

IN THE MATTER OF

the Resource Management Act
1991

AND

IN THE MATTER OF

applications by Central Plains Water
Trust to:

Canterbury Regional Council for
resource consents to take and use
water from the Waimakariri and
Rakaia Rivers and for all associated
consents required for the
construction and operation of the
Central Plains Water Enhancement
Scheme

Selwyn District Council for resource
consents to construct and operate
the Central Plains Water
Enhancement Scheme

AND

IN THE MATTER OF

a notice of requirement by Central
Plains Water Limited to:

Selwyn District Council for the
designation of land for works
associated with the construction and
operation of the Central Plains
Water Enhancement Scheme

BRIEF OF EVIDENCE OF JEREMY HABBERFIELD-SHORT

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1. QUALIFICATIONS AND EXPERIENCE

- 1.1 My full name is Dr Jeremy Habberfield-Short.
- 1.2 I am employed by Opus International Consultants Ltd as a Heritage Consultant / Archaeologist, based in Christchurch. I have held this position since 2004. Prior to that I was at the Southern Cross University in New South Wales, Australia, where I studied for my PhD and had my own heritage management consultancy. I am a member of the New Zealand Archaeological Association.
- 1.3 I hold a First Class Honours Degree in Anthropology from the University of Otago (1997) and a PhD in Environmental Science and Management from Southern Cross University, Australia (2006). Both degrees specialised in archaeology. I have worked as an archaeologist since 1996 in Thailand, Australia and New Zealand, and in heritage asset management in Australia and New Zealand since 1999.
- 1.4 I have read the code of conduct for expert witnesses set out in the Environment Court practice note, and confirm that I have complied with the code in the preparation of my evidence.

2. SCOPE OF EVIDENCE

- 2.1 I have been engaged by the applicants to present evidence in relation to their respective applications under the Resource Management Act 1991 ("RMA") for the construction of the Central Plains Water Enhancement Scheme ("the Scheme").
- 2.2 The area to be irrigated by the Scheme is bounded by the Waimakariri River in the north, State Highway 1 to the east, the Rakaia River to the south and the foothills of the Southern Alps to the west.
- 2.3 My evidence addresses the following matters:
- (a) Archaeological background to the study area and recorded archaeological sites within the project area;
 - (b) Physical impact of the project on archaeological sites within the study area;
 - (c) Consideration of effects; and
 - (d) Recommendations.

- 2.4 The key conclusions of my evidence can be summarised as follows:
- (a) Within the Scheme area there are 26 archaeological recorded sites (See Appendix 1). Ten of these sites may be modified, damaged or destroyed by the construction of the Scheme's intakes, intake canals, reservoir, headrace and reticulation network;
- 2.5 Where practicable, the sites should be protected from inappropriate subdivision, use and development (section 6(f) RMA).
- 2.6 For sites dating before 1900, this management should involve integration with archaeological authority processes under the Historic Places Act 1993 ("HPA"). This is an essential statutory requirement and advice should be sought from the regional New Zealand Historic Places Trust ("NZHPT") archaeologist.
- 2.7 I think it is acceptable that the consents be granted as long as the effects on recorded and accidentally discovered archaeological sites in the Scheme area are mitigated by the following actions:
- (a) That the Scheme applies for a section 18 Authority from the NZHPT prior to work starting on the Scheme. These investigations should focus on establishing the exact boundaries of the sites prior to any physical works being undertaken.
 - (b) Accompanying the section 18 investigation should be a survey of areas affected by the Scheme works to determine whether there are any unrecorded sites on that land.
 - (c) Following the completion of the survey and section 18 investigations, the applicant should undertake a reappraisal of the Scheme's effects on archaeological sites.
 - (d) It will be necessary to then apply to the NZHPT for a section 12 Archaeological Authority to modify, damage or destroy sites to cover the Scheme works. This is a statutory requirement.
 - (e) All sites should be avoided, but where sites, such as those within the Waianiwiwa Reservoir cannot be avoided, full and appropriate recording and documentation of such sites must be undertaken before they are destroyed.

- (f) All archaeological sites within the Scheme footprint should be guided by a archaeological management plan and research strategy prepared by a heritage professional.
- (g) Any taonga tuturu (artefacts of tangata whenua origin) recovered during the earthworks and investigations are the property of the Crown and should be registered with the Ministry of Culture and Heritage.
- (h) Arrangements should be made for the storage of such materials with an appropriate repository being either a local or regional museum.
- (i) Ngai Tahu and Ngai Tuahiriri are key tangata whenua affected by the Scheme. It should be a condition of the consent that they be involved as key stakeholders in the heritage management process.

3. COMMISSION

- 3.1 Opus International was commissioned by the applicants in June 2007 to undertake an archaeological survey of recorded archaeological sites (“sites”) within the Scheme area in April 2007 and an Archaeological Assessment of Effects (“AAE”) of the Scheme on archaeological values.
- 3.2 The purpose of the archaeological survey was to identify any recorded sites with archaeological significance, as defined by the RMA and the HPA, within the study area. This was in response to requests for mapping the precise location of the sites noted in the Selwyn District Council’s (“SDC”) and the Scheme's planning maps. Ngai Tahu also requested site specific surveys in the Kowai / Waimakariri confluence and the Waianiwaniwa reservoir to locate the archaeological sites within the general bounds of these two areas more precisely.
- 3.3 The purpose of the AAE was to assess the archaeological significance of the recorded archaeological sites in the region. The AAE discussed this information in light of the proposed water enhancement scheme activities and assessed the impact of these activities on the archaeological values associated with these recorded sites.
- 3.4 The evidence outlined below draws on these two documents.

4. METHODOLOGY

- 4.1 This evidence draws on the following methodology.

Archaeological Survey

4.2 The following methodology was used for the archaeological survey:

- (a) New Zealand Archaeological Association Site Record Files (“SRFs”) were obtained for the study area and reviewed in conjunction with the cultural heritage impact assessment (Jolly 2005) and the CPW Ltd Final Designation Network Plan maps. The SRFs for the study area were used to identify the nature, background and spot locations of the archaeological sites prior to going into the field. They were also used to check when the sites were last surveyed, by whom and why, as a measure of the accuracy and rigour of their recording.
- (b) The SDC database and CPW Ltd Final Designation Network Plan were reviewed for the location of the Scheme footprint in relation to the sites.
- (c) Landowners were telephoned to obtain permission for access to their land.
- (d) GPS and Topographic maps were used to aid in navigating to the coordinates provided for each archaeological site on its SRF.
- (e) The survey consisted of a walk-over survey looking for surface evidence of archaeological materials and features such as ovens, pits, ditches, and artefacts.
- (f) 1:25000 scale aerial photographs were used to interpret the landscape features and mark up the indicative boundaries of sites.
- (g) GPS coordinates were taken of sites that were still visible.

4.3 The sites in the Scheme area were added to URS NZ Ltd’s Geographic Information System (“GIS”) Database and are shown in maps 1-8 (Appendix 2).

Archaeological Assessment of Effects

4.4 The AAE was informed by guidelines written by the NZHPT (2006) *Guidelines for Writing Archaeological Assessments* which is the standard used by professional archaeologists in New Zealand.

