CENTRAL INTERCEPTOR PROJECT: ARCHAEOLOGICAL ASSESSMENT

Report prepared for

Watercare Services Ltd

By

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EXECUTIVE SUMMARY

Summary

The purpose of this report is to assess the potential effects on archaeology arising from the construction, operation and maintenance of the proposed Central Interceptor wastewater tunnel. It is one of a series of technical reports which support the overall AEE for the project.

The methodology for the Archaeological Assessment included a desktop component wherein the New Zealand Archaeological Association's (NZAA) site record file, the Auckland Council's Cultural Heritage Inventory (CHI), the New Zealand Historic Places Trust (NZHPT) Digital Library, Land Information New Zealand (LINZ) Landonline and the relevant District Plan schedules were searched for relevant information.

The second component was a brief field survey which included a visual inspection and photographic record of areas along the main tunnel and link sewers. The third component involved sub-surface testing in three areas identified as requiring further testing (Kiwi Esplanade/Ambury Park, Hillsborough Bay and Western Springs) in order to determine whether unrecorded archaeological sites were present subsurface in areas affected by the proposed works. The majority of the route did not require detailed inspection as the tunnels will be drilled and many of the locations where surface works are proposed are in landscaped or modified road and other reserves.

The subsurface testing carried out at Kiwi Esplanade/Ambury Park, Hillsborough Bay and Western Springs did not identify any archaeological remains.

Three areas of high archaeological or heritage significance (Ambury Park, Mt Roskill and the Western Springs area) were identified and are shown on Figure 1. Impacts on unrecorded subsurface remains are considered possible in the vicinity of these areas.

Overall, the effects of the proposal on archaeological values are likely to be less than minor. However, it is advised that a precautionary Authority under Section 12 of the Historic Places Act is obtained prior to the commencement of works as part of a mitigation strategy should any archaeological remains be exposed during works.

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Recommend-ations

On the basis of this assessment it is recommended:

- That there should be no major constraints on the proposed Central Interceptor Project on archaeological grounds, as no known archaeological sites will be affected.
- That Alternative Construction site no. 1 in Ambury Park in the Mangere Bridge area should be recognised as having high potential for encountering unidentified archaeological deposits, as the park on the whole has high archaeological values.
- That Alternative Construction site no.2 in Kiwi Esplanade in the Mangere Bridge area should be recognised as having low/moderate potential for encountering unidentified archaeological deposits and features, although the site is close to an area of high archaeological values (Ambury Park).
- That comprehensive Accidental Discovery Protocols should be developed in consultation with tangata whenua, setting out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed while project works are under way.
- That consideration should be given to applying for an Authority under Section 12 of the HPA for the project as a whole, or for the specific areas identified as archaeologically sensitive, as a precaution in case any unrecorded subsurface remains are exposed during earthworks. This would ensure that any delays to the project are minimised.
- That the tangata whenua are consulted regarding the effects of the proposal on Maori cultural values.

TABLE OF CONTENTS

1. INTRODUCTION

Project Review

Watercare Services Ltd (Watercare) is planning to construct a new wastewater tunnel to collect wastewater flows from the Auckland isthmus area and transfer them across the Manukau Harbour to the Mangere Wastewater Treatment Plant (MWWTP). The Central Interceptor Project (the Project) arose out of the Three Waters Plan (2008) which identified the need to provide trunk sewer capacity to central Auckland to reduce wet weather wastewater overflows and provide capacity for growth.

The project extends across the Auckland isthmus from Western Springs in the north to the Mangere WWTP in the south (Figure 1).

Purpose of this Report

The purpose of this report is to assess the potential effects on archaeological values arising from the construction of the proposed Central Interceptor. It is one of a number of technical reports which support the overall AEE for the project.

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Proposed Works

The overall concept proposed for the Central Interceptor Project is a gravity tunnel from the Western Springs area to the Mangere WWTP with various link sewers and connecting pipelines connecting the existing network to the main tunnel at key locations along this route.

The key elements of the project include:

- An approximately 13 km long 4.5 m diameter main tunnel from Western Springs to Mangere WWTP, up to 110 m below ground.
- Four link sewers connecting the main tunnel to the existing sewerage network.
- Associated connections to existing sewers.
- Associated structures at key sites along the route and at connections. At each site facilities include access shafts, drop shafts, and flow control structures. Grit traps, air intakes, air vents, or air treatment facilities are proposed at some sites.
- A limited number of overflow structures in nearby watercourses to enable the safe discharge of occasional overflows from the tunnel.
- A pump station located at the Mangere WWTP.

Other associated works at and in the vicinity of the Mangere WWTP, including a rising main to connect to the WWTP and an emergency pressure relief structure to enable the safe discharge of flows in the event of pump station failure.

The main tunnel, link sewers, connection pipes and many of the associated structures will be underground. The tunnel and link sewers will be constructed by tunnelling methods, with access provided from around 19 surface construction sites. These surface construction sites include:

- Three primary construction sites (at Western Springs, May Road and Mangere WWTP);
- 16 secondary construction sites to provide connections to the main tunnel and link sewers.

The primary construction sites will be used for launching or retrieving the tunnel boring machine, and materials for tunnel construction would be delivered and stored, tunnel spoil removed, and per permanent facilities constructed. Activities at the secondary sites on the main tunnel will include shaft sinking and the construction of surface facilities and at the link sewer sites will also include launching or retrieving the microtunnel boring machine.

Other construction activities include removal of vegetation, service relocations, establishment of construction yards, lay down areas and site access ways, traffic management, earthworks and site reinstatement.

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Proposed Works, *continued*

The duration of construction will range from generally around 5 to 6 years at the primary sites, 6 to 18 months at secondary sites. Due to the nature of construction at the secondary sites the total period of occupation will be longer than this (ranging between 2 and 5 years) with some periods of time where no active construction works will occur at the sites.

The project has been developed to a concept design stage. It is likely that some details may change as the project moves through the detailed design process. Detailed construction method will be determined following appointment of a construction contractor.

Methodology

The methodology for the Archaeological Assessment included the following:

1. Background

The New Zealand Archaeological Association's (NZAA) site database (ArchSite) and Auckland Council's Cultural Heritage Inventory (CHI) were searched to determine whether any archaeological sites had been recorded on or in the immediate vicinity of the proposed pipeline route. The relevant District Plans were searched for scheduled items in the vicinity of the proposed works. The New Zealand Historic Places Trust (NZHPT) Digital Library and Land Information New Zealand (LINZ) Landonline were also consulted for historical and archaeological information including early maps and plans relating to the project area. Relevant archaeological literature was reviewed. Where archaeological surveys have been undertaken along sections of the route these are listed in the bibliography at the end of the report (s.6).

2. Field Survey

The field survey included a brief initial visual inspection and photographic record of areas of proposed works along the route undertaken on 15 April 2011. Archaeological and historical research was undertaken and subsequently three areas were identified of being of potential archaeological interest, requiring field survey with additional subsurface testing: Kiwi Esplanade/Ambury Park (AS7); Hillsborough Bay (PS23 – AS5); and Western Springs (WS1). The survey of the Kiwi Esplanade/Ambury Park area was undertaken on 17 May 2012 and the Hillsborough Bay and Western Springs sites on 2 August 2011.

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Organisation of Assessment

Previous archaeological surveys in the area, existing archaeological and heritage databases held by NZAA, NZHPT and the Auckland Council, and early survey information held by LINZ provided the primary source of information regarding the archaeological sites that might be located along the proposed pipeline route.

The locations of the proposed works have been grouped into the main tunnel and link sewers, as listed below.

Main Tunnel:

CI(1) – Mangere Pump Station

CI(2) – Mangere Pump Station to Hillsborough Bay

CI(3) – Hillsborough Bay to May Road Access Shaft

CI(4) – May Road to Western Springs

CI(5) – Western Springs Park

Link Sewers:

LS(4) – Kiwi Esplanade to Witla Court

LS(3) – PS25 to May Road

LS(2) – Mt Albert War Memorial Reserve to Rawalpindi Reserve

LS(1) – Western Springs Depot to Motions Road (Western Springs)

Three areas traversed by the route were identified at the outset as being areas which should be examined in more detail because they were either relatively unmodified or were in close proximity to major heritage sites (Figure 2). These were :

1. Kiwi Esplanade/Ambury Park (AS7 area) within zone CI(2)
2. Mt Roskill (May Rd WS2 area) within zones CI(3), CI(4) and LS(3)
3. Western Springs (WS1 and Motions Rd L1S1 areas) within zones CI(5) and LS(1)

A summary of the desk top study undertaken on these areas is provided in the Background section below (s.2). The results of the field visits are discussed in s.3, and the conclusions reached in s.4. Recommendations are made in s.5.

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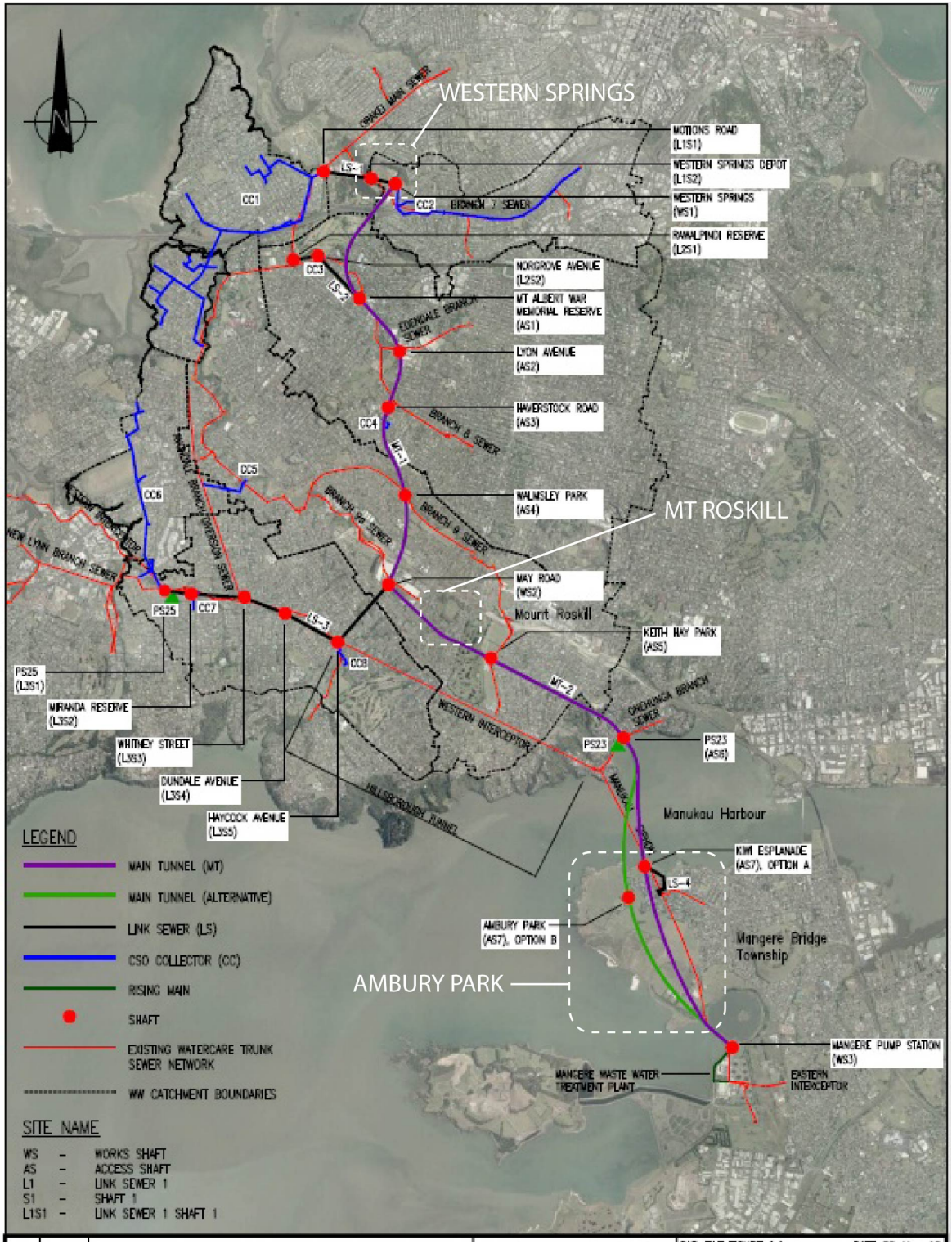

