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The Association's newsletter, *Archaeology in New Zealand*, provides an outlet for shorter papers on any topic connected with the archaeology of New Zealand (including relevant material from the Pacific), contains news of current archaeological work and gives notice of Association activities. Back issues are available.

The Association also publishes the *New Zealand Journal of Archaeology*, and a monograph series. The *Journal* is edited by Dr Janet Davidson, and publishes articles on all aspects of prehistoric and historic archaeology in New Zealand and the Pacific. It is published once a year. The price varies with fluctuations in exchange rate and postage costs, and is set at the time of production for each issue. Volume 28 was NZ\$32 for NZ subscribers and NZ\$50 for overseas subscribers (includes postage). Back issues are available. Orders to: The Business Manager, *New Zealand Journal of Archaeology*, PO Box 14359, Kilbirnie, Wellington.

Cover: The Mataraua site (U14/2351), Tauriko, Western Bay of Plenty during excavation in August 2007. Photo: Ben Thorne.

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HERITAGE VALUES OF THE ALBERT PARK AIR RAID SHELTERS

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Introduction

When considering the heritage values associated with a particular place, or a particular type of place, different values need to be taken into consideration. This varies from case to case, but certain common elements soon make themselves clear (Historic Places Trust 2004). The purpose of this investigation is to explore the heritage values present in the Albert Park air raid shelters and its history, and present them to the wider community.

Historic values are those concerning the association of the site with important or representative aspects of history for a country, region, or local people, and also its rarity as a site of its type.

Archaeological values are those which deal with the importance of the site, the condition of the site, and its visual, educational or recreational values.

A brief history of the tunnels

The earliest piece of legislation that affects the tunnels was brought about by the withdrawal of the military barracks from Albert Park with the 1872 Auckland Improvement Trust Act¹ where the park and the land within it were classified as 'unalienable', meaning that no part of the park may be separated from the rest of the park – and potentially sold to a private individual or organisation (Clough, 1996; "Parks in Auckland – Albert Park"; Statutes of New Zealand 1971).

1941 saw the entry of Japan into the Second World War with a dawn raid on the US naval base of Pearl Harbour on O'ahu, Hawai'i. Quickly paranoia spread through the US before being transmitted through its allies to Auckland, where the City Council immediately began plans to excavate tun-

nels beneath Albert Park with the intention of using them as air raid shelters in the event the Japanese came to attack, giving the inner city residents a place to take refuge.

The tunnels were finally completed in 1946 and due to the evaporation of the Japanese threat, the tunnels were instantly filled with unfired clay bricks (which appear to be wet enough that some that have been recovered from the tunnels have reappeared as pottery (Swabey 2007), also see Figure 1), the entrances buried and the air shafts and other shafts in-filled. However, interest in the tunnels did not die there. Even into the 1960s there were newspaper articles excitedly proclaiming ideas and opinions about the future use of the tunnels (Auckland City Archives a–d). These were renewed in the 1990s by two separate groups, a businessman seeking to open it as a tourism venture, and a group of architecture students and their lecturer who viewed the tunnels as part of the solution to Auckland's traffic problem (Bourke a; Tonks 2007). However, not a lot is known about the tunnels at all (Bourke 2007; Farrant 2007; McBride 2007; McCann 2007; Mitchell 2007).

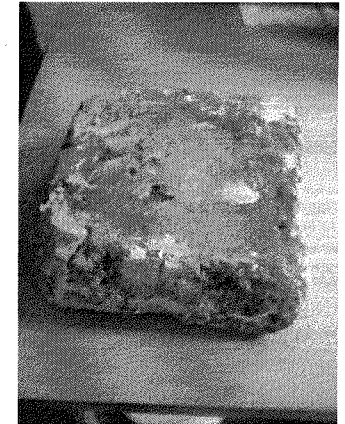


Figure 1. Photograph of an unfired brick from tunnel complex.