Limitations

- 4.5 This evidence does not represent a statement of cultural values or understandings and opinions of the recorded archaeological sites in the Central Plains from a cultural perspective.
- 4.6 The precise locations of the archaeological items already noted in the SDC database (they are shown on SDC's and the Scheme's planning maps) were surveyed to enable comment on whether they will be modified, damaged or destroyed by the Scheme works. The evidence only relates to those sites that are recorded. It does not relate to any unrecorded sites.
- 4.7 Therefore this evidence does not represent an assessment of the archaeological values (known and unknown) in totality for the Central Plains, nor does it represent an assessment of the impact of the Scheme footprint on the totality of those values. Such a thing can only be derived from a survey of that land in which all archaeological sites are recorded systematically and holistically assessed for the values mentioned above. This would result in all the sites within the Scheme footprint being managed according to best practice heritage management principles. This is typically the case for most authorities granted for changes in land use. In this way it is possible to avoid or mitigate damage to known sites of significance.
- 4.8 Generally it is difficult to assess the presence, the condition and extent of an archaeological site without first undertaking systematic test pitting or a ground penetrating radar survey of an area. The presence of archaeological materials and features on the ground surface is often a good sign of occupation, but it only represents a presence in that location, not the spatial layout of a settlement. Hence, the methodology that was used in the survey biases the interpretations made about the boundaries of sites in favour of caution because it was not possible to conduct excavations or test pitting to support interpretations made from aerial photos, the SRF, and ground survey. The areas mapped on the marked-up maps are biased in favour of caution to ensure sites are not affected.
- 4.9 The methodology that was used in the survey may also bias interpretations made about the archaeological value of the sites. Hence, conclusions are biased in favour of caution to ensure sites are not affected.
- 4.10 Further, in some cases sites could not be relocated due to ploughing of the surface, vegetation cover or incorrect map co-ordinates in the SRF. This does not necessarily mean that the sites have been destroyed since they

were first recorded. It means they could not be relocated. These sites have been marked up on the maps with a sensitivity zone around them and were included in the AAE.

- 4.11 Some land owners withheld permission to survey sites on their land. In these cases the easting and northing for a site (from the SRF) were used to provide a rough location of the site, and an approximate 100m boundary is drawn around the co-ordinates on marked-up aerial photographs (Appendix 2) to denote a sensitivity zone around them. The actual boundaries of these sites may be larger or the sites may not be located in the identified position or they may have been destroyed.
- 4.12 Attempts were made to contact the Selwyn Plantation Board for permission to access sites within the proposed reservoir footprint. They were unavailable to give permission within the timeframe required for the survey.
- 4.13 Attempts were made to contact Environment Canterbury for permission to access sites along the Waimakariri River. They were unavailable to give permission within the timeframe required for the survey.
- 4.14 These factors need to be considered when this evidence is reviewed, for they have had a significant influence on the writing of the evidence.

5. ARCHAEOLOGICAL BACKGROUND

- 5.1 Apart from the primary research of Rains and Rains (1992), to the author's knowledge there is an absence of primary archaeological research that directly focuses on the Central Plains area. Accordingly, a substantial component of the AAE relied on contextual information from secondary sources such as a comprehensive regional overview by Aidan Challis (1995), with support from other works by Atholl Anderson (1989) and Trotter and McCulloch (1997) to establish an archaeological context that can be used to interpret the archaeological sites present in the Central Plains area.

Regional Context

Settlement Pattern

- 5.2 No better summary of the settlement can be found than Challis' (1995: 5-6) overview of Canterbury settlement:
- 5.3 *"Maori activity on the Canterbury Plains is indicated by substantial numbers of oven sites and find spots of stone implements. These have been*

recorded particularly adjacent to tributary channels of the major rivers (e.g. the Waimakariri) and around the swampy areas between the Hekeao (Hinds) and Hakatere Rivers and west of Waihora (Lake Ellesmere). It is thought that much of this activity may have related to the gathering of plant foods, but no sites have been investigated in sufficient detail, and few survive. Maori activity in the downlands and foothills has left distinctive archaeological evidence. In the downlands of South Canterbury, rock shelter sites, rock drawings, and umu ti sites are numerous. In North Canterbury downlands, rock shelter sites and rock drawings again predominate, with isolated ovens and artefact finds. Oven sites have been recorded near the margins of the foothills with the plains, notably in the Homebush area. Quarry sites for silicified tuff and silcrete have been identified at Gawler Downs near Mt Somers and at Miro Downs near Oxford. Maori occupation sites in Canterbury were concentrated in the coastal zone, where food resources were most varied and abundant and where the climate was more benign. Horomaka (Banks Peninsula) provided the most extensive estuarine systems and the widest array of shellfish and fish resources. Many archaeological sites are clustered in and around the numerous bays, notably pa sites and fortifications on the low but steep hills, and horticultural sites on sheltered slopes. North and south of Horomaka, the ponding of rivers and streams behind coastal bars created numerous lagoons and estuaries. Such river and stream mouths were favourable to early settlement locations, both on the steep coastlines north of the Waipara River, and on the low gravel coasts of Tai O Arai Uru (South Canterbury). They are characterised by midden and oven sites, often associated with moa-hunting.”

Chronology

- 5.4 On the chronology of settlement in Canterbury it is widely accepted that there are two broad phases present – the Moa-hunting or Archaic Phase associated with specific types of artefacts and moa remains and the Classic Phase associated with changes in artefact form and technology. Conservatively, it can be considered that colonising settlement had begun by the twelfth century (Anderson and McGlone 1992:15; Challis 1995:10). These settlements were characterised by seasonal occupation of river mouth sites like the Rangitata River mouth, temporary fishing camps and probably permanent camps in places like Banks Peninsula. Radiocarbon dates from numerous Canterbury archaeological sites indicate that this

founding population was well established by the fourteenth to fifteenth centuries

- 5.5 Settlement during the Archaic Phase appears to be associated with specific activities including the use of large scale specialised moa-hunting sites on the South Canterbury coast and seasonal hunting and gathering in a wide range of inland areas such as the downlands and Waitaki catchment (Challis 1995:64). This probably included a significant exploitation of cabbage tree in South Canterbury and the downlands. Many raised rim ovens, 2-4m across, are thought to be associated with cabbage tree cooking activities in these areas. Artefacts typical of this period are made from a variety of materials including silcrete, argillite, chert, greywacke, basalt, sandstone, haematite, flint, silicified tuff and obsidian (Challis (1995:32). Artefacts from inland sites were also made from slate, jasper and schist.
- 5.6 The transition from the late Archaic Phase to the Classic Phase has been suggested by some to be a reflection of immigration of new people from the North Island rather than progressive regionalism or influences of trade and exchange (Duff 1976; Leach, BF 1978; Leach, HM 1978). Others argue that the Archaic Phase was followed by a transitional phase in which transition and innovation in technology gives the impression of cultural change within the region rather than its being introduced by migrating peoples (Challis 1995; Jacomb 1995). Radiocarbon dating and seriation studies of artefact styles from sites within this phase indicate that the transitional phase occurred between the 16th to 17th centuries (Jacomb 1995). With the decline of the moa in the 15th to 16th century, settlement patterns reflect a decline in the dominance of river mouth settlements increasingly in favour of coastal areas where there were a variety of marine resources and a reliance on kumara horticulture (e.g. Banks Peninsula, Kaiapoi, Taumutu and estuaries).
- 5.7 Artefacts from this period typically reflect a loss of variety in manufacturing materials in favour of greenstone materials from the West Coast and South Westland. Greenstone materials are present in Archaic Phase sites but only in minor quantities. The development of many of the pa and hill fortifications date to the development of the Classic Phase from the mid 18th century (e.g. Banks Peninsula, Kaiapoi, Taumutu). Several kinds of fortifications: e.g. pa that are relatively small in size and have little evidence to suggest interior settlement imply different uses from defence of territories and resources and use for refuge during warfare. Others that contain

terraces may reflect permanent settlements (Challis 1995: 49). The scale of larger flat land pa like Kaiapoi indicates permanent settlement. This settlement pattern continued into the early 19th century when significant changes occurred in Maori society with the influence of European contact and inter-iwi warfare.

