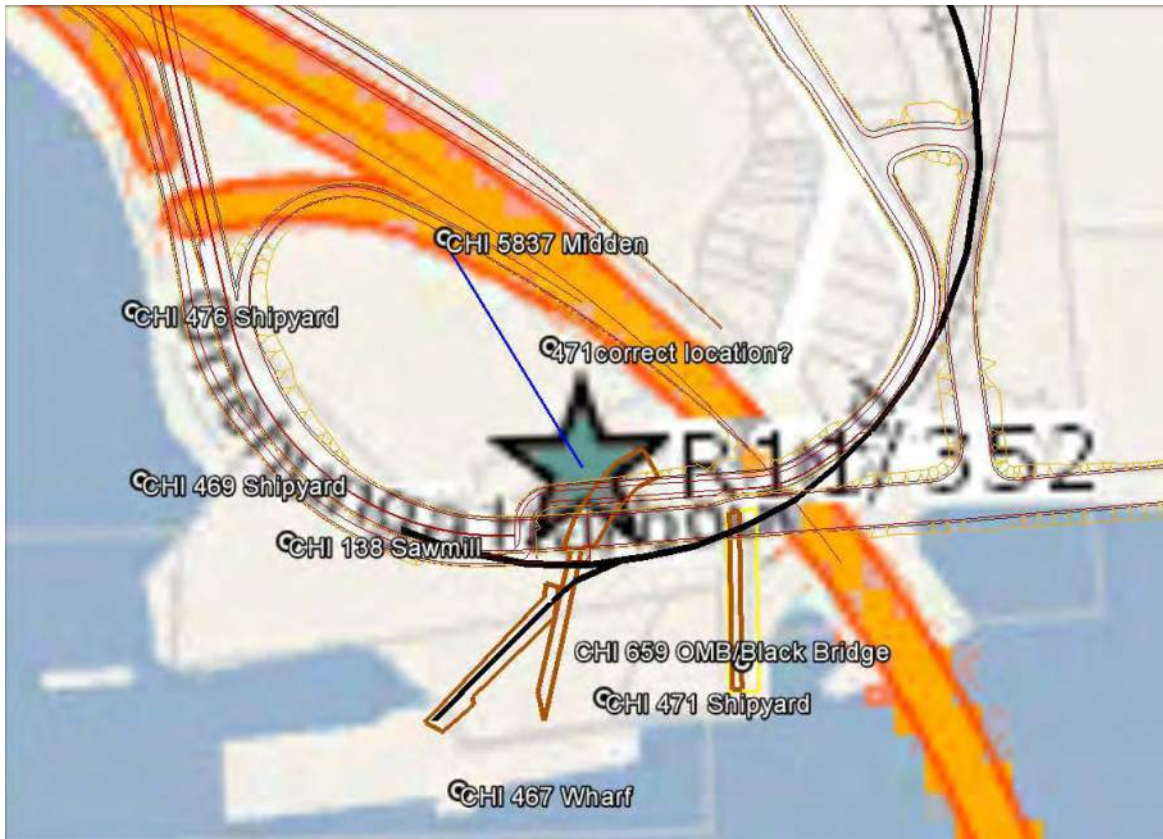


Figure 5-27: Sector 6 CHI grid reference overlain on NZAA browser data

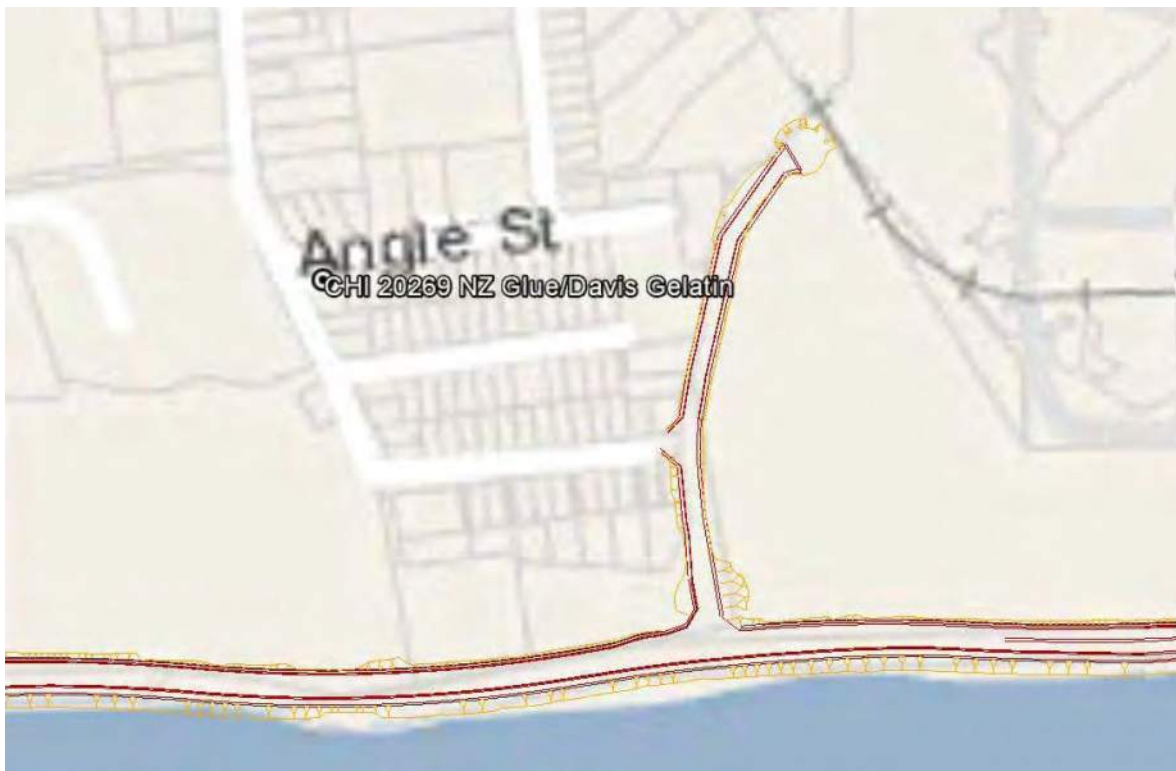


Figure 5-28: Sector 3 NZAA record locations, with CHI grid references R11/1695 extents

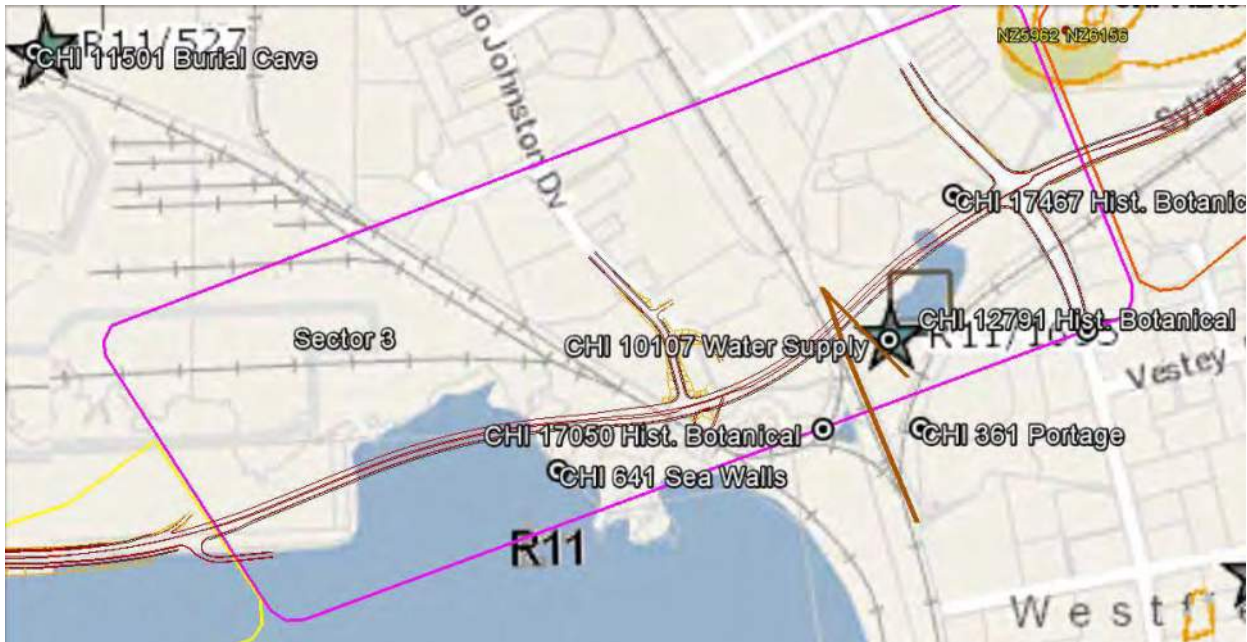
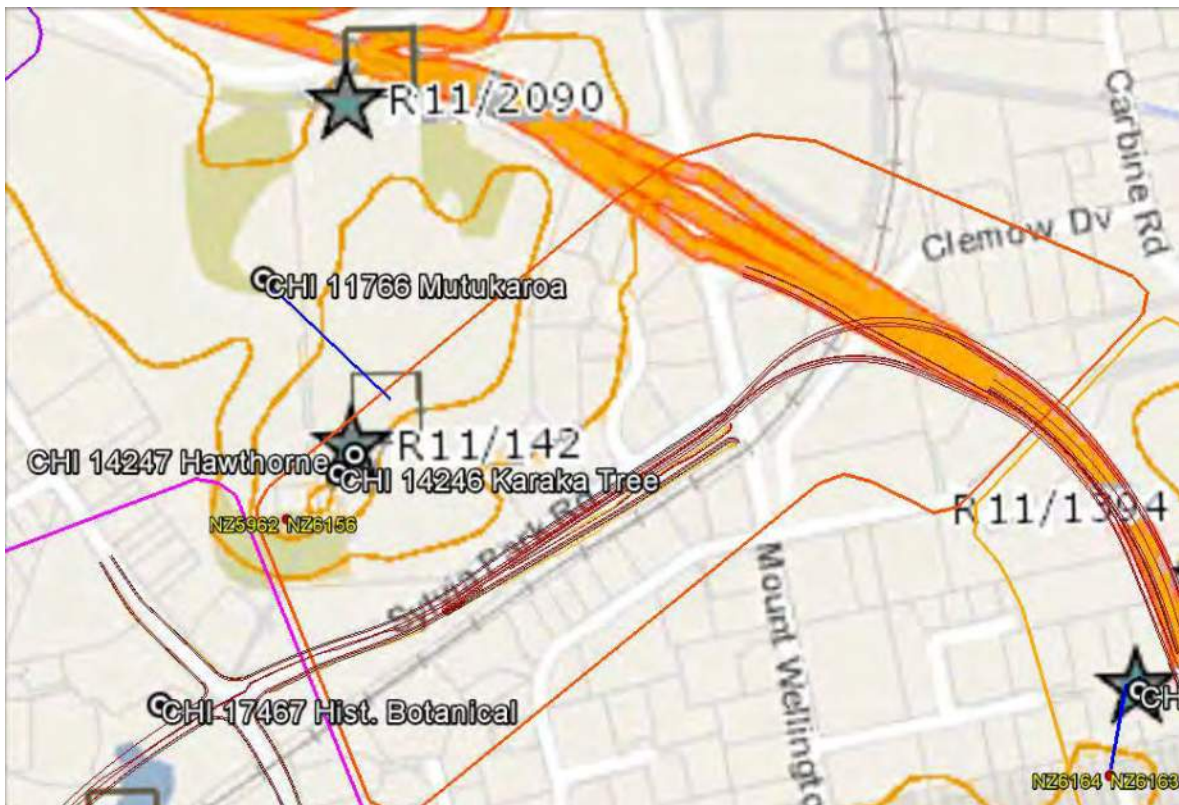