Historic Values

Perhaps most important to the tunnels are their historic values to Auckland, and to New Zealand. The tunnels are a link to the past in regards to the society at the time, and especially the parts that were not recorded. The historic values of the site are mostly linked to its individualism and high level of rarity, both at a local and at an international level.

Historic values: fortifications in Auckland during World War II

During the 'terror' that was apparent during the Second World War, huge amounts of capital were invested in the defence of New Zealand while its fighting men were off on duty. The tunnels were not the only establishments constructed at the time, with a large network being constructed around and in the Waitamata harbour on which Auckland City sits.

Major fortifications include a battery above the tunnels in Albert Park (completely separate to the tunnels), batteries on the North Shore, as well as

on various harbour islands such as Motutapu, Motohui and Waiheke. Many of these were adaptations of earlier fortifications built around the turn of the century in anticipation of a surprise attack by a Pacific Coast Russian navy, and these earlier fortifications took advantage of the limited range of the time by constructing the batteries on the landward sides of the Hauraki Gulf islands pointing towards the harbour itself. The idea was that an invading navy would progress beyond the islands without harassment, and almost reach the harbour itself before being in range of any artillery. Here, they would then be surrounded by batteries of disappearing guns. These were guns which utilised the large amount of force created by the discharge of shells to push the gun into an underground bunker to be reloaded while being near invisible from outside and relatively safe from return fire. However, by the 1940s, artillery technology had advanced well beyond this and ships were able to fire on the city without having to come as close as the islands, so batteries near the city were stripped of the disappearing guns (which were expensive and now of little use) and used for other purposes while the front-line batteries were moved further out to sea to combat this new threat. Most of these batteries were decommissioned and deconstructed after the war. However, the Albert Park tunnels are unique at a local level for four main reasons: they were constructed by the council, they were an air raid shelter, they were in the dense inner city, and they were constructed during the war. Although other constructions in New Zealand meet some of those criteria, only the tunnels meet all four, with the only comparable examples in New Zealand being the Wrights Hill Fortress, Cracroft Caverns, North Head, and Stony Batter.

Wrights Hill Fortress is in suburban Wellington. It was initially conceived in 1934, but due to the enormous costs involved in the creation of a fortress this was delayed continuously until the outbreak of World War II when in 1939 it was considered, like all defence, top priority (“Wrights Hill Fortress”; “Wrights Hill Fortress Restoration Society”). However, although the fortress was constructed in a built-up environment, and it was built during the war it was constructed by a completely different process as it was built by the Ministry of Defence, as opposed to the tunnels which were built by the Auckland City Council, and as a military building its primary focus was not in sheltering civilians in the event of an attack. Furthermore, the fortress is essentially a series of underground buildings connected by tunnels which could house people in the event of an attack, but at the end of the day, the fortress’ primary focus was on defending the capital rather than sheltering civilians.

Cracroft Caverns in Christchurch, similarly to the Albert Park tunnels were adapted during 1942 in reaction to the Japanese threat (“Cracroft Caverns”). However, there the similarities seem to end. The Cracroft Caverns

were adapted from natural caverns in an existing hill by the Ministry of Defence, not a local body; they were constructed as a provision of operational shelters to enable the Combined Headquarters (Army, Navy and Air) to carry on in the event of an attack; and there is not enough evidence currently available to determine whether they were in a built-up area or not.

North Head is so-named as it sits atop an extinct volcano at the northern head to the harbour on which inner city Auckland resides, and shares a lot of similarities to the construction in Albert Park: there is a history of Maori occupation before European arrival; it was taken for a military base; and its main construction was built in response to a ‘scare’. However, the majority of its works were constructed during the crisis point of the 1870s, the ‘Russian Scare’, well before World War II, although the subterranean works accompanied the installation of disappearing guns in the early 1900s. Like the fortress and the caverns, North Head was constructed not by the local body, but by the Ministry of Works and the Ministry of Defence; its primary focus was to prevent attacking ships from entering the harbour rather than to shelter civilians; although it was built fairly close to a built-up area (North Head; North Head – Takapuna).

