UPPER STEBBINGS VALLEY, WELLINGTON

PHASE ONE: LANDSCAPE AND ECOLOGY ANALYSIS

July 2018

Boffa Miskell

Document Quality Assurance

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Cover photograph: Stebbings Valley hillside,

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View south from the Site towards Churton Park and Paparangi

1.0 Introduction

1.1 In 2005 Boffa Miskell was engaged by Wellington City Council to undertake some preliminary landscape and ecology investigations in the Upper Stebbings Valley, as this area had previously been identified as part of the city's northern growth area. In 2017, Wellington City Council commissioned Boffa Miskell to carry out further landscape and ecology investigations and analysis in order to understand the condition of the upper Stebbings Valley (the Site) in anticipation of future residential development in this area.

1.2 The focus of this first phase of 2017 work is to review and update the existing base information in relation to landscape, terrestrial ecology, and streams and waterways, and to identify key issues to provide a better understanding of characteristics and attributes of the Site. The information and analysis in this report will be used to inform a structure plan for the Site, which will be prepared as a precursor to residential development.

1.3 Phase One has involved a review of published and unpublished information, interrogation of existing GIS datasets, and field work both within the project area defined by the Council (i.e. the Site) and also in relation to the wider environs so as to provide an appropriate level of landscape and ecological context.

1.4 The Site covers approximately 280ha and extends from the northern end of Churton Park/ Glenside to the ridgeline that forms the southern boundary of Tawa/Redwood. The entire site is contained within Ecodomain 9a, which is broadly described as inland hill country and basins. The basins are typically broad and damp with moderately steep hill country between them. Located within the Site are two main ridgelines, Bests Ridge and Marshall Ridge, both of which are included in the ridgetops and hilltops overlay in the Wellington City District Plan. The 350kV Oteranga Bay to Haywards transmission lines are located at the southern end of the Site and these have a significant effect on the character of the area and also the wider landscape (Figure 1). The Site partly wraps around the Churton Park subdivision that is currently being developed and the nature of the earthworks being carried out in this area also affects the overall area's landscape character.

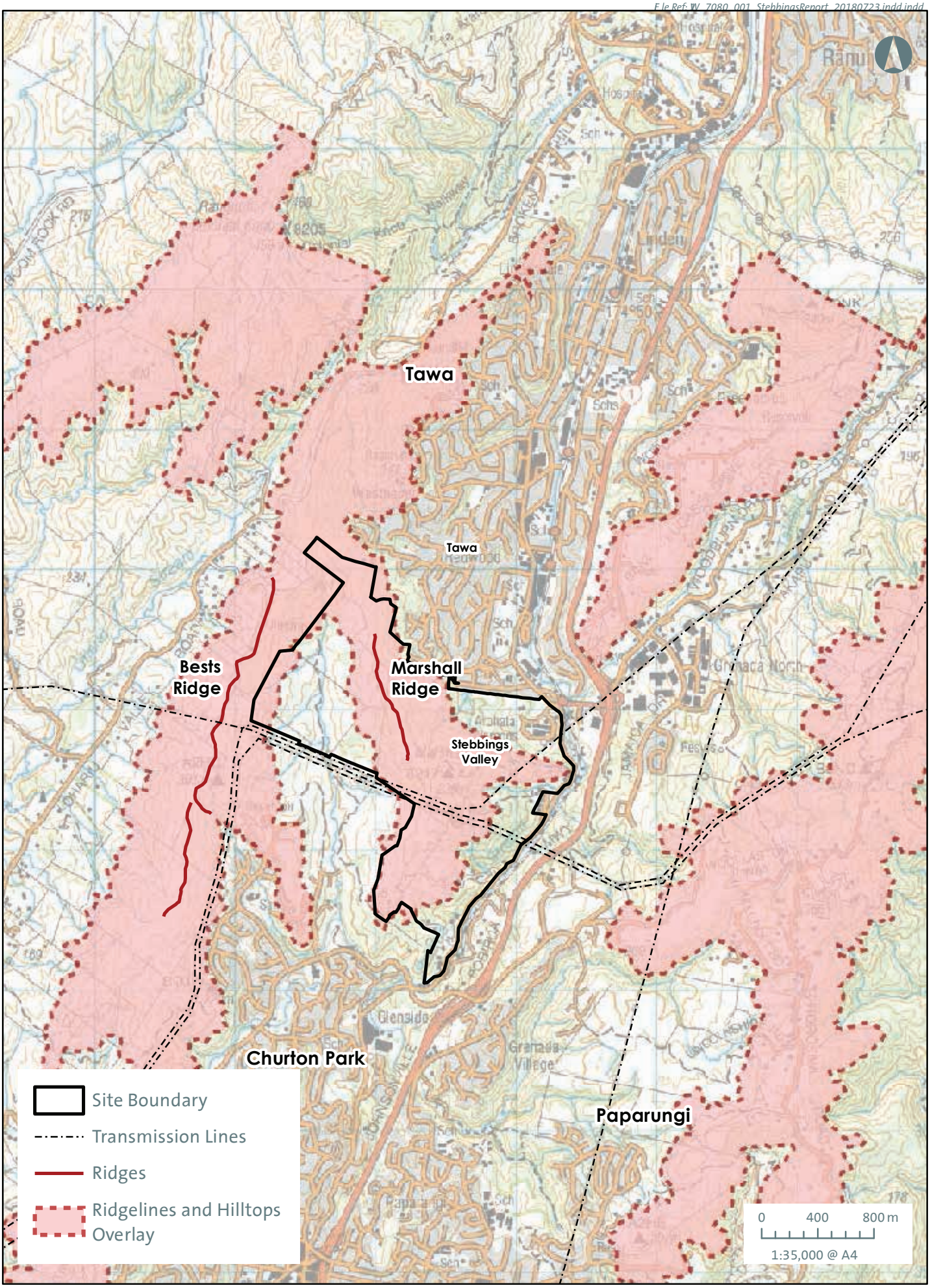
1.5 A third of the Site is heavily grazed pasture and about a quarter is in semi-mature pine forest, located in the eastern part of the Site. Another large block of pine forest is situated immediately adjacent to the Site along the north-western boundary and this too contributes to the overall character of the area. Small remnant areas of mature native forest are present but these are unfenced and have been modified by stock access and grazing. There are areas of regenerating mahoe-dominated seral vegetation in places, with the most extensive of these located at the northern edge of the Site adjoining the pine forest on the neighbouring property and surrounding Redwood Bush.

1.6 Figure 1 illustrates the Site and its relationship to the surrounding landscape and Figure 2 shows the site boundary and district plan zoning.

Report Structure

1.7 Preparation of this report has involved a Boffa Miskell team from a range of disciplines related to landscape and ecosystem conditions. The report is divided into four sections together with an appendix with information on the ecology methodology and the results of the field investigations.

1.8 Both the Ecology section and Landscape sections are divided into several sub sections covering specific aspects. The Summary section draws together, in a table, the key findings, and outlines how these could be used to inform a structure plan for upper Stebbings Valley.



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Context Plan

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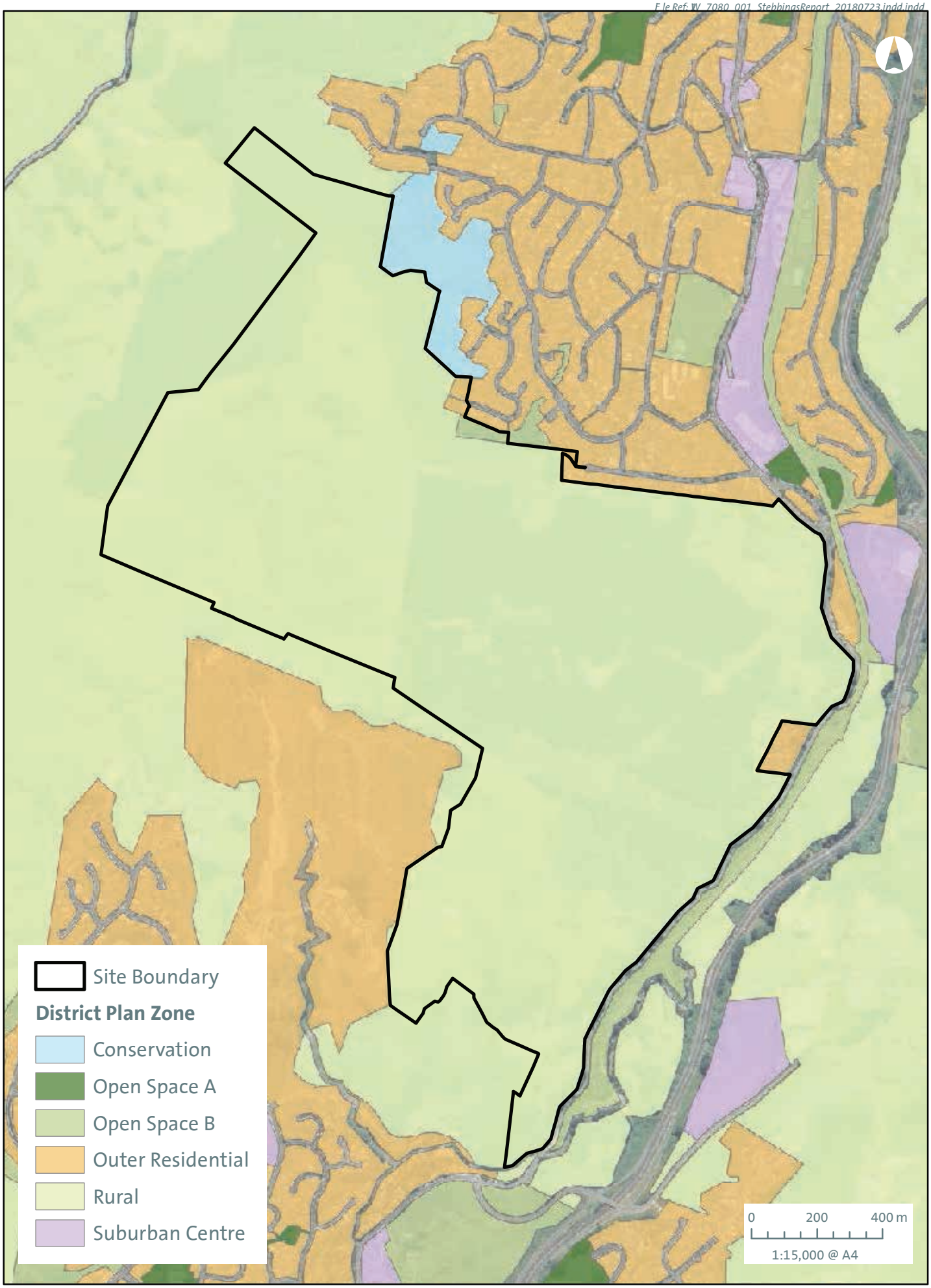
Figure 1



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District Plan Zoning

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Figure 2

View over the Site towards modified natural wetlands on the valley floor

2.0 Site description

Location

2.1 The Site occupies land to the north of Churton Park, to the south of Tawa, and to the west of State Highway 1, on the fringe of the Wellington Outer Green Belt. The Site is defined by two key ridgelines – Bests Ridge to the west and Marshall Ridge to the east, which are separated by Stebbings Valley.

Landform

2.2 The existing topography encompassing the Site is shown on Figure 1. Landform within the site rises from the southeast, towards the two key ridgelines which define the site – Bests Ridge to the northwest forms the western boundary of the site, with Marshall Ridge lying to the north east. Stebbings Valley lies roughly north-south in between the two ridgelines. South of Marshall Ridge two minor spurs separate the greater Stebbings Valley area from the wider Tawa valley area. Only the upper part of the valley landform lies within the site boundary, to the northwest of the Site.

Landcover

2.3 The landform of steep upper slopes and almost level ridgetops is largely in pasture cover. Transmission lines form the only prominent built features on the mid-upper slopes. Pine plantations on the escarpment slopes to the north contrast with the pasture on the ridgelines.

3.0 Ecology

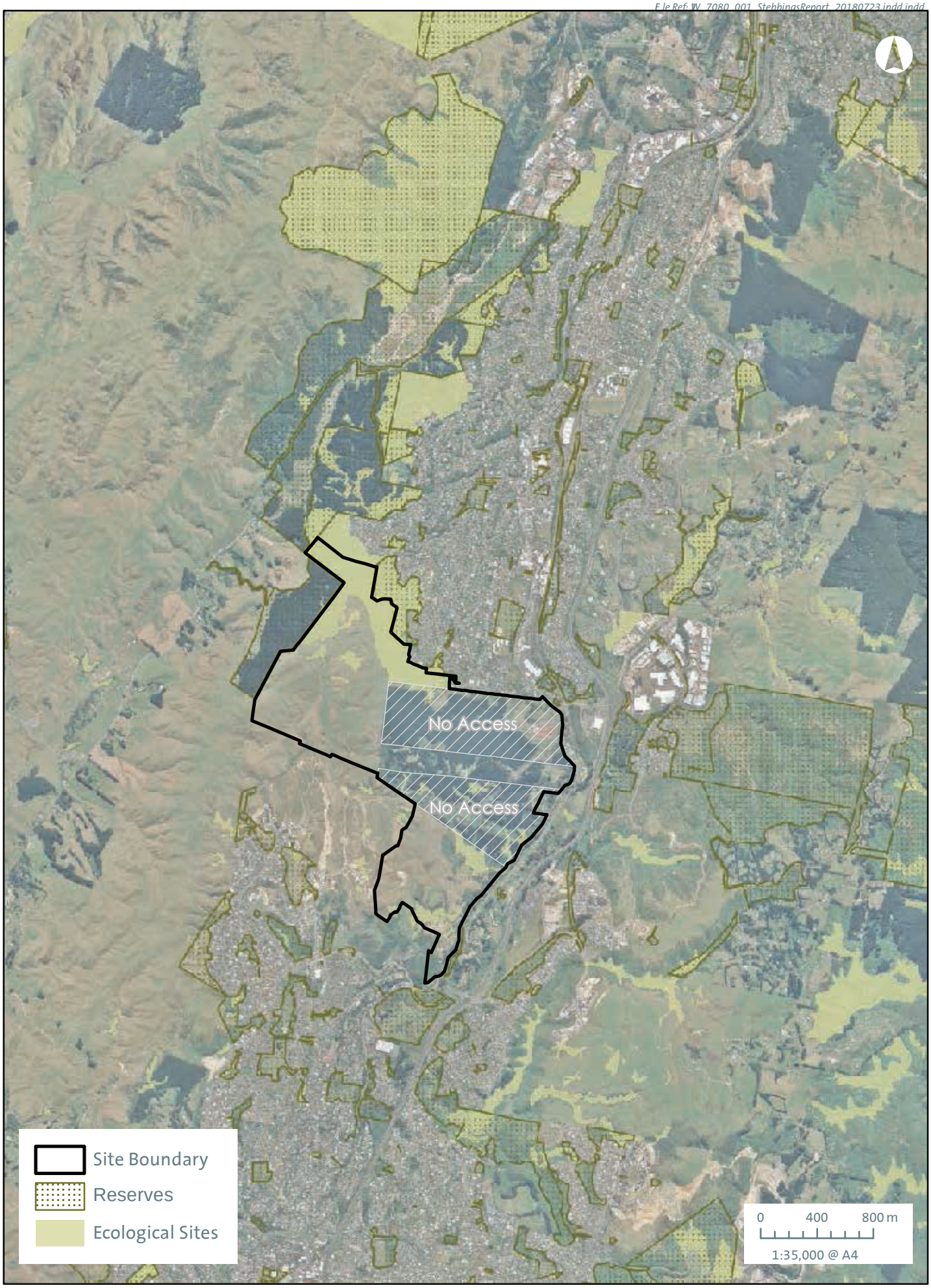
3.1 For the biological investigations, the study area consisted of two components, as shown on Figure 3:

- The Site: relates to the cadastral boundaries of the properties which fall within the growth area. Some biological communities are influenced by these boundaries, e.g. Redwood Bush stops at the ridgeline property boundary, with pasture present on the other side. Similarly pine forest planting is constrained by several property boundaries.
- Study Area: relates to the wider landscape. The study area varies for each of the biological studies described here. We have drawn on biological information from a number of nearby and equivalent sites such as Redwood Bush, Porirua Bush, various small forest remnants as identified by Park (1999), and seral forest within Belmont Regional Park and Colonial Knob Scenic Reserve. The Avifauna Study included information from an area of 200 km^2 to account for mobile species.

3.2 We note that we could not access several properties within the Site and have relied on aerial photography and the colour and texture of the vegetation canopies to determine their canopy dominant species. These areas require verification if access is permitted at a later date.