Archaeology of Sites in the Scheme Area

Chronology

- 5.8 The only C14 radiocarbon age for the sites in the Scheme area comes from two ovens out of the group of ovens at M35/146, M35/147, M35/1 and M35/2 on the dunes adjacent to the Waimakariri River (Rains and Rains 1992: 25; Appendix 2: 9). The two radiocarbon ages come from raised rim ovens. The oldest date (11th century AD) is possibly derived from wood with in-built age (a long lived tree species used for cooking), thus the likelihood of the ovens being this old needs to be assessed with caution. It is generally accepted that settlement first occurred in the 12th century in New Zealand (which is within the age range of the calibrated date). These sites are extremely rare, thus it is possible that this date is an accurate reflection of the age of the oven. The younger date is a more probable age for the ovens in the group of sites along the dunes adjacent to the Waimakariri River course. An age range of the mid 13th to mid 15th century is implied by the calibrated age of this younger date. This places the dating of these ovens squarely in the period of moa-hunting activities. This certainly corresponds with the range of material cultural associated with M35/146, M35/147, M35/1 and M35/2, which includes a black argillite tanged adze, a flint flake, flaked greywacke cobbles, greywacke hammerstones, cores and heat shattered oven stones and flaked dolerite.
- 5.9 However, only two radiocarbon dates come from the site assemblage in the study area. This does not provide enough data from which to make an accurate statement about the age of occupation of the area without considering other evidence.

Resource Use

- 5.10 Where chronometric radiocarbon samples have not been dated we must rely on the use of artefact styles and site types to produce a relative age for the other sites within the scheme area. The widespread presence of raised rim ovens in the study area likely correlates with similar sites in the downlands and South Canterbury (Challis 1995). Those in South

Canterbury reflect umu-ti exploitation and cooking activities. This would help explain the presence of raised rim ovens (L35/15 & L35/16) on Homebush Ridge, some 300m above sea level. These activities were typical of the Archaic Period of moa-hunting culture. An oven at Homebush (L35/12) is recorded as being associated with flakes of obsidian, flakes of agate and chalcedony and red and amber porcellanite. Other ovens at L35/20 and L35/21 were associated with flakes of jasper, chert, orthoquartzite and milky chalcedony.

- 5.11 Together these aspects imply that the raised ovens at least, if not all the ovens, with the exception of those at Ohinekakaraite (see below), in the Scheme area were associated with Archaic Phase food gathering activities which included the exploitation of eels, cabbage tree and other downland resources.

Settlement Patterns

- 5.12 The location of sites in the study area appears to favour dunes, elevated river terraces, hills, the base of hill slopes, and terrace edges that are adjacent to river courses. Such locations would have been important for potable water sources rather than for defence. The dune bodies are found adjacent to the main river channels of the Waimakariri River such as those on the terraces adjacent to the Waimakariri River in the West Melton part of the study area.
- 5.13 There are three main areas of settlement concentration – the group of oven sites and the eeling site at the confluence of the Kowai and Waimakariri Rivers (L35/1, L35/2, L35/3 & L35/4), the cluster of ovens investigated by Rains and Rains (1992) on the West Melton bank of the Waimakariri River (M35/1, M35/2, M35/146 & M35/147) and the cluster of ovens at Homebush (L35/12, L35/13, L35/14, L35/15, L35/16, L35/17 & L35/18). The group of oven sites at the confluence of the Kowai and Waimakariri Rivers have many ovens that are located on raised terraces. There are also ditches in a swamp on a lower terrace which has been associated with eeling activities (NZAA SRF). These sites could not be surveyed by the author, but they have been referred to in the cultural heritage impact assessment by Dyanna Jolly Consulting (2005: 14) as the location of a historic pa called Ohinekakaraite.
- 5.14 The pa is referred to as representing a permanent settlement of reasonable size and settlement. There is also another pa with pits (L35/11) on a hilltop

overlooking the eastern banks of the Selwyn River near Coalgate. This site was excluded from the New Zealand Archaeological Association Site Upgrade Project as it could not be found and could not be relocated during the field survey. The NZAA SRF gives no other evidence apart from the description of 'pa with pits'. The remaining oven sites as well as the eeling site are sporadically scattered around the study area adjacent to rivers and streams.

6. ARCHAEOLOGICAL VALUES

Sites and Relation to Other Sites in the Region

- 6.1 The presence of pa, pa with pits, and raised rim ovens typified by resource materials associated with the Archaic Phase suggests that there are at least two phases of settlement in the study area. The radiocarbon dating suggests that the Archaic Phase is present and many of the raised rim ovens likely date from between the 14th to 16th centuries AD. As pa found in other parts of Canterbury are associated with the Classic Phase of Maori culture it is likely that the pa at Ohinekakaraite and L35/11 at Coalgate are related to a late period of settlement. It is not possible, based on the evidence at hand, to include the intermediate period of Jacomb (1995).

Condition

- 6.2 What is the condition of the archaeological record? Challis (1995) has already stated that the integrity of the archaeological record in Canterbury is poor. This is especially so for the sites in the Central Plains where only four intact sites were observed during the survey. Some, such as L35/13, L35/14, L35/17 and L35/18 at Homebush could not be relocated. It is assumed that these have been damaged by ploughing and farm activities. Others, as expressed above, were unable to be assessed due to access being denied by landowners. Generally, it is safe to say that the visible condition of sites in the study area is poor.

Representativeness

- 6.3 To what degree are the sites in the Central Plains representative of other sites in Canterbury? Oven sites along the coast of Canterbury from Clarence River to the Pareora River in the south are numerous. They range in size from 2 to 4m in size, most are characterised by oven stones and heat shattered cobbles. Others, such as the raised rim ovens are uniquely found only in South Canterbury and on the downlands in areas

such as the study area. These ovens are associated with human activity that was focused only on specific parts of the landscape where there were favourable conditions for the harvesting of plant resources – mainly the cabbage tree. This places a premium on the preservation and management of raised rim sites that are still intact.

- 6.4 Of the pa themselves, these likewise are similar to ovens in distribution along coastal areas, stream mouths and estuaries. In fact their distribution is so significantly associated with coastal areas that one must one ask – why are there pa inland and what conditions allowed these to develop when settlement was favouring occupation in Kaiapoi, Banks Peninsula and Taumutu areas (Challis 1995:56)?

Regional or National Status

- 6.5 Kaiapoi pa has strong regional status due to its being part of a settlement pattern which was associated with a specific period of Maori occupation of the South Island. The pa also has national status due to its connection to the production and trade of pounamu and its later connection with Te Rauparaha's raiding and warfare down the Canterbury coastline. Yet can the same be said for the pa sites in the study area? As yet little is known archaeologically about the origins of the pa sites and their relationships both regionally and nationally. The author was unable to find anything in a limited literature search of whakapapa and place names which associated with the two pa (Beattie 1995, 2004; Evison 1993; TeMaire Tau 2003).
- 6.6 Regionally, the raised rim sites are an important component of a diminishing resource. This site type represents a kind of economic activity and settlement pattern associated with cabbage tree or umu-ti gathering and cooking, which was present in only Canterbury and Otago.
- 6.7 In terms of age, most of the raised rim ovens date to the older periods of Maori settlement in the South Island associated with the 'Moa hunter' culture prior to Ngati Mamoe and Ngai Tahu movement into the South Island.
- 6.8 The only research into the function of the ovens in South Canterbury showed that some ovens also date to the period of Ngai Tahu settlement. However, radiocarbon dating and historical documentation have shown that some ovens and umu-ti exploitation continued up to the 1800s.