Figure 5-29: Sector 4 NZAA and CHI data



CHI #	NZAA #	Type	Potential effects	Name/description
				and the names provided are misleading.
364	R11/2147	Portage	The portage itself is not within the Project footprint - the project does cross the eastern estuarine approach to this portage.	“Māngere East Canoe Portage” in the CHI- this grid reference pertains to the Ōtāhuhu portage which formerly followed the approximate route of Portage Road, Ōtāhuhu.
467	Unrecorded	Wharf	<p>The Chi record refers to and 1850s wharf with a stone abutment from the foot of Queen Street, but this may in fact refer to the wharf of this nature constructed in the late 1850s where Orpheus Drive now runs. The stone abutment is still extant in modified form and this structure will not be affected by the project.</p> <p>The Chi record also refers to an 1865 wooden structure where the current port is located. Rail services were extended to this area in the late 1870s. Any in-ground archaeological remains of this structural complex will be affected in part by the Project.</p>	Onehunga Wharf. There is no NZAA record for this but various earlier wharf structures were present in this area, but have not been recorded in the NZAA scheme. The CHI record includes information that the first wharf was built in 1859, with a stone abutment from the foot of Queen Street, Onehunga, and that the first substantial wharf at Onehunga was completed in wood in 1865, replacing extant older makeshift structures. Built for war equipment. The railway was extended in 1878, according to the CHI. There is substantial additional information in the CHI which has not yet been reviewed. Archival research for detailed plans etc. has not been completed. A goods shed was built adjacent to the wharf approach in the 1870s. A waiting room and toilets were provided by means of a relocated building in 1897 or soon after. The timber wharf was replaced by the AHB in 1923 with a reinforced concrete structure, considered in more detail in the built heritage assessment.
469	Unrecorded	Shipyard	The CHI grid reference does not match the described location. A shipyard is shown on an 1862 sales brochure (Figure 5-18) for land in the area within the former lagoon, but this may be a different shipbuilding operation predating that of Henry Roe. Effects on these are not expected.	Oregon/Williamette: The Henry Roe Shipyard (CHI ID# 469) was reported to be located on Kauri Point, Onehunga, on the water’s edge, alongside the Onehunga Steam Saw and Planning Mill; possibly in the location of the Aotea Sea Scouts Hall. Pishief has summarised the available ARC records and states that Matthew Roe’s ship yard operated from about 1863-4 in an area, since reclaimed, west of the Onehunga Wharf. Throughout the 1860s and 1870s the Onehunga mill used logs hauled from Huia and Big Muddy Creek by a fleet of cutters Roe had built for the purpose. CHI database describes the site as the location of the building of the 17-ton paddle steamer Oregon for towing logs from Big Muddy Creek and Huia. It is considered possible that the 28-ton cutter Williamette was also built there. The McIntyre’s Clyde Iron Works at the foot of Queen Street, Onehunga, built and installed the engine and boilers in the Oregon.
471	Unrecorded	Shipyard	Effects within Te Hōpua former foreshore areas are not expected- deeper earthworks are proposed on the outer edge (southern side) of the tuff ring.	Manukau/ Cunningham /William Holmes: A temporary building slip was established here in 1879, to construct a 45-ton steamer. From the information in the CHI this appears to be located inside the former lagoon, behind the extant hotel.

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CHI #	NZAA #	Type	Potential effects	Name/description
476		Shipyard	Potentially affected- location uncertain. Post-1900	Waiuku: A ship reassembly site (1913) of an iron steamer shipped to NZ after disassembly- reported in the CHI to be located “on the foreshore near the wharf”.
641		Sea wall	Not affected. Probably post-1900, associated with Southdown Works	<p>Timber Sea Wall: Manukau Harbour: The CHI states that the site was recorded in 1993 by Alastair Jamieson, of the Auckland City Council. The site is described as a timber sea wall and maritime site. The date of construction of the timber sea wall is not known.</p> <p>These structures are probably still extant, because vegetation lines can be seen in the mangrove growth pattern. Geotechnical coring in the Anns Creek area has recovered sheep or cattle phalanges from organic sediments, suggesting effluent from the works may have been widespread in Anns Creek. These may be containment ponds for effluent from the Southdown works, because connecting structures or pipes are visible in the 1940 air photographs.</p>
659	Unrecorded	Bridge	Northern termination will be affected by proposed deep excavation for cut and cover section of the Project	The Old Māngere Bridge, and the “Black Bridge” (its timber predecessor). The approach to the original 1870s bridge is within the study area and is expected to be affected by works.
	R11/307		Not affected, well to the north of the Project footprint	Shell midden comprising fragmentary cockle and other shell species.
5837	R11/352	Midden	Extents are likely to be greater than those recorded, may be affected by proposed cut-and-cover works on the outer edge of the southern arm of the former tuff ring.	<p>Hōpua: The record pertains to shell midden recorded on the southern rim of the former tuff ring. There is evidence from the analysis of historic land use changes and landscape modifications in the current assessment that early and continuing cut-and-fill operations may have buried significant evidence of former Māori occupation of Onehunga on the edges of the former tuff ring, this is recorded as “destroyed” but there is potential for archaeological material to be buried beneath old reclamation around the former crater rim. There is evidence from historic maps and plans for episodic progradation/reclamation in some areas. It is highly likely that proposed deeper earthworks on the former crater rim will encounter some evidence of Māori occupation and use, as well as colonial-era midden discarded by a more diverse population.</p> <p>This should be considered as comprising part of R11/99, and was recorded on the southern rim of the tuff crater. The NZAA ArchSite site record form for this site states that it was first recorded in 1977 by Agnes Sullivan as a “shell midden consisting of cockle fragments eroding from under [several] house foundations in a brown soil. This was described as “thin, disturbed, several patches”. The site was in poor condition. The next addition to the record is in 1996 by Sarah Ross as part of an assessment for the ARC CHI database. Ross notes that the “old houses mentioned on the SRF no longer</p>

CHI #	NZAA #	Type	Potential effects	Name/description
				exist, area extensively modified by construction of new motorway and bridge". In 2011 R Foster visited the area and noted on the record form that the midden was destroyed and under new housing. This does not preclude archaeological material being present beneath more recent earthworks.
6826	R11/99	Settlement (reported)	Extents potentially widespread, effects covered in relation to R11/352 above.	<p>Onehunga: this identifies Onehunga in the NZAA scheme and in the CHI as an important locus of Māori settlement. The NZAA ArchSite site record form for this site states that it was already destroyed by 1961. Analysis of the various information regarding works in the area and the nature of the original records suggests that buried in situ archaeological features may still exist in areas that have suffered less modification. The site was recorded based upon the information given by F.D. Fenton in "Important Judgements" 1879, J.L. Campbell's work Pounamu (1840) and the Letters and Journals of Samuel Marsden written by Elder. Based on these records the site type was recorded as "settlement" and was known as Onehunga. As per the site record form information the site was described as a pā or a position of defence as well as having extensive kumara and potato gardens.</p> <p>Brown thought that the settlement was located along the northern banks of the Manukau Harbour at Onehunga and in the area of the boat ramp westward of the Onehunga Wharf. Through further archival research, Pishief concluded that the area of the settlement may be located in the vicinity of Hill Street/Princes Street/Wharangi Street, as a native reserve was originally located on the point west of Wharangi Street, once named Walter Street. This may simply be a result of reserves being required under Imperial "protection of Aborigines" legislation, which resulted in "sufficient" reserve lands being designated. It must be assumed that settlement was widespread in the area. Dr Paterson's review of NZAA information in the Onehunga City@Risk heritage report supports this broader view.</p>
10107	R11/1635	Water Supply	This is currently beneath proposed elevated structure, and could potentially be affected by pylon foundations.	This is visible on the 1940 air photography in the Auckland Council GIS viewer. Former extents are shown approximately in Figure 5-28 as a brown line.
11656	R11/898	Waahi Tapu	Additional remain of R11/898 may be affected by retaining works to the south of Tip Top Corner	Westfield: Numerous archaeological test trenches were carried out here prior to destruction of most of the site, and retention of a small area as a listed and scheduled Wāhi Tapu. Records will be reviewed in more detail under a separate heading below.
11766	R11/142	Settlement-occupation-terraces-pits-midden-	Limited-scale effects possible outside the PAUP extents.	Mutukāroa-Hamiltons Hill has been subject to numerous archaeological investigations of limited areas with a complex history of reporting. These will be briefly reviewed under a separate heading below. There is extensive

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CHI #	NZAA #	Type	Potential effects	Name/description
		shell		<p>information in the CHI concerning this major Māori settlement complex, scheduled for protection in the PAUP as a historic heritage place.</p> <p>A statement of significance by Graeme Murdoch notes that the Mutukāroa site provides a regionally rare example of an extensive pre-European Māori settlement that was constructed primarily for its strategic importance on a major portage route, and adapted through drainage techniques to its location on poorly-drained clay soils. Murdoch describes the site as being of significance to Ngati Whatua, Ngati Paoa and Te Waiohua. It is accessible to the public as a 48 ha. regional park.</p>
12791		Tree Trees	Not affected almost certainly post-1900	Phoenix Palm Pōhutukawa: Near the former main entrance of the Westfield Freezing Works, one of the palms is well within the property boundary, and the other does not appear to survive. The pōhutukawa are next to the road, and thus more likely to be affected by any road upgrades at this intersection. Historical significance, if any, is unknown.
14246	Part of Mutukāroa	Tree	Not affected	Karaka, on Mutukāroa, not of particular relevance to the Project. This is an indigenous Karaka tree reported by the botanist Rhys Gardner. Karaka trees and groves often grow in places formerly occupied by Māori settlements. Although the exact location has not been established, air photographs suggest this is highly unlikely to be within any footprint of works, due to lack of such trees extant near to works in this locality.
14247	Part of Mutukāroa	Tree Trees	Not affected	Hawthorne, on Mutukāroa, not of particular relevance to the Project. According to the botanist Rhys Gardner, this tree is potentially NZs largest Hawthorne, either a relic of an old hedgerow, or an escapee, on Mutukāroa.
17050	Unrecorded	Historic botanical type locality	Potentially affected	Coprosma crassifolia. The CHI grid reference places this to the south of the project footprint, the actual location of surviving examples is not known in detail. This is the type location for the species Coprosma crassifolia, which was identified from samples collected here by William Colenso in 1846. The five specimens of the species, which remain here, are identified in the CHI as of scientific importance.
17467	Unrecorded	Tree-Fig- Ficus caria	Potentially affected	A number of edible fig (Ficus caria) trees are growing near the path down to Anns Creek when recorded in February 2008. The exact location, historical significance or current condition of these, or whether still extant, is unknown.
18500	R11/2743	Onehunga Railway Station and Onehunga Branch Line.	The former rail embankment will be affected in part by proposed works to the south of the Tuff Ring.	The railway station itself is well outside the footprint of proposed works but parts of the track bed and associated structure will be affected. The Onehunga line (R11/2743) was the first railway line to be constructed (in 1873) within the Auckland metropolitan rail network. It is recorded with the NZAA, and extends into the