3.3 The Study Area and the Site are shown in Figure 3. This map shows both the site and the surrounding forest areas and council's bush reserves. The Site lies at the southern end of a series of near adjacent bush reserves that extend from Porirua Reserve at the northern end, through a series of forest and bush fragments lying beneath Colonial Knob to Redwood Bush and this site in the south. Beyond this site the next nearest large native forest area is Johnsonville Park.

3.4 This report presents a summary of the results. The methods, data and analysis are contained within Appendices.



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Site Boundary and Study Area

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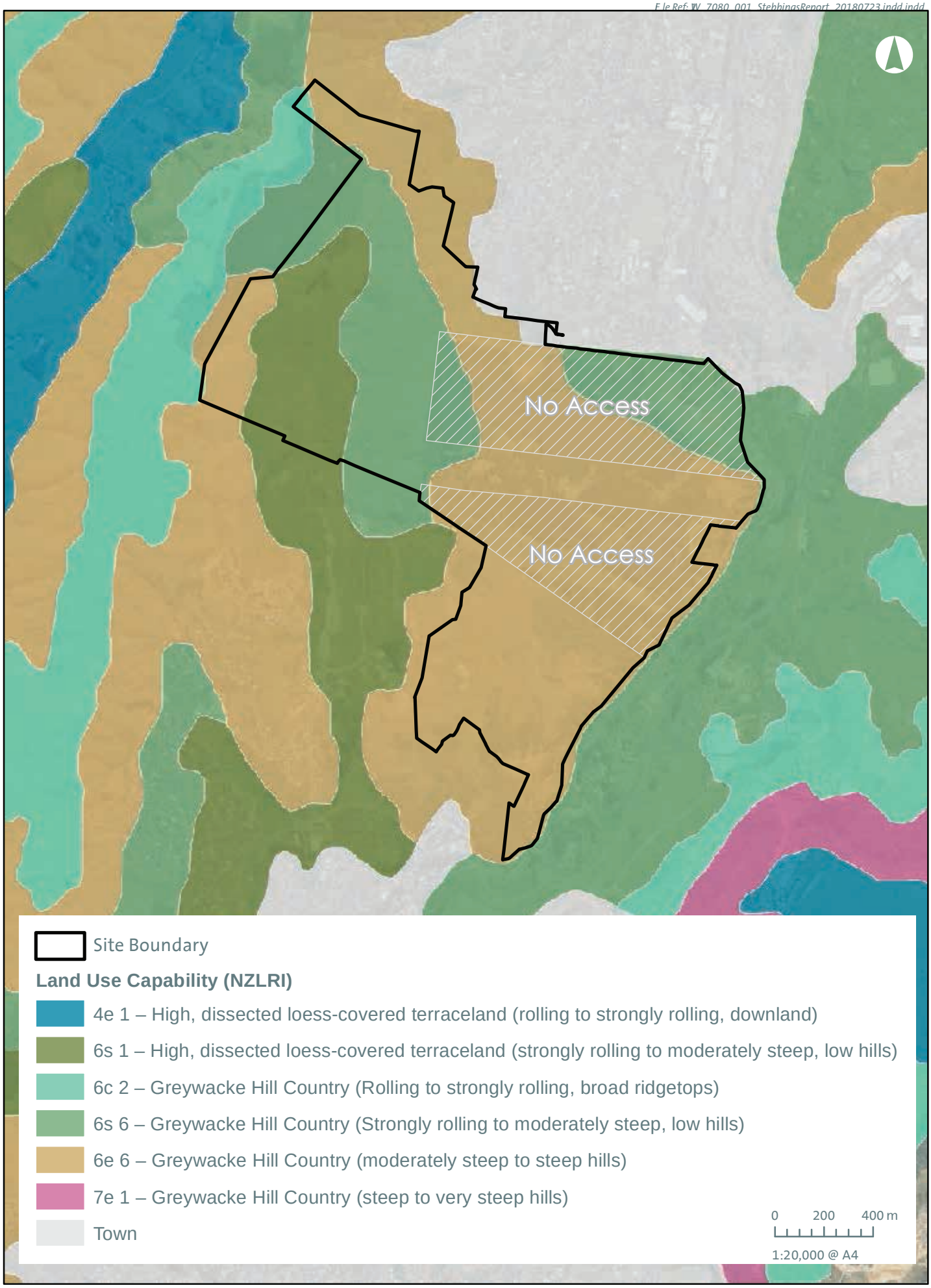
Figure 3

4.0 Soils and Geology

4.1 The following table describes the landforms, their soils, slopes, and erosion potential. The areas are shown on Figure 4.

The valley floor and lower slopes of Stebbings	6s1 JH = Judgeford Hill Soils	JH – Lo/Cg D – P2 gSO	Strongly rolling to moderately steep, terraces and low, stable hills with a mantle of loess over gravels and consolidated gravels. Rainfall typically 1140-1270 mm p.a. These slopes are well drained and have low potential for erosion. Historic vegetation would have been rimu-rata/ tawa – hinau forest.
The mid and upper slopes to the east and west	6s6 KoH - Soils are Korokoro hill soils.	KoH – Lo/GW D+E – P2 M8 m6	Moderately steep, to steep greywacke hill country in areas of moderate rainfall (1140-1270mm p.a.) with seasonal moisture deficits. The hill country is at altitudes greater than 400 m a.s.l. Soils are well-drained Korokoro hill soils formed from greywacke drift on weathered loess. The slopes are stable but there is potential for slight sheet and soil slip. Historic vegetation would have been rimu-rata/ tawa – kohekohe forest.
The headwater and eastern ridgeline	6e6 KoH - Soils are Korokoro hill soils (& Makara steepland soils).	KoH – (Lo)/GW E - P2 M8 m6	Strongly rolling to moderately steep low hills with a mantle of loess over greywacke. The hills are typically at elevations greater than 300 meters and have moderate rainfall (1140-1270 mm p.a.) Slopes are stable but subject to seasonal soil moisture deficits. For this soil maintenance of a complete vegetation cover is necessary. Erosion is negligible but with the potential for moderate soil slip, scree and sheet erosion where forest cover is removed. Soil conservation = maintenance of complete vegetation cover. Pastures are prone to scrub reversion. Historic vegetation would have been rimu-rata/ tawa – kohekohe forest.



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Soils and Geology

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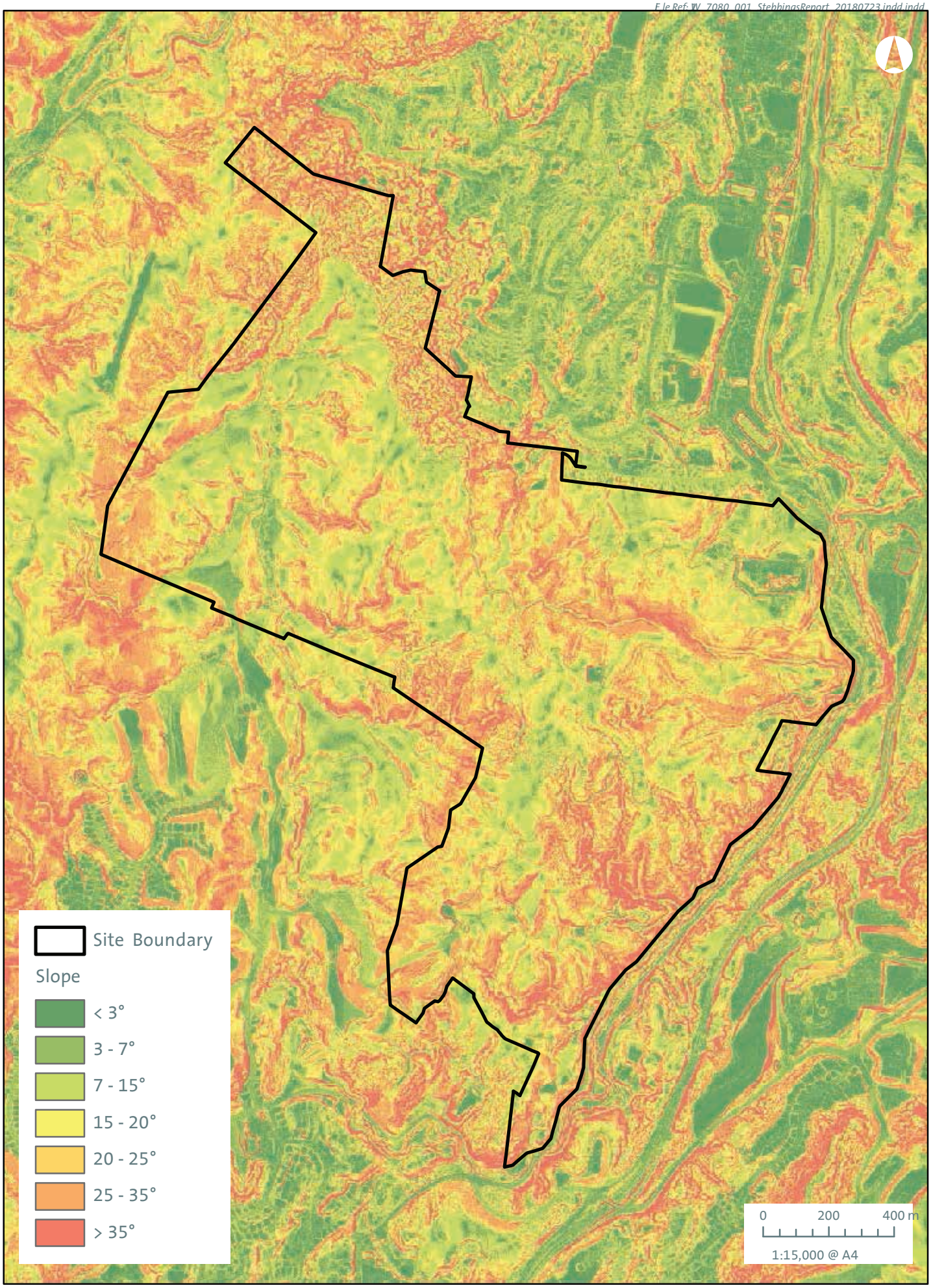
Figure 4

4.2 The following table describes the steepness of the site, with all slopes over 35 degrees identified as very steep. These very steep slopes are highlighted on the Figure 5.

	Description	Area (%)
0 -3°	Flat to gently undulating	9.4
3 - 7°	Undulating	12.7
7 - 15°	Rolling	21.7
15 - 20°	Strongly rolling	14
20 - 25°	Moderately Steep	14
25 - 35°	Steep	19.3
> 35°	Very Steep	8.9
		100.0%

Landform of a rolling nature forms the majority of the Site



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Slope Analysis

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Figure 5

5.0 Terrestrial Vegetation and Habitats

Pre-Settlement Vegetation

5.1 The entire Site is contained within Ecodomain 9a (Boffa Miskell 2002), which is broadly described as inland hill country and basins. This ecodomain shares an even year round rainfall and constant temperatures and winds through the year when compared to the more coastal zones of Wellington. The basins are typically broad and damp with moderately steep, to steep hill country.

5.2 Pre-settlement, slopes would have had emergent conifers and rata over a tawa, hinau and kohekohe dominated canopy. Redwood Bush is one of the last large remnants of this vegetation type.

5.3 The basins are typically cold in winter experiencing both air and ground frosts and are poorly drained. Tall conifers, in particular kahikatea, would have dominated pre-settlement vegetation, together with tree species tolerant of moist, heavy soils such as pukatea and pigeonwood.

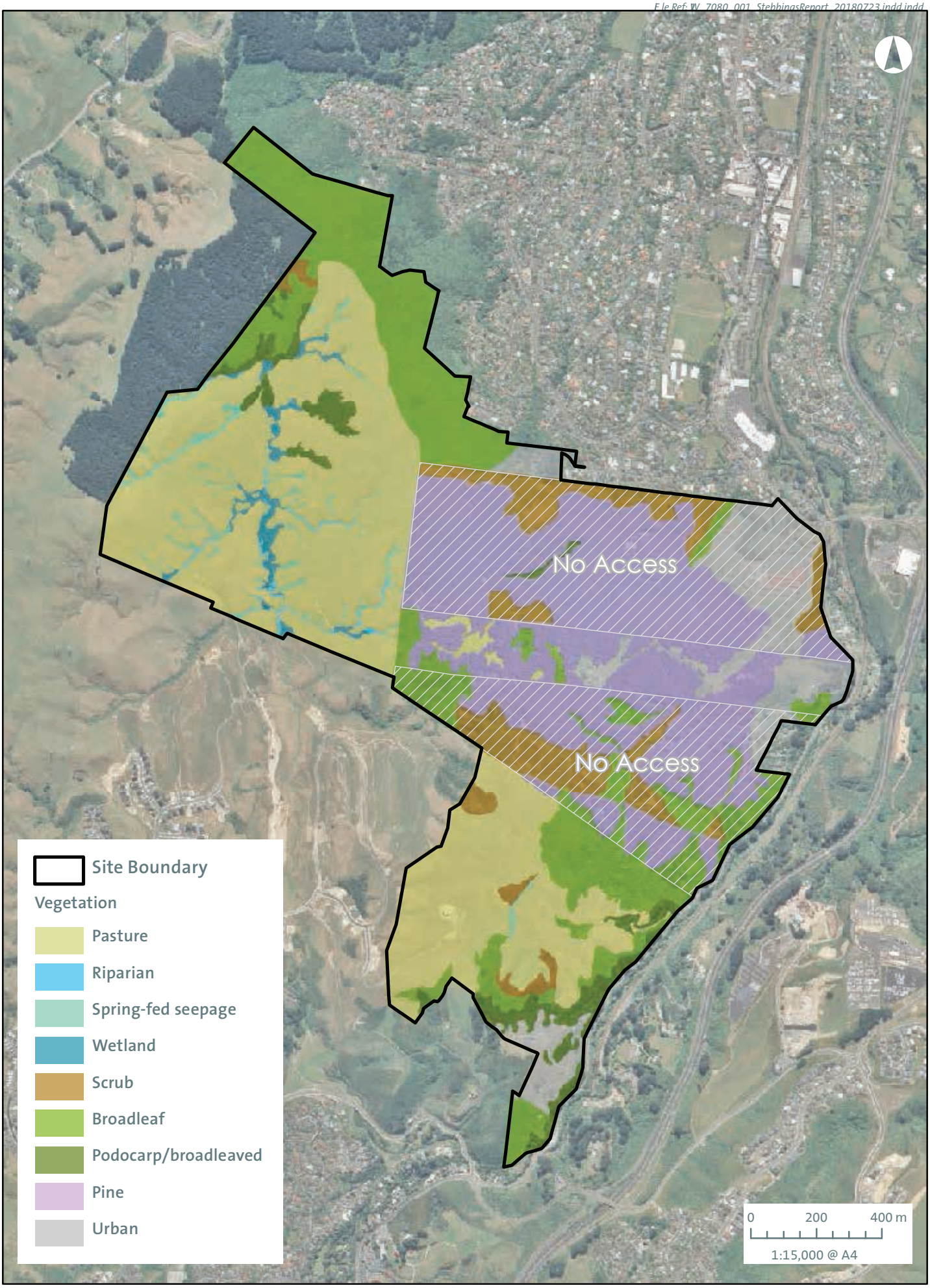
5.4 Gullies would have been dominated by tree ferns.