- 6.9 As we yet do not know of the age of the raised rim ovens in the study area, hence it is not possible to say which period they date to. I can say with a degree of certainty that those located at the Ohinekakaraite Pa are likely to be of the late prehistoric era (i.e. Ngati Mamoe Ngai Tahu settlement) as pa usually are a late prehistoric settlement type.
- 6.10 I believe that the raised rim site type has potential regional and national status but I am hesitant to say this with certainty until we know the age of the raised rim oven sites. Generally, sites from the earliest period of Polynesian settlement in New Zealand are accorded the highest significance due in part to their rarity, rarity caused by both natural erosion and subsequent human modification to the landscape. Therefore one could assume that the ovens sites which may date to the Archaic Phase are likely to have national status.
- 6.11 The surveys of the archaeological sites showed that most, if not all sites were located where potable water was obtainable from rivers or streams. The survey of Rains and Rains (1992) showed distinct evidence that a concentration of ovens associates with river flood-flow terraces adjacent to the Waimakariri River. Notably these sites are in relatively undisturbed areas where farming practices have not destroyed them. The preservation of sites in the general distribution network area is poor due to the effects of human activity on the Central Plains area including the ploughing and development of pastoral land. Where any archaeological sites are preserved they have either intentionally been avoided by landowners (L35/26) or else they have been in areas of the landscape unsuitable for intensified land use such as swamps or Council land that has remained uncultivated..

Likelihood of Section 15 HPA Significant Information

- 6.12 Section 15 investigations would assist in further amplifying the discussion of regionalism vs migration in the influence of cultural change in Canterbury. It may also assist in further delineating the intermediary phase advocated by Jacomb (1995). Umu-ti sites have been studied, in South Canterbury. It would be useful to know more about the function of the oven sites in the study area and their age and cultural associations to test if they are umu-ti sites, and if so, how these relate chronologically to those further south.
- 6.13 Of the pa, especially the one known as Ohinekakaraite, investigations would assist in incorporating this site into the regional picture of pa

fortifications, chronology and cultural associations. Likewise, the ditches in the swamp have yet to be proved to be associated with eeling. Section 15 investigations of such sites may allow us to establish the timing of the activities and their associations with the settlement pattern both locally and regionally.

7. ASSESSMENT OF EFFECTS

- 7.1 Detailed descriptions of the proposed Scheme and associated earthworks have been provided in the evidence of others appearing at this hearing and it is not my intention to go through this here. However, it should be noted that any form of earthworks has the potential to impact on archaeological features or subsurface deposits in the area. As such, general comments are given here in regard to the possible impact of the proposed Scheme on the archaeological resource as a whole.
- 7.2 Within the Scheme area there are 26 archaeological sites recorded on the SRF (see Appendix 1). These sites comprise 21 oven sites, six of which are associated with artefacts and two with pits; two areas with ditches in swamps, which possibly associate with eeling; a pa with pits; a find spot and possibly a mound. The commissioners are referred to my April 2007 report for a full description of the list of sites and their associated field descriptions. Of the 21 ovens recorded, eight raised-rim ovens were found during the survey.
- 7.3 The mapping of the sites onto a GIS Database by URS NZ Ltd with the areas of intakes, intake canals, reservoir, head race and reticulation network showed that ten sites may be affected by the Scheme (Appendix 2) (using conservative assumptions as to the boundary of these sites).
- 7.4 The following will be, or have the potential to be, destroyed, modified or damaged by the Waianiwaniwa Reservoir and canal construction:

Waianiwaniwa Valley and surrounds			
C18	L35/19	Raised rim oven near Auchenflower Road.	Reservoir designation area directly impacts the site as well as being submerged by the RL.
C20	L35/20	Raised rim ovens and artefacts near Auchenflower Road.	Impacted by road designation area – design could possibly be altered at detailed design stage.

C20?	L35/21	Raised rim ovens and artefacts near Auchenflower Road.	Impacted by road designation area – design could possibly be altered at detailed design stage.
N/a	L35/14	Raised rim ovens Homebush Property.	The designation area goes directly through the site. Construction is likely to destroy this site depending on final design.

7.5 The following sites have the potential to be modified or damaged by the headrace and intake construction:

The upper Waimakariri intake and Kowai Confluence			
C27	L35/2	Ditches in a swamp potentially related to eeling activities near Kowai Bush Road.	This area borders with the designation area – careful construction work should be able to avoid this area.
C28	L35/3	Pits, ovens near Kowai Bush Road.	Should not impact this area
Lower Waimakariri intake (area in the vicinity of ‘Gorge Bridge’)			
C23	L35/22	Ditches in a swamp potentially related to eeling activities near Minchins Road.	The zone of ditches identified will not be impacted during construction. Access roads etc will need to avoid this area. The area south of these sites identified as potential ditches will be directly impacted by the construction in the designation area. As the site is beside the toe of the terrace it will probably be impossible to avoid the area.
The area adjacent to the Rakaia River as the headrace ‘climbs’ the terrace			
C34	L36/3	Oven near Sleemans Road.	Designation runs directly through the site. As the site appears to be beside the toe of the terrace or on the top of the terrace face it will probably be impossible to avoid this area
C34	L36/4	Oven near Sleemans Road.	Designation runs directly through the site. As the site appears to be beside the toe of the terrace or on the top of the terrace face it will probably be impossible to avoid this area.
The area adjacent to the Waimakariri River and Tompsons Road			
N/a	M35/146	Oven near Sleemans Road.	Distribution race runs along the border of identified location. May not have any impact with careful construction works.

It is difficult to avoid archaeological sites without knowing the true extent of the below the ground archaeological resources for these sites. The marked-up areas on the aerial photographs in the Appendices are no more than a conservative estimate of the boundaries of the sites from what was visible on the land surface during the survey, plus a 100m buffer zone around the outside of these areas.

- 7.6 As the boundaries of the sites have been conservatively documented there may well be room to avoid sites. If so it should be a condition of the resource consent that identification of the site boundaries is undertaken in relation to the areas of intakes, intake canals, reservoir, headrace and reticulation network (section 18 HPA). A section 18 investigation is commonly used to assess the boundaries of archaeological sites in relation to a proposed development and is an accepted tool for identifying areas for conservation and mitigation.
- 7.7 The section 18 investigations of the boundaries of the sites listed above will then determine if further archaeological authorities are required under the HPA process.
- 7.8 It is necessary to survey the Scheme footprint itself in order to proactively manage the accidental destruction and loss of sites. It is not a prerequisite to undertake this survey prior to the hearing as long as the sites discovered during the survey are managed according to the same conditions as outlined in section 8 below.
- 7.9 According to the results of the investigations where whole or parts of sites cannot be avoided, a condition of the resource consent should be that mitigation of damage, modification or destruction of the sites must be undertaken according to the HPA (sections 10 and 12).
- 7.10 For sites that are accidentally discovered during the program of works it should be a condition of the consent that an accidental discovery protocol be developed by an appropriately qualified archaeologist and that all contractors, project managers and stakeholders are inducted into the protocol and made aware of their individual responsibilities under the protocol.
- 7.11 Further, it should be a condition of the consent that investigation of both recorded sites and unrecorded sites be guided by a management plan and an archaeological research strategy. The plan should guide the active management of the sites and matters such as the responsibilities of

contractors and project managers, control of vegetation, stock, soil erosion, vandalism, and public access and interpretation. The research strategy should guide the methods of excavation, sampling of archaeological materials and their subsequent analysis and the kinds of issues and questions which the investigations aim to address. This is a key method of mitigating the loss of both archaeological and cultural values and the physical resource. Where an archaeological site will be lost as a consequence of the development activity, the archaeological values of the site should be fully investigated and documented by a professionally qualified archaeologist according to the research strategy.

