

<i>Cuphea hyssopifolia</i> *	s	sparingly naturalised in eastern memorial garden
<i>Digitalis purpurea</i> *	l	naturalised from recent flower plantings, western cemetery
<i>Echium plantagineum</i> *	l	naturalised from recent flower plantings, western cemetery
<i>Erodium moschatum</i> *	o	on old graves
<i>Helminthotheca echioides</i> *	o	herb of old graves and boundary edges
<i>Lamium purpureum</i> *	o	herb of old graves and boundary edges
<i>Lapsana communis</i> *	c	common herb of old graves and boundary edges
<i>Lathyrus latifolius</i> *	l	naturalised from recent flower plantings, western cemetery
<i>Lobularia maritima</i> *	s	naturalised from recent flower plantings, western cemetery
<i>Oenothera biennis</i> *	l	naturalised from recent flower plantings, western cemetery
<i>Oxalis exilis</i>	o	on old graves
<i>Papaver</i> sp. *	s	naturalised from recent flower plantings, western cemetery
<i>Pericallis × hybrida</i> *	o	herb of old graves and boundary edges
<i>Physalis peruviana</i> *	s	Fancourt Reserve boundary
<i>Prunella vulgaris</i> *	o	herb of old graves, lawns, and boundary edges
<i>Samolus repens</i>	l	intertidal banks of Purewa Creek
<i>Senecio vulgaris</i> *	c	common on old graves
<i>Solanum nigrum</i> *	c	present on old graves throughout
<i>Sonchus oleraceus</i> *	o	herb of old graves and boundary edges
<i>Tagetes</i> sp. *	s	naturalised from recent flower plantings, western cemetery
<i>Talinum</i> sp. *	s	sparingly naturalised in eastern memorial garden
<i>Tradescantia fluminensis</i> *	l	western boundary forest
<i>Tropaeolum majus</i> *	l	naturalised from recent flower plantings, western cemetery
<i>Veronica persicaria</i> *	o	herb of old graves and boundary edges
<i>Vicia sativa</i> *	o	on old graves
<i>Viola odorata</i> *	s	naturalised along a boundary fence, Fancourt Reserve

Arch Hill Scenic Reserve, Auckland City

Rhys Gardner

Introduction

This 5 ha 'neglected frontage' of bush with mountain-bike tracks, mown grass and revegetation plantings lies east of Western Springs, on the slope that leads down from the Great North Road to the valley floor and the North-western Motorway (Fig. 1). It has been described by Mike Wilcox (2012: 71) as "Auckland weed forest", and as such probably fills the needs of most of its visitors, who come to ride the bike tracks and can be supposed to require only that its larger plants are thornless and its groundcover soft. The lack of specimens in the Auckland Museum herbarium would also seem to be significant.

It is true that the trees here are not of outstanding age, size or character, and that the most abundant native species are familiar ones: silver tree-fern

(*Cyathea dealbata*), hangehange (*Geniostoma ligustrifolium*), coastal karamu (*Coprosma macrocarpa* subsp. *minor*), and cabbage tree (*Cordyline australis*). But for two reasons, first, on Esler's Principle that "You don't need to go to the Old Man Range to do ecology", and second, "That it is better to know a lot about common species than a little about rare ones" (unattributed), its value as a natural habitat seems to deserve a re-evaluation. Here I describe its vascular flora (for a species list see Appendix); in an ideal world its equally educational lichens and bryophytes would have been covered too.

History

The reserve consists of bush on the slopes and on the lower ground two areas of mown grass, between which lies a motorway-side strip of plantings of

native trees and shrubs. I do not know its legal history, in particular, why "Scenic" should be in its title. It may be because it is part of the broad, winding band of greenery along the northern side of the motorway between Western Springs and Newton, and therefore very visible from the houses on the opposite side of the valley, as well as being a soothing backdrop for anyone trying to use the motorway to move about on.

