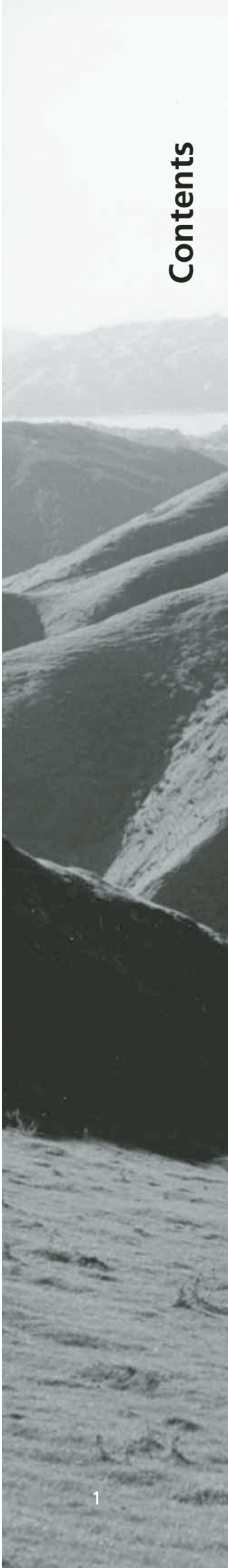
Belmont Regional Park

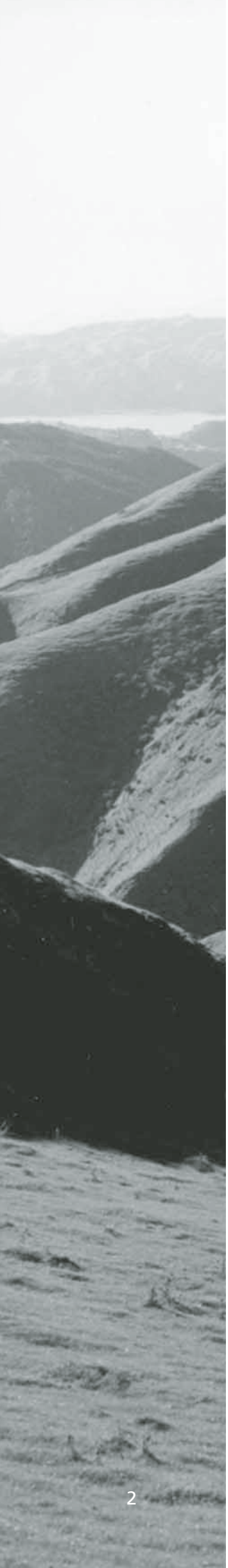
Resource Statement

Belmont
REGIONAL PARK

greater WELLINGTON
REGIONAL COUNCIL | Parks

Contents





History and Cultural Heritage

1. History of Belmont locality and origins of Belmont Regional Park

The land included within the Belmont Park, (see *Map 2 Location*) is made up of a stretch of hills that lie between the Wellington and the Porirua harbours. Over time, from the arrival of Maori through to the settlement of Europeans in the district, both harbours have been important for their resources and as places of occupation. It is not surprising then, that the peoples who have occupied the greater Wellington district, soon found routes to link these two harbours. It was over the lands that now lay within the Belmont Regional Park that these links were established. From pre-European tracks, to the building of permanent roads, these links provide a consistent theme and vehicle to tell the history of the lands within the Park. A number of these historical features are shown on *Map 1 Historical Features*.

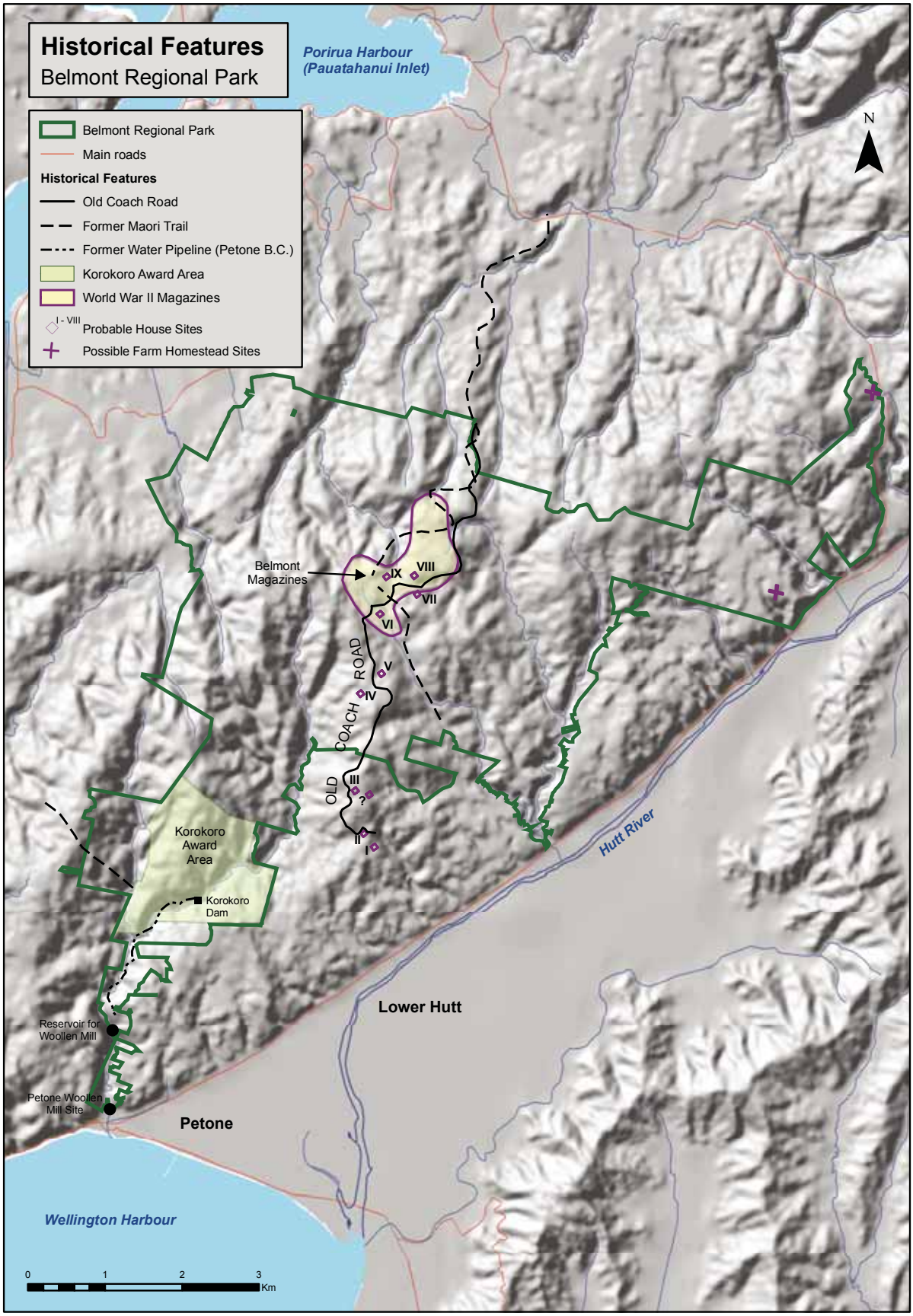
1.1 Pre-European Maori occupation

In Maori tradition it is recorded that the voyager Kupe, came to Te Whanganui a Tara (now known as Wellington Harbour) as part of his extensive travels. Several place names within the harbour have come from Kupe.[1] The next recorded explorer was Whatonga who named the harbour after his son Tara. Settlement of this area was undertaken by peoples who claimed descent from Whatonga. These included Ngai Tara, Rangitane, Muaupoko and Ngati Apa. The development of Wellington peoples continued with successive migrations into and out of Te Whanganui a Tara. One of the most recent arrivals before the advent of Europeans was the Ngati Ira who had come from the east coast of the North Island and had intermarried with the descendants of Tara. By the start of the nineteenth century, Ngati Ira were settled along the east coast of Te Whanganui a Tara from Waiwhetu to Turakirae. At this time, Heretaunga (now know as the Hutt Valley) was inhabited by two hapu known as Rakaiwhakairi and Ngati Kahukuraawhitia. These people were descendants of Iraturoto, Toi (the grandfather of Whatonga) and Kahungunu. They had also intermarried with Ngai Tara and Rangitane of the Wairarapa.

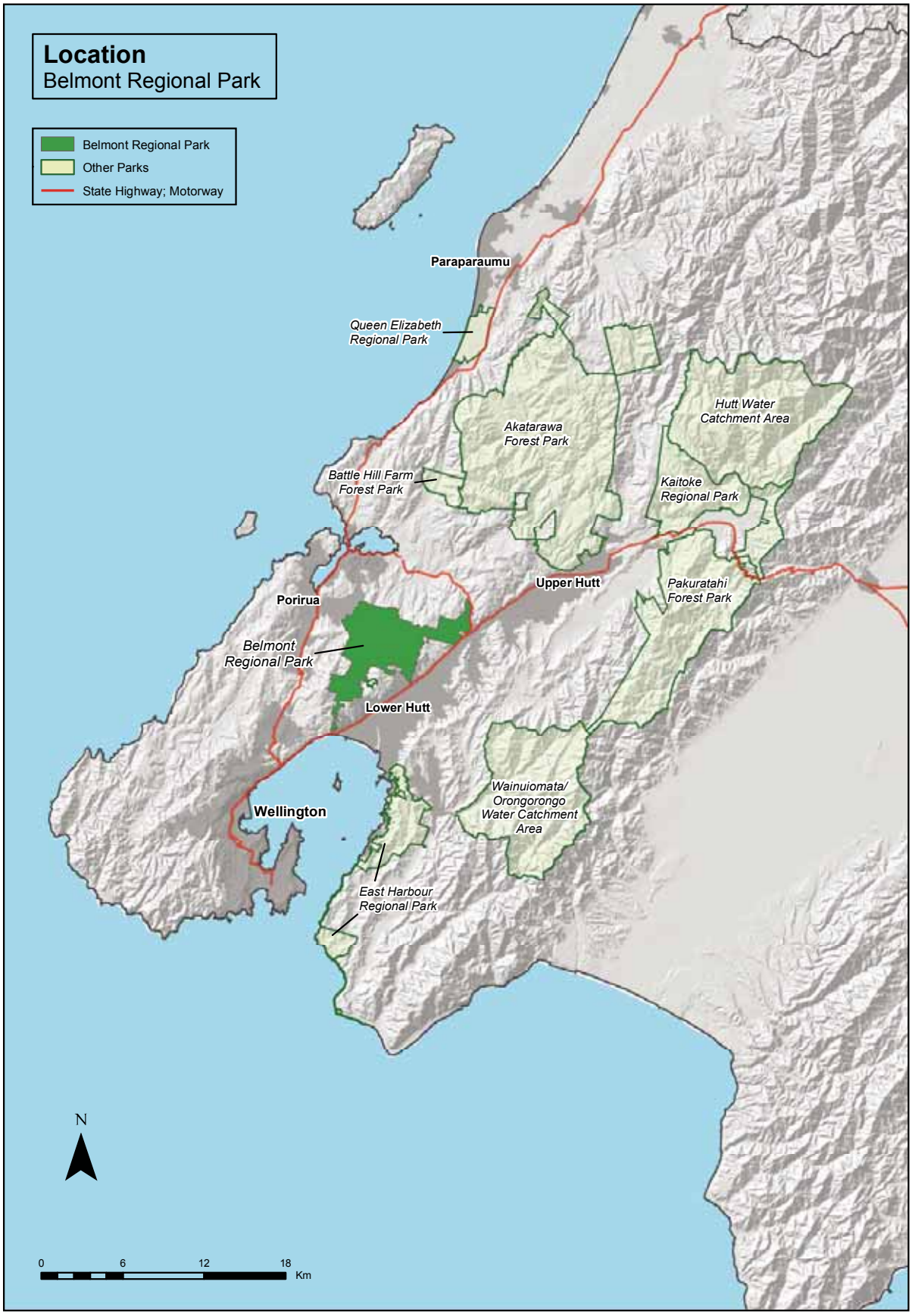
Just as Ngati Ira, Rakaiwhakairi and Ngati Kahukuraawhitia occupied the environs of the Hutt valley, so too did other whanau from these groupings reside around Porirua harbour and on the western coast. With the close relationships that existed between those who lived within Heretaunga and Porirua, it is likely that the tracks known to exist at the time of European arrival, were in existence many hundreds of years previously and dated from the beginning of human settlement in the district. There were two primary routes linking Te Whanganui a Tara and Porirua. One began from what is now called the Korokoro stream and after following the stream for some distance, rose up and over the ridges until it descended down towards Porirua Harbour following the Kenepuru stream. The other traveled from the Pauatahanui arm of the Porirua Harbour in a southerly direction over the hills towards the Hutt Valley and emerging at the Heretaunga (Hutt) River near Taita.

[1] Information on which this subsection is based has come from Waitangi Tribunal *Te Whanganui a Tara me ona takiwa*. Wellington:Waitangi Tribunal, 2003, pp.17-43

Map 1 Historical Features



Map 2 Location



Early in the nineteenth century, the occupation of Te Whanganui a Tara was to change dramatically. In 1819 and 1821, war parties armed with muskets came from the north and fought with the resident people. Those who took part in these raids included, at different times, Ngapuhi, Ngati Toa, Waikato, Ngati Maniapoto and Ngati Whatua. Although several battles were fought and lost by the Wellington groups, their attackers from the north did not occupy the land.

Following these military excursions, a series of migrations to Te Whanganui a Tara came from Kawhia and Taranaki. These began in the early 1820s and continued for a number of years bringing groups such as Ngati Toa, Ngati Mutunga, Ngati Tama, Te Atiawa, Ngati Raukawa and several others to different places around the Wellington district. During this invasion, a key feature of the Belmont Regional Park landscape was named. It is said that the Ngati Mutunga chief Te Poki claimed the stream and gully of Korokoro by saying: "Ko te korokoro tenei o taku tamiti" (This place is the throat of my child). The child's name was presumably Te Mana as the full name for the Korokoro stream is Te Korokoro o Te Mana.[2]

Several other recorded pre-European placenames lay just outside of the boundaries of the Regional Park. One of these is Puketirotiro, which is now known as Maori Point. Although the exact origin of Puketirotiro is not recorded, its name suggests that it may have been a lookout point. As Adkin has commented: "It is probably one of the most comprehensive viewpoints in the Wellington Harbour area and is easily accessible; the whole harbour (except its north-west shoreline), the lower part of the Hutt Valley and the Rimutaka Range are all in full view and in good conditions form a magnificent prospect."[3]

Down towards the harbour, a hill named Nga Puhoro is located although the exact site has not been identified.[4] Two other sites have been identified around the Korokoro Stream. One – Te Ahiparera – lay on the northern side of the stream. Commentators have speculated that it was the site of an old earthworks pa, but this has not been confirmed.[5] To the west of the Korokoro Stream is a place recorded as Te Raho-o-Te Kapawai. Te Kapowai is said to have been a Ngati Kahungunu ancestor.[6]

Following the arrival of the Kawhia and Taranaki peoples, the resulting occupation and nature of land rights around the harbour was complex and multi-faceted. Around the northern shores of Te Whanganui a Tara, Ngati Mutunga were the principal residents until their departure for the Chatham Islands in 1835. Te Atiawa groups took up the lands formerly occupied by Ngati Mutunga. The significance of the track system from Heretaunga to Porirua is reflected by the location of Te Puni's pa on the western side of Pito-one beach, alongside the Korokoro Stream at the entranceway of the track. It is thought that the area within the Park was covered by heavy bush but that by the time of European arrival, clearings had been located on the hillside facings above the valley by Pito-one Maori.[7]

Away from the northern shores of Te Whanganui a Tara, and occupying the central and northern Heretaunga Valley, were Ngati Rangatahi, a Ngati Maniapoto hapu who occupied the central and northern Heretaunga valley area before the arrival of Europeans under the authority of Ngati Toa chiefs Te Rauparaha and Te Rangihaeata.

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[2] Best, Elsdon, "Te Whanganui a Tara", *Journal of the Polynesian Society*, v.10 no.3 p.154
[3] Adkin, George Leslie, *The great harbour of Tara : traditional Maori place-names and sites of Wellington harbour and environs : a revision*, Chch, Whitcombe and Tombs, 1959, pp.69-70
[4] Ibid, p.46
[5] Ibid, pp.10-1
[6] Ibid, p.72
[7] Bagnall, Richard.Gordon. (comp. & edit.) *Survey of the proposed Belmont Regional Hill Park. Part one. Recommendations on development and management, Wgtn, Victoria University of Wellington*, 1976, p.30

With Ngati Toa hapu holding major areas of occupation along the Porirua Coast extending south to Ohariu and east to Heretaunga, the tracks from Porirua remained important. These tracks enabled Ngati Toa quick access into Heretaunga if Ngati Rangatahi provided early warning of any incursions from the Wairarapa peoples. The tracks were also said to be used during the 1830s by Ngati Rangatahi to convey their tribute of eels, wood or canoes to Ngati Toa at Porirua.[8]

The Te Atiawa Chief Te Puni with Pito-one pa in the background
[Heaphy], Charles 1820-1881 :[Epuni, London, Smith Elder1845] Alexander Turnbull Library, PUBL-0011-02-2

[8] Waitangi Tribunal, op cit, pp.17-43

1.2 The arrival of the New Zealand Company

In 1839, the New Zealand Company arrived in Wellington with plans of establishing a colony. With origins dating back to 1825, the Company was established to put into practice a theory of colonisation devised by Edward Gibbon Wakefield. [This theory is discussed more fully in the Resource Statement for the Battle-Hill Farm Park] A scheme to establish the town of Port Nicholson had been set out in a prospectus launched on 2 May 1839. Amid rumours that the British Government would soon intervene in New Zealand to seek sovereignty over the islands, the Company fitted out a ship named the *Tory* and their officials voyaged to New Zealand to buy land for their colonisation scheme. On 20 September 1839, the *Tory* sailed into Te Whanganui a Tara.[9] On 21 September, Edward Jermingham Wakefield visited Te Puni's village and noted that the Korokoro waterway, which he described as a "merry, brawling stream", flowed into the sea between the pa and the western hills.[10]

The arrival at Te Whanganui a Tara of New Zealand Company officials on the *Tory* was soon followed by negotiations with local Maori to acquire land for settlement. On 27 September 1839, the Port Nicholson Deed was signed with Te Puni and others from Pito-one being involved in this land transaction. There were numerous difficulties with this attempt to purchase land, however. The deed was in English, the interpreter had only a basic grasp of te reo, the boundaries were so poorly recorded that they remain difficult to map, no plan of the land transaction was available during the negotiations and certain key groups of Wellington Maori did not sign. Despite these problems, and to ensure the widest possible support for their objectives, the New Zealand Company officials then sailed north to Kapiti Island, negotiated with Ngati Toa chiefs and signed another deed on 25 October this one purporting to have acquired an area extending from Taranaki to the top of the South Island. Following this, a further deed was signed with Te Atiawa at Queen Charlotte Sounds on 8 November for the same area of land as that noted in the Kapiti document. If the first Port Nicholson deed has since been regarded as sketchy in detail, these later two deeds were especially vague.[11]

Whilst in the Wellington area, the New Zealand Company officials undertook several journeys of exploration to surrounding districts. On 14 November 1839, Edward Jermingham Wakefield decided to journey from the Hutt Valley to Wanganui. He took the Kenepuru track through to Porirua Harbour and described what he saw.

> *The usual farewell was shouted by the assembled Petone natives; and I started up a steep footpath beyond the Korokoro or 'Throat' stream.*
>
> *...We ascended a steep hill, through extensive potato-gardens belonging to Tuarau; and from thence had a noble view of the harbour and the infant settlement. After a tedious march of two or three hours over very undulating ground on the top of the range, along a track constantly obstructed by webs of the kareao or supple-jack, we came to the brow of a descent, from which we had a view of a narrow wooded valley, and a peep of the sea in Cook's Strait over a low part of the further hills. On descending the hill, we found ourselves in a fine alluvial valley, through which a considerable stream brawled and cascaded.*[12]

Wakefield had reached Kenepuru Stream and made his way down to Porirua Harbour.

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[9] Ibid, pp.45-8
[10] Wakefield, Edward Jermingham, *Adventure in New Zealand*, New York, De Capo Press, 1971 (reprint) pp.27-8
[11] Waitangi Tribunal, op cit, pp.52-59
[12] Wakefield, op cit, p.94

View of Pito-one that Wakefield and Crawford would have seen when on the Korokoro-Kenepuru Track
[Heaphy], Charles 1820-1881 :[Port Nicholson from the hills above Pitone in 1840, [London, Smith Elder1845]
Alexander Turnbull Library, PUBL-0009

Another traveler in the area at around this time was James Coutts Crawford who had traveled from England to Sydney in 1838. In November 1839, he had sailed to New Zealand to explore trading opportunities and had been landed by the crew of the success at Titahi Bay. After he had been some time in the area, he use the Korokoro track to travel across to Te Whanganui a Tara. Crawford described his trip from Porirua Harbour, up Kenepuru Stream, and over the summit before descending down to join the Korokoro Stream following it down to the harbour. Accompanying Crawford were unnamed Maori guides, Thomas Wilson and Hugh Sinclair.

> *Passing Titahi Bay, and the pretty shores of Porirua, we entered the main bush and travelled up the stream, in a line with whose course the present road stretches. We crossed and re-crossed the stream about seventy times, until at length the path ascended and led us over the summit of the range overlooking the Korokoro. The whole distance traversed, with the exception of some few patches of cultivation at Porirua, was through dense and uncleared forest. When I looked down upon the broad waters of Whanganuiatera [sic], or Port Nicholson, I thought I had never seen a finer sheet of water anywhere, and we seated ourselves for a few minutes to enjoy the view. Bright sunshine gleamed, reflected from the waters, which were dotted with canoes engaged in fishing. The Hutt valley presented a dense forest of gigantic trees, and a large pa (village) was visible at Pitone [sic]. As we descended the hill, our advance was hindered by a mass of newly-felled forest, which was cleared and ready for burning off. Our escort now commenced firing guns to attract the attention of the fishermen; and as we descended the hill the canoes approached the shore, so that when we reached it, they were there to meet us.*[13]

Crawford and his party met with the chiefs Te Puni and Wharepouri and joined them for dinner before they return by boat to Ngahauranga.

[13] Crawford, James Coutts, *Recollections of travel in New Zealand and Australia*, London : Trubner, 1880, pp27-9

1.3 The processes of colonisation

To trace how the land currently within the Regional Park came into the possession of the agencies that now hold it requires a description of the many processes that occurred which saw the land pass from Maori to Crown ownership, to private Pakeha ownership to return again to being Crown and public land. The following narrative, charts the complexity of how the land passed out of possession of the various Maori groups who held the land.

Soon after the Company's arrival, Crown officials landed in New Zealand and, on 6 February 1840, the Treaty of Waitangi was signed. One of the first actions of the new Government was to set up a Commission of Inquiry to generally inquire into all the many hundreds of land transactions between Europeans and Maori that had allegedly occurred prior to 1840. If these were found to be valid, then they would be ratified by the Crown and a title awarded. During the hearings into the New Zealand Company's transactions for the Wellington district, however, the evidence revealed that local Maori who had been involved had varying views towards the transactions. Te Puni of Te Atiawa, informed the Commission that not all of his people were satisfied with the transaction. Wi Tako, also of Te Atiawa, testified of his belief that the goods received were merely payments by the Company for anchorage rights. Of Ngati Toa, Te Rauparaha expressed his belief that the deed he signed related only to a piece of land on the northwest coast of the South Island whilst Te Rangihaeata thought it related to his interests in Wakatu (present-day Nelson). This testimony was given before the Commission in 1842. The Commissioner, William Spain, having heard this testimony, expressed his view in a preliminary report of 12 September 1843, that there were serious difficulties in the way of seeing the New Zealand Company's 1839 land transactions as being valid. Despite these findings, a major difficulty existed. On 21 January 1840, the first ships carrying the first Company migrants had arrived in Wellington and since then hundreds of colonists had settled in the town and countryside on the harbour's southern shores. Any finding that the Company's claims had no validity would have major ramifications for these settlers.[14]

Whilst the Spain Commission was proceeding, the planning of the colony at Wellington continued. Although surveying had begun around the Port Nicholson township, it was gradually extended out to the surrounding environs such as the Hutt Valley. By 1 April 1843, Chief Surveyor Samuel Brees reported to Principal Agent William Wakefield that Tiffen, one of his surveying staff, was at work in an area that was generally called the Horokiwi district and that he was also setting out the Horokiwi Road.[15] Although almost all of the land currently within the Belmont Regional Park was not surveyed through this process, a small area of the Horokiri sections just to the northeast of Mt. Magee were eventually included in the parkland.

Despite the Company officials continuing with settlement plans, problems were growing with local Maori. [The events from 1843 to 1846 are discussed more fully in the Resource Statement for the Battle-Hill Farm Park.] Several groups were finding settlers encroaching onto land that had not been considered as having been included in the 1839 purchase. With Commissioner Spain reaching a view that this purchase did indeed have problems a compromise was sought which entailed getting the various groups of Port Nicholson Maori to signs 'deed of release' giving up all their interests in Wellington, for a further payment and the granting of reserves. Recent evaluations of this arbitration

[14] Waitangi Tribunal, op cit, pp.60-65 and 199
[15] Brees to Wakefield, 1 Apr 1843, NZC 135/3, Micro Z 5355, Arch NZ, Wgtn.

process, which took place in February and March 1844, have found that it proceeded in a coercive manner.[16] Not surprisingly, several groups, such as Porirua Ngati Toa, initially refused to participate in the arbitration. In addition, in Heretaunga, Ngati Rangatahi and Ngati Tama (with support from Ngati Toa chiefs such as Te Rangihaeata) refused to give up their occupation of Heretaunga. This protest infuriated Crown and Company officials as they believed the Hutt Valley had already been purchased.[17] Although negotiations continued, and Ngati Toa chiefs eventually accepted the arbitration, the protest occupation of Heretaunga remained. In response, the colonists built stockades and forts in the Valley and elsewhere and troop reinforcements were sent to Wellington but Governor FitzRoy refused to take further action. By November 1845, however, FitzRoy had been recalled by the British Government. His replacement, George Grey, had in his mind other ways of dealing with the Hutt situation. In February 1846, the new Governor visited the area and negotiated, under the threat of arms, a withdrawal by Maori from the area.