- 7.12 Any taonga tuturu (artefacts of tangata whenua origin) recovered during the earthworks and investigations are the property of the Crown and should be registered with the Ministry for Culture and Heritage. Arrangements should be made for the storage of such materials in an appropriate repository such as a local or regional museum.
- 7.13 Ngai Tahu and Ngai Tuahiriri are key tangata whenua affected by the Scheme. It should be a condition of the consent that they be involved as key stakeholders in the heritage management process. This may involve the assignment of a cultural monitor to the Scheme.

8. CONCLUSIONS

- 8.1 Where practicable, the sites should be protected from inappropriate subdivision, use and development (section 6(f) RMA).
- 8.2 For sites dating before 1900, this will involve integration with archaeological authority processes under the HPA. This is essential and advice should be sought from the regional NZHPT archaeologist.
- 8.3 I think it is acceptable that the consents be granted as long as the effects on recorded and accidentally discovered archaeological sites in the Scheme are mitigated by the following actions before any earth works are undertaken:
- (a) That Central Plains Water Enhancement Scheme applies for a section 18 Authority from the NZHPT prior to work starting on the Scheme. These investigations should focus on establishing the exact boundaries of the sites prior to any physical works being undertaken.

- (b) Accompanying the section 18 investigation should be a survey of areas affected by the Scheme works, to assess the distribution of unrecorded sites on that land.
- (c) Following the completion of the survey and section 18 investigations the applicant should undertake a reappraisal of the Scheme's effects on archaeological sites.
- (d) It will be necessary to then apply to the NZHPT for a section 12 Archaeological Authority to modify, damage or destroy sites, to cover the entire Scheme works. This is a statutory requirement.
- (e) All sites should be avoided, but where sites such as those within the Waianiwaniwa Reservoir cannot be avoided, full and appropriate recording and documentation of such sites before they are destroyed should be undertaken.
- (f) All archaeological sites within the Scheme footprint should be guided by an archaeological management plan and a research strategy prepared by a heritage professional.
- (g) Any taonga tuturu (artefacts of tangata whenua origin) recovered during the earthworks and investigations are the property of the Crown and should be registered with the Ministry for Culture and Heritage.
- (h) Arrangements should be made for the storage of such materials with an appropriate repository either in a local or regional museum.
- (i) Ngai Tahu and Ngai Tuahiriri are key tangata whenua affected by the scheme. It should be a condition of the consent that they be involved as key stakeholders in the heritage management process.

Dr Jeremy Habberfield-Short

9. APPENDIX 1

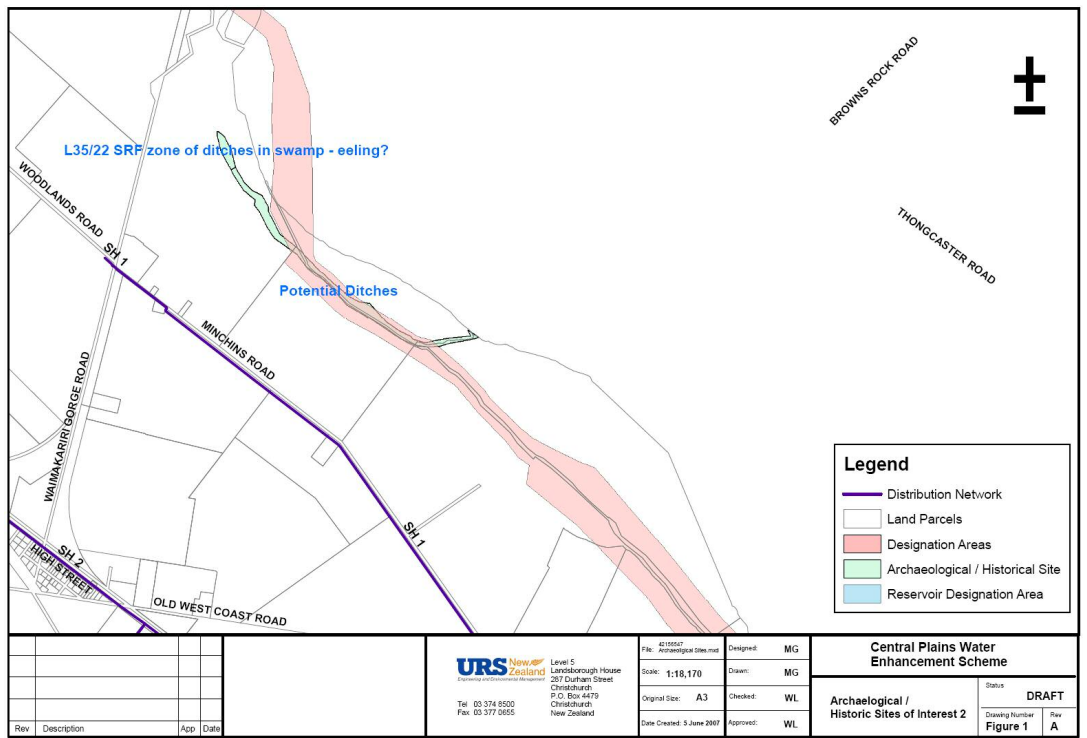
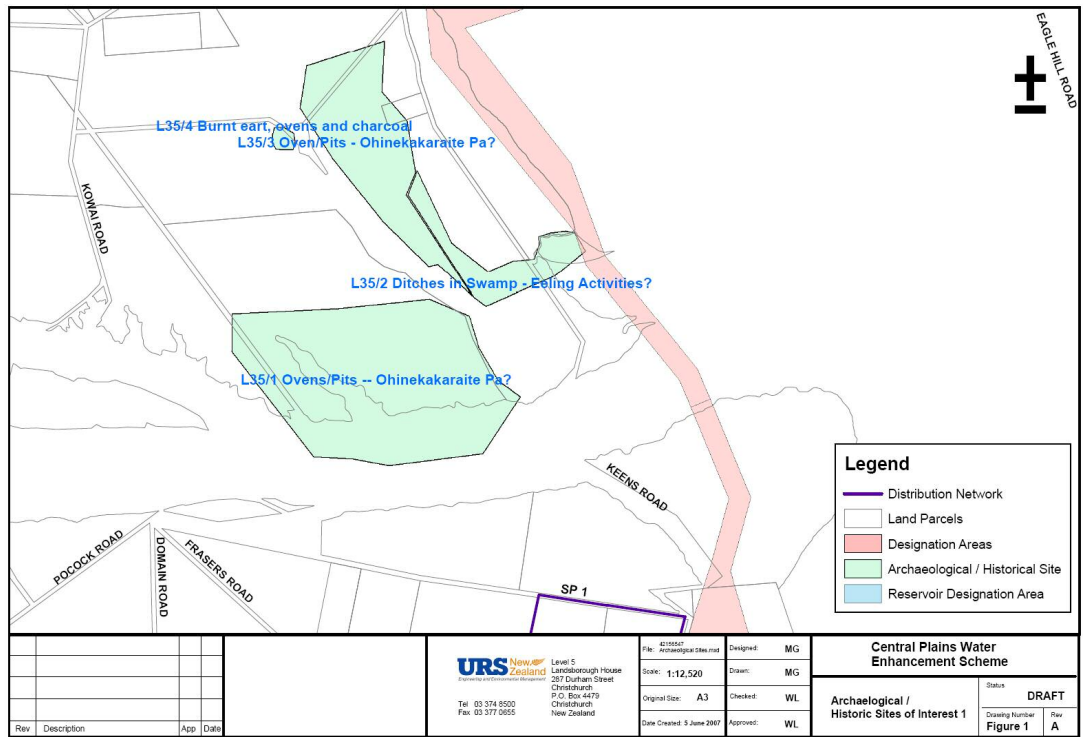
Site Survey	Condition	Land cover	Exposures	Archaeology	Date of Visit	Potential for Impact by Scheme Works	Appendix 1 Site Detail Map Page No.
M35/146	Possibly in good condition. Does not appear to have been ploughed	Grassland/scrub	Nil	N/a	Area viewed from roadside 13/04/07	?	15
M35/147	Possibly in good condition. Does not appear to have been ploughed	Grassland/scrub?	Nil	N/a	No	?	15
M35/1	Possibly in good condition. Does not appear to have been ploughed	Grassland/farming	None visible but dune land surface appears to me relatively intact	Possible pits and hollows seen in the dunes but no surface evidence of charcoal or oven stones.	13/04/07	?	17
M35/2	Possibly still in good condition as area does not appear to have been ploughed or disced	Grassland/farming	None visible, but dune land surface appears to me relatively intact	N/a	Area viewed from roadside 13/04/07		17
L35/22	Sections of the swamp are fenced off; others are in a track reserve at the base of the terrace and outside the main area of farm activity	Open vegetation (grasses, broom, gorse, willow, blackberry, cabbage tree)	Ditches, oven and possibly an artefact (chopper)	Ditches: Network of herringbone ditches running parallel with the main channel (c.1 m wide) and smaller narrow (c. 50cm) crossing the swamp flat intersecting with the ditches and channel. Chopper: Split disc shaped greywacke cobble to form a bevelled point and rounded shoulder at the distal end. 150mm	16/04/07	High	19

