

Archaeological Assessment and Geophysical Surveys

# Area N

Bell Block, Taranaki

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September 2010

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## 1.0 Introduction

New Plymouth District Council (NPDC) are considering a zoning plan change for an area of land in the Bell Block area bounded by Devon Road (SH3), Henwood Road, the New Plymouth – Lepperton Railway, and Egmont Road. This land has been designated as Area N. A previous report (Geometria 2010) summarised the history of Area N, discussed the known archaeology and archaeological excavation work undertaken to-date, and addressed some of the options and risks associated with the proposed zoning change and new road between Henwood Road and Egmont Roads.

This report follows on from that initial report, providing more detailed assessment of the archaeology and risks posed by intensified land use in Area N. It includes a detailed GIS investigation and analysis of historic land-use change, along with a field-based archaeological assessment of Area N. Geophysical surveys, using a Foerster Ferex 4.032 Fluxgate Gradiometer in twin probe configuration, have been undertaken on areas of suspected archaeological potential to identify possible sub-surface anthropogenic activity not visible on the surface.

Specifically the report addresses:

- Identification of modified land through remote sensing and historical documentary sources.
- Mapping of modified areas – roads, trees, industrial and commercial development, farming areas, and buildings (past and present).
- Field Assessment – walkover of non-modified areas of Area N and identification of areas of high archaeological potential.
- Geophysical survey of several areas identified during the field assessment.

For the purposes of this report and ease of reference the existing Area N property parcels are numbered 1-16b (Figure 1). Full property parcel appellations are contained in the descriptions of each property, which follow in Section 3. The landowners of these properties were contacted prior to the fieldwork, and where possible, on-site discussions were held with the landowners and information about the history of the area was recorded. Iwi representatives Jo Broughton and Glenn Skipper were also present during the visit to the Hoewaka Urupa and adjacent property (Areas 12 and 13 in Figure 1).



Figure 1: Location of Area N Cadastral Parcels investigated for this report. (Source: New Plymouth District Council 2010).

## 1.1 Historic Places Act

Under the Historic Places Act 1993 (HPA) all archaeological sites are protected from any modification, damage or destruction. Section 2 of the HPA defines an archaeological site as:

*"any place in New Zealand that either was associated with human activity that occurred before 1900; or is the site of the wreck of any vessel where that wreck occurred before 1900; and is, or may be, able through investigation by archaeological methods to provide evidence relating to the history of New Zealand."*

To be protected under the HPA an archaeological site must have physical remains that pre-date 1900 and that can be investigated by scientific archaeological techniques. If a development is likely to impact on an archaeological site, an authority to modify or destroy this site can be sought from the New Zealand Historic Places Trust (NZHPT) in Wellington under Section 11 or 12 of the HPA. Where damage or destruction of archaeological sites is to occur the NZHPT usually requires mitigation.

Most archaeological evidence consists of sub-surface remains and is often not visible on the ground. Indications of an archaeological site are often very subtle and hard to distinguish on the ground surface. Sub-surface excavations on a suspected archaeological site can only take place with an authority issued under Section 18 of the HPA issued by the NZHPT.

## 1.2 The Resource Management Act 1991.

Archaeological sites and other historic heritage may also be considered under the Resource Management Act 1991 (RMA). The RMA establishes (under Part 2) in the Act's purpose (Section 5) the matters of national importance (Section 6), and other matters (Section 7) and all decisions by a Council are subject to these provisions. Sections 6e and 6f identify historic heritage (which includes archaeological sites) and Maori heritage as matters of national importance.

Councils have a responsibility to recognise and provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga (Section 6e). Councils also have the statutory responsibility to recognise and provide for the protection of historic heritage from inappropriate subdivision, use and development within the context of sustainable management (Section 6f). Responsibilities for managing adverse effects on heritage arise as part of policy and plan preparation and the resource consent processes.

This survey and assessment uses archaeological techniques to assess archaeological values and does not seek to locate or identify wahi tapu or other places of cultural or spiritual significance to Maori, apart from those that have been previously recorded in the NPDC District Plan. Such assessments may only be made by Tangata Whenua who may be approached independently of this report for advice.

## 2.0 Background Mapping

Using remote sensing and historical documentary sources a spatial database has been used to identify and map areas that have undergone significant landscape change. Sources used include:

- Geo-rectified black and white stereo aerial photography from ca. 1950's
- Colour ortho-photography from 2005
- Historical documentary map sources e.g. survey plans
- Existing archaeological data from the NZAA site record file
- Landowner recollections

This helps elucidate a clearer picture of how the current landscape of Area N has evolved throughout history, and provides a basis for determining the anthropogenic nature of topographic forms that might be interpreted as archaeological in nature.

The data from the collected information has been mapped to illustrate the main changes that have occurred to Area N.

### 2.1 Land Use Change

#### Early (1950s) land-use

During the 1950s Area N is mainly in pasture with several farmhouses and residential buildings, limited vegetation and several waterways readily identifiable (Figure 2).

#### Land-use change ca. 2005

By 2005 several key changes can be noted: Residential growth has occurred at either end of Area N bordering Devon Road, and a light commercial area has been established at the northeast corner of Area N. More commercial activities have been established including the establishment of a 9-hole golf course and driving range on property 16, small orchard operation on property 10, and a small pine plantation on property 5. There is more vegetation throughout the area with the most significant vegetation change occurring in the margins of the waterways in the eastern side of Area N. Drainage works are also evident (Figure 3).

#### Post 2005 land-use change

Since 2005 more landscape transformation has occurred as a result to two significant developments, the Bell Block State Highway 3 Bypass and the light industrial and commercial Graphite Management development. Construction of the Bell Block Bypass has resulted in significant excavations of the Te Oropuriri Pa and several smaller archaeological sites discovered during earthworks. The earthworks for the bypass have resulted in large areas of cut and fill along the new road alignment and the deposition of surplus fill material in several areas in Area N. The Graphite Management Development has resulted in the removal of the north-western residential area during remodelling for the light industrial/commercial space, which has also led to significant re-contouring of this area of Area N (Figure 4).