Figure 1. Plan of the proposed route of the Central Interceptor main tunnel and link sewers, with the three key areas of archaeological interest highlighted (white dashed lines)

2. BACKGROUND

Mangere Mountain

Mangere Mountain (Te Pane o Mataoho) is near the pipeline route but will not be directly impacted by the proposed work. However, Mangere Mountain should not be considered as a site in isolation, but rather as part of a wider Maori archaeological landscape which includes Ambury Regional Park to the west. This landscape incorporated elements of horticulture and settlement, evidence of which can be found both at Mangere Mountain and Ambury Park.

Mangere Mountain is one of the largest cone pa in the Tamaki region and is recorded in the NZAA site recording scheme as R11/26. It is one of the best preserved pa sites in the country (Bulmer 1994, quoted in Bickler & Clough 2010). Terraces, ditches and banks are clearly visible around the site (Bickler & Clough 2010).

Ambury Park

This is the first of three key areas of archaeological interest along the proposed route of the main tunnel. The area is located on the western side of a peninsula on the southern shore of the Manukau Harbour and sits atop an ash covered lava field that originated in eruptions from Mangere Mountain approximately 18,000 years ago (Auckland Council 2011).

Ambury Park offers excellent views of the Manukau Harbour, and is located close to two known canoe portages between the Manukau Harbour and the Tamaki River (Huebert 2008: 8; Stone 2001: 2). The volcanic soils are rich and fertile. The presence of extremely fertile soils coupled with readily accessible marine resources and freshwater access made the area ideal for Maori agriculture and settlement (Judge 2007; Sewell 1994). This is reflected in the nature and density of the recorded archaeological sites across the Ambury Park area.

Evidence of Maori occupation and horticulture is represented by numerous shell middens, stone heaps/mounds, stone rows, caves, terraces and platforms. There are over 70 archaeological sites located within Ambury Regional Park recorded on the NZAA site database (ArchSite). Close to the route of the pipeline in the Ambury Park area there are 23 recorded sites (see Figure 2; Table 1). These sites range from caves and shell middens to house platforms and terraces (Table 1).

The Ambury Park Stonefields are a scheduled Waahi Tapu in Auckland Council's Manukau District Plan (item 10 in Schedule 6F). The Ambury Park stone structures and stone walled enclosures are also scheduled archaeological sites (items 6 and 8 in Schedule 6G). The Ambury Park settlement (R11/819) to the east of the project area is also scheduled (item 7 in Schedule 6G).

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Ambury Park, *continued*

A number of archaeological surveys, excavations and assessments have been undertaken in the area of Ambury Regional Park. In the early 1970s an Auckland wide survey by Agnes Sullivan identified a number of areas of remnant Maori horticultural systems that survived in differing conditions across Auckland (Sullivan 1972). While the most notable of these are the Otuataua Stonefields not far to the south and the Matukutureia Stonefields at Wiri, Sullivan identified the Ambury Park area as being a remnant of a probable Maori stone walled horticultural area (Sullivan 1972: 153). Maori horticultural traditions are considered to have been related to the ancestral Polynesian horticultural practice of constructing garden plots defined with stone boundaries (Furey 2006: 24, quoted in Huebert 2008). Stone rows, mounds and heaps are thought to represent the *in situ* remains of cultivation areas, garden plots and/or evidence of boundary markers (Furey 2006: 24-32).

Before the establishment of the farm park within Ambury Park, an archaeological survey was undertaken in 1979 by students under the government Student Community Service Project for NZHPT (Sewell 1994). This initial survey recorded 68 sites within the park area (White, Slane & Grant 1979, quoted in Law 2002: 12). However, by 1981 Bulmer, in her review of the archaeology of Auckland's Regional Parks, recorded 95 sites within Ambury Park (Bulmer 1981). Also in 1981 more new sites were recorded by Lynette Morris in the Rocky Paddocks area of the park (Morris 1981, quoted in Law 2002: 12). In that same year, prior to the laying of the gas and oil pipeline from Marsden Point to Wiri and the sludge disposal pipe from the sewage treatment plant, a further survey was carried out by Crammond and Nevin which identified an additional 9 sites (Sewell 1994; Law 2002). Several of these sites were on or near to the path of the pipeline and would be either partially destroyed or damaged by the works (Sewell 1994). In the Little Rocky Paddock, Lilburn (1982) excavated sites R11/1123 (previously N42/1137), R11/29 (N42/1143), and an unrecorded site (Law 2002). This investigation was to examine the construction of stone mounds and their relationship to surrounding stone-free areas (Sewell 1994: 4). However, excavation confirmed only one site as a stone mound, with the others proving to be natural stone outcrops (Sewell 1994: 4).

During the same year, Adds and Brassey excavated the midden site R11/736 and its surrounding area (Sewell 1994; Law 2002). It was thought that several flat areas might have contained evidence of structures such as houses, but no structural evidence was found (Sewell 1994: 4). However, 739 obsidian flakes, a butt of a greywacke adze, and 13 other flakes including sandstone, pumice, chert and greywacke specimens were recovered (Sewell 1994: 4).

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Ambury Park, *continued*

Later works have included survey and mapping of features within Ambury Park (Rickard, Veart and Bulmer 1983; Sewell 1994). A number of sites located in the Big and Little Rocky Paddocks were assessed by Law in 2002. These sites consisted of middens, platforms, pits, a cave and a variety of stone features (Law 2002). In recent years, works include: an archaeological assessment for the State Highway 20 Manukau Harbour Crossing (Pishief 2006), an assessment of effects of proposed fencing within the park (Tanner 2006) and an archaeological assessment of the effects of planting within the park (Judge 2007).

Later History of the Ambury Area

During the late 1840s Governor Grey, fearing invasions from Nga Puhi warriors, requested that the Waikato chief Te Wherowhero and 80 of his best warriors (and their families) should occupy land at Mangere as Maori fencibles (ARC 1994; Law 2002). The land comprised an area of 480 acres near Mangere Bridge, including the land occupied today by the marae Te Puea (ARC 1994). Cultivation of this land was undertaken by Maori with a much more varied range of crops than traditionally grown (Law 2002). It should be stated that no artefactual evidence characteristic of this period has been noted during excavations or survey in the Ambury area (Law 2002).

For most of the 1850s Maori and Pakeha lived side by side, cultivating the land and utilising the harbour, and an 1851 plan (SO 1340C) illustrates land occupied by Maori and Pakeha in the area (Figure 3). However, as numbers of European settlers arriving grew and Maori awareness of the effects of land sales increased, conflicts began to occur (Law 2002). As Maori discontent grew, the people of the Manukau and Waikato areas united in a tribal confederation under their king Te Wherowhero (King Potatau) in 1858 and made a stand against further land sales to Europeans. Governor Grey responded by demanding that all Manukau Maori surrender their weapons and sign a formal declaration of allegiance to the Queen or retire to the Waikato (ibid.). Almost all Manukau Maori retired to the Waikato.

Following the Waikato wars, the government confiscated most of the Maori land in the Mangere area because of perceived Maori disloyalty, and the land was claimed for the Crown (ARC 1994; Huebert 2008). This land was then divided and sold to European settlers, who ploughed it and turned it to pasture, and this process can be seen in plan SO234 dated to 1879 (Figure 4).

Stones cleared from these areas were utilised in dry stone wall construction both within and around the area (Sullivan 1972:154-55). Evidence from later 19th century farming possibly remains in the form of the surviving stretches of dry stone walling in the area. Archaeological survey of these remnant field boundaries has been undertaken in recent years (Lawler 2002; Clough 2008).

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2. BACKGROUND, CONTINUED

Ambury Park, *continued*

In 1893, Stephen Ambury purchased the area now known as Ambury Park as a dairy farm and pasture lands, and formed Ambury, English & Co. which supplied milk to Auckland (ARC 1994). The farm continued to be operated by the Ambury family until the mid-1960s, when it was purchased by the Auckland Regional Council and turned into a park.