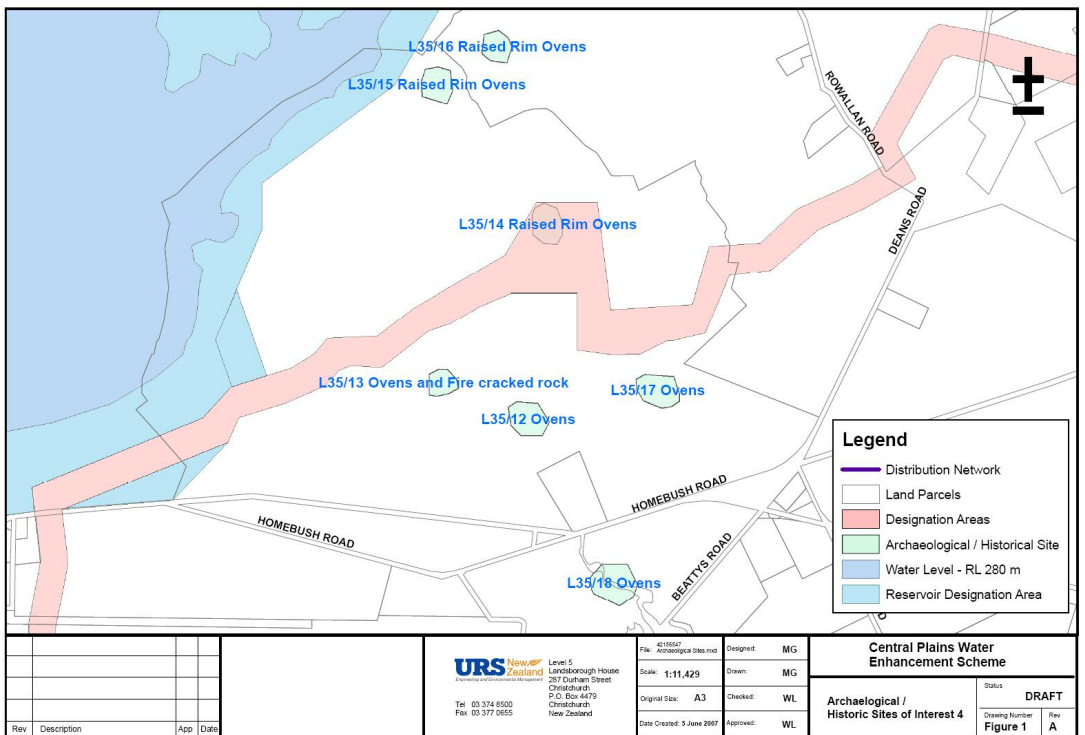
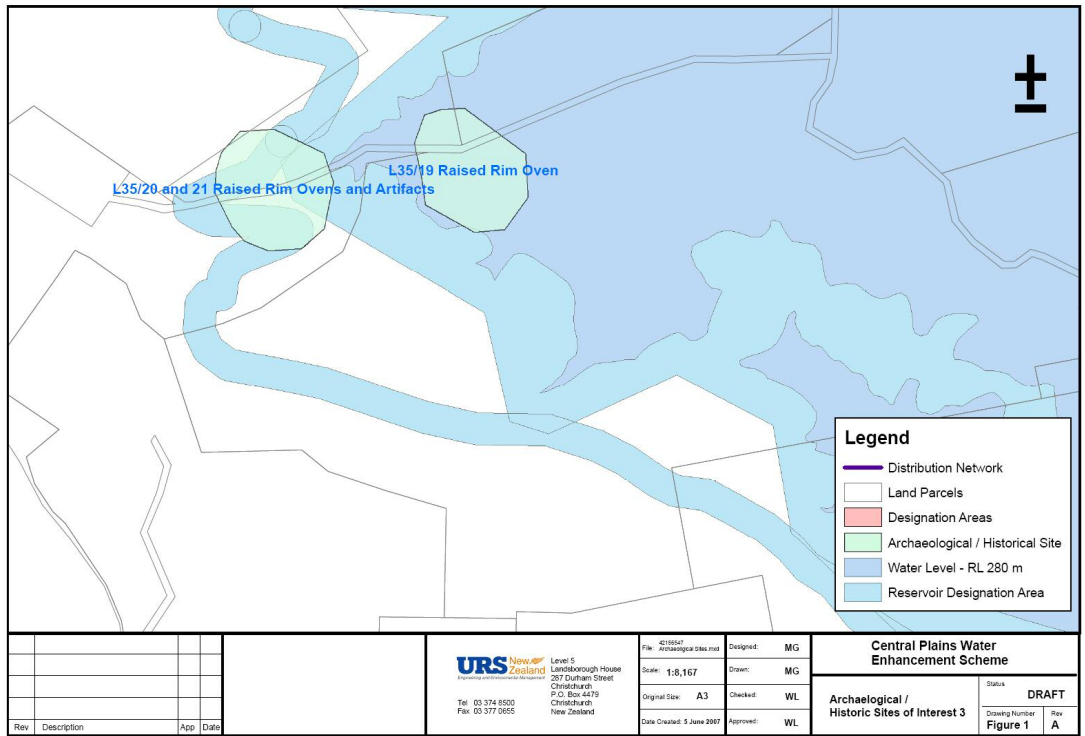
Site Survey	Condition	Land cover	Exposures	Archaeology	Date of Visit	Potential for Impact by Scheme Works	Appendix 1 Site Detail Map Page No.
				<p>wide x 170mm long with elongated notches along the distal edge. Some are recent notches other have the patina of age/use.</p> <p>Oven: One possible oven 0.5m wide found in the up hill profile of the road which cuts into the base of the top terrace slope. Represented by a cluster of small greywacke cobbles, but no charcoal present</p>			
L35/1	N/A	N/A	N/A	N/A	No	?	21
L35/2	N/A	N/A	N/A	N/A	No	High	21
L35/3	N/A	N/A	N/A	N/A	No	High	21
L35/4	N/A	N/A	N/A	N/A	No	?	21
L35/11	Ploughed farm land	Open paddock on farm land and long grass and scrub on terrace edges over looking the Hororata River	N/A	N/A Unable to relocate	13/04/07	?	
L35/12	Ploughed farmland	Open paddock on farm land; ploughed	N/A	N/A	16/04/07	?	
L35/13	On Homebush homestead section and in SW corner of farm paddock	Tree cover (oak, walnut and ash?) 100% with ivy ground cover	Exposures of ovens visible on the ground surface from recent disturbance due to clearing and felling of a tree	Scattered oven stones with charcoal stains and fire cracked rocks near a seasonal river bed. More ovens found out in the paddock north of the homestead section on the same side of the channel. Also exposed during recent	16/04/07	?	