Present Day Terrestrial Vegetation

5.5 The Site is dominated by a) grazed pasture, or b) plantation pine. Other elements of scrub reversion, seral forest and remnant forest are smaller elements in the following table:

VEGETATION COMMUNITIES	
Grasslands	
1	**Pasture:** A third of the site or 93.4ha is composed of heavily grazed pasture. This is found is two distinct areas: above Hill Road to the south of the site, and in the western corner of the site. This community is largely exotic in origin, comprising both pasture grass species and common herbaceous pasture weeds.
Wetlands	
5	**Ripari an:** The vegetation associated with the main stream on the Site on Churton Park Farm, covers 0.6ha or 0.2% of the site. It remains unfenced and is highly impacted by stock. It consists of a mix of exotic pasture species and natives. The native component is primarily of *Carex secta* and instream macrophytes, with limited intermittent shrubs of tauhinau, manuka and coastal tree daisy.
6	**Spri ng-fed seeps:** This vegetation type is found within areas of grazed pasture and covers 1.2% of the site or 3.4ha. Extent originates with a spring, following the path of this seepage downhill accumulating into a wetland or stream. It contains a mix of exotic and native species; primarily floating sweet grass and Yorkshire fog and *Isolepis*. This community is highly modified in nature, resulting from past and current farming practices. Prior to vegetation removal and grazing these would have once been a forested stream system as indicated by remaining remnant forest systems to the north of Churton Park Farm.
7	**Valley floor wetlands:** This vegetation type is found within the main valley floor in Churton Park Farm on the west of the Site, and is associated with the floodplain. It covers approximately 1% of the site or 2.9ha and is heavily impacted by stock through grazing and pugging. The vegetation of the wetland comprises a mix of exotic and native sedges and rushes, primarily *Isolepis* and *Juncus effusus*.
Seral scrub (>80% woody cover - majority of stems < 10cm dbh)	

2	**Gorse scrub over pasture:** Approximately 19.3ha or 7% of the site carries this vegetation. This can be predominantly found on the dry ridgelines where pasture has been retired from stock, and on the edge of pine and forest communities. The community consists of differing proportions of exotic and native species, depending on time since abandonment. Gorse is the main pioneer species forming a diversity of shrub-grasslands, shrublands, and scrub. Among the gorse is a variety of early seral broadleaved species mainly, rangiora, mahoe, matipo, and tree ferns.
Seral broadleaved forest (majority of stems > 10cm dbh)	
3	**Mahoe-mamaku-mixed broadleaf forest:** 52.7ha (19%) of the Site carries late-seral forest. This is found at the northern edge of the Site, surrounding Redwood Bush and joining Porirua Scenic Reserve in contiguous forest. Other patches of this vegetation community are found bordering the pasture and pine communities to the south and east of the Site. On wetter southern slopes and steep gullies mamaku dominate, while in the dryer ridgelines silver-fern, rangiora, *Coprosma areolata* and red matipo are dominant. In addition, several other broadleaved species such as hinau, putaputaweta, ramarama, kohekohe and titoki occasionally occur in the canopy. Vines of supplejack, bush lawyer, and pohuehue, are present, along with a variety of both tree and ground fern species. Where fenced, the subcanopy and understorey have a good diversity of typical forest shrubs (rangiora, hangehange, kawakawa, silver fern, pate) as well scattered saplings of potential canopy species such as kohekohe, titoki, pigeonwood, pukatea, tawa, nikau, hinau, matai, rimu and kahikatea. The canopy varies from 2-3m on upper slopes to an average of 6m on the valley floor. Some exceptional individuals reach 10m. The stem size of the dominant mahoe is typically 10 to 30cm with some specimens to 120cm. The slopes are typically steep to very steep (15° to 30°), with little soil found on the steeper slopes. The core of the vegetation is largely free of exotic weed species, but many invasive weeds occur along the modified margins, including blackberry, gorse, holly and boxthorn.
Mature or maturing indigenous forest	
4	**Tawa dominated, podocarp mixed broadleaved forest:** This community covers 9.5ha or 3% of the Site. It is an example of a more modified extent of Redwood Bush that occurs north of the Site. It comprises a patchwork of mature native forest and is found predominantly within areas of farmland, on the steeper shaded slopes, likely because of poor conditions preventing grass establishment. The forest canopy is mainly tawa but also contains titoki, pukatea, hinau, and kohekohe. Podocarps are emergent, with kahikatea on the flat areas at stream confluences, and matai and rimu found in the steeper gullies. The larger trees typically range in size from 30cm to 50cm dbh, but with a few larger stems up to 70cm dbh. The subcanopy, where present without grazing pressure, comprises pate, mamaku, mahoe, pigeonwood and tarata, together with a variety of native lianes and epiphytes including supplejack, vine rata and kiekie. The understorey contains the normal shrub species kawakawa, hangehange, pate and silver fern, and in addition tree fuchsia, nikau and saplings of karaka, tawa and titoki. However, where grazing is present this has mostly been lost, with a select few unpalatable species such as *Coprosma areolata* and ongaonga remaining.
Exotic forest	
8	**Plantation pine:** A large area of plantation pine is found from the centre of the site spanning east covering 26% of the site or 72.2ha. This vegetation is predominantly exotic, with a sparse understory containing weedy shrubs such as blackberry, wattle and gorse. Early native seral species, mahoe, matipo and rangiora, are also present.
Urban	
9	**Residential homes & gardens:** Approximately 22.7ha or 8% of the site is occupied by residential homes, buildings and amenity gardens.



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Site Vegetation

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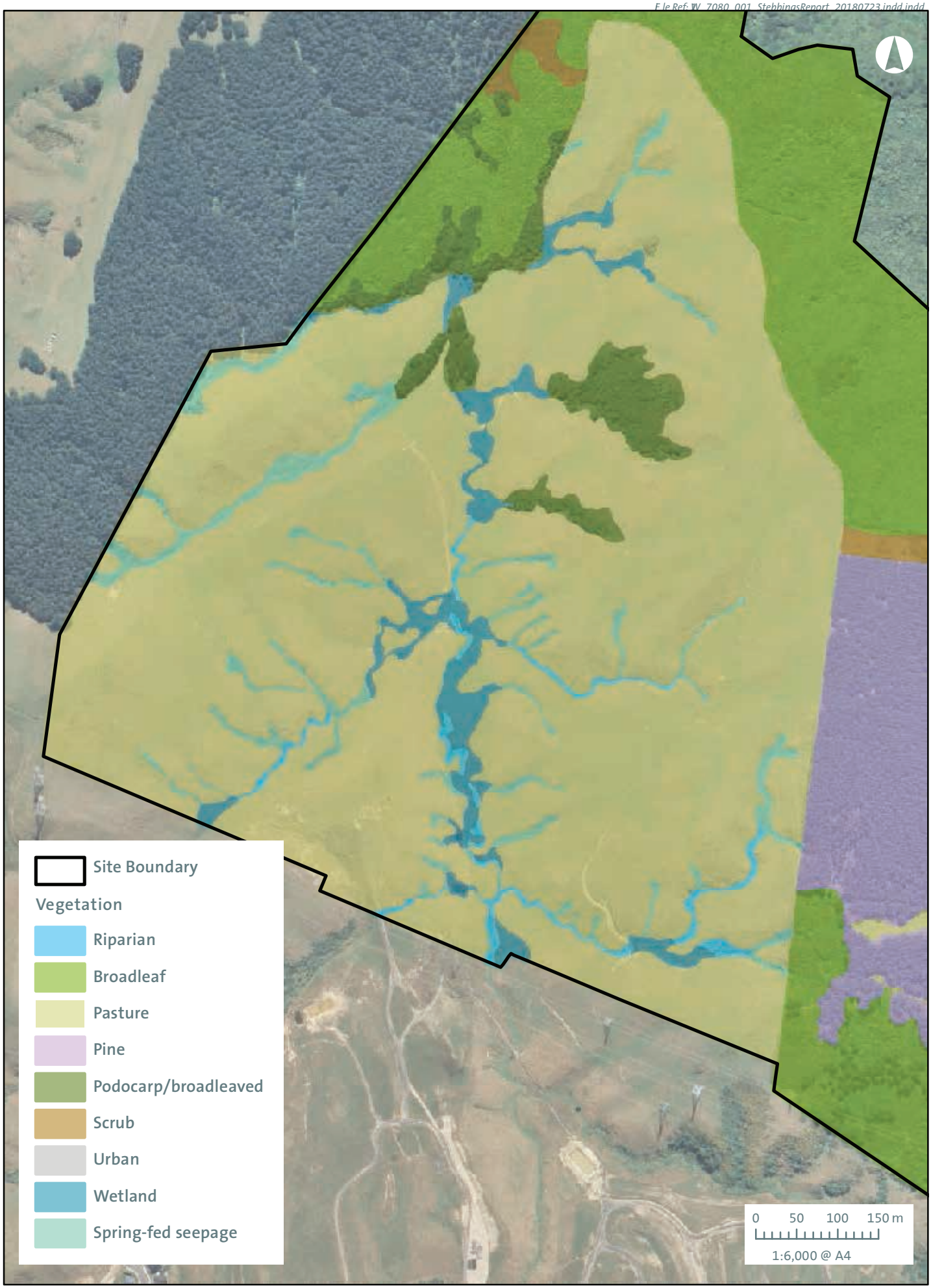
Figure 6



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Farm Vegetation Detail

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Birds

5.6 Bird species recorded in the Site and wider Stebbings Valley area based on the current survey and the literature review conducted (species that use habitats not found within the study area are not included – for a full species list refer to Appendix 1). The conservation status of each species is provided (Robertson et al., 2017).

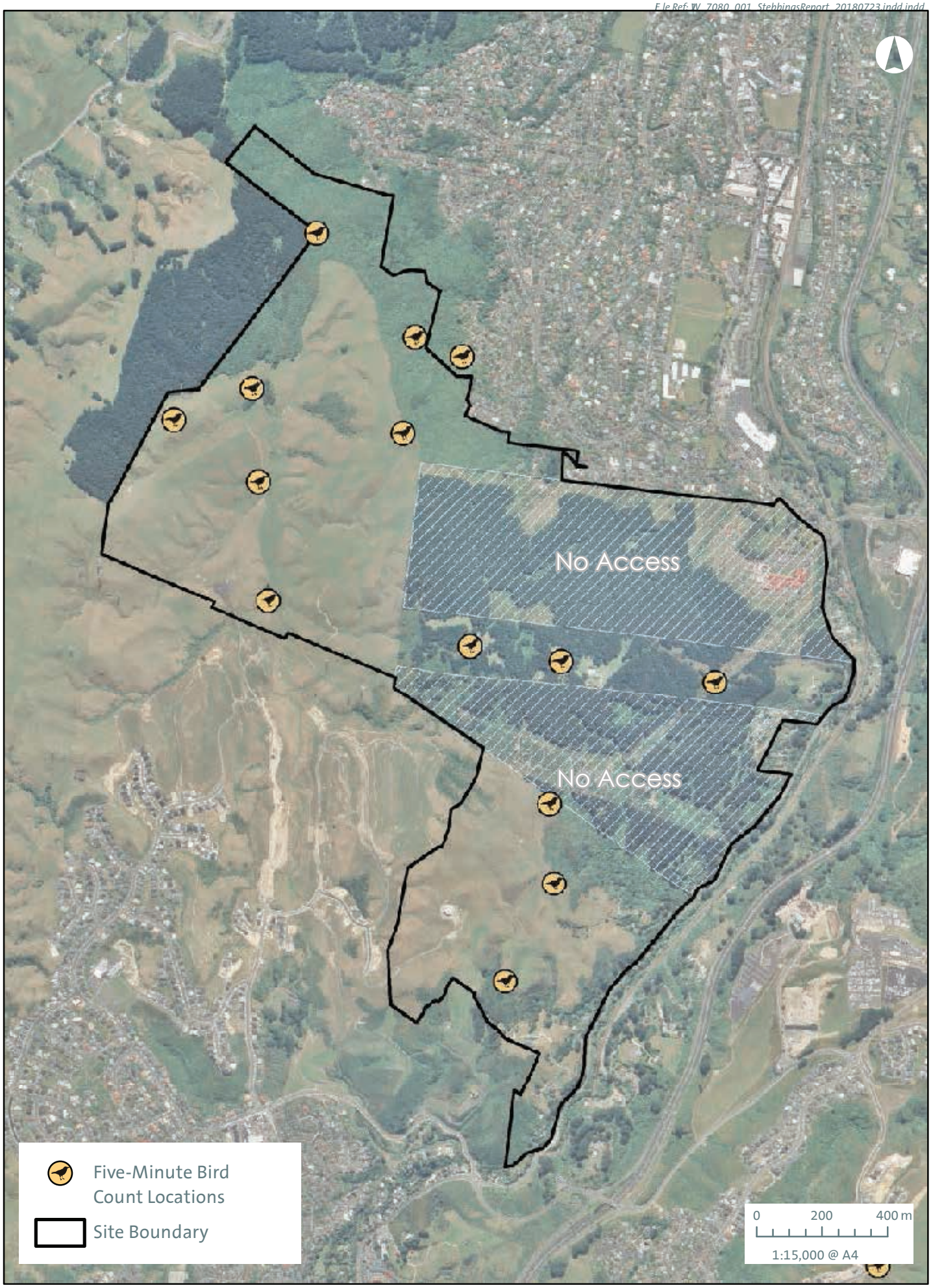
5.7 During the survey fourteen species of native birds were seen or heard. Six species are typically found in indigenous forest although they can also inhabit plantation pine. Six species are typically found in freshwater habitats; either ponds, streams or wetlands. Seven species are typically found utilising open country, grasslands and shrublands.

5.8 The most commonly observed (seen or heard) native birds were silvereye, black-backed gull, tui and grey warbler. The most commonly observed (seen or heard) exotic birds were goldfinch, starling, chaffinch and house sparrow.

5.9 We did not identify any species that have not already been recorded locally. However, a number of native species have been recorded locally but were not seen during this investigation. They include species recently introduced to Zealandia (whitehead, North Island kaka, Red-crowned kakariki, bellbird) which are still dispersing, the two cuckoo species which may have left the site by the time of the study, and NZ falcon which is locally uncommon and has a very large territory.

					Preferred Habitat				
Avifauna Spet es	**Conservation Status**		Potentially present	Observed 2018	Streams / wetlands	Open country	Shrublands / scrub	Indigenous forest	Plantation Pine
Paradise shelduck	Endemic	Not Threatened	✓	✓	Y				
Pukeko	Native	Not Threatened	✓	✓	Y				
White-faced heron	Native	Not Threatened	✓		Y				
Black-backed gull	Native	Not Threatened	✓	✓		Y			
Kingfisher	Native	Not Threatened	✓	✓		Y			
New Zealand pipit	Native	At Risk – Dec.	✓	✓		Y			
Spur-winged plover	Native	Not Threatened	✓	✓		Y			
Swamp harrier	Native	Not Threatened	✓	✓		Y			
Welcome swallow	Native	Not Threatened	✓	✓		Y			
Grey warbler	Endemic	Not Threatened	✓	✓			Y	Y	
North Island fantail	Native	Not Threatened	✓	✓			Y	Y	
Silvereye	Native	Not Threatened	✓	✓			Y	Y	
Tui	Endemic	Not Threatened	✓	✓			Y	Y	
New Zealand falcon	Endemic	At Risk – Rec.	✓			Y		Y	
Bellbird	Endemic	Not Threatened	✓					Y	
Kereru	Endemic	Not Threatened	✓	✓				Y	
Long-tailed cuckoo	Endemic	At Risk – Nat. Unc.	✓					Y	
Morepork	Native	Not Threatened	✓	✓				Y	
North Island kaka	Endemic	At Risk – Rec.	✓					Y	
Red-crowned kakariki	Endemic	At Risk – Rel.	✓					Y	
Shining cuckoo	Native	Not Threatened	✓					Y	
Whitehead	Endemic	At Risk – Dec.	✓					Y	

Conservation Status -Dec. = Declining, Rec. = Recovering, Rel. = Relict, Nat. Unc. = Naturally Uncommon.