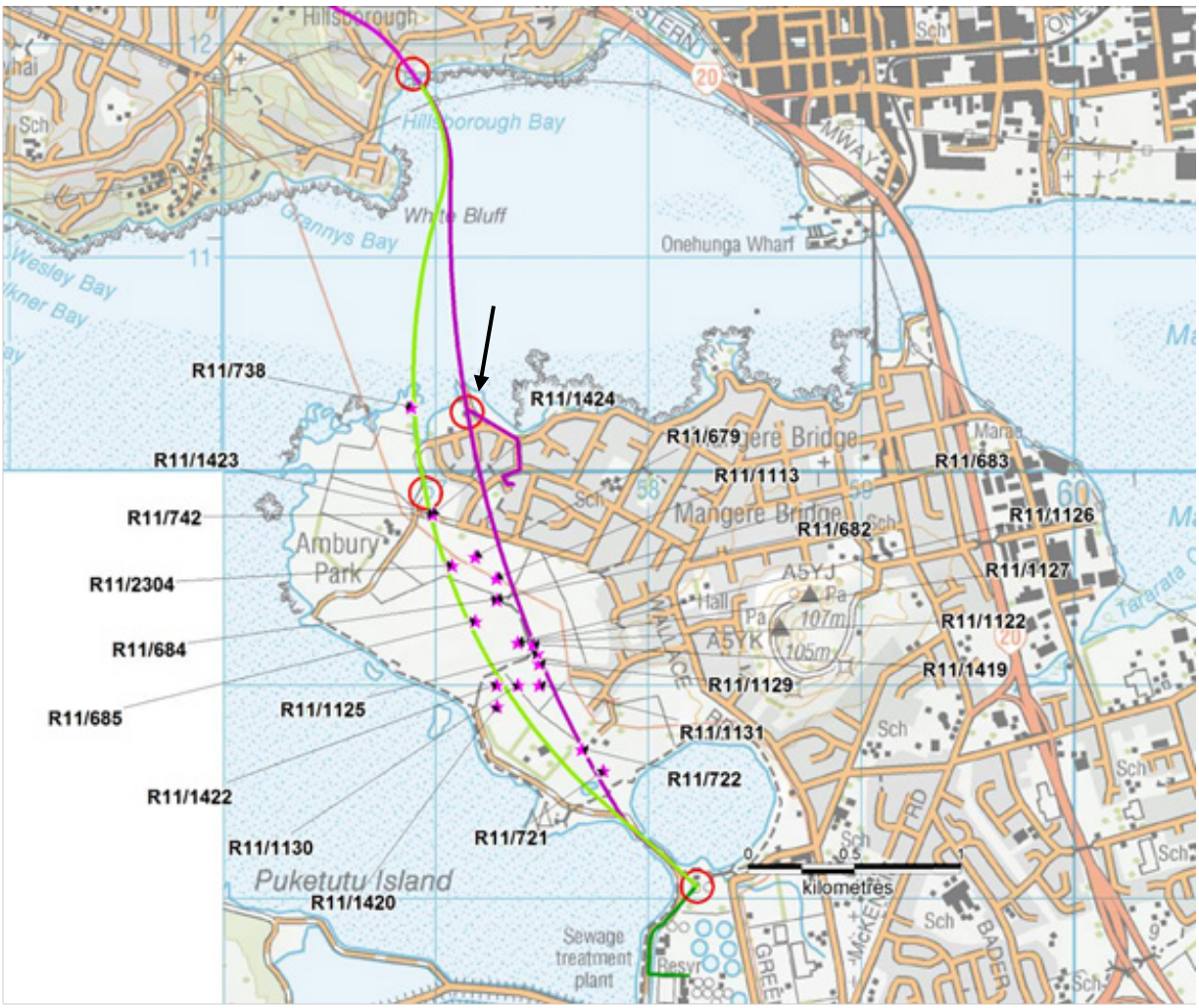

Figure 2. Archaeological sites recorded on the NZAA database in Ambury Regional Park near (within c.150m of) the two proposed pipeline routes through Ambury Park , and Kiwi Esplanade (black arrow)

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Table 1. List of archaeological sites located in the vicinity of the route of the tunnel in the Ambury Park area

CHI No.	NZAA ID	Description	Site Type	Project Area	NZTM Easting	NZTM Northing
10478	R11/721	House Floors/Shell Midden	House/Midden	Ambury Park	1757788	5908604
3873	R11/722	Shell Midden	Midden	Ambury Park	1757688	5908704
10828	R11/1420	Stone Heap/Shell Midden	Stone Heap/Midden	Ambury Park	1757288	5908903
4361	R11/1130	Stone Row	Stone Row	Ambury Park	1757387	5909003
10830	R11/1422	Shell Midden	Midden	Ambury Park	1757287	5909003
4388	R11/1131	Platform	Platform/Terrace	Ambury Park	1757487	5909004
11572	R11/1129	Stone Row	Stone Row	Ambury Park	1757487	5909104
4403	R11/1125	Terrace/Shell/Midden	Terrace/Midden	Ambury Park	1757477	5909154
10827	R11/1419	Shell Midden	Midden	Ambury Park	1757457	5909194
4405	R11/1127	Stone Heap	Stone Heap/Mound	Ambury Park	1757387	5909203
4401	R11/1122	Stone Heap	Stone Heap/Mound	Ambury Park	1757387	5909203
4404	R11/1126	Stone Heap	Stone Heap/Mound	Ambury Park	1757387	5909203
4311	R11/685	Cave/Shell Midden	Cave & Midden	Ambury Park	1757187	5909303
10453	R11/684	Shell Midden/Cave	Midden & Cave	Ambury Park	1757287	5909403
10456	R11/682	Cave	Cave	Ambury Park	1757287	5909403
4468	R11/683	Shell Midden/Pit	Midden & Pit	Ambury Park	1757287	5909403
11568	R11/1113	Cave/Shell Midden	Cave & Midden	Ambury Park	1757286	5909503
14774	R11/2304	Shell Midden	Midden	Ambury Park	1757076	5909563
10443	R11/679	Shell Midden	Midden	Ambury Park	1757186	5909603
10832	R11/1424	Stone Heaps	Stone Heap/Mound	Ambury Park	1756986	5909803
10831	R11/1423	Stone Heaps	Stone Heap/Mound	Ambury Park	1756986	5909803
10459	R11/742	Cave/Shell Midden	Cave & Midden	Ambury Park	1756986	5909803
4317	R11/738	Shell Midden	Midden	Ambury Park	1756885	5910302

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2. BACKGROUND, *CONTINUED*

Figure 3. SO 1340C dated 1851 shows the Ambury Park area to be in the ownership of W.S. Grahame. The area of Kiwi Esplanade is indicated by the arrow and the settlement of Governor Grey's Maori fencibles is circled

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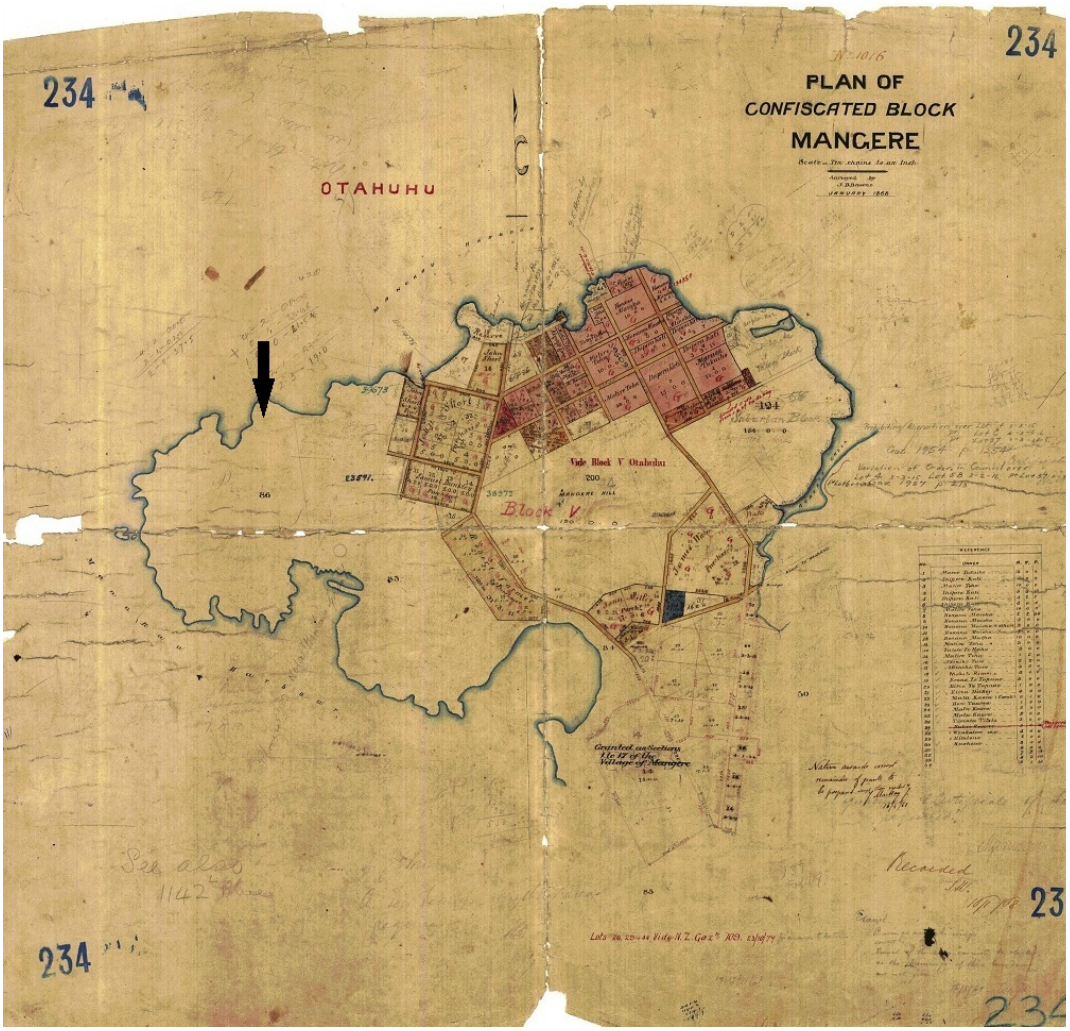

Figure 4. SO 234 dated 1879 shows the land that was confiscated from Maori and the initial development of the area by European settlers. The area of Kiwi Esplanade is indicated by the arrow

Mount Roskill Area

This is the second area of archaeological interest on the route of the wastewater tunnel. Mount Roskill volcanic cone pa is known to Maori as Puketapapa, which translates as flat-topped hill. The cone pa is recorded on the NZAA site recording scheme as R11/19. It has been significantly modified over the years, recent examples including works for a cycleway (Bickler & Farley 2010), and damage by contractors installing fences (Clough, Judge & Farley 2010; Pick & Clough 2010). However, terraces and pits still survive, particularly on the west and south faces (Walton, 2007 NZAA site record form). These pits and terraces, and many other features recorded prior to modification, indicate that the pa was a focal point for a population that was settled in the surrounding area. However, the area has been intensively developed and a midden and a findspot are the only recorded evidence of occupation in the area around the pa (Figure 5; Table 2).

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Mount Roskill Area, ***continued***

While the route of the main tunnel will pass close to Mount Roskill, the mountain would not be directly impacted by the proposed work.

The soil of the surrounding environs of Mount Roskill would have been a rich and fertile volcanic soil similar to that surrounding Mangere Mountain and other volcanic cone pa, and would have been attractive to Maori for cultivation purposes. Stone-walled complexes such as those found at Otuataua and their remnants at Ambury Park, were probably once present in the vicinity of Mount Roskill (Sullivan 1972: 154), but have been destroyed by urban development.