"Arch Hill" does not refer to any natural feature but was the name given to the main nineteenth century farm here, which took in a large area between Great North Road and Kingsland. It was the property of the Joseph Young family, one of the early (1840s) settlers of Auckland, and was named after the farm in Northern Ireland that Joseph grew up on (Truttman 2012). In the newspapers of the 1870s, the name is sometimes spelt "Archill".

Setting

Long ago there would have been an inlet of a branch of the ancestral Waitemata River in the valley below the reserve, until it was dammed by the lava flows, first from Mt St John and later from Three Kings, that formed the wetlands complex of Western Springs (Hayward et al. 2011: 135, 142). Oddly, there appears never to have been a named watercourse in this valley; it seems always to have just been called "Newton Gully".

An even bigger picture considers the valley's northern side as a succession of high-ground curves that run from Symonds Street and Newton Road out westwards past Arch Hill and the northern side of Western Springs to reach the sea at

Westmere. These curves are said to describe a "subhorizontal fault", one of a number in the Auckland region believed to have been caused by the Miocene emplacement of the Northland Allochthon (Kenny 2008: fig. 1).

Topography, soils

The upper edge of the reserve, behind the developed properties that front onto Great North Road, runs fairly uniformly at c. 60 m a.s.l. The lower ground, between the foot of the slope and the motorway, is relatively level and lies at c. 25 m a.s.l. According to Kermode's (1992) geological map (Fig. 1) the lower ground is "undifferentiated alluvium", but the berm along the mown field in the west, now with revegetation plantings, is made by a fill of clay, gravel and stones.

The sloping ground up to the upper boundary is underlain by Waitemata Group sandstone and mudstone. It comprises several shallow gullies, between which lie short ridges and relatively smooth-contoured ground. The gullies tend to run down in a south-westerly direction. The deepest and longest one is situated behind the houses of Commercial Road at the reserve's eastern end, but in summer it and the others are just seepages. Their position is indicated in Fig. 2. The image from which this is derived, the "Terrain" setting in Auckland Council's Geomap website, is considerably clearer when viewed online than this printed figure, which is given here mainly to show the upper and lower walking paths that run along the slope — the mountain-bike tracks, developed here in the last ten years, mostly weave between the two.