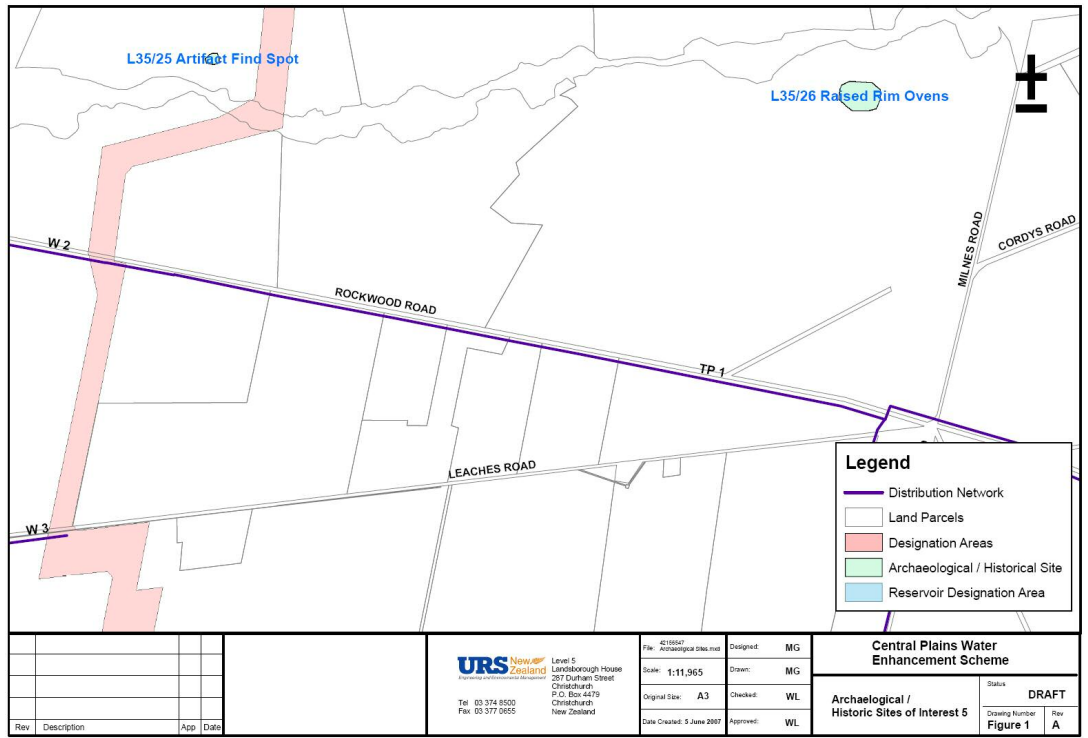
Site Survey	Condition	Land cover	Exposures	Archaeology	Date of Visit	Potential for Impact by Scheme Works	Appendix 1 Site Detail Map Page No.
				scrub clearing of hedges in the paddock			
L35/14	Not relocated. Actual location difficult to assess. SRF says exposed during cultivation but location of SRF coordinates are in a field of mature evergreen trees.	Open grassed paddock and mixed species open forest with shrub and grass ground cover	N/A	N/A	16/04/07	High	24
L35/15	Site relocated on side of hill sloping into a valley below Homebush Ridge	Farm paddock	Depressions on the surface	Three raised rim ovens? Fully covered by grass. Located at the base of a rock stack at the edge of the paddock on the left as you enter the paddock from the downhill gate	16/04/07	?	24
L35/16	Site could not be relocated	N/A	N/A	N/A	16/04/07	?	24
L35/17	Site could not be relocated	N/A	N/A	N/A	16/04/07	?	26
L35/18	Site could not be relocated	N/A	N/A	N/A	16/04/07	?	26
L35/19	N/A	N/A	N/A	N/A	No	High	28
L35/20	N/A	N/A	N/A	N/A	No	High	28
L35/21	N/A	N/A	N/A	N/A	No	High	28
L36/1	N/A	N/A	N/A	N/A	No		30
L35/26	Ambiguous if this is the same site that is recorded in the SRF as it is in the paddock adjacent to the coordinates given in the SRF. The site was pointed out to me by the landowner, Mr Richard Foster	Grass	1 - 2m wide circular depressions on the edge of a dry water course which floods in the winter	Three to five raised rim ovens with greywacke cobbles in the base	13/04/07	?	32
L35/25	Not surveyed as the SRF	N/A	N/A	N/A	13/04/07	?	34

Site Survey	Condition	Land cover	Exposures	Archaeology	Date of Visit	Potential for Impact by Scheme Works	Appendix 1 Site Detail Map Page No.
	states that there is no associated archaeological evidence of occupation. Spoke to the land owner and they knew of no artefacts being found there.						
L36/3	Visited the area of the sites following a paper road but could not get onto the farm land. Aerial photographs show that the area is mostly grassland.	N/A	N/A	N/A	13/04/07	High	36
L36/4	Visited the area of the sites following a paper road but could not get onto the farm land. Aerial photographs show that the area is mostly grassland.	N/A	N/A	N/A	13/04/07	High	36
L36/5	N/A	N/A	N/A	N/A	No	?	38