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CHI #	NZAA #	Type	Potential effects	Name/description
				Project area. It had a masonry retaining wall along its seaward curve where it ran around the outer rim of the tuff crater.
	R11/2466		This is located on Princes Street 100m to the north of the proposed works on Neilson Street and will not be affected.	A stone building which may have been built as early as 1854. Appears to have been Captain James Ninnis's residence; also said to have been a general store. Later believed to have been used as a commissariat during the Waikato War (1863-4).
19517	R11/2580	Historic Land parcel	This is located on Princes Street 100m to the north of the proposed works on Neilson Street and will not be affected.	Vegetation removal and soil stripping was monitored by Clough & Associates between 7-10 January 2013. 19th century archaeological features were exposed consisting of 2 drains, a refuse pit and 18 postholes. Various furnaces were recently located by archaeologist Richard Shackles in this area, not yet reported (Personal Communication Myfanwy Eaves 10/8/2016). This is part of a city block adjacent to the former shoreline, and one of the earliest parts of Onehunga to be developed in the colonial era as a town.
19762		Tree Trees	Not affected by intersection upgrade due to being set back from Princes Street, Ōtāhuhu. 20 th Century	Ōtāhuhu. "Phoenis"(Sic) Palm (3)"Phoenis Palms", listed in the CHI, historical significance unknown, Planted along the boundary of Gudwara Sahib temple,
20269	Unrecorded	Industrial	Not affected	New Zealand Glue Company Limited Davis Gelatine. The CHI grid reference for this ins inaccurate and it has not been recorded in the NZAA scheme. Although in-ground archaeological remains are possible, historic background research above suggests remains of this factory lie to the west of proposed works and to the east of the CHI grid reference by about 250 metres.
	R11/2710	Wharf and Māori Hostelry	Works footprint in this area is within the current road reserve. Not affected.	Wharf built for Matthew Roe's sawmill established in the 1860s. Roe brought logs (kauri and kahikatea) to his wharf from Huia and Big Muddy Creek, towing rafts with his own ship Oregon, holding them in booms in Onehunga Bay. His mill was eventually taken over by the Kauri Timber Company who operated the mill until it burnt down in 1919. The property was subsequently leased by contractor H. Bray & Co. In the 1850s a Māori Hostelry had been built here (see SO 683). DP plan 19623 (1926) appears to show the extent of the wharf.
	R11/3019	historic bakery and residence	Not affected	This is on Princes Street well to the north of the Project footprint. Site of an 1847 bakery which was demolished in 1991. There is also an 1860-70 villa still standing on the property which is planned for demolition.

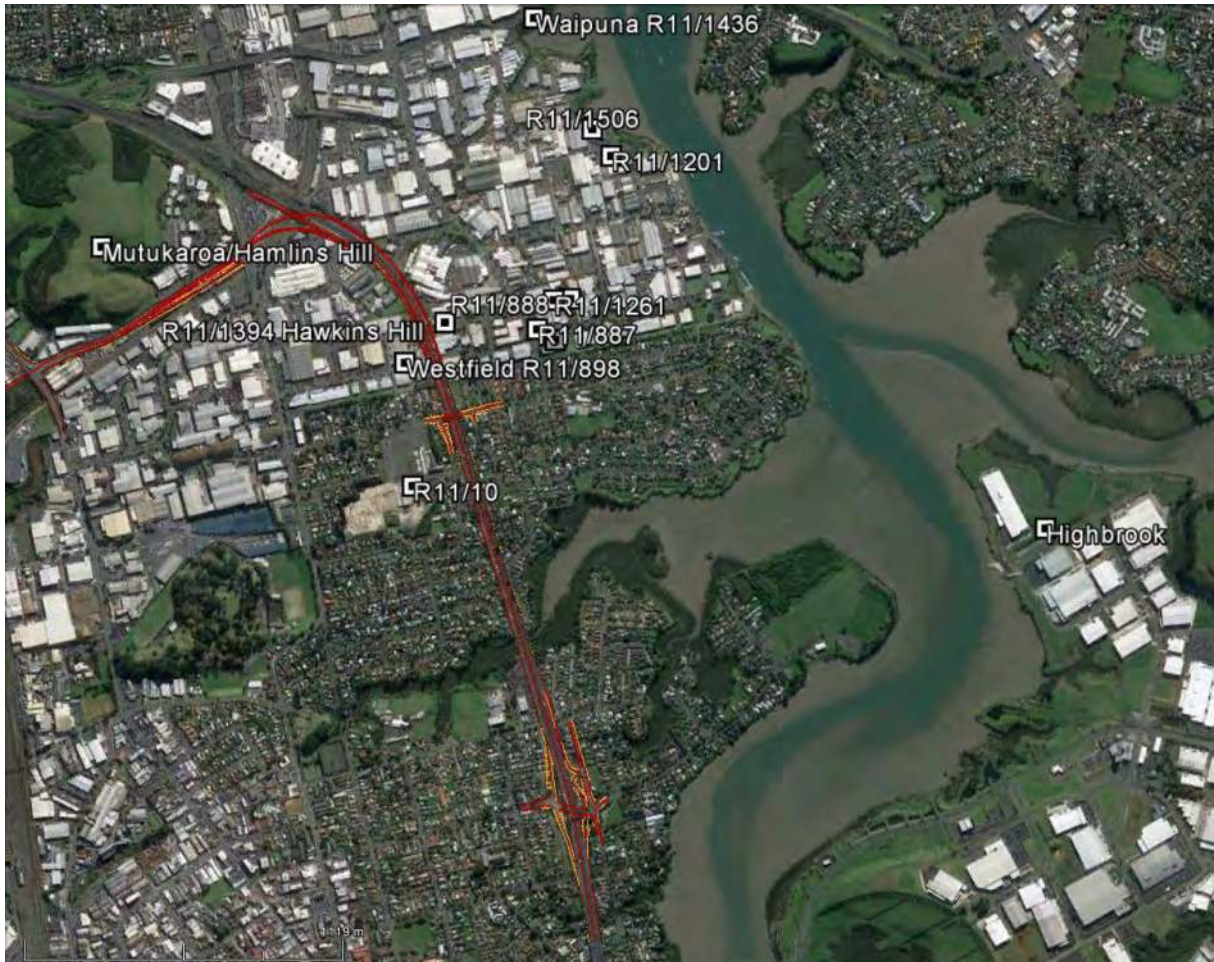
5.3.5 Review of Previous Archaeological Investigations

A number of archaeological investigations have been undertaken in the wider area of the proposed Project. These are listed in Table 5-4 and shown in Figure 5-31. Information from selected key archaeological reports of relevance to the current assessment is reviewed below, pertaining to Sectors 3 to 5.

Table 5-4: Previous archaeological investigations in the wider area

Sector	NZA Site Number	Location	Description	References
1	R11/2580	13-17 Princes Street and 9-13 Wharangi Street Onehunga	19th century features relating to colonial settlement	Clough & Associates, Report not yet available, work still in progress at the time of writing.
4	R11/142	Mutukāroa	Māori settlement site on a large non volcanic hill	(Davidson, Salvage Excavations At Hamlin's Hill, N42/137, Auckland, New Zealand, 1970) (Irwin, 1975) (Nichol, 1980) (Pearce, 1975) (Phillips C. , 2012) (Walton, 1979)
4	R11/898	16 George Bourke Drive	Undefended pit and terrace site	(Furey, 1986) (Sewell, 1992)
	R11/887, R11/888, R11/899	Fisher Road	Open settlement or settlements associated with pa sites at Ōtāhuhu (Mt Richmond) and Te Apunga o Tainui (McLennan Hills)	(Foster & Sewell, An AOpen Settlement in Tamaki, Auckland, New Zealand: excavation of sites R11/887 R11/888 and R11/ 899, 1988) (Foster & Sewell, The Excavation Of Sites R11/887, R11/888 And R11/899, Tamaki, Auckland, 1989)
5	R11/10	Te Apunga o Tainui McLennan Hills	Pits/Terraces	(Cruickshank, 2015)
	R11/1201	Tāmaki River		(Foster & Sewell, The Tamaki River Sites: excavations at sites R11/1201 and R11/1506, Tamaki, Auckland, New Zealand, 1993)
	R11/1506	Tāmaki River		(Foster & Sewell, The Tamaki River Pa: The Excavation Of A Small Defended Site, R11/1506, On The Tamaki River, Auckland, 1997) (Foster & Sewell, The Tamaki River Sites: excavations at sites R11/1201 and R11/1506, Tamaki, Auckland, New Zealand, 1993)
	R11/1436	Waipuna Road project	Significant investigation not shown in Figure 5-31.	(Clough & Turner, 1998)
	Numerous	Highbrook development	A very significant body of archaeological work to the east of the Tāmaki, not shown in Figure 5-31.	(Fredericksen & Visser, 1989)
	Numerous	AMETI Stage 1a	Various formative-period investigations Morrin Road to Mt Wellington Highway	(Hudson & Opus, 2014) (Felgate & Opus, 2014)

Figure 5-31: Previous archaeological investigations of Māori archaeological sites relevant to Sector 5



Sector 5 works are proposed in what was formerly an extensive archaeological complex, of which small-scale traces may well be encountered during proposed works. This archaeological complex has been recorded as a variety of NZAA records, with the most conspicuous, and formerly rich, record being R11/10, pertaining to settlement on the major volcanic cone component of the complex. A summary of these, overlain of the 1940 Air Photograph to illustrate the former landscape, is shown in Figure 5-32. The yellow linework added indicates areas of the landscape particularly suited to Māori settlement and gardening, on which traces of settlement can be seen on the 1940 air photograph when viewed in detail in the Auckland Council online GIS viewer.

Figure 5-32: Te Apunga o Tainui archaeological landscape interpretation from 1940 Air photographs



There have been considerable advances in radiocarbon dating method since the 1990s and the brief review below makes use of an interpretive methodology developed during the AMETI archaeological investigations at Panmure. This utilises a phase terminology arrived at through Bayesian statistical analysis of a set of 45 radiocarbon determinations (many being shell-charcoal pairs of dates) with regard to other sequence information such as environmental changes and stratigraphic relationships (Felgate & Opus, 2014, p. 93). The phase terminology developed for median conventional radiocarbon age (CRA) (which is an uncalibrated function of measured isotope ratios, rather than a calendric date) is shown in Table 5-5.

Table 5-5: Rough median CRA categorization into AMETI-phases, based on patterning in AMETI-1 shell/charcoal pair sets

Median Conventional Radiocarbon Age (CRA) Marine Shell	AMETI-1 Phase	Median CRA Charcoal	AMETI-1 Phase
801-763	1	535, 342-361	1
763-712	2	403-376	2
		361-297	3
		236-230	4
671-563	5/6	219-147	5/6

5.3.5.1 R11/10

Proposed works adjacent to this (Figure 5-32) are in an area of archaeologically sensitive land. The NZAA record states that the site was first recorded in the NZAA scheme in 1961 by Bob Brown and was recorded at the time as destroyed. Nowadays the term “destroyed” is regarded with caution by archaeologists in that although the main volcanic cone may be destroyed by quarrying, surrounding areas may still have archaeological material in-ground. R11/10 was primarily recorded off early aerial photographs which show it to be a volcanic pā with terraces with 50 or more storage pits visible from the air. No defensive ditches were evident in the 1940 air photograph. It has been noted in a previous assessment that surrounding areas of this complex are relatively unmodified in some areas (Campbell, 2013). Recent archaeological work in the vicinity by CFG Heritage Limited (report in preparation) has found evidence relating to this complex.

The lower slopes were used as a military encampment in the 1860s (Campbell, 2013).