By 17 February, Ngati Tama had departed leaving only Ngati Rangatahi in position. On 25 February, Ngati Rangatahi also left Heretaunga. Things then went wrong as settlers plundered Rangatahi houses and desecrated their chapel. Two days later, troops burnt down the pa including the chapel and the fences around the urupa.[18] Ngati Rangatahi responded by returning to the Hutt, plundering settler houses and skirmishing with British soldiers. Although Ngati Rangatahi withdrew from the Hutt, and it appeared that tensions were lessening, matters soon escalated again, however, when two Maori accused of plundering settler goods in the Valley were put on trial in late March. On 2 April, two of the settlers who had remained in the Hutt were killed. On 16 May, Boulcott's farm, which was being used as a military outpost, was attacked and six British soldiers killed. Although the attack involved Whanganui Maori who had Ngati Rangatahi affiliations, Te Rangihaeata's men were implicated with being involved. Plans were laid to attack the chief's pa located at Pauatahanui.[19]

On 30th July, a party of militia and police, as well as 160 Te Atiawa under the chiefs Te Puni and Wi Tako, set off from the Hutt to converge on Te Rangihaeata's pa. The contingent of militia was under the command of Mr. Donagh and William Bertram White, the police under A.C. Strode and the "friendly natives" were said to be under the command of David Scot. The route they took was the old Maori track to Pauatahanui that runs through the Belmont Regional Park. Of this journey, White was later to write: "That was a terrible march, three days in the rain through the bush."[20] Scot also kept a journal of the trip. On 31 July he wrote:

> *...proceeded on the mountain road towards Porirua (or as it is called by the natives Pariraho). It rained heavily during the day; at about 3 pm the party arrived at a convenient spot for camping about half way which the natives decided on as being best calculated to conceal our approach to the rebels to which Captain McDonogh reluctantly consented to, being anxious to push on. Temporary houses were soon erected for the whole party which in some measure sheltered them from the rain which continued heavily at night.*[21]

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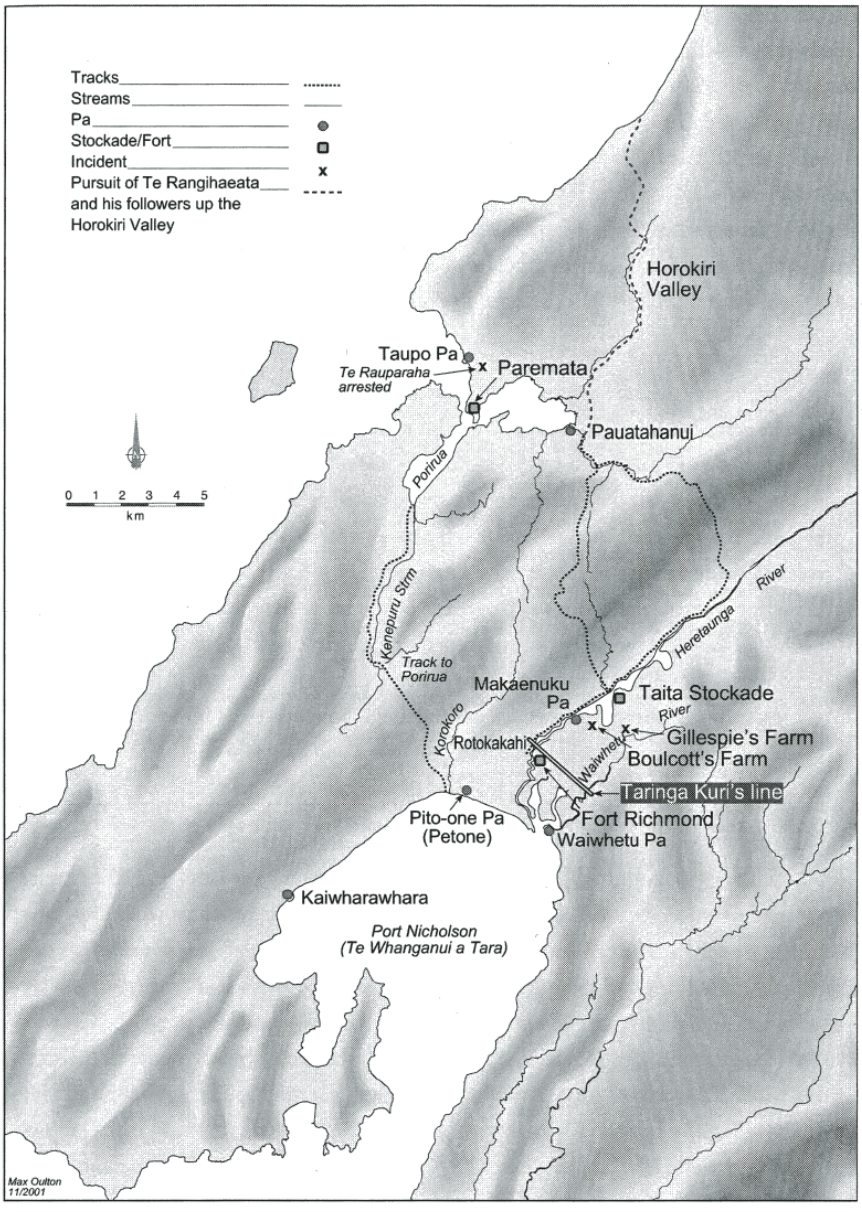
[16] Waitangi Tribunal, op cit, pp.145-179
[17] Ibid, pp.195-200
[18] Ibid, pp.210-12
[19] Ibid, pp.214-216.
[20] White, William Bertram "Highlights in the life of William Bertram White" , MS-Papers-4542, Alexander Turnball Library, Wgtn, p.21
[21] Scot, David "Journal of expedition against rebel natives in 1846", MS-Papers-5574, Alexander Turnball Library, Wgtn

On the next day, 1 August, the party continued onwards along the track as Scot recorded:

> *At daylight proceeded in the same order, Captain McDonogh leading the advance guard of Natives accompanied by myself, Mr White leading the Militia, Mr Strode the Police and Mr Swainson the rear party of Natives; the road continued very hilly and fatiguing, and notwithstanding the men were heavily loaded, they advanced cheerfully at a smart pace untill [sic] descended into flat timbered land at the head of the north branch of the Porirua Harbour at about 11 am and where we supposed the rebels' Pa was situated.*[22]



Map showing features related to the 1846 conflicts with the Maori tracks highlighted.
Adapted from Map 7 of Waitangi Tribunal's *Te Whanganui a Tara me one Takiwa* report

[22] Scot, David "Journal of expedition against rebel natives in 1846", MS-Papers-5574, Alexander Turnball Library, Wgtn

When the Hutt force reached the pa, they found it recently abandoned. They occupied the site and established a base. The party then intended to set off after Te Rangihaeata, who had headed towards the Horokiri Valley. [The account of a battle fought within the Horokiri Valley is detailed in the Resource Statement for the Battle-Hill Farm Park.]

Up to this point, much of the land that is currently within the Belmont Regional Park had not officially passed into European ownership. This then occurred through two processes. The first was the settlement of the New Zealand Company's claim to Port Nicholson. Following the completion of the arbitration process on 1844, Commissioner Spain issued his final report for the Port Nicholson claim in March 1845 recommending that the Company receive a Crown Grant for 71,900 acres of land which effectively equated with the sections that had been surveyed for settlement up to that time. This Grant was issued by Governor FitzRoy in July 1845. For the New Zealand Company, however, a major problem had not been dealt with. Several of the sections which had been surveyed during the settlement process had ignored the presence of various Maori cultivations on the land. In other cases, cultivations had been extended onto surveyed land which had not been occupied by settlers after 1839. Company officials, therefore, wanted to claim this survey land as part of their award from the Crown but did not have a way of dealing with Maori claims.

The Crown appointed an army officer, Colonel W.A. McCleverty, to make inquiries and he devised a system where exchanges would be arranged with Maori being required to give up their cultivations on surveyed land for which they would be given land in exchange as compensation. A long process of investigation took place. By 1847 a series of deeds of exchange were signed by those Maori groups affected. However, recent evaluation of this process has found a number of problems existed. It has been noted that a degree of pressure was placed on Maori to accept the exchanges. Secondly, the land that was given was often of poorer quality than that which was taken. And finally, Maori were often given land from the Wellington Tenths (a collection of endowment reserves in which Maori already had interests) or were given land from the unsurveyed areas of Wellington. As these areas were outside of the proposed Company Grant, this land still belonged to Maori. Therefore, Maori were being compensated in land that was already theirs.[23]

One of the groups involved in McCleverty's process, were Pito-one Te Atiawa. McCleverty found that 61 acres of settler land in the Hutt had been cultivated on by Pito-one Maori. Following his investigations, McCleverty recommended that one of the areas Pito-one Maori should be given in exchange for their Hutt cultivation land was a 1,214 block called the Korokoro or Maungaraki reserve. This land came from out of the unsurveyed areas outside of the proposed Company Grant. Most of this reserve was located in what is currently the Belmont Regional Park. Although this seems a large amount of land to be given in exchange, the Hutt land that was being given up was good quality land, whereas McCleverty himself noted that although Korokoro and other reserves given "may appear large in extent, but in reality they possess little land available for cultivation". Korokoro was located fairly close to the Pito-one pa and already had cultivations of Pito-one Maori located on the site. However, most of the land was of little quality for farming. Many years later, the land was described as being generally of a "steep and broken" nature. It was noted that there was only "very poor soil right through" being only half an inch to an inch in depth.[24]

[23] Waitangi Tribunal, op cit, pp.227-278
[24] Minutes of the Native Land Court, Wellington Minute Book 17, pp314-324

Following the completion of McCleverty's processes, the giving up of cultivation land and the granting of new reserves, a new Crown Grant was drawn up by Governor Grey and was awarded the New Zealand Company. However, rather than being based on the surveyed land, as recommended by William Spain, Grey's grant covered the whole of the original block claimed by the New Zealand Company. Therefore, instead of receiving almost 70,000 acres as Spain had recommended after investigating the Company's claim and determining that this was the extent of land that had been paid for, the Company was granted all 209,247 acres of their original claim. This extended Grant included much of the hill lands around Wellington and the Hutt and includes the lands currently in the Belmont Regional Park that are located on the western Hutt hills. When the New Zealand Company collapsed from financial ruin in 1850, that land became Crown land.

The remainder of the land that is today within the Regional Park around Pauatahanui and extending south to the hills behind Porirua became Crown land through another land acquisition process which was aimed at Ngati Toa. As noted above, in August 1846, the Crown had fought with Te Rangihaeata over his supposed involvement in the Hutt disturbances. Following the abandonment of his pa at Pauatahanui, the chief made a stand in the Horokiri Valley at a place now named Battle Hill. After a short three day battle, he abandoned this position and headed north. Although pursued he was not caught. Safely in Ngati Raukawa territory, Te Rangihaeata ensconced himself at Poroutawhao, a swamp pa belonging to Ngati Huia of Ngati Raukawa of which Te Rangihaeata was also a chief. Governor Grey took no further action to dislodge him. With the fighting over Te Rangihaeata remained at Poroutawhao.

In the meantime, Grey had also implemented another course of action involving Te Rauparaha. Although the chief had actively kept out of events occurring in the Hutt, Grey decided it would satisfy public pressure and strike a blow at Ngati Toa power to kidnap Te Rauparaha. On 23 July 1846, a night raid by soldiers and militia on Taupo pa at Porirua resulted in the capture of Te Rauparaha and six others. Without being charged or committed to trial, the Ngati Toa chiefs were taken to Auckland and held there for 18 months.[25]

With Te Rauparaha removed to Auckland, and Te Rangihaeata in exile in the Manawatu, leadership of Ngati Toa fell to three younger chiefs, Matene Te Whiwhi, Tamihana Te Rauparaha and Rawiri Puaha. To complete his objectives of pacification Grey set his sights on acquiring Ngati Toa's remaining lands at the Wairau Valley in Marlborough and at Porirua. On 18 March 1847, the Crown purchased the 608,000-acre Wairau block the deed being signed by Rawiri Puaha, Matene Te Whiwhi and Tamihana Te Rauparaha. Two weeks later, the Porirua purchase was completed on 1 April, with the Crown acquiring most of Ngati Toa's land from Ohariu to Paekakariki. Included within the 1847 Porirua purchase was much of the land now in the western half of the Belmont Regional Park.

Evidence is available that the negotiations for these land transactions took place within a pressured context of discussions over Te Rauparaha's continuing imprisonment and other matters.[26] For Grey, the purchases were part of a wider strategy to end Ngati Toa military power. As he later wrote to his superiors in London, he believed that the acquisition of Ngati Toa land "will give us an almost unlimited influence over a powerful and hitherto a very treacherous and dangerous tribe." With the acquisition of the iwi's land, Grey had pacified the Wellington district.

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[25] Boast, Richard "Ngati Toa and the Upper South Island: A report to the Waitangi Tribunal", WAI-785 #A86, Sept 1999/Mar2000, Vol.1 pp.220-229

[26] Boast, op cit.

Although the processes described above explain how the land within the Park became Crown land, several further steps occurred before the land came into the Regional Park land and these are described below.

1.4 Archaeological sites in Belmont Park

The recorded archaeological sites in Belmont Park are all of European origin. The lack of sites of Maori origin may give the impression that Maori were not occupying and using the park land before European settlement, but this not the case: the activities of the first Maori occupants have simply not left remains that can be located and recorded by an archaeologist.

This report has already noted the Maori tracks through the park area between the Wellington and Porirua Harbours. Early writers (Adkin, Best and others) have noted occupation in the park area including pa, gardens and other sites. However none of these activities have left archaeologically locatable remains within the park.

European sites focus on economic and defence activities.

The Wellington Woollen Manufacturing Company mill operated from the late 1880s, and was located at the end of Cornish St. The mill was extended several times, and closed in the early 1970s. The buildings on site today with the "sawtooth" roof line closley resemble the form of the original, much larger mill building, but nothing of this original building remains. However a remanat of the original mill site is seen in the marble-faced wall along the edge of Cornish St fronting onto State Highway 2, built in 1920.

A major group of built sites within the park are the military magazines. Sixty two of these rectangular, concrete buildings were built in the mid 1940s for storage of ammunition away from built up or residential areas. They are significant structures in their own right, but also form part of the story of the defence of Wellington: many defence sites of European origin are still located around the Wellington hills and harbour, with some sites dating from the 1880s and subsequently rebuilt for later conflicts.

The "Old Coach Road" winds its way through the park from the end of Normandale Rd, joining Belmont Rd and winding north to Pauatahanui. This was the first road from Wellington Harbour over to the Porirua Harbour, and almost certainly follows, in whole or in part, an original Maori track over the hills. The road is an unpaved benched surface; it has been widened significantly to allow motorised traffic. Despite its name it is not likely that horse-drawn coaches would have gone over the road, given the steepness of the grade in places; it is more likely the road was used by bullock-drawn drays and wagons.

Also located within the park are at least four small quarries. Their age and function is not known; however each quarry face is located alongside a road, which suggests they were built and in use at the time the roads through the park were built. As each quarry face is relatively small (about 3 to 5 metres across) it is likely they were used to provide road fill to construct the roads. It is also possible they provided fill for the sites of the military magazines.

Recorded archaeological sites:

Archaeological sites in New Zealand are recorded by the NZ Archaeological Association. Sites are referred to by the mapsheet on which they are located and then by their site number. So R27/195 is the 195th site recorded on the R27 mapsheet.

Mapsheet	Site number	Easting	Northing	Site type	Date recorded
R27	195	2669800	6003400	ww2 magazine area	1993
R27	248	2666041	5997908	Weir	2003
R27	246	2669862	6002699	Quarry	2003
R27	249	2669343	5997908	Quarry	2004
R27	250	2669443	6002229	Quarry	2004
R27	251	2669381	6002431	Quarry	2004
R27	252	2669241	6000610	Road	2004

Potential for unrecorded sites

From what is known of the nature, type and location of the currently recorded sites and the human use of the park there is low potential for further unrecorded sites.

Historic house sites are located within the park: these are houses of European settlers dating from about the 1850s onwards which are located beside the Old Coach Road. There are no archaeological remains of the houses themselves; however their locations are marked in some cases by remnant stands of very large macrocarpas. The park ranger also reports occasional patches of daffodils and other introduced flowers in places along the Old Coach Road.

1.5 The Belmont to Pauatahanui Road

Just as the Belmont tracks had been important as a means of communication to Maori, so they remained for the first Pakeha settlers. By 1848, the beginning of the path to Porirua that began from Korokoro stream, was described as follows:

> *At this point, a native foot-path winds up the western hills towards Porirua, a neighbouring harbour.... From a deep dell between two ridges of these hills, a brawling stream called the Korokoro, or "Throat", rushes into the sea. This water-course is well adapted for turning a millwheel.*[27]

However, it appears that little European settlement occurred in the area now covered by the Regional Park until the era of the Wellington Provincial Government. In 1857, surveyor Albert Beetham was contracted to lay out the Pauatahanui Small Farm settlement. As part of his work, he cut a straight line over the ridge and down through to Korokoro. Soon after, along the southern end of the cut which had become known as "Beetham's Line", settlers McEwen, Galloway, Wallace and Welch took up sections which stretched across from Korokoro stream to current-day Stratton Road and through to the old hill road.[28]

[27] Wakefield, Edward Jermingham, *The Handbook for New Zealand*, London, John W. Parker, 1848, p.100
[28] Bagnall, op cit, p.30. Also McLennan, Rosemary *Glimpses into early Normandale*, Hutt, Normandale Progressive Association, c1993, pp.3-4

Following this initial settlement, a series of 50 smaller sections were surveyed in the 1860s, but these were found difficult to farm in the environment of the Belmont hillsides. By the 1870s, many of the original settlers, such as David McEwen, T. and H. Sanson and the Ellerm family had walked off the land to take up new sections in the Manawatu.[29] Before then, however, these families had sought to open up their district. With the arrival of the first European settlers began a long campaign to have the Belmont bridle track made into a permanent and serviceable road. From an early period, putting a road from Belmont through to Pauatahanui was considered a priority and work at the Belmont end began under the Western Hutt Highway District Road Board. It appears that in the first instance, the settlers themselves began to build the road from their own funds and resources. After persisting with this for some time, they turned to the authorities for funding assistance. On 20th April 1858, a petition of 23 settlers was presented to the newly-established Wellington Provincial Council "praying for assistance to make a road."[30] The petition was referred to a select committee of the Council which reported on 21st May.

> *Your Committee having considered the evidence submitted to them in support of the petition of the Western Hutt Settlers, and having referred to the course pursued by the Council in parallel cases, are of opinion that the line of Road proposed and partly executed by the petitioners, will be one of considerable advantage to the public generally, and for many years will probably be the main road from the Hutt and Wairarapa to Pahautanui [sic] and the West Coast, being about fourteen miles shorter than the present road.*
>
> *That there is a large quantity of Government Land on both sides of this road, which would be very speedily sold if this work is carried out, as is evident from the fact that the result of making the Bridle track so far as it has already gone, has been to sell sufficient Land to double the amount of rate at 1s. per acre. That the Settlers in the District have already contributed 2s. per acre, and a third annual rate of 1s. is now being levied. The Committee, therefore, recommend that an amount equal to two-thirds of the estimated cost of £600 should be appropriated to carry out the objects of the Petitioners.*[31]

Having received this report, the Superintendent of Wellington, Isaac Featherston, wrote to the petitioners agreeing to their request.

However, delays were experienced and nothing occurred over the next fifteen months. The following year, as part of his 30th August 1859 opening address to the second session of the second Provincial Council, Featherston noted that if the council agreed to his budgetary proposals for the year, which included selling reclaimed land and raising a substantial loan, a number of public works could go ahead including the conversion of the Belmont bridle track into a dray road.[32]

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[29] Bagnall, op cit, p.30. Also McLennan, Rosemary *Glimpses into early Normandale*, Hutt, Normandale Progressive Association, c1993, p.3-4

[30] Votes and Proceedings of the Wellington Provincial Council, 1858, Presented Petitions.

[31] Votes and Proceedings of the Wellington Provincial Council, 1858, Report of the Western Hut Road Committee.

[32] Votes and Proceedings of the Wellington Provincial Council, 1859, p.8

A Section of the Completed Belmont-Pauatahanui Road, 1870: Alexander Turnbull Library, PA Coll-1574-17

This conditional support for the road angered the Belmont petitioners who felt that the Superintendent was going back on his word. On 7th November 1859, Belmont settler David McEwen wrote to Featherston on behalf of his fellow local settlers.

> *Sir,*
>
> *I, at the request of a good many of the settlers in this district, beg to draw your Honour's attention to the following parts. In April 1858 the settlers in this district forwarded a memorial requesting your Honour to place on the estimates a sum sufficient to convert the then Belmont Bridle Path consisting of about 114 chains into a cart road. Your Honour in reply stated unconditionally that you were prepared to do so but on references to your speech on opening the present session of the Provincial Council your Honour stated that you would make provision for the said work only if the Council would agree to sanction a loan of £25,000. This statement does not look well for our interests and I have therefore to put you in mind of your promise in reply to our memorial...*
>
> *...We expect something to be done this session as we consider that the exertions we have made in making the Bridle Path, now nearly four miles, is certainly in our favour and we daily feel more and more the want of a cart road. I hope therefore that your Honour will be pleased to place on the estimates what you may consider a sufficient sum to make the cart road.*[33]

[33] McEwen to Featherston, 7 Nov 1859, WP3 1859/480, Box 7, Arch. NZ, Wgtn

Following this, it appears that agreement was made for the road to go ahead, although several letters from McEwen during mid-1860 reflects his growing impatience with Provincial engineering staff as to the progress being made.[34]

With the cart road sufficiently advanced, McEwen began efforts to have the road further improved. On 12th November 1862, after several efforts to have the engineer visit the district to lay out proposed extensions to the road, McEwen wrote to the Superintendent asking that he instruct the Engineer to come or to give McEwen authority to begin the work himself. McEwen wearily added: "up to the present time I have received no reply. I do not complain of this as uncourteous to myself as I am perfectly used to such neglect or contempt (either word will suit my purpose) by the Officials of the Wellington Provincial Government."[35]

The progress on the road remained slow. When, in January 1863, James Coutts Crawford returned to Wellington from Wanganui, instead of traveling on the uncompleted road, he journeyed along the cutting made by Beetham's line and later briefly described his journey.

> *On my return to Wellington I walked through from Pauatahanui to the Hutt by what is called Beetham's line. It is a line taken for the greater part straight, like a Roman road, consequently forms a constant ascent and descent and is a most fatiguing walk.*[36]

The Belmont-Pauatahanui road was not completed, however, until July 1872 under the Belmont Highway Board. By the end of the Provincial period (c.1875), the road had been widened to take wheeled traffic.[37] The road did not completely follow the old Maori track from Pauatahanui but turned down the hill through present day Normandale to join up with a bridge that had been built over the Hutt River.[38] Eventually a branch road was run down to Korokoro which the settlers used to bring up firewood from the bush that bordered the stream.[39] There has apparently been debate on whether coaches were ever used on this road with the recollections of local residents being adamant that this did occur.[40] By the mid-1880s, however, and the formation of the Haywards road, the Belmont-Pauatahanui Road fell into disuse as a route linking the Hutt Valley and Pauatahanui.[41]

1.6 Continued European settlement

As European settlement progressed, sawmills were set up in the vicinity of the land which is now included in the Regional Park. In 1859, the Carter and Hurly sawmill was erected on Thomas Stace's property and in 1863 another sawmill was built on Francis Bradey's property at Duck Creek. Recollections of the Hutt Valley from the 1860s, note that the forests of the Belmont hills were being felled on one side of the Valley whilst the bush of the Wainuiomata Hills was being cleared on the other side. The land was then burnt off. Sometimes bush fires resulted. The valley would be covered in ash and burnt leaves and settlers had to be vigilant that their shingle roofs did not catch fire.[42]

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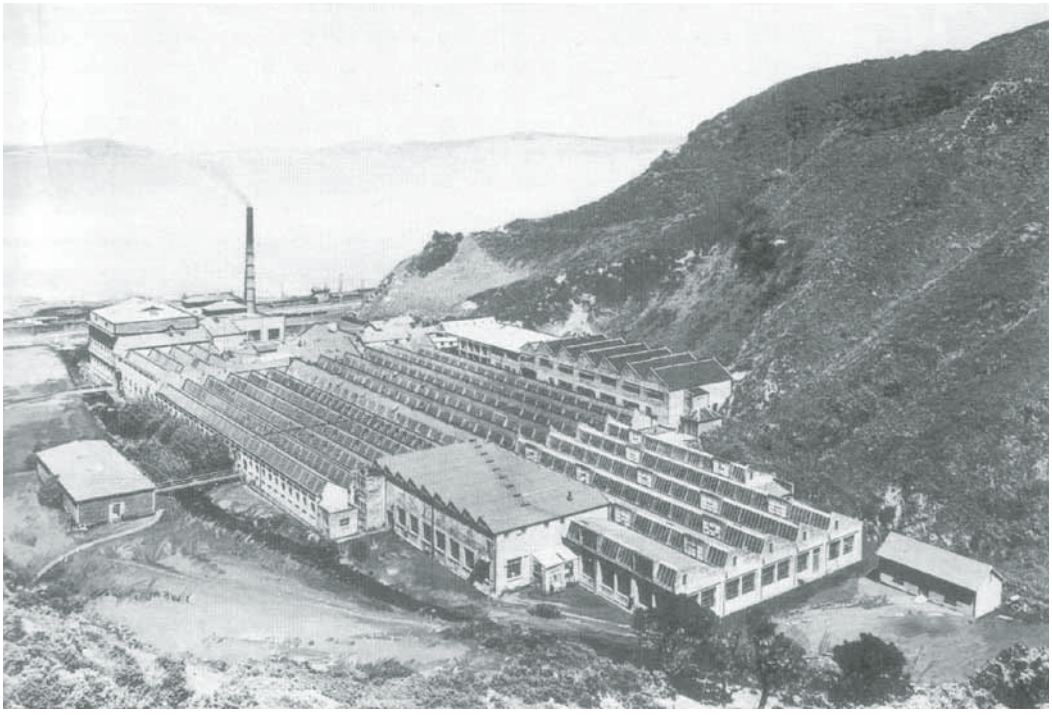
[34] See WP3 1860/447, 1860/459, 1860/467 and 1860/542, Box 8, Arch. NZ, Wgtn
[35] See WP3 1862/524 and McEwen to Featherston, 12 Nov 1862, WP3 1862/530, Box 11, Arch. NZ, Wgtn
[36] Crawford, op cit, pp27-9
[37] Bagnall, op cit, pp.30-1
[38] McLennan, op cit, p.1
[39] Ibid, p.27
[40] McLennan, op cit, p.4
[41] Bagnall, op cit, pp.30-1
[42] McGill, David *Lower Hutt : the first garden city*, Lower Hutt, Lower Hutt City Council, 1991, p.12

From the 1870s, the land tenure of many of the sections that would later be included within the Belmont Park began to change. William Fitzherbert, Member of Parliament for the Hutt from 1858 to 1879, had owned land on the floor of the Hutt Valley since 1864. During the 1870s, he began to acquire western hillside land as he extended his property to form the Western Hutt sheep station. Although many of his purchases included land now covered by the suburbs of Korokoro, Maungaraki and Normandale, Fitzherbert also acquired some of the sections now included within the Regional Park including Section 301 from the Golder family in 1877, Section 424 from James Buick in 1879, and Section 423 from James McKenzie in 1883. Thomas Stratton became the farm manager of the continually increasing Western Hutt sheep station.[43]

In addition to farming occupation of the land, the mouth of the Korokoro Stream was long the site of mills which used the waterway as a power source for processing and driving machinery. Therefore, by the 1880s the stream had been dammed to provide a sufficient water quantity. In 1885, the Wellington Woollen Manufacturing Company was formed and took over the site at the mouth of the Korokoro Stream where a new mill complex was built. The mill commenced manufacture in June 1886 and employed up to 200 workers. It was an all-purpose woollen mill making flannels, tweeds, knitting yarn and hosiery.[44] The mill remained opened until 1968 when changes in the marketplace meant that the operation was no longer viable. After the closure of the mill, the buildings were demolished in 1970 with only the marble wall at the front of the site, originally built in 1920, remaining in place.[45]



The Wellington Woollen Manufacturing Company mill showing the Korokoro Stream running alongside: Petone Public Library

[43] McLennan, op cit, p.4
[44] Butterworth, Susan Margaret *Petone : a history*, Petone, Petone Borough Council, 1988, pp.110 & 112
[45] Ibid, pp.121-2

In the meantime, by the end of the nineteenth century, the situation on the western hills had changed as farming gave way to housing. In 1890, a year before his death, Fitzherbert transferred most of this land to his sons William Alfred and Henry Samuel. The following year, Henry transferred his interests over to his brother who had also become the first Mayor of the newly-formed Lower Hutt borough. William Alfred Fitzherbert continued to buy western hillside land much of which is now within the Regional Park. This includes Section 321 from Charles Cottle in 1897 and Sections 308 and 319 from Alfred Belmont Cottle in 1899. By this time, the western hills were beginning to be seen as being suitable for housing purposes. In 1900, the hill subdivision of Korokoro was opened and the following year, the Maungaraki subdivision was established.[46] In 1903, much of the Fitzherbert Western Hutt estate (1,623 acres) was sold to the Crown for £15,419 pounds, the plan being to establish suburban housing and small farms.[47]

In June 1903, Lands Department official Thomas P Allen, filed a report on the land intended to be included in the new subdivision. The northern land Sections Nos.40-43 (which eventually would be included within the Regional Park), was described as being: "high, hilly land and much broken by spurs and deep gullies. The soil is open and rubbly, subject to slipping... from my experience should advise large holdings... As the country is only suitable for pastoral purposes and would not carry sufficient stock to make a living on smaller holdings." Allen noted that along the Belmont road gorse was beginning to get a hold and fencing was not in a good shape although the road itself was in a fair condition. The northern sections were said to be well watered, although some concern was noted that ragwort had made an appearance on Section 40.[48]

The southern Normandale sections, which were available on 999-year lease, were gradually taken up although the area soon came to be called the 'Heartbreak Settlement' on account of the harshness of conditions and the marginal quality of land for farming. The larger farming sections Nos.40-43 were not taken up until after the First World War when William Inglis Ward leased all 857 acres under the Discharged Soldiers' Settlement Act. His lease was from 26 October 1910 for 33 years with a perpetual right of renewal for further 33-year terms.[49]

For those who continued to farm the hills, the difficulties of making a living remained. Local farmer T.W. Caverhill noted in 1911 that overall the soil was light "and the cleared land gets burned up in summer." W.A. Cottle believed that the soil was somewhat better on the hill tops, than on the hillsides. He ran cattle over the land. He had also tried sheep but these were harried by dogs.[50]

Although as at 1900 most the Belmont Park's land was still privately owned, it was not intensively occupied and it appears that informal public use of the land soon began. Before the establishment of the Park, limited walking tracks crossed the land.[51] Areas within the park were used for camping and it was noted that shooting of rabbits, hares and possums was popular.[52] The Korokoro Dam site for a long time back was a site for

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[46] Committee of Petone citizens (comp) *Petone (Pito-one) : first 100 years 1840-1940 : progress & prosperity : history and traditions from farms to factories,* Wellington, Petone Borough Council, 1940, p.100
[47] McLennan, op cit, pp.4-5
[48] Ibid, p.29
[49] Ibid, pp.27 and 142-3
[50] Minutes of the Native Land Court, Wellington Minute Book 17, pp314-324
[51] WRC file, 108-3, Vol.2
[52] WRC file, 108-3, Vol.3

picnicking. Although swimming was not allowed in the dam, young children would do so if they did not get caught. Stories are remembered of these escapades and on one occasion a group of boys who were skinny dipping in the dam had their clothes taken by the ranger responsible for the Borough waterworks.[53]

Members of Tararua Tramping Club and Hutt Valley Tramping Club at Belmont Trig, 4 December 1927
Alexander Turnbull Library, PA1-o=650-01-2

1.7 The Petone water supply

Aside from driving the woollen mill, from the beginning of the twentieth century, the Korokoro stream would also play a major role in supplying water to the township of Petone. Through until the end of the nineteenth century, Petone's water-supply came from artesian wells but the difficulty was that there was no high pressure water source to be used for the purposes of fire fighting. Initially, in 1899, the mayors of Lower Hutt and Petone inspected the Belmont or Speedy Stream with an eye to establishing a joint scheme. When the Hutt Council pulled out of this venture, the Petone councilors began to consider a closer water supply based on the Korokoro stream. Consideration of the merits between the two possible sites continued for some time. By February 1902, however, the Petone Borough Council opted for a scheme based on Belmont Stream.[54] This decision was made despite a Borough Engineer's report in favour of Korokoro Stream.