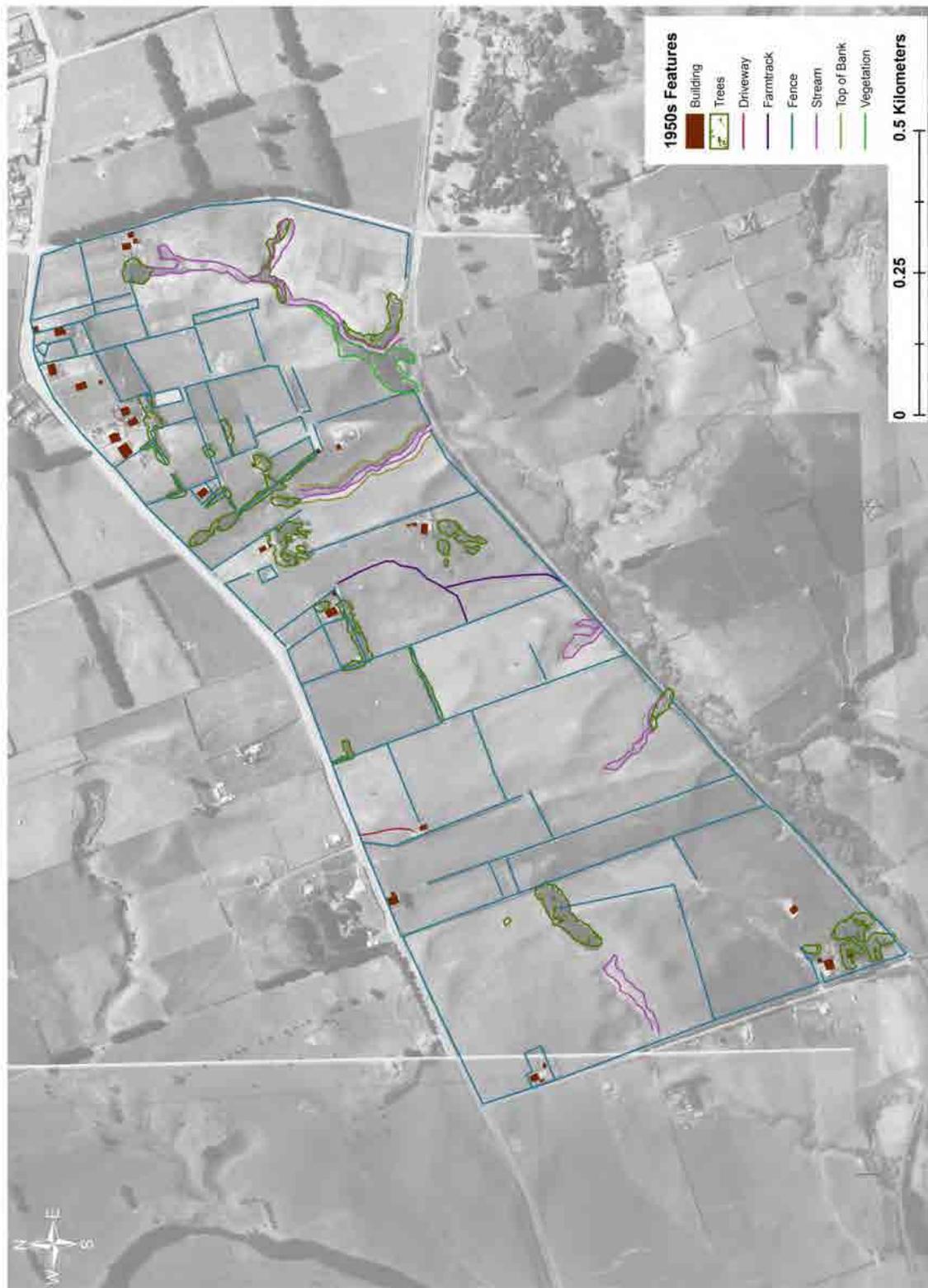


Figure 2: Area N, landscape features ca. 1950s.



Figure 3: Area N, 2005.



Figure 4: Area N 2010 showing the Bell Block bypass construction and development of commercial area along the Egmont Road/bypass corner. (Source: New Plymouth District Council).

## 2.2 Archaeological Sites

Within Area N seven archaeological sites have been recorded (Figure 5) Of these, three sites (P19/321, P19/332 and P19/334) (Figure 6) have now been completely excavated and destroyed and two (P19/262 and P19/331) have had large parts of the respective sites excavated and destroyed as a result of earthworks related to the Bell Block Bypass and Graphite Management developments. The full extent of P19/262 Te Oropuriri Pa is not currently known as large parts of the site lies underneath pastoral land on Property 9 and remnant orchard land in Property 10 (and possibly Property 8)(Figure 7). A large part of the Hoewaka settlement (P19/331) lies underneath an adjoining residential development (Figure 8). A house site (P19/261) is recorded near Property 10. This was recorded from historic plans (Figure 9), and is located on title Hoewaka 2B3B3 TNC3/1165.

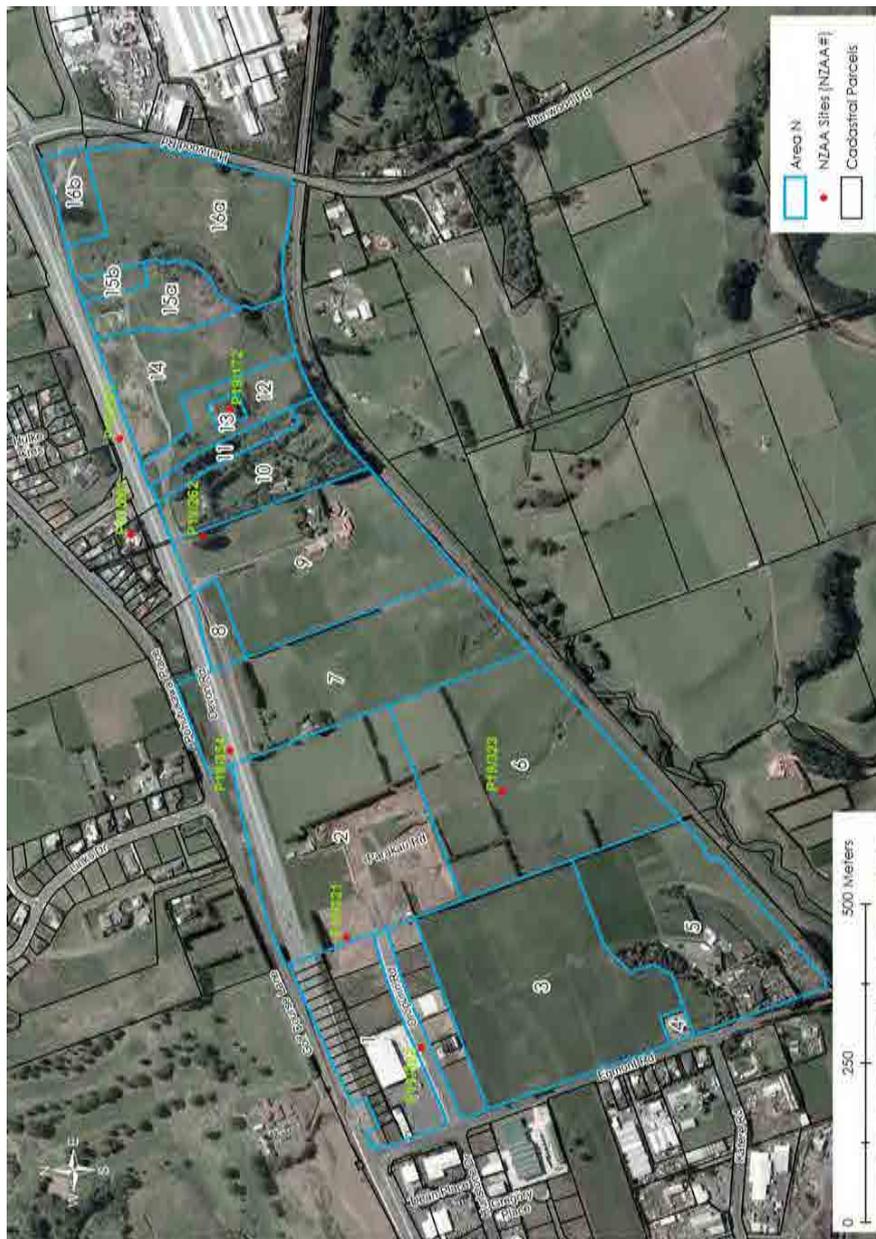


Figure 5: Area N recorded archaeological sites (overlaid on 2010 aerial).



Figure 6: Archaeological sites P19/321, P19/322 and P19/334.



Figure 7: Excavated extent of P19/262 in relation to properties 8, 9 and 10.



Figure 8: Excavated extent of P19/331 showing contiguous residential area to the north under which more of the settlement lies.

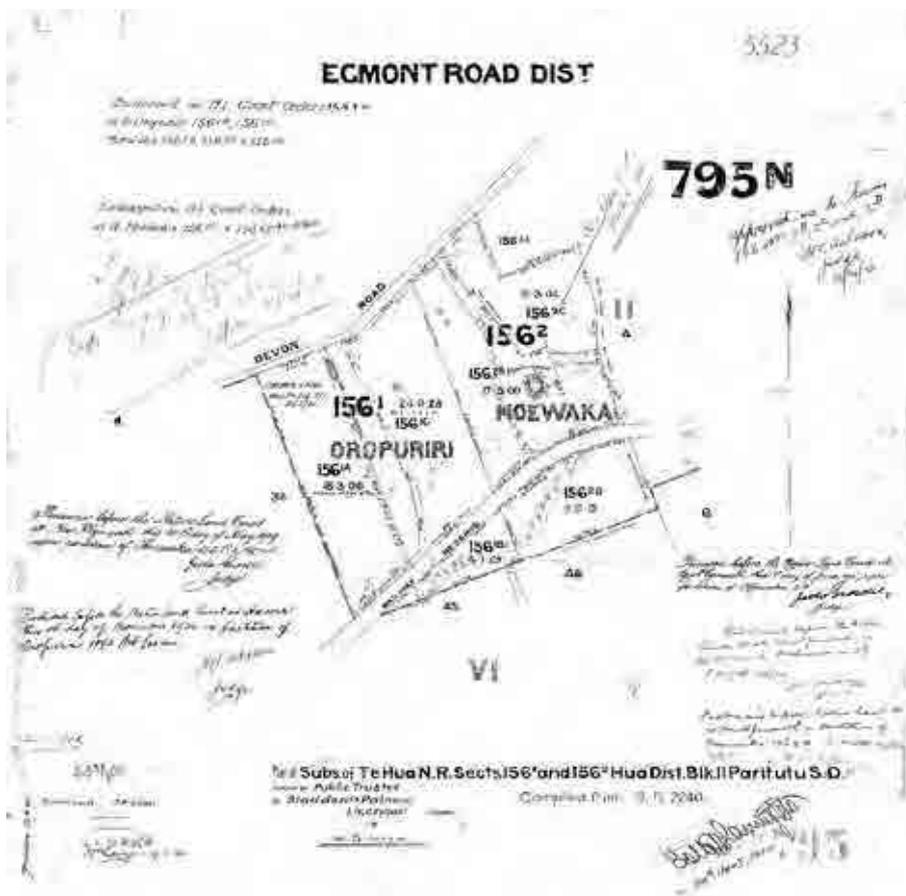


Figure 9: Survey Plan ML 795 showing location of house site recorded as NZAA P19/261.