Unfortunately, no formal archaeological study of Te Apunga o Tainui McLennan Hills was carried out prior to their destruction in the 1950s (Campbell, 2013, p. 6). A single radiocarbon date on shell for R11/10 was reported by Sewell, (NZ Radiocarbon database WK 1722- CRA 680 ±50) which would be consistent with occupation similar in age to AMETI Phase 3-4, in the late 16th or early-to mid-17th century. Any additional information from the vicinity of this settlement would have contextual value (HNZPT criteria) and knowledge value (PAUP criteria). The lack of any shell-charcoal date pairs is particularly problematic and if any could be obtained this would be very valuable.

5.3.5.2 NZAA R11/142 Mutukāroa-Hamlin’s Hill

The Project has been designed to avoid impacts on Mutukāroa-Hamlin’s Hill. Works are proposed at the base of this hill, outside the scheduled extents, apart from a very small paved area at the entrance to a driveway. This area of works in the vicinity of Mutukāroa-Hamlin’s Hill should be regarded as archaeologically sensitive, but the location at the base of the hill of these works suggests relatively minor archaeological values may be affected, if any. The NZAA ArchSite site record form for Mutukāroa-Hamlin’s Hill includes 20 pages of information and there are additional archaeological reports regarding this (refer to Table 5-4). R11/142 has been part of a historic reserve managed by Auckland Council since 1985 (Phillips 2012) when it was acquired by the Crown and designated as a recreational reserve.

This was first recorded in the NZAA scheme by Archaeologist Dr. Janet Davidson in 1968. It is recorded as a settlement site with at least three areas of occupation, identified as the spur, southern section of the main ridge and the north end of the main ridge. It was mapped in 1964 by Molly Nicholls and since 1970 additional areas have been excavated in advance of quarrying activities. Between 1970 and 1998, at least 14 different excavation investigations occurred which added to the growing knowledge of the site as a whole (Davidson, Salvage Excavations At Hamlin’s Hill, N42/137, Auckland, New Zealand, 1970) (Irwin, 1975) (Nichol, 1980) (Phillips C. , 2012) (Sewell, 1992). Mutukāroa is thought to have a long and complex history of Māori settlement. Features identified, investigated and recorded on the site consist of terraces, hangi, midden, post holes and pits. Faunal remains recorded include dog bone.

Two radiocarbon CRA are given in Table 5-6. The shell CRA is most similar to AMETI-1 samples from Phase 5/6 (at AMETI-1 AD1660-AD1705) while the charcoal CRA is most similar to charcoal CRAs for AMETI-1 Phase 2. It is difficult to say much from this small set of radiocarbon determinations. If any Māori material was encountered during works additional information would clearly be very valuable.

Table 5-6: Radiocarbon determinations from Mutukāroa (source NZ Radiocarbon database)

Lab #	Material	CRA	Similar to AMETI-1 phase
NZ5962	Charcoal (from pit)	411 ± 76	Phase 2?
NZ6165	Shell	637 ± 52	Phase 5/6

The Pakeha name of Hamlins Hill comes from the first Pakeha owner – the Rev. James Hamlin, a CMS Missionary. Remains of historic 19th century farming activities including hedges and stone fences still exist within the park, but not in the study area.

The land has been farmed since at least 1838 and during the 1850s and 1870s was used as an experimental farm for new farming techniques. Later in the 1880s and 1890s it was used for grazing racing horses on behalf of the Auckland Stud Company (Phillips C. , 2012, p. 10). It seems unlikely that any material of archaeological value in regard to this latter colonial-era land use will be affected by the Project.

5.3.5.3 NZAA R11/1394 Pit/Terrace

This is often referred to as Hawkins Hill. It is clear that there was a dense record here of Māori settlement, much of it infilled and undiscovered until detailed investigation, and that there is considerable potential for small scale discoveries in this vicinity during proposed works. Archaeological Investigations (Coates, Foster, & Sewell, 1996) suggested that the two sets of archaeological investigations on either side of SH1 pertained to a single extensive Māori settlement (Coates, Foster, & Sewell, 1996). The situation may have been more complex than this in that the area may have been subject to various occupations over time. Investigations of 145 square metres in total found a very dense record of six infilled pits, a house, cooking area and other archaeological features in some areas (Figure 5-33). 15 pieces of moa bone were found in the vicinity of a cooking area. Additional unrecorded features such as infilled pits were also discovered on the final day of the investigation by last-minute machine trenching. Artefacts recovered included adzes (found in the fill of pits and this possibly post-dating occupation), a piece of worked moa bone, numerous pieces of obsidian and other flaked material, a chisel, hammer stones, a grindstone and several flakes reworked from adze repair or re-use. Faunal remains were predominantly shellfish with almost no bird bone represented.

Figure 5-33: Coates Et al investigation results



Table 5-7: Hawkins Hill Radiocarbon determinations (source NZ Radiocarbon Database)

Lab #	AREA	Material	CRA	Similar to AMETI-1 phasing
NZ6971	R11/1394 (Area B1, Layer 2C - interim layer. Sample collected from a fire scoop.)	Shell	716 ± 52	Phase 2
NZ6972	R11/1394 (Area C/15, Layer 3, Feature B - oven.)	Charcoal	410 ± 55	Phase 2
NZ7008	R11/1394 Area B1. Sample from the interim fill layer of a pit.	Shell	586 ± 50	Phase 5/6
NZ7011	R11/1394 (Area C/15, Layer 2B - fragmented midden and	Shell	714 ± 28	Phase 2

Lab #	AREA	Material	CRA	Similar to AMETI-1 phasing
	soil matrix.)			
NZ7023	R11/1394 (Area C/16, Layer 2B. Sample of whole cockle shells in a matrix of fragmented shell and soil.)	Shell	765 ± 36	Phase 1/2

If the set of Radiocarbon median CRAs from R11/1394 are compared with those from the AMETI 1 Bayesian series (Felgate & Opus, 2014) (and with further refinement of this in preparation for the final archaeological report) it is possible that occupation commenced as early as the 16th century, and that one of the radiocarbon CRAs was likely to be from a later event, possibly post AD1660 (late 17th century or early 18th century).

5.3.5.4 R11/887, R11/888, R11/1201, R11/1506

These investigations, nearer to the Tāmaki river, in the Fisher Road area, provide valuable information on archaeological structures and artefacts from the broader complex that all archaeological investigators have noted was widespread in the Te Apunga o Tainui area. A brief summary of radiocarbon results is provided here (Table 5-8) to supplement the somewhat scanty information from investigations nearer to the project footprint. These all appear to be rather early in the formative period when compared to the AMETI Stage 1 date series. This is of archaeological interest in that a wider range of C14 dates has previously been obtained in the vicinity of Tip Top corner, although the sample of dates is small, and this may be sampling error.

Table 5-8: Radiocarbon determinations Fisher Road (source NZ Radiocarbon database)

Lab #	Context	Material	CRA	Similar to AMETI-1 phasing
NZ7048	R11/899	Shell	770 ± 23	Phase 1-3
NZ7049	R11/888	Shell	749 ± 48	Phase 1-3
NZ7064	R11/887	Shell	730 ± 36	Phase 1-3
NZ7065	R11/899	Shell	721 ± 36	Phase 1-3

5.3.5.5 NZAA R11/898 Pit/Terrace

The motorway verge in the vicinity of this former archaeological site may well contain additional archaeological evidence and should be regarded as archaeologically sensitive. Investigations were undertaken for part of this hill, near Tip Top corner, by Furey under archaeological permit 1981/51, in advance of construction of the Maui gas line through the area (Furey, 1986) with additional salvage investigation in advance of development (Sewell, 1992).

The hill on which this settlement was located was basaltic stone field, subsequently blanketed with Ōtāhuhu volcanic ash, since eroded in places and built up by slope wash erosion near the base of the hill, with ash remaining in pockets on the hill at that time. Furey notes that surface features at the time consisted of shell midden exposures, several cut terraces, and two pit depressions.

Archaeological investigation over a period of seven weeks in 1981, totalling 244 square metres (located as shown in Figure 5-34), revealed numerous and complex buried archaeological features, very near to the Project footprint. Radiocarbon dates submitted (Table 5-9) were all from what Furey regarded as the earlier period of occupation represented in the area investigated, although NZ6154 was regarded as representing earlier event within the settlement history. Furey regarded these as indicating occupation occurred within a short space of time in the late 16th century.

Comparison with the AMETI-1 date series (Opus & Felgate, 2015, p. 107) suggests two separate periods of occupation within the earlier occupation phasing at R11/898 (Table 5-9). Any further information from the Project is of archaeological value and of knowledge value in terms of the PAUP Historic Heritage evaluation criteria.

Cockle was the dominant shell species represented (Tuangi- *Austrovenus stutchburyi*). Minor quantities of other faunal remains were reported. An unusually large number of artefacts was recovered, including bone needles, a shell pendant, greywacke adzes and adze fragments, and unfinished adze preforms, and two pounamu (nephrite) chisels, along with backed clay items, similar to ones found on Mutukāroa-

Hamlins Hill. A large number of raw material flakes were also found, as well as many flakes indicating re-work of finished adzes by flaking, along with a stone sinker and part of a fishhook.

Additional investigation prior to development of the land by a team led by Sewell in 1988 was carried out under archaeological authority 1989/25 (Sewell, 1992) (Figure 5-34). These investigations revealed numerous archaeological features, very few of which were visible in the 1940 air photograph. Stratigraphic profile drawings show that terrace areas generally had significant overburden obscuring these on the surface and rendering their surface form indistinct.

The majority of artefacts recovered by Sewell consisted of greywacke and obsidian flakes with a small number of finished Taonga. These included broken adzes, a sandstone file, hammer stones, grinding slab fragments, a broken chisel a piece of baked shaped clay (Sewell 1992: 31-32). The main source of stone raw material was greywacke, obtainable in the Hauraki Gulf. Fire-resistant remnant Puriri was represented in the charcoal assemblage from some contexts. Table 5-10 provides a comparison of Sewell radiocarbon determinations with the AMETI -1 detailed date series. These complement the dates obtained by Furey and suggest an extended period of occupation commencing in the 16th century and continuing to at least the late 17th century or later. The information currently available regarding this extended occupation must therefore be regarded as very scanty, and any additional information that can be gained is enormously valuable.

A small portion of this area was preserved as an urupa following a series of legal actions. Extents are defined in the ACDP (Isthmus) Schedule and in the PAUP Historic Heritage Extent of Place overlay.

It is quite likely that the motorway shoulder (the motorway passes through a cutting here) retains additional archaeological material, which could potentially be affected, at very limited scale, by construction of additional lanes.

Figure 5-34: Extent of Furey, and Sewell, R11/898 areal investigations



Table 5-9: Radiocarbon determinations from Westfield (Furey) predating occupation II (source NZ radiocarbon database)

Lab #	Material	CRA	Similar to AMETI-1 phasing
NZ6163	Shell	660 ± 55	Phase 5/6
NZ6164	Shell	746 ± 55	Phase 1/2
NZ6165	Shell	637 ± 52	Phase 5/6

Table 5-10: Radiocarbon determinations reported by Sewell (Source NZ Radiocarbon Database)

Lab #	AREA	Material	CRA	Similar to preliminary AMETI-1 phasing
WK2030	A (from pit)	Charcoal	340 ± 45	Phase 3
WK1720	B	Shell	630 ± 45	Phase 5/6
WK1721	C	Shell	540 ± 45	Phase 5/6
Wk2013	Ōtāhuhu	Shell	600 ± 50	Phase 5/6
Wk1722	Te Apunga o Tainui	Shell	680 ± 50	Phase 3-4?

5.4 Results of field assessment

Field assessment consisted of various field inspection visits by Brooke Jamieson (Archaeologist at Opus) and by Felgate. Various parts of the Project area were also visited by Felgate in company with HNZPT Council Heritage and the NZ Transport Agency, and with the built heritage specialists. The nature of current land use precluded in-ground assessments.