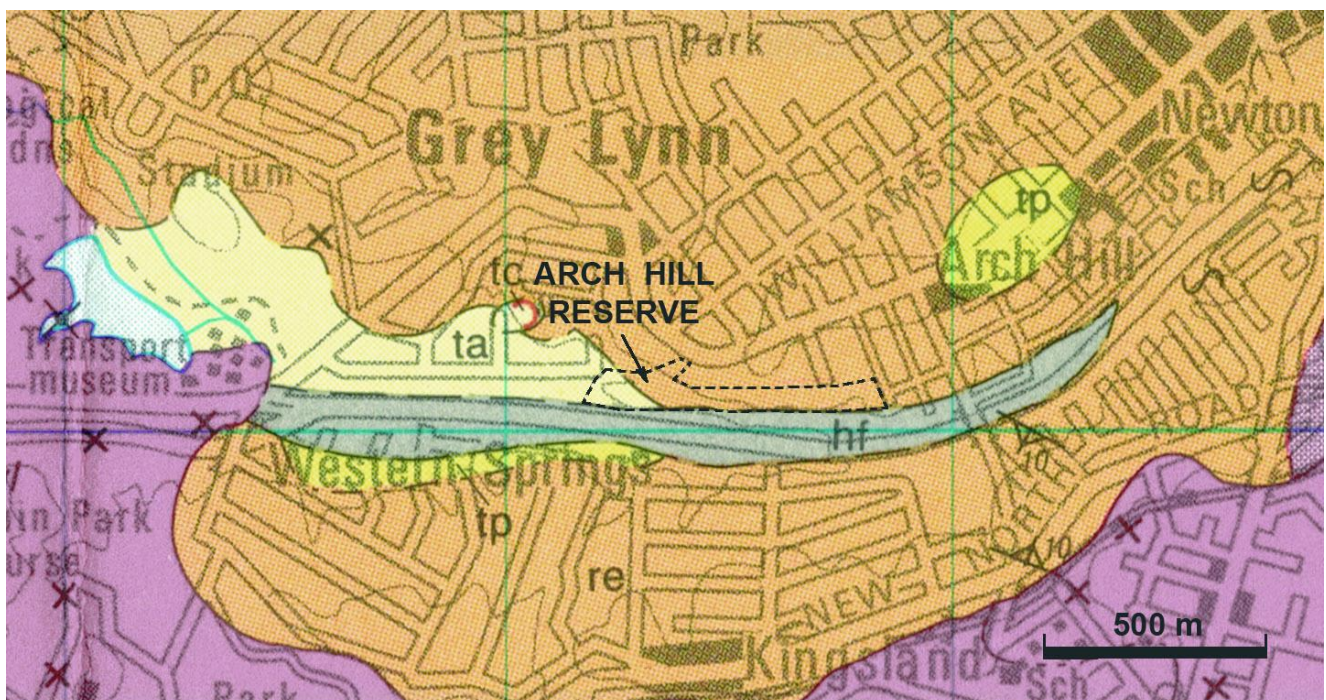


Fig. 1. Location of Arch Hill Scenic Reserve. From map R11 in Kermode (1992).

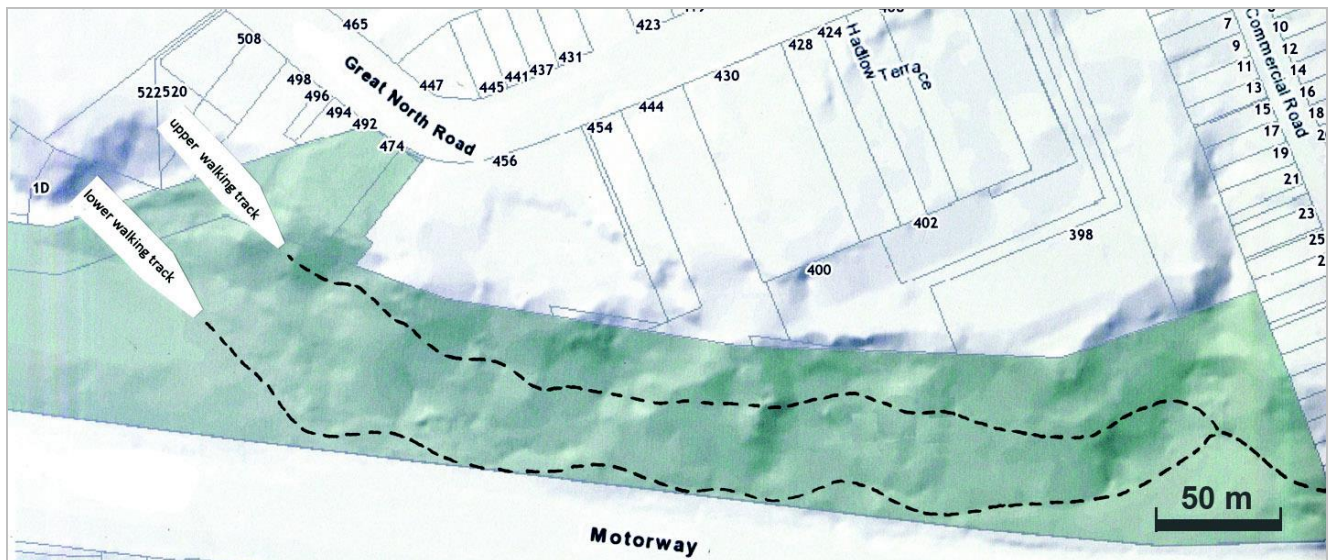


Fig. 2. Arch Hill Scenic Reserve, showing walking-tracks. Based on Auckland Council GeoMaps website, Terrain 2017 base map.