> *The Korokoro watershed above the proposed reservoir will embrace a considerable area of virgin bush, which if conserved will guarantee a steady and clean inflow. About 100 acres or less may be set aside as sufficient for this purpose if taken in the most advantageous position. The quality of the Korokoro water is soft and palatable and it may be considered superior to that of the Belmont stream...*[55]

[53] McLennan, op cit, Introduction
[54] Committee of Petone citizens, op cit, pp.68-70
[55] 4 February 1902, *The Evening Post*, "Petone's Water Supply"

The Engineer noted that the Korokoro option would provide enough water to supply 15,000 persons once a dam was built, whereas the Belmont stream would only supply 10,000 persons. The Korokoro stream would give better water pressure. Compared with this, Belmont stream in wet weather "fouls rapidly and becomes unsuitable for household purposes." Nevertheless, the Mayor and Councillors were concerned over the woolen mill having possible claims of riparian rights on the Korokoro Stream which would complicate matters enormously. Therefore, the decision was made to devise a scheme based on Belmont or Speedy's Stream.

When the Petone Borough Council sought to buy the water rights of Belmont Stream, it was found that the Hutt Council had gone ahead and already taken this action. Although the Hutt Council offered to discuss matters, the overture was refused. The focus returned to the Korokoro stream but the difficulty which existed here was the location of the woollen mills and the possibility that the mill owners could successfully claim riparian rights over the stream. Investigation into this problem somewhat held matters up until a major fire and destruction of several commercial buildings occurred in Petone in June 1901 and intensified public agitation for a high-pressure water supply. Negotiations therefore began with the mill's owners who proposed that if the Borough Council would build a lower reservoir for the exclusive use of the mill and would guarantee a certain flow into that reservoir, then the Company would raise no objection to the water supply scheme. Although a number of councillors were against any such arrangement, the majority supported the compromise and passed a resolution to this effect. Despite this, a bitter dispute arose within the Council with Mayor G.T. London refusing to sign a deed of agreement within the woollen company and therefore going against the resolution that been formally passed. In response, five outraged councillors resigned in protest and the issue of the water supply became a major issue in the ensuing election. Nevertheless, a complete victory was achieved by the Mayor and his supporters over their position of refusing to accept any terms from the Company.

Ceremony marking beginning of construction of the Petone Waterworks Scheme, 25 April 1903: Petone Public Library

However, the Company had begun an action to have its riparian rights recognised and the terms of agreement with the Council honoured. Although the Council had a certain period of time to file a response, as fate would have it, an oversight by Council officials meant that the date of reply passed without the Council filing. The Woollen Company could now proscribe terms and the Council had to conform.[56] Following some years of wrangling, matters were finally settled under the Petone Corporation Waterworks Act of 1905. Therefore the Scheme went ahead and a ceremony was held on 25 April 1903 marking the beginning of construction.[57] Within a year, the scheme was completed. In 1907, improvements were made when an underground settling tank was built to allow sediment in the stream water to drop to the bottom allowing cleaner water to flow into the water supply.[58]

A caretaker, J.C. Davis, was appointed to look after the newly-established water supply. In 1911, he wrote complaining of his onerous duties.

> *Through the winter I have to work from 90 to 100 hours a week. I have to leave home at all hours of the night in stormy weather and walk about two miles along a track where limbs of trees and boulders are flying all around me and I don't know what minute I may be struck with one. When I get there, I have to stand by in the storm till morning. I also have the fire alarm to look after, which, when I leave home at night, Mrs Davis has to watch and if necessary go down into the gully at any hour in the night to turn on the pressure. Mrs Davis is also employed the whole of the week with no time off while I am away working. Since the Council has taken over the bush at Normandale I have about 100 acres over which I act as ranger on holidays and Sunday mornings to keep visitors from burning the bush and stop the settlers from falling the same.*[59]

The bringing in of the water supply scheme was not always effective, however. The woollen company's control of the water scheme, through its negotiated agreement that it be supplied with a certain amount of water, meant that in dry seasons the Council had to honour the agreement and release water from the upper reservoir into the Company's lower reservoir with the result that borough residents were sometimes without water.[60] In addition, by the end of the 1920s, with the increasing size of the Petone Borough and more houses and buildings, the water pressure available to each residence began to drop away to a point where once again it was not high enough for fire-fighting. The possibility of raising the height of the Korokoro dam was considered but found to be an expensive option. Another possibility was to use artesian water, but, from a health perspective, this water was considered less desirable than getting the supply from a running stream. For a while the acquiring of water rights over the Whakataki Stream in Upper Hutt was considered as an option.[61] After looking at a number of possibilities, the artesian water supply was turned to with the solution of dealing with impurities being solved by pumping the water up to the settling tank on the hillsides above Korokoro Stream to ensure pressure and provide an opportunity for foreign matter to drop to the bottom of the tank before the water was used.[62]

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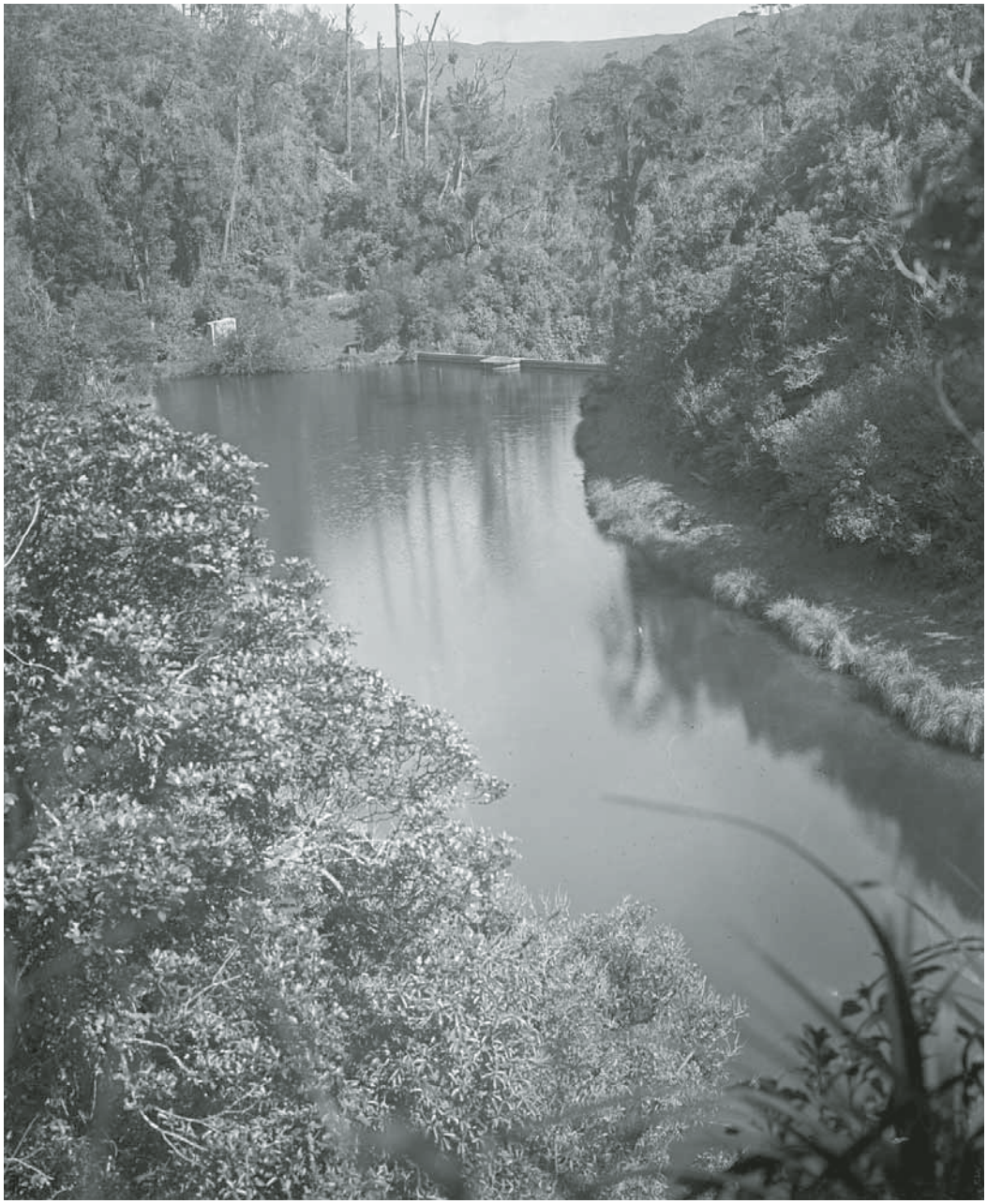
[56] Committee of Petone citizens, op cit, pp.68-70
[57] Butterworth, op cit, pp.132-3
[58] Ibid, p.133
[59] Ibid
[60] Committee of Petone citizens, op cit, pp.70
[61] 12 October 1928, District Engineer to Permanent Head Public Works Dept, ABKK w4357 50/345 pt.1 Arch. NZ, Wgtn.
[62] Committee of Petone citizens, op cit, pp.70

By 1933, concerns were raised over the potential for the Korokoro stream to be polluted by surrounding settlement. As a result, the Petone Borough Council began to take steps to bring the stream, and all its tributaries under the control of the Council. This did not mean the acquisition of land, but only the right to make decisions or take interventions in the management of the stream. The Department of Health supported the move, the Wellington Medical Officer of Health noting of the Korokoro stream: "This is a most excellent source of water supply, but it requires careful supervision."[63] Eventually, however, in December 1964, water from the Korokoro supply system was pronounced unfit for human consumption and Petone residents relied for some years, on their artesian water supply.



The Korokoro Dam: Alexander Turnbull Library, APG G633

[63] 15 November 1933, Medical Officer of Health to Director General of Health, AAFB w4415 124/12/16 box 242, Arch. NZ, Wgtn.

1.8 The Maungaraki Reserve

The demands of the Korokoro water supply had an important impact on the Te Atiawa reserve at Maungaraki.

Little evidence has been found that gives a full history of this land. It does appear, however, that by the 1870s much of the 1,214-acre block had been leased to private persons such as Fitzherbert. In 1884, however, the owners wrote to the Native Minister asking consent, as was required by legislation, to sell 11 acres to the Woollen Manufacturing Company to allow the establishment of their mill at the bottom of Korokoro Stream. The area of the reserve being discussed for sale lay just outside of the boundaries of the Belmont Regional Park. When reporting on this request, the Commissioner of Native Reserves Alexander MacKay noted that the owners were using just one acre of the land in question, and that the sale would be good for them because of the price being offered for the land and because of "the future benefits they will derive by the establishment of the manufacturing in their neighbourhood, as it will undoubtedly, if successful, enhance the value of the remainder of their property..."[64] The request for sale was agreed to and, as noted above, the woollen mill was built.

At this stage, the Maungaraki Reserve was still held in joint ownership by all those who had a beneficial interest although who these people were had not been exactly determined. In 1889, therefore, the owners took a case to the Native Land Court to investigate the title to the land. When the Maungaraki Reserve came before Judge Alexander MacKay, who previously as Commissioner of Native Reserves was familiar with all of the Wellington reserves, he proposed that the block should be awarded to the descendants of those Te Atiawa who were living at Petone when the New Zealand Company arrived in 1839 and who were the owners of the cultivations that had been taken and for which the Maungaraki reserve had been given as compensation. On investigation it was found that 42 persons qualified as having interests in the land. Regarding the extent of each interest, Judge MacKay noted that as the remaining Petone reserves already had been awarded to certain persons, those others who had received little land elsewhere should receive the greater proportions of the Maungaraki Block.[65] By 1890, therefore, the title of the Maungaraki Block was awarded in 10 subdivisions. Of these, Sections 3 to 7 were located in what is now the Belmont Regional Park.[66]

With the development of the Petone's water supply coming to focus on the Korokoro Stream, borough officials formed the view that they needed to acquire most of the Maungaraki reserve to preserve the catchment area of the waterway. The water supply was often deemed as being under threat by suburban growth beginning in 1903 when Normandale was being developed and the Petone Borough Solicitor sought reservations of the catchment area.[67] Therefore steps were soon taken to acquire the Maungaraki reserve. In 1904, several sections of the Maungaraki reserve were taken under the Public Works Act for water supply purposes. These included all of No.2 block and most of No.3 (almost 196 out of 239 acres). Although the land was taken compulsorily, owners were awarded compensation.[68]

Seven years later, more land was taken including all of No.4 (almost 88 acres), all of No.7 (119 acres) and all of No.8 (64 acres). When the land came before the Land Court, a number of witnesses appeared to provide testimony on the land's value. The valuers

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[64] Quinn, Steve "Report on the McCleverty Arrangements and McCleverty Reserves", WAI-145, #I8, p.160.
[65] Minutes of the Native Land Court, Wellington Minute Book 3, pp143-4
[66] Green, Terence "Report on Wellington Tenths Reserve Lands", WAI-145 #E12, App.77
[67] McLennan, op cit, p.29
[68] Minutes of the Native Land Court, Nelson Minute Book 4, p255

for the Borough Council were strongly critical of the land noting that it had no useful timber, had poor soil and no access. In some places, fires had been through the bush and noxious weeds had taken hold. However, other witnesses called by the owners, including local settlers, had more positive things to say noting that in some places there was quite good timber including tawa and pukatea.[69] The Court awarded compensation closer in line with the valuers brought forward by the owners.

1.9 The Belmont Magazines

The Belmont magazines grew out of a general Cabinet decision made in August 1941 to provide £355,000 expenditure on ammunition accommodation for sites around the country. It appears that initially Belmont was not chosen as a site with locations in Waikato, Manawatu, Papakura and Waiouru being selected instead.[70] By October 1942, however, the intention to build 60 magazines at Belmont, with the possibility of increasing these to 80 structures, had been announced.[71] These magazines, it appears, were needed to meet the requirements of the United States army and navy authorities. By the time the decision to built at Belmont was made, there was some urgency in getting on with the work as ammunition was continually arriving from overseas and congestion was building at the Wellington docks.[72] It was expected that 15,000 tons of ammunition and explosives would be eventually stored at the site. Belmont was chosen due to its isolation from residential settlement and the location of roads close to the site. The work at Belmont alone was to take up £200,000 of the allocated budget.[73]

Almost 32 acres of land was required for the magazines. This land was occupied under Defence Emergency Regulations. Almost six acres came from the farm of W.A. Cottle, 2 acres from W.Kilmister's property, just over a quarter acres from G.H. Galloway's land, whilst the bulk of site, (24 acres), was located on the Maher Estate.[74]

In addition to the magazines, a camp to house up to 100 men was to be built. To lessen detection from the air, the Army Camouflage Unit made up plans to lay out this camp so that it had the general appearance of a poultry farm.[75] By February 1943, however, delays with working through contract issues with the private firms commissioned to complete the buildings was causing problems as a Public Works Department official informed his chief executive:

> *The matter is undoubtedly urgent; the Army is being seriously embarrassed and we have had to prepare extensive areas for the temporary stocking of ammunition in the open. Quite a large quantity is already stacked here and ammunition is arriving continuously.*[76]

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[69] Minutes of the Native Land Court, Wellington Minute Book 17, pp314-324
[70] 15 September 1941, Quartermaster General to Engineer-in-chief Public Works Dept, W1 23/112/9 pt.1 Arch. NZ, Wgtn.
[71] 6 October 1942, Commissioner of Defence Constructions to Engineer-in-chief Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn.
[72] 6 October 1942, Quartermaster General to Engineer-in-chief Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[73] 11 November 1942, Beck to Engineer-in-chief Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[74] 27 May 1946, Quartermaster General to Engineer-in-chief Public Works Dept, AAQB w3950 23/862/1 box.204 Arch. NZ, Wgtn
[75] 23 November 1942, Quartermaster General to Engineer-in-chief Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[76] 11 February 1943, District Engineeer to Permanent Head Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn

By March, work had begun on the magazines. Before this, the camp had been built and workmen were living in the huts that would eventually be occupied by the soldiers guarding the magazines. A total of 50 of these huts had been erected. Whilst ten of these had been built with a homestead to look like the poultry farm, the other 40 huts had to be hidden from any potential aerial reconnaissance. Therefore they had been located under a row of tall and spreading pine trees. As a result, these living quarters got no sun, were draughty and were damp in wet and foggy weather. The workers formed themselves into a Belmont Camp Committee and by the end of March 1943, the Secretary of the Committee wrote to officials asking that expenditure be approved to line the huts.

> *In their present condition, they are definitely very damp, everything within being affected. As an instance, matches become unstrikable over night. If the huts are not lined, the sickness rate will be very high with the colder and wet weather fast approaching.*[77]

The huts were lined as requested but the camp remained a cold place. By April, the Camp Committee has asked for heaters for every hut: "The percentage of colds and complaints due to this is higher than it should be and with the winter coming on the position will become much worse." The District Engineer responded that he was "definitely not in favour of providing individual heating for huts" as this would create a precedent for every Public Works Department camp around the country to lobby for improved heating.[78] However, a portable electric heater was sent to the camp for use in the recreation room. By 23 June, the Secretary of the Camp Committee wrote to officials to express the gratitude of the men: "If you lived here you would doubtless be as pleased as we are".[79]

Another complaint that had been received from the Camp Committee was that the army would not let taxis drive the men into the camp when they returned from trips into town. As the sentry post was one and a half miles from the men's huts, they had quite a hike ahead of them when they returned to the camp which often was at night. The District Engineer responded that this was a matter for the Army to consider and that possibly a pass system could be brought in. He added, however: "all I would say is that if the Army should agree to letting taxis in they should be searched for liquor by the guard."[80]

Despite these difficulties, the magazines were built by June 1944 at which time the workmen moved out, and the Army moved in. By mid-1945, with the end of the War in sight, the Army was not sure of the future of the magazines. Whilst this matter was being determined, it was decided that as half-mile exclusion zone would be put in place around the magazines. This affected 991 acres of surrounding land with only the local landowning farmers being allowed within the declared danger zone.[81] In the beginning of 1950, however, the land was officially taken for defence purposes and the owners received compensation.[82]

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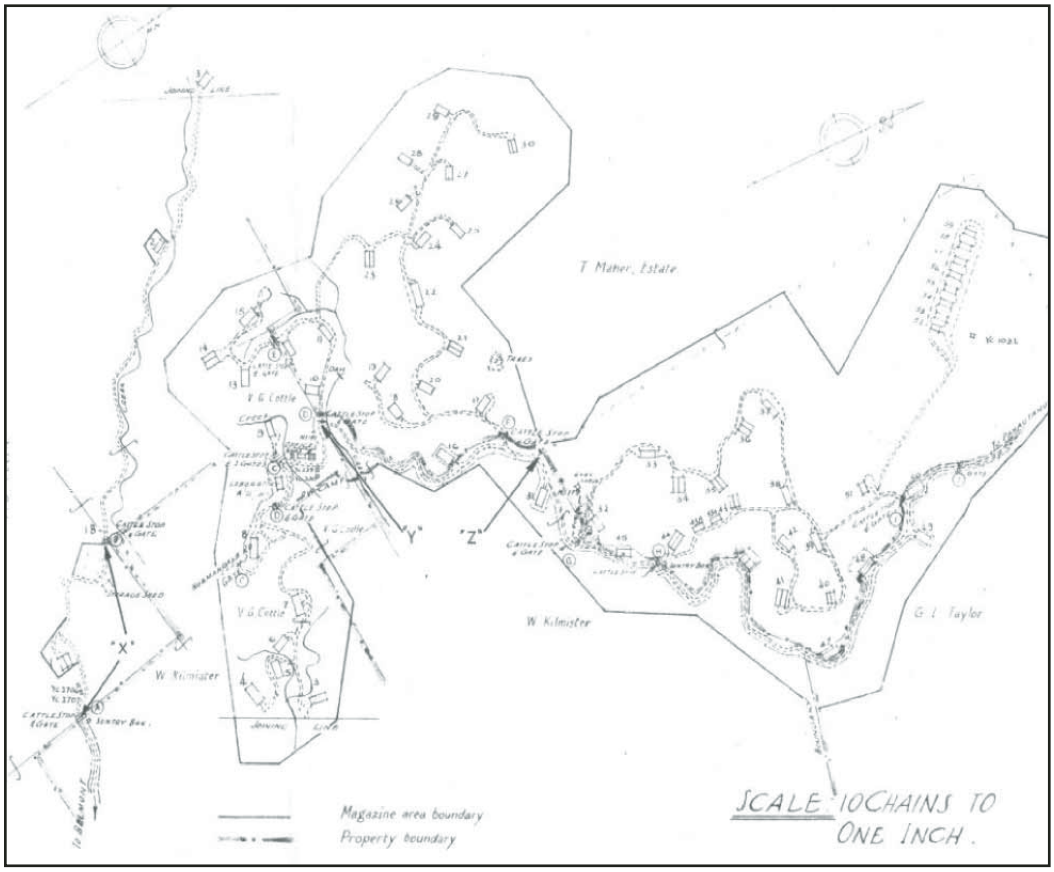
[77] 31 March 1943, Assistant Under Secretary, Public Works Dept to District Engineer, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[78] 22 April 1943, District Engineer to Permanent Head Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[79] 23 June 1943, Engineer-in-Chief, Public Works Dept to District Engineer, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[80] 22 April 1943, District Engineer to Permanent Head Public Works Dept, AAQB w3950 23/862 box.205 Arch. NZ, Wgtn
[81] 9 July 1945, Quartermaster General to Engineer-in-chief Public Works Dept, AAQB w3950 23/862/1 box.204 Arch. NZ, Wgtn
[82] See AAQB w3950 23/862/1 box.204 Arch. NZ, Wgtn

After the War ended, the magazines remained manned by a reduced guard of five soldiers. By 1949, the magazines still held 2,776 boxes of howitzer shells and 3,655 boxes of other artillery ordinance. In addition, 1,755 boxes of grenades were located there. However, the maintenance of this ammunition was becoming a problem. The majority of the magazines leaked. Several needed restacking as earthquakes had shifted and mixed up batches of ammunition. In two of the magazines, the labels on boxes could not be read.[83]



Plan of the Belmont Magazines, 1945: AD-W w1965, 51/125/1, Arch. NZ, Wgtn

The following year, in May 1950, it was discovered that two magazines had been broken into and entered. Break-in attempts were evident at a further two magazines. Initially, it was thought that anti-aircraft ammunition and possibly some grenades had been stolen but investigations eventually revealed that no ammunition was missing. Although 11 men were now stationed at the site, this was not enough to undertake regular security patrols. However, as suburbs were being established closer to the magazine site, increased personnel and patrols would be brought into effect.[84]

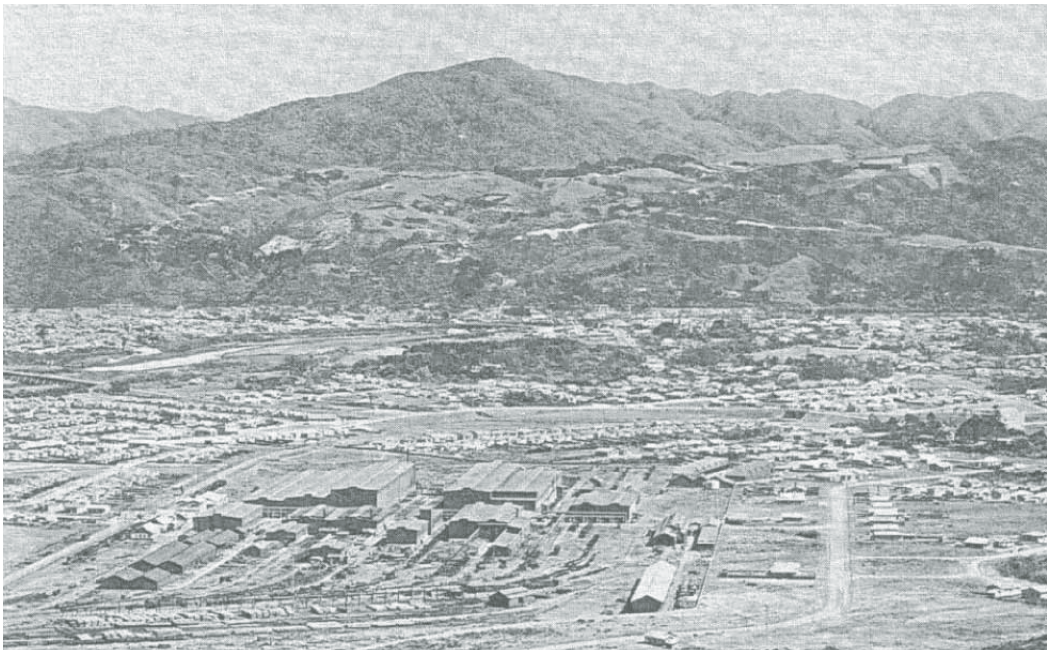
Other problems occurred. On 6 May 1951, a fire broke out as a result of heating installation work that had been done on site and although the fire was soon got under control by the men stationed there, once again the vulnerability of the isolated site was clear.[85] Nevertheless the site remained occupied for a number of years through to the end of the decade.

[83] 30 June 1949, "Annual Magazine Inspection Report – Belmont", AD-W w1965 51/125/1 Arch. NZ, Wgtn
[84] See various letters, AD-W w1965 51/125/1 Arch. NZ, Wgtn
[85] See "Conclusions and Recommendations" of Investigating Officer, AD-W w1965 51/125/1 Arch. NZ, Wgtn

2.0 Belmont Regional Park

By 1900, almost all of the land that is currently located within the Belmont Regional Park was in private ownership. Over the course of the twentieth century, through a number of different processes, the various blocks that make up the Park were acquired by Crown agencies and local authorities. The first such land, as noted previously, was the Maungaraki Maori Reserve that was acquired for water preservation purposes by 1911 by the Petone Borough Council.