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Bird Count Locations

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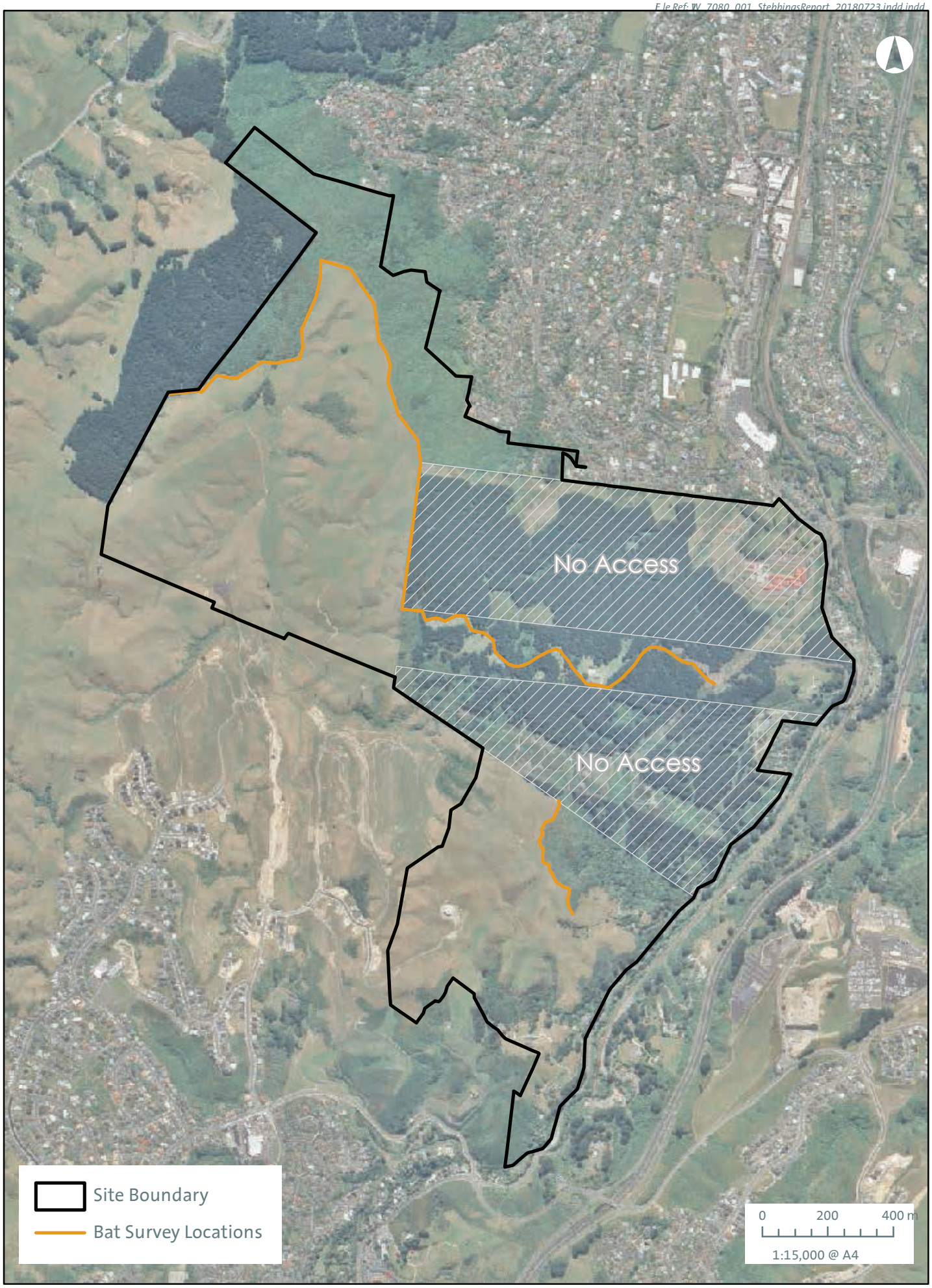
Figure 8

Bats

5.10 The only local evidence of bats found during the literature review was in Orongorongo Valley; however, the last detections of long-tailed bats in the area were between 1937 and 1947 (O'Donnell, 2000). Long-tailed bats were detected in Zealandia in 2007, however there have been no records of their presence within the sanctuary since then (D. Shanahan, pers. comm., 2018). Furthermore, acoustic bat recorder (ABM) and/or walking transect (with handheld bat detectors) surveys conducted by Boffa Miskell ecologists in other local areas (Grenada North (2016), Horokiwi (2016), Korokoro (2016), Makara (Post Office Bush and Warrens Bush) 2004-2005 and Transmission Gully (Te Puka Stream and Wainui Saddle), 2012-2013 (preliminary investigation 2010), have not detected any bats (Boffa Miskell unpublished data; Figure 9). Distribution records of long-tailed and short-tailed bats from the Department of Conservation (DOC), also provide no recent evidence of bats in the local area (Figure x).

5.11 No bats were detected during the two night-time walking transects conducted with handheld bat detectors along the native forest margins and exotic forest (pine) tracks.

5.12 Based on the lack of bat detection during the current survey and a lack of detection evidence found during the literature review and after consultation with DOC, it was considered unnecessary to deploy ABMs within the Stebbings Valley survey area.



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Bat Survey Locations

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Figure 9

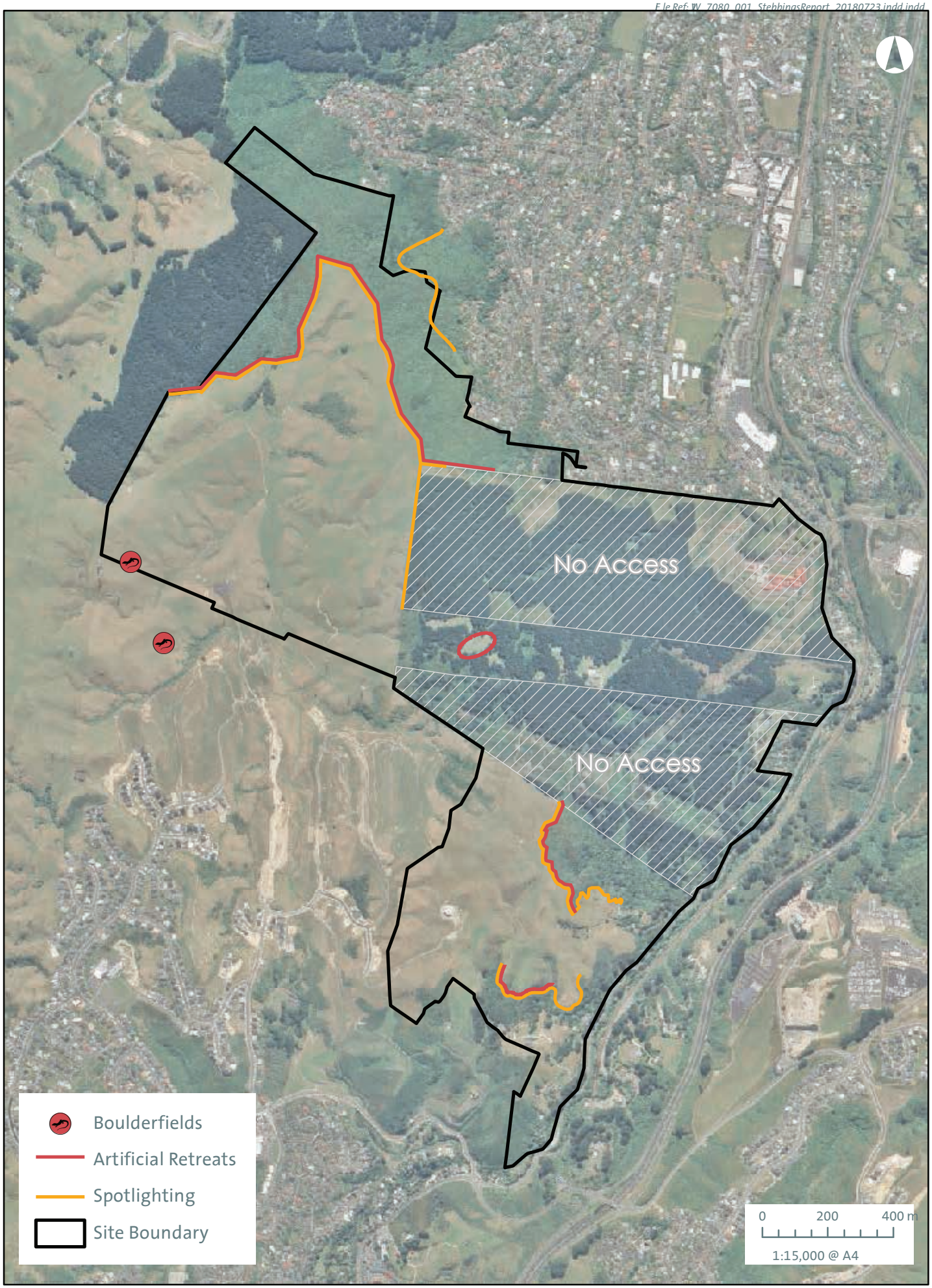
Lizards

5.13 According to the DOC Bioweb database, six lizard species have been recorded within the wider landscape surrounding the Site (Tawa and Grenada). These are the Northern grass skink, barking gecko, Ngahere gecko, Raukawa gecko, brown skink, and copper skink. However, there was only one brown skink observation, and all entries for copper skink were from the 1960s – 1980s.

Common name	Threat class	Preferred Habitat (modified from EcoGecko 2014)
Skink		
Brown skink	Not threatened	Densely vegetated and typically damp or shady habitats in lowland areas, including forest, scrub, farmland and coastlines. Found occasionally on boulder beaches or within dense coastal forest (Whitaker & Lyall 2004).
Copper skink	Not threatened	Forest and open or shaded areas with adequate groundcover such as logs, rocks or long grass. Also encountered in urban areas such as compost heaps, rock gardens etc. (Chapple et al. 2008).
Northern grass skink	Not threatened	The species occupies a very wide range of generally open habitats up to 1800m including grasslands, shrublands, rocky sites, and wetlands.
Ornate skink	Declining	Forest and shrubland, in leaf litter or amongst rocks and logs under canopy cover. Often found amongst Tradescantia.
Spotted skink	Relict	They inhabit open areas including scrub, grasslands, flaxlands and may live among dense vegetation, scree and rock piles.
Gecko		
Barking gecko	Declining	Forest and scrub, including manuka and kanuka shrubland.
Ngahere gecko	Not threatened	Forest, shrubland, in ferns, and creviced limestone or clay banks.
Raukawa gecko	Not threatened	A very wide range of habitats from boulders and bluffs in the littoral zone to inland broadleaf and beech forests; isolated populations sometimes occur on highly modified farm or urban habitats, especially those once forested; often in rocky or scree habitats.

5.14 Extensive surveying for lizards was done in the area. Only one species was observed; northern grass skink. The habitat searched and observed lizard presence is described below.

Habitat type	Habitat Value	Description
Pasture grass / open country	Low	Grazed pasture grass does not provide suitable habitat for lizards.
Streams / wetlands	Nil	The lizard species likely to be found at this site do not utilise freshwater habitats.
Boulderfields	High	Boulderfields provide habitat for a number of skinks and geckos including Northern grass skinks, brown skinks and Raukawa geckos. During our site investigations we only saw 2 Northern grass skinks during boulderfield dismantling, however, we counted 46 lizard droppings. No sloughed skins were observed suggesting that no gecko were present.
Grassland-forest interface	High	The rank grass at the pasture grass-forest interface provides habitat for Northern grass skinks and Copper skink. In our surveys we observed a large number of Northern grass skink in this habitat, but no other species.
Native forest and scrub	Moderate	Native forest is less utilised for terrestrial lizard species, but provides important habitat for specialist arboreal lizards. While none were seen during these surveys, the cryptic nature of arboreal lizard species means that lizards may be present, though it is likely they are at very low densities within these forests.
Plantation pine	Low	Pine is not suitable habitat for the lizards of the Wellington region. Only one Northern grass skink was observed during surveys in plantation pine, however, it was seen in a clearing within rank grass.



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Lizard Habitat

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Figure 10

Freshwater Habitat

Stream Verification

5.15 Three stream forms have been identified within the project site:

5.16 Perennial: streams with a continuous flow for at least a part of the year.

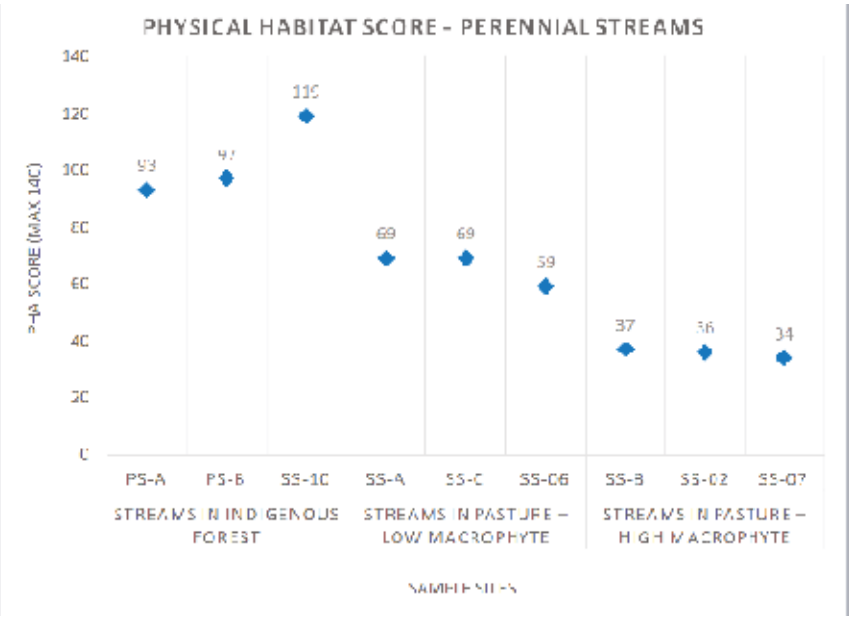
5.17 Ephemeral/ Intermittent streams: streams which flow predominantly during and immediately following heavy rainfall, but these flows occasionally persist during periods of continuous rain due to a raised water table.

5.18 Seepage wetlands: waterways that originate primarily in gully heads as the result of the presence of freshwater springs or which in some cases form within a perennial stream channel due to sharp changes in gradient, culverting or damming. These waterways are typically vegetated by macrophyte vegetation which is obligate or wetland facultative.

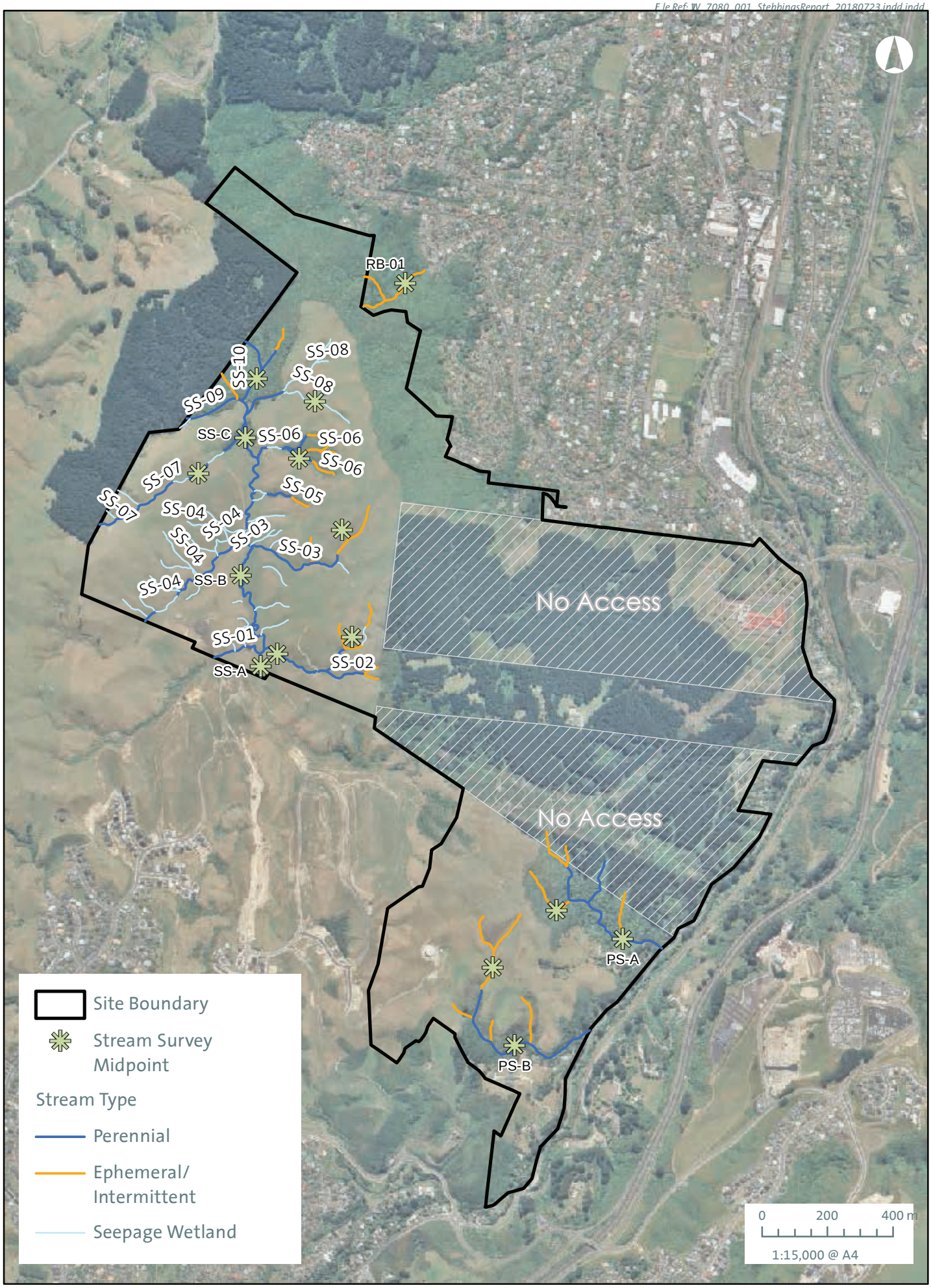
Habitat Type	Extent (m)
Length of perennial:	5,073
Length of ephemeral / intermittent:	2,706
Length of seepage wetland:	3,380

Physical habitat assessment (PHA)

5.19 Within the stream forms identified above, the physical habitat varies based on land use and vegetation cover. We describe these changes using each site's PHA results.