Western Springs

This third area of archaeological interest is located in the northern extent of the project area, near where the main tunnel terminates at Western Springs (Figure 1). Five archaeological sites, one maritime heritage site, three military heritage sites, four historic structures, a brick findspot, and three Maori Heritage Sites (Wai Orea, Nga Kauaewhati and Te Rehu – the first two of which are scheduled on the District Plan) are located at Western Springs, with other sites located in the wider area (Figure 5; Table 2).

Of the archaeological sites related to Maori settlement, two are related to a former pa. On the hillside off Old Mill Road overlooking Western Springs Park was a pa called Nga Kauaewhati (R11/537). Little of this site remains except for two small terraces (23m x 14m and 18m x 10m) located in the north-western corner of Western Springs Stadium and recorded as site R11/1149. Shell midden site R11/1148, southeast of the pa location, was located within tree roots in Western Springs Park. The NZAA site record describes it as consisting of a small number of oyster shells, and in generally poor condition. Located slightly further afield to the north-west is another midden site (R11/104), now destroyed, but previously thought to relate to a Maori settlement named Te Rehu. R11/349, further to the west, is a destroyed burial site.

Nga Kauaewhati is also a scheduled Maori Heritage Site on the Auckland City District Plan: Isthmus Section (Auckland City District Plan) (C05-13). The springs within the reserve are also recorded on the Auckland Council CHI as a Maori Heritage Area, and the Western Springs main lake is a scheduled Maori Heritage Site on the Auckland City District Plan (C05-14; CHI #12771). This water source would have played an important role in settlement selection by Maori, and the springs were also important to later industrial development in 19th century Auckland.

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Western Springs, *continued*

There is a significant collection of historic buildings at Motat, three of which are recorded on the CHI and scheduled on the Auckland City District Plan. These are related to the history of the Western Springs Waterworks. The first two are the former Pumping Station/Pumphouse (CHI #2690, District Plan D06-01 Category A) and the former Engineer's House built in 1879 (CHI #19083, District Plan D06-20 Category B). A historic tram shelter (CHI #18449; District Plan D06-18 Category B) located within this area is also part of this group of historic structures related to early industry in Auckland. Another historic house site (CHI #17142) is located some distance to the west.

The engineer's house, the pumphouse and their associated landscape setting have been internationally recognised for their exceptional contribution to the establishment of Auckland, receiving a UNESCO award in 2009 (Auckland Council Assessment 2010).

Prior to 1874 Auckland was largely supplied with water from a spring in Auckland Domain, along with numerous wells. However, pressure for a new reticulated water supply in 1874 led eventually to Council voting to proceed with a steam pumping scheme based at Western Springs. Design and construction began immediately and in July 1877 the Western Springs Waterworks were commissioned. Auckland now had a permanent reticulated supply of good quality water that was designed to meet the needs of the city until the turn of the 20th century (Murdoch n.d.). Part of this system is illustrated on an early plan entitled "Auckland west showing pipe lines from Western Springs to reservoir in Ponsonby Road" (NZ Map Number 4679) dating to the 1880s (Figure 6).

On the northern side of the Western Springs Park between Old Mill Road and Motions Road is the location of the former Low & Motions Flour Mill, now recorded as a maritime site on the CHI (#756). The mill was constructed in 1848 after Joseph Low and Henry Motions moved their mill to Western Springs, establishing the 'New Mills' (Murdoch n.d.). This mill can be seen on the 1880s plan illustrated in Figure 6.

A United States Military Camp has also been recorded on the CHI (#16977), and this is located to the south of the former Mill site. The Western Springs camp was one of a scattering of camps in Auckland, from Pukekohe and Papakura in the south to Mechanics Bay and Western Springs, and various parks on the Auckland Isthmus, where 29,500 US soldiers found accommodation from 1942 to 1944 (http://www.nzhistory.net.nz/war/us-forces-in-new-zealand/the-camps).

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Western Springs, *continued*

Three heritage sites are recorded in the CHI within Chamberlain Park Golf Course. Two of these comprise a military fortification (CHI #3179) and an anti-aircraft battery (CHI #13718). These structures are related to the US military camp located at Western Springs during WWII. A brick findspot (CHI #17141) further north within Western Springs park is a small reminder of the buildings located in the area prior to landscaping works for the construction of the golf course.

Other Areas

The only other archaeological/heritage sites recorded in the project area are at Hillsborough Bay, where a maritime heritage site (Sheerlegs, CHI #269) is recorded, and in the Mt Albert area, where a burial site (R11/139), now destroyed, was recorded.

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2. BACKGROUND, CONTINUED

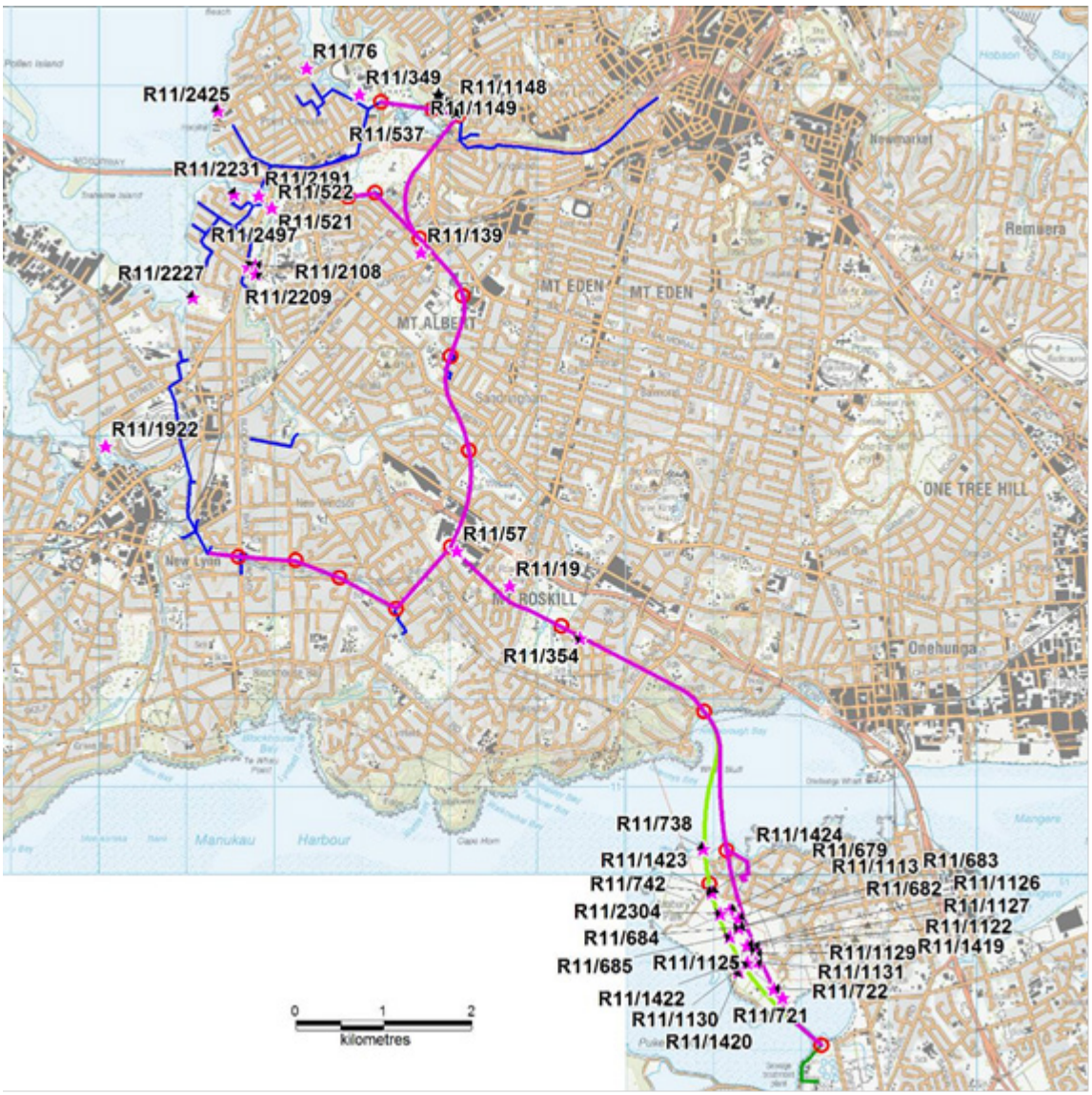

Figure 5. Map showing location of sites of archaeological and heritage interest recorded on the NZAA database within c.150m of the proposed tunnel route

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2. BACKGROUND, *CONTINUED*

Figure 6. Detail from NZ Map No. 4679 (dated 1880s) – "Auckland west showing pipe lines from Western Springs to reservoir in Ponsonby Road". The site of Low & Motions mill is indicated with an arrow

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Table 2. List of archaeological and other heritage sites in the vicinity of the tunnel between Hillsborough Bay and Western Springs

CHI No.	NZAA ID	Description	Site Type	Project Area	NZTM Easting	NZTM Northing
269	n/a	Site of Sheerlegs	Maritime Structure	Hillsborough Bay		
5838	R11/354		Midden	Mt Roskill	1755480	5912699
11669	R11/19	Mt Roskill/Puketapapa Pa	Pa	Mt Roskill	1754679	5913298
7031	R11/57	Wooden Artefacts	Findspot	Mt Roskill	1754078	5913697
11495	R11/139	Burial	Burial	Mt Albert	1753672	5917095
8554	R11/1149	Terraces	Terraces	Western Springs	1754068	5918696
6061	R11/1148	Shell Midden	Midden	Western Springs	1753968	5918796
6847	R11/537	Pa (Nga Kauaewhati)	Ridge Pa? /Maori Heritage Area	Western Springs	1753868	5918896
5576	R11/104	Te Rehu, Midden,	Midden/ Maori Heritage Site	Western Springs	1754368	5919095
11500	R11/349	Burials/Findspot/Te Rehu	Burials/Findspot	Western Springs	1752968	5918894
756	n/a	Low & Motions Flour Mill	Maritime Site	Western Springs		
3179	n/a	Military Fortification	Military Structure	Western Springs		
13718	n/a	Anti-Aircraft Battery	Military Structure	Western Springs		
17141	n/a	Artefact Findspot - Bricks	Findspot	Western Springs		
18449	n/a	Bus/Tram Shelter	Historic Structure	Western Springs		
19083	n/a	Building /Dwelling - Engineers House	Historic Structure	Western Springs		
2690	n/a	Pumphouse/ Pumping Station	Historic Structure	Western Springs		
12771	n/a	Wai Orea	Maori Heritage Area	Western Springs		
16977	n/a	U.S. Military Camp/	Military	Western Springs		
17142	n/a	House Site	Historic Structure	Western Springs		

3. ASSESSMENT

Field Survey

Three areas were identified as being of potential archaeological interest and requiring field survey with additional subsurface testing: Ambury Park/Kiwi Esplanade (AS7); Hillsborough Bay (PS23 – AS5); and Western Springs (WS1). A list of sites and the type of field assessment undertaken (sub-surface or visual) is provided in Table 3. The survey of the Ambury Park/Kiwi Esplanade area was undertaken on 17 May 2012 and the Hillsborough Bay and Western Springs sites on 2 August 2011. As for the remaining areas, the bulk of the route would be tunnelled and would not affect any archaeological remains, while many of the construction sites are located in road or other reserves that have been landscaped and modified to the extent that archaeological remains would not be expected, or in private properties. Sixteen of these sites have been considered in this development phase, but are not discussed specifically in the report due to their location (in road reserves or on private land). If the final route of the pipeline changes, any new sites that are on private property will be considered and a field survey undertaken if it is deemed necessary.