### 3.0 Field Inspections

A walkover inspection of the Area N properties was undertaken by Dan McCurdy and Russell Gibb on July 14 and 15 to inspect for potential archaeological features visible on the land surface, and to identify areas for further investigation using geophysical survey.

Property 1 (DP 133325) and 2 (DP 403718) Twelve Gauge Limited

These properties had previously been assessed<sup>1</sup> for Graphite Management Ltd and subsequently have been heavily modified by industrial subdivision (Figure 10). As such, no detailed inspection of the property was required for this assessment. The 2006 assessment had identified one new archaeological site (P19/321 Pits) and two further possible pits (P19/332). Subsequently, further invasive investigation of P19/321<sup>2</sup> and P19/332<sup>3</sup> was undertaken under Section 18 of the HPA which concluded that P19/321 was a small horticultural site and that P19/332 was in fact modern farming rubbish pits and not an archaeological site. P19/321 was later destroyed under section 11<sup>4</sup> of the HPA during the commercial development.

Recent earthworks on the property boundary have exposed the soil strata providing a clear view of the subsurface along the boundary of this property and Property 6 (Figure 11). The bank cuttings show a homogenous upper soil horizon with no indication of intercutting archaeological features.



Figure 10: Properties 1 and 2 (outlined in blue).

<sup>1</sup> Geometria 2006

<sup>2</sup> NZHPT Authority 2008//308

<sup>3</sup> NZHPT Authority 2007/126

<sup>4</sup> NZHPT Authority 2009/05



Figure 11: Exposed bank cutting on the boundary of southern boundary of Property 1, facing south towards Property 6.

### Property 3 (Lot 2 DP400849) Wheeler Holdings

Originally part of the larger Sampson farm holding, this property (Figure 12) has had a number of modifications including significant drainage works and landscaping associated with farming activity. The previous owner, David Sampson, recalls a long history of maize farming with deep ploughing commonly occurring throughout the property. At various times silage storage areas have been formed and rubbish pits dug on the property, including a series of large rubbish pits dug in an area of former swamp, which has now been drained and is now in pasture (Location A - Figure 12). A small hillock alongside Egmont Road has been modified by the formation of Egmont Road, and later earthworks (Location B - Figure 12). Most of this property sits in pasture and at the time of survey was being grazed with cattle and horses.

Four paddocks (Figure 12, Areas 1-4 ) were identified where the surface topography was indicative of anthropogenic change<sup>5</sup>. Area 1 sits on the top of the high knoll bounded to the west by Egmont Road. Although the surface was heavily rutted by stock movement there are a number of depressions apparent. Areas 2 and 4 once formed a continuous area but a north-south farm race now bisects these areas. Area 3 lies to the south of the drained swamp on a low natural platform with a small spur in the northeast which would have once been contiguous with the lower lying former swamp.

Surface features identified as having archaeological potential included terracing, possible house platforms, and possible storage pits or collapsed rua in Area 1 (Figure 13 and Figure 14) and terracing, pits, house platforms and a possible ditch in Area 3 (Figure 15). Areas 2 and 4 were only surveyed from a distance as the number of horses and cows (respectively) in the paddock made access unfeasible, but ephemeral anthropogenic features were present on these rises also. David Sampson indicated a silage storage area was once located adjacent to the north-south race.

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<sup>5</sup> The identification of surface features as anthropogenic in nature is a preliminary assessment and could indicate archaeological features or later activity related to farming, such as animal burials or rubbish pits. These however may predate 1900 and could still be considered archaeological sites.

Areas 1 and 3 were selected for geophysical survey, as they demonstrated the most modification and were not being grazed at the time. Access to Areas 2 and 4 was impossible with geophysical equipment due to horses and stock presence in these paddocks at the time.



Figure 12: Location of Property 3 (outlined in blue) including Areas 1-5 and references from text



Figure 13: Property 3, Area 1.



Figure 14: Property 3, Area 1 knoll with suspected anthropogenic features looking east towards Area 4.



Figure 15: Property 3, Area 3 shown on relation to Areas 2 and 4.

Property 4 (**LOT 1 DP 400849**) PowerCo.

This small, heavily modified property (Figure 16 - Figure 17) is located adjacent to Egmont Road below Area 1 (see Property 3 above) and consists of a level platform excavated below the original ground level. An inspection of the exposed embankment surrounding the north, south and east perimeter of the property show no obvious signs of in-situ archaeology, although the embankment face is largely covered by grass growth, limiting visual observation. The excavation that formed the building platform has removed any archaeological potential for this site.



Figure 16: Property 4 (outlined in blue) viewed from Area 1, Property 3.



Figure 17: Property 4 (outlined in blue).

Property 5 (Lot 2 DP18340) David and Noeline Sampson

The Sampson property is part of what was once a much larger landholding and has had substantial modification in some areas with farm and commercial buildings and associated curtilage (Figure 18). The remaining open farmland is currently used for grazing with some of the property utilised for pine plantings for a commercial Christmas tree operation.

Nothing of archaeological interest was noticed on this property during the walk over, however some features related to Area 1 (Property 3) could continue into the light bush which is immediately east. However, no features were noted in this area of bush due to the thick layer of pine needles (Figure 19).



Figure 18: Property 5 (outlined in blue).

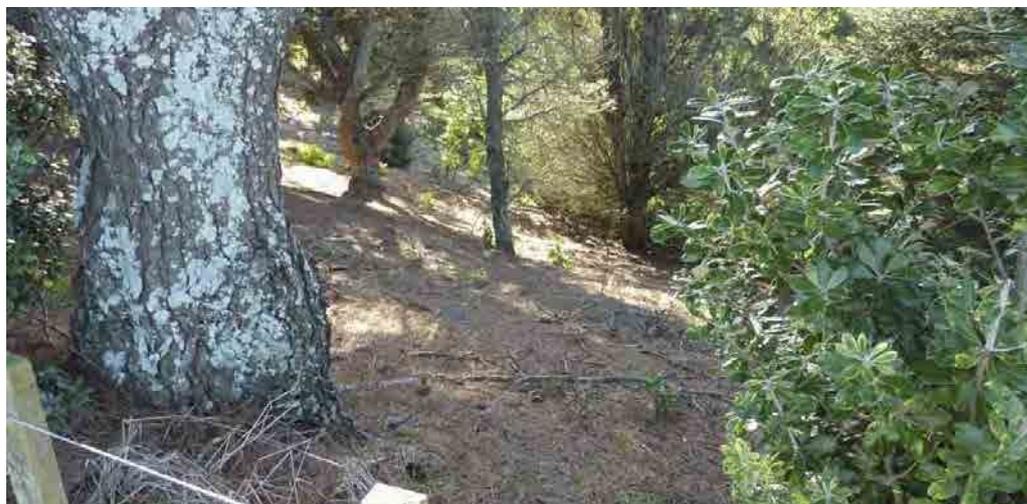


Figure 19: Slope (looking east) immediately adjacent to Area 1, under light tree cover.

Property 6 (Lot 2 DP 403718) Keith and Evelyn Cummings

This property (Figure 20) had been partly assessed during the investigation of the proposed Graphite Management development<sup>6</sup> and subsequently some of the original larger landholding has been developed<sup>7</sup>. A historic drainage tunnel (P19/323 - Figure 22) was recorded from this earlier work and research established a date of 1915<sup>8</sup> for the construction of this drainage feature.