In the 1930s, the Lower Hutt City Council acquired a small amount of land between Korokoro and Horokiwi and two hectares of pine trees were planted on it as part of a Great Depression work scheme.[86] In the 1950s, the Hutt Council purchased an area of land from the Kilmister, Kells and Gault families. This 632-hectare area, which became known as the Kilmister Block, was to be used for housing and roading purposes.[87] When these plans did not go ahead, the Council leased the land to the Department of Lands and Survey (and subsequently to Landcorp) for farming purposes.



The Western Hills showing the increasing urban growth 1932: Alexander Turnball Library, G 87616 1/2

On the western side of the Park, the Crown purchased the Maher Estate and the Waitangirua Block in 1959 for housing purposes, but when 1,300 acres were found to be surplus to requirements, they were taken over and farmed by the Department of Lands and Survey as the Waitangirua Farm Settlement.[88]

The Waitangirua farm increasingly provided a means to utilise unused Crown land that had been acquired by several agencies for a number of purposes including housing, defence and electricity generation. In 1967, the Department of Defence land on which the Belmont magazines sat was taken over by the Department of Lands and Survey and added to the Waitangirua Farm settlement.[89] On 20 May 1971, the land on which the magazines sat was released for defence purposes and became Crown land.[90]

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[86] WRC file, R/05/01/07, Vol.1
[87] WRC file, LM/09/06/03, Vol.1
[88] WRC file, 108/3
[89] Wellington Regional Council, *Belmont Regional Park Management Plan, Part 3 Resource Statement*, Wgtn, Wellington Regional Council, 1989, p.43
[90] See AAQB w3950 23/862/1 box.204 Arch. NZ, Wgtn

By the early 1970s, the Waitangirua Farm Settlement consisted of 1,862 hectares and ran almost 10,000 sheep and 1,000 cows. Despite facing difficulties of public trespass from being located so close to several urban centres, the farm was regarded as being successful because of strong management and because of the farming methods that had been adopted.[91]

Also by the early 1970s, local authority planners around the Wellington District were becoming increasingly aware that many of the rural areas surrounding the cities that informally had been made available to public use by landowners were being closed off as the urban population swelled. With a core of public land held by central and local agencies sitting between the Lower Hutt and Porirua cities the Belmont area was chosen as having the greatest potential to be maintained as a permanent open space area. A proposal arose to establish it as a rural zone where the rural character of the land would be retained and improved, whilst greater public recreational use would be encouraged.[92]

At a meeting of the Wellington Regional Planning Authority on 19 November 1973, it was resolved to ask the various local authorities and state agencies that held land within the proposed park, to provide in their district scheme or development plans, allowance for designating a regional park centred on Belmont. By 1976, the Petone Borough Council had introduced the requested provisions and the Porirua and Lower Hutt City Councils were taking similar steps.[93]

By March 1974, the objectives identified for the Park included the protection and enhancement of valuable common open space and natural features that currently existed between the district's cities. Urban populations were to be given an opportunity to enjoy natural landscapes located close to the places in which they lived.[94] It was envisaged that the farming activity would continue, but that the park would be developed to provide for walking, riding and picnicking. It was even envisaged that the stream systems might be developed to provide recreational fishing. In the initial planning stages, more intensive uses, including archery, rifle shooting and go-carting, were also considered as possibilities.[95]

In April 1977, the Minister of Lands agreed in principle to include the 895-hectare Waitangirua Block within the proposed park on the proviso that farming activity would continue.[96] Those farming the Waitangirua Block were supportive of the land being included in the Park believing that it could be used as a mechanism to address some of the problems that were being encountered from being located so close to urban centres. These included sheep deaths from dog attacks (recorded at 483 in 1976), stock theft, the shooting of lambs, and malicious damage of fencing and other farm property. By bringing more people onto the Park area it was hoped to provide more restraint over the delinquent behaviour. In addition, signage and public education would lead to a greater appreciation of how to use the farmland for recreation purposes. Finally, track systems could be developed to keep people away from sensitive farming areas.[97]

To assist in planning the park, a large multi-disciplinary research project was commissioned from Victoria University to document the park's geology, climate, vegetation, wildlife and history.[98] By mid-1976, the research team had reported the

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[91] WRC file, 108-3, Vol.3
[92] WRC file, 108-3, Vol.2
[93] WRC file, 108-3, Vol.2
[94] WRC file, 108-3, Vol.2
[95] WRC file, 108-3, Vol.2
[96] Wellington Regional Council, *Belmont Regional Park Management Plan, Part 2 Resource Statement*, Wgtn, Wellington Regional Council, Sept. 1996, , p.3
[97] WRC file, 108-3, Vol.3
[98] WRC file, 108-3, Vol.2

findings of their investigations. They also reached a number of recommendations on the ideal boundaries of the park, and on the recreational activities that were consistent with the park's environment and objectives. Shooting was to be actively phased out, boating or camping was said to be unfeasible and trail bikes were not wanted by any of those consulted. However, the other activities envisaged by planners were supported. Pest eradication was also urged.[99]

Ahead of the Park being officially opened, initial development began in the late 1970s. Much of the track system of the Belmont Park was already established over the public lands by the time the Park was being formed.[100] Unemployment Scheme labour was used to clear gorse and improve or establish tracks. One of the first tracks established in 1978 was the Korokoro Dam walkway.[101] For those areas on the Waitangirua farm that were too heavily affected by gorse, aerial spraying was adopted. Following the eradication of noxious weeds, it was planned to further fence the land. Areas prone to erosion were to be planted out.[102]

In 1980, an old, dying pine plantation located at the Oakleigh Street entry to the Park was felled by the Petone Borough Council. The Regional Authority took the opportunity to form tracks in the area, develop car parking and replant a woodland area. The development plan was prepared in consultation with Maungaraki residents.[103] Development within the Belmont Regional Park has a long history of partnerships with community groups. On the Cannon's Creek side, the Friends of Maara Roa and the Brandon Intermediate School have been involved. On the western hills side, the Otonga Intermediate School has been active in replantings.[104]

Aside from the public land, a certain amount of private land was located in the midst of the blocks belonging to central government agencies and local authorities. Whilst the park's planners were sanguine about leaving that land within the park and making access arrangements with the owners, the park was seen as being more viable from a management point of view if the private land could be acquired. Therefore, purchases were negotiated of three large blocks of private land of over 300 acres each.[105]

More land became available. Since 1905, Bill Ward had been the holder of the lease over the Normandale rural sections. When he passed away, his widow Mabel, who became executrix to the estate, sold the leased farm on 27 April 1950 to Donovan Edwin Cooper. Three years later, the property was transferred to the Fugle family who, under changing regulations, were able to freehold the land. In turn, in 1977, most of the land was sold and became the property of the Wellington Regional Water Board after which it was included in the Belmont Park.[106]

During the early 1980s, further land was acquired that was to be included in the Park. In 1980, the Takapu Road Block was acquired by the New Zealand Electricity Department as a small part of the land contained a substation. The rest of the land was farmed by the Department of Lands and Survey as part of the Waitangirua Block.[107]

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[99] WRC file, 108-3, Vol.3
[100] Wellington Regional Council, Belmont Regional Park Life Cycle Plan, WRC Oct 1999 draft., p.8
[101] Pharazyn Landscape Design "Takapu Road block... An assessment of the Recreation and Landscape Values", Wgtn, p.5
[102] WRC file, 108-3, Vol.3
[103] WRC file, R/05/04/03, Vol.1
[104] Wellington Regional Council "Cannons Creek: Restoration and Development", WRC Oct 2001
[105] WRC file, 108-3, Vols.2 and 3
[106] McLennan, op cit, p.142-3
[107] WRC file, R/05/01/03, Vol.1

In 1981, the Wellingon Regional Council purchased a block of land at Stratton Street to link up the lands of the Hutt City and Petone Borough Councils with the Waitangirua Farm block.[108] Another acquisition was of the Dry Creek property which had originally been acquired by the Crown for state housing purposes. As it was found to be surplus to this requirement, in 1983 it was transferred to the Department of Lands and Survey. This was added to the Park after 1986 when the land was transferred over to the Department of Conservation.[109]

From the mid-1980s, planning for the Park continued. In 1986, the Wellington Regional Council commissioned landscape design proposals for the Cannons Creek entrance of the Park. At the time, this area was predominantly grazed pasture and reverted gorse. The lands had also been damaged by a burn off which got out of control during the early 1980s when the land was being farmed. Over a number of years, the proposed landscape proposals were implemented with tree plantings being a key feature.[110]

Other management steps were put in place. By the late 1980s, the Belmont magazines, whilst recognised as being unique due to their large number and their close proximity to settled areas, were also deteriorating with the doors missing off many buildings and timber work on the structures beginning to rot. It was therefore recommended that a conservation plan be developed to address these difficulties.[111] In 1988, a draft management plan was also opened for public consultation.

The Belmont Park was officially opened on 2 April 1989. Conservation and recreation groups, as well as state agencies provided static displays. Due to their link with the World War II magazines, the New Zealand Army displayed a field kitchen as well as tanks, artillery and ammunition. Several organised walks featured. Rides included horse treks, trailbiking and the Army giving rides in unimogs. Up to 1,400 people attended.[112] Belmont was said to be the first park in New Zealand to combine private and public land managed for recreation, farming, forestry and conservation purposes. Later that year the Regional Council received the New Zealand Planning Institute's Award of Merit in recognition of its efforts to preserve open space, and the New Zealand Institute of Parks and Recreation Administration's National Project Award for outstanding merit.[113]

Today land in the park is owned by the Hutt, Porirua and Wellington City councils, Greater Wellington Regional Council, Department of Conservation and the Crown. Greater Wellington manages the park on behalf of the landowners.

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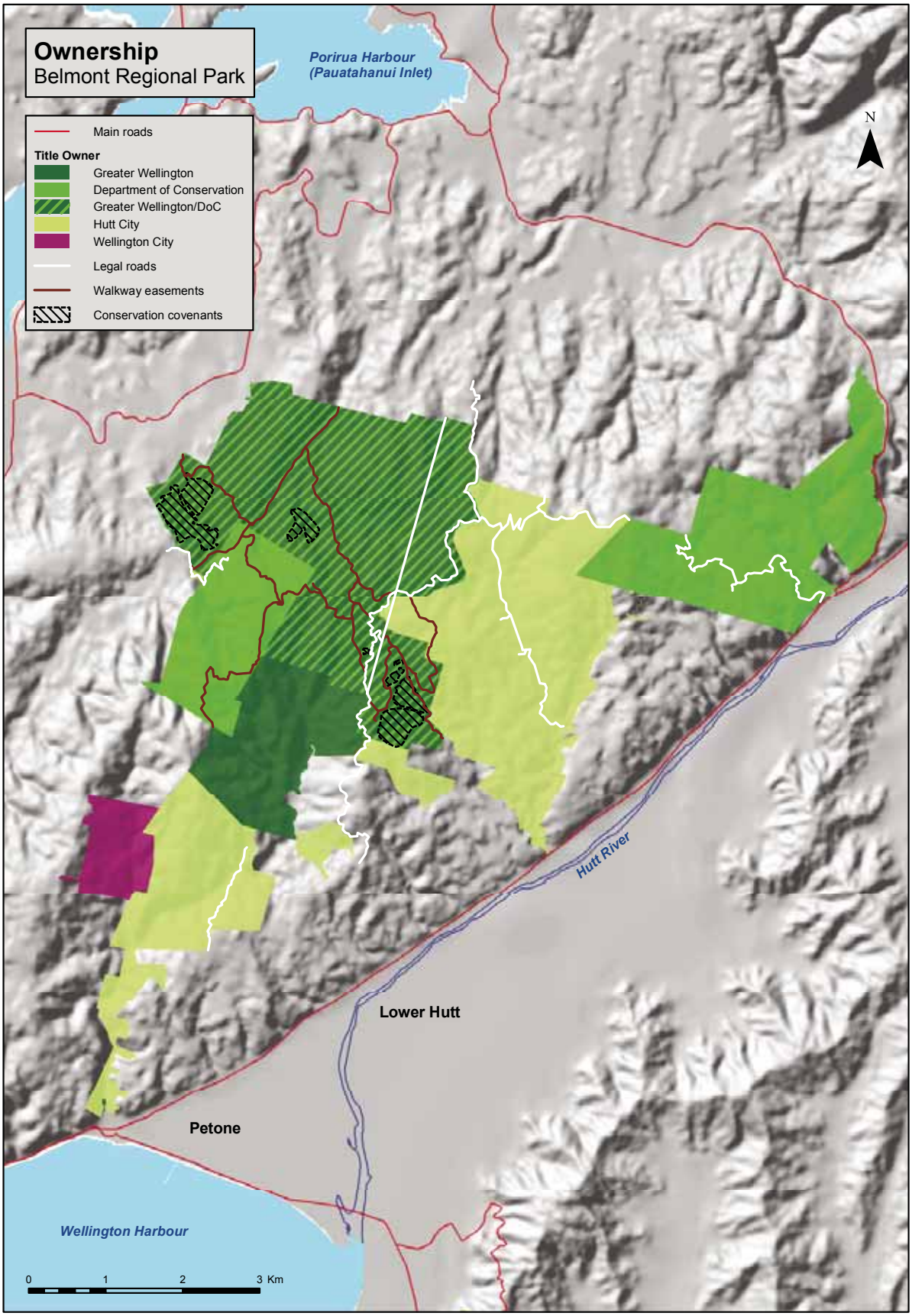
[108] Pharazyn Landscape Design, op cit, p.5
[109] Ibid. Also Wellington Regional Council, (1996), op cit, p.4
[110] Wellington Regional Council, (2001), op cit, p.4
[111] WRC file, R/05/01/05, Vol.1
[112] Fowler, Elizabeth "Belmont Regional Park Opening Day Report", 2 Apr 1989
[113] WRC file, R/05/01/07, Vol.1

Map 3 Ownership



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New Zealand Army:	AD-W w1965 51/125/1 Arch. NZ, Wgtn
New Zealand Company:	NZC 135/3, Micro Z 5355
Public Works Department:	ABKK w4357 50/345 pt.1: W1 23/112/9 pt.1: AAQB w3950 23/862 box.205: AAQB w3950 23/862/1 box.204
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- ***Wellington Regional Council***

  WRC file, 108-3, Vols. 1, 2 and 3

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Physical Environment

2. Topography, Geology and Landforms

2.1 Hilly topography around central plateau

In its topography, geology and landforms, Belmont Regional Park is a microcosm of the hill landscapes which so characterize Wellington. In particular, the park contains an interesting range of landforms which superbly illustrate the effect of the tectonic forces, as well as the periglacial and fluvial processes, which have fashioned the Wellington landscape over millions of years. Belmont Regional Park covers the Belmont hills which separate Wellington Harbour and the Lower Hutt Valley from Porirua Harbour. Over 60% of the park (total area, 3612 ha) has a topography of strongly rolling to moderately steep slopes (greater than 15 degrees). Most of the steeper slopes are in the east and south, and have either been left in bush or allowed to revert to bush. The central part of the park is an open, undulating, grassy, plateau 350 m to 450 m above sea level. Seven small catchments have their headwaters in the park, all radiating from this central plateau, which extends in an arc from Belmont Trig (457 m) in the south-west, through Cannons Head (390m) and Round Knob (410 m) to Boulder Hill (442 m) in the north-east (*see Map 4, Topography and Waterways*). The direction of most streams is fault controlled, with water eroding out the weakened, fractured rock produced within fault zones.

Most of Belmont Regional Park has a hilly topography with over 60% of the area with slopes greater than 15 deg.

2.2 Predominance of greywacke rocks

The rock underlying Belmont Regional Park is the typical ***greywacke*** of the Wellington region, a sequence of grey sandstone interbedded with mudstone. In geological terms, the Wellington greywacke is part of the Torlesse Terrane (named after Mt Torlesse in the greywacke ranges of Canterbury), which forms much of the mountainous backbone of central and eastern New Zealand. The sediments which make up the individual grains in the greywacke were eroded from the eastern part of the ancient continent of Gondwana 240-140 million years ago and deposited in an adjoining trough known as the New Zealand Geosyncline. From 140-100 million years ago, these sediments, consolidated now into rock, progressively rose out of the sea in a major period of tectonic uplift and mountain building (known as the Rangitata Orogeny) to form much of the landmass that was to eventually become New Zealand. Tectonic uplift slowed around 60 million years ago and most of this mountainous landmass was subsequently eroded away, to form an extensive peneplain just above sea level. Over the last 25 million years another period of uplift (known as the Kaikoura Orogeny) affected the region and that part of the peneplain surface in what is now Wellington was uplifted, tilted and progressively destroyed by further erosion. However, remnants of this peneplain surface, named by Cott on (1957) as the 'K surface' after the prominent

Wellington skyline landmark Mt Kaukau, have survived. In addition to Mt Kaukau, the best remaining fragments around Wellington of this gently undulating peneplain are found in Belmont Regional Park and around Quartz Hill near Makara. Support for this uplift ed peneplain theory is provided by the high degree of summit accordance in the western hills which extend all the way from Makara, through the park, to the forested Akatarawa uplands and the Southern Tararua Range. An approximate outline of the peneplain surface is shown in *Map 5: Landforms and Faults*.

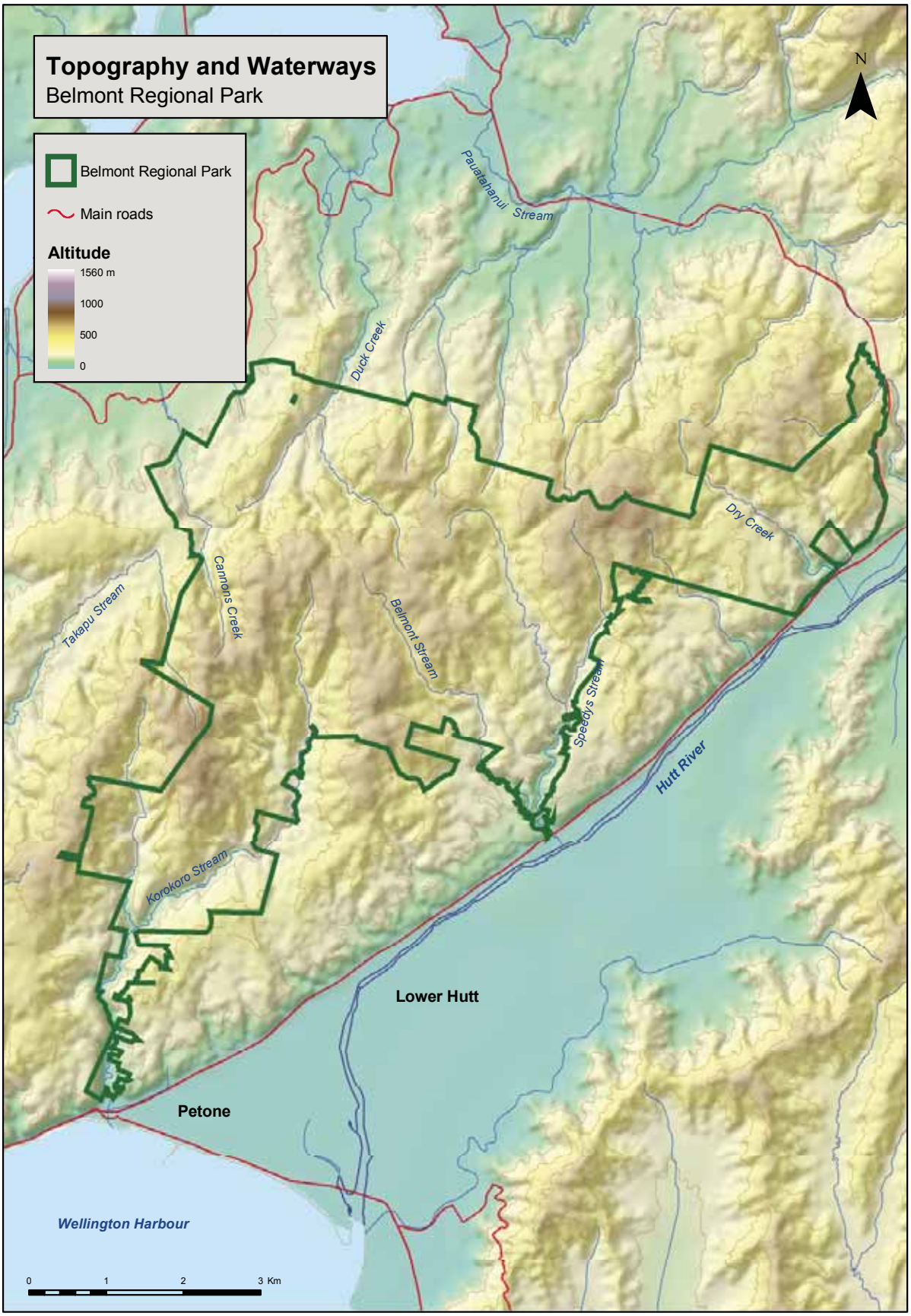
2.3 Tectonic setting of Belmont Regional Park

The proximity of Wellington to the active margin of the continental Indian/Australian Plate and the oceanic Pacific Plate has generated intense tectonic stresses, causing the greywacke bedrock to fracture along lines known as faults. There are four main fault lines in the Wellington region: the Wairarapa Fault; the Wellington Fault; the Ohariu Fault and the Pukerua Fault (McConchie et al., 2000); each is many tens of kilometres long, and all run roughly parallel to each other with an overall northeast trend. Movements on the faults are mainly lateral and dextral, that is, if viewed from one side of the faultline, the opposite land moves laterally to the right in an earthquake.

The Wellington faults also display vertical displacement of the land and the combined effect of this lateral and vertical movement has produced a series of uplifted blocks tilted to the west, with sharp escarpments just to the west of each fault line and a depression to the east. The topographic effect is hills immediately to the west of each fault rising steeply: the Rimutaka Range adjacent to the Wairarapa Fault reaches up to 900 m within 10 km of the fault, and the Belmont hills west of the Wellington Fault reach 400 m within four km.

Further spectacular evidence of the progressive tectonic uplift of the Wellington landscape is found in the series of old beach ridges, coastal platforms and marine terraces around the coastline. These former wave-cut features are most easily recognized at Pencarrow Head and Baring Head adjacent to East Harbour Regional Park, and in the famous raised beaches of Tirakirae Head (where a 6500 year chronology of uplift is preserved). The average recurrence interval for movement on the Wellington Fault falls in the range 500–800 years and, for the Ohariu Fault (west of Moonshine), 2000–5000 years (Berryman, 1990; Heron & van Dissen, 1998). These faults also control Wellington's drainage network, with most of the rivers and streams following the line of easily eroded crushed rock in the fault zone. The Hutt , Wainuiomata and Orongorongo Rivers and major streams like Ohariu Stream, Takapu Stream and Duck Creek all flow along the NE-SW axis of the major faultlines. However, many secondary streams, such as Korokoro, Speedys, and Horokiri Streams, are instead more aligned along the N-S axis of the less active network of splinter faults caused by frictional 'drag' as the land slips sideways along the major fault lines. Known variously as splinter faults, or subsidiary faults, they are thought to have originated during the initial stages of the current period of uplift. Strain was later taken up by the major faults with the smaller faults becoming inactive (Turner, 1985). It is interesting to note that before major uplift began along the Wellington Fault, the Hutt River flowed to the Pauatahanui Inlet, along the route now followed by the Haywards Hill Road. As the Belmont hills rose, the river followed the line of least resistance and turned southwest along the fault, entering the sea where the suburb of Kilbirnie lies today (Stevens, 1991).

Map 4 Topography and Waterways



Belmont Regional park is a part of one of several landforms in the Wellington Region uplifted to the west of a major fault line (in this case, the Wellington Fault). View looking eastwards down the fault escarpment to the Hutt Valley from blockfields above Hill Road. Photo: Les Molloy

2.4 Fault-controlled streams within the park

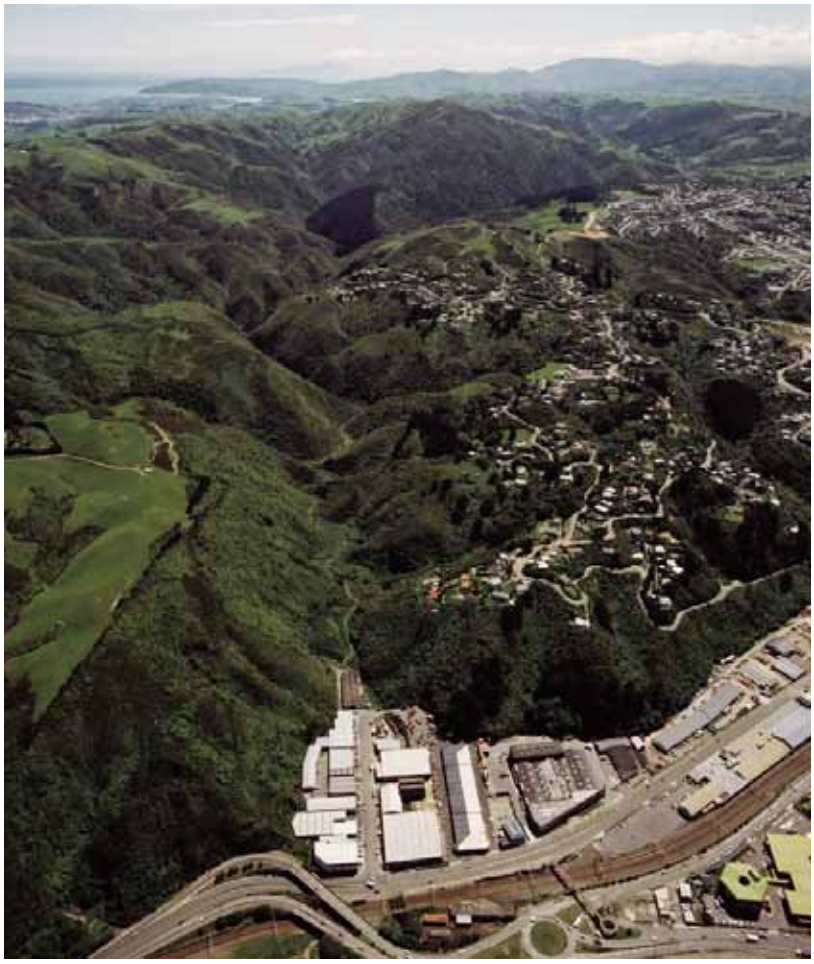
Two active faults run on either side of the park, the Moonshine Fault cutting across the northwest boundary and the Wellington Fault (with the escarpment of the western side of the Hutt Valley) along the southeastern side. The Moonshine fault is clearly defined where Takapu Stream and Duck Creek have eroded out the shattered and pulverised rock of the fault plane. However, in their upper reaches, these two streams follow N-S trending splinter faults but then sharply change direction (Takapu Stream to the SW; Duck Creek to the NE) where they meet the SW-NE trending Moonshine Fault. Most of the streams within the park have deeply incised valleys (Stevens, 1976); Korokoro Stream and Dry Creek are good examples. The network of these major active faults and splinter faults in, and adjacent to, the park are shown in *Map 5: Landforms and Faults*.

2.5 Impact of glacial periods on the Belmont landscape

The upper parts of Belmont Regional Park contain a number of well-preserved landforms which illustrate the impact of the cold climate of the glacial periods. Throughout geological time the world's climate has fluctuated between cooler periods known as glacials and warmer periods known as interglacials, such as at present. During a glacial more of the Earth's water is locked up in ice caps and glaciers and, as a result, sea level falls and exposes marine sediments. The last glacial period (from about 70,000 to 14,000 years ago) had a significant influence on the landforms of the Wellington area. Even though the nearest glaciers were as far away as the upper slopes of the Tararua Range, the Wellington region would have experienced a harsh 'peri-glacial' environment. As the mean annual temperature dropped to as much as 5°C lower than present day, the climate became windier and drier. Large areas became devoid of vegetation and soils were lost through frost-heave and wind erosion. Forests retreated and were replaced by lower stature vegetation – cold-tolerant grasses and scattered shrublands.