Tipped-in rubble and a variety of other natural and man-made materials are all too plentiful in the reserve, especially just below its upper boundary. The contrary process might have occurred too—that is, the Auckland Council Geomaps photo taken in 1959 seems to show small-scale quarrying in a 50 x 50 m approx. area at the western end of the bush, more or less below the library and St Joseph's Church. I wonder whether a small deposit of pumiceous material was worked here and perhaps used locally as clean fill, but it might just be that there was similar value in the sandy bedrock that now outcrops in this over-steepened ground.

The nearly continuous asphalt and concrete of the developed properties along the top boundary must mean that the reserve's subsoil is deprived of moisture (there are no discharges into it from these properties), and in this way the dryness of at least the upper slopes would be intensified. Over the higher parts of the bush, even under dense tree-fern litter, there is little development of a humus layer, and the generally light and discontinuous (and partially deciduous) nature of the canopy has meant that strong rain washes much of the leaf litter and humus away downslope.

To learn something about the texture of the soils here I took samples from four exposed faces of weathered-rock subsoil. They were dispersed in water, shaken in a 15 cm long by 2.5 cm diameter glass tube, and allowed to settle over a day or two. One sample, from just below the library, was seen to consist mainly of sand, with very little silt or clay. The other two were mainly silty. Another sample, from surface soil near the top of the slope towards the eastern end of the property, was mainly of silt and clay. All four samples had a pH of c. 6.5.

Vegetation history

The present distribution of the reserve's trees, especially with respect to their relationship with the areas dominated by silver tree-fern, has no apparent connection with topography or with what might be differing histories of land-use (there are no internal fence-lines in this bush). The imagery of the Auckland Council GeoMaps website ought to help here but does not. Its first set of photographs (taken in 1940) and the next (1959), are quite clear, but from then until 2008 the images offered resemble vegetable soup rather than vegetation.

I suppose though that 150 years ago, in the Arch Hill Farm days, these infertile slopes would have been covered with some kind of low scrub and would have soon been burnt to provide rough grazing. An old map (Auckland Libraries' NZ Map 4121, dated 1863) apparently shows scrub over the entire gully and its sides right up to the Great North Road and Surrey Crescent. More than 50 years later, a 1927 photograph ("Looking east from Beaney's Foundry [east of St Joseph's Convent] ..."; Auckland Libraries, Record 4-5256) shows the eastern half or so of the site as pasture, without any trees or scrub to obscure the houses of Commercial Road.

The Auckland Council Geomaps 1940 aerial photography shows the reserve with a more or less continuous, dark-toned low vegetation. This might be grassland reverting perhaps to gorse (*Ulex europaeus*), bracken (*Pteridium esculentum*), blackberry (*Rubus ulmifolius*) and native shrubs. As far as I can tell from the Geomaps 1959 photograph no large-scale disturbances took place between 1940 and 1959, and this might also be the case, the subsequent photographs indicate, right up to the present day; that is, the reserve has not suffered recent major fires or episodes of tree removal.

The vegetation today (Fig. 3)

Perhaps about a quarter of the slope's cover is given by just three tree species: shining privet (*Ligustrum lucidum*), Japanese hill cherry (*Prunus serrulata*), and crack willow (*Salix × fragilis*). Most individuals of the privet and cherry are 5–10 m tall; the willows are generally taller, except for those that have fallen and resprouted. The rest of the cover, the 'scrub', is especially conspicuous in the eastern half of the site. It is dominated by 2–4 m tall silver tree-ferns but with a variety of younger growth (native and exotic trees and shrubs) in places more recently disturbed. Open low weedy growths in clearings and seepages make up the remainder of the cover. It can also be mentioned that mamaku tree fern, *Cyathea medullaris*, currently occurs in just a few mid-slope places, as youngish plants. But perhaps twenty or so years ago it was frequent right across the reserve, as evidenced by the presence of tall dead stems, many of them still standing (Fig. 4).