Further field investigation was undertaken on this property and a small knoll (Figure 20 - Area 5) where a farm trough once stood (Figure 21) was investigated by geophysical survey. This area was investigated because it had a measurable modern feature, and as it was thought to be largely unmodified, it provided a suitable control area similar in nature to the other areas that were surveyed by geophysical means.



Figure 20: Property 6 (outlined in blue).

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<sup>6</sup> Geometria 2006

<sup>7</sup> The Cummings originally had a much larger landholding, part of which was subdivided and sold to Graphite Development with Property 6 remaining in the Cummings' ownership.

<sup>8</sup> NZAA Archsite P19/323



Figure 21: Area 5 geophysical study area. Author stands on approximate location of old water trough.



Figure 22: P19/323 Drainage tunnel entrance.

Property 7 (MBLK 1A Oropuriri None) Caskey

Property 7 (Figure 23) extends between the Bell Block Bypass and the New Plymouth – Lepperton Railway and consists of several paddocks, a small knoll with several buildings<sup>9</sup> dating to around the late 19<sup>th</sup> century<sup>10</sup> located on it, and a small swamp area to the south of the property. These are clearly shown on survey plan ML 245 (1895)(Figure 24).

There were no observable surface features interpreted as being of possible archaeological origin recorded during the walkover. The swamp located adjacent to the railway line on the southern boundary holds some archaeological potential, as does the knoll under the house. During excavations<sup>11</sup> for the bypass a number of artefacts and archaeological features were located in the cutting for the bypass, located in the general area below this knoll. The bypass project archaeologist, Michael Taylor, surmises that it is unclear as to their exact origin but suggests that they may be associated with a pre-historic occupation on this small hill, now masked by the house located there<sup>12</sup>.

Figure 23: Property 7 (outlined in blue) with location of the swamp referenced in text.



<sup>9</sup> At this stage it is unclear as to whether the mapped structures represents the residence currently situated on the knoll.

<sup>10</sup> These structures are mapped from at least 1895 and are potentially archaeological sites but are not recorded as such in the NZAA or NPDC records.

<sup>11</sup> The extent of excavations in this area generally relates to route of the bypass, new access road formation of associated batters with these two roads.

<sup>12</sup> Taylor 2010 pers. comm.

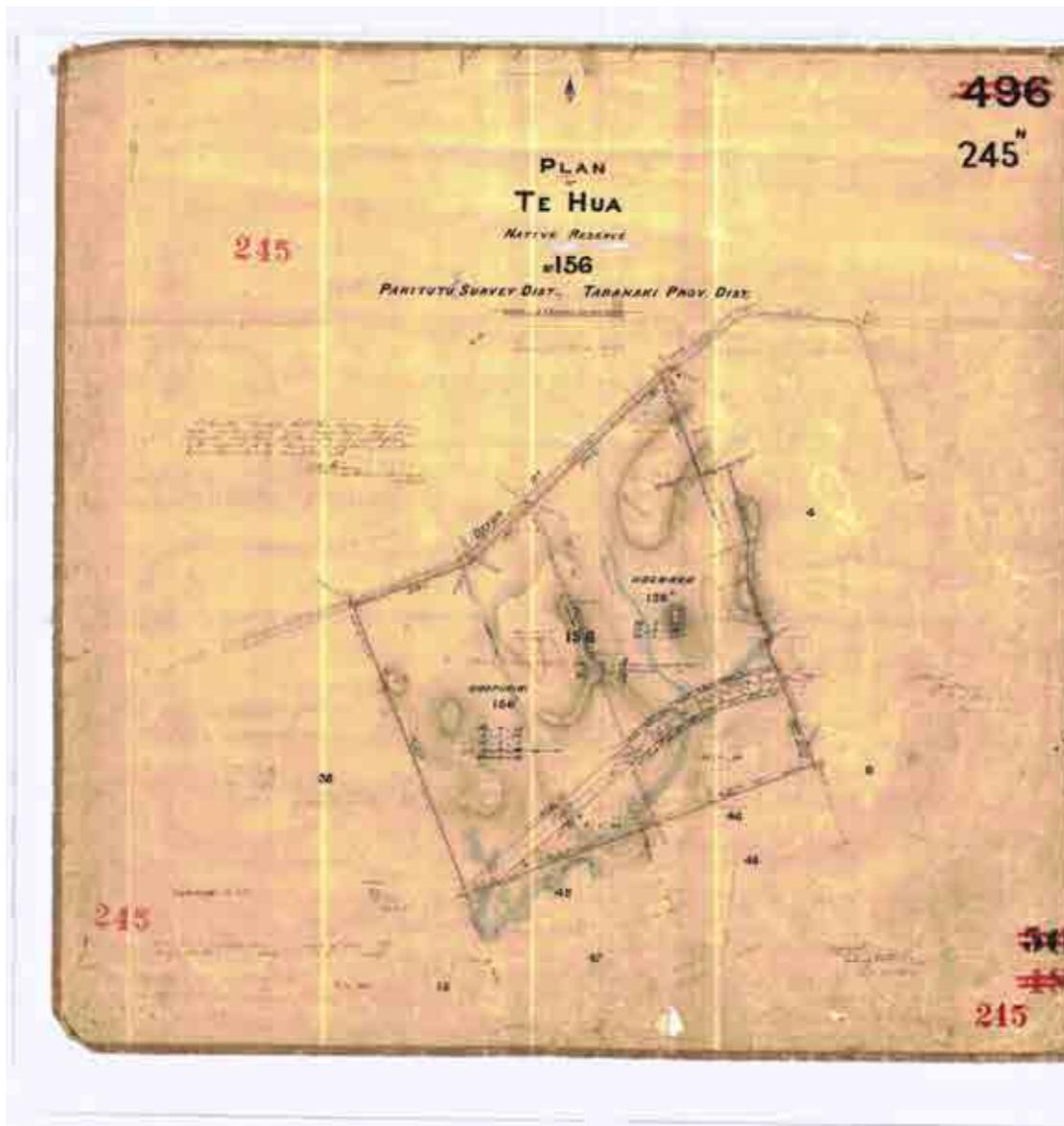


Figure 24: Survey plan ML 245 (1895) showing several buildings on the small knoll (centre left).

#### Property 8 (PT MBLK 1C1 Oropuriri None) NPDC

Property 8 (Figure 25) is a small corner section and has no obvious surface archaeological features although its proximity to the excavated area of Te Oropuriri suggests that there is some archaeological potential here. However, the adjacent area immediately north of the property was excavated for the bypass and no archaeological material was reported.

#### Property 9 (1C2B2 Oropuriri None) Caskey

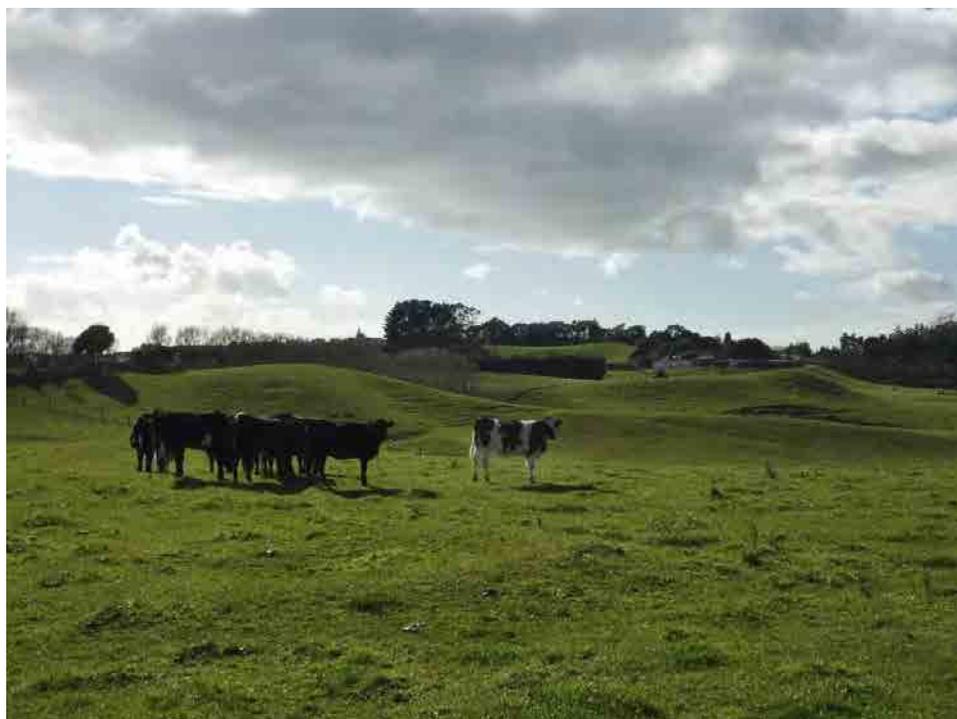
Property 9 (Figure 25) features the highest point in Area N - a small knoll located on a north-south ridgeline that forms part of the eastern boundary of the property (Figure 26). A flat spur runs from this main ridgeline (from the north part of the section) in a

westerly direction with a smaller secondary spur leading off the central ridgeline to the southwest and parallel with the first spur<sup>13</sup>. This property is also contiguous with the

Figure 7). The property has a main residential house and a number of farm buildings and associated cartilage.