- Three streams had PHA scores greater than 50% of the maximum. There were all located in mature native forest.
- The surveyed streams which had the lowest PHA scores lay within grazed pasture and were unfenced, resulting in low riparian and bank stability scores. The stream sections with the three lowest PHA scores (SS-B, SS-02, and SS-07) also had dense macrophyte growth (predominantly monkey musk (*Erythranthe guttata*)) and very little bank stability.



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Stream Verification

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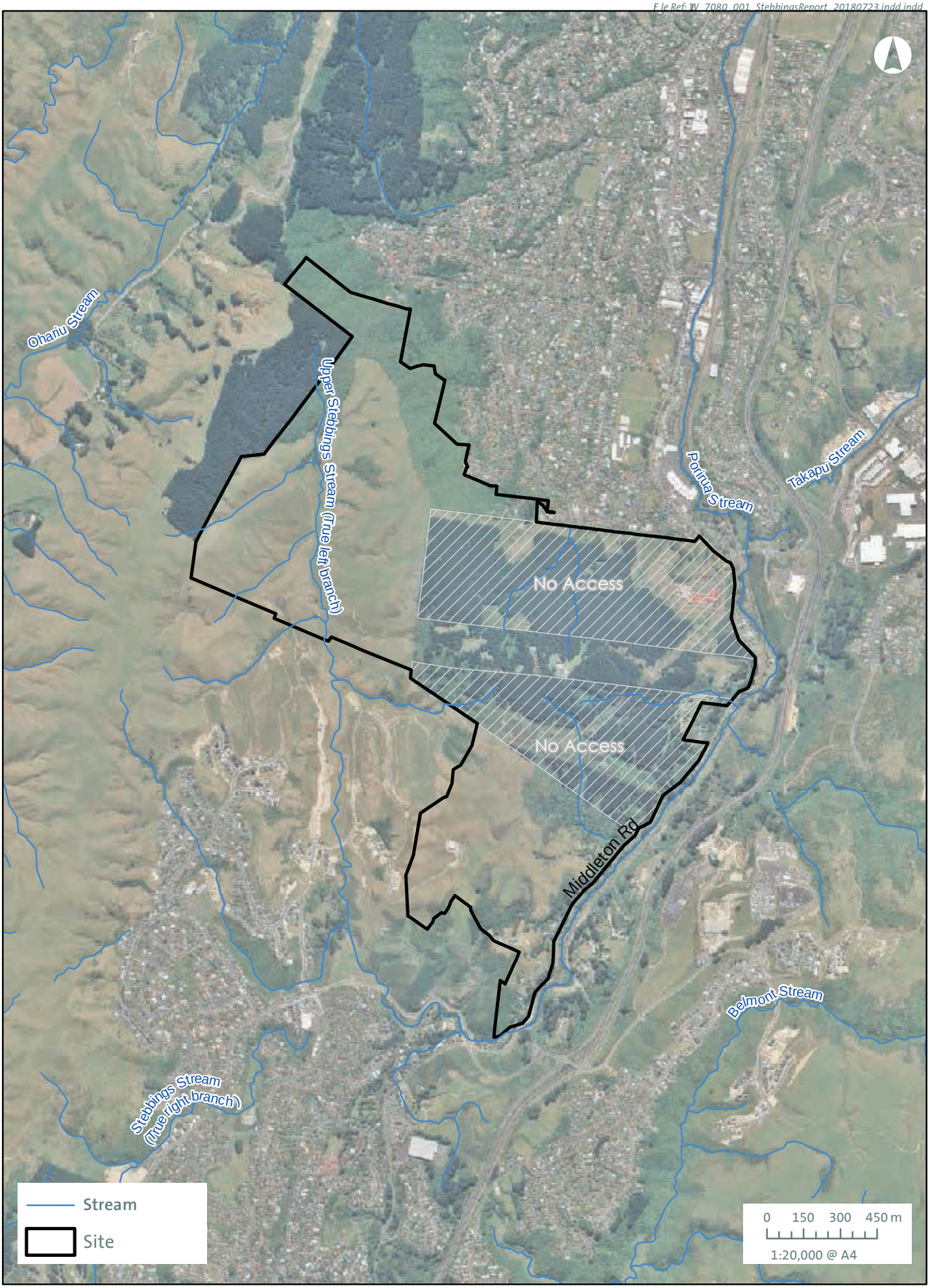
Figure 11

- The three streams which scored between 40% and 50% of the total maximum were surrounded by pasture, but had open, macrophyte-free channels and a greater bank stability, riparian heterogeneity, and habitat heterogeneity.

5.20 Based on the PHA scores and the surrounding vegetation, it was evident there were three broad types of stream system, irrespective of hydrology:

- Native forested stream – SS-10, PS-A, PS-B
- Pasture stream – open channel, low macrophyte presence – SS-A, SS-C, SS-06
- Pasture stream – vegetated channel, high macrophyte presence – SS-B, SS-02, SS-07

Seepage wetlands originate primarily in gully heads as a result of freshwater springs



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Stream Locations

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Figure 12

Freshwater Fauna

Fish

5.21 The following table first lists all fish recorded in the Porirua Stream, from all references, and extending from the headwaters to the stream mouth. It then identifies the fish found within the study area, upstream of the two land bridges which create a fish barrier.

Common name	Threat classification	Porirua Stream (All References)	Stebbings below land bridge (BML 2010)	BML above Land bridge (BML 2018)
Shortfin eel	Not threatened	Yes	Yes	Yes
Longfin eel	At risk – declining	Yes	Yes	Yes
Giant kokopu	At risk – declining	Yes	Yes	
Koaro	At risk – declining	Yes	Yes	
Banded kokopu	Not threatened	Yes	Yes	Yes
Inanga	At risk – declining	Yes	-	
Upland bully	Not threatened	Yes		Yes
Common bully	Not threatened	Yes	Yes	
Giant bully	Not threatened	Yes		
Bluegill bully	At risk – declining	Yes		
Redfin bully	At risk – declining	Yes	Yes	
Common smelt	Not threatened	Yes		
Brown trout	Introduced	Yes	Yes	
Counts		**13 Species**	**8 Spec es**	**4 Spec es**

Macroinvertebrates

5.22 No readily available and detailed macroinvertebrate data was found relating to the Site; however, Boffa Miskell Ltd (2004) has a long history of stream sampling of Stebbings Stream. The following table shows the macroinvertebrate results from this study, and from the 2010 baseline sampling for Westchester Link Road.

Stream	Ter est r al Habitat	Total Abundance	Taxa Rib ness	EPT Taxa	M I	QM I	FW Crayfish
Main A	Pasture	798	20	8	92	3.5	1
Main B	Pasture	932	35	8	94	4.0	0
Main C	Remnant treeland	941	19	5	101	2.9	65
Stebbings 02	Pasture	617	22	1	69	2.4	0
Stebbings 06	Scrub-low forest	266	14	0	94	3.2	37
Stebbings 07	pasture	691	20	1	87	3.6	6
Stebbings 10	Native forest	199	19	4	97	3.5	92
Glenside A	Native forest	242	20	3	104	3.9	95
Glenside B	Native forest	110	18	3	110	4.4	139
Redwood Bush outside Project Extent							
Redwood Bush	Native forest	na	na	na	na	na	143

Stebbings Stream below land-bridges (2010)							
Stream	Ter est r al Habi-tat	Total Abun-dance	Taxa Rib ness	EPT Taxa	M I	QM I	FW Crayfish
Stebbings Site 1B	Pasture	368	32	13	99	2.7	26
Stebbings Site 2A	Partial forest	203	26	17	129	3.5	0
Stebbings Site 2B	Partial forest	313	21	9	102	2.9	0

Summary table of key biological criteria for perennial/ ntermittent streams

5.23 This tables summarises the stream locations, habitats present, presence of fish barriers, and the length of the sample reach and provides three key criteria, fish taxa, quantitative macroinvertebrate community index and PHA.

Stream	Terrestrial Habitat	Fish barriers	Sampled reach	Fish taxa	QMCI	PHA score
Main A	Pasture	2 x land bridge	100m	3	3.5	49
Main B	Pasture	2 x land bridge	100m	1	4.0	26
Main C	Remnant treeland	2 x land bridge	100m	3	2.9	49
Stebbings 02	Pasture	2 x land bridge	50m	2	2.4	26
Stebbings 06	Scrub-low forest	2 x land bridge	50m	0	3.2	42
Stebbings 07	Pasture	2 x land bridge	50m	1	3.6	24
Stebbings 10	Native forest	2 x land bridge	100m	1	3.5	85
Glenside A	Native forest	Road culvert	100m	0	3.9	66
Glenside B	Native forest	Road culvert	100m	0	4.4	69
Redwood Bush outside Project Extent						
Redwood Bush	Native forest	Stormwater pipe	50m	0	na	na
Stebbings Stream below land-bridges (2010)						
Stebbings Site 1B	Pasture	1 x land bridge	100m	1	4.9	39
Stebbings Site 2A	Partial forest	N l	100m	4	3.6	39
Stebbings Site 2B	Partial forest	Nil	100m	6	4.1	54

Below is an interpretation of the summary results tabled above:

- Fish taxa abundance (opinion based on site context)
  - Excellent - >5 taxa
  - Good - 4-5 taxa
  - Fair - 2-3 taxa
  - Poor - <2 taxa
- QMCI (from Stark & Maxted, 2007)
  - Excellent - >5.99
  - Good - 5.00-5.99
  - Fair - 4.00-4.99
  - Poor - <4.00
- PHA scores (opinion based on site context quartiles)
  - Excellent - >9075%
  - Good - 70-8951-75%
  - Fair - 50-6925-50%
  - Poor - <5025

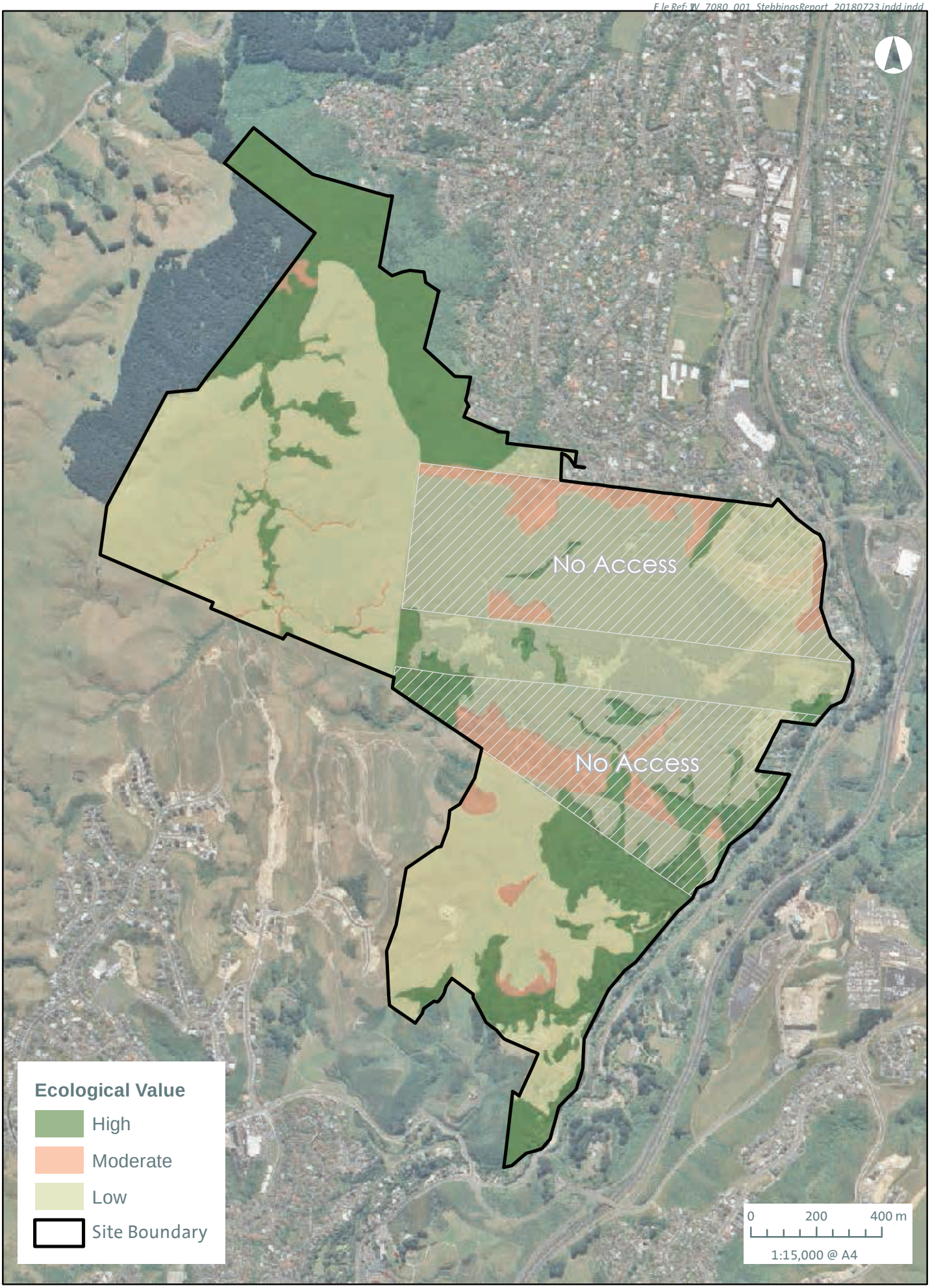
Habitat Value

5.24 Figure 13 combines results to present a values / constraints map for the site. It presents value as a simple high/moderate/low separation.

- High value means that both indigenous habitat and indigenous fauna are present, and at least some communities or species are considered to be At Risk due to population decline or because they are naturally uncommon, e.g. indigenous forest.
- Moderate value means that the habitats might not trigger significance under a significance assessment but have low representativeness, lack any species which are considered rare or at risk, but have existing or potential value, e.g. relatively unmodified streams, natural wetlands with limited or no indigenous elements remaining, and seral scrub.
- Low value means that the habitat is of poor quality and the indigenous species that utilise it are robust, common, and widespread, e.g. plantation pine and improved pasture.