A number of archaeological assessments which have involved subsurface testing have been carried out in various locations along the route, and this information was reviewed as part of the assessment.

Central Interceptor Route

The proposed main tunnel extends for c.13km, with a diameter of 4.5m and will be located up to 110m below ground level. Works related to pumping stations, access shafts and air treatment will be required at points along the route.

For the purpose of this assessment the Central Interceptor main tunnel route has been divided into 5 Zones, which are described below:

CI(1) – Mangere Pump Station

CI(2) – Mangere Pump Station to Hillsborough Bay

CI(3) – Hillsborough Bay to May Road

CI(4) – May Road to Western Springs

CI(5) – Western Springs Park

Continued on next page

Table 3. Type of field assessment undertaken at each of the tunnel sites

Main Tunnel	Shaft Number	Field Assessment Type
Western Springs and Western Springs CSO Collector	WS 1	Sub surface
Mount Albert War Memorial Reserve	AS 1	Visual inspection
Lyon Avenue	AS 2	Visual inspection
Haverstock Road	AS 3	Visual inspection
Walmsley Park	AS 4	Visual inspection
May Road	WS 2	Visual inspection
Keith Hay Park	AS 5	Visual inspection
Pump Station 23 (Frederick Street)	AS 6	Sub-surface
Kiwi Esplanade	AS 7 Option A	Sub-surface
Ambury Park	AS 7 Option B	Sub-surface
Mangere Pump Station	WS 3	Visual inspection
Western Springs and Western Springs CSO Collector	WS 1	Sub surface
Mount Albert War Memorial Reserve	AS 1	Visual inspection
Lyon Avenue	AS 2	Visual inspection
Haverstock Road	AS 3	Visual inspection
Walmsley Park	AS 4	Visual inspection
May Road	WS 2	Visual inspection
Link Sewers		
Motions Road	L1S1	Visual inspection
Western Springs Depot	L1S2	Sub-surface
Rawalpindi Reserve	L2S1	Visual inspection
Norgrove Avenue	L2S2	Visual inspection
Pump Station 25 (Miranda Reserve)	L3S1	Visual inspection
Miranda Reserve	L3S2	Visual inspection
Whitney Street	L3S3	Visual inspection
Dundale Avenue	L3S4	Visual inspection
Haycock Avenue	L3S5	Visual inspection

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CI(1) Mangere Pump Station

The main Central Interceptor tunnel will terminate at the proposed Mangere Pump Station located on the coast south of Ambury Park (Figure 2 and Figure 7). This area was inspected from the roadside only. It was characterised by flat landscaped grounds under grass, interspersed with large structures associated with the treatment of waste water and effluent.

There are no archaeological or heritage sites located within the pump station grounds. This area is close to Mangere Mountain (R11/26) and south of Ambury Park; however, the likelihood of there being unidentified archaeological sites in this location is considered low due to the landscaped and disturbed nature of the grounds.

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Figure 7. Mangere Pumping Station, facing southwest

CI(2) Mangere Pump Station to Hillsborough Bay

The main tunnel alignment runs between Mangere Pump Station and Hillsborough Bay (Figure 8). It passes beneath a significant concentration of archaeological sites located in Ambury Regional Park (only those within 150m of the alignment options are shown in Figure 8).

While a significant number of sites are situated close to the two possible tunnel routes at Ambury Park, the tunnel passes underground at a considerable depth (30m) and no known archaeological sites will be affected. However, there are two alternative construction sites in the area: the first in Kiwi Esplanade (Option A) and the second just within Ambury Park (Option B).

Kiwi Esplanade (AS7):

There are no known archaeological sites in the area of Kiwi Esplanade which would be affected by the proposed works. However, it is considered likely that archaeological material may be present in the Kiwi Esplanade area. It has been noted by the former Auckland Regional Council that "evidence of habitation is so dense that it should be suspected that archaeological remains may be found virtually anywhere along the coast" (ARC 1994: 63).

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CI(2) Mangere Pump Station to Hillsborough Bay, *continued*

Kiwi Esplanade is a recreation reserve and extends from Mangere Bridge in the east to Ambury Regional Park in the west. While the park predominantly comprises extensive grassed areas, there is also a tar seal walkway, a car park, a boat club (and three boat ramps), and a playground.

The topography is generally flat with the exception of a few gentle undulations towards the western part of the site. It is bounded to the north and east by the Manukau Harbour, to the west by Ambury Regional Park (Figure 9) and to the south by a residential area. The area sits on extensive ash covered lava flows that emanated from Mangere Mountain to the south east. The survey was undertaken in good weather with good visibility.

The proposed works at Kiwi Esplanade involve the excavation of a 7m diameter access shaft, a 3m diameter drop shaft, and open trenching for the laying of a 0.4m diameter consolidation pipeline which extends across the esplanade and a new toilet building (Figure 10). As part of the construction process, necessary works also include: a topsoil strip to facilitate the laying of a temporary access road; minor surface disturbance associated with temporary works structures such as a site office, and lastly the erection of a 2m high fence around the site perimeter. An archaeological field survey including subsurface testing with a probe was undertaken to assess the area for unidentified archaeological remains.

The proposed new chambers are to be placed at the rear of public toilet facilities already in place in Kiwi Esplanade. This specific part of the park has been previously modified through installation of the ablution block and also through landscaping activities and the planting of small trees and shrubs (Figure 11 and Figure 12). Probing, therefore, was focused on the proposed location of the access road. Here, a loamy soil was encountered, with basalt and scoria present in concentrations. However, there was no evidence of midden in the vicinity of the works.

The flat grassed area of the esplanade where the link sewer trench is to be placed was also probed for midden. Here there were also some compact layers of stones beneath the surface in places, although the results were negative for archaeological deposits such as midden (Figure 13). There does appear to have been some infilling and small scale reclamation in the area during creation of the park. As such, any archaeological deposits are likely to be located at a greater depth and could not be identified by probing due to the presence of basalt stones in the fill.

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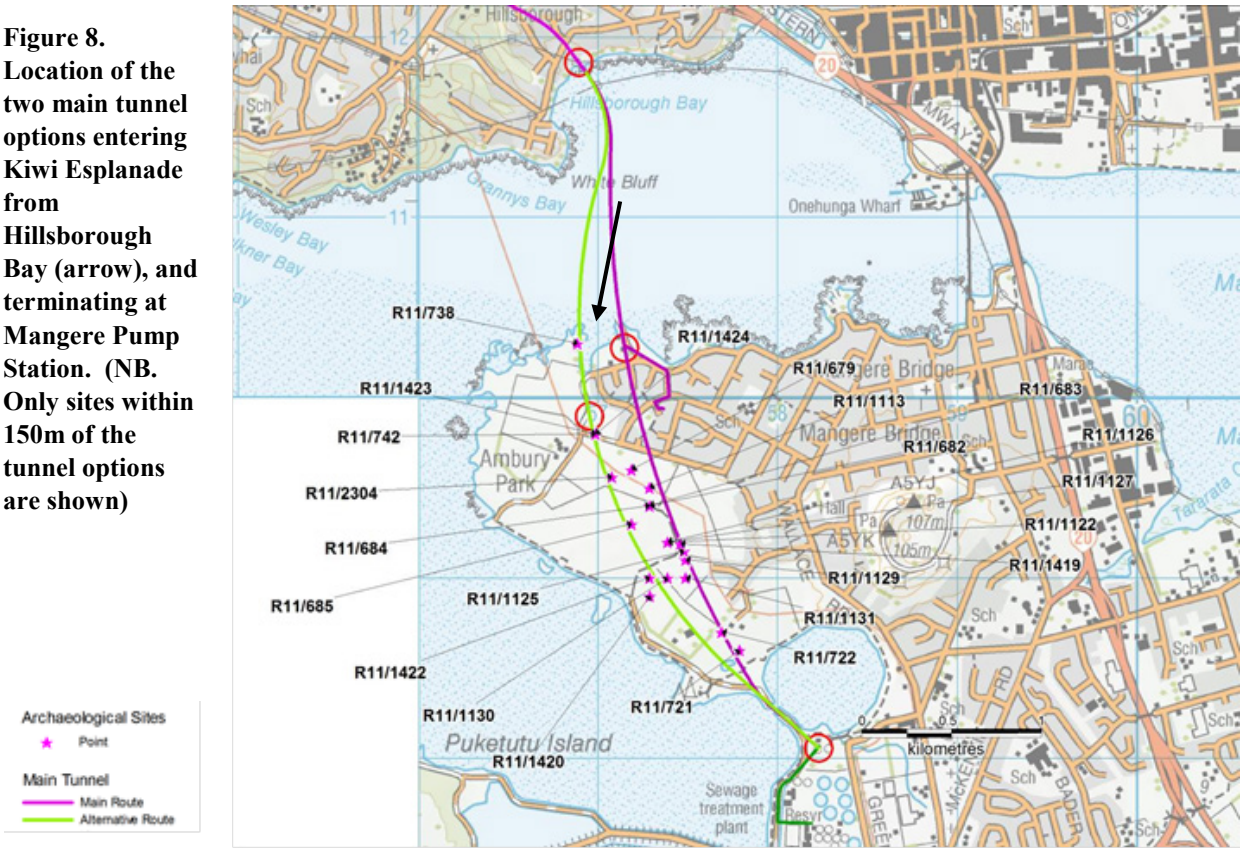

Figure 8. Location of the two main tunnel options entering Kiwi Esplanade from Hillsborough Bay (arrow), and terminating at Mangere Pump Station. (NB. Only sites within 150m of the tunnel options are shown)

Figure 9. View across Kiwi Esplanade with Ambury Park located just behind the treeline

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Figure 10. Construction site and works plan for Kiwi Esplanade. The main tunnel is seen in purple

Figure 11. Location of the proposed construction site for the drop shafts at Kiwi Esplanade. This southern area was probed for midden. Facing north

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Figure 12. The proposed location of the drop shafts near the ablution block, facing east

Figure 13. Looking east across the grassed area of the esplanade where the proposed Link Sewer trench would be located

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CI(2) Mangere Pump Station to Hillsborough Bay, *continued*

Ambury Park (AS7)

The proposed construction site within Ambury Park is located just inside the southern entrance to the park, between the road and hedge line, which was characterised predominantly by native tree species such as cabbage and manuka trees (Figure 14). A post and wire fence to enclose stock is located on the west side of the road, and the grass is closely cropped and relatively flat in the area of the proposed works (Figure 15). To the east on the other side of the hedge is the Education Board Paddock also used for stock grazing.