Figure 25: Properties 8 and 9 (outlined in blue).



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<sup>13</sup> This topography is shown clearly in Figure 24: Survey plan ML245.

Figure 26: View looking east from Property 6 towards Property 7, 8 and 9 with Te Oropuriri, ridgeline and highpoint in the background.

The focus of the walkover was the ridgeline and spurs that extend from it to ascertain if further archaeological features could be recognised and better define the extent of Te Oropuriri. The northern end of the ridgeline has a small platform that is sited directly above the excavated area of Te Oropuriri. The western edge of this platform is bordered by a line of pine trees forming a windbreak.

Moving further south along the ridge the platform drops to a flatter area before rising to the highest point, another small platform. On each platform and the area between there a number of depressions (Figure 27), most of which are thought to relate to Te Oropuriri, as well as some modern intrusions, including an open rubbish pit (Figure 28).



Figure 27: Possible archaeological features located on the lower platform, looking north to the area of Te Oropuriri Pa excavated during the Bypass construction.

The large northwest spur has been recently grazed and is generally flat and without obvious depressions (Figure 29). Bottle glass and ceramic fragments and fire-cracked rock were all observed in the exposed topsoil (Figure 30). The southwest spur has been heavily modified with landscaping, earthworks and building construction and did not present any readily identifiable archaeological features. A long in-filled trench feature runs parallel to the north south boundary of Property 7 and approximately 10m from the end of each of the spurs (Figure 31). This is thought to be a drainage feature related to farm activity rather than a defensive feature relating to Te Oropuriri.

We had hoped to conduct a geophysical survey on the northern spur and another at the bottom of the main ridgeline to the rear of the property but Mr Caskey declined our request to undertake geophysical surveys on his property.



Figure 28: Open modern rubbish pit on Te Oropuriri, located on the Caskey property



Figure 29: Northern spur, Property 9. The excavated area of Te Oropuriri lies to the left of the wooden fence.



Figure 30: Ceramic artefact observed on the northern spur during the walkover.



Figure 31: Lateral feature (possible drain) observed parallel to Property 7 boundary.

Property 10 (MBLK 2B3B5 Hoewaka None) Ian and Patricia Rowe

This property (Figure 32) has very significant archaeological potential, as it is contiguous with the excavated area of Te Oropuriri and the ridgeline boundary of Property 9. It has been highly modified in the past with a house and garage, sheds and large area of the property divided by a series of windbreaks that delineate and protect orchard fields that flank the eastern slopes of the property. A driveway has been cut parallel to the Te Oropuriri ridgeline (Figure 33) and another terrace has been formed above this between the drive and boundary with Property 9. The eastern boundary is delineated by a spring and a heavily vegetated swampy area, fed by the Waipapa Stream (Figure 34). The area between the swamp and lower orchard fields has flat terracing with a steep bank separating these two areas. This bank might be a defensive structure associated with Te Oropuriri.

To the rear of the house another large terrace has been formed (Figure 35), bulldozed by the previous owner Dr. Frengley<sup>14</sup>. The remnant part of the ridgeline has what appears to be older shallow terracing on the western side and this ridgeline extends to the rear of the property where it drops off to the railway below, forming a steep embankment. Some of this embankment would have been formed (battered) during the construction of the railway but it appears that a steep natural slope originally defined this end of the ridgeline. The cleared soil from the large terrace has been used to create a batter above the lower rear orchard field on the eastern slope (Figure 36).

The house has been constructed on the slope of the high platform (the majority of which is located on Property 9) and during construction some contouring to the platform and adjacent slopes would have been undertaken, slightly modifying the original topography (Figure 37).

An inspection of exposed cuttings along the driveway and adjacent upper terrace bank revealed several artefacts including ceramic, glass, fire cracked rock and large water-worn stones (Figure 38 - Figure 41).

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<sup>14</sup> Frengley 2010 pers. comm.



Figure 32: Property 10. The remnant orchard rows and windbreaks are located on an east-facing slope that falls to the swampy eastern boundary.



Figure 33: Driveway and upper terrace adjacent to the boundary of Property 10 (far right of frame). View is looking south with Property 9 located immediately right of the frame.



Figure 34: Spring and swamp (Waipapa Stream) area southeast of Te Oropuriri. Hoewaka urupa is visible in the rear of frame.



Figure 35: Large bulldozed rear terrace looking north towards the Rowe house. The central rear spur is located on the left and the batter formed by the bulldozing of the terrace is covered in vegetation on the right of the frame.



Figure 36: Rear terrace and scarp looking south. Possible rifle trenches are visible in centre of frame, filled with weeds. The vegetation on the right of the frame covers the batter below the bulldozed terrace.



Figure 37: View looking north towards house and upper Te Oropuriri platform.



Figure 38: Author indicates location of artefacts along the Property 10 driveway cutting.



Figure 39: Ceramic cup fragment.



Figure 40: Ceramic shard.



Figure 41: Fire cracked rock (left) and flat water worn rock (right).

A number of linear depressions of varying length are clearly visible throughout the property, along with possible in-filled kumara and rifle pits. These features are mostly positioned along the lower slopes in the orchards (Figure 42 - Figure 45) and include trenches that are very similar in shape and alignment to previously excavated gunfighter trenches at Te Oropuriri. The current owners, Ian and Patricia Rowe, and the previous landowner, Dr Frengley, do not know the origin of these features and have not actively modified them. Dr Frengley developed the orchards and remnants of these are still found spread throughout the property.



Figure 42: Linear trench in lower orchard



Figure 43: Possible in-filled kumara pits in upper-middle orchard



Figure 44: Possible rifle pits in lower-middle orchard



Figure 45: Alignment of possible gunfighter trench and linear features which join up with rifle pits that have been previously excavated as part of the Bellblock Bypass archaeological investigations.

Property 11 (PT LOT 2 DP 14420) NPDC

Property 11 is an NPDC property through which the Waipapa Stream runs and has archaeological potential given its proximity to Te Oropuriri and Hoewaka (Figure 46). No anthropogenic features were visible but it is likely to be associated with both Hoewaka and Te Oropuriri.



Figure 46: Property 11.

Property 12 (PT MBLK 2B2 Hoewaka None) NPDC

Property 12 is a fenced property that surrounds the Hoewaka Urupa - Property 13 (Figure 47). It is currently being used as an equestrian training and grazing ground (Figure 48). On the slopes below the urupa at both the front (northern end) and rear of the property are a number of depressions and terracing (Figure 49), which are most likely anthropogenic features that relate to the pa site on which the urupa was later formed<sup>15</sup>. These areas are both suitable for geophysical survey but this was not required as this property is in NPDC ownership and can be investigated at a later date if necessary. The site was visited with iwi.

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<sup>15</sup> Hoewaka urupa was first recorded in the NZAA records (P19/172) as a small ring ditch pa named Ngahinepouri – refer Figure 9 and Figure 24



Figure 47: Property 12 (outlined in blue) and Property 13 (Hoewaka– wholly inside Property 12).



Figure 48: Property 12 looking south.



Figure 49: Probable anthropogenic features (centre) on the lower northern slopes of Property 12.

#### Property 13 (MBLK 2B1 HOEWAKA NONE)

Hoewaka Urupa is a fenced Urupa or Maori cemetery built on the upper slopes of an older pa site as previously mentioned (Figure 50). It contains a number of gravesites and there are a large number of weeds growing within and on the slopes of the urupa.<sup>16</sup> No investigation of the site was necessary.



Figure 50: Hoewaka Urupa looking north

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<sup>16</sup> It is recommended that these weeds should be carefully removed so as not to disturb the gravesites or cause further damage to the slopes of the pa.