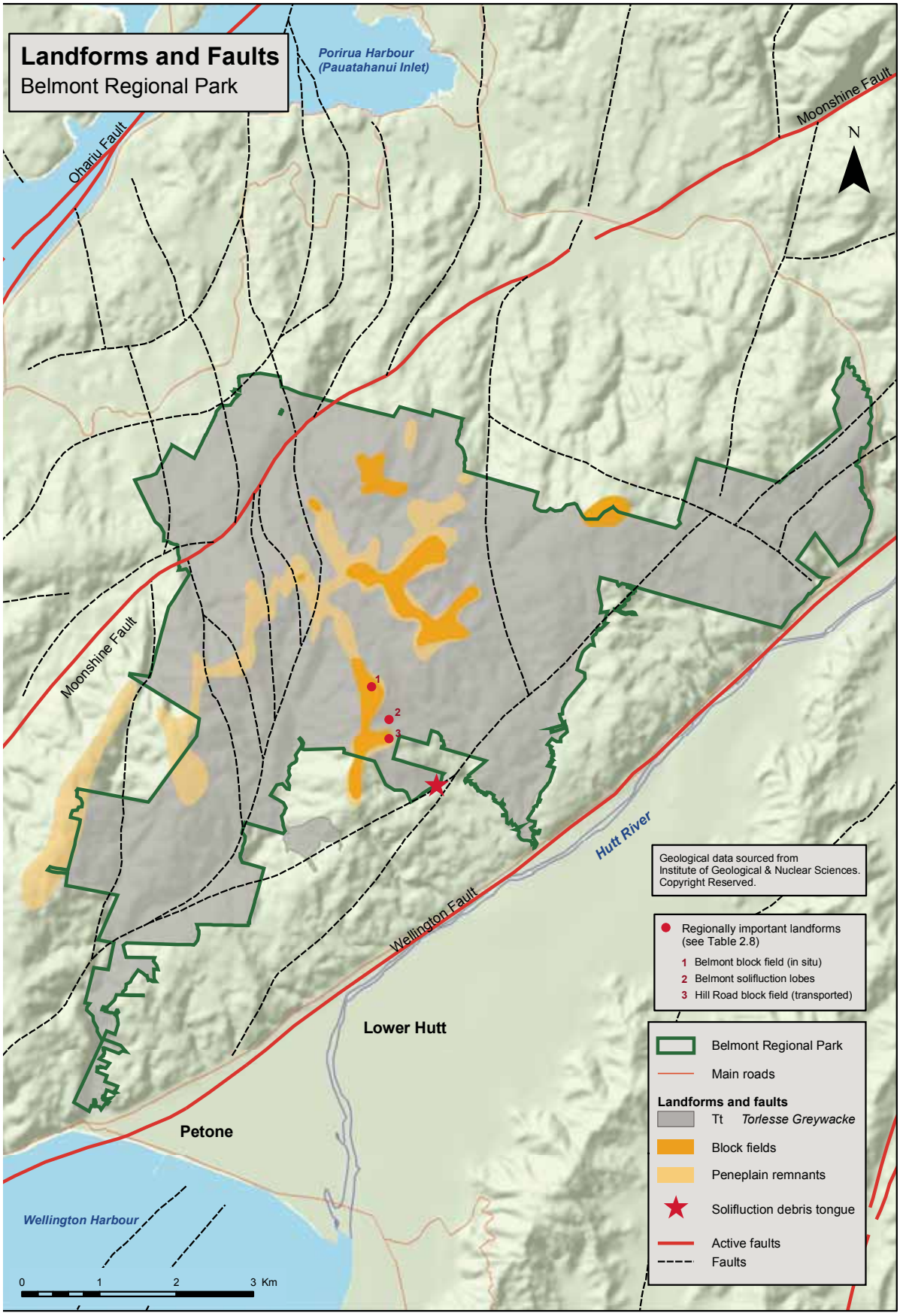
Rivers such as the Hutt and Orongorongo in Wellington, and the Waikanae and Otaki on the Kapiti Coast, carried sediments down from the bare ranges and spread them as gravels, sands and silts in large outwash plains in the lowlands. In the windier conditions, silt from the outwash plains and exposed seabed was blown landwards, mantling the hills with a cover of fine silty sediment known as loess.

The Belmont landscape was too low to be glaciated but it would have experienced the severity of a periglacial climate, with most of the subsoils probably frozen (a condition called permafrost) and their drainage consequently impeded. During daytime, however, some thawing would have occurred, allowing a viscous 'porridge' of wet soil and rock particles above the permafrost to slowly slide down even quite gentle slopes under the force of gravity (McConchie, 2000). This mass, called solifluction debris, accumulated in the hollows, filling small gullies and smoothing out the contours of the land. These 'fossil gullies' (technically known as 'colluvium-filled bedrock depressions') are not immediately recognizable on the present day undulating land surface but they assume enormous importance when lubricated by prolonged rainfall. Because the surface of the underlying greywacke rock was smoothed by the rasping action of the solifluction debris moving over it, the whole mass (when saturated) can slide off this bedrock contact surface if the toe of the gully is destabilised, for example, by road cutting or prolonged or intense wet weather. There is a close correlation between the incidence of landslips during extreme rainstorms and the location of these colluvium filled bedrock depressions throughout the whole Wellington region (see 'Slope Stability and Evolution of the Belmont Landscape').



Looking north across the Cornish Street entrance to the park and the deeply-incised, fault controlled lower Korokoro Stream. The line of the Korokoro splinter fault can be traced through the branch of the stream to the west of Belmont Trig, the highest point in the park. Photo: Lloyd Homer, GNS

Map 5 Landforms and Faults



2.6 Solifluction features and block fields on the Belmont plateau

The solifluction process at work on the higher parts of the Belmont landscape during the cold periods, caused soil and smaller rock pieces split from outcrops by the freeze-thaw action to move downslope. These tongues of solifluction debris moved very slowly but were able to carry within the semi-liquid slurry quite large blocks which had split off from the exposed sandstone on the ridges – in much the same way as a glacier carries rocks (which are eventually deposited as moraine when the ice retreats). The heads of many valleys in the park are choked with this solifluction debris and it can be distinguished as fan-like lobes on the grassy slopes on the flanks of hills. Where accumulations of large boulders in this transported debris stand out in the landscape, they are known as ***transported block fields***. The thick sandstone beds in the centre of the park have resisted erosion, especially in areas with few faults and this has tended to preserve the peneplain features. Around this central 'massif', units of mudstone (siltstone and argillite) occur interspersed with the sandstone. Where these softer siltstones have been eroded away, ribs of sandstone 10-20 m thick, standing proud, can be found (Stevens, 1976). Since fractures (or 'joints') traverse the massive sandstone, water was able to enter the cracks and subsequently freeze during the cold temperatures of a glacial period. The pressure exerted by the ice forced the cracks in the rocks to widen, and prolonged exposure to this 'freeze-thaw' action caused large blocks to split off from the outcrops of sandstone. Eventually, in situ scatterings of large greywacke blocks accumulated, and ten or more of these ***in situ block fields*** occur along the summit plateau within the park (Stevens, 1976). The location of the main block field areas are shown in *Map 5: Landforms Features and Faults*.

'In situ' blockfield on summit of trig ITB (384 m), looking northwest to Old Coach Road and summit plateau. Photo: Les Molloy

'In situ' blockfield on summit plateau (peneplained surface). Photo: Chris Wootton

2.7 Slope instability and evolution of the Belmont landscape

During the last glacial period, loess was blown inland from the Kapiti Coast and accumulated on the Belmont Hills after becoming trapped there by grasses. The loess varies in thickness and can be almost a metre deep on the sheltered eastern side of the undulating plateau and generally 30 cm deep on the higher western slopes. The combination of soliflual debris and overlying loess smooths out irregularities in the land surface, resulting in the formation of saucer shaped features in the valley heads, known as "dells".

The susceptibility of these fossil gullies to land slipping in an extreme climatic event was dramatically demonstrated in the landscape of Belmont Regional Park during the storm which severely affected the Hutt Valley on 20th December 1976. During a 24 hour

period the higher parts of the park received an extraordinary amount of rainfall, around 350 mm. The return period for the storm was considered to be 500 years (and possibly even 1000 years). A large number of landslides were triggered in the hills subjected to the most intense precipitation – a line extending from Karori, through Belmont, to Stokes Valley and Pinehaven (Crozier, 1986). The greatest density of 'mud flows' in the region affected ranged from 40-56 per sq.km. (Bishop, 1977) – and this was in the upper parts of the park. The poorly-consolidated loess and colluvium in the hollows became completely saturated and just flowed off what were only moderate slopes (some as gentle as 20 degrees). The flows were quite liquid and very mobile, compared with conventional landslips. And because they tended to occur in the hollows at the head of tributary streams, the mud (along with trees and rocks) was transported long distances by the floodwaters, scouring out the deeply-incised valleys of Korokoro and Speedys Streams, as well as all the lesser streams draining off the park in between. The impact of the storm on the Belmont Regional Park landscape (and on the hill country of the Soil Bureau, DSIR research station behind Taita on the opposite side of the Hutt Valley) indicated the importance of extreme climatic events in moulding the shape of the greywacke hill country around Wellington. The type of vegetative cover (original forest, or induced shrubland, or pasture) was of minor significance, for the landslides were virtually all associated with fossil gullies, regardless of the type of vegetation growing on them. Consequently, it is easy to surmise that the evolving Belmont landscape has probably been influenced much more by the rare extreme climatic event, rather than millennia of daily weathering and erosion associated with regular minor climatic events.

2.8 Scientific significance of geological and landform features

A 1985 report to the Wellington Regional Council on the Geological Features of the Wellington Region (Turner, 1985), listed 15 notable geological features within the park. Most are peneplain remnants, solifluction lobes, block fields, soil iron pan features, and fault-guided streams. None were considered fragile enough to warrant strict protection and most were recommended for conservation (that is, available for public recreation, with the land used in ways which sustained the feature).

Subsequently, the Geological Society of New Zealand published its Inventory and Maps of Important Geological Sites and Landforms in the Manawatu and Wellington Regions (Kenny & Hayward, 1996). Three of these park landforms – an in situ block field, a solifluction lobe, and a transported block field near the top of Hill Road – were classed as regionally important landforms of scientific/educational value, and of low ulnerability to recreation and grazing activities. A brief description of the names and locations of these three landforms is given in table 2.8 and their location is shown in *Map 5*.

Site name	Significance	Locality	Importance	Vulnerability
Belmont Block Field	In situ block field	Belmont Plateau R27/697022	Regional	Unlikely damage from humans
Belmont Solifluction Lobes		Belmont R27/700019	Regional	Unlikely damage from humans
Hill Road Block Fields	Transported block field	Belmont R27/700016	Regional	Unlikely damage from humans

Table 2.8 Regionally important landforms in Belmont Regional Park (from Kenny & Hayward, 1996)

3. Soils

3.1 Soils of Belmont Regional Park

Belmont series sol, with transported blocks of greywacke in profie. Photo: Les Molloy

The soils of the park have developed on greywacke, or on loess deposits of varying thickness, under podocarp/rata/broadleaf forest. They are described below and their distribution is shown in *Map 6: Soils of Belmont Regional Park*. The soils are classified and given a series name based on a geographical location where that soil was first described. The most widespread soil order in the park is the brown earths. Brown soils form on materials derived from sedimentary rocks in a climate where the soil rarely dries out and is not waterlogged in winter. The two soil classification systems used in New Zealand are used below to classify the soils: the New Zealand Genetic Soil Classification (NZG) describes soils according to *how they were formed* (Taylor, 1948), while the present New Zealand Soil Classification (NZSC) describes soils *as they are* (Hewitt, 1998).

Within the park, well drained, brown soils with low natural fertility occur on the steeper slopes of the area. More versatile soils have developed on loess on the rolling uplands. Much of the land was cleared for pasture but steeper slopes have been allowed to revert to native vegetation. The following soil descriptions are from Bruce (2000) and a more general description on the relationship between soils and landscapes in the Wellington region can be found in Molloy (1988).

Korokoro series soils are found on moderately steep to steep slopes and some rolling ridge crests. They have developed in greywacke colluvium although loess may form part of the surface horizon. The silt loam surface horizon lies above a silt loam or clay loam subsoil overlying weathered greywacke at 50-90 cm. This soil is suitable for farming with the addition of suitable fertiliser. Their erosion potential is low.

NZSC: *Typic Firm Brown Soils.*
NZG: *Yellow-grey earths.*

Makara and **Ruahine** series are steepland soils occurring on moderately steep to very steep slopes (18 to >30°) at low elevations. Both are thin stony silt loam soils which have developed on greywacke and associated slope deposits. They require careful management to prevent erosion.

Makara series
NZSC: *Typic Orthic Brown Soils.*
NZG: *Steepland soils related to yellow brown earths.*

Ruahine series
NZSC: *Typic Orthic Brown Soils.*
NZG: *Steepland soils related to yellow brown earths.*

Belmont series soils occur on rolling to strongly rolling uplands and ridges on loess parent material up to 1.3 m thick. The loess contains volcanic ash (tephra) which weathers in Belmont's humid climate to form a clay mineral called allophane.

Allophane has a very high surface area and has the ability to retain water and fix phosphate fertilizer in a form which is only slowly available to plants. The dark brown friable silt loam upper horizon becomes paler with depth and is underlain by greywacke and solifluction debris. Well drained and versatile, these soils are very well suited to pastoral production but require fertiliser for good pasture growth. They are not subject to erosion.

NZSC: *Allophanic Firm Brown Soils.*
NZG: *Yellow-brown earths.*

Ngaio series soils occur to a very localized extent on a gently undulating plateau south east of Boulder Hill. These silt loam soils are developed in silty loess and slope deposits on weathered greywacke or greywacke gravels. Ngaio series soils are imperfectly drained and their weak structure makes them susceptible to pugging and erosion under repeated trampling (either by stock or by visitors). It is important to retain a vegetative cover and site tracks to avoid them.

NZSC: *Pedal Immature Pallic Soils.*
NZG: *Yellow-grey earths.*

Judgeford series soils occur in two small localities in the park, one alongside SH 58, and the other at the Takapu Road substation. These deep fertile soils are more versatile and were once used for market gardening and dairying in other parts of the region.

NZSC: *Acidic-allophanic Firm Brown Soils.*
NZG: *Yellow-brown earths.*

4. Climate

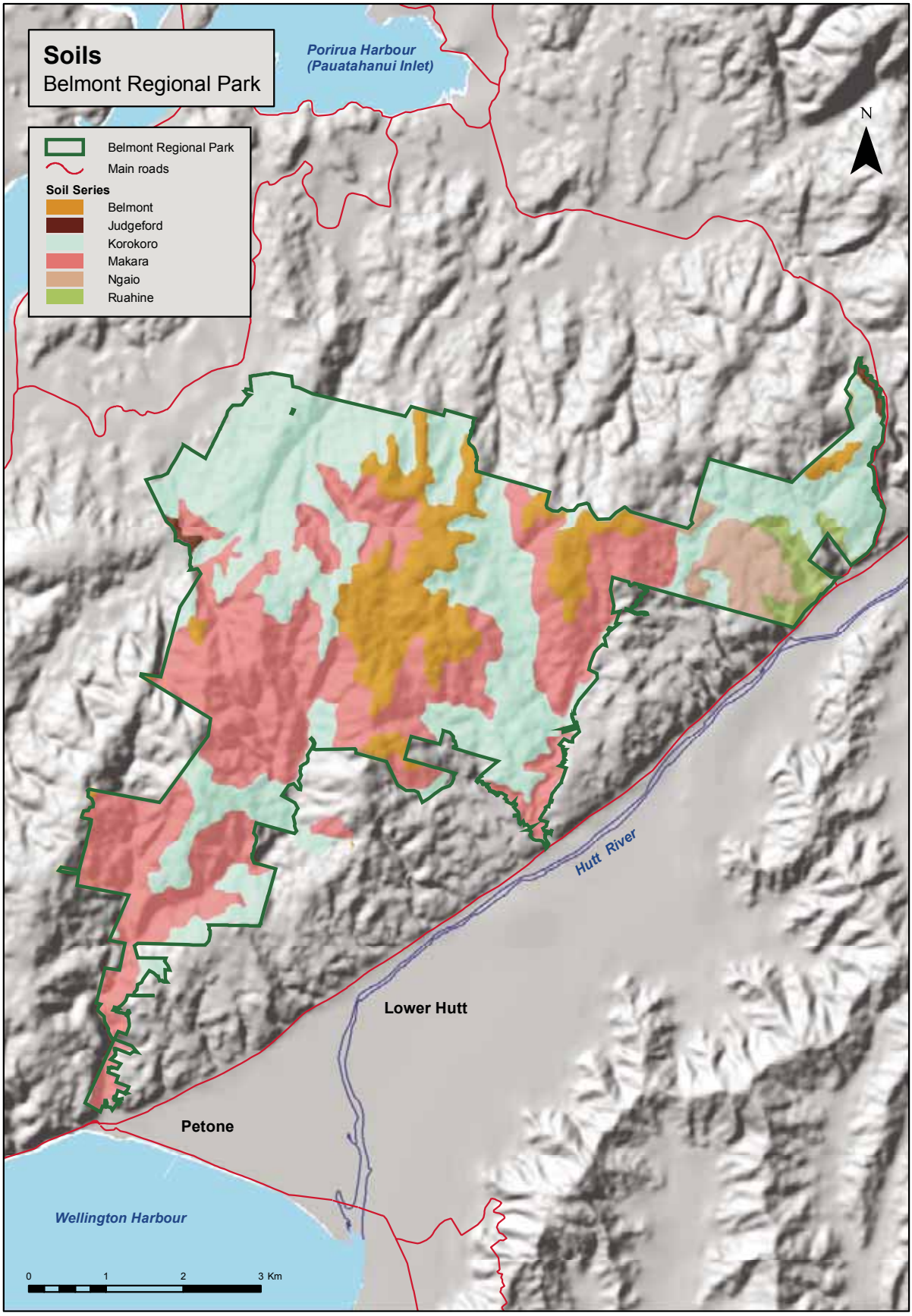
4.1 Climate of Belmont Regional Park

There is no permanent climate station within the park, so the climatic environment has been extrapolated from long-term measurements in surrounding locations, as well as from the one short-term record within the park during 1994-95 (Wilkes, 1996).

The climate of the park is dominated by north-westerly winds, which are experienced on the exposed summits on 50% of the days of the year. The average wind speed is high, with Wilkes recording an average 6.9 m/s (or 25 km/hr) at a site below the summit plateau in the park. This compares with an average wind speed of 33 km/hr in the narrows of Cook Strait and 46 km/hr on Mt Kaukau, a site very similar to Belmont Trig (Goulter, 1984). Like the other summits along the western hills of Wellington, Belmont experiences very high maximum wind gusts but these have not been measured. The maximum gust recorded at Hawkins Hill during the Wahine storm in April 1968 was an incredible 237 km/hr (Goulter, 1984; Reid, 1998). Belmont Regional Park is also exposed to strong winds from the south; these are experienced on 30% of the days of the year, leaving only 20% of days relatively calm.

These near-constant winds bring rain in the cooler months but exacerbate dry spells in summer and autumn. Belmont's higher than regional average wind speed lowers air temperatures (see Table 4.1) but also ensures that frosts are rare.

Map 6 Soils of Belmont Regional Park



A rainfall isohyet map for the Wellington region is shown in *Map 7: Rainfall for Wellington and Belmont Regional Park*. The mean annual rainfall for Belmont is 1306 mm (Salinger, 2000). This compares with 1240 mm at Kelburn and 1144 mm at Pauatahanui (Goulter, 1984). Variations in rainfall are to a large extent determined by topography, with the higher altitude parts of the region receiving more rainfall per year than the coastal areas (Salinger et al. 1986). Rain falls throughout the year with peaks in winter and spring due to the increased frequency of depressions that cross the region at these times.

The range of temperatures for Belmont, as for the rest of Wellington, is small compared to the rest of the country. This is because Wellington's maritime location and wind have a moderating effect on air temperatures. The region's average winter mean temperature is 8.2°C and the average summer mean temperature is 16.4°C (see Table 4.1 below for 30-year average temperatures for sites within the region). The night/day temperature differences in the region are also small (Salinger, 2000). However, temperatures can vary within the region because of the rugged topography (Goulter, 1984). For example, the average annual temperatures in the lower parts of the park are around 12.5°C – but perhaps 10.5°C on exposed summits above 400 m.

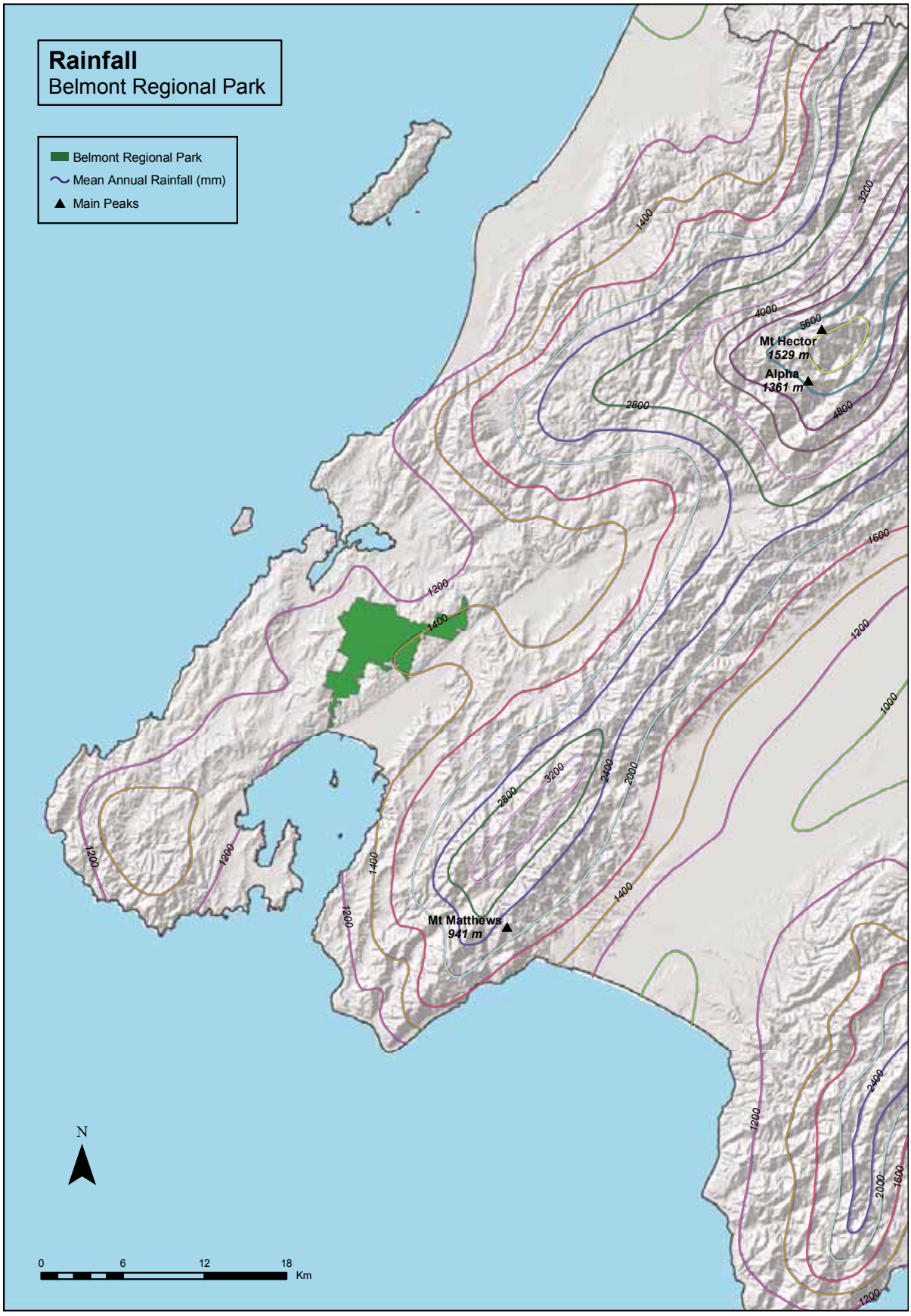
Relatively frequent fogs are also experienced in the higher parts of the park, usually associated with southerly air flows which bring stratus and fog into the harbour and up the Hutt Valley.

These fogs are particularly prevalent from May to November. Belmont and the other western hills are also affected by orographic cloud that forms under northwesterly conditions. This occurs when the moist northwesterly airflow cools and condenses to form clouds as it is pushed up to pass over the western hills. As a consequence, annual sunshine totals are lower in the park than in the surrounding valleys and basins. Overcast skies occur more frequently in winter and in the morning (Goulter, 1984).

Sites	Height (m)	Min	Mean	Max
Belmont (1994-1995)	Unknown	8	11.6	15
Taita	65	8.9	12.7	16.5
Avalon	15	9.3	13.1	16.9
Kelburn	125	9.7	12.8	15.8
Gracefield	34	9.7	13.1	16.5
Wainuiomata (golf course)	82	8.4	12.3	16.3
Wellington Airport	6	10.5	13.5	16.6
Kaitoke	223	6.9	11.3	15.7
Wallaceville	56	7.7	12.3	16.8

Table 4.1: Daily temperature normals at various sites around Wellington for the period 1961-1990, compared with temperature normals over an 11 month period at Belmont Regional Park (Tomlinson & Sansom, 1994; Wilkes, 1996).

Map 7 Rainfall for Wellington and Belmont Regional Park



5. Waterways

The Korokoro Stream is the largest in the park. Looking upstream across the pond behind the Korokoro Dam. Photo: Les Molloy

Seven small streams have their headwaters in the park. These all drain the central grassy plateau, with those in the east and south flowing to Wellington Harbour and those in the west to Pauatahanui Inlet and Porirua Harbour. The location of these streams and harbours is shown in *Map 4: Topography and Waterways*. The streams respond quickly to rain for a number of reasons:

- Steep slopes and narrow gullies channel the water and move it quickly downhill.
- There is little forest vegetation and organic matter-rich soil on the hilltops to intercept and absorb rain and thereby slow surface run-off .
- A lack of ponds and wetland areas that can store water and mitigate the downstream effects of intense rainfall.

High flood peaks and the lack of riparian vegetation also contribute to erosion of the stream bed and banks. As a result significant volumes of sediment and vegetation can be carried downstream during intense rainfall events.

The largest of the streams is the Korokoro with a catchment of 1585 ha. Table 5.1 contains flow statistics for the stream, measured at Mill Weir (NZMS 260 R26 660972) over a 15-year period. Sediment from Korokoro Stream formed a delta in Wellington Harbour that can be clearly seen in photographs from the early 20th Century. The delta was later obscured by reclamation.

Station	Min	Mean	Median	Max	MALF
Mill Weir	20	233	169	30, 893	62

Table 5.1: Mill Weir flow statistics (l/s). Mean annual low flow (MALF) = mean of the lowest instantaneous flow for each year of record (WRC, 1995). Statistics were collected over a 15 year period from 9/12/80 to 6/6/94.

Korokoro Stream is the waterway of most hydrological concern. During extreme rainfall events it is prone to flooding because of its very steep slopes and narrow defile. Furthermore, the mouth of the stream in the Cornish Street locality, where it is crossed by State Highway 2 and the railway, is very confined by industrial development and a major water main. Major damage to the Cornish Street properties was sustained during the severe Hutt Valley floods of December 1976 (see also section 2.7).

Five of the streams are managed to lessen the effects of flooding by using channels and culverts where they pass through urban areas before reaching the sea. Only Duck Creek and Pauatahanui Stream discharge into significant coastal wetlands (on the shores of Pauatahanui Inlet).

Biodiversity

6. Flora

6.1 Pre-historic vegetation of Belmont

Prior to the arrival of humans in the region, climatic change was the main determinant of vegetation on the Belmont Hills. There have been many periods when temperatures in Wellington have been both warmer and colder than today, sometimes by as much as 4°C (Mildenhall, 1994). The warmer periods seem to be associated with higher rainfall and the cooler ones with windier weather. More than 80,000 years ago the climate was warm, rather similar to today. Palynological studies (of ancient pollen grains and wood fragments found at depth in soil cores) show that the lowland forest around Belmont was dominated by rimu (*Dacrydium cupressinum*) and tree ferns (*Cyathea species*). Northern rata (*Metrosideros robusta*) grew at Seaview (Mildenhall, 1994). The forest retreated into sheltered gullies and warm west facing slopes during the last glaciation. When this cold period ended 10,000 years ago, the forest flourished again with the gradual rise in temperature.