5.25 A finer grain assessment can be carried out if required.

Remnant tawa-kohekohe forest (Hill Road remnant)



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UPPER STEBBINGS VALLEY

Ecological Value

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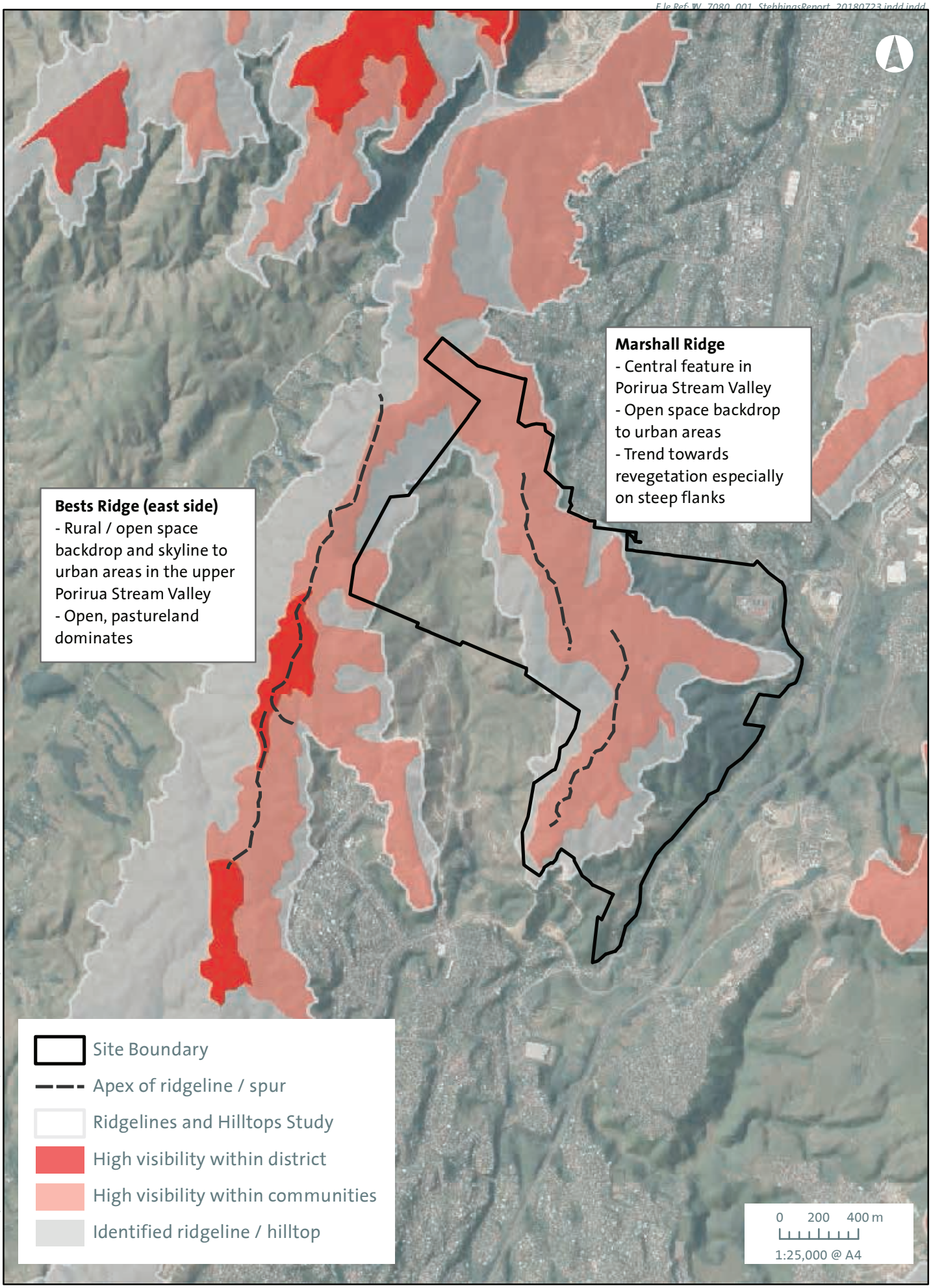
Figure 13



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Ridgelines and Hilltops - Visibility

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Figure 14

6.0 Landscape

Ridgelines and hilltops

6.1 Wellington's ridgelines and hilltops extend over land which is managed under a variety of zones – residential, rural area, open space and conservation sites. The Wellington City District Plan has a ridgeline and hilltops overlay, together with policies, which focus on protecting the visual amenity values of the city's undeveloped ridgelines and hilltops. While the original 2001 study that led to the adoption of the overlay assessed four types of values – natural, visual, heritage and recreation, the Council adopted only the visual values, focusing primarily of visibility. The 2001 study also referred to the features as "ridgetops and hilltops". For clarity this report is consistent with the District Plan which refers to ridgelines and hilltops.

6.2 The overlay shows the extent of each of the identified ridgelines and hilltops and the parts of each of these to show the areas that are 'high visibility within the district' and those areas that have 'high visibility within communities.' The overlay is also annotated noting the particular characteristics of each ridgeline or hilltop (Figure 14), and the wider context shown overleaf.

6.3 There are two identified ridgelines/ hilltops relevant to the Site, Bests Ridge and Marshall Ridge, which coalesce at the northern end of the Site to become Spicers Ridge (see plan on the following page).

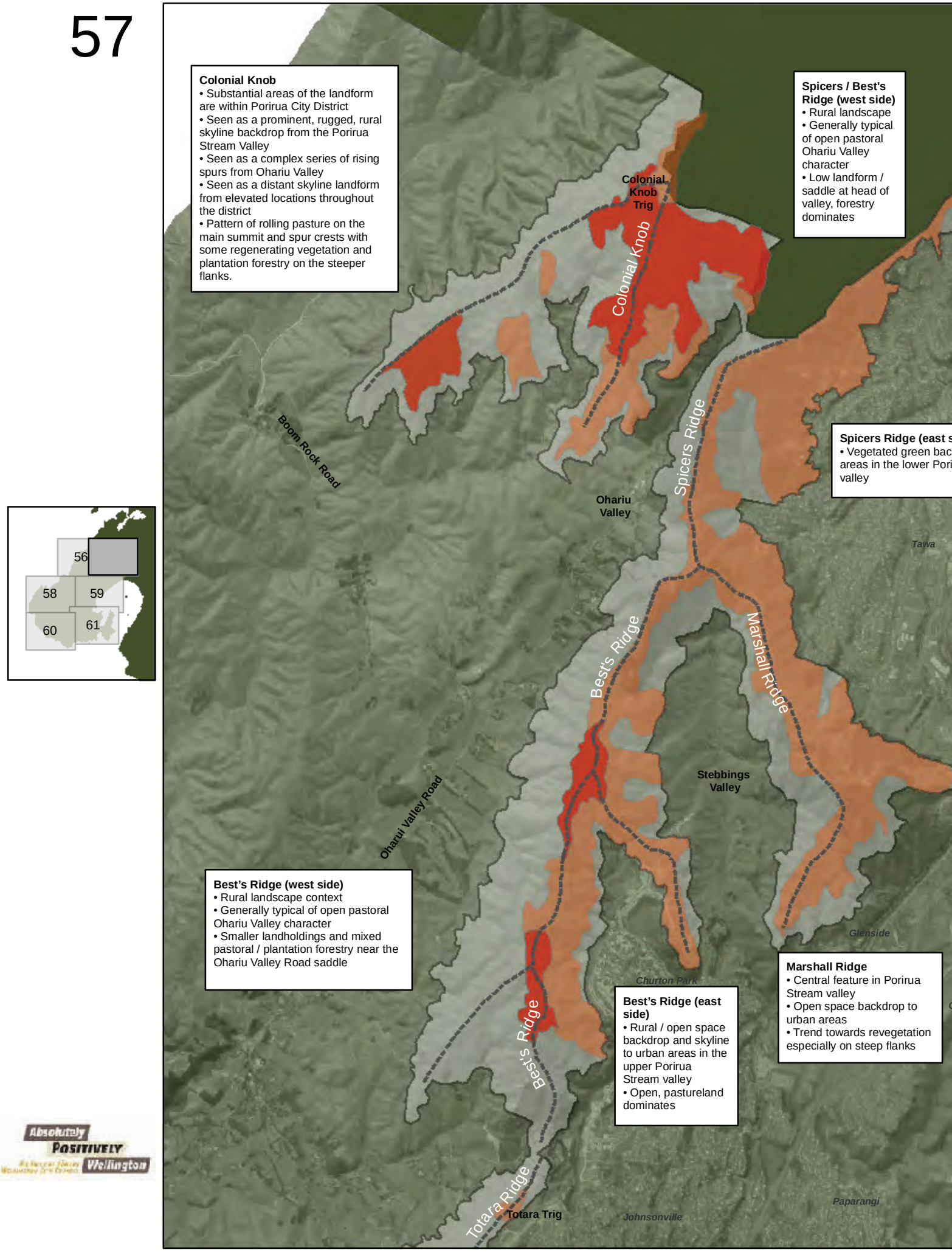
6.4 The descriptions of Bests Ridge and Marshalls Ridge from the 2001 study, covering the range of values (as opposed to just visual aspects) are helpful to understanding of the contextual landscape relationships and intrinsic attributes of these areas. The findings from the study are summarised as follows:

- Seen as a skyline ridge with a simple pastoral character from many locations, including the urban motorway.
- The natural landform dominates although transmission lines pass along mid slopes.
- Pine plantations at the head of the Best Farm valley are a new, contrasting element.
- Recent housing and earthworks on the lower slopes at Churton Park are at the maximum elevation if the ridgetop is to retain its rural context.
- The central side spur in the Best Farm valley is locally important as a natural landform within recent subdivision development at Churton Park.

6.5 Section 7 of the Ridgelines and Hilltops Assessment of Values identifies the main ridgelines of the district and associated ridgetop and hilltop values. The site lies within the area identified as Totara/Bests/Spicer Ridge, which runs south / north from Mt Kaukau to Porirua. The setting of the area is described as follows:

The east side is in the urban sector of the district although the ridge is predominantly rural in character. Totara, Best's and Marshall's ridges are predominantly pasture covered although areas of steep land on Marshall Ridge and parts of the slopes behind Tawa are now reverting to scrub and native vegetation. Pine plantations have recently been planted at the head of Stebbings Valley and are a feature of the slopes behind Tawa and Linden. Housing is generally confined to the base of the valley or lowest slopes of the ridge, although recent subdivision has reached the upper slopes at Totara Ridge.

Transmission lines follow much of this ridge: - on the west flanks of Totara Ridge, crossing over to the east flanks of Best's Ridge at the Ohariu saddle and then turning east across Marshall ridge.



The main visual values for each ridgeline or hilltop are summarised on these maps. For more information, including the natural, heritage and recreation values, see Wellington's Ridge

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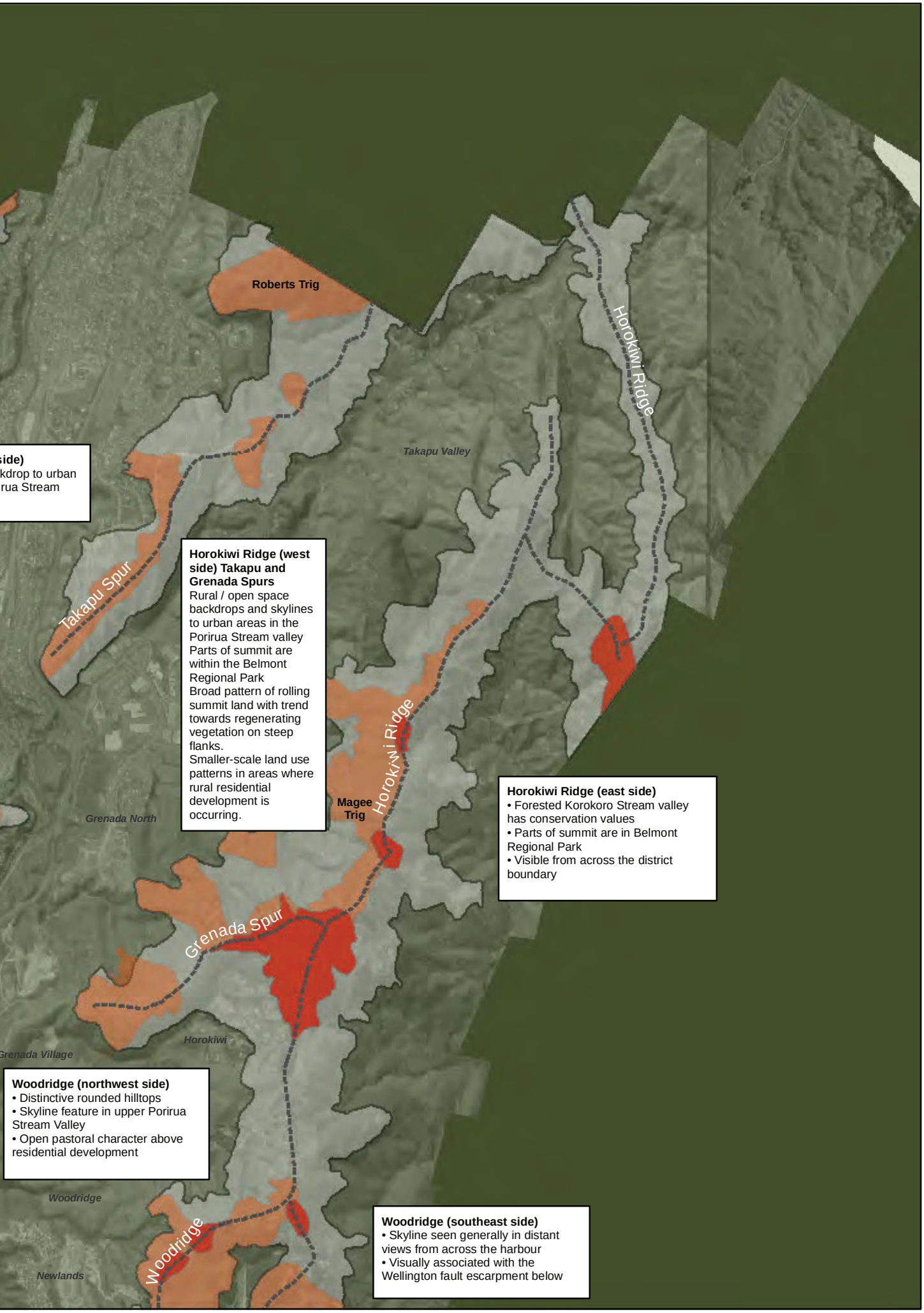
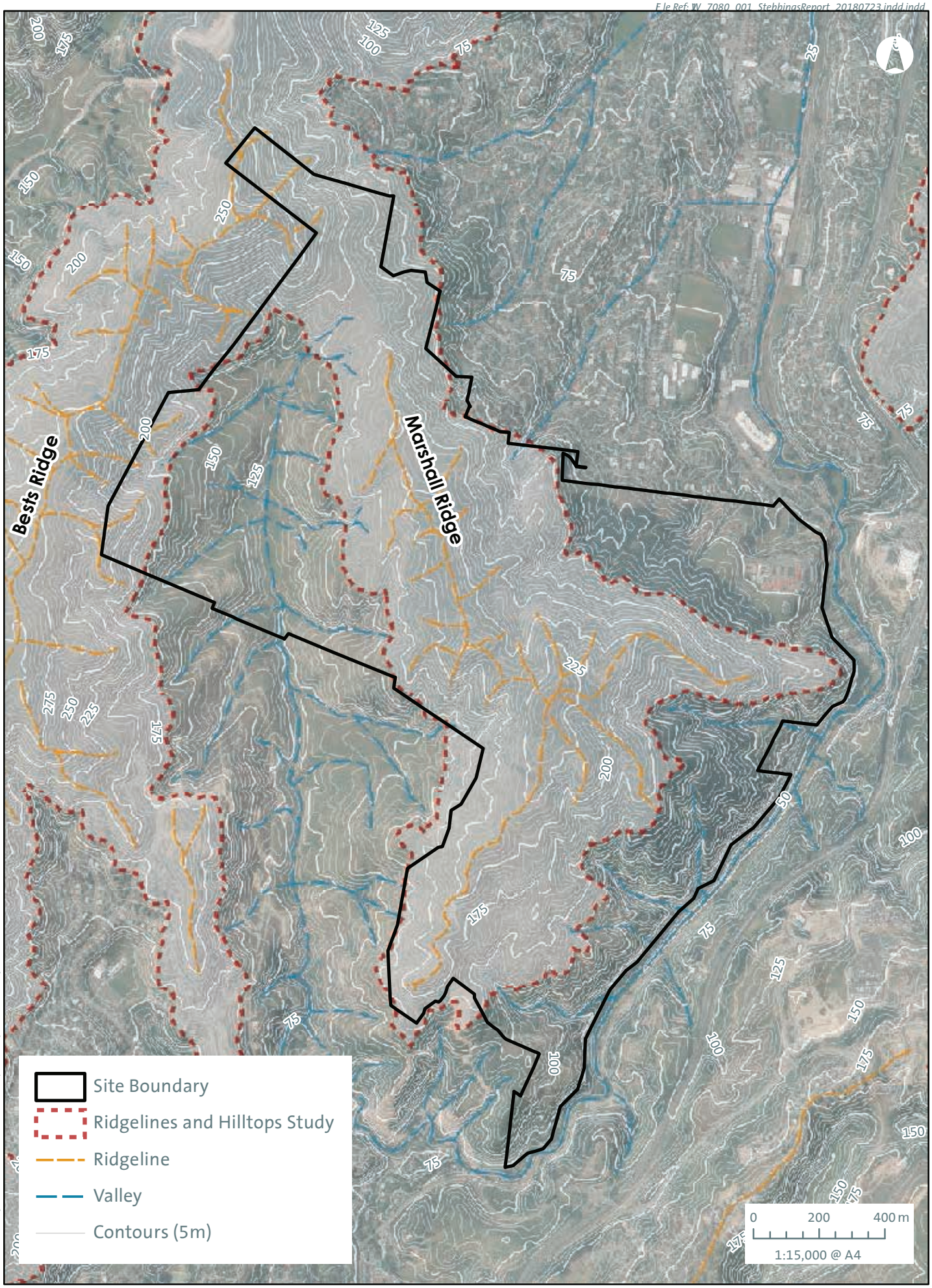


etops and Hilltops, the Natural and Amenity Values, 2001

CIL RIDGELINES AND HILLTOPS

High visibility within district
High visibility within communities
Apex of ridgeline / spur
Identified ridgeline / hilltop



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Ridgelines and Hilltops - Location Detail