Property 14 (PT SEC 165 HUA DIST) NPDC

The majority of the mid and rear part of this property (Figure 51) has undergone recent contouring from activity associated with the bypass earthworks. This includes the removal of fill material and dumping and levelling of a large volume of soil (Figure 52 - Figure 53). The property was archaeologically accessed prior to this activity beginning as part of the bypass project with no archaeological material reported<sup>17</sup>.



Figure 51: Property 14.



Figure 52: Area in Property 14 that was heavily modified during the Bellblock Bypass roading works (West of house in Property 15).

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<sup>17</sup> (M. Taylor pers. comm.)



Figure 53: Aerial photograph (2008) showing earthworks on Property 14 during the bypass construction.

Property 15a and 15b (SEC 13 SO 417947) NPDC

Property 15a (Figure 54) has a two storied brick house situated on the top of a small hillock (Figure 55). This property has historic contouring associated with the house construction - levelling of the house and garage platform, driveway and garden formation. Bypass earthworks have modified the front and rear of the property. A number of large trees have recently been removed from the rear of the property. During this activity, soil horizons in several areas of bank overlooking the waterway have been exposed (Figure 56) and there was no evidence of archaeological features in any of these.



Figure 54: Property 15 (outlined in blue).



Figure 55: House situated in Property 15.



Figure 56: Clearing activity at rear of Property 15.

Property 15b is a small section adjacent to 15a with an access way crossing through the section. There is evidence of earthworks along the boundary of this site with Property 16a. No archaeological evidence was encountered on this property.

Property 16a (Lot 2 DP414614) Yong Kim

A 9-hole par 3 golf course and driving range were developed over the majority of this property (Figure 57). This resulted in some contouring to form the driving range field, construction of several buildings and a driving range tee facility, and concrete pads for golf tees around the property. A large pond was also formed that drained to the original waterway. Concrete foundation remnants and landscaping can be found throughout the property (Figure 58). No obvious surface archaeological features can be seen. A small raised area at the end of the old driving range was selected for geophysical survey due to a few small depressions and modified topography,

although it was thought that most of this related to the construction and operation of the driving range.



Figure 57: Property 16 and the location of Property 16a.



Figure 58: Modern earthworks relating to the golf driving range.

Property 16a (Lot 1 DP414614) MacDonald's Restaurants (NZ) Limited

This small corner site (refer Figure 57) has been heavily modified and has no obvious archaeological potential (Figure 59).



Figure 59: Property 16a, a highly modified landscape.

## 4.0 Geophysical Surveys

### 4.1 Background

The fluxgate gradiometer measures small underground magnetic anomalies. Both geomorphologic changes and anthropogenic soil changes can be detected. Among the features often recognize in archaeological geophysical surveys are fireplaces, houses, and pits (Zickgraf 1999) and shell middens (Dalan et al., 1992).

A geomagnetic survey is influenced by three components (Zickgraf 1999:107-9):

*The magnetic susceptibility of any material affects the magnetic signature to different degrees. Therefore different materials in the ground may present different magnetic signatures. Ferromagnetic materials (e.g. iron) can have their own magnetic signature (remnant magnetism).*

*Le Borgne effect: The magnetic susceptibility of the topsoil to a depth of about 0.30m can be up to 100 times stronger than the susceptibility of the soil at 1m depth. This is due to chemical reactions of the soil close to the surface. Therefore any trench or pit back filled with mainly topsoil shows a much stronger magnetic signature than the surrounding soil.*

*The magnetic field of the earth is constantly changing and influenced by environmental changes, e.g. the intensity of the sun. The configuration of the instrument as a gradiometer, where one magnetometer is positioned close to the soil surface and a second magnetometer set approximately 1 metre apart compensates for environmental changes.*

Several types of geophysical anomalies are often found in archaeological contexts (ibid):

*Small areas of high (dark) values generally represent substantial burning events such as fireplaces, hearths or hangi. Interpretation of anomalies as fireplaces is based on anomalies similar to the possible pit features but smaller and more discrete. It is expected that these anomalies are the result of induced magnetism by localized burning events.*

Ferrous material has remnant magnetism which shows up as a positive and a negative pole surrounding the object i.e. areas of high (dark) values, contiguous with areas of low (light) values.

Pits are often distinguished by the outline or shape of the feature where the fill of the pit has a different magnetic signature to the surrounding undisturbed soil outside the pit. Therefore, possible pit features are interpreted on the basis of a strong magnetic signature from the presumably deeper and denser top soil, suggestive of an in filled pit feature; coupled with geometric shape recognition or patterning, such as a row of square anomalies.

House floors are sometimes interpreted by the magnetic response given by the compacted hardened floor, compared to the surrounding area.

When interpreting geophysical results generally the “big picture” is examined, rather than the finer details of the survey. It is for this reason that best practice geophysical surveying demands that the grids surveyed be as large as possible, however the physical limitations (extensive tree cover, stock presence etc...) prevented large

scale geophysical survey for most of the properties examined within this report. It is difficult to distinguish between recent anthropogenic change and that which is archaeological significant and this should be taken into account with the following results, as most of the surveys took place on working farms where large-scale soil modification is commonplace.

#### 4.2 Geophysical Surveys in Properties 3 and 6

In properties 3 and 6, geophysical surveys were carried out in locations that presented the highest likelihood of encountering anthropogenic modification (Figure 60), however some sites (Areas 2 and 4) were not accessible due to livestock being present in the fields. Areas 1 and 3 were surveyed due to the presence of surface features that required further investigation, while Area 5 was investigated as a control, given that the farming history of the knoll was well understood by the farmer.

The location of all geophysical grids was recorded with an RTK GPS with an accuracy of approximately  $\pm 5\text{cm}$ .



Figure 60: Location of geophysical grids 1, 2 and 3 in Properties 3 and 6.

## Property 3 – Grid 1

A 50 x 50m grid was surveyed in Area 1 across the top of the knoll, positioned to cover all of the visible surface features (Figure 61). This grid is difficult to interpret as the underlying geological processes dominate any anthropogenic modification. While a number of ephemeral features are evident most cannot be confidently determined to be anthropogenic in nature.

Features 1 and 6 are interpreted as being possible house floors, and Feature 2 is likely to be an in-filled pit (or collapsed rua), all in line with surface observations. However none of the other surface features observed during the walk over were clearly evident in the geophysical results and thus could not be confirmed. Features 3 and 4 were not visible on the surface but potentially represent the edges of previously formed terraces. Feature 5 is a geomorphological feature, which is likely unrelated to any anthropogenic modification.



Figure 61: Grid 1 geophysical results.

### Property 3 – Grid 2

This 80 x 30m grid was surveyed as two grids (50 x 30m and 30 x 30m), covering the length of the knoll and capturing the most prominent surface features (Figure 62). This grid demonstrated significant anthropogenic modification, which largely correlated with surface observations.

Features 1, 2, 3 and 4 are likely to be collapsed pits and correlate with depressions identified in the walk over. Features 5 and 8 were initially identified as ditches in the walk over and the geophysical results lend support to this hypothesis. Features 6 and 7 appear to be the edges of terraces, but these are not clear given their location on the edge of the grid. Feature 9 most likely represents modern farming activities (potentially the burial of modern refuse) or a significant geomorphological process.