The Onehunga Tuff Ring area comprises principally existing road and port facilities. Field inspection combined with consideration of large scale deep excavation works proposed indicated that subsurface inspection of the ground to be affected was not feasible.

Neilson Street and The Captain Springs Road Project area was also visited as was the Angle Street area and results indicated that subsurface assessment was not feasible, however, there is potential for limited areas of old shoreline to retain archaeological material at limited scale.

Mutukāroa-Hamlins Hill southern margin was also subject to surface inspection. The areas of existing road berm had previously been landscaped and there was evidence of in-ground services. Subsurface testing was not feasible.

Great South Road/Sylvia Park Road was also inspected for signs of the former Saint Anns Bridge Abutment - this area is heavily vegetated and was not accessible.

Tip Top corner southwards (SH1 motorway berms) were inspected by drive-by assessment to establish areas of existing cuttings that, with regard to results of previous archaeological work, can be expected to retain archaeological evidence at limited scale.

The Panama Road and Princes Street intersections were also visited, with existing landforms indicating potential for archaeological material to be affected during upgrade of the eastern end of the Panama Road overbridge upgrade. Princes Street intersection upgrade area in Ōtāhuhu comprises existing modified road areas and berms. Subsurface inspection was not feasible. There is potential here for deeper components of works, such as services trenching, to encounter archaeological remains. This is also true of foundations for proposed new overbridge structure.

The motorway embankment along Mataroa Road was also inspected on foot, as was the SH1 Tāmaki river crossing culvert, where a new motorway bridge is proposed.

6 Research results: Archaeological Values

The highly modified terrain of the Project makes detailed assessment of archaeological values and significance difficult, but an assessment of the areas identified as having potential for unrecorded archaeological sites, both recorded and unrecorded, leads to an expectation that values under relevant criteria provided in Section 3.3 can be expected. Evaluation results are detailed in Table 6-1. No assessment is made here of Mana Whenua Values, or values pertaining to built heritage.

Table 6-1: Archaeological values present or expected

Sector	HNZPT Criteria Values Present or expected	Considerable or outstanding Historic Heritage Importance?	Statement of values
1	Contextual value Information Potential Cultural-Associations	No	<p>The history of Māori occupation as evidenced by archaeological records suggests values under these criteria may exist. If this is the case, such values would be moderate, because, although a range of archaeological material may be present, and there has been no systematic archaeological investigation previously of such sites in this area, the degree of previous modification of the area would suggest that areas with archaeological values would be limited in extent. Information potential may include information on periods of occupation of use obtainable through radiocarbon dating, combined with information on economy, state of food resources and environment, derived from analysis of food remains and macro botanical remains. Information on changing interaction patterns over time might also be obtained from analysis of geological sources of stone artefact raw materials. Any archaeological discoveries also would have the potential to inform regarding the distribution of Maori settlement and land use in Auckland over time and the nature of settlement and settlement feature characteristics. If Koiwi are discovered, there is potential for information to be recovered on pathology/health. Such information has contextual value if compared with results of other investigations, and may provide useful contextual archaeological information to those with a knowledge of Maori traditions and history.</p> <p>Values pertaining to early colonial era settlement (Fencible pensioner Village allotments) and subsequent 19th century occupation and use may exist, including, but not limited to, early port installations and railway infrastructure. Values pertaining to potential in-ground archaeological remains of domestic occupation in the 19th century may also exist.</p>
2	None	No	
3	Contextual value Information Potential Cultural-Associations Rarity/ uniqueness	Works extend into the scheduled extents of Mutukāroa-Hamllins Hill (a small paved portion of an access driveway). This area is not expected to have considerable or outstanding archaeological value/ importance.	<p>In areas where elevated structure will have a supporting pillar footprint, and in areas where earthworks to extend Hugo Johnston Drive are proposed, Māori Archaeological material may be encountered. Archaeological values pertaining to Māori cultural associations could be present. Similarly, values pertaining information potential and contextual archaeological value may be present, as detailed in regard to Sector 1.</p> <p>If remains of the original Anne's bridge northern abutment are present, these would have high information potential as an example of the technology of military pensioner bridge construction, and potentially would also have value under the criterion of rarity/uniqueness pertaining to the possibility of origins as a Fencible road bridge.</p>

Sector	HNZPT Criteria Values Present or expected	Considerable or outstanding Historic Heritage Importance?	Statement of values
4	Contextual value Information Potential Cultural-Associations	No	If any Māori archaeological material is present at the foot of Mutukāroa-Hamllins Hill, outside the scheduled extents there would be information potential under HNZPT criteria (the fuller statement made in regard to Sector 1 might apply), and also contextual values pertaining to developing an understanding of the wider contextual relationships of this poorly-dated occupation. Supporting structure foundations for raised structure proposed for the western end of sector 4 have potential to affect material with similar values.
5	Contextual value Information Potential Cultural-Associations	No	There are likely to be areas of limited scale in sector 5 works that have archaeological values pertaining to Māori occupation. Regardless of how small in scale such remains might be, there is considerable potential, with recent advances in radiocarbon dating method, to make further contribution to archaeological knowledge of Tāmaki's past. Critical review in Section 5.3 of previous archaeological records shows that the widespread destruction of the archaeological landscape in Sector 5 since the 1950s, and the very limited scale of archaeological recording, means that any extant remains that might be recovered during works could have high information potential, in regard to any information that can be gained on changes in the environment during the formative period of Māori society. This could include valuable information from faunal and macro botanical remains, and might also include further information on coincident changes in Māori health and burial practices if Kōiwi are encountered, and if Mana Whenua consent to archaeological analysis of these latter. Applying current archaeological method in regard to radiocarbon dating could also contribute valuable contextual information regarding changing patterns of Māori use of the landscape over time.
6	Contextual value Information Potential Cultural-Associations	No	Works in sector 6 have potential to encounter Māori and colonial-era archaeological remains in the Captain Springs Road/Neilson Street area at a very limited scale. It is expected that these would be of very limited extent, and most likely to be encountered during any trenching for relocation of services (detail design not yet available). Any extant remains that might be recovered during works could have moderate information potential, in regard to any information that can be gained on changes in the environment during the formative period of Māori society. This could include information from faunal and macro botanical remains, and might also include further information on coincident changes in Māori health and burial practices if Kōiwi are encountered, and if Mana Whenua consent to archaeological analysis of these latter. Applying current archaeological method in regard to radiocarbon dating could also contribute valuable contextual information regarding changing patterns of Māori use of the landscape over time, in an area where very little information is currently available. Similarly, the former landing reserve and a further limited area of former waterfront on Captain Springs Road may have remains of Colonial-era settlement of archaeological value.

7 Research Results: Effects

Archaeological effects in most areas of the Project can only be estimated, on the basis of previous archaeological results and recording, due to the highly modified nature of the terrain, but cannot be precluded, despite the lack of direct evidence in most cases. Any effects are expected to be limited to those areas of the construction footprint assessed in the previous section as having archaeological potential. Pillars/foundations for raised structure have potential for very limited-scale archaeological effects in some areas.

For places with potential for buried archaeological material, archaeological effects are in general expected to be limited to areas where there will be excavation deep enough to encounter buried material. Archaeological effects are not expected in those areas with potential for buried remains where new infrastructure will be constructed on embankments, existing ground, or previous fill.

Archaeological effects are not expected in areas that have previously been fully cut to natural levels, and are not expected where archaeological material will remain deeply buried. In modified landscapes, it is often the transition between areas of cut and areas of fill that is most archaeologically sensitive, because in such areas one is encountering the more accessible and vulnerable elements of preserved buried landscapes.

7.1 Areas with potential for effects by sector

Areas with potential for archaeological effects are identified in the following figures:

- Sector 1 refer to Figure 7-1: effects are potentially quite extensive in scale, and there would definitely be effects on part of the former rail embankment and the extant 1915 rail overbridge and any pre-1900 remains within the abutment of the earlier rail overbridge; there is also potential for effects on unrecorded Māori archaeological material and other former industrial sites such as the Clyde Iron Works (it is not known whether in-ground remains of these are still extant); there is also potential for very other, limited scale, effects, assuming there will be trenching for relocation of services during intersection upgrades etc.;
- For Sector 3 refer to Figure 7-2: there is potential in this sector for archaeological effects of very limited scale. No archaeological sites are on record within the footprint of works, with the exception of a small area of the access driveway within the scheduled extents of Mutukāroa /Hamlins Hill, but there is potential for unrecorded Māori material to be affected; marginal encroachment into the scheduled extents of Mutukāroa-Hamlins Hill are not expected to affect values ascribed to this Scheduled place; other archaeological discoveries during limited area deeper excavations for foundations for raised structures are unlikely but cannot be precluded;
- For Sector 4 refer to Figure 7-3: there is potential in this sector for archaeological effects of very limited scale. No archaeological sites are on record within the footprint of works but there is potential for unrecorded Māori material to be affected;
- Sector 5 refer to Figure 7-4 Figure 7-5 and Figure 7-6: review of previous archaeological investigations suggests there is quite high potential for Māori archaeological sites to be affected by retaining works and intersection upgrades, but any such effects are expected to be very limited in scale; and
- Sector 6 refer to Figure 7-7: there is potential for very limited scale effects assuming there will be trenching for relocation of services during intersection upgrades etc.

Figure 7-1: Sector 1 areas with potential for archaeological effects (red polygons)



Figure 7-2: Sector 3 areas with minor potential for archaeological effects (foundation/pillar locations for elevated structure)



Figure 7-3: Sector 4 areas with potential for archaeological effects (structural column foundations in former swamp excluded)



Figure 7-4: Areas with potential for limited-scale archaeological effects in the northern part of Sector 5



Figure 7-5: Areas with potential for limited-scale archaeological effects in the central part of Sector 5