The final installation is Stony Batter on Waiheke Island. Effectively, it shares no similarities with the Albert Park Tunnels as it was constructed by the Ministry of Defence, it is at the rural end of the island, not the urban end, it was developed in the early 1930s, and its purpose was to take advantage of new long-range cannons, rather than the sheltering of civilians. The big similarity is simply that it has a tunnel complex under the battery from where the complex was operated and stocked (“Stony Batter”; “Stony Batter Historic Reserve”; “Waiheke Battery”).

Historic values: civilian shelters in expected major bombing regions during WWII

There also does not appear to be any exact similarities in Europe and Britain. These places did not suffer ‘terror’ – they suffered the real thing, such as the Blitz and the Berlin Raids. As a result, both have similar establishments to the Albert Park tunnels, but when considered using the criteria of being a tunnel complex for the purpose of sheltering civilians, constructed during World War II by a civilian council rather than a national ministry, and built in a dense area, as far as research could determine, the Albert Park Tunnels are still unique and as a result, rare. It should be noted that there was only limited research to come out of Germany, so the bulk of the information on German complexes comes from British authorities.

Firstly, there are a range of air raid shelters in Britain dating to the World War II period, recorded by the Council for British Archaeology, so there are subterranean buildings with a similar purpose built during a similar period, but none of these are tunnels. Six school shelters (one room buildings) and two converted cellars are recorded, suggesting that the trend in Britain was to have been for small shelters at periodic intervals rather than a single very large tunnel complex with entrances at periodic intervals. Also, the buildings were constructed mostly by civilians but often under order or supervision and so differ enough from Albert Park Tunnels to make them unique.

Second are the Wymering Tunnels in Portsmouth ("Pourtsdown Tunnels"). Built outside the town centre in an old chalk pit, against a sheer chalk face, by a civilian commercial company, the tunnels were designed to accommodate 2565 people on a presumably long-term basis: there were three tier bunk beds, first aid and canteen facilities suggesting that this would be needed for extended periods at a time. Although it was constructed by a non-government agency in World War II, and was a tunnel complex designed as a shelter for civilians, it was not constructed in a built-up area, making it significantly different from the Albert Park Tunnels.

Thirdly, in Kent there are a number of sites ("WWII sites") which were air raid shelter tunnels constructed for sheltering civilians, and a number were in built-up areas, during the war, but these are few and far between. Many of them have now been vandalised and/or demolished and the majority of the remaining structures are military or state compounds. Only the military and state compounds actually had more than one tunnel, with the majority of the other tunnels being simply a single tunnel that either ran in a straight line with two entrances, or ran in a zigzag pattern downwards.

Also, emails from the National Trust (Cawser 2007), and the Council for British Archaeology (Charno 2007; Langley 2007) announced that in Britain there is no interest in tunnel systems from World War II, and not a lot is known about the tunnel complexes. The Imperial War Museum (Eddisford 2007) and the London Transport Museum (Resource Desk 2007) both state that the focus of the blitz was on London and in London no civilian shelter complexes were constructed during the war although the tube had some stations converted into shelters during this period. However, as more and more complexes deteriorate or are demolished, the Albert Park Tunnels will become even rarer as an artefact from the war.

In Germany there is not a lot known about tunnel complexes, but all of those that have been recorded have been military establishments which have also occasionally sheltered civilians ("Nordhausen KZ tunnels – V 2 factory"; "Tunnel and Shelter Researching") so it would appear from the limited infor-

mation available that in Germany there are no complexes similar to the Albert Park Tunnels.

Lastly, in Newhaven are a series of tunnels running under the town ("Row erupts over WWII tunnel plans") which were not for civilian shelter, were built by the navy as a secret naval base, but were built in World War II in a built up area and although not similar to the Albert Park Tunnels, are important to this study as these tunnels are undergoing similar conservation issues.