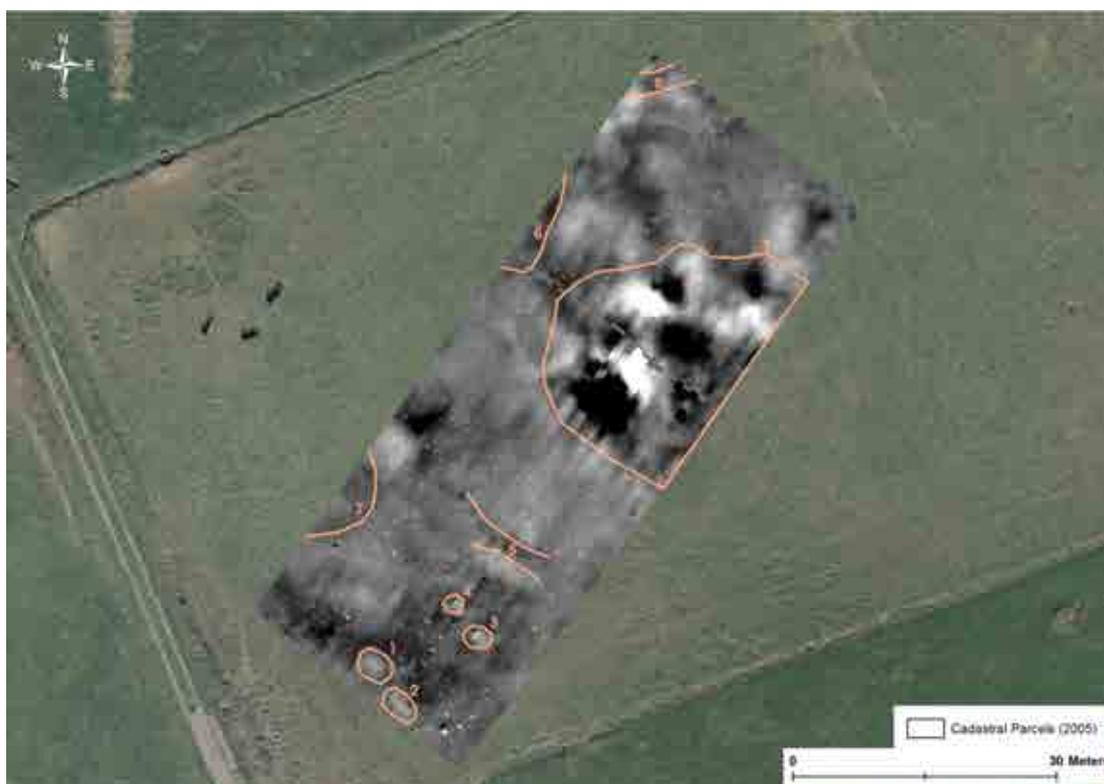


Figure 62: Grid 2 geophysical results.

### Property 6 – Grid 3

This 33 x 28m grid (Figure 63) was surveyed primarily to function as a control grid for comparison with the other nearby knolls. The adjacent paddock to the East could not be surveyed due to stock presence.

The survey results clearly show the trough area (which was indicated accurately by the land owner) and another large feature (Feature 1), which is most likely to be modern and relates to compressed earth from stock movement around both the earlier and current troughs. The exact nature of this feature cannot be confirmed however as it was not visible on the surface, and thus it could be of archaeological significance.



Figure 63: Grid 3 geophysical results, with the trough being clearly identifiable.

#### 4.3 Geophysical Surveys in Property 10

Property 10 is located immediately adjacent to the known pa site of Te Oropuriri and it was suspected that the pa extends further towards the railway line than previously recorded. Deep depressions similar to those excavated during the Bell Block Bypass excavation were encountered in all of the orchards, and it was suspected that these were remnant rifle pits/trenches. In order to ascertain whether any other features existed relating to these trenches geophysical surveys were undertaken in three of the four main orchards on this property (Figure 64). The orchard closest to the Bell Block Bypass has already been demonstrated to contain rifle trenches as it has already been partially excavated by Archaeology North Ltd. during the bypass construction.



Figure 64: Location of geophysical grids surveyed in Property 10.

#### Grid 5 – Rear orchard

This terrace is bounded by the swamp to the North and a high scarp to a modern terrace to the South. This is a narrow terrace, largely in weeds and overgrown kikuyu grass. A long 68 x 10m grid was surveyed (Figure 65), limited by thick growth either side and inside the visible features. The grid largely fits the surface features and due to its limited size broad interpretation is not possible.

Features 1 and 2 are evident on the surface as long, 50-80cm deep trenches, currently “planted” in woolly tobacco weed. Feature 3 is not evident on the surface but is likely to be a depression – possibly a pit or continuation of the rifle trenching. Features 4, 5 and 6 are modern wooden posts relating to the orchard. The probable rifle pits (Features 1 and 2) are angled to target the river/swamp immediately to the north-east.



Figure 65: Geophysical Grid 5, lower orchard, Property 10.

#### Grid 6 – Middle Orchard

In contrast to the lower orchard it was possible to do a much larger survey in the middle orchard and the lack of vegetation inside visible features made their survey easier and more accurate. It is understood that this orchard was previously planted in tamarillos but now has nine large trees planted instead. Consequently the anthropogenic features are more clearly visible (Figure 66).

Features 1 and 2 were clearly visible on the surface as depressions similar to Features 1 and 2 in Grid 5. It is very likely that these are rifle pits given their surface topography and uniform magnetic signature. Feature 3 is likely to either be a storage pit or rua which contains a quantity of metal, which is consistent with others that were excavated during the Te Oropuriri excavations. Feature 4 is probably a medium-sized isolated ferrous metal item – potentially related to the modern orchard. Feature 5 seems to be a worn path or levelled bank but the signature of this feature is very weak. Feature 6 is likely to be a collapsed storage pit.

Of interest in this grid are the plough marks running diagonally across the grid at the same angle as the rifle pits. Whether this is coincidental or not is impossible to determine without further archaeological investigation. The angle of the probable rifle pits (Feature 1 and 2) indicate that they are targeted at the river/swamp immediately to the east, similar to those in Grid 5.

The southern end of the grid contains strong magnetic features which make identification of soil anomalies difficult, but it does appear that there is more

modification immediately below Feature 1 which cannot be clearly differentiated from the surrounding magnetic noise.



Figure 66: Geophysical Grid 6, middle orchard, Property 10.

#### Grid 7 – Upper Orchard

The upper orchard was relatively easy to survey, with the only obstacles being bare tamarillo trees (Figure 67). The survey results show a fairly homogenous magnetic signature across most of the paddock with a series of regular “bumps” (approximately 1-2m diameter) most likely being related to earlier stages of the orchard.

Features 1, 2 and 3 are all consistent with the probable rifle pits in the other two grids and the magnetic signatures tightly correlate with the surface features. They are again angled to face the river to the north-east. Features 4 and 5 are modern orchard windbreak structures while Feature 6 represents a large ferrous-metallic item, possibly buried modern refuse or a rubbish pit related to Te Oropuriri.



Figure 67: Geophysical grid 7, upper orchard, Property 10.

#### 4.4 Geophysical survey in Property 15a

The area surveyed (Figure 69) on the golf course was considered the most likely to show signs of anthropogenic modification, being a knoll slightly removed from the main golf course, and thus had the least historic modification. The area immediately north-west of the study area showed clear signs of having been bulldozed within the last few years and thus was not surveyed.

Feature 1 ( ) is visible on the surface as a large depression and could be an old water trough or clearing related to the golf course. Features 2 and 4 are visible on the surface as small depression and contain significant ferrous metal – potentially rubbish pits or simply metallic refuse from the golf course. Feature 3 is also visible on the surface as a small depression but is likely to be a small, modern hole – possibly an uprooted tree or foundation for the golf course fencing.



Figure 68: Location of geophysical survey in Property 15a.



Figure 69: Geophysical Grid 4, Property 15.

## 5.0 Discussion

Area N has several areas of high archaeological potential, some of which have been identified during prior archaeological investigations such as those associated with the Bell Block Bypass, as well as new areas identified during this assessment. The distribution and complexity of archaeological remains identified previously indicates a high level of Maori occupation in areas along the bypass route, particularly those associated with Te Oropuriri Pa, Hoewaka settlement and Ngahinapouri/ Hoewaka Pa. The small knoll on Property 8 also has archaeological potential that relates to mapped pre-1900 structures and evidence of pre-historic evidence reported by Taylor during the bypass excavations. The relationship between these areas and the Waipapa Stream is clearly demonstrated in survey plan ML 245 (refer Figure 24).

Further investigations around Te Oropuriri have identified likely archaeological features in the form of surface depressions, preliminarily identified as probable rifle trenches and pits, located throughout the old orchards on the eastern slopes of the Rowe property (Property 10), as well as isolated artefact finds, particularly around the boundary with the Caskey farm (Property 9). Modern earthmoving and construction events are apparent on both Property 9 and 10. Terracing probably related to the pa was also recorded along the western side of the southern spur beyond the Rowe house. This is consistent with the existing archaeological data collected over several seasons of excavations at Te Oropuriri; where excavated features have shown a trend of continuing beyond the southern boundaries of the excavation zones, i.e. further into the Caskey and Rowe properties.

A number of depressions were also noted on the Caskey farm, thought to relate to both archaeological and more recent farm activity. The high knoll on the Caskey property located immediately south of the Te Oropuriri excavations and which sits at a higher elevation than the pine-lined platform along the northern boundary of the Caskey property is likely to be the actual tihi of the Te Oropuriri Pa, not the pine-lined lower platform as previously interpreted.