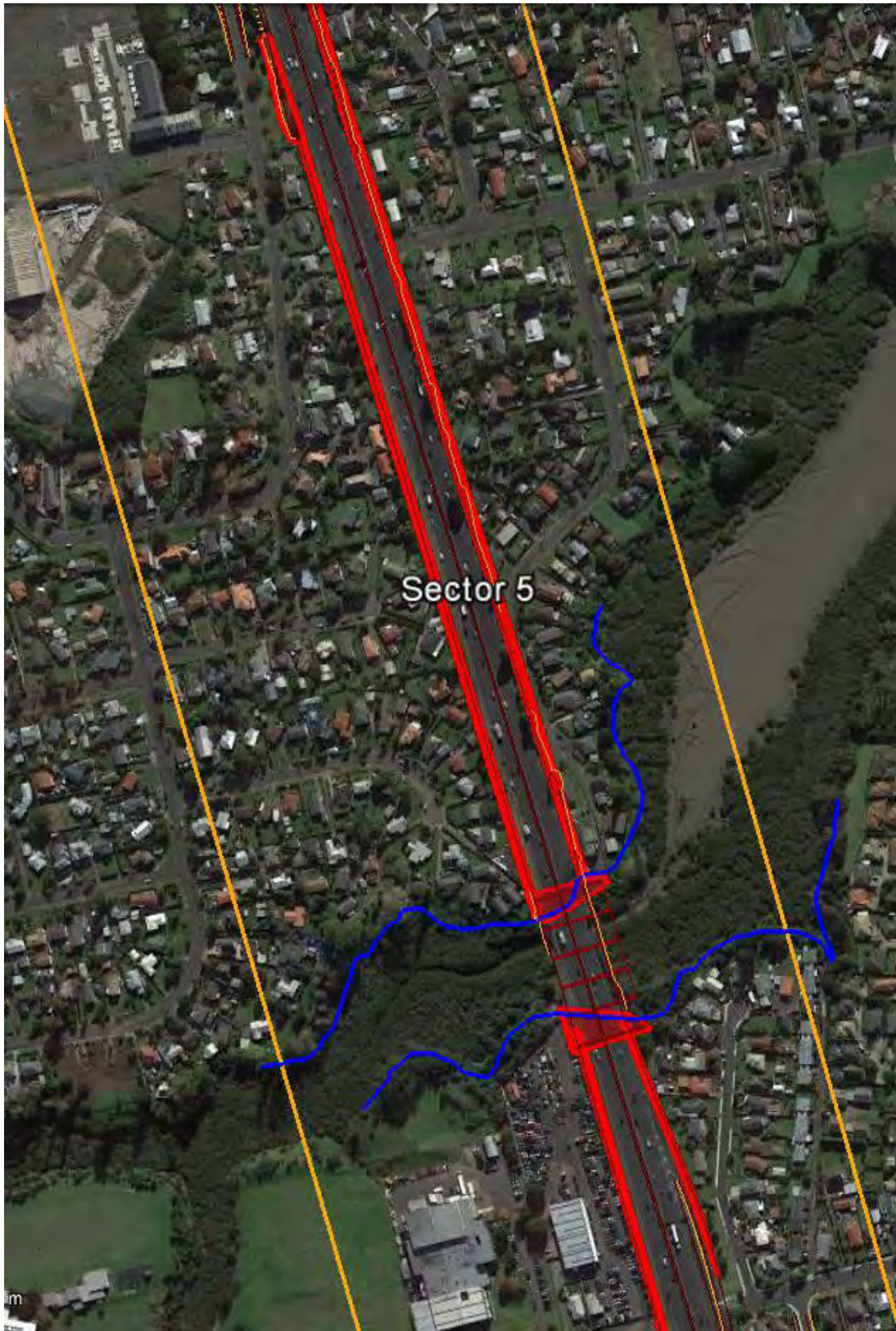
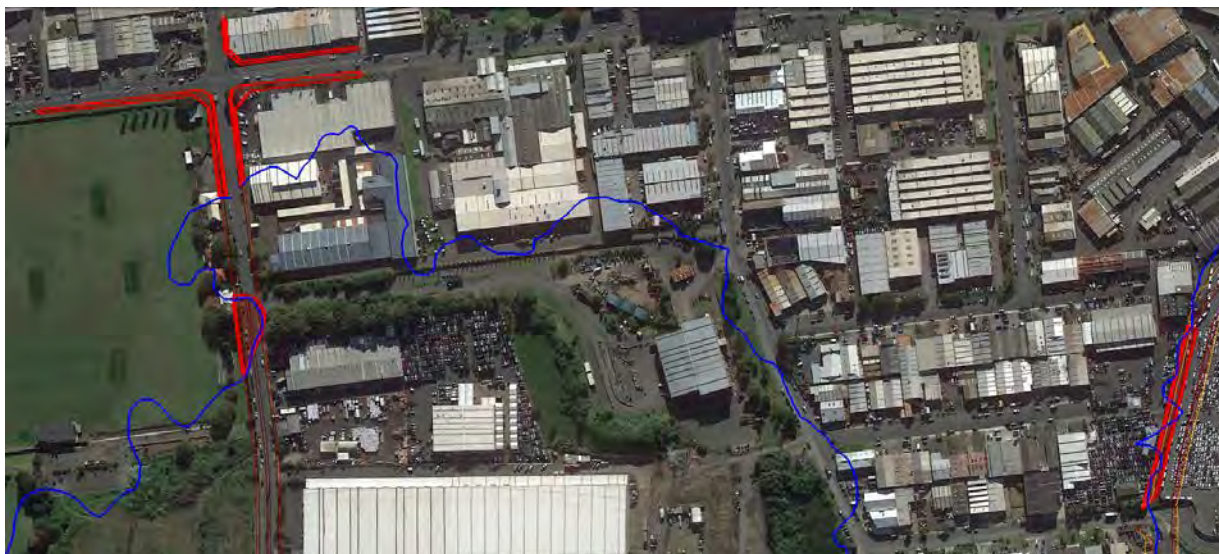


Figure 7-6: Areas with potential for limited-scale archaeological effects in the southern portion of Sector 5



Figure 7-7: Sector 6 Areas with potential for limited-scale archaeological effects



7.2 Summary of effects

Pre-1900 Archaeological material cannot be affected without first obtaining an archaeological Authority for this purpose from HNZPT. Historic Heritage protection and management provisions of the PAUP must be regarded for works marginally within the scheduled extents of Mutukāroa-Hamllins Hill paved access driveway. It is not thought that these works will result in adverse effects on the significance of the place.

Most of the areas where archaeological effects seem more likely or cannot be precluded were established with regard to predictive factors established through the description of existing environment, leading to assessment of probable archaeological values of areas of the Project, both through landscape analysis and through review of previous archaeological records.

The assessment of effects presented is therefore probabilistic.

None of the likely or estimated adverse effects will have any impact on known archaeological values, but where there is reasonable cause to suspect there will be adverse archaeological effects on values, an Authority or Authorities, should be sought from HNZPT under the archaeological provisions of the HNZPTA 2014 for those areas of the Project where this is likely. This is consistent with the definition of archaeological sites under the HNZPTA 2014, to which the decision version of the PAUP refers. This legislation defines archaeological sites in a probabilistic way, recognizing that such places are in many cases unrecorded and physical evidence of the existence of these is often only discovered during earthworks.

For the purposes of RMA decision-making, anticipated archaeological effects are probably best described as minor, cumulative effects, that will probably be unavoidable in some instances, and are best managed under the archaeological provisions of the HNZPTA 2014. That legislation applies regardless of whether a resource consent or designation is granted, and works that do modify or destroy archaeological sites are not lawful unless an Authority to carry out such works is obtained.

Works within the scheduled extents of Mutukāroa-Hamllins Hill would need to be carried out in accordance with Objectives, Policies and Rules of the PAUP.

Declamation works for a new bridge across the Tamaki, to replace the SH1 existing culvert with a new bridge, could be regarded as a positive archaeological effect. There are likely to be numerous unrecorded archaeological sites along the banks of this creek, and amenity values of such places may well be benefitted by restoration of this creek into a navigable channel for small waka-ama, kayaks etc.

Any effects on archaeology of Maori origin would need to be in accord with PAUP objectives, policies and rules in regard to cultural heritage.

8 Discussion and Recommendations

Adverse effects on archaeological values, probably quite limited in scale, can be expected, and where encountered during works, cannot usually be avoided. Previous options assessment work has largely achieved avoidance of effects within the scheduled extents of Mutukāroa-Hamllins Hill.

Regardless of scale, adverse effects on archaeological values are cumulative and cannot be remedied. There is a duty under the RMA to mitigate any such effects where possible. Recommendations are provided here in regard mitigation of adverse effects.

Any activities in areas identified as having the potential to modify or destroy an archaeological site will be required to obtain an authority under the HNZPTA, the conditions of which, if granted, will outline and provide for appropriate archaeological monitoring, recording, investigation, analysis and reporting.

HNZPT and Council Heritage staff have been apprised of the scale and likely effects of Project works. The HNZPT Authority decision process has regard to the views of Tangata Whenua.

- For areas where there is identified potential for archaeological effects, an archaeological Authority be sought from HNZPT;
- If an HNZPTA 2014 Archaeological Authority is applied for, the application would be accompanied by an archaeological management plan specifying detailed procedures for recording, Kōiwi discovery protocols, Tāonga Tuturu protocols etc.
- For areas which have not been identified as having potential for archaeological sites to be present, the NZTA Accidental Archaeological Discovery Specification provides protocols to identify any unexpected archaeological discoveries, and to ensure that any such discoveries are managed appropriately, and PAUP Accidental Discovery Protocols could also be applied;
- Further consultation with Auckland Council Heritage staff should be undertaken in regarding works at the entrance to the access drive at Mutukāroa-Hamllins Hill;
- If archaeological sites are in fact affected by works, there may be scope for providing mitigation of adverse effects by installing interpretive material for identification of such places and commemoration of these, to provide amenity value; and
- If any substantial area of archaeological investigation is in fact required during works, there may be opportunities for public appreciation of archaeological discoveries in some areas by means of public open days during investigations.

8.1 Recommendations

It is recommended that:

- The Project continues to liaise with Mana Whenua and Council Heritage Staff with regard to developing a framework for management of Historic Heritage values during construction, in accordance with conditions of any HNZPTA 2014 Authority, and to identify opportunities for interpretive and commemorative material for any archaeological discoveries;
- For areas identified as having greater potential for archaeological discoveries an Authority or Authorities should be sought from HNZPT under the archaeological provisions of the HNZPTA 2014;
- For other areas of the project, NZTA Accidental Archaeological Discovery Specification and PAUP accidental discovery protocols should be applied, to ensure appropriate steps are taken in the event of archaeological discoveries.

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Appendix A

NZAA Summary Reports from ArchSite


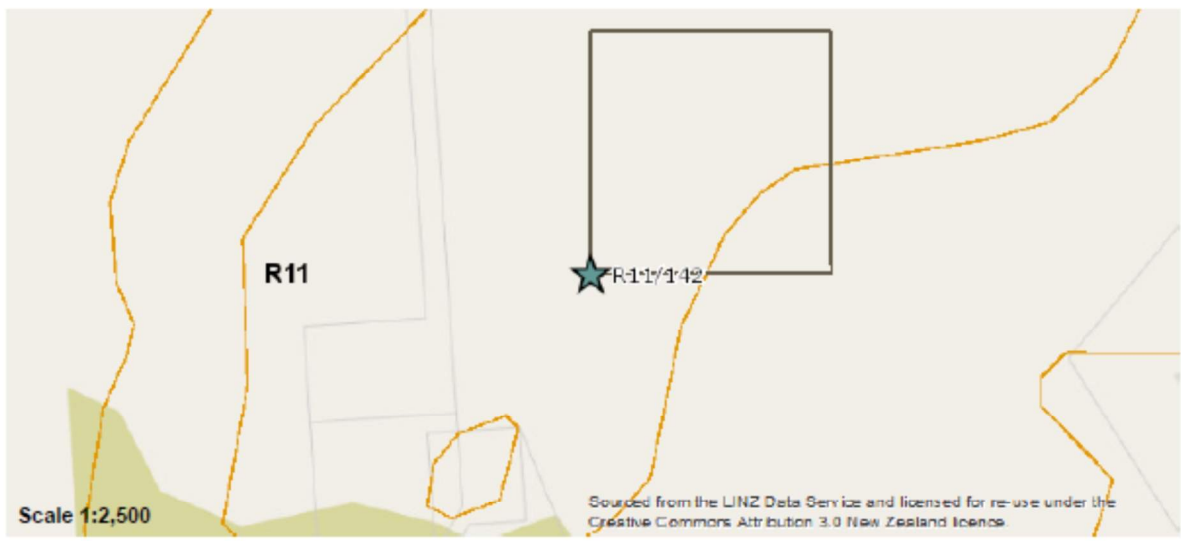
R11/99

AD --- CD AA EY

SITE REFERENCE FORM Map number N42 Map name Auckland Grid reference 245 505 298512		SITE NUMBER N42/92
		SITE TYPE <i>Settlement</i>
1. Aids to relocation of site E229800 N651200		
2. State of site; possibility of damage or destruction <p style="text-align: center;">Already destroyed</p> <p style="text-align: right; font-weight: bold; font-size: 1.2em;">DESTROYED</p>		
3. Owner Address Attitude	Tenant Address Attitude	
4. Name of site Onehunga Source of name F.D. Penton "Important Judgements" 1879		
5. Date recorded Details of investigation; methods and equipment used		
6. Aerial photograph numbers Site shows: clearly/badly/not at all		
7. Reported by Bob Brown Date August 1961	Filekeeper L. Grube Date September 1961	