Archaeological values

Although the vast majority of the values present in the site are historical, there is a significant amount of archaeological value present in the location. The tunnels themselves could provide, through archaeological investigation, information about the construction techniques used in this time period and on this type of building; what sort of life people lived in Auckland during the war, as demonstrated by artefacts and waste items left in the tunnels on their closure; local civilian history for the period; as well as a case study for historical archaeology.

Through archaeological investigation of the tunnels, research could be conducted on historic engineering of the early 1940s (similar to that carried out on the London sewers of Joseph Bazalgette, or the Empire State Building by Gregory Johnson), and could be used as a case study with other historical engineering sites. The air shafts themselves have been a focus of research and work for members of the heritage management team at Auckland City Council. A complex design was required to allow access to the engines, most of which came from the engines of large trucks, without filling the tunnels with diesel fumes, and in the event of a bombing raid, the capability to withstand the blast with the engines still running without any of the blast or debris being forced down the air shafts onto the civilians (Bennett 2007).

Archaeological investigation could also help determine what kind of life Aucklanders involved with the project had. Although the many engineers, city planners and officials who entered during the construction are relatively unlikely to have left anything behind, the likelihood of artefacts remaining from the men who sealed the tunnels are quite high, such as broken tools from when the main wooden supports were removed to be sold.

The archaeological value of the site is largely as an educational tool. Due to the fact that the tunnels are beneath ground and nothing shows of them, they have no visual values, and as they are in-filled and sealed (largely, except periodic circumstances where a pocket or hole will open up which is quickly resolved by the proper authorities), the recreational values of the tunnel

system cannot be particularly existent. However, should the tunnels be excavated and/or investigated, the educational values present would be great – for the tunnels are literally the condensation of the thoughts, emotions and judgments of the City of Auckland in 1941 into a single object, a monument of the attitudes of the time. By investigating the tunnel systems and learning what is there to be gleaned from the ruins (Bourke a; Crossley 2007; Tonks 2007) an image can be constructed of what was happening to society in the 1940s. This is important as the records from the time regarding the people making decisions are emotionless engineering and accounting reports, massed correspondence between counsellors and officials in Auckland, and a few letters first asking for advice and then receiving it from other cities in New Zealand and from the United States of America (Auckland City Archives).

Discussion

Perhaps the most important feature of the tunnels is that they threaten to collapse and take parts of Albert Park, the University of Auckland campus, and Constitution Hill Reserve with it, along with a cross-section of Princes Street, and the busy intersection of Anzac Avenue, Altern Road, Waterloo Quadrant and Symonds Street. Admittedly, if there was going to be a major collapse of the intersection, this would have happened by now (Crossley 2007). However, in 2005 there were a series of soil collapses in the park, which were subsequently splashed across the front page of various media (Auckland City Council 2005) and resulted from the subsidence into the old ventilation air shafts by the erosion of water (Bennett, 2007; Farrant 2007; Millward 2005). George Farrant, as chief advisor to the City Heritage department at the Auckland City Council comments: that as a result of these collapses “it is impossible to say if any of these original historic features remain, but I seriously doubt whether untreated timber and fabric will have survived to any degree. Nevertheless, we are taking a precautionary approach to possible historic value in all discussions with interested parties” (2007). This event occurred when a piece of Princes Street verge, directly outside the University’s Clocktower (Old Arts Building) collapsed into a void made by the dissolution of soil into an air shaft (Figure 2). Due to the nature of the design of the air shafts, the pocket opened down to the concrete blast pad (Figure 3). Bryan Bennett climbed into the pocket and complained of feeling unwell while there so did not a complete full investigation, Peter Crossley suggests (from his own investigations into the tunnels) that the oxygen levels in the tunnels and pockets of air around the tunnels are very low, and any investigation should be carried out with at least one speleologist present with carbon dioxide meters (Bennett 2007; Crossley 2007). Naturally, given the state of the complex, con-



Figure 2. Composite image of tunnel systems, circles indicating known collapses, dashed circle indicating suspected collapse. Cityscape taken from Google Earth, tunnel layout taken from engineers blueprints (sourced from Auckland City Archives).

servation of the tunnels would need to be carried out during and following an investigation as an exploration would not be permitted to occur without the intervention of structural engineers, which is one of the reasons why to date nothing has occurred, as there appears to be no-one willing to finance a team of engineers – particularly on a project which could fail (Bennett 2007; Crossley 2007; Farrant 2007; Tonks 2007).