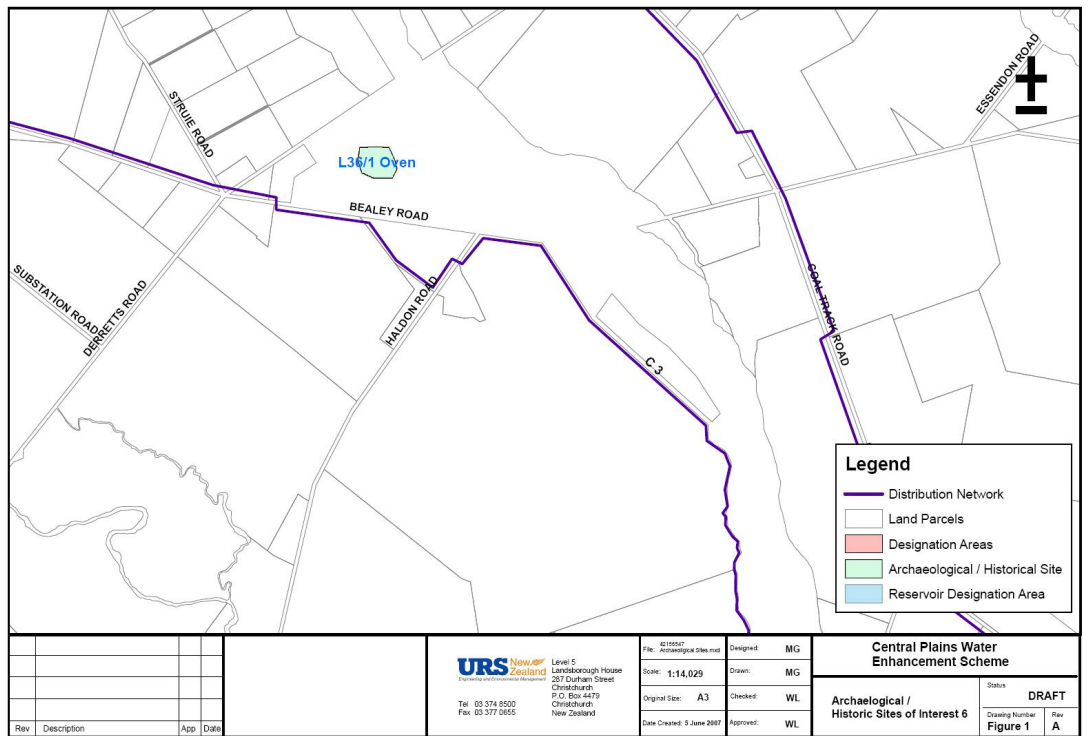
10. APPENDIX 2



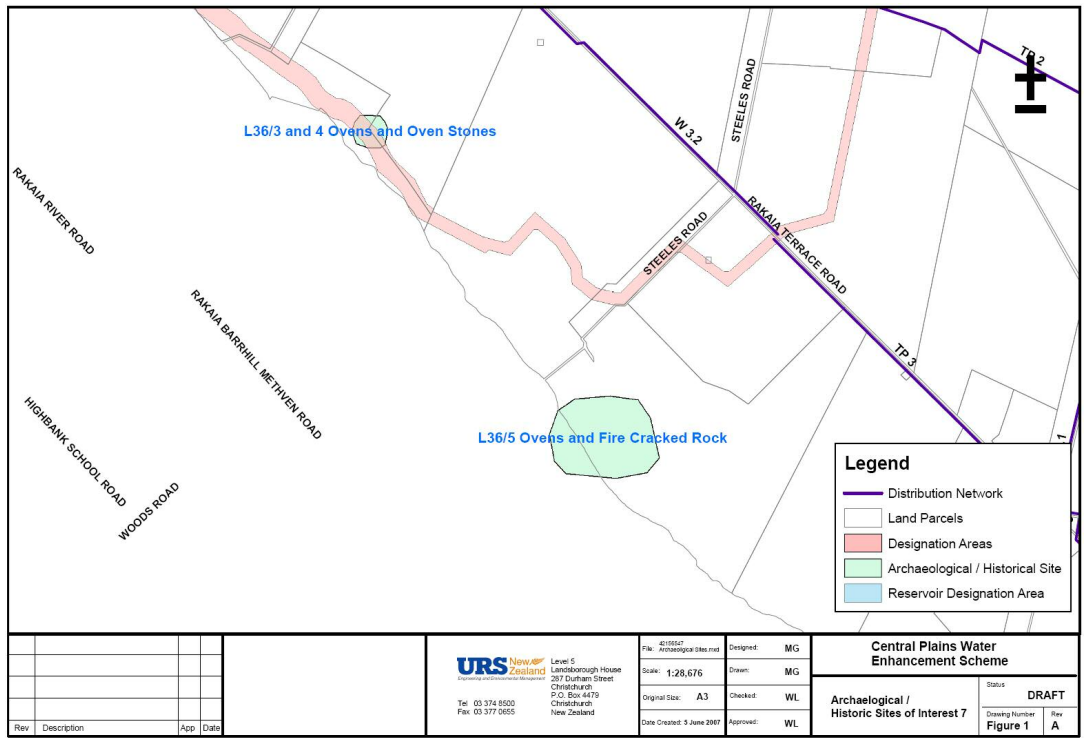




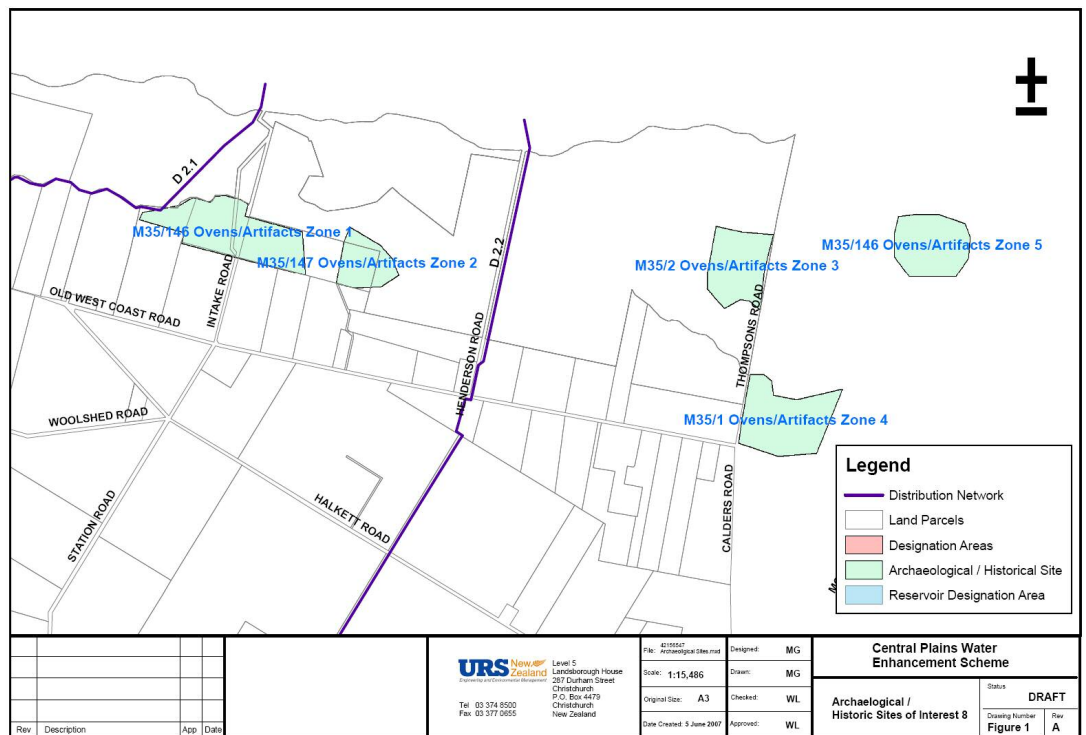
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