<p>Map number Map name Grid reference</p>	<p>SITE NUMBER N.42/92</p>
<p>N.42 Auckland 298515</p>	<p>SITE TYPE Settlement</p>
<p>Fenton. Important Judgments. p.62 1720 His (Kiwi's) people held pas or positions of defence... at Onehunga. Until c.1740 Waiohua people p.68 About the year 1820 we find...Te Taou at...Onehunga. p.76 1836 - Potatau's people commenced planting at Onehunga.</p> <p>J.L.Campbell. Poenamo (1840) As we neared the settlement we walked through a large kumara plantation, and upon coming near the huts and being descried by the natives were welcomed with the customary cry of welcome...We had arrived most opportunely; the stream was just arising from their hangi as these were being uncovered, and we were all soon served, each with a little freshly-plaixted Flax-leaf basket filled with most deliciously cooked kumara, potatoes and peppy (pipi) shellfish... The chiefs of the tribe were on the opposite shore of the harbour at their shark fishing. We saw around us plentiful proof of their takings, as shark was hanging up to dry in the sun from lines stretched from pole to pole, and the odour therefrom was not of too pleasant description. Our repast finished with a draught of the most exquisitely clear spring water which gushed out on the beach in a wonderful stream.</p> <p>Elder. Letters and journals of Samuel Marsden. p.314 At Manukou three brother chiefs reside name Kowhou (Kawau) Koroearu, and Tattawagh. They carry on an extensive cultivation of potatoes.</p> <p>The Waiohua people had a defended position here from 1720-1741. The next we hear is that the Ngati-whatua were in occupation of the area in 1820. After fleeing from Hongi in 1821, they returned some years later and had extensive cultivations round about.</p> <p>One meaning of the name Onehunga is friable earth. Another rendering is the place of burials. (notes H.J.R.Brown)</p>	



NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>Summary Site Record</p>		<p>NZAA SITE NUMBER: R11/142</p> <p>SITE TYPE: Pit/Terrace</p> <p>SITE NAME(s): Mutukaroa Hamlins Hill</p> <p>Record last updated: 19/01/2012</p>
<p>SITE COORDINATES (NZTM) Easting: 1763381 Northing: 5912215 Source: CINZAS</p>		
<p>IMPERIAL SITE NUMBER: N42/137 METRIC SITE NUMBER: R11/142</p>		
		
<p>Finding aids to the location of the site There are at least three occupation areas - the spur, southern section of main ridge and northern end of main ridge.</p>		
<p>Brief description of the site Settlement site. There is occupation evidence of pits, terraces, midden, hangi, houses and artefacts.</p>		
<p>Condition of the site when last visited Good – Majority of visible features are intact, but some minor loss of definition and/or damage</p>		
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>	

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14/08/2016

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

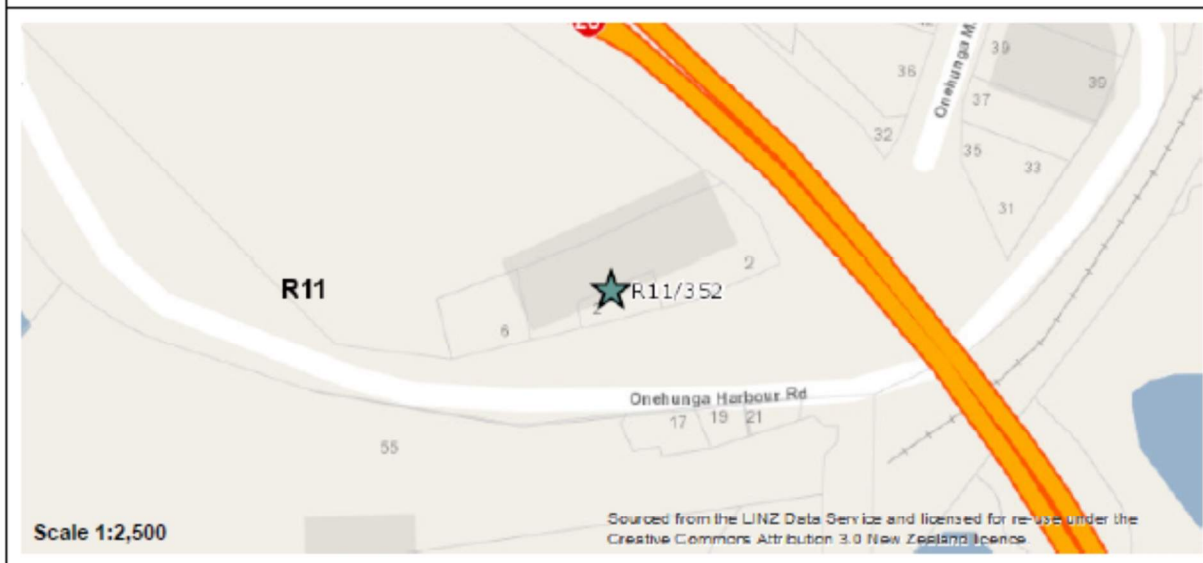
 <p>ARCHSITE archaeological site recording scheme</p> <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: R11/307</p> <p>SITE TYPE: Midden/Oven</p> <p>SITE NAME(s):</p> <p>Record last updated: 29/09/2014</p>
<p>SITE COORDINATES (NZTM) Easting: 1758481 Northing: 5912105 Source: CINZAS</p>	
<p>IMPERIAL SITE NUMBER: N42/313 METRIC SITE NUMBER: R11/307</p>	
 <p>Scale 1:2,500</p> <p>Sourced from the LINZ Data Service and licensed for re-use under the Creative Commons Attribution 3.0/New Zealand licence.</p>	
<p>Finding aids to the location of the site Manukau Road near corner with Trafalgar Street.</p>	
<p>Brief description of the site Shell midden comprising fragmentary cockle and other shell species.</p>	
<p>Condition of the site when last visited Poor - Visible features are incomplete, unclear and/or the majority have been damaged in some way</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>

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	<p>Summary Site Record</p>	<p>NZAA SITE NUMBER: R11/352</p>
		<p>SITE TYPE: Midden/Oven</p> <p>SITE NAME(s):</p>
		<p>Record last updated: 01/07/2011</p>

SITE COORDINATES (NZTM) Easting: 1758987 **Northing:** 5911270 **Source:** Site Record Form

IMPERIAL SITE NUMBER: N42/360 **METRIC SITE NUMBER:** R11/352




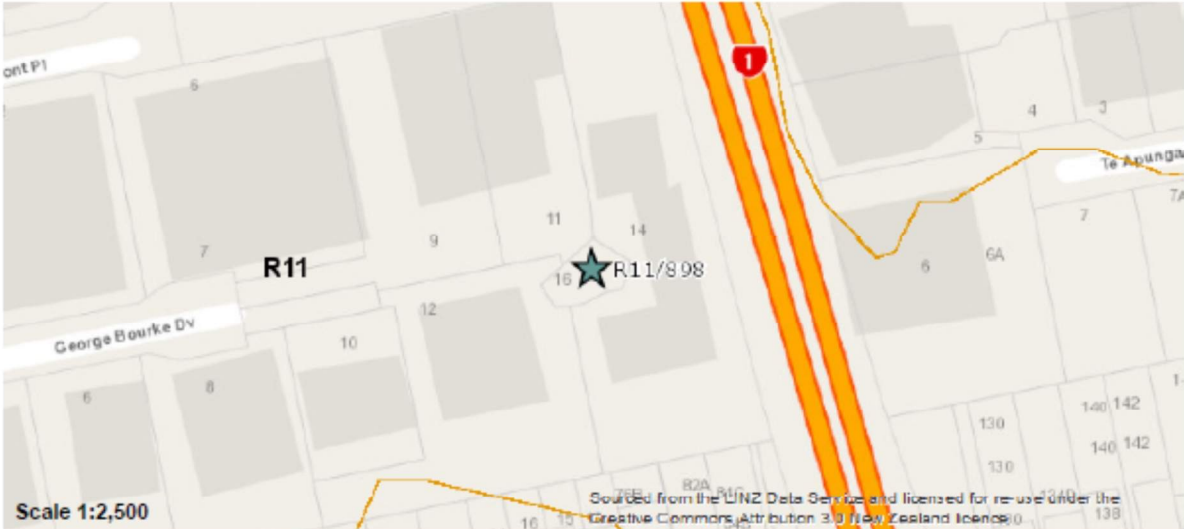
Finding aids to the location of the site
 South side Te Hopua Crater; west side of SH 20.

Brief description of the site
 Midden.

Condition of the site when last visited
 Destroyed - Evidence must be provided New housing over area.

<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact:</p> <p>ArchSite Coordinator, PO Box 6337, DUNEDIN</p> <p>admin@archsite.org.nz</p>
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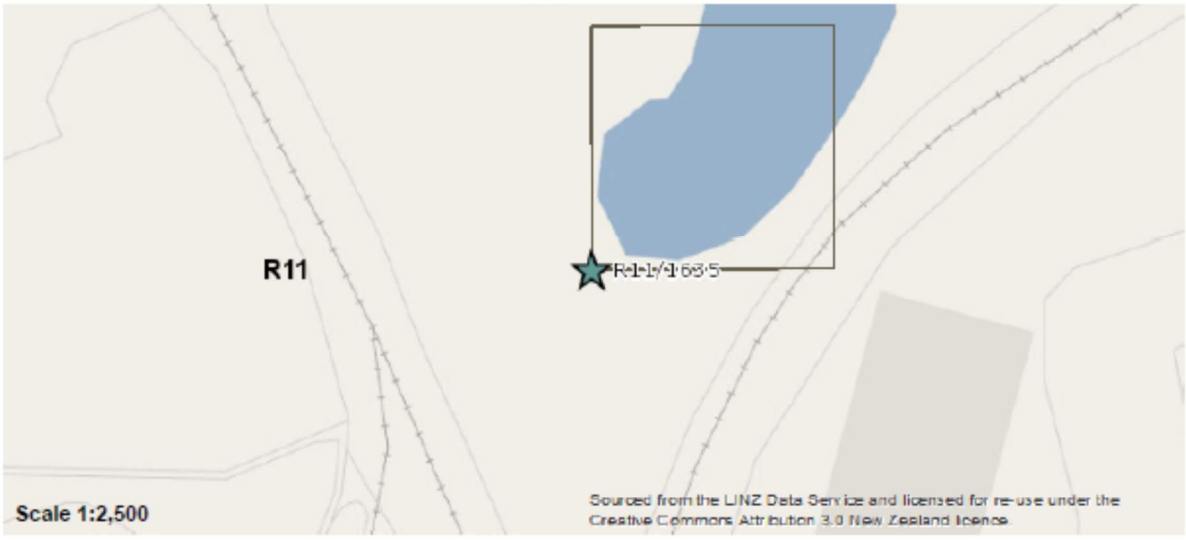
NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: R11/898</p> <p>SITE TYPE: Pit/Terrace</p> <p>SITE NAME(s):</p> <p>Record last updated: 16/08/2013</p>
<p>SITE COORDINATES (NZTM) Easting: 1764532 Northing: 5911847 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: N42/941 METRIC SITE NUMBER: R11/898</p>	
 <p>Scale 1:2,500</p> <p>Sourced from the LINZ Data Service and licensed for reuse under the Creative Commons Attribution 3.0 New Zealand licence</p>	
<p>Finding aids to the location of the site</p>	
<p>Brief description of the site PITS/TERRACES</p>	
<p>Condition of the site when last visited</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>