By all accounts, the complex seems to be in a fair state, even though they were constructed out of untreated timber. Swabey (2007) reports that the tunnels were in a fairly reasonable state when he was last inside, with a ‘small amount of roof collapse’, which seems small in volume, indicating that there is a possibility of the complex being reopened. This however, is

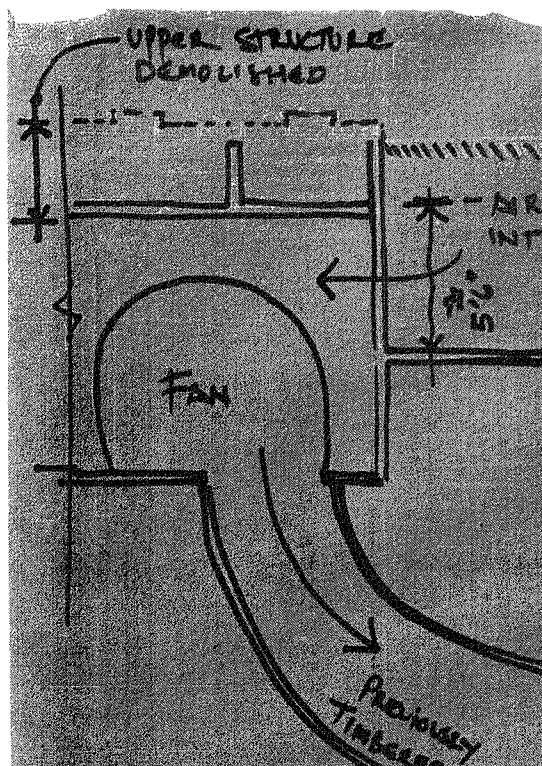


Figure 3. Image taken from Auckland City Council files, photocopy of engineering blueprints, annotated by Bennett following the Princes Street collapse in 2005. Note pocket above blast pad above air shaft

in contrast with Tonks' (2007) statement that he seriously doubted whether or not the tunnels would ever be able to be reopened, as the distance into the tunnel he was legally able to go indicated no problems, but depressions in the park approximately where the tunnels lie suggest that there has been heavy collapses in the complexes making the tunnels structurally unsound. Crossley (2007) stated that the tunnels are not going anywhere and in theory can be opened without too much trouble except where the tunnels run through the old volcano and are surrounded by scoria – a type of volcanic rock which has a loose and rubble-like nature (“scoria” a; “scoria” b). If the tunnels are going to collapse anywhere, it will be there. Bennett (2007) suggests that possibly a scoria seam was encountered in the tunnel construction as an area dug into produced a collapse that “just kept falling and falling, and they couldn’t stop it” which was eventually plugged, possibly with a concrete shell.

However, should anything be done about the tunnels, consent would first be needed from the occupants of the Merchant houses along the west

side of Princes Street, and the University, under which the tunnels lie. Should investigation breach Albert Park, permission would be needed from the New Zealand Government (under the Auckland Improvement Trust Act 1872) but not if the work does not breach the surface (under the 2001 amendment to the Act). A similar case provided itself in East Sussex (as mentioned above in “Row erupts over WWII tunnel plans”) where the secret naval base HMS Forward was built under Newhaven which in 1993 was denied to have existed by the Imperial War Museum and Ministry of Defence (Friends of HMS Forward). The problem is that there was no record of the tunnels until the late 1990s and so when Glynde Close was developed in the 1970s there was no knowledge of the tunnels and 24 houses were built above them. Now that the tunnels have been discovered, a community group want to open the tunnels and tell their story, and to install an exhibition of wartime artefacts. However, before the tunnels can be developed, permission is needed from all 24 residents, some of whom oppose the tunnels completely and want them filled in, for a variety of safety-related reasons. This problem could very well occur in Auckland under the air raid tunnels as well.