While no archaeological sites are located in the exact location of the proposed works, there is a concentration of archaeological sites close by in the park, as previously discussed (Figure 8). Furthermore, the Education Paddock has 3 known sites, the closest of which is site R11/742, a midden in a lava tunnel (Figure 14). The full extent of the lava tunnel is not known.

The works would entail construction of a 3m drop shaft and 7m access shaft, a pressure relief air vent, and open trenching for the laying of a 0.4m diameter link sewer which extends south along the existing road, then extends to the east exiting the park along Ambury Road (Figure 14). Subsidiary works include temporary construction of a site office, and temporary access road and parking areas.

The proposed site was probed for archaeological midden and evidence of depressed features such as pits (Figure 16). Basalt stones were encountered very close to the surface in places (5-10cm), while in other locations only loamy soil was encountered. This suggests a variable soil profile typical in the area due to the high level of volcanic basalt interspersed with pockets of fertile soil. The results were negative for archaeological deposits or features across the construction site.

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Figure 14. The location of the second option for the construction site within Ambury Park

Figure 15. The proposed location of the temporary site office and car parking area in Ambury park, with the road and stock fenceline indicated by the arrow. Facing northeast

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Figure 16. Proposed location of the drop and access shaft, with the probe in the foreground

CI(3) Hillsborough Bay to May Rd

After the main Interceptor tunnel passes beneath the Manukau Harbour, it enters the isthmus at Hillsborough Bay (Figure 17). No known archaeological sites have been recorded in the Bay, although the pipe would pass close to a maritime heritage site identified on the CHI (#269) as a Sheerlegs site.

The proposed works are situated at the existing Watercare Pump Station 23 (AS6) and entail construction of a temporary construction platform in the coastal marine area of Hillsborough Bay. Proposed works consist of a 7m diameter access shaft; a 5m diameter drop shaft; a 1.6m wide tunnel air vent and the construction of a 20m x 10m below ground passive Air Treatment Facility. As the foreshore surrounding the immediate area of the proposed works site is relatively undeveloped an archaeological field survey including subsurface testing with a probe was undertaken to assess the area for subsurface archaeological remains.

Hillsborough Bay (PS23-AS5):

The Hillsborough Bay works area (Figure 17) is situated due north of Kiwi Esplanade on the opposite side of Manukau Harbour. The survey area comprised the coast line, which includes the Goodall Street Reserve and the Watercare Pump Station 23.

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CI(3) Hillsborough Bay to May Rd, *continued*

Goodall Street Reserve:

The Goodall Street Reserve runs adjacent to the foreshore and is approximately 30m wide and extends from the Bluff Terrace car park to the gardens of the residential property at 15 Frederick Street. This area comprises a gravelled walkway, a flat 15m wide strip adjacent to the coast which breaks to a pronounced grassed slope that is dotted with mature pohutukawa up to Frederick Street (Figure 18). The area was probed for subsurface midden deposits, but none were identified.

Pump Station 23:

The Watercare Pump Station is located on the foreshore and is accessed off Frederick Street. The pumping station complex is a highly modified environment with a tar seal area, concrete and aluminium buildings with access to the existing storm water pipe and surrounding landscaped area under grass (Figure 19 and Figure 20). The foreshore bank itself consists of large basalt rocks forming a seawall. The grassed area was probed for midden, but none was identified. The foreshore bank to the west and south of the pumping station comprises private residential properties, and as such could not be surveyed. The foreshore to the east of the pumping station was accessed from the station and consisted of a steep bank approximately 7m in height that was thickly vegetated with mature and young trees and shrubs (Figure 20). This area was surveyed and where soil stratigraphy could be observed it consisted of a light brownish yellow clay overlying Waitemata series mudstones (Figure 21). In addition, the foreshore bank was also inspected for midden, but again none was identified.

Hillsborough Bay to May Road:

The area between Hillsborough Bay and May Road is dominated by residential areas and roads, and the pipeline passes through the Mt Roskill area, with a drop shaft, access shaft, manhole and a fence located on private property adjacent to Keith Hay Park), along with three manholes along the entrance to the park. The pipeline then passes on the southwest side of the cone and up to May Road (Figure 17). The main pipeline passes close to recorded midden site R11/354, south of Mt Roskill, and just to the south of the pa site of Mt Roskill itself (R11/19).

In the May Road area, wooden artefacts (CHI #7031; NZAA no. R11/57) were recovered in the immediate vicinity of the proposed works in an area of former swampland, although the site is now recorded as having been destroyed. The works include a drop shaft, access shaft and potential Air Treatment Facilities (Figure 17 and Figure 22; Table 2). While there is a low density of known archaeological sites in the area, the close proximity of R11/57 (and to a lesser extent Mt Roskill), suggests that archaeological remains could be identified during earthworks in the area. However, if so these are likely to consist of isolated artefact finds in the former swamp, which would not be visible on the surface and extremely difficult to locate with subsurface testing. Therefore, archaeological survey and subsurface testing of this area would not be feasible.

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Figure 17. Location of the main tunnel from Hillsborough Bay through to Mt Roskill/May Road. May Rd is indicated by the arrow

Figure 18. Goodall Street Reserve. Facing northeast

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Figure 19. Watercare Pump Station 23. Facing south east

Figure 20. Foreshore bank at Pump Station 23. Facing west

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Figure 21. Stratigraphic profile just east of the pump station. Facing north

Figure 22. View of May Road site seen from Mount Roskill (facing northwest)

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CI(4) May Rd to Western Springs

The main tunnel alignment extends northwards from the May Road area towards Western Springs (Figure 23). It passes at depth (c.30m) beneath the residential area of Mt Albert, with construction works involving drop shafts and associated earthworks (such as temporary access roads, a temporary bridge) taking place at Walmsley Park, Haverstock Road, and Lyon Avenue, and also Mt Albert War Memorial Reserve (Figure 24). However, no archaeological or heritage sites have been recorded in these locations, and as they are in built-up areas, and generally modified, the likelihood of intact archaeological remains is considered low.

North of the Mt Albert shops the tunnel passes beneath residential areas and also site R11/139, a former burial site that has been destroyed (Figure 25). Within Chamberlain Park Golf Course two military structures have been recorded on the CHI (#3179 and #13718), the locations of a military fortification and an anti-aircraft battery. These structures are related to the US military camp that was located at Western Springs during WWII. A brick find spot (CHI #17141) further north within the park relates to a former building located here prior to the construction of the golf course. There are no construction work areas in this stretch of the pipeline.

Figure 23. Route of the main tunnel northwards towards Western Springs via Mt Albert

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Figure 24. View of Mt Albert War Memorial Reserve site (facing north west)

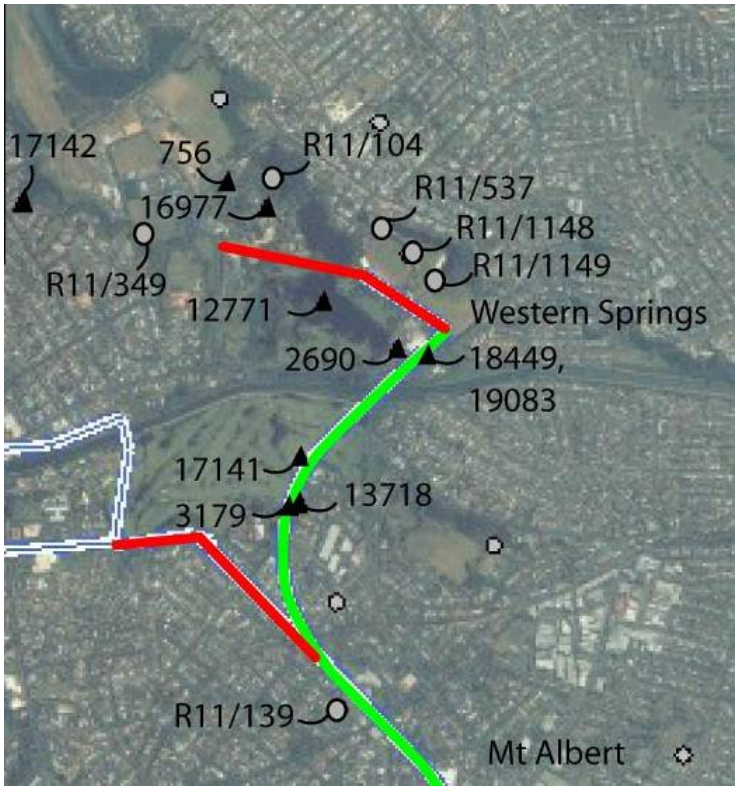

Figure 25. Route of the main tunnel from Mt Albert to Western Springs, where it terminates

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CI(5) Western Springs

The northern limit of the main tunnel is at Western Springs (Figure 25). The proposed construction works are situated at the Western Springs playing fields to the north and northeast of the three rugby pitches and cover an area of 7000m² (Figure 26). The MOTAT heritage area opposite the playing fields contains three historic structures – the Engineers House (CHI #19083), the Western Springs Pumphouse (CHI #2690) and tram shelter (CHI #18449), all of which are scheduled in the District Plan. The main tunnel and link sewers extend at a depth beneath these structures and therefore they will not be directly impacted. Link sewer 1 extends from here beneath Western Springs Park, Playing Field, Stadium, and Auckland Zoo through to Motions Road.

The works consist of a 7m diameter drop shaft; a small ellipse shaft; grit and control chambers; and the construction of an Air Treatment Facility. However, as part of the construction process, necessary works also include: a topsoil strip to facilitate the laying of a temporary access road; minor surface disturbance associated with temporary works structures such as engineers' and main contractors' site offices, a canteen, water treatment plant and workshop; and lastly the erection of a 2m high fence around the site perimeter. No archaeological sites have been identified in this specific area.

However, the fields are located below R11/537, Nga Kauaewhati ridge pa, its surviving terraces (R11/1149) and midden site R11/1148 (Figure 25; Table 2), and are also near the springs (Wai Orea, CHI #12771) which, like Nga Kauaewhati, is a scheduled Maori Heritage Site in the Auckland City District Plan.

As the extent of landscaping used to form the playing fields is not known, it is difficult to assess the potential survival of any archaeological remains within the playing fields, although the construction of playing fields generally involves significant levelling and drainage works. Therefore, an archaeological field survey including subsurface testing with a probe and the excavation of test pits was undertaken to assess the area for unidentified archaeological remains.