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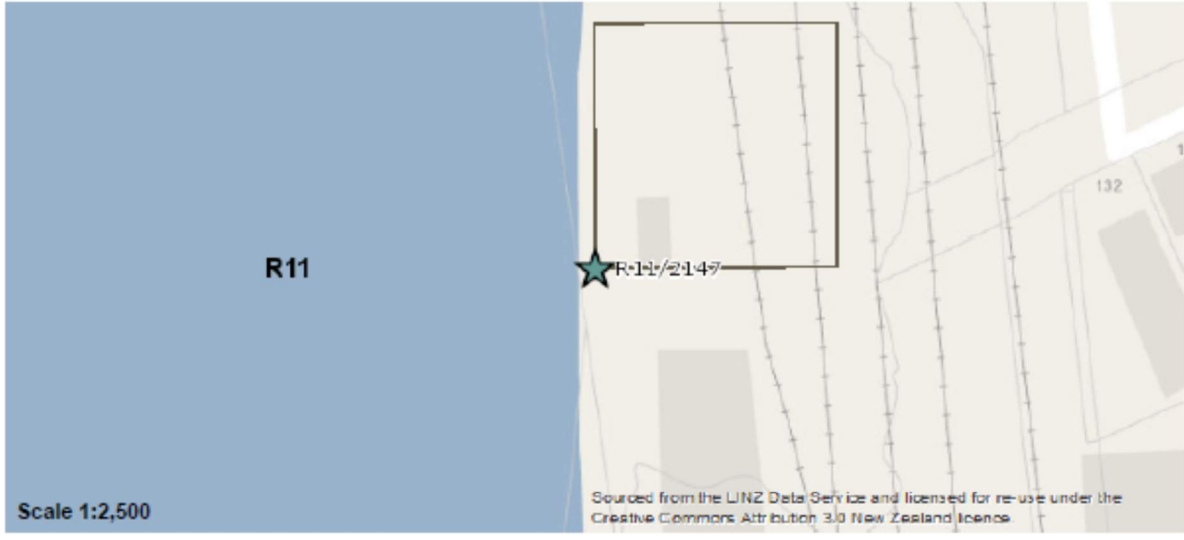
NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>Summary Site Record</p>		<p>NZAA SITE NUMBER: R11/1635</p> <p>SITE TYPE: Industrial</p> <p>SITE NAME(s):</p> <p>Record last updated: 01/01/1991</p>
<p>SITE COORDINATES (NZTM) Easting: 1762982 Northing: 5911614 Source: CINZAS</p>		
<p>IMPERIAL SITE NUMBER:</p>		<p>METRIC SITE NUMBER: R11/1635</p>
		
<p>Finding aids to the location of the site</p>		
<p>Brief description of the site WATER SUPPLY</p>		
<p>Condition of the site when last visited</p>		
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>		<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>

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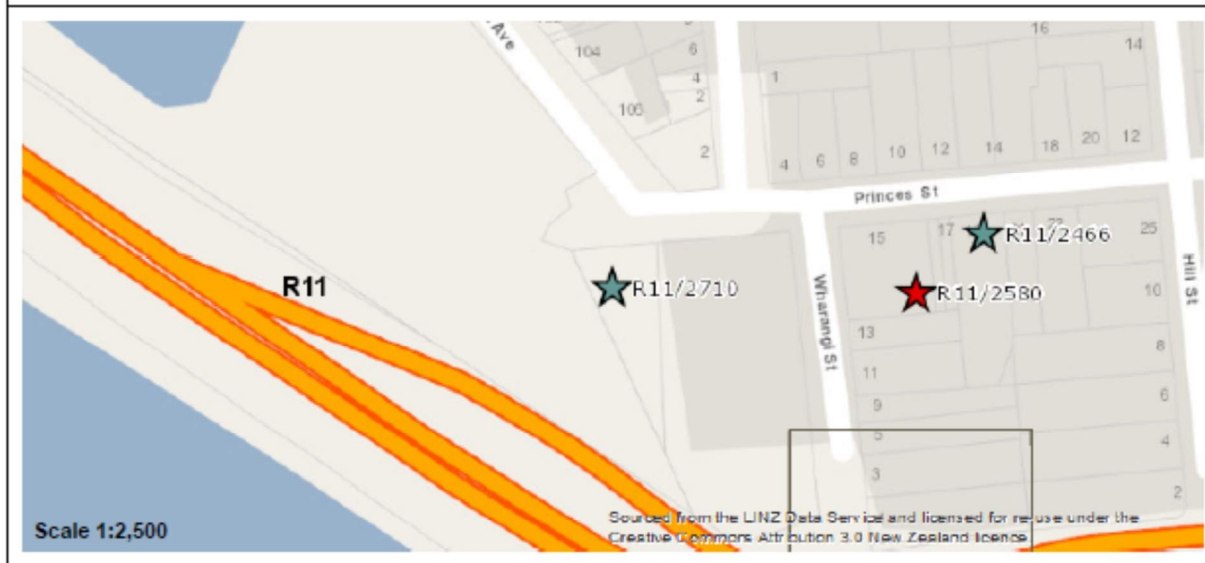
 <p>Summary Site Record</p>		<p>NZAA SITE NUMBER: R11/2147</p> <p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s):</p> <p>Record last updated: 01/01/2001</p>
<p>SITE COORDINATES (NZTM) Easting: 1762954 Northing: 5910444 Source: CINZAS</p>		
<p>IMPERIAL SITE NUMBER:</p>		<p>METRIC SITE NUMBER: R11/2147</p>
		
<p>Finding aids to the location of the site</p>		
<p>Brief description of the site PORTAGE</p>		
<p>Condition of the site when last visited</p>		
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>		<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>

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 <p>ARCHSITE archaeological site recording scheme</p>	<p>Summary Site Record</p>	<p>NZAA SITE NUMBER: R11/2710</p>
		<p>SITE TYPE: Timber milling</p> <p>SITE NAME(s):</p> <p>Record last updated: 26/07/2011</p>

SITE COORDINATES (NZTM) Easting: 1758408 **Northing:** 5911864 **Source:** Handheld GPS

IMPERIAL SITE NUMBER: **METRIC SITE NUMBER:**



Finding aids to the location of the site
Western end of Princes Street, Onehunga.

Brief description of the site
Wharf.

Condition of the site when last visited
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.

<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact:</p> <p>ArchSite Coordinator, PO Box 6337, DUNEDIN</p> <p>admin@archsite.org.nz</p>
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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>ARCHSITE archaeological site recording scheme</p>	<p>Summary Site Record</p>	<p>NZAA SITE NUMBER: R11/2743</p>
		<p>SITE TYPE: Transport/ communication</p> <p>SITE NAME(s):</p>
		<p>Record last updated: 20/12/2011</p>

SITE COORDINATES (NZTM) Easting: 1759170 **Northing:** 5911940 **Source:** Handheld GPS

IMPERIAL SITE NUMBER: **METRIC SITE NUMBER:**




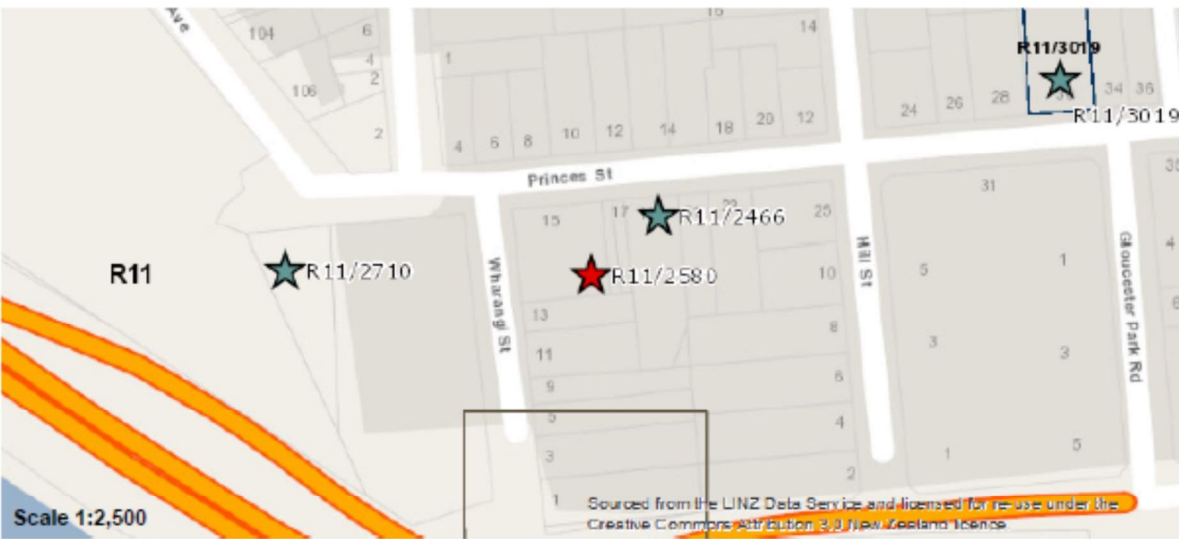
Finding aids to the location of the site
 The Onehunga Branch Line (OBL) originally ran from the Penrose Junction at the Penrose Railway Station to the Onehunga Wharf. The original Onehunga Railway Station was located at 65 Princes Street, Onehunga, Auckland.

Brief description of the site
 Onehunga Railway Station and Onehunga Branch Line.{{

Condition of the site when last visited
 Good – Majority of visible features are intact, but some minor loss of definition and/or damage

<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact:</p> <p>ArchSite Coordinator, PO Box 6337, DUNEDIN</p> <p>admin@archsite.org.nz</p>
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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

 <p>ARCHSITE archaeological site recording scheme</p> <p>Summary Site Record</p>	<p>NZAA SITE NUMBER: R11/2580</p> <p>SITE TYPE: Historic - land parcel</p> <p>SITE NAME(s):</p> <p>Record last updated: 01/08/2016</p>
<p>SITE COORDINATES (NZTM) Easting: 1758534 Northing: 5911862 Source: On Screen</p>	
<p>IMPERIAL SITE NUMBER: METRIC SITE NUMBER:</p>	
 <p>Scale 1:2,500</p> <p>Sourced from the LINZ Data Service and licensed for re-use under the Creative Commons Attribution 3.0 (New Zealand) licence</p>	
<p>Finding aids to the location of the site 13 - 17 Princes Street and 9 - 13 Wharangi Street, Onehunga. Adjacent to the Onehunga Bluestone Store (R11/2466).</p>	
<p>Brief description of the site Vegetation removal and soil stripping was monitored by Clough & Associates between 7-10 January 2013. 19th century archaeological features were exposed consisting of 2 drains, a refuse pit and 18 postholes.</p>	
<p>Condition of the site when last visited Destroyed - Evidence must be provided The site has been completely excavated down to natural, culturally sterile, deposits. All of the postholes were either fully excavated or excavated in half section. The early drain, well, historic storage pit as well as a beam slot were also completely excavated. Final excavation report will be appended once produced. However, related features and deposits likely extend beneath Wharangi Street and the footpath and grass berm on the southern side of Princes Street.</p>	
<p>This report contains a summary of the information about this site held in ArchSite.</p> <p>For a complete Site Record Form containing all the recorded information, please contact the ArchSite Coordinator.</p>	<p>For further information please contact: ArchSite Coordinator, PO Box 6337, DUNEDIN admin@archsite.org.nz</p>