Conclusions

The historic and archaeological values associated with the Albert Park air raid shelters are those pertaining to its association with fortifications and shelters of World War II, at local, national and international levels, as a building in Auckland in the 1940s, and its rarity on those accounts, and the educational value the tunnels would have by excavation and exploration. It is, however, important to note that the tunnels are progressively deteriorating and consideration of this needs to be taken before any investigation or work of any sort takes place. But, by the same token, if no work takes place, then there very well may be more collapses in the future, similar to the small one in Albert Park, and the larger one on Princes Street.

The heritage values explored in this investigation have been of a historic and archaeological nature, but these are by no means the only values the tunnels may have, only two areas explored here.

As mentioned above, the tunnels have not had a particularly exciting history, but nevertheless, they prove to be unique – they are the only ones of their type in the world. As far as research could discover, there are no matching systems in New Zealand, and British authorities have indicated that there is nothing in Britain or Germany similar either. Although perhaps most importantly of all: the British authorities, and some New Zealand authorities as well, have stated that this tunnel complex, and other tunnel complexes, fortifications and shelters in other places and what goes with them are not of any particular interest and should be noted, recorded and allowed to suffer at the hands of time.

References

- Auckland City Archives: Auckland City Council Engineers Department 9/8/1944-25/2/1959
- Auckland City Archives: City Engineers Department 13/3/1942-12/9/1942
- Auckland City Archives: Department of Works 1/9/1958-15/8/1988
- Auckland City Archives: Albert Park Conservation Plan 1997
- Auckland City Council; "Press release: Investigation into subsidence in Albert Park" *Scoop Independent News*; 29/10/2005; accessed 6/8/2007 <http://www.scoop.co.nz/stories/print.html?path=AK0510/S00129.htm>
- Bennett, Bryan; Heritage Management, Auckland City Council; 14/8/2007 (interview)
- Bourke, Paul; "Exploration by the Intrepid Binary Brothers", University of Western Australia; accessed 6/8/2007 <http://local.wasp.uwa.edu.au/~pbourke/other/albert/journey.html>
- Bourke, Paul; Senior Research Fellow (Visualisation), Western Australian Supercomputer Program (WASP), Faculty of Engineering, Computing and Mathematics, University of Western Australia; 2/8/2007 (email to me)
- Cawser, Christopher; Land and Property Data Officer, Geographical Information Unit, The National Trust; United Kingdom; 14/8/2007 (email to me)
- Charno, Michael; Curatorial Officer, Archaeology Data Service, Department of Archaeology, University of York; United Kingdom; 16/8/2007 (email to me)
- Clough, Rod; *Albert Park Conservation/Management Plan: Archaeological Assessment*, Clough & Associates, Auckland, 1996
- "Cracroft Caverns"; *Christchurch Online*; Archives New Zealand; accessed 6/8/2007 at <http://www.archives.govt.nz/exhibitions/currentexhibitions/chch/pc-cracroft.php>
- Eddisford, Rosie; Imperial War Museum Collections Enquiry Service, United Kingdom 21/8/2007 (email to me)
- Farrant, George; Chief Advisor, City Heritage, Auckland City; 6/8/2007 (email to me)
- Friends of HMS Forward; "HMS Forward", *Royal Naval HQ, HMS Forward, Newhaven, 1939-1945*, 2005, accessed 8/10/2007 at <http://www.secret-tunnels.co.uk/>