The following notes concentrate on the vegetation's architecture rather than its graffiti. Many of Auckland's unwanted species are here, most conspicuously, veldt grass (*Ehrharta erecta*). The upper parts of the slopes though are generally too dry, except in the gullies, to have much ginger

(*Hedychium* spp.) or tradescantia (*Tradescantia fluminensis*). Some other weed species are listed by Wilcox (2012: 71).

The canopy species

1. Shining privet, *Ligustrum lucidum* This is the most abundant canopy species, though in most places it shares dominance with others (Figs. 5, 6). Two large multi-trunked trees (c. 13 m tall, 60 cm basal diam.) stand close together above the easternmost gully, but hardly any elsewhere come near that size. It is not clear what will succeed shining privet; even its own seedlings and saplings are infrequent. Totara (*Podocarpus totara*) may be as good a guess as any. A pole stand of youngish shining privet near the top boundary in the east has been copiously girdled by the puriri moth—the old holes are often occupied by the Auckland tree weta, *Hemideina thoracica*.

2. Crack willow, *Salix × fragilis*. The reserve has a couple of dozen large willows, most of them 12 m or more tall and at least 80 cm in basal diameter. They are not always in obviously wet sites, though they have a notable presence in the eastern and central gullies, and also, they punctuate the lower boundary against the motorway, perhaps in the dampest places here (which have subsequently been re-



Fig. 3. Vegetation of Arch Hill Scenic Reserve. Most of the Reserve, on S-facing gullied slopes, has an exotic cover of 6–12 m tall shining privet, Japanese cherry and crack willow, with hawthorn (hw) and a few other tree species locally. In the Reserve's eastern half, on less-broken ground, silver tree fern (tf), mostly 2–3 m tall, stands over low hangehange and not much else. Weeds are omnipresent but there is a fair amount of *Coprosma macrocarpa*, young cabbage trees, rasp fern, *Carex lambertiana* and *C. ochrosaccus*. Regeneration of native canopy trees is mostly of totara but the few young puriri and kohekohe are growing well. Kahikatea has not yet colonised the willow groves, but cabbage tree is starting to. The foot of the reserve (incl. off map to W), along boundary with motorway, has plantings of 8 m tall ngaio and smaller lemonwood, karo, cabbage tree, kanuka etc. The drought of summer 2019–20 has killed mahoe, manuka and both *Griselinia* species. Notable trees or groupings: *Arundo donax* (Ad); *Acacia longifolia* (Al); *Casuarina cunninghamii* (Cc); *Metrosideros excelsa* (Me); *Pseudosasa japonica* (Pj); *Populus trichocarpa* (Pt); *Robinia pseudoacacia* (Rp); *Salix fragilis* or *Salix* sp. (Sf); *Syzygium smithii* (Ss). Based on Auckland Council GeoMaps website, Aerial 2015/16 base map.

ground have fallen, usually in the downslope direction. One tree though, near the upper boundary in the east, is growing vertically, having been drawn upwards by the surrounding trees. Now more than contoured). A fair proportion of willows on the higher 15 m tall, propped up at its base by a huge block of concrete, and in what seems to be a fairly dry place, it could well be mistaken from below for a strangling fig.

One large willow, near the western end of the lower path, has brownish, somewhat drooping branches. It may be *Salix × chrysocoma* but I have not been able to check whether it has the distinctive monoecious catkins.

In New Zealand, crack willow, to a very large extent, consists of male trees only, and how the reserve's large trees came to be scattered across it can only be conjectured at. They might simply be old plantings, or perhaps cattle once browsed the lower growth of the first ones and spread the easily-removed branchlets, or perhaps the branchlets were spread by storms. Regeneration today is completely lacking.

3. Japanese hill cherry, *Prunus serrulata*. As a canopy tree this has approximately the same abundance as shining privet. How it reached here is another puzzle—I do not know of any notably old street trees in the neighbourhood. The larger cherries, which reach 8 m or more tall and 80 cm in basal diameter, are often multi-trunked (Fig. 7). They seem unlikely to be much more than about 30 years old, but unfortunately their rings are unreadable. A fair proportion of the larger trees are stag-headed and it appears possible that some kind of dieback is taking place. Just as with shining privet, this tree produces copious seed but is not conspicuous as seedlings and saplings.