About 7,000 years ago, another cooling phase began and the climate also became drier with more frosts and wind. The forest remnants we see today have developed over this time. Black beech (*N. solandri var solandri*) and hard beech (*N. truncata*) – both species able to withstand cooler temperatures – slowly invaded southwards along the uplands from the Tararua and Rimutaka Ranges. However, the lower, western parts of the park continued to be dominated by podocarp/broadleaf forest. Common trees here were: rimu, miro (*Stachypitys ferruginea*), matai (*Prumnopitys taxifolia*), totara (*Podocarpus totara*), tawa (*Beilschmiedia tawa*) and tree ferns.

6.2 Human impacts on the vegetation

Anthropogenic change to this natural environment began with the settlement of New Zealand by Polynesians about 1000 years ago. There is evidence of major fires throughout the country, most occurring roughly 750 years ago and leading to extensive deforestation (McGlone, 1989). According to the accounts of early European settlers, however, the western hills of Wellington appear to have suffered little of this loss, although Maori did have localized cultivation on the banks of the Hutt River. So, at the beginning of the 19th Century the Belmont hills were still covered in podocarp/broadleaf forest whose genera included: *Dacrydium; Metrosideros, Beilschmiedia; Dysoxylum; Prumnopitys; Nestigis; Alectryon; Streblus; Knightia; Pennantia Elaeocarpus; and Weinmannia* (Druce & Atkinson, 1959; Park, 1999). With its dense understorey and many vines this forest was depicted in photographs and paintings of the era (Angas, 1847). In contrast to the western hills, the Akatarawa uplands and the Tararua and Rimutaka Ranges were dominated by beech forest. The reasons for this pronounced difference in forest type have long been a matter of local scientific speculation. Soil differences are likely to be involved. On the western hills around Belmont the soil-forming materials are less weathered, with thicker coatings of loess; they are more fertile and better drained than the clay-rich Taita soil series on the eastern side of the Hutt Valley (Gibbs, 1983).

Early in 1840 the first European settlers landed on the beach at Petone and, needing wood for building and for fuel, immediately began to fell the forest (Oliver & Williams, 1981). Within a few years much of the floodplain forest was gone, to be replaced with

Nikau palms in gully under podocarp/broadleaf forest in eastern tributary of Korokoro Stream. Photo: Les Molloy

introduced pasture grasses and plantation trees. The first recorded European settler use of a resource from the Belmont hills was water from the Korokoro Stream, for a flour mill established in 1845 at what is now the top of Cornish Street. In return for relinquishing to the British Government all of their cultivations on sections now occupied by European settlers, individual hapu and whänau of Petone Maori were granted reserved lands ('McCleverty Awards') on the southern end of the Belmont hills. For instance, the Korokoro Award reserved 492 ha extending from just below Belmont Trig southwards down the Korokoro Valley to Maori Point Trig (see Part A for a more detailed history).

Nevertheless, the survey of the Belmont hills appears to have commenced in 1857 (with a straight cut through the bush from Pauatahanui to Korokoro) and the clearing of the bush for settlement soon after. A sawmill was established in Duck Creek in 1863 and several homesteads had been established along the Belmont-Pauatahanui Road by the time that it was completed in 1872. A sawmill was opened on Belmont Road itself in 1875 and clearance of the forest continued throughout the 1880s and 1890s. By the turn of the century, most of the virgin forest which used to cover the western slopes of the hills between the ridge crest (where present-day Hill Road and the old Belmont-Pauatahanui Road intersect) and Pauatahanui had been cleared for farming.

6.3 Vegetation of the park today

A simple map of the land cover in the park is shown in *Map 8: Land Cover and Significant Natural Areas*. Pastoral farming remains the dominant land use in the park today. One large area of original forest remains in the Korokoro catchment plus smaller pockets in Cannons Creek, Boulder Hill, Dry Creek and Speedys Stream. Gullies containing small indigenous remnants are scattered through the farmland.

6.3.1 Composition of the indigenous forests/shrubland

A more detailed description of the indigenous forest and shrubland vegetation is given below, in terms of the different catchments shown in *Map 8*.

Korokoro Valley

The forest in the Korokoro catchment seems to have survived because water from the stream was used to power the woollen mill built in 1885 at the mouth of the stream where it is crossed by the Hutt Road. The forest in the catchment subsequently assumed more conservation significance when Petone Borough Council began to use the Korokoro Stream for its water supply in 1902. The eastern tributary of the Korokoro Stream supports the only large stand of rimu-rata/tawa-kohekohe forest in the southwest of the Wellington Region. Both Korokoro Valley and Otari/Wilton Bush are considered to be the significant examples of podocarp/broadleaf forest in this part of Wellington (NZ Biological Resources Centre *et al*., 1984). Emergent canopy trees in Korokoro Bush include miro, northern rata, rimu, kahikatea (*Dacrydium dacrydiodes*) and pukatea (*Laurelia novae-zelandiae*). The dominant canopy trees are tawa, kohekohe (*Dysoxylum spectabile*), rewarewa (*Knightia excelsa*), hinau (*Elaeocarpus dentatus*) and titoki (*Alectryon excelsus*). Lemonwood (*Pitt osporum eugenioides*) and mapou (*Myrsine australis*) are also common. On the moister soils there are large numbers of black

Tawa/kohekohe forest canopy with emergent rimu and rata, Korokoro forest. Photo: Les Molloy

tree fern (*Cyathea medullaris*) and some nikau palm (*Rhopalostylis sapida*); occasional cabbage trees (*Cordyline australis*) still survive on the more exposed tops. The shrub layer includes Coprosma grandifolia, kawakawa (*Macropiper excelsum*), five-finger (*Pseudopanax arboreus*), putaputaweta (*Carpodetus serratus*) and a large variety of ferns.

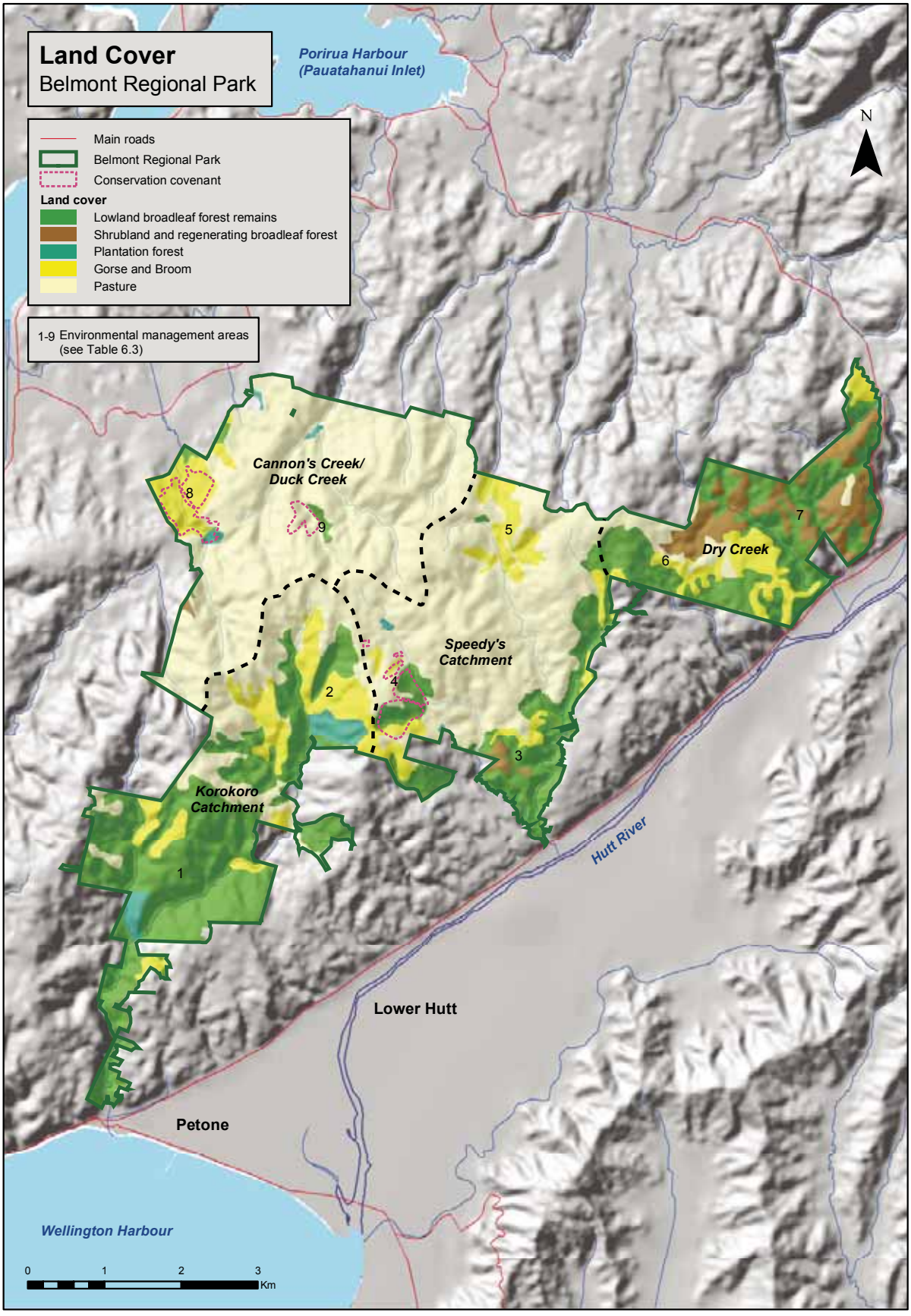
The vegetation on the true right bank of Korokoro Stream is similar to that found on the true left bank, with kohekohe replacing tawa as the predominant canopy tree. Climbers in the Korokoro Valley include scarlet rata (*Metrosideros fulgens*), kiekie (*Freycinetia banksii*), native passionflower (*Passiflora tetrandra*) and native clematis (*Clematis paniculata*). On the valley floor and more gentle slopes, the vegetation includes kamahi (*Weinmannia racemosa*), wineberry (*Aristotelia serrata*), fuchsia (*Fuchsia excorticata*) and several species of native orchid, e.g. green hooded (*Pterostylus sp.*), spring (*Earina mucronata*) and autumn (*Earina autumnalis*).

The canopy varies in height from greater than 30 m in sheltered valleys to 5 m (or less) on the exposed upper ridges. A large area of regenerating bush surrounds the original forest remnant and many of the original emergent and canopy trees have been removed from the upper slopes. Here the vegetation is composed mostly of broadleaf native vegetation: rangiora (*Brachyglott is repanda*), kohuhu (*Pitt osporum tenuifolium*), mahoe (*Melicytus ramiflorus*) and hangehange (*Geniostoma rupestre var lingustrifolium*) are common. There are extensive areas of horopito (*Pseudowintera colorata*), manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*) and tauhinu (*Ozothamnus leptophyllus*) on the windier slopes and hill tops.

Stratton Street

Regenerating shrubland/bush is present in many of the stream catchments in this area. Species commonly found are rangiora, wineberry, fivefinger, mahoe, karamu (*Coprosma robusta*), manuka and gorse (*Ulex europaeus*). There has been an ongoing fencing programme at Stratton Street to exclude stock from regenerating shrubland in order to allow natural succession to take place. Various stages of regenerating forest can now be seen – podocarp regeneration around the original forest remnants; broadleaf forest on the areas first retired from grazing; and gorse, mahoe, manuka, mingimingi and tauhinu in the more exposed areas and those most recently retired from grazing.

Map 8 Land Cover and Significant Natural Areas



Speedys Stream

A 150 ha block of regenerating and remnant forest is located in the Speedys Stream area. The dominant tree species in this remnant are pukatea, tawa, and rewarewa, with tree ferns, kohekohe, and many broadleaf species beneath. The surrounding bush is advanced regenerating forest, containing hangehange, fivefinger, kaikömako (*Pennantia corymbosa*), lemonwood, mingimingi (*Coprosma propinqua*), Coprosma areolata and a variety of ferns.

Dry Creek

The upper Dry Creek catchment marks the southern limit for beech in these western hills. Here black and hard beech are found on either side of the creek. The beech occurs not as a component of the podocarp/broadleaf forest but on the shallow soils of the ridge crests and spurs within the forest (Dawson, 1988). Pukatea, matai and kahikatea are emergent over a tawa canopy in the remnant forest, with kowhai (*Sophora microphylla*), fuchsia and titoki also present. At nearby Boulder Hill, fewer emergents can be found, but tawa, miro and rewarewa are common. Plants of special interest here are narrowleaved mahoe (*Melicytus lanceolatus*) and Raukaua edgerleyi. These species are rare in the Wellington region and may be seen on the slopes of Boulder Hill between Dry Creek and Speedys Stream. As for Stratton Street, large areas of regenerating bush have now been fenced off and various stages of regenerating forest can be seen.

Cannons Creek

At Cannons Creek, a small original forest remnant still survives. This tawa/kohekohe forest is the largest pocket of native forest on the eastern side of the Porirua Basin. The emergent kahikatea, tawa and pukatea have recently been singed by a fire, but many coprosmas and a diversity of ferns can be found in the surrounding area of regenerating bush.

Other small pockets of remnant indigenous vegetation

A number of smaller areas of indigenous shrubland and forest on Waitangarua Farm have been covenanted and these are described in section 6.3.3. There are also areas of remnant bush in the Hutt City block leased by Landcorp. Small pockets of nikau, pigeonwood (*Hedycarya arborea*), pukatea and small rimu can be found amongst mahoe and tawa in the northeastern section of this block. Dense Coprosma areolata shrubland is also found here. Other gullies in the area contain mixed broadleaf forest.

A plant species list is given in Appendix One.

6.3.2 Exotic vegetation

The majority of Waitangirua/Kilmister block is in pasture. Smaller areas of grassland are found in Stratt on Street and Dry Creek. All these areas are farmed by Landcorp.

At Korokoro Stream Forks, there is a 15 ha radiata pine (*Pinus radiata*) plantation, which includes a few macrocarpa (*Cupressus macrocarpa*) on the lower slopes. It is not currently feasible to harvest these pines and current plans for this block are to allow the pines to thin over time and to allow natural native regeneration. In the middle section of Korokoro Stream accessible from Stratt on Street, there is a 24 ha block of *Pinus radiata* which is managed for amenity and production purposes. This block was planted in 1979. Other small stands of exotic trees include macrocarpa trees associated with early settlers homestead sites.

Nikau palms and tree fern below tawa canopy, Korokoro forest.
Photo: Les Molloy

6.3.3 Protected and managed natural areas

Over the past 20 years there have been various attempts to identify, protect and rehabilitate through management, significant areas of natural vegetation within the park. Some of these areas have protection as recreation reserves under the Reserves Act 1977; others have been identified as 'ecosites' by the Department of Conservation. Some are identified as "significant natural areas" in the Hutt City and Porirua City district plans; others are protected as conservation covenants under the Reserves Act.

In 1998, the Wellington Regional Council's environmental ranger also identified a number of areas of high ecological importance in the park (Blake, 1998) – Korokoro Valley, Speedys Bush, Boulder Hill Bush, Dry Creek Bush, and the covenanted areas of Cannons Creek and Belmont Hill Bush. These areas have subsequently become the priority areas for ecosystem management by the Greater Wellington Regional Council. The nine areas are listed in Table 6.3 in the column headed 'Environmental Management Areas (GWRC)'. Table 6.3 also attempts to clarify the relationship between the many, often overlapping protected areas and 'significant natural areas' either identified or designated within the park.

The 'Conservation Covenant' column in Table 6.3 refers to eight parcels of land (identified by the Department of Conservation) that have been covenanted in perpetuity within Waitangirua farm managed by Landcorp, in order to preserve their natural environment Two of these covenanted areas include Cannons Creek and Takapu Road covenants. The vegetation in this area has been previously described in the section on Cannons Creek. The four Hill Road covenants contain mainly mahoe, tawa, tree ferns, gorse and small leaved coprosmas, while the Round Knob covenant has nikau and broadleaf (*Griselinia littoralis*) present. In 2004, responsibility for the covenanted areas passed from the DoC to the Greater Wellington Regional Council.

The location of the GWRC Environmental Management Areas and the Conservation Covenants is shown in *Map 8: Lands Cover and Significant Natural Areas.*

Lianes on rimu trunk, Korokoro forest.
Photo: Les Molloy

Mahoe regeneration with kawakawa understorey, beside track from Oakleigh Street to Korokoro Valley. Photo: Les Molloy

7. Fauna

7.1 Birds

7.1.1 Belmont as bird habitat within the wider Wellington ecological region

The diversity of birdlife found in the Wellington region today reflects the extensive changes that have occurred in the area since the arrival of European settlers. A number of forest and wetland bird species have become extinct in the region since that time. These include: North Island saddleback (*Philesturnus carunculatus*), NZ thrush (*Turnagra capensis*), NZ robin (*Petroica australis*), NI kokako (*Callaeas cinerea*), NI weka (*Gallirallus australis*), stitchbird (*Notiomystis cincta*), banded rail (*Rallus philippensis*), little spotted kiwi (*Apteryx owenii*) and huia (*Heteralocha acutirostris*). Habitat loss and the introduction of predatory mammals have been two of the major causes of this decline.

The native birds that remain are much depleted in number and many are now confined to the large tracts of forest that still exist in the ranges in the northern and eastern parts of the region. Kaka (*Nestor meridionalis*), rifleman (*Acanthisitt a chloris granti*), whitehead (*Mohoua albicilla*), long-tail cuckoo (*Eudynamys taitensis*) and tomtit (*Petroica macrocephala*) are no longer seen or heard in the smaller remnants of bush in farmland or in the urban areas of Wellington.

NZ falcon. Photo: Rod Morris

A corridor of forest linking the city and the Akatarawa Forest along the western Hutt hills has been advocated for many years (Parrish, 1984). The forest and shrublands of Belmont Regional Park would play an important part in this corridor, especially Korokoro Valley which contains the largest area of indigenous habitat in the western hills. The regenerating shrublands and forest areas in Dry Creek, Speedys Stream and Cannons Creek, as well as the covenanted areas, all contribute to this corridor.

7.1.2 Surveys of bird species

At present, the native forest birds recorded in Belmont Regional Park are those commonly found in bush remnants, though recently a bellbird (*Anthornis melanura*) was recorded at Dry Creek and kakariki (*Cyanoramphus novaezelandiae*) (now a rare species) have been seen. In 1975, a survey of the birdlife of the park was completed by Victoria University (Bagnall, 1976). The study focused on the Korokoro and Stratt on Street areas and five-minute bird counts were undertaken in selected vegetation types. A total of 30 native bird species were recorded, with black shag (*Phalacrocorax carbo*), little shag (*Phalacrocorax melanoleucoss*), and white-faced heron (*Ardea novaehollandiae*) noted only in association with the streams or ponds and kereru (*Hemiphaga novaeseelandiae*) and tui (*Prosthemadera novaeseelandiae*) only in mature native bush. Species present in both the bush and the shrubland were: grey warbler (*Gerygon igata*), fantail (*Rhipidura fulginosa*), silvereye (*Zosterops lateralis*), shining cuckoo (*Chrysococcyx lucidas*), and morepork (*Ninox novaeseelandiae*); typical introduced species were thrush

(*Turdus philomelos*), blackbird (*Turdus merula*), chaffinch (*Frigilla coelabs*) and hedge sparrow (*Prunella modularis*). The only native birds recorded on the farmland were pipit (*Anthus novaeseelandiae*) and Australasian harrier (*Circus approximans*), while the introduced magpie (*Gymnorhina tibicen*), starling (*Sturnus vulgaris*), racing pigeon (*Columba livia*), goldfinch (*Carduelis carduelis*), redpoll (*Carduelis flammea*) and greenfinch (*Carduelis chloris*) were also present. Kingfisher (*Halcyon sancta*) and yellowhammer (*Emberiza citrinella*) ranged across most habitats and New Zealand falcon (*Falco novaeseelandiae*) sightings were also reported. It was concluded that the forest in the Korokoro Valley was large enough to support a significant population of native birds. These include: fantail, grey warbler, morepork, NZ kingfisher, tui (*Prosthemadera novaeseelandiae*), bellbird, kereru (*wood pigeon*), rifleman (*Acanthisitta chloris*), shining cuckoo, and silvereye. Tui and kereru appear to range between the forest and adjacent residential gardens, depending on food sources at different seasons. Between July 1989 and July 1990, Dr Tony Beauchamp of the Wellington Ornithological Society conducted bird counts within the park, using 11 forest sites and eight in the open land. Forest-dwelling native birds observed were: silvereye, kereru, grey warbler, tui, fantail and shining cuckoo. In the open country, the native birds included fantail, grey warbler, pipit; silvereye, paradise duck (*Tadorna variegata*) and black-backed gull (*Larus dominicanus*).

In 2003, seven transect lines were established by Greater Wellington staff in indigenous vegetation near Stratton Street. "Slow walk transects" were monitored several times during spring and this monitoring is planned to be continued on an annual basis. Twenty one species were recorded in 2003. Silvereye were the most numerous birds, showing an average density of 2.27 birds/ha, followed by grey warbler (2.11) and fantail (1.73). Tui, blackbirds, kereru and chaffinch were also common.

At Cannons Creek, the Maara Roa care-group completed a one-off bird survey in 2001. Hugh Robinson recorded 23 species at that time, with grey warbler, chaffinch and tui being the most common birds recorded. Care-group members have recently (2003) begun annual bird monitoring in the area.

A list of bird species recorded within the park is given in Appendix Three.

NZ Pigeon / Kereru. Photo: Les Molloy

Tui. Photo: Les Molloy

Table 6.3: Natural Areas within Belmont Regional Park protected and/or managed for biodiversity conservation.

Catchments	Area of Indigenous Vegetation (ha)	Environmental Management Areas (GW)	DoC Ecosites	District Plan Status	Conservation Covenant	Reserve Status Reserve Act 1977	Ecological Values (All lowland forest or shrubland)	References
Korokoro Catchment (910 ha)	Native forest 62 ha Regenerating bush 239 ha	1. Korokoro Valley 2. Stratton Street	Korokoro Stream Bush (400 ha)	SNR 26 Hutt City DP		Recreation Reserve *	Rimu-rata/tawa-kohekohe forest remnant Broadleaf regenerating forest Species: Forest gecko, NZ Pigeon	Bagnall 1976 Parrish 1984; 43,39 SSWI 24/13 8,10 Wassilieff *et al.*1986 Korokoro Scenic Reserve NZ Biological Resources Centre *et al.* 1984 14g,14a,14b Stephensen 1974 Blake 1998
Speedy's Catchment (950 ha)	Native forest 8 ha Regenerating bush 290 ha	3. Speedy's Bush	Speedy's Bush (40 ha)	SNR 49 Hutt City DP		Recreation Reserve *	Pukatea/tawa forest remnant Broadleaf regenerating forest	Parrish 1984; 37 NZ Biological Resources Centre *et al.* 1984 15g SSWI 24/13 2 Blake 1998
		4. Landcorp Remnants	Hill Road Bush (70 ha)	SNR 63 Hutt City DP	Belmont Road (D) 0.37 ha (E) 0.46 ha, (F) 1.57 ha, (G) 7.45 ha, (H) 23.20 ha		Broadleaf regenerating forest (mahoe, tawa)	Hughes pers. comm. 1993 Bagnall 1976 Gorman 2004
		5. Kilmister Block Bush	Belmont Saddle Bush (15 ha)	SNR 2 Hutt City DP		Recreation Reserve *	Broadleaf regenerating forest (Rimu, pigeonwood)	Stephensen 1974 Gorman 2004
			Belmont Road Bush A (5 ha)	SNR 2 Hutt City DP		Recreation Reserve *	Regenerating broadleaf forest *Coprosma areolata* shrubland	Stephensen 1974 Gorman 2004
			Belmont Road Bush B (5 ha)	SNR 2 Hutt City DP		Recreation Reserve *	Regenerating broadleaf forest *Coprosma areolata* shrubland	Stephensen 1974 Gorman 2004

Table 6.3: Natural Areas within Belmont Regional Park protected and/or managed for biodiversity conservation (continued).

Catchments	Area of Indigenous Vegetation (ha)	Environmental Management Areas (GW)	DoC Ecosites	District Plan Status	Conservation Covenant	Reserve Status Reserve Act 1977	Ecological Values (All lowland forest or shrubland)	References
Dry Creek Catchment (545 ha)	Native forest 22 ha Regenerating bush 489 ha	6. Boulder Hill Bush	Boulder Hill Bush (200 ha)	SNR 3 Hutt City DP		Recreation Reserve	Tawa/miro forest remnant Regenerating broadleaf forest Species: NZ Pigeon	Parrish 1984; 31,32 NZ Biological Resources Centre *et al.* 1984 15h,15e Stephensen 1974 SSWI 24/13 4,5 Blake 1998
		7. Dry Creek Bush	Belmont Bush (60 ha)	SNR 1 Hutt City DP		Recreation Reserve	Pukatea-matai/tawa forest remnant Species: NZ Pigeon	Parrish 1984; 28 NZ Biological Resources Centre *et al.* 1984 15f Stephensen 1974 SSWI 25/13 1 Blake 1998
			Haywards Shrubland (200 ha)	SNR 17 Hutt City DP		Recreation Reserve	Regenerating shrubland	Boffa Miskell Partners 1989
Cannons Creek/Duck Creek Catchment (1200 ha)	Native forest 8 ha Regenerating bush 110 ha	8. Cannon's Creek Bush	Cannons Creek Bush (10 ha)	SES 12 Porirua City DP	Cannon's Creek (B) 11.3 ha	Landscape Protection Area – Porirua City	Tawa-kohekohe forest remnant	Hughes 1980 10 NZ Biological Resources Centre *et al.* 1984 13c C Blake 1998
				SES 12 Porirua City DP	Takapu Road (A) 29.2 ha	Landscape Protection Area – Porirua City	Regenerating broadleaf forest	Hughes 1980 10
		9. Nikau Remnant	Belmont Hills Bush (10 ha)	WCC – Not in District Plan	Near Round Knob (C) 9ha		Regenerating broadleaf forest (Nikau, broadleaf)	Bagnall 1976 NZ Biological Resources Centre *et al.* 1984 4c C Blake 1998

* Reserving in process

Abbreviations:
SNR = Significant Natural Area **SES** = Significant Ecological Site **WCC** = Wellington City Council **SSWI** = Sites of Special Wildlife Interest

7.2 Freshwater fish

Giant kokopu (juvenile). Photo: G.A.Eldon

Records for freshwater fish in the park date back to the 1950s and rare fish, such as giant kokopu (*Galaxias argenteus*) and banded kokopu (*Galaxias fasciatus*), have been recorded in a number of the streams. The last published freshwater fish survey was in 1983 (see Table 7.2 below), but a recent electric fishing survey revealed the presence of banded kökopu in Cannons Creek, Dry Creek, Duck Creek and Korokoro Stream. Other species recorded included koura (*Paranephrops planifrons*), and short-finned (*Anguilla australis*) and long-finned eels (*Anguilla dieff enbachii*). Also, fish surveys using conventional methods such as electric fishing do not necessarily reveal all fish present in a stream, so there may be more species than have been recorded.

In pre-European times, these small streams had plentiful vegetative cover with margins of indigenous forest, shrubs or swamp vegetation. Light levels in such environments would have been low (mean -1.3% of ambient) compared with present day pasture streams (mean -45% of ambient) (Davis, Colley & Quinn, 1998). Now the headwaters of virtually all of the streams in the park originate in pasture, except Korokoro Stream which passes through indigenous forest or regenerating shrubland for most of its length.

Seven of the ten species recorded in the park need to migrate between freshwater and the sea, usually for spawning. There are good quality spawning sites for inanga (*Galaxias maculatus*) at the mouth of Korokoro Stream and to a lesser extent at Duck Creek. Since most of the park's streams flow into larger waterways which pass through residential or industrialized areas on their route to the sea, the migration of such fish is at risk from water-borne pollutants and riparian degradation.

Barriers to fish passage also present difficulties for migrating fish. Structures at the Korokoro Dam and at Porirua Lakes are acting as migration barriers. The number and age of banded kokopu recorded recently in Cannons Creek, however, suggests that these fish may be using the lakes to spawn.

A list of freshwater fish species found in the park is given in Appendix Two.