- Historic Places Trust, 2004: *Heritage Management Guidelines for Resource Management Practitioners*, New Zealand Historic Places Trust, Wellington
- Langley, Seren; Assistant Information Officer, Council for British Archaeology; United Kingdom; 15/8/2007 (email to me)
- McBride, Caroline; E. H. McCormick Assistant Librarian, Auckland Art Gallery; 6/8/2007 (email to me)
- McCann, Erina; Mid-Northern Administrative Assistant, New Zealand Historic Places Trust - Pouhere Taonga; 2/8/2007 (email to me)
- Millward, David; Foreperson, Premier Parks, Auckland City 27/7/2005 email to Graham Marchant; Central Premier Parks Officer, Recreation and Community Services, Auckland City, forwarded to Ian Grant (unknown) 27/7/2005, replied back 28/7/2005, printed out and given to Bryan Bennett, who allowed me to photocopy it during our interview 14/8/2007
- Mitchell, John; Inspector 6918, Policing Development Manager, Auckland City District 17/8/2007 (email to me)
- "Nordhausen KZ tunnels - V 2 factory"; accessed 6/8/2007 <http://www.bunkertours.co.uk/nordhausen.htm>
- "North Head"; *Department of Conservation*; accessed 6/8/2007 <http://www.doc.govt.nz.ezproxy.auckland.ac.nz/templates/page.aspx?id=34073>
- "North Head - Takapuna"; *New Zealand Historic Places Trust*; accessed 6/8/2007 at <http://www.historic.org.nz/Register/ListingDetail.asp?RID=7005&sm>
- "Parks in Auckland - Albert Park"; *Auckland City Council*; accessed 6/10/2007 at <http://www.aucklandcity.govt.nz/whatson/places/parks/albertpark.asp>
- "Pourtsdown Tunnels" accessed 6/8/2007 <http://portsdown-tunnels.org.uk/>
- Resource Desk, London Transport Museum; 21/8/2007 (email to me)
- "Row erupts over WWII tunnel plans" *BBC news*; 10/10/2005; accessed 6/8/2007 http://news.bbc.co.uk/2/hi/uk/news/england/southern_counties/4328778.stm
- "scoria" *A Dictionary of Ecology*; Michael Allaby (Ed.); Oxford University Press, 2006; Oxford Reference Online; Oxford University Press; Auckland University; 22 January 2008 <http://www.oxfordreference.com.ezproxy.auckland.ac.nz/views/ENTRY.html?subview=Main&entry=t14.e5003>
- "scoria" *The Dictionary of Physical Geography*; 2000; CredoReference; 22 January 2008 <http://www.credoreference.com.ezproxy.auckland.ac.nz/entry/758352>
- (The) Statutes of New Zealand 1971, Vol. 4, Public Acts 111-157, Local Acts, Private Acts, Reprinted Acts
- (The) Statutes of New Zealand 2001, vol. 3, Public Acts no. 85-106, Local Acts, Private Acts
- "Stony Batter"; accessed 6/8/2007 at <http://www.netlineservices.co.nz/waiheke/stonybatter.html>
- "Stony Batter Historic Reserve"; Department of Conservation; accessed 6/8/2007 at <http://www.doc.govt.nz.ezproxy.auckland.ac.nz/templates/page.aspx?is=34077>
- Swabey, Stephen; Principal Advisor, Climate Change Adaptation, Ministry for the Environment 20/8/2007 (email to me)
- Tonks, Garry; Senior Lecturer, School of Architecture, The University of Auckland; 20/8/2007 (interview)
- "Tunnel and Shelter Researching" accessed 20/8/2007 <http://www.geocities.com/CapeCanaveral/1325/>
- "Waiheke Battery"; New Zealand Historic Places Trust; accessed 6/8/2007 at <http://www.historic.org.nz/Register/ListingDetail.asp?RID=7472&sm=advanced>
- "Wrights Hill Fortress"; New Zealand Historic Places Trust; accessed 6/8/2007 at <http://www.historic.org.nz/Register/ListingDetail.asp?RID=7543&rm=Full&sm>
- "Wrights Hill Restoration Society" accessed 6/8/2007, <http://whfrs.org.nz>
- "WWII sites"; undergroundkent; accessed 7/10/2007 at <http://www.undergroundkent.co.uk/ww2.htm>