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Figure 15

6.6 Section 7.10.6 of the report provides a summary of values for the areas as follows:

Natural

- *Landform: low ridge in the inland context (high point 303m), gently undulating, Best's / Spicer's ridge a continuous remnant peneplain surface.*
- *Land cover: predominantly pasture or pine plantation. Secondary native forest and regenerating vegetation on flanks in Redwood Bush area, on flanks of Marshall Ridge and in Johnsonville Park.*
- *Natural systems: natural regeneration occurring in places on flanks.*
- *Modification: landform comparatively unmodified apart from farm and transmission line tracks and Linden reservoir. Original vegetation cover substantially cleared.*

Visual

- *Prominence: locally distinctive undulating tops at Totara Ridge. Best's Ridge is a pastoral backdrop in the Upper Porirua Stream Valley and Spicer's a vegetated backdrop in the lower valley.*
- *Coherence: generally simple patterns of pastoral cover with regenerating vegetation on moister flanks. Some siting of pine plantations not sympathetic to landform.*
- *Visibility: Not highly visible at the district level but highly visible in local areas.*
- *Naturalness: natural landform generally very evident but generally managed for rural productive purposes. Forested areas in Johnsonville Park and Redwood Bush recognisably have more natural values.*

Heritage

- *Connections: Old Coach Road, an early settlers route.*

Recreation

- *Accessibility: currently confined to the Old Coach Road and tracks in Johnsonville Park and Redwood Bush. Most of ridgetop is privately owned. Potential as part of Outer Green Belt concept.*
- *Destinations: Johnsonville / Ohariu Valley trip via Old Coach Road, potential round trips between Churton Park and Tawa.*
- *Experience: pedestrian-only, rolling open tops, threshold between increasingly urban Porirua Stream Valley and rural Ohariu Valley.*

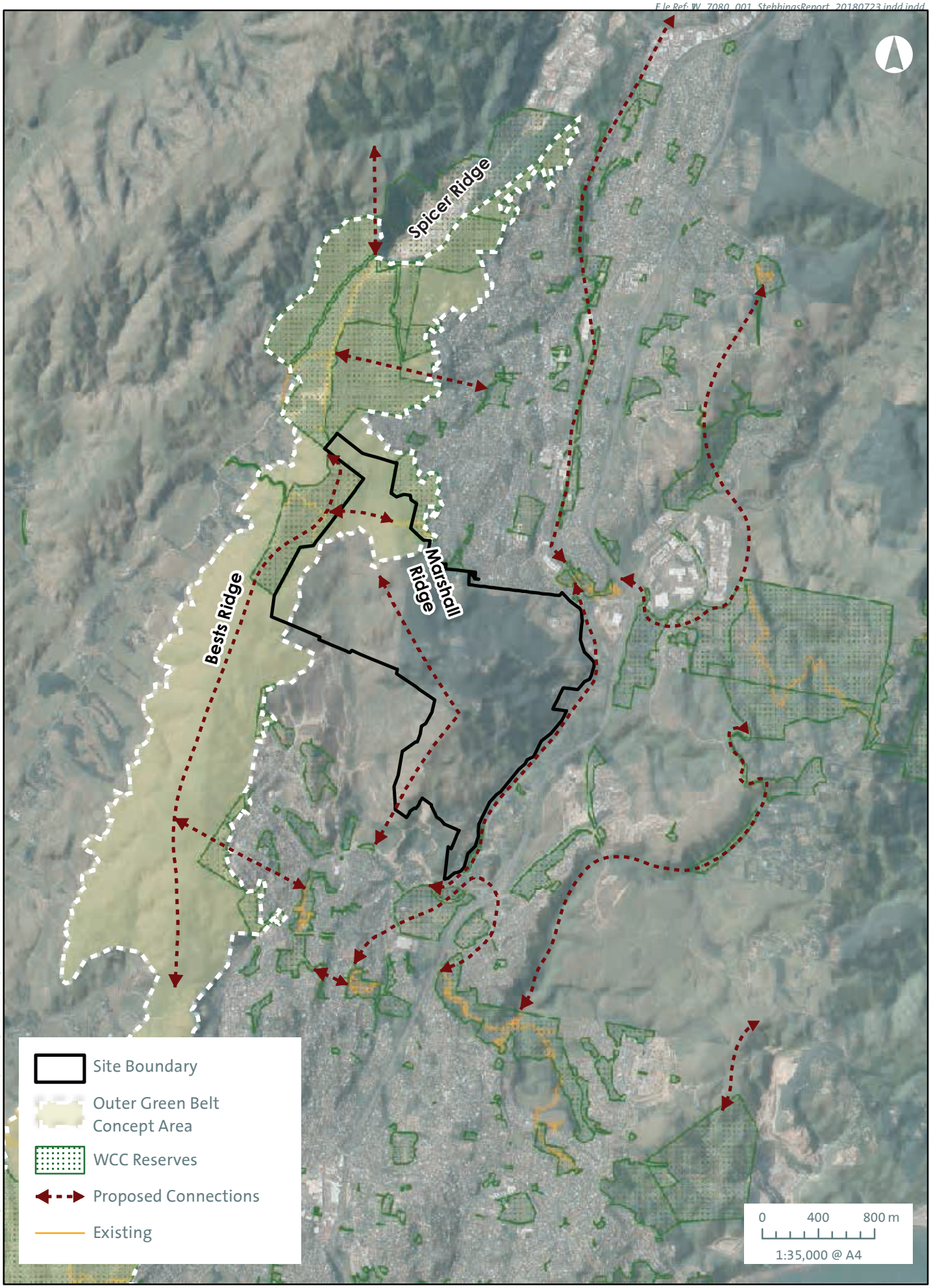
Outer Green Belt Management Plan

6.7 The site lies adjacent to the Outer Green Belt concept area, as identified by Wellington City Council's Outer Green Belt Management Plan (2004). The Outer Green Belt comprises both public and private land linked by shared ecological and landscape values, including ridgeline and hilltop values. The land forming the Outer Green Belt forms a natural backdrop to the city and a continuous skyline visually linking all the notable high points.

6.8 The vision for the Outer Green Belt is "a continuous green belt following the ridges to the west of the city from the South Coast to Colonial Knob, in which indigenous vegetation is restored and an informal recreation network is widely accessible."

6.9 The site lies at the junction between two of the identified Outer Green Belt sectors, which are illustrated on Figure 16: Sector 1 Spicer and Sector 2 Bests Ridge. Policies for the Spicer area include to:

- *Improve access via all three reserve sub-clusters to the upper slopes and links to a the wider open space network envisioned for this area in the Northern Growth Management Plan;*
- *Protect the open space at the junction between the Outer Green Belt and Marshall ridge as a key feature of a wider open space network for the northern suburbs;*
- *Maintain an open ridgeline with good access running north/south;*



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Recreation Connections

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Figure 16

- *Retention of pasture along the ridgeline for landscape and access purposes;*
- *Regeneration of indigenous bush below the ridgeline;*
- *Improved ecological linkage down to the north face of the Stebbings Valley ridge.*

6.10 Identified future initiatives for Sector 1 include to establish track links, discontinue forestry following harvest of these areas and allow the area to revegetate, enhancing the ecological corridor. The open ridgeline is to be maintained. The forestry areas lie directly to the north and west of the Site. Future landscape change in this area should be considered as part of the wider development of the site.

6.11 Sector 2, Bests Ridge, is primarily private land, and includes a small part of the northern part of the site. There is no established track network in this area and this is identified as one of the major gaps in access along the main Outer Green Belt ridgeline. It is recognised that as development extends up Stebbings Valley, demand for access to this ridge will increase .

6.12 Sector 2 has limited ecological significance and is not directly connected to any of the major ecological corridors. The management plan identifies that priority should be the protection of open pastoral landscapes on high areas and a green (planted) fringe adjoining the existing and future urban edges. Existing pine plantations will be managed.

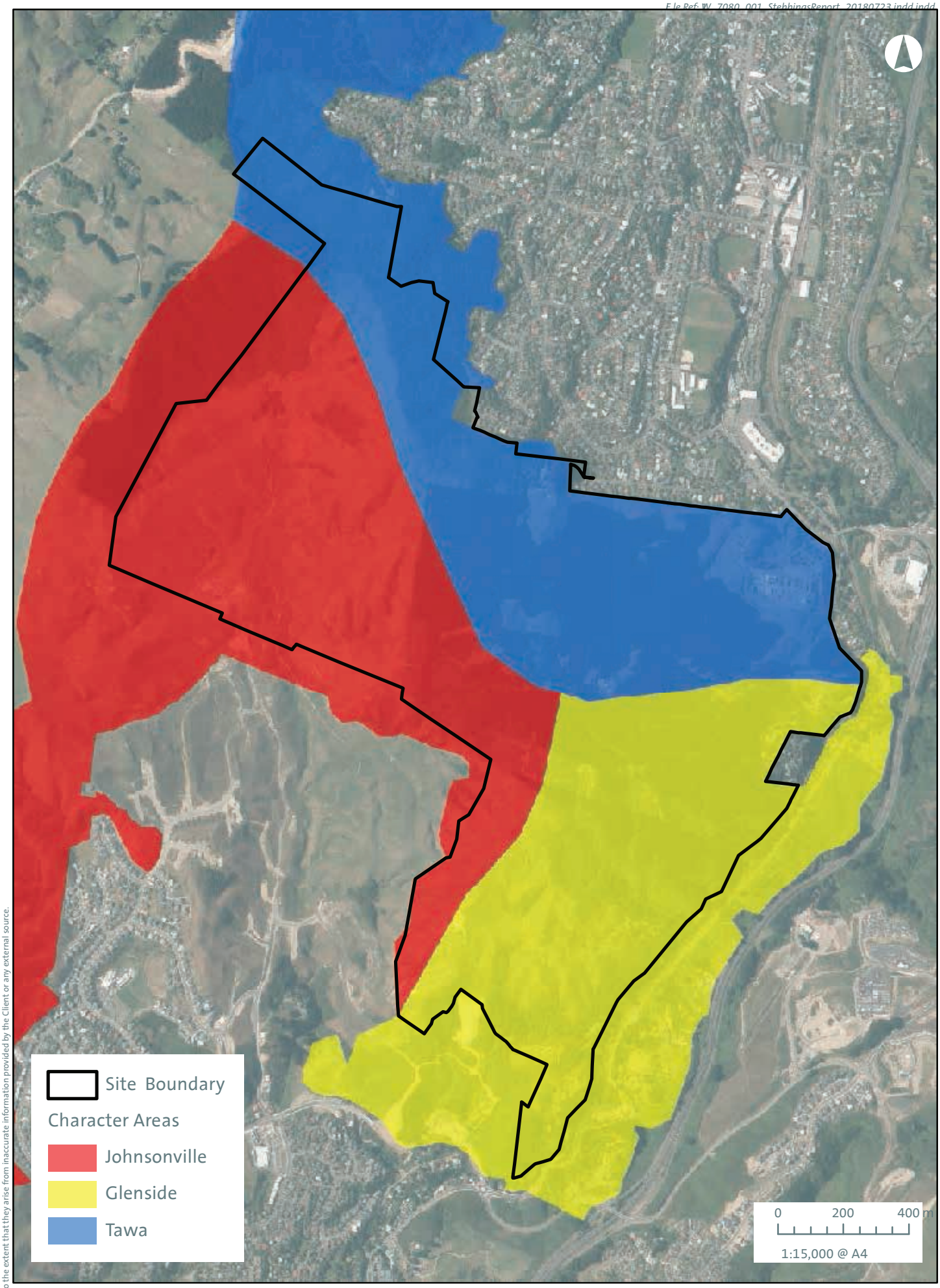
6.13 Objectives for Sector 2 of relevance to the Site include to:

- *Prevent land uses or the building of structures which would have a negative effect on the ridgetop landscape;*
- *Protect Outer Green Belt values through a variety of appropriate means;*
- *Work with private landowners to achieve a recreational access route along the main ridgeline, and at one or more side routes on the eastern side;*
- *Encourage a buffer of native vegetation along the residential edge of the eastern slopes, which results in a connected and accessible corridor;*
- *Encourage restoration of riparian planting along western stream courses.*

Northern Reserves Management Plan

6.14 The site also lies in close proximity to a number of reserve lands covered by Wellington City Council's Northern Reserves Management Plan (August 2008). The plan aims to provide a framework for management and decision making for the Council owned reserves in the northern area. These reserves are located on the fringe of or within the existing urban areas of the city, (see Figure 16). There are opportunities to create connections between these areas and the Site as a part of the wider recreation network. Policies of relevance to the Site include:

- *Acquire a network of reserves in Stebbings Valley that enhances the quality and integrity of the stream, protects remnants of indigenous vegetation and, where possible, provides buffers and linkages across steeper slopes and down to Stebbings Stream. In particular the ecological remnants in Upper Stebbings Valley.*
- *Provide future residents of Stebbings Valley with lists of plants used by the Council in reserves and advocate for their use across steeper areas of their properties in order to enhance the character and coherence of their community.*
- *Protect the open space character of Marshalls Ridge and the steeper ridges and spurs falling to Stebbings Valley and Middleton Road and the significant ecological remnants, through the provisions of this plan and other mechanisms.*



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Landscape Character Areas

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Figure 17

7.0 Landscape Character Areas

7.1 In 2014 Wellington City Council commissioned a Landscape Character Description to assist in understanding the city's landscape resource. The aim of the study was to provide a level of descriptive information to contribute to developing planning measures for managing landscape change. The CBD and urban areas of the city were excluded from this assessment. The study also provided a starting point and base information for the landscape evaluation technical report completed in 2017 that identified and mapped outstanding natural features and landscapes (ONFs, ONLs) and special amenity landscapes (SALs).

7.2 The study divides the city into a series of landscape character areas and describes the distinctive characteristics of each area. The Site straddles three landscape character areas: Johnsonville, Glenside and Tawa (Figure 17). When considered at a finer scale these three character areas can be subdivided in a series of sub character areas.

Johnsonville

The Johnsonville landscape character area lies on the western edge of suburban Johnsonville. The edge of the residential housing forms the east boundary, and the area extends to the ridgetop of Totara/Bests Ridge, which forms the west boundary.

Key Characteristics

- Narrow strip of land close to the backs of residential housing
- Pastured-covered ridgetop over regenerating native vegetation and scrub
- Open tributary stream/drain for much of the length
- Part of the Outer Green Belt
- Limited public access

Glenside

The Glenside landscape character area is located northeast of Churton Park and south of Tawa; and to the west of State Highway 1. It covers the southeastern part of the Site, to the south of Marshall Ridge.

Key characteristics

- Links to Ohariu Valley
- Private land in forestry and pasture
- Areas of regenerating scrub
- Close to other areas of regenerating scrub/remnant forest both to the east and west
- Highly visible from State Highway 1

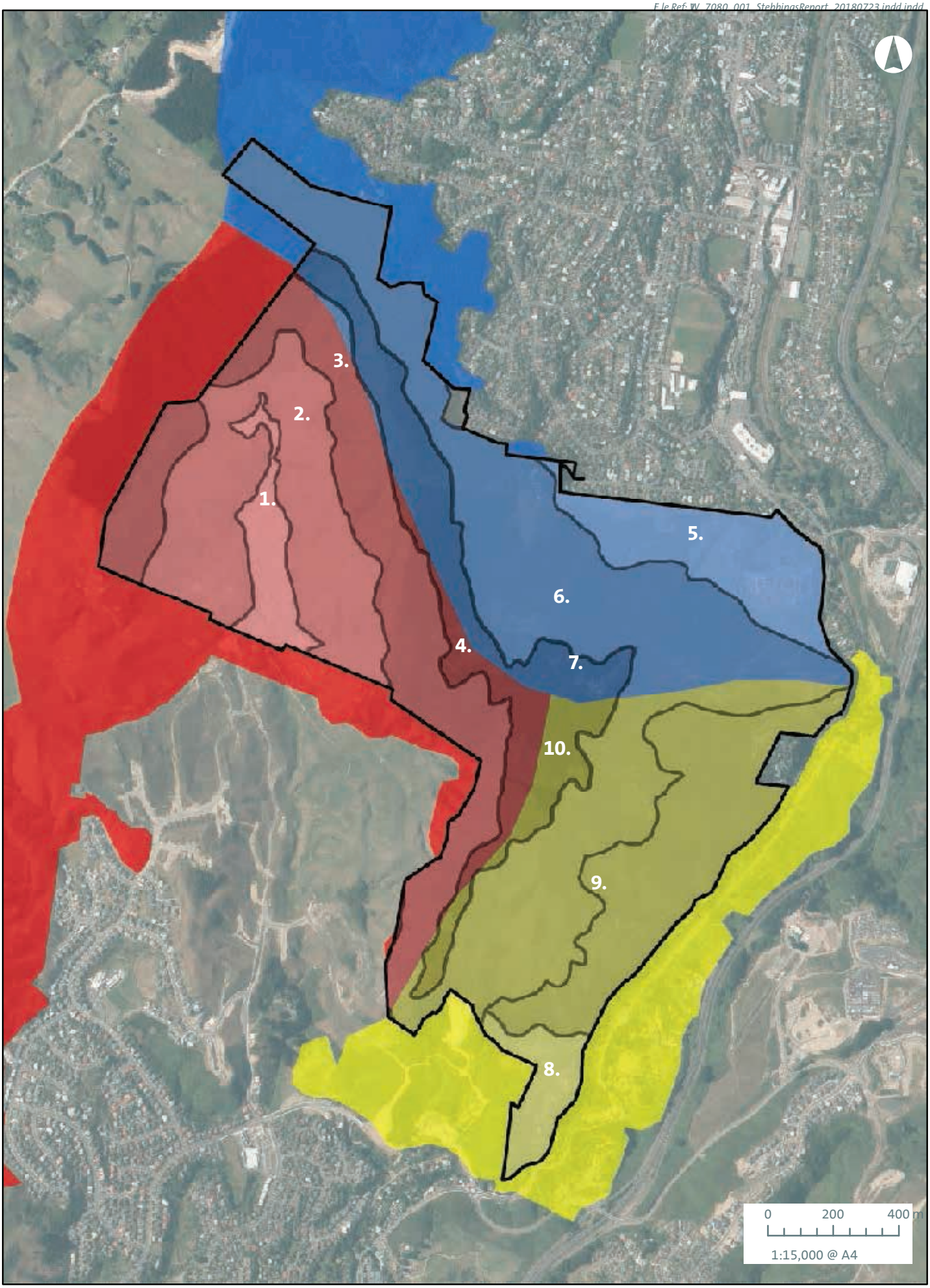
Tawa

This area lies to the southwest of Tawa. It covers the northeastern part of the Site, to the north of Marshall Ridge.