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CI(5) Western Springs, *continued*

Western Springs Field Survey:

The topography of the proposed Western Springs works site is area is flat and is grass covered (Figure 26).

Four small test pits were excavated to determine the nature of stratigraphy in the area of the proposed construction works and associated activities (Figure 27). These test pits were excavated by hand with spade and trowel, and one section was cleaned and recorded (Figure 28 and Figure 29). The following stratigraphic profiles were observed:

Test Pit 1 E1754179 N5918662**:**

1. Topsoil, dark brown silty clay loam, 0-9cmbs
2. Subsoil, greyish-brown sandy silt, 9-25cmbs
3. Grey mudstone bedrock – encountered at 25cmbs

Test Pit 2 E1754188 N5918669**:**

1. Topsoil, greyish light-brown silty clay, 0-6cmbs
2. Subsoil, light greyish orange mottled clay, 6-10cmbs
3. Buried topsoil, light-brownish grey sandy silt loam, 10-15cmbs
4. Subsoil, orange/grey mottled clay, 15-26cmbs

*Test Pit 3 E1754206 N5918635***:**

1.Topsoil, dark brown silty clay loam, 0-7cmbs
2. Subsoil, mid-brownish grey silty clay, 7-17cmbs
3. Compacted layer of degraded scoria, 17-20cmbs and extending

*Test Pit 4 E1754131 N5918649***:**

1. Topsoil, greyish dark brown waterlogged silty clay, 0-10cmbs
2. Buried topsoil, dark brownish-black organic silty clay, 10-15cmbs
3. Subsoil, orange/grey mottled clayey silt, 15-21cmbs

No archaeological deposits or features were observed in any of the test pits excavated on the Western Springs site. Additionally, the area of the proposed works was probed for possible midden deposits and this also proved negative. It should also be noted that in the area of the proposed 25m x 15m elliptical drop shaft in the west of the proposed area of works, that it was not possible to excavate a test pit as this area was waterlogged and extremely boggy (Figure 30).

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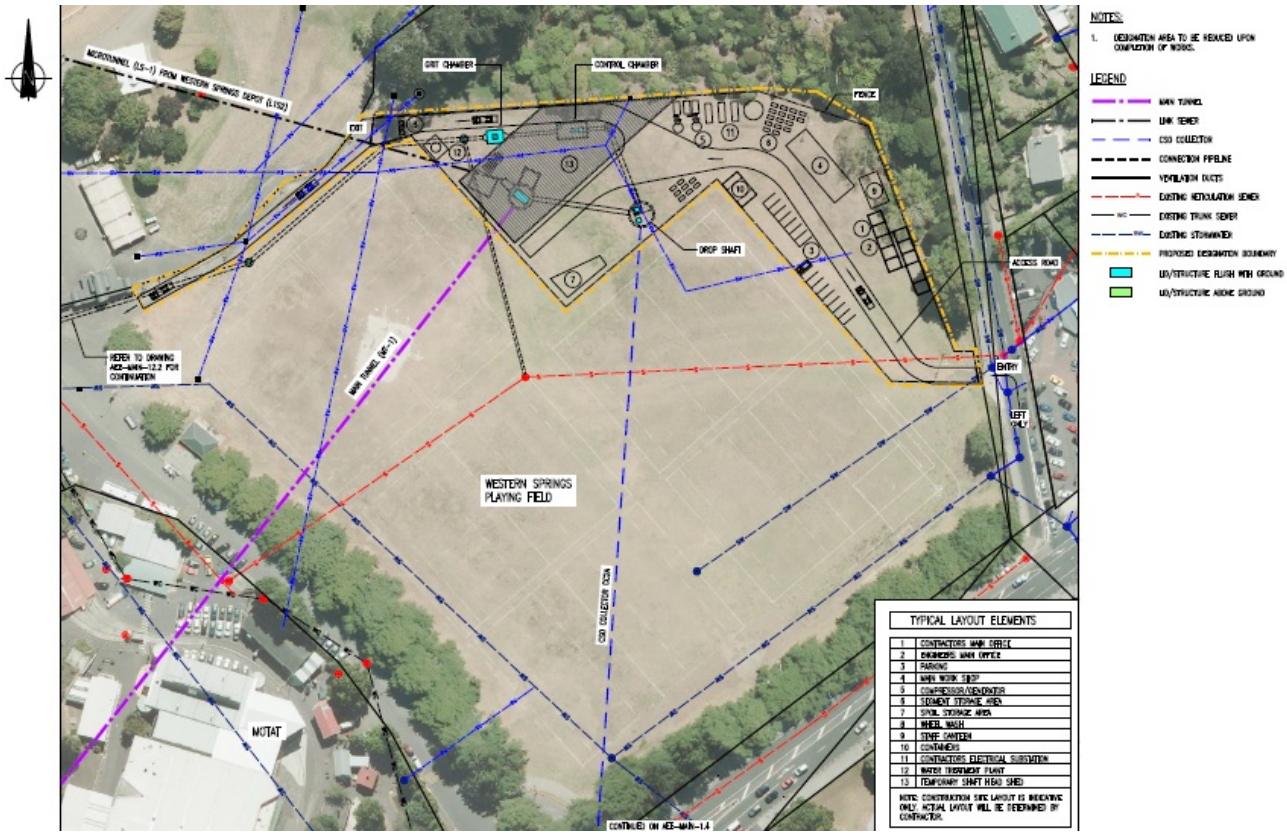

Figure 26. The site of the proposed Western Springs Central Interceptor works

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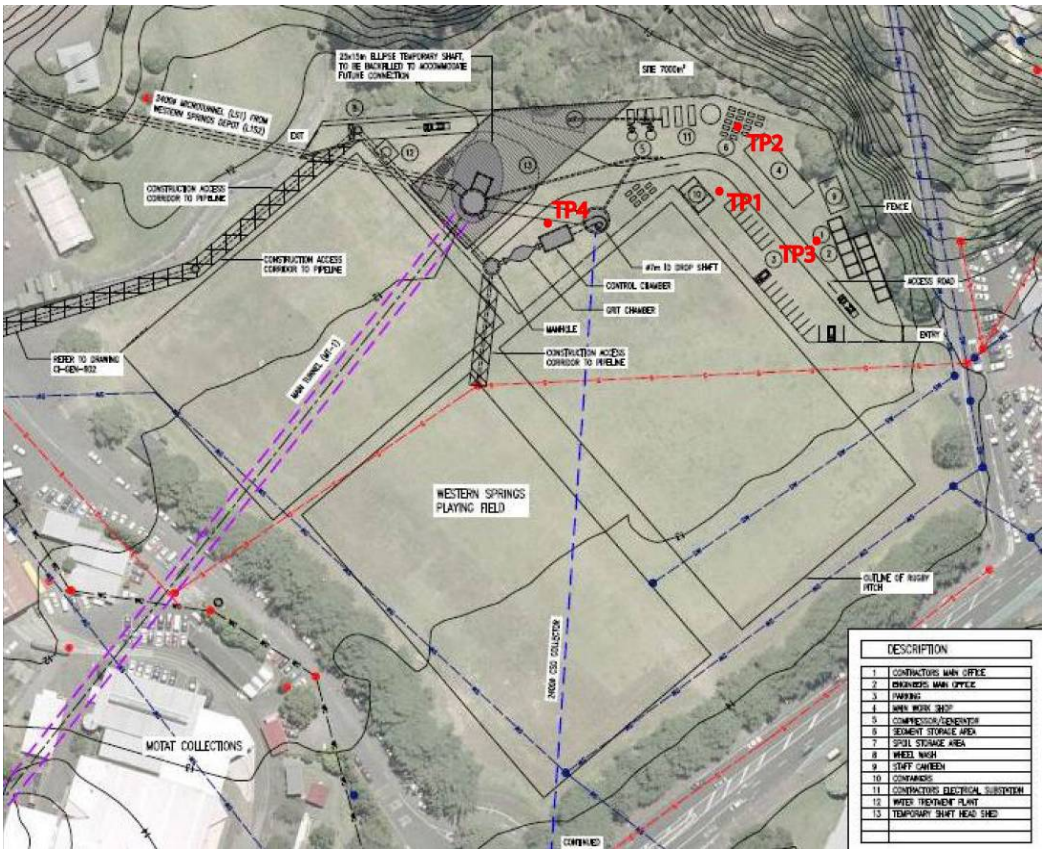

Figure 27. Location map of the test pits excavated on the Western Springs site

Figure 28. Stratigraphic profile of Test Pit 2, Western Springs. Facing north

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Figure 29. Stratigraphic profile of Test Pit 4, Western Springs-facing north

Figure 30. The boggy area in the west of the proposed construction site at Western Springs. Facing east

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Link Sewer Routes

The link sewers will be located at a depth of 20-80m below the surface, and they include several areas for new drop shafts and potential air treatment facilities, with associated structures where required. For the purpose of this assessment they have been divided into the following zones:

LS(4) – Kiwi Esplanade to Witla Court

LS(3) – PS25 to May Road

LS(2) – Mt Albert War Memorial Reserve to Rawalpindi Reserve

LS(1) – Western Springs Depot to Motions Road (Western Springs)

LS(4) Kiwi Esplanade/ Ambury Park to Witla Court

This link sewer extends eastward for approximately 740m from the main tunnel at Kiwi Esplanade/Ambury Park to Witla Court (Figure 10 and Figure 9). The works consist of a trenched 0.4m pipeline, a 3m diameter dropshaft on Kiwi Esplanade and at Ambury Park and a grit chamber in Witla Court.

It is considered likely that archaeological material may be present in the Kiwi Esplanade/Ambury Park area.

LS (3) PS25 to May Rd

This link sewer extends from May Road through to Avondale, and includes construction at the following locations:

Dundale Avenue – a tunnel running to Haycock Avenue and Whitney Street respectively, and a dropshaft and connection chamber located on a private residential property on Haycock Avenue.

Whitney St – a tunnel and one drop shaft located in the road reserve.

Pump Station 25 –tunnel drop shafts, chambers and a potential air treatment facility.

At PS25 the area has been substantially developed previously and it is unlikely that any archaeological features or deposits would be encountered (Figure 31). No archaeological or heritage sites have been identified in any of these areas, and as they are predominantly located within landscaped road reserves/parks, there is little potential for unrecorded archaeological remains.

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Figure 31. View of PS25 site showing the landscaped and developed nature of the site (facing south)

LS(2) Mt Albert War Memorial to Rawalpindi Reserve

Located to the south of Chamberlain Park Golf Course, this link sewer would involve construction at Norgrove Avenue and Rawalpindi Reserve (Figure 32) in a residential area.

No archaeological or heritage sites have been identified in these areas, and as they are predominantly located within a road and a landscaped reserve, there is little potential for unrecorded archaeological remains.