The presence of the probable rifle pits and other high points, as well as artefact finds, has resulted in the estimation of a larger extent of Te Oropuriri. From the evidence gathered it likely that features associated with the pa could be found in situ along the ridgelines shown in ML 245, and on the eastern slope of the central north-south ridge alignment. It is likely that archaeological evidence would be encountered right to the rear boundary of the Rowe property. Although artefacts were recorded on the Caskey property towards the southern boundary of Property 9, the western extent of Te Oropuriri is unclear due to a lack of surface features. The same applies to the south of the property where earthworks related to the farm and residential buildings have significantly altered the landscape, particularly along the southwest ridge.

Until further investigation is undertaken it is difficult to determine the exact extent of Te Oropuriri. However, given the topography and evidence gathered to date it is possible that features associated with the pa could be located along the ridgelines throughout Property 9 and 10 as shown in Figure 70 and Figure 71.

Large exposed cuttings along the boundary of the Cummings property (Property 6), associated with the Graphite Development earthworks, revealed no in situ

archaeological material. The geophysical survey on the knoll on this property suggests features related to modern farming activity. There is still some uncertainty as to the actual construction date of the drainage tunnel P19/323 which requires further clarification as its date of origin.

Although significant change has occurred in Area N, particularly with more residential and light industrial development occurring, this is mainly located on the periphery of the area and the land is still largely used for pastoral farming. In general little change has occurred to the main open space farm areas between 1950 and now, apart from the emergence of small pine plantings, draining of swamps, and subdivision of major land-holdings, and some intensification of fenced paddocks.

Most of the waterways are now heavily vegetated, with invasive weed species predominant. Increased vegetation along the stream margins and development of swamps does not diminish the archaeological potential of these (particularly the Waipapa Stream given its proximity to the main settlements), as storage of carved and utilitarian wooden items is commonly recorded in the Taranaki region.

The Area N farms have been intensively farmed for decades, with deep ploughing, changing crop and stock regimes and earthworks associated with farm/pasture improvements reported by landowners. As a result the potential to identify surface features on the landscape is greatly diminished, as shown by the lack of features noted prior to excavation along the bypass route, compared to the actual incidence of excavated features. Continued farming will have undoubtedly removed many surface indicators of in situ archaeology and those that are left are generally very ephemeral in nature. It is likely that some of the flat areas that lie close to the recorded Maori settlements in Area N were used for gardens (such as P19/321), although repeated deep ploughing and crop production has potentially disturbed these and makes the identification difficult.

No artefacts were found in any areas in Area N other than around Te Oropuriri during the walkover or geophysical surveys.

New areas of suspected archaeological features have been identified. The accumulated information suggests less occupation in the eastern areas of Area N and concentrated occupation in the middle and possibly central-western end of Area N. The eastern part of Area N has less archaeological potential due to the significant earthworks associated with Property 14 and 15a. The now defunct golf course development in Property 16a and 16b likely resulted in some contouring of the driving range, as well as earthworks associated with the building of tee boxes and golf course facilities.

Geophysical survey conducted on selected areas has provided more information as to the archaeological potential of these sites. Of the areas investigated geophysically, several have shown the need for further investigation to ground-truth results and verify suspected anthropogenic features. Areas 1 and 3 (Property 3) and the orchards in Property 10 show the most potential for having in-situ archaeological features. If testing confirms these features as archaeological, then Areas 1-4 in Property 3 might be related and form a contiguous large occupation site. At present no archaeological site(s) are recorded here. Ground-testing the features surveyed in

the orchards will verify if these are related to the occupation of Te Oropuriri, or are later features related to the orchard production, or both.

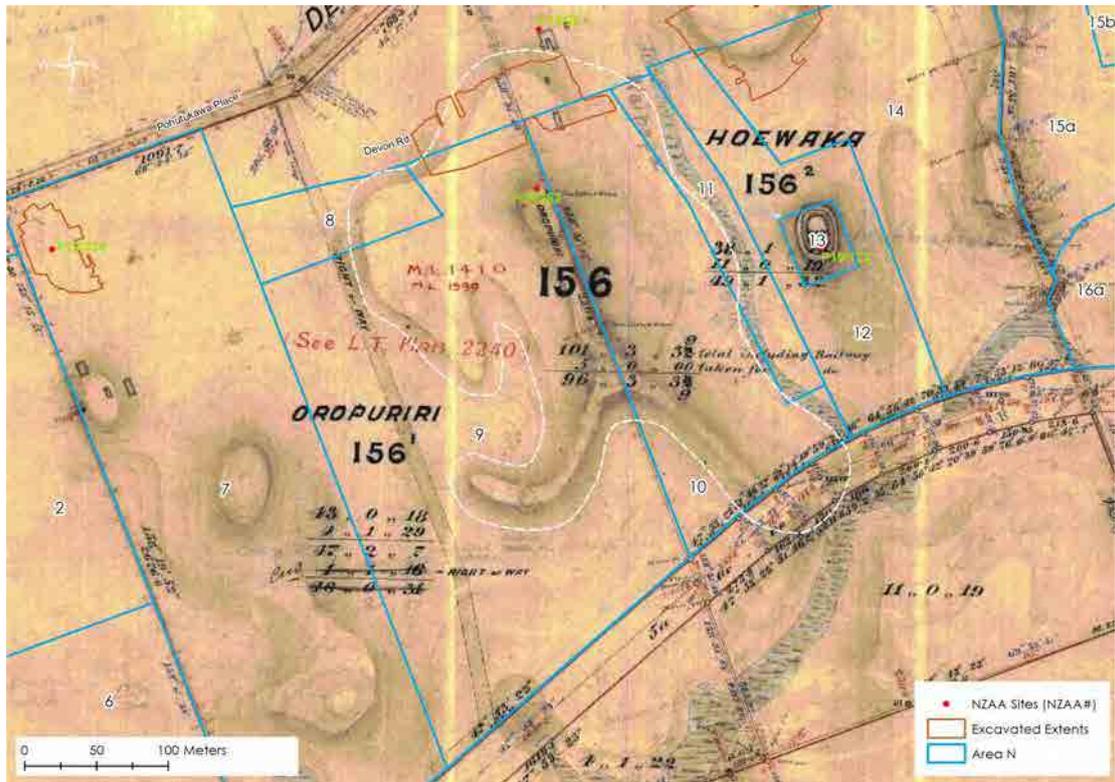


Figure 70: Extent of major ridgelines over Property 9 and 10, delineated from survey plan ML 245, where archaeological features associated with Te Oropuriri might be found.



Figure 71: The same extent as in Figure 70 overlaid on the 2010 aerial showing recent changes to the immediate environs.

## 6.0 Recommendations

1. It is recommended that two small-scale excavations be undertaken under Section 18 of the Historic Places Act to help confirm the nature of the suspected archaeological features that were identified as surface features and corroborated with geophysical investigation. Section 18 investigations in the areas that show signs of potential early occupation would help provide certainty to landowners and the New Plymouth District Council prior to any proposed plan changes. Section 18 excavations will also help establish whether or not the features identified on the surface and confirmed with geophysical survey were archaeologically significant.

A Section 18 authority should be applied for to investigate:

- A. The suspected rifle and storage pits in the Property 10 orchards. This would involve small trenches being excavated across one or two of the pits from each orchard.
- B. Several of the key features identified in Areas 1 and 3 on Property 3.

## 7.0 Conclusions

The walkover surveys conducted on the properties within Area N have shown several areas of high archaeological potential. However, large parts of the area have limited potential due mainly to the topography, previous change and farming history. When possible, landowners and iwi representatives were consulted to glean more details regarding their recollections of the history of land ownership and use. This information, along with the documentary sources collected added to the understanding of the history of land-use change in the area.

Several areas of archaeological potential, firstly identified by the presence of ephemeral surface features, were further investigated using geophysical surveys. These areas require limited further work to verify archaeological concerns and as a result Section 18 investigations have been recommended prior to any zoning changes.

## 8.0 Acknowledgements:

We would like to thank the landowners and trustees of the Area N properties for providing access and information regarding the histories of the Area N properties.

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NZAA:

New Zealand Archaeological Association Site Record Forms.

Survey Maps (LINZ):

ML 245

ML 795