Korokoro Stream					Speedy's Stream		Duck Creek
1952	**1974**	**1975**	**1982**	**1985**	1961	1963	1983
Common bully	brown trout	bluegill bully	bluegill bully	brown trout	banded kokopu	brown trout	banded kokopu
inanga	longfin eel	brown trout	brown trout	common bully	bluegill bully	lamprey	common bully
longfin eel	redfin bully	longfin eel	giant okopu	redfin bully	brown trout		giant kokopu
redfin bully		redfin bully	longfin eel		common bully		inanga
		shortfin eel	redfin bully		giant kokopu		longfin eel
			shortfin eel		koura		redfin bully
					longfin eel		shortfin eel
					red fin bully		
					shortfin eel		

Table 7.2: Belmont Regional Park freshwater fish statistics (NIWA NZ Freshwater Fish Database October 2003) Fishers: NIWA; DOC; Wellington Fish & Game and unknown.

Wellington green gecko. Photo: Rod Morris

7.3 Lizards

There are eleven species of lizard in the Wellington region (seven skinks and four geckos) (Parrish, 1984). As with the bird species, these fauna will have suffered from habitat loss and predation by introduced mammals. Four of the region's skinks have only been recorded on the coast or on islands, but common (*Oligosoma nigriplantare*) and copper skink (*Cyclodina aenea*) are likely to be present in the open country of the park. The ornate skink prefers forest habitat and is thought to be widespread in the region. Of the geckos, one species is confined to Mana Island, but the other three; common (*Hoplodactylus maculatus*), forest (*Hoplodactylus granulatus*) and green gecko (*Naultinus elegans*) are present in the park. A green gecko was found near Kelson in 2001 and a rare finding of a forest gecko was made in Normandale in 2002.

Common gecko. Photo: Rod Morris

7.4 Invertebrates

Knowledge of invertebrate diversity is limited in New Zealand, because of a lack of information about most species and their distribution. The vast majority of the indigenous invertebrates are forest-dwellers and it is likely that these species have suffered from the same impacts as the birds and lizards. Few studies have been completed on the terrestrial invertebrate fauna of Belmont Regional Park, but current research in the park includes an investigation of parasitic wasps by Victoria University post-graduate, Rudi Schnitzler, and mosquito research by students associated with Otago School of Medicine. Peripatus (*Peripatoides novaezelandiae*), (an ancient slug-like creature) has been recorded in the park.

Freshwater invertebrate fauna were studied by the Zoology Department of Victoria University in 1975 (Bagnall, 1976). Korokoro Stream, Belmont Stream and Duck Creek were sampled for bottom fauna and in excess of 50 species of animals were seen within the ten sites selected.

Forest gecko. Photo: B.W.Thomas

Most sites supported a rich and varied fauna, with mayfly nymphs dominating the fauna at all but two sites. At these latter sites in Korokoro Stream, snails were more important elements of the fauna. Greater Wellington's school education programme uses the Korokoro Stream as a site to assess water quality. The teachers indicate that the invertebrate diversity continues to be high. The Korokoro reservoir supplies habitat for tiny water fleas, as well as damselflies, dragonflies, water beetles, snails, leeches and worms.

Environmental Management & Land Uses

8. Ecosystem Classification and Environmental Protection

8.1 Belmont's ecosystems

One of the goals of the Belmont Regional Park management plan is to protect and enhance indigenous ecosystems within the park. This ecosystem approach reflects a recognition that everything is interconnected and processes which occur in an ecosystem are as important as the species living within them. Defining ecosystems is not simple, as they generally lack concrete boundaries and biological communities are complex, with continuous variation across landscapes. In the late 1980's ecological districts and regions across New Zealand were defined, using landscape and ecological patterns. Belmont Regional Park is part of the Wellington Ecological District, which runs from south of the Akatarawa Ranges to north of the rocky South Coast. It is characterised by the steep, strongly faulted hills of greywacke parent material and by the windy climate.

A numerically-based approach to ecosystem classification has recently been developed – the Land Environments of New Zealand (LENZ), (Ministry for the Environment, 2003)., Within LENZ, ecosystem patterns are mapped through consideration of 15 environmental drivers, combining climate, landform and soil variables such as, temperature, solar radiation, water supply, slope, soil drainage, soil fertility, etc. While the environmental drivers in LENZ were chosen primarily because of their importance for tree species growth, they are also useful for depicting the distribution of other organisms.

Throughout New Zealand, LENZ has defined and mapped these 'environments' at different scales. At its most detailed scale of 500 environments nationally, four can be identified as making up the bulk of Belmont Regional Park, and two of these environments are of conservation importance. Lower Korokoro Valley, Stratton Street, Speedys Stream and Cannons Creek all fall within an ecosystem type only found in the Wellington Region. Dry Creek contains an ecosystem type which has 25% of its distribution in the Wellington Region, but only 14.5% of this type is still left in natural vegetation.

The application of the LENZ classification is still in its infancy, but it will be used and refined to attempt to guide management of the park on an ecosystem basis.

8.2 Impacts of introduced pests on the vegetation

Possums (*Trichosurus vulpecula*), goats (*Capra hircus*), mustelids (*Mustela spp.*) and rats (*Rattus spp.*) have major impacts on the ecological values of the park. Pigs (*Sus scrofa*), cats (*Felis catus*), mice (*Mus musculus*), rabbits (*Oryctolagus cuniculus*), hares (*Lepus capensis*), hedgehogs (*Erinaceus europaeus*) and magpies are also contributors to the decline of native flora and fauna. Possums eat leaves, seeds, fruit and seedlings of plants and are also known to predate native birds and insects. Possum damage varies between plant communities and possums will often target certain preferred food

sources, such as kohekohe, rata and tawa (Pekelharing, 1995). Possums have colonised the Wellington region since the late 1800's and caused great damage to the vegetation during this early invasion phase. The vegetation change is now more gradual, but ongoing impacts can be seen where possums are not controlled. Goats browse the seedlings of the forest and shrublands. They also prefer particular species, such as wineberry, pate and fuchsia, the early colonisers of slips. They are capable of removing much of the forest understorey. This browsing causes increases in erosion of steeper slopes, weakens forest structure and inhibits natural regeneration processes. Mustelids and rats prey on birds, invertebrates and lizards.

Pest plants have the potential to significantly change the composition or structure of native habitats. Many climbing pest plants, such as old man's beard and ivy can smother mature plants, while other plant pests interfere with regeneration and compete with indigenous plants for space and soil nutrients.

8.3 Control of introduced mammalian pests and weeds

Possums:

Throughout the 1990's, the main form of possum control was through fur recovery operations in the bush areas of the park. Rangers also completed regular night shootings of possums. Forest and Bird volunteers began filling bait stations in the Oakleigh Street area with brodifacoum (Talon) in 1998. In 2000, a major possum control operation in the Korokoro Valley used cholecalciferol to reduce numbers from a residual trap catch rate of 22.8% to 4.7%, while in 2002, at Dry Creek, a trapping operation lowered the possum population from 29.6% to 3.9% RTC. In the same year, bait stations were set up at Cannons Creek and possums were controlled using brodifacoum (Talon). Maara Roa volunteers have now taken over the refilling of the bait stations on an ongoing basis. A similar bait station network has recently been established in Speedys Bush, where possum control will also be ongoing. A second major possum control operation is planned for Korokoro Valley in 2004/2005 and funding has been allocated through the Environmental Asset Management Plan to continue to control possums in the park in the future.

Goats:

Park rangers have culled goats in the park since its establishment in 1989. In the 1990's, regular goat control operations removed around 800 animals (over 80% of the original population), but these pests continued to be an ongoing problem. As the area of shrublandand regenerating bush increased over time, goats were less visible and hunting was hampered by the inaccessible terrain, especially in areas such as Korokoro Valley and Dry Creek. Goats continue to reinvade the park from surrounding land and ongoing control is needed to keep these animals at low numbers. In 2001, an intensive goat control programme began in Korokoro Bush. Professional hunters culled over 300 animals and, in 2002, a Judas goat control programme was initiated. Judas goats wear collars fitted with transmitters, which makes them easy to relocate. Because goats are social animals and tend to mob up with others, the Judas goat unwittingly brings about the 'betrayal' of its companions. Goats in Dry Creek were also controlled in this way and it is planned to continue to keep goat numbers down in the park, by making regular checks on the Judas goats.

Pest plants:

Old man's beard infestations in Korokoro Valley have been controlled since the 1990's. Wilding pines and gorse have also been controlled. In 2001, a major pest plant survey of Korokoro Bush, Dry Creek, Speedys Stream and Cannons Creek was completed. Forty-three environmental pest plants were identifi ed and all infestations were prioritized using criteria related to the urgency and practicality of control. Over twenty pest plant species were selected for control. These include: Japanese honeysuckle (*Lonicera japonica*), German ivy (*Senecio mikanioides*), selaginella (*Selaginella kraussiana*), tradescantia (*Tradescantia fluminensis*), old man's beard (*Clematis vitalba*), cathedral bells (*Cobaea scandens*) and banana passionfruit (*Passiflora mollissima*). The last three plants are required to be controlled under the Regional Pest Management Strategy. Ongoing control has been programmed.

Rats are controlled as a byproduct of the possum control operations, by using bait that they also eat, eg, brodifacoum or cholecalciferol. Pigs are present only in Dry Creek and a volunteer is used to cull these animals. Rabbits and hares are regularly shot by the park ranger.

8.4 Ecosystem rehabilitation and restoration

Stock still have access to some areas of native bush on the park, but a fencing programme is in place to allow the progressive retirement of uneconomic farm areas. Since the 1996 management plan, six km of fencing has been completed at Stratton Street and Dry Creek. The Cannons Creek block has also been retired from grazing. The resurgent woody vegetation on farmland is characterised by colonising species such as gorse, mahoe, manuka and kanuka .

Young volunteers assisting Cannons Creek forest regeneration programme.

Three permanent 20 m by 20 m plots were established in the indigenous forest in the park in 1996. Two of the plots are located in the Korokoro catchment, one near Oakleigh Street and the other near Belmont Trig. The third plot is in Dry Creek, near Boulder Hill. Measurements from these plots show changes in forest composition and growth over time. The most common seedlings recorded in 2001 were hangehange, pigeonwood, Myrsine divaricata, kawakawa, pate (*Schefflera digitata*) and silver fern (*Cyathea dealbata*). Miro and matai seedlings were also found at the Dry Creek site. Basal area, (a measure of tree growth) had increased in all plots (Landcare Research, 2003).

The 'Western Hills – Pauatahanui' locality, which includes Belmont Regional Park, was identified as an ideal set of ecosystems which could be restored by a network of landowners and community volunteers (Simpson, 1997). Fifteen years ago, much of the Cannons Creek valley was covered in gorse or grazed pasture. Landcorp set aside two covenants in the area and a group of Cannons Creek residents began restoration planting in the area, in co-operation with Brandon Intermediate School. The 'Friends of Maara Roa' care-group, which was formed in 1999, has been responsible for continuing this restoration work. Many seedlings were planted in the catchment in an effort to hasten the regeneration of the forest and a document detailing a restoration plan for the area was published in 2001 (WRC and Friends of Maara Roa, 2001). In the early stages of forest regeneration, especially on dry ridges and slopes facing the prevailing north-westerly wind, the risk of fire is high. Unfortunately, in March 2003, fire blazed through the area destroying their work. The 'Friends of Maara Roa' have continued with their work, however, and are also involved in monitoring the ecological health of the valley.

In the Korokoro Valley, the 'Korokoro Environmental Group' have planted trees and cleared weeds near Cornish Street for over a decade. This group is now focusing its restoration efforts on nearby Galbraith's Gully (Hutt City), but their work in the park has established trees and shrubs that are continuing to survive amongst the blackberry and other pest plants.

9. Landscape character

9.1 Belmont Regional Park as a component of the Porirua and Hutt Valley landscape setting

Belmont Regional Park lies along the watershed between the lower sections of the Hutt River and the Porirua and Pauatahanui Streams. The park's most prominent landscape feature is a skyline of grassed hilltops that extends for nearly 10 kilometres, from near Magee Trig and Belmont Trig to east of Boulder Hill. The pasture covering the summit ridges gives the park a visual coherence, enabling it to be recognized by surrounding residential communities as a single landscape feature. At present the central ridges and summit plateau are comparatively free of engineering structures, such as pylons and telecommunication masts, thereby maintaining a rural pastoral character which contrasts with the predominantly urban setting of Porirua, Hutt and Wellington cities.

The high points along Belmont's central ridge are prominent components of the Wellington's hill landscape sett ing, because they are visible from many points beyond the park's boundaries. The conical form of Belmont Trig (457 m) is the highest and most prominent, visible from Wellington City, Wellington Harbour, Eastbourne and the eastern bays, and the eastern side of the Hutt Valley. The peneplain remnant which

forms the skyline between Belmont Trig and Round Knob (408 m) is not only visible from the harbour, eastern bays and the eastern parts of the Hutt Valley, but also from Tawa and parts of Porirua and Plimmerton. The gently domed Boulder Hill (442 m) is the second highest point on the Belmont skyline and is a prominent landmark for the residents of Stokes Valley and upper parts of the Hutt Valley, as well as Judgeford, Pauatahanui and Whitby.

Although Belmont Regional Park does not encompass the Belmont Hills in their entirety, the park nevertheless includes most of the higher parts of the wider hill landscape, while narrower landscape corridors extend down to 100 m above sea level at Dry Creek and virtually sea level at Cornish Street. The more detailed landscape character of the park is best described below within four 'landscape zones', each broadly corresponding to the park's management zones (Belmont Regional Park Management Plan, s.4, pXXX).

Aerial view looking northwest across Stratton Street and upper Korokoro Valley landscape. Porirua Harbour can be seen in the distance. Since this photograph was taken in 1977, a significant amount of indigenous forest has regenerated on the hill slopes.
Photo: Lloyd Homer, GNS

9.2 Korokoro Valley (lower)

The landscape character of this zone is largely determined by one of the most impressive landforms in the park – the deeply-incised, steep-sided lower Korokoro Valley. The hillsides that enclose the lower 2.5 km of the valley below the forks are covered in gorse and regenerating indigenous shrubland, allowing close visual contact with the sinuous course of the Korokoro Stream. The true left tributary of Korokoro Stream (above Korokoro Forks), between Belmont Trig and the ridgeline at Maungaraki, contains the park's best remnants of the original podocarp/broadleaf forest.

Belmont Trig (457 m) is the highest point in the park. Looking south to Wellington Harbour.
Photo: Lindsay Keats

Visually isolated from the surrounding Petone, Korokoro and Newlands residential areas, the lower Korokoro Valley has an intimate stream and bushland character that is an important part of its value and appeal for recreation. Stands of pine trees at the Korokoro Forks and at the Oakleigh Street park entrance provide local land marks but their harvesting would have a very significant visual and environmental effect on the lower Korokoro landscape. The remains of water harvesting structures in the main Korokoro Stream provide historical interest.

Any developments in the valley would have a low visual impact on the overall character of the park because of the valley's isolation within Wellington's wider landscape setting. However, there is a potential for considerable impact at close quarters, because they could negatively impinge on visitors' perception of the park at one of its most accessible entrances, and their recreational experiences in one of the park's more natural landscape settings. Any developments on the higher southern slopes and summit of Belmont Trig have the potential to have significant impacts on Wellington and the Hutt Valley's' landscape setting because of the prominence of this landscape feature.

Looking into the Stratton Street landscape from the Middle Ridge track (to cannons head).
Photo: Syd Moore

Aerial view Korokoro Valley forested landscape, taken in 1988. The Korokoro Dam in the eastern tributary of the stream can be seen in the bottom left, and Belmont trig is the high point in the top left. Photo: Lloyd Homer, GNS

9.3 Stratton Street and upper Korokoro Valley

The landscape character of this zone is determined by the steep hills and narrow valleys that form the headwaters of the Korokoro Stream. Variations in land cover, especially the pockets of exotic vegetation, also add complexity to the character of this valley landscape. Open grassed ridges, areas of regenerating indigenous vegetation on steeper hillsides, and an area of pine forest and grassed flats in the valley floor add detail and interest. The valley floor contains a series of sub-zones that enable a variety of uses and recreational activities to be accommodated within this zone. The mixture of land uses on neighbouring properties visible from within the valley also add to the complexity and interest of the landscape of the Stratt on Street zone.

Belmont Trig (457 m), the highest point in the park, is the prominent landmark in this zone and its profile is the most visible park landscape feature. From its summit on a good day, there are panoramic views of Wellington, Porirua, Mana and Kapiti Islands, the Tararua and Rimutaka Ranges, the Hutt Valley and the silhouette of the South Island beyond Cook Strait.

The upper Korokoro catchment is hidden from the surroundingurban areas by the enclosing ridges and because of its visual isolation and the complexity of the lower valley floor part of this zone, it has quite a high visual absorption capacity. The visual impact of any developments in this locality is likely to be confined to the immediate vicinity of Stratton Street (as it drops into the valley and the main entry carpark). However, any developments on the high western ridge between Belmont Trig and Cannons Head could have a major impact on the landscape character of the park and the wider landscape setting of the surrounding urban areas.

The Waitangirua/Kilmister landscape of pastoral farming on the undulating summit plateau and gentler hill slopes. Photo: Les Molloy

9.4 Waitangirua/Kilmister

This is the largest management zone, a landscape of homogenous vegetation and pastoral land use, that is given a more complex character by some diversity in landform. It encompasses the central ridge system and the undulating plateau of peneplain remnants. It is a rural landscape of high rolling hills falling away to deeply cut valleys. The central ridge is less distinct here than elsewhere in the park.

Landforms and land cover both contribute to the character of this zone. The principal land cover of this zone is pasture, reflecting its use for farming. Farm woodlots and small

remnant patches of indigenous forest and scrub contribute complexity. Farm buildings, roads, the Belmont magazines and scattered block fields around the high points of Belmont Road, I.T.A. and I.T.B trig points add local detail and interest. The upper parts of this landscape are visible from the surrounding urban areas, providing a rural backdrop to Porirua and the Hutt Valley. Internally, the landscape of this zone is highly visible, the lower lying areas radiating out in all directions and capable of being viewed easily from the higher land.

Developments on the higher plateau and hill tops that are visible from the surrounding urban areas have the potential to have a significant impact on the natural character of this part of the park. Elsewhere, the topographic complexity of the stream valleys and 'dells' (see section 2.7), and the presence of existing structures, make it likely that new developments will cause little adverse visual impact provided that they are carefully designed and sited.

9.5 Dry Creek

Within the overall context of the park, the landscape of the Dry Creek zone is relatively complex and is determined by both landform and land cover. It comprises a single deep valley flanked by elevated terrace lands. Above the terrace lands on the southern side of the valley is the high rounded form of Boulder Hill.

The sides and head of the valley are clad in indigenous vegetation. This remnant forest area is botanically interesting as it contains black beech, marking the southern limit of beech forest along the western side of the Wellington Fault. Open grassed spaces on the floor of the lower valley provide a sequence of subspaces enabling a variety of uses and activities to be accommodated within this part of the valley.

Aerial view looking southwest along the western part of the Waitangirua landscape to the distant hills around Ohariu Valley. The line of the Moonshine Fault through the valleys of Takapu Stream and Duck Creek marks the western margin of the park. Photo: Lloyd Homer, GNS

Aerial view looking northwest into the Dry Creek landscape. Since this photo was taken in 1977, there has been significant growth of indigenous forest regeneration within the gorse and Manuka covered upper slopes. Photo: Lloyd Homer, GNS

The elevated terrace lands and the southern flank of Boulder Hill are regenerating vigorously to indigenous shrublands and low forest now that they have been retired from pastoral use. In addition, the upper south-eastern slopes of Boulder Hill have an area of remnant indigenous forest (tawa/rewarewa/pukatea/hinau – see section 6.3). The boulder field on the top of Boulder Hill and scattered sandstone boulders on its slopes add landform detail and interest. The upper part of Boulder Hill is a prominent landmark, visible from the Hutt Valley and Porirua urban areas. Any developments here have the potential for major visual impacts, both on the natural character of the Hutt Valley and Porirua's landscape setting and on the recreational value of this more natural part of the park.

The lower parts of the Dry Creek zone, including the terrace fl anks of the incised valley, are hidden from view from outside the park by the Wellington Fault escarpment along the western side of the Hutt River floodplain. These areas have the capacity to absorb developments without affecting the natural character of the wider urban setting. With care in siting and design, developments on the terraces and in the valley could add to the interest and recreational value of the landscape character of this zone.

10. Recreation

10.1 Recreational opportunities

The predominantly rural setting of Belmont Regional Park, coupled with its easy topography and accessibility from the surrounding urban areas, makes it an ideal location for recreational opportunities which do not depend upon remoteness, high levels of backcountry skills, or a predominantly natural landscape. In addition, recreational opportunity within Belmont Regional Park is dependent on its compatibility with farming, and habitat conservation (especially in the covenanted areas and identified 'significant areas of native vegetation' – see *Map 8*).

The Woolshed, upstream of the Stratton Street park entrance, and the beginning of the track leading from the valley floor to the Old Coach Road. Photo: Les Molloy

A mountain-biker navigating the Danzig Track through the exotic forest plantation. Photo: Les Molloy

Consequently, the main opportunities are for open space recreation which does not require over-nighting and is not too dependent on the weather – walking (and tramping), jogging/running, mountain-biking and horse-riding. Although strong winds and cloud can be signifi cant weather factors limiting recreational opportunity in the summit plateau and ridges, its suitability for these activities in both summer and winter is an important characteristic of the park. In addition, there are limited site-specific opportunities for camping, picnicking and abseiling, but these are minor activities.

The park also offers a wide range of educational opportunities, including geographical orientation, geomorphology, history of human settlement, forest and stream ecology, study of pastoral agriculture, etc. The Woolshed, upstream from the Stratton Street carpark, is used as a base for educational day visits. Photography, sketching and painting are also passive recreational opportunities throughout the park.

10.2 Recreational zones and permitted activities

Some of these main recreational activities are zoned (both in time and location), to avoid undesirable environmental impacts and/or conflicts with farming operations, or other recreational users. The entry points to the park, visitor facilities, tracks and permitted recreational activities (by management zone) are shown in *Map 9: Public Access, Recreational Facilities and Activities*.

As a generalisation, all the marked tracks are open for walking/running, except that those in zone 3 are generally closed to public access during the lambing season in late winter/early spring. Mountain-biking is permitted along most of the formed access tracks along the summit plateau, as well as those descending to lower altitudes in the lower Korokoro Stream and Dry Creek zones. A specific mountain-biking trail ('Danzig Trail') has been formed in the exotic forest between the Old Coach Road and the Woolshed near the Stratton Street carpark. Cannons Creek is the only entry area which is not available for mountain-bike access. Most horse-riding is centred on zones 2 and 3, especially the horse trails emanating from the Stratton Street and Hill Road entrances.

Dogs and other pets are not compatible with the farming operations within the park. Dogs are permitted to be walked on a leash, however, in the non-farmed parts of zone 1, especially the Korokoro Stream below the Korokoro Dam.

Various recreation activities within Belmont Regional Park.
Photo: Syd Moore and Chris Wootton

10.3 Visitor preferences and patterns of recreational use

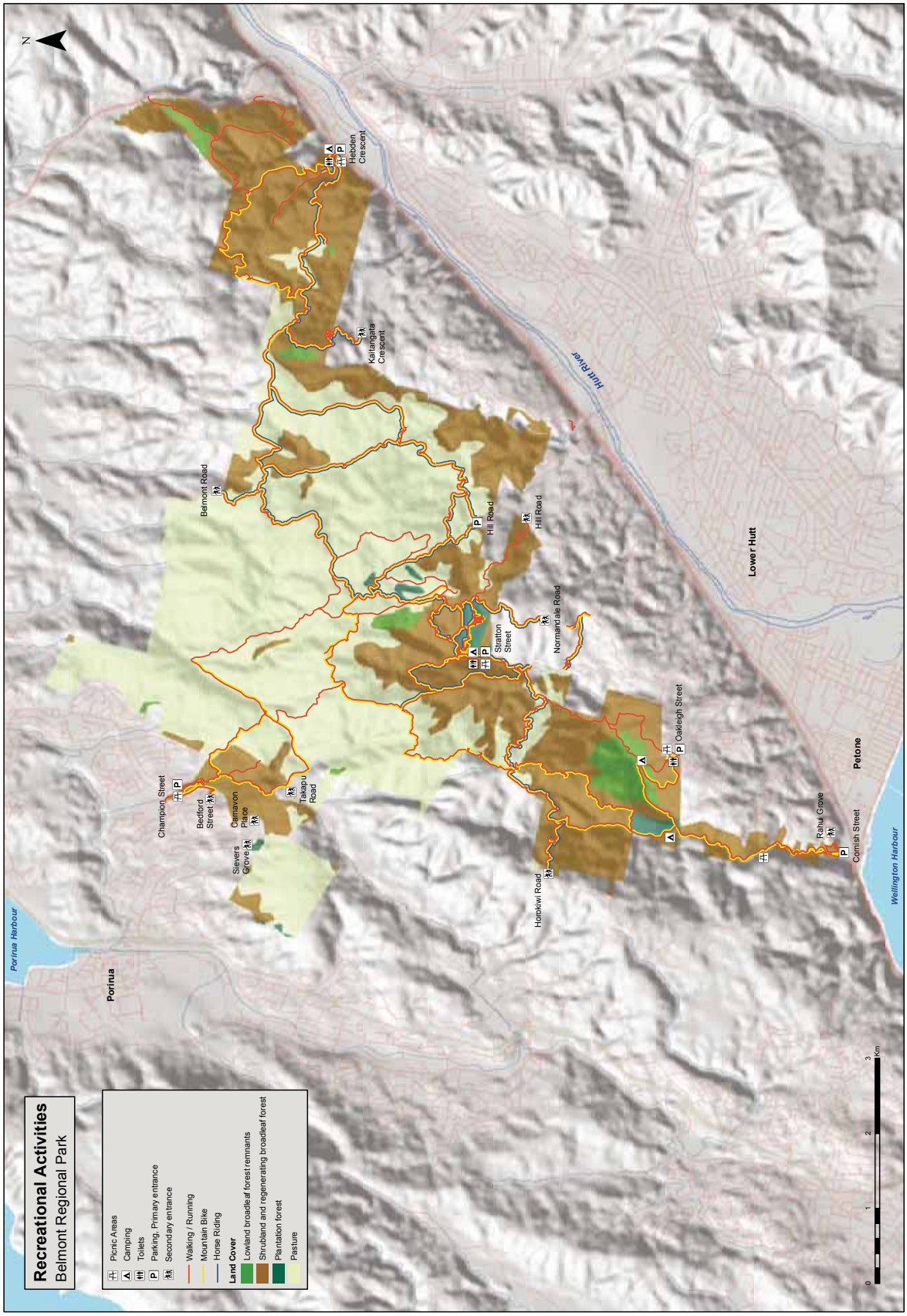
Visitors' attitudes and patterns of recreational use within the park have been surveyed periodically since 1990. Numbers of visitors increased from an estimated 95,000 per annum in 1991/92 to 130,000 in 1993/94 and this figure seems to have remained rather static since then. The most comprehensive survey was undertaken for the WRC by Tourism Resource Consultants in summer and winter of 1995 (TRC, 1995). Visitors surveyed stressed the value of the quiet, peaceful and unspoilt nature of the park, as well as the many recreational opportunities and environmental values that it provided. An interesting feature was the high number of repeat visitors, with 30% of winter, and 35% of summer, visitors having entered the park at least 25 times in the past 12 months. The overwhelming majority of visitors came from the Hutt Valley (84% in summer and 69% in winter).

In 1995, the most favoured recreational activity was walking (60% of surveyed visitors) and 40% of these stated that they were accompanied by a dog. Mountain-biking was the activity of 17% of the summer visitors (dropping to 9% in winter), although there is a likelihood that this proportion has risen in the past 9 years. Running was a moderately popular activity in summer (13%), considerably higher than horse-riding, picnicking, and camping. The most popular destination was Korokoro Dam, visited by 48% of winter (and 34% of summer) visitors. The high point of Belmont Trig was the next most popular destination (14% of summer and 16% of winter visitors).

Less comprehensive Visitor Satisfaction Surveys have subsequently been carried out for Belmont Regional Park in late summer 1998, 1999, 2000, and 2002. Their data have confirmed that walking/tramping remains the most popular recreational activity (around 55% of visitors), with 25-30% of walkers preferring to walk with their dog. Since 1995, mountain-biking has increased in popularity and, with running, is now the preferred recreational activity of 20-25% of visitors. Horse-riding has remained static as the recreational pursuit of 2-3% of visitors.