4. Silver tree-fern, *Cyathea dealbata*. About a third or so of the cover, especially in the eastern half of the bush, on its fairly smooth-contoured areas, carry a scrub of this tree-fern, which in favourable sites reaches 3(-4) m tall. It is generally accompanied by a lesser amount of 1.5–2 m tall hangehange (Fig. 8). Seedlings of many species, but few saplings, occur sporadically under the tree-ferns, but no clear succession is obvious, not even to shining privet or cherry.

5. The following exotic tree species have a minor presence:

Acacia longifolia, Sydney golden wattle. There is very large tree among the regeneration plantings in the west, near the motorway. It fell over in the last few years but is still partly rooted and continues to flower and fruit. Its trunk now measures 45 cm diam. at what was once breast height, and it must have been c. 8 m tall. There are scattered younger trees



Fig. 4. Shadows of dead mamaku trunks on the silver tree-ferns below, near eastern end of bush. Arch Hill Scenic Reserve. Scale bar 5 m. Base photo as for Fig. 3.



Fig. 5. Western end of bush on slope below Grey Lynn Library, mainly shining privet c. 8 m tall; planted ngaio on lower right. Arch Hill Scenic Reserve. All photos (Figs. 5–9) by the author, Sep 2020.



Fig. 6. Eastern end of bush, looking north up the eastern gully. Flowering cherry, mahoe, shining privet and shrubs in front, large shining privet above, middle; huge perching willow on upper left; large pohutukawa on skyline at right. Arch Hill Scenic Reserve.

in this part of the reserve, and here and there along the motorway edge, but the species is largely absent from the bush above.

Crataegus monogyna, hawthorn. There are c. 20 rather scrappy but fairly old trees here (to c. 8 m tall, 30 cm dbh), mainly near the central part of the lower walking-track (Fig. 9). Younger plants are infrequent. Like the shining privet, it is often girdled by the puriri moth.



Fig. 7. Lower slope of bush, showing flowering cherry to 10 m tall among silver tree ferns and shrubs. Arch Hill Scenic Reserve.



Fig. 8. Lower slope of bush, showing scattered 3 m silver tree ferns and lesser-stature hangehange, the ground quite bare. Bag for scale, 30 cm tall. Arch Hill Scenic Reserve.



Fig. 9. Site's largest hawthorn, c. 8 m tall and 75 cm basal diam., near lower track and concrete debris, Arch Hill Scenic Reserve.

Ligustrum sinense, Chinese privet. This small tree is widespread in canopy gaps but does not form pure stands anywhere and very few individuals reach c. 3 m tall and 15 cm dbh. *Paraserianthes lophantha*, brush wattle. This pioneer tree is sporadic in clearings along the upper boundary, but is not common elsewhere.

Robinia pseudacacia, honey locust. There are four large trees in the middle and upper part of the slope below the library; the largest (southernmost) one, on flat ground) being c. 13 m tall and 50 cm dbh. There are a few of the thorny shoots to be careful of around this stand, but no young plants.

Syzygium smithii, acmena. The bush contains one medium-sized tree. Regeneration near it, and across the site at large, is very infrequent. (I have never seen native pigeons here.)

Trachycarpus fortunei, Chinese windmill palm (or Chusan palm). There are two 5 m tall individuals, well-separated from each other; they are not regenerating.

Ulex europaeus, gorse. There are no extensive stands of "old-man gorse" here, although several small groups of 2 m tall bushes occur towards the east, near the top boundary.

6. The less-frequent native trees

Grouped together here, more or less in descending order of abundance, are: *Coprosma macrocarpa* subsp. *minor*, *Melicactus ramiflorus*, *Pittosporum eugenoides*, *P. tenuifolium*, *Pseudopanax lessonii* and *Myrsine australis*. Adults of all these are rather infrequent and few are more than c. 10 cm dbh. It could be that all except the first two species at least have reached the bush as seed from local gardens. All are regenerating to some modest degree, perhaps mainly in open places along the bike tracks.