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Figure 32. Rawalpindi Reserve, predominantly grassed but with some established macrocarpa (facing north east)

LS(1) Western Springs Depot to Motions Rd

This link sewer extends from the south side of the playing field/stadium at Western Springs to Motions Road located to the west. The Western Springs depot is located within the southwest stadium area on the boundary with the park, and consists of a 5m diameter drop shaft, a microtunnel (LS1) from Motions Road and a microtunnel (LS1) to Western Springs (WS1). The tunnel will extend from the site beneath Auckland Zoo to the site at Motions Road where a drop shaft, chamber and additional works are to be located in a small grassed area opposite Auckland Zoo.

The pipeline extends at approximately 30m beneath the surface, and the route passes close to a recorded archaeological site located to the west of the Western Springs Park – R11/349, a former burial site destroyed by the construction of Seddon High School. A historic house site CHI #17142 was also located close to Motions Road, some distance to the west.

Unlike the link sewers already discussed, this line does pass close to recorded archaeological sites, and as already noted Western Springs was a known area of both Maori settlement and 19th century industrial development in the form of Low & Motions Mill and the Waterworks. Therefore, while the construction sites for the link sewer are predominantly located within landscaped reserves and parks, there is some potential for unrecorded archaeological remains to be encountered during the construction.

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4. DISCUSSION AND CONCLUSION

Archaeological Significance and Potential

The main heritage values associated with the project area relate to:

- The areas around Ambury Park/Kiwi Esplanade
- The area around Mt Roskill (May Road)
- Western Springs Park

As previously discussed, the area with the highest number of archaeological sites within the vicinity of the main tunnel route is Ambury Park. This park has high archaeological significance as it is one of the few stonefields and Maori horticultural sites still surviving in Auckland. When the park is considered within the wider Maori settlement landscape the park gains further significance from its relationship with the Otuataua Stonefields to the south, Mangere pa very close to the east, and Puketutu Island to the southwest. The archaeological sites within the park are therefore considered collectively to be of high significance.

Within Ambury Park itself, Alternative Construction site Option B – Ambury Park will not affect any known archaeological sites, but it is located close to the stonefields and Maori horticultural sites, as well as the midden and lava tunnel site in the Education Board Paddock. As such, it is considered likely that archaeological deposits would be encountered during earthworks in this area.

No archaeological remains were located during the survey of Alternative site Option A - Kiwi Esplanade, located adjacent to Ambury Park. However, the results suggest that the park has undergone some infilling and partial reclamation. As such, archaeological remains relating to Maori occupation as an extended landscape of Ambury Park are possibly present, but buried beneath the recent topsoil that was recorded during the survey, too deep to penetrate with a probe.

Mt Roskill, or Puketapapa, has undergone various modifications in the past through the development and expansion of Auckland. However, it is a significant pa site within the Auckland Isthmus, and pits and terraces are still present on the southern and western faces of the pa. Surrounding the pa would have been rich volcanic soils that would have been cultivated by Maori prior to European settlement, but intensive development around Mt Roskill has destroyed any such evidence. At May Road, however, wooden artefacts have been recovered in the past (R11/57) within the general area of the proposed construction works. The artefacts recovered were described as wooden implements for maize grinding from the 'mission swamp'. Much of this area is former swampland unsuitable for human habitation in the past. The only archaeological evidence that might be present in areas of former swamp would be isolated artefacts, although the likelihood of any being discovered is considered 'low to remote' (Clough, Macready & Bickler 2010: 78).

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Archaeological Significance and Potential, *continued*

Western Springs is the third area of heritage significance, in large part due to the remains of buildings related to the development of Auckland's water supply in the late 19th and early 20th centuries. However, the presence of a former ridge pa overlooking the springs, two terraces of which have been identified archaeologically, also attests to it being an important settlement locale for Maori prior to European settlement, while the scheduling of the pa and the Western Springs main lake as Maori Heritage Sites attests to the traditional significance of the area. The field survey did not identify archaeological remains in the northern corner of the playing fields. However, the swampy nature of the ground and its close proximity to the former ridge pa means there is a possibility of isolated artefacts related to Maori settlement to be recovered during construction works in this area. However, it is unlikely that structural remains relating to occupation (such as pits and postholes) would be present due to the swampy nature of the ground which would have made it less suitable for settlement.

The field survey undertaken in the Hillsborough Bay area did not identify any archaeological remains, and in general its archaeological potential is considered low.

Otherwise, the proposed main tunnel and link sewer routes with their associated constructions (shafts and small buildings) run through areas that have already been substantially modified by urban development and where there would be little archaeological potential.

Overall Effects of the Proposal

The bulk of the proposed pipeline is unlikely to impact on any known archaeological features. Generally, the central and branch pipelines will be tunnelled between 30m and 110m below the surface, where there is no potential to directly affect any archaeological and/or heritage sites. It is only in the areas where shafts and associated structures and ancillary buildings are proposed that there is some potential for impact on archaeological remains, and then only in areas that have not already been substantially modified.

None of the archaeological sites or heritage buildings and structures listed on the CHI or in the NZAA database (Tables 1 and 2) would be affected by the proposal. The main tunnel passes 30m beneath the surface through Ambury Park and its recorded archaeological sites and will not impact on them. However, if Alternative Construction site Option B is selected, it is likely that archaeological deposits would be modified by the works. The tunnel also passes deep beneath the southern edge of Mt Roskill (50-70m), but there will be no impacts on the pa itself. Nor will any of the buildings or sites at Western Springs be affected. An assessment into the effects of vibration from tunnel drilling on heritage structures concluded there is a very low risk to the MOTAT structures (T & T, 2012). These are the three areas identified as having high archaeological and heritage significance.

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4. DISCUSSION AND CONCLUSION, CONTINUED

Overall Effects of the Proposal, *continued*

Although the proposed construction sites will not affect the location of any recorded archaeological remains, in some cases, where archaeological sites have been recorded in the vicinity, they do have some potential to affect unrecorded subsurface remains.

Care should therefore be taken in the areas of high archaeological significance (in the Ambury Park, Mt Roskill and Western Springs areas). At the May Road site (near Mt Roskill), and the waterlogged area at Western Springs, it is possible that isolated artefacts may be exposed in what was formerly an area of swamp. However, archaeological features associated with occupation are unlikely to be encountered and subsurface testing to locate isolated finds is not considered feasible.

Overall, in all areas except Ambury Park, the effects of the proposal on archaeological values are likely to be less than minor. While there may be some effect on archaeological values in the Ambury Park area, these effects would be minor.

Maori Cultural Values

This is an assessment of effects on archaeological values and does not include an assessment of Maori cultural values. Such assessments should only be made by the tangata whenua, as Maori cultural concerns encompass a wider range of values than those associated with archaeological sites. All the recorded archaeological sites in the vicinity of the proposed works relate to Maori settlement and occupation, and it is noted that there are two scheduled Maori heritage sites in the Western Springs area, and a scheduled waahi tapu at Ambury Park.

Survey Limitations

It should be noted that archaeological survey techniques (based on visual inspection and limited subsurface testing) cannot necessarily identify all sub-surface archaeological features, or detect waahi tapu and other sites of traditional significance to Maori, especially where these have no physical remains.

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Resource Management Act 1991

Section 6 of the RMA 1991 recognises as matters of national importance: *'the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga*' (S6(e)); and '*the protection of historic heritage from inappropriate subdivision, use, and development*' (S6(f)).

All persons exercising functions and powers under the RMA are required under Section 6 to recognise and provide for these matters of national importance when '*managing the use, development and protection of natural and physical resources*'.

Historic heritage is defined as '*those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, deriving from any of the following qualities: (i) archaeological; (ii) architectural; (iii) cultural; (iv) historic; (v) scientific; (vi) technological*'. Historic heritage includes: '*(i) historic sites, structures, places, and areas; (ii) archaeological sites; (iii) sites of significance to Maori, including waahi tapu; (iv) surroundings associated with the natural and physical resources*'. (S2).

No effects on known historic heritage sites have been identified as a result of this archaeological assessment.

Historic Places Act 1993

In addition to any requirements under the RMA 1991, the HPA 1993 protects all archaeological sites whether recorded or not, and they may not be damaged or destroyed unless an Authority to modify an archaeological site has been issued by the New Zealand Historic Places Trust (NZHPT).

An archaeological site is defined by the HPA s. 2 as: 'any place in New Zealand that – (a) Either – (i) Was associated with human activity that occurred before 1900; or (ii) Is the site of the wreck of any vessel where that wreck occurred before 1900; and (b) Is or may be able though investigation by archaeological methods to provide evidence relating to the history of New Zealand.'

Authorities to modify archaeological sites can be applied for either under Section 11, in respect to a particular site or sites, or under Section 12, for all sites that may be present within a specified area. Applications made under Section 12 require approval by the Maori Heritage Council of the NZHPT. An application to undertake an archaeological investigation can also be made under Section 18 of the Act. The tangata whenua must be consulted regarding applications to modify, destroy or investigate archaeological sites which have Maori cultural associations.

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Historic Places Act 1993, *continued*

An Authority would be required should any unidentified sites be exposed during construction.

It is recommended that comprehensive Accidental Discovery Protocols are developed in consultation with tangata whenua, setting out procedures to be followed if any archaeological remains, taonga or koiwi tangata (human remains) are discovered. These would require that works are halted in the vicinity of the remains while appropriate action is taken from legal and cultural perspectives.

A general authority under Section 12 of the HPA could be applied for prior to the start of the project earthworks as a precaution. This would be linked to the Accidental Discovery Protocols and would minimise any delays should archaeological remains be exposed when works are under way.

5. RECOMMENDATIONS

It is Recommended:

- That there should be no major constraints on the proposed Central Interceptor Project on archaeological grounds, as no known archaeological sites will be affected.
- That Alternative Construction site no. 1 in Ambury Park in the Mangere Bridge area should be recognised as having high potential for encountering unidentified archaeological deposits, as the park on the whole has high archaeological values.
- That Alternative Construction site no.2 in Kiwi Esplanade in the Mangere Bridge area should be recognised as having low/moderate potential for encountering unidentified archaeological deposits and features, although the site is close to an area of high archaeological values (Ambury Park).
- That comprehensive Accidental Discovery Protocols should be developed in consultation with tangata whenua, setting out procedures in the event that archaeological remains, taonga or koiwi tangata (human remains) are exposed while project works are under way.
- That consideration should be given to applying for an Authority under Section 12 of the HPA for the project as a whole, or for the specific areas identified as archaeologically sensitive, as a precaution in case any unrecorded subsurface remains are exposed during earthworks. This would ensure that any delays to the project are minimised.
- That the tangata whenua are consulted regarding the effects of the proposal on Maori cultural values.

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APPENDIX 1: NZAA SITE RECORD FORMS

APPENDIX 2: CHI RECORDS