Another interesting trend has been the change in 'location of residence' for visitors over the seven years since the major 1995 visitor survey. Whereas Hutt City residents still make up the largest number of visitors, their proportion dropped from 84% to 53% over this period. On the other hand, visitors from Wellington and Upper Hutt cities approximately tripled (11% to 29%, and 2% to 7%, respectively). The proportion of visitors to Belmont Regional Park from Porirua City and Kapiti District is still very small but the trend shows that their numbers are increasing.

Map 9 Public Access, Recreational Facilities and Activity



Map for reference – in final this map will be on A3 and fold into three to fit in report.

11. Farming

The Waitangirua Farm is run as a breeding unit supplying store lambs and weaner calves to growing and finishing units. By 1996, 14,000 sheep and 5,000 cattle were being run on the property.

In addition to the land directly held by Landcorp, it leases land from other agencies such as the Hutt City Council. From 1991, Landcorp gained grazing rights from the Wellington Regional Authority over the 300-hectare Stratton Street Block. This land was regarded as offering only low quality feed through having been overgrazed and overstocked in the past. The principle method of farming is to mob stock the area with up to 3,000 sheep three to four times a year for between four and eight weeks. This has meant that this area of the park is oft en empty of stock and recreational use is allowed to proceed unhindered. In the Dry Creek zone, the area between Boulder Hill and Buchanans Road is also grazed by Landcorp and is used to winter cattle.

The only other farming conducted in the Park is on the Dry Creek valley floor which is grazed by the ACTS Institute of New Zealand to maintain the appearance of the land and provide training opportunities for the ACTS trainees.

12. Utility Networks

Several network utilities cross Belmont Regional Park, the most important being natural gas pipelines, electricity transmission lines and water mains. The location of these network utilities is shown in *Map 10: Utility Networks.*

12.1 Natural gas pipelines

Several high pressure gas transmission pipelines traverse land in the park; nearly of their routes within the park being within Landcorp Farming Limited's Waitangirua Farm property. These are:

- the Waitangirua to Tawa pipeline, which supplies gas to the Wellington area through the Wellington City Gate; and
- the Waitangirua to Belmont Loop line, which provides gas to the Hutt Valley area through the Belmont Hill City Gate.

The Wellington City Gate is located between the motorway and railway at Takapu, outside the park boundary. The Belmont Hill City Gate is located well within the park, at the top of Hill Road, and utilises an ammunition magazine. A third gate, the

Waitangirua City Gate, is also located in the park, near Duck Creek on the Porirua East side of the park. These gates are significant physical features in the park. The function of the gates is to reduce the gas pressure sufficiently to enable it to be used by local urban areas.

From the Belmont Hill City Gate, two low pressure distribution gas pipelines (1900kPa) traverse park land in a south/south-east direction; one exiting the park above Kelson, the other passing close to Belmont Road Trig, continuing down to the corner of Normandale Road and Cottle Park Drive, then along Dowse Drive. A third low pressure distribution gas pipeline takes gas from the Waitangirua City Gate into Porirua East exiting the park near Waihora Park.

The high pressure gas transmission pipelines are owned by the Natural Gas Corporation of New Zealand Limited. The existing privileges provisions of section 107 of the Crown Minerals Act 1991 apply to all high pressure gas transmission pipelines which were authorised prior to 1 October 1991 (including those crossing Belmont Regional Park). They carry over the duties and obligations established by authorisations granted by the Minister of Energy under the Petroleum Act 1937. The pipelines are protected by the conditions of the easements from disturbance or planting of trees and shrubs on the easement strip. At least 72 hours notice is required to Natural Gas Corporation Transmission (New Plymouth) for on-site locations and work permits.

12.2 Electricity transmission lines

Several high voltage AC and DC electricity transmission lines cross Belmont Regional Park. Two of these lines traverse park land between Takapu Road Substation and Pauatahanui. The others traverse the park in a south-west/north-east direction between Newlands/Tawa and the Haywards Substation. Trans Power New Zealand Limited owns these electricity transmission lines, as well as a property at the end of Takapu Road (outside the park boundary) upon which their substation is sited.

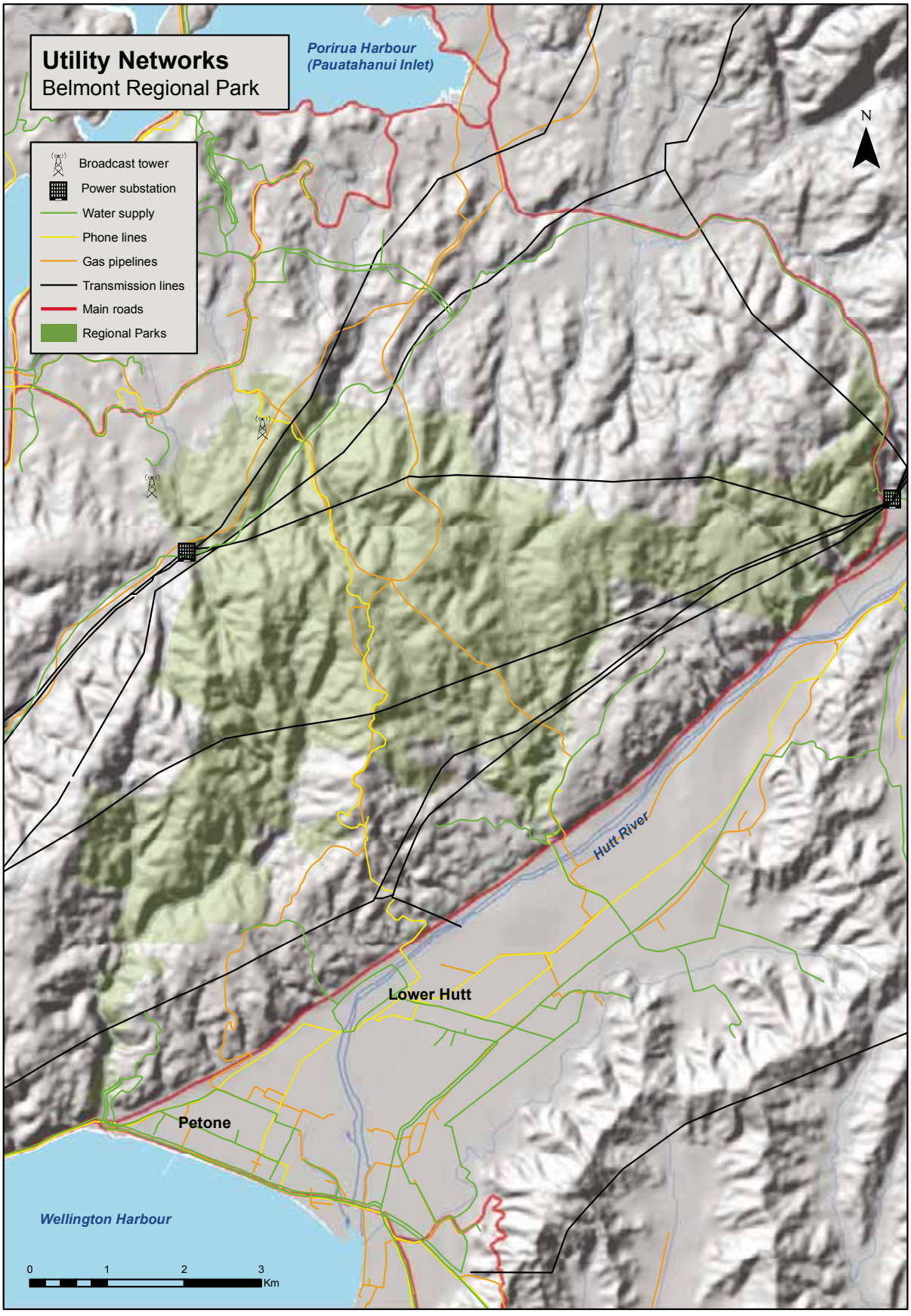
12.3 Water main

From Murphy's Road/State Highway 58 intersection, a large (750 mm nominal diameter) water main traverses park land along the Duck Creek Valley (Waitangirua Farm) in a south-west direction to and along Takapu Road. This water main is owned and operated by the Bulk Water Department of the Greater Wellington Regional Council under the Wellington Regional Water Board Act 1972. Conditions on the water main easement documents state that no buildings or plantings are permitted on the easement strip.

12.4 Telecommunications and broadcasting

There are two telecommunications towers and one broadcasting tower located on the western part of Waitangirua farm.

Map 10 Utility Networks



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Appendix One

Belmont indigenous and exotic plant species list

List compiled from WRC, 2001; Bagnall, 1976; Wellington Botanical Society, 2001.

Species name	Common name	Maori name
Gymnosperm Trees		
Dacrycarpus dacrydiodes	white pine	kahikitea
Dacrydium cupressinum	red pine	rimu
Podocarpus totara	totara	totara
Prumnopitys taxifolia	matai	matai
Stachypitys ferruginea	brown pine	miro
Monocot Trees		
Cordyline australis	cabbage tree	ti kouka
Cordyline banksii	forest cabbage tree	ti ngahere
Rhopalostylis sapida	nikau plam	nikau
Dicot Trees / Shrubs		
Alectryon excelsus	NZ oak	titoki
Aristotelia serrata	wineberry	makomako
Beilschmiedia tawa	tawa	tawa
Brachyglottis kirkii		kohurangi
Brachyglottis repanda	rangiora	rangiora
Carmichaelia australis	broom	
Carpodetus serratus	marble leaf	putaputaweta
Coprosma areolata	thin-leaved coprosma	
Coprosma cunninghamii		
Coprosma foetidissima	stinking coprosma	hupiro, hupirau-ririki,
	karamu, mikimiki	
Coprosma grandifolia	kanono	kanono
Coprosma lucida	karamu	karamu
Coprosma propinqua	minimingi	minimingi
Coprosma propinqua x C. robusta		
Coprosma rhamnoides		
Coprosma robusta	glossy karamu	karamu
Coprosma rubra		
Corynocarpus laevigatus		karaka
Dysoxylum spectabile	NZ mahogany	kohehohe
Elaeocarpus dentatus	hinau	hinau
Fuchsia excorticata	tree fuchsia	kotukutuku
Gaultheria antipoda	bush snowberry	tawiniwini, koropuka,
		taupuku, takapo
Geniostoma rupestre		
var lingustrifolium		hangehange
Griselinia littoralis	broadleaf	kapuka, papauma,
		maihihi, paraparauma
Griselinia lucida	pukatea	puka
Hebe parvifl ora		
Hebe stricta var. atkinsonii		koromiko
Hedycarya arborea	pigeonwood	porokaiwhiri
Hoheria sexstylosa	lacebark	houhere
Ileostylus micranthus	small flowered mistletoe	pirinoa, pirirangi, pirita
Knightia excelsa	rewarewa	rewarewa

Species name	Common name	Maori name
Dicot Trees / Shrubs continued		
Korthalsella lindsayi	dwarf mistletoe	
Kunzea ericoides	white tea tree	kanuka
Laurelia novae-zelandiae	pukatea	pukatea
Leptospermum scoparium	tea tree	manuka
Leucopogon fasciculatus	tall mingimingi	mingimingi
Lophomyrtus bullata	NZ myrtle	ramarama
Lophomyrtus obcordata		rohutu, routu, tuhuhi
Macropiper excelsum	pepper tree	kawakawa
Melicope ternata		wharangi
Melicytus lanceolatus	narrow leafed mahoe	mahoe wau
Melicytus ramiflorus	whitey wood	mahoe
Metrosideros robusta	northern rata	rata
Myoporum laetum		ngaio
Myrsine australis	red matipo	mapou
Myrsine salicina		toro
Neomyrtus pedunculata	myrtle	rohutu, routu, tuhuhi
Nestegis cunninghamii	black maire	maire
Nestegis lanceolata	white maire	maire
Nestegis montana	mountain maire	
Nothofagus solandri var solandri	black beech	tawhai
Nothofagus truncata	hard beech	tawhai raunui, hutu, hututawai
Olearia rani	tree daisy	heketara
Olearia solandri	coastal tree daisy	
Ozothamnus leptophyllus		tauhinu
Pennantia corymbosa	kaikomako	kaikomako
Peraxilla tetrapetala	red mistletoe	
Pittosporum cornifolium	perching kohukohu	tawhirikaro, wharewhareatua
Pittosporum eugenioides	lemonwood	tarata
Pittosporum tenuifolium	black matipo kohuhu	
Pseudopanax arboreus	five-finger	whauwhaupaku
Pseudopanax crassifolius	lancewood	horoeka
Pseudowintera axillaris	lowland pepper tree	horopito
Pseudowintera colorata	alpine pepper tree	horopito, oramarama
Raukaua anomalus		
Raukaua edgerleyi		raukawa, haumangaroa
Schefflera digitata	seven finger	pate
Solanum aviculare		poroporo
Solanum laciniatum	bullibul	poroporo
Sophora microphylla	kowhai	kowhai
Streblus heterophyllus	small leaved milk tree	ewekuri, tawari, towai, turepo
Syzygium maire	swamp maire	mairee tawake
Urtica ferox	tree nettle	ongaonga
Weinmannia racemosa		kamahi
Monocot Lianes		
Freycinetia	banksii	kiekie
Ripogonum scandens	supplejack	kareao
Dicot Lianes		
Clematis forsteri	Forster's clematis	poananga, puawananga, pohue
Clematis paniculata	NZ clematis	puawhananga
Metrosideros diffusa	white climbing rata	rata
Metrosideros fulgens	scarlet rata	rata
Metrosideros perforata	small whie rata, clinging rata	rata

Species name	Common name	Maori name
Dicot Lianes continued		
Muehlenbeckia australis	large leaved muehlenbeckia	puka
Muehlenbeckia complexa	wire vine	pohuehue
Dicot Lianes continued		
Muehlenbeckia australis x M. complexa		
Parsonsia heterophylla	NZ jasmine	kaihua
Passifl ora tetrandra	NZ passion vine	kohia
Rubus australis	swamp lawyer	tataramoa
Rubus cissiodes	bush lawyer	tataramoa
Grasses		
Cortaderia toetoe	toetoe	toetoe
Poa cita	silver tussock	wi
Microlaena avenacea	bush rice grass	
Rytidosperma sp		
Sedges		
Carex dissita		
Carex forsterii		
Carex geminata	cutty grass	
Carex secta	niggerhead purei,	purekireki, pukio, mata, matata
Carex solandri		
Carex virgata	swamp sedge	
Carex sp "raotest"		
Cyperus ustulatus	giant umbrella sedge	toetoe upokotangata, whatumanu
Gahnia sp		
Isolepis prolifer	three square	
Isolepis reticularis		
Uncinia clavata		
Uncinia gracilenta	hook grass	watu, matau, matau ririki
Uncinia uncinata	hook grass	kamu, matau-a-Maui
Rushes		
Juncus gregiflorus	leafless rush	wi, kopupungawha
Juncus pallidus	giant rush	wi, kopupungawha
Juncus sarophorus	leafless rush	
Other Monocot Herbaceous Plants		
Arthropodium cirratum	rengarenga lilly	rengarenga
Astelia fragrans	bush lily / flax	kahaha
Astelia solandri		kawharawhara
Collospermum hastatum		kahakaha
Collospermum microspermum		
Dianella nigra	blueberry	turutu
Libertia grandiflora	NZ iris mikoikoi,	manga-a-huripapa, tukauki
Libertia ixioides	NZ iris mikoikoi,	manga-a-huripapa, tukauki
Phormium tenax	swamp flax	harakeke, korari
Phormium cookianum	mountain flax	whararikí, korari-tuauru

Species name	Common name	Maori name
Dicot herbaceous plants		
Acaena anserinifolia	bidibid	piripiri
Cardamine sp		
Centella uniflora	centella	
Dichondra brevifolia		
Dichondra repens	kidney weed	
Epilobium pedunculare		
Euchiton involucratum		
Geranium microphyllum	geranium	
Gonocarpus micranthus		
Helichrysum filicaule		
Hydrocotyle heteromeria	wax weed	
Hydrocotyle moschata	hairy pennywort	
Lagenifera pumila		
Leptostigma setulosa		
Nertera depressa	fruiting duckweed	
Oreomyrhus ramosa		
Oxalis exilis		
Plantago raoulii		tukorehu
Pratia angulata		panakenake
Potomogeton cheesemanii	red pondweed	
Pseudognaphalium luteo-album agg		
Ranunculus reflexus	bush buttercup	maruru, kopukapuka, pirikau
Senecio minimus	fireweed	
Senecio rufiglandilosus		
Stellaria decipiens		
Stellaria parviflora	NZ chickweed	
Urtica incisa	scrub nettle, stinging nettle	ongaonga
Wahlenbergia racemosa		
Wahlenbergia violacea		
Lycopods and Psilopods		
Huperzia varia	hanging clubmoss	whiri o Raukatauri
Lycopodium scariosum		
Lycopodium volubile		waewae koukou
Tmesipteris elongata		
Ferns		
Asplenium bulbiferum	hen and chickens fern	manamana
Asplenium bulbiferum x A. hookerianum		
Asplenium flaccidum	hanging spleenwort	makawe o Raukatauri
Asplenium hookerianum	perching spleenwort	
Asplenium oblongifolium	shining spleenwort	huruhuru whenua
Asplenium polyodon	sickle spleenwort	petako
Blechnum chambersii	lance fern	nini
Blechnum discolor	crown fern	piupiu
Blechnum filiforme	thread fern	panako
Blechnum fluviatile	ray water fern	kiwakiwa
Blechnum membranaceum		
Blechnum novae-zelandiae		kiokio
Blechnum penna-marina		
Blechnum procerum	small kiokio	
Botrychium biforme	fine leaved parsley fern	pototara
Ctenopteris heterophylla	comb fern	
Cyathea cunninghamii	gully fern	punui, ponga
Cyathea dealbata	silver tree fern	ponga

Species name	Common name	Maori name
Ferns continued		
Cyathea medullaris	black tree fern	mamaku
Cyathea smithii	soft tree fern	ponga
Dicksonia fibrosa	golden tree fern	wheki-ponga
Grammitis billardierii		
Histiopteris incisa	water bracken	mata
Dicksonia squarrosa	rough tree fern	wheki-ponga
Hymenophyllum bivalve	filmy fern	
Hymenophyllum demissum	drooping filmy fern	irirangi, piripiri
Hymenophyllum dilatatum	filmy fern	matua mauku, irirangi
Hymenophyllum ferrugineum		
Hymenophyllum flabellatum		
Hymenophyllum multifidum	much divided filmy fern	
Hymenophyllum rarum		
Hymenophyllum revolutum		
Hymenophyllum sanguinolentum		
Hymenophyllum scabrum		
Hypolepis ambigua		
Hypolepis rufobarbata		
Lastreopsis glabella	smooth shield fern	
Lastreopsis hispida	hairy fern	
Leptopteris hymenophylloides	single crepe fern	heruheru
Microsorum pustulatum	hounds tongue	kowaowao
Microsorum scandens	fragrant fern	mokimoki
Paesia scaberula	ring fern	matata
Pellaea rotundifolia	round leafed fern	tarawera
Pneumatopteris pennigera		
Polystichum richardii	common shield fern	pikopiko
Polystichum silvaticum		
Polystichum vestitum	prickly shield fern	punui
Pteridium esculentum	bracken	rarauhe
Pteris macilenta	brake	titipo
Pteris tremula	shining brake	turawera
Pyrrosia eleagnifolia	leather leaf fern	ota
Rumohra adiantiformis	leathery shield fern	karawhiu
Trichomanes reniforme	kidney fern	raurenga
Trichomanes venosum	veined bristle fern	
Orchids		
Chiliglott iscornuta	green bird orchid	
Earina autumnalis	easter orchid	ruapeka
Earina mucronata	spring or bamboo orchid	peka a waka
Microtis unifolia	onion leaved orchid	maikaika
Praseophyllum collensoi		
Pterostylus banksii	greenhood orchid	tutukiwi
Pterostylus foliata		
Pterostylus graminea	greenhood orchid	tutukiwi
Pterostylus montana agg		
Thelymitra longifolia	white sun orchid	maikuku

Some adventive plants	
Species name	Common name
Trees and shrubs	
Acer pseudoplatanus	sycamore
Berberis darwinii	Darwin's barberry
Buddleja davidii	buddleia
Cotoneaster sp.	cotoneaster
Crataegus monogyna	hawthorn
Cupressus macrocarpa	macrocarpa
Cytisus scoparius	broom
Eleagnus sp	eleagnus
Erica lusitanica	Spanish heath
Hydrangea macrophylla	hydrangea
Hypericum androsaemum	tutsan
Ilex aquifolium	holly
Leycestaria formosa	Himalaya honeysuckle
Metrosideros excelsa	pohutakawa
Paraserianthes lophanta	brush wattle
Pinus sp.	pine
Pittosporum crassifolium	karo
Rubus fruticosus	blackberry
Salix sp.	willow
Sambucus nigra	elder
Ulex europaeus	gorse
Lianes	
Clematis vitalba	old man's beard, traveller's joy
Cobaea scandens	cathedral bells
Hedera helix	English ivy
Lonicera japonica	Japanese honeysuckle
Passiflora mollissima	banana passionfruit
Senecio mikanioides	German ivy
Monocots	
Allium triquetrum	onion weed
Anthoxanthum odoratum	sweet vernal
Cortaderia jubata	pampas grass
Crocosmia x crocosmiflora	montbretia
Cyperus eragrostis	umbrella sedge
Dactyli glomerata	cocksfoot
Ehrharta erecta	veld grass
Holcus lanatus	yorkshire fog
Dicot herbs	
Acaena sanguisorbae	
Achillea millefolium	yarrow
Albizzia lophantha	
Apium nodiflorum	water celery
Arctium minus	burdock
Carduus nuttans	nodding thistle
Cedronella arvensis	Balm of Gilead
Cirsium vulgare	scotch thistle
Convolvulus arvensis	convolvulus
Conyza sp	Canadian fleabane
Dahlia sp.	dahlia

Species name	Common name
Dicot herbs continued	
Daucus carota	wild carrot
Digitalis purpurea	foxglove
Erigeron karvinskianus	Mexican daisy
Gallium aparine	cleavers
Geranium robertianum	
Gunnera tinctoria	Chilean rhubarb
Leucanthemum vulgare	oxeye daisy
Lotus pedunculatus	lotus
Mimulus guttatus	monkey musk
Nasturtium officinale	
Polygonum persicaria	willow weed
Phytolacca octandra	inkweed
Plectranthus ciliata	plectranthus
Prunella vulgaris	self heal
Ranunculus repens	creeping buttercup
Rumex acetosella	sheep's sorrel
Rumex sp	dock
Selaginella kraussiana	
Senecio angulatus	Cape ivy
Senecio glastifolius	holly leaved senecio
Senecio jacobaea	ragwort
Solanum chenopodioides	velvety nightshade
Solanum nigrum	black nightshade
Sonchus oleraceus	sow thistle
Satchys silvatica	hedge stachys
Stellaria media	chickweed
Tradescantia fluminensis	wandering willie
Tropaeolum majus	nasturtium
Vicia hirsuta	hairy vetch
Vinca major	greater periwinkle
Vitus sp.	grape

Moss Flora (Boulder Hill), Beveridge, 2001

Atrichum androgynum
Bryum billardierei
Breutelia pendula
Calomnion complanatum
Calyptopogon mnioides
Campylopus clavatus
Campylopus introfl exus
Camptochaete arbuscula var arbuscula
Cladomnion ericoides
Cryphaea chlorophyllosa
Cyathophorum bulbosum
Dichelodontium nitidum
Dicranoloma menziesii
Ditrichum diffi cile
Echinodium hispidum
Fissidens tenellus var tenellus
Glyphothecium sciuroides
Goniobrium subbasilare
Hymenodon pilifer
Hypnum chrysogaster
Hypnum cupressiforme var cupressiforme
Hypnum cupressiforme var filiforme
Hypopterygium fi liculaeforme
Kindbergia praelonga
Leucobryum candidum
Lembophyllum divulsum
Leptostomum macrocarpon
Leptotheca gaudichaudii
Lopidium concinnum
Macromitrium gracile
Macromitrium helmsii
Macromitrium retusum
Neckera pennata
Orthorhynchium elegans
Papillaria crocea
Plagiomnion novae-zealandiae
Polytrichadelphus magellanicus
Pseudotaxiphyllum falcifolium
Ptychomnion aciculare
Pyrrhobryum bifarium
Racomitrium crispulum
Racopilum strumiferum
Rhaphidorrhynchium amoenum
Rhizogonium bifarium
Schistidium apocarpum
Thamnobryum pandum
Thuidium furfurosum
Thuidium laeviusculum
Trachyloma diversinerve
Trachyloma planifolium
Weymouthia cochlearifolia
Wij kia extenuata

Appendix Two

Belmont freshwater fish species list

Korokoro Stream, 1982, 1985		
Species	**Common name**	**Maori name**
Anguilla australis	shortfin eel	tuna
Anguilla dieffenbachii	longfin eel	tuna
Galaxias argenteus	giant kokopu	kokopu
Gobiomorphus hubbsi	bluegill bully	
Gobiomorphus huttonii	redfin bully	
Salmo trutto	brown trout	

Speedy's Stream 1961, 1963		
Species	**Common name**	**Maori name**
Anguilla australis	shortfin eel	tuna
Anguilla dieffenbachii	longfin eel	tuna
Galaxias argenteus	giant kokopu	kokopu
Galaxias fasciatus	banded kokopu	kokopu
Geotria australis	lamprey piharau, kanakana	
Gobiomorphus cotidianus	common bully	
Gobiomorphus hubbsi	bluegill bully	
Gobiomorphus huttonii	redfin bully	
Paranephrops planifrons	freshwater crayfish	koura
Salmo trutto	brown trout	

Duck Creek, 1983		
Species	**Common name**	**Maori name**
Anguilla australis	shortfin eel	tuna
Anguilla dieffenbachii	longfin eel	tuna
Galaxias argenteus	giant kokopu	
Galaxias fasciatus	banded kokopu	kokopu
Galaxias maculatus	inanga	kokopu
Gobiomorphus cotidianus	common bully	
Gobiomorphus huttonii	redfin bully	

Appendix Three

Belmont bird species list

Survey lines are yet to be set up in the Park. This list is compiled from Bagnall, 1976 and Chris Wootton (personal comment).

Species	Common name	Maori name
Alauda arvensis	skylark	
Anas platyrhynchos	mallard	
Anthus novaeseelandiae	New Zealand pipit	pihoihoi
Ardea novaehollandiae	white-faced heron	
Callipepla californica	California quail	
Carduelis carduelis	goldfinch	
Carduelis chloris	greenfinch	
Carduelis flammea	redpoll	
Chrysococcyx lucidus	shining cuckoo	pipiwharauroa
Circus approximans	Australasian harrier	kahu
Columba livia	rock pigeon	
Emberiza citrinella	yellowhammer	
Eudynamys taitensis	long-tailed cuckoo	koekoea
Falco novaeseelandiae	New Zealand falcon	karearea
Fringilla coelebs	chaffinch	
Gerygone igata	grey warbler	riroriro
Gymnorhina tibicen	Australian magpie	
Halcyon sancta vagans	New Zealand kingfi sher kotare	
Hemiphaga novaeseelandiae	New Zealand pigeon kereru	
Hirundo tahitica neoxena	welcome swallow	
Larus dominicanus	black-backed gull karoro	
Larus novaehollandiae	red-billed gull tarapunga	
Meleagris gallopavo	wild turkey	
Ninox novaeseelandiae	morepork	ruru
Passer domesticus	house sparrow	
Phalacrocorax carbo	black shag, black cormorant	kawau
Phalacrocorax melanoleucos	little shag	kawaupaka
Platycercus eximius	eastern rosella	
Porphyrio porphyrio	swamphen	pukeko
Prosthemadera novaeseelandiae	tui	tui
Prunella modularis	hedge sparrow, dunnock	
Rhipidura fuliginosa	North Island fantail	piwakawaka
Sturnus vulgaris	starling	
Tadorna variegata	paradise shelduck putangitangi	
Turdus philomelos	song thrush	
Vanellus miles	spur-winged plover	
Zosterops lateralis	silvereye	tauhou

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