Metrosideros excelsa, pohutukawa. Young bushy growths of pohutukawa are plentiful, sometimes on cut banks but more often in well-lit places low on the trunks of silver tree-ferns; few though have been able to get their roots into the ground and raise a proper canopy. They might mostly be the offspring of the two large old trees behind St Joseph's Church.

Podocarpus totara, totara. Seedlings and saplings are quite common in all parts of the reserve. The three fairly young trees (c. 12 m tall 25 cm dbh) in a line just behind library might be their parents.

The regeneration plantings

The strip of level ground between the motorway and the edge of the field in the west, and the slightly rougher ground further east between the motorway and the lower walking track, consist largely of regeneration plantings and gap-filling

scrubby, weedy growths. The berm between the motorway and the field presents a uniform canopy at c. 8 m, with ngaio (*Myoporum laetum*) the species that is coping best on this hard and droughty clay-and-gravel soil. Cabbage tree, puriri (*Vitex lucens*) and *Pittosporum crassifolium* are generally growing well too, but *Griselinia littoralis* and mahoe (*Melicactus ramiflorus*) have suffered greatly in the drought of summer 2019–20. The undergrowth is gradually filling up, mainly with coastal karamu, and lesser amounts of totara, cabbage tree, titoki (*Alectryon excelsus*), *Pittosporum*

eugenioides and *P. crassifolium*. There is no regeneration of ngaio, and hardly any of the two privet species or *Prunus serrulata*. In contrast to its abundance in the scrub on the slopes above, hangehange seems to be absent.

Acknowledgements

Several of the uncommon species listed above were first seen by Marley Ford in August 2020. I am also grateful to the biking-club members for their clean-up efforts, a sometimes hazardous job that Auckland Council should be helping them with.

References

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Appendix. Native vascular plant species list for Arch Hill Scenic Reserve

(Motorway-side plantings not included.) Note that many of the tree species may not be truly native to the site, but have entered via the seed rain from local gardens, etc. Based on observations Mar–Oct 2020.

uncommon, seen at fewer than about ten locations

Ferns

Asplenium flaccidum #
Asplenium polyodon #
Blechnum novae-zelandiae #
Cyathea dealbata
Cyathea medullaris #
Dicksonia squarrosa #
Doodia australis
Microsorium pustulatum #
Pteridium esculentum #
Pteris tremula
Pyrrosia elaeagnifolia #
Tmesipteris elongata #
Tmesipteris lanceolata #
Trichomanes venosum #

Monocots

Carex breviculmis #
Carex inversa #
Carex geminata agg.
Carex lambertiana
Carex ochrosaccus
Carex spinirostris #

Carex (Uncinia) uncinata

Cordyline australis

Cyperus ustulatus

Eleocharis acuta #

Gahnia setifolia

Isolepis inundata #

Isolepis reticularis #

Juncus edgarae

Juncus usitatus

Microlaena stipoides

Oplismenus hirtellus subsp. *imbecillis*

Schoenus maschalinus #

Dicot trees

Alectryon excelsus #
Coprosma macrocarpa subsp. *minor*
Coprosma robusta
Corynocarpus laevigatus #
Dysoxylum spectabile #
Geniostoma ligustrifolium
Haloragis erecta
Hebe cf. *stricta* #
Hoheria populnea #

Leptospermum scoparium

Metrosideros excelsa

Melicope ternata #

Melicactus ramiflorus

Myrsine australis

Pittosporum crassifolium #

Pittosporum eugenioides #

Pittosporum tenuifolium #

Podocarpus totara #

Pseudopanax arboreus #

Pseudopanax lessonii

Vitex lucens #

Dicot herbs

Haloragis erecta
Hydrocotyle moschata

Notable absences

Adiantum hispidulum
Dianella nigra
Quercus robur Note: There are several old groves of oak further east, at the foot of Commercial Road and beyond to Bond Street.