Key characteristics

- Green backdrop to Tawa/Linden
- Predominantly forested; pine plantations, native remnants, regenerating native vegetation
- Significant forest remnants
- Limited public access; limited track network

Open pasture of the toe slopes, with regenerating native vegetation in spring fed seepages



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Sub Character Areas

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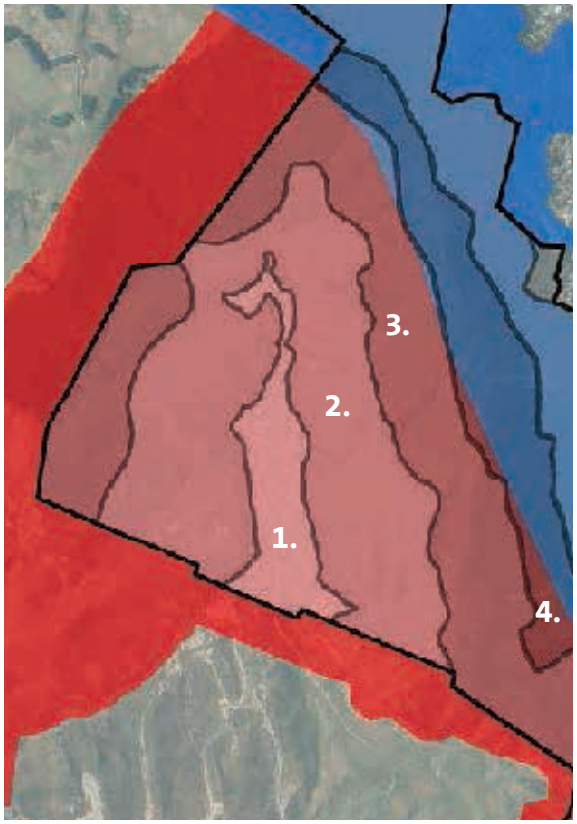
Figure 18

8.0 Sub Character Areas

Johnsonville Sub Character Area

8.1 The Johnsonville character area is made up of the following sub character areas: valley floor, toe slopes, mid slopes and ridgetops,. Refer to the map detail below for location and Figure 18 for a wider view.



1. Johnsonville Valley Floor

This area comprises the narrow valley bottom of Stebbings Valley, and includes areas of pastoral land edging onto the stream boundaries with wetland, riparian vegetation and pockets of broadleaf/podocarp forest to the north. The valley floor has a sheltered and intimate feel and is enclosed by the surrounding slopes. Pylons cross this area in the lower part of the valley.

Flat open area of the valley floor

Johnsonville valley floor and adjacent toe slopes

2. Johnsonville Toe Slopes

The toe slopes area covers the steeper hummocky landform with its distinctive flat tops created by spring fed seepages. The area of largely pasture and grazed by sheep, with some areas of regenerating podocarp/ broadleaf forest in the upper seepages on the eastern side, together with areas of wetland and riparian vegetation. There is little evidence of erosion of the pastoral land. Areas of wetland and riparian vegetation occur within the incised areas created by spring fed seepages on the higher slopes.

Johnsonville toe slopes with regenerating vegetation in spring fed seepages

3. Johnsonville Mid Slopes

The mid slopes area, lying between 150 to 190masl, covers the steeper landform of the mid slopes of the valley. Mid slopes on the western side have occasional rocky outcrops exposed through the pasture.

Steeper landform of the Johnsonville mid slopes

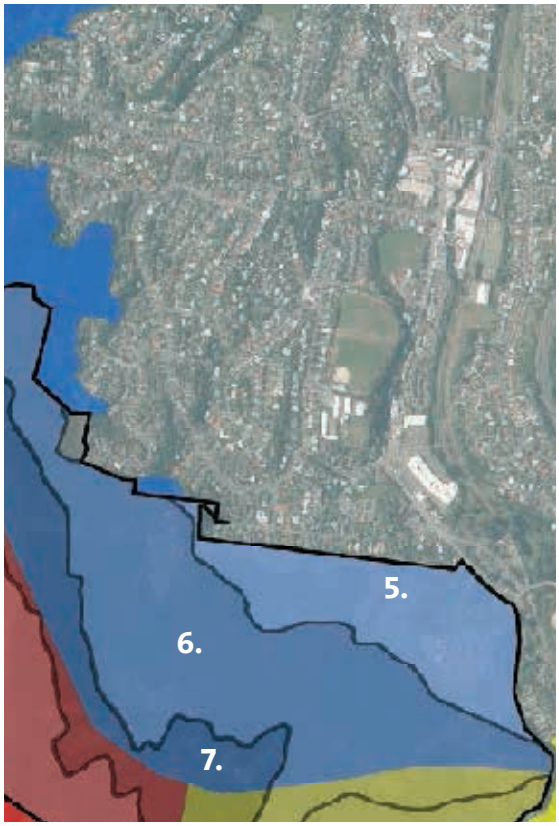
4. Johnsonville Ridgetops

The open ridgetops straddle the Johnsonville/ Tawa area and are evidence of the remnant eroded peneplain of Marshall Ridge. The ridgetops are open and exposed pasture, with thinner soils. From the area there are panoramic views across Churton Park, Tawa, Paparangi and Grenada North.

View towards open ridgetops in Johnsonville

Tawa Sub Character Areas

8.2 The Tawa character area comprises three sub character areas: toe slopes, mid slopes and ridgetops. Refer to the map detail below for location and Figure 18 for a wider view.



5. Tawa Toe Slopes

The Tawa toe slopes lie to the north of Marshall Ridge and also have a steeper hummocky landform with flat tops. One flat topped area is occupied by Arohata Women's Prison. The remaining area is covered by a mix of pine plantation and scrub. This area is immediately adjacent to residential development in Tawa, some of which also occupies the same toe slope landform to the north.

View towards Tawa toe slopes and Arohata Women's Prison

6. Tawa Mid Slopes

The Tawa mid slopes area covers the steeper hummocky landform with its distinctive rounded valleys. It is covered by regenerating broadleaf forest in the north, with pine plantation to the south. Transmission lines separate the two areas. The rectilinear pine plantations conceal the hummocky landform and contrast with the native vegetation on these slopes, creating a distinctive landscape pattern visible from the east.

View towards Tawa mid slopes with pine plantation contrasting with native regeneration

7. Tawa Ridgetops

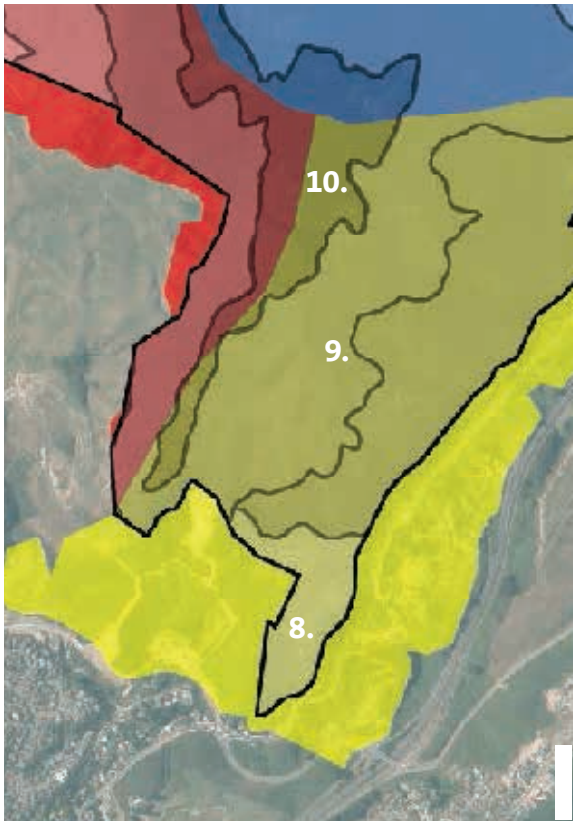
The Tawa ridgetop area is covered by tracts of regenerating broadleaf forest to the north and pine plantation to the south. This area provides a green backdrop to suburban Tawa. The area is exposed with vegetation cover less established than in the lower valleys.

View towards vegetated ridgetops from Tawa, pines are visible in the left and right of the view with regenerating native vegetation in between

View over Tawa character area showing forested ridgeline and midslopes which provide a backdrop to Tawa

Glenside Sub Character Areas

8.3 The Glenside character area is made up of the following sub character types: toe slopes, mid slopes and ridgeline, Refer to the map detail below for location and Figure 18 for a wider view.



8. Glenside Toe Slopes

The Glenside toe slopes cover the more gently rolling landform at the southern most corner of the site. This area is not widely visible due to its elevation and concealment by surrounding landform and vegetation. It is primarily visible from the adjacent areas of Middleton Road and Howells Road. The area accommodates several rural lifestyle properties and a mix of native and exotic vegetation.

Glenside toe slopes with existing residential dwellings and mixed vegetation

9. Glenside Mid Slopes

Glenside mid slopes lie at around 150 to 190masl, covering the steeper hummocky landform on the upper slopes of the spur to the southwest of Marshall Ridge. Land cover is predominantly pasture, with some areas of regenerating broadleaf forest. The distinctive landform of this area is widely visible from areas to the southwest including Paparangi and Grenada North.

View towards Glenside mid slopes and ridgetops from Grenada North

10. Glenside Ridgetops

The Glenside ridgetops are formed by a spur which runs southwest from the southern end of Marshall Ridge. The ridgetop is grazed pasture and is open and exposed, with panoramic views out over the surrounding area.

View from open and exposed Glenside ridgetop illustrating long distance views to the south

View over Glenside Character Area showing undulating mid slopes

9.0 Viewing Audience

9.1 To understand the levels of visibility of the Site from surrounding areas a viewshed analysis was carried out. This involved preparing a computer-generated Zone of Theoretical Visibility (ZTV) map, based on existing contour data. The ZTV does not take into account vegetation cover or structures. ZTVs are a useful tool to determine where field work should be directed and provides an understanding of the potential viewing audience of the Site from surrounding areas. Figure 19 shows the overall visibility of the Site.

9.2 Views towards the Site are available from the north, from open or elevated areas within Tawa, to the east from the ridgeline between and south. Views towards the Site from the west are truncated by Bests Ridge.

9.3 Following interrogation of the ZTV and filed reconnaissance, key viewpoints from adjoining areas were identified and representative photographs taken from the following areas:

Views from the north

- Lyndhurst Park in Tawa
- Allen Terrace
- Pikitanga Reserve

Views from the south east

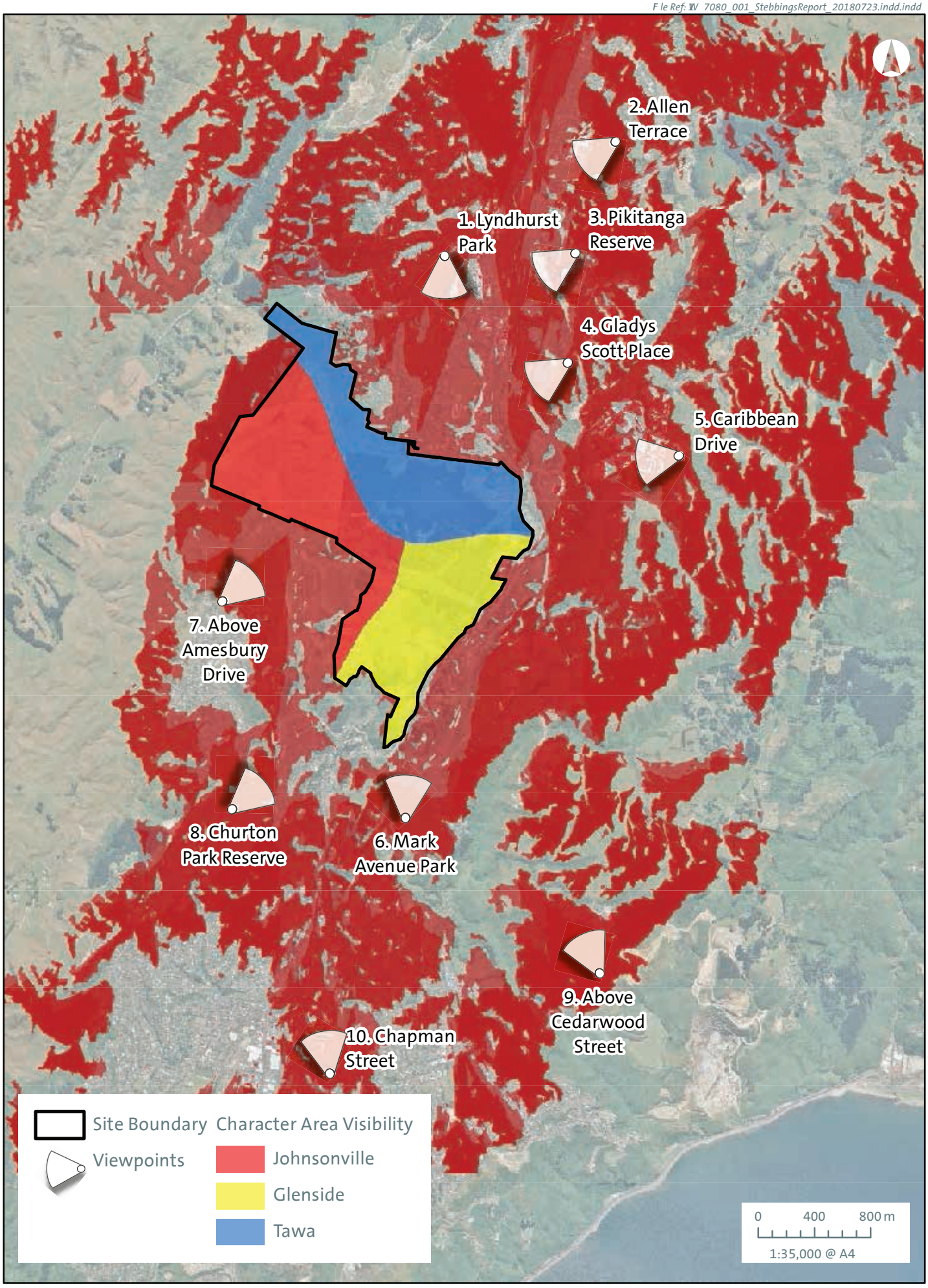
- Gladys Scott Place
- Caribbean Drive

Views from the south

- Mark Avenue
- Above Amesbury Drive
- Churton Park Reserve

Distant views

- Above Cedarwood Street, Woodridge
- Chapman Street, Newlands



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UPPER STEBBINGS VALLEY

Zone of Theoretical Visibility

| Date: 19 July 2018 | Revision: 1 |

Plan prepared for Wellington City Council by Boffa Miskell Limited

Project Manager: **boyden.evans@boffamiskell.co.nz** | *Drawn:* HHM | *Checked:* RGi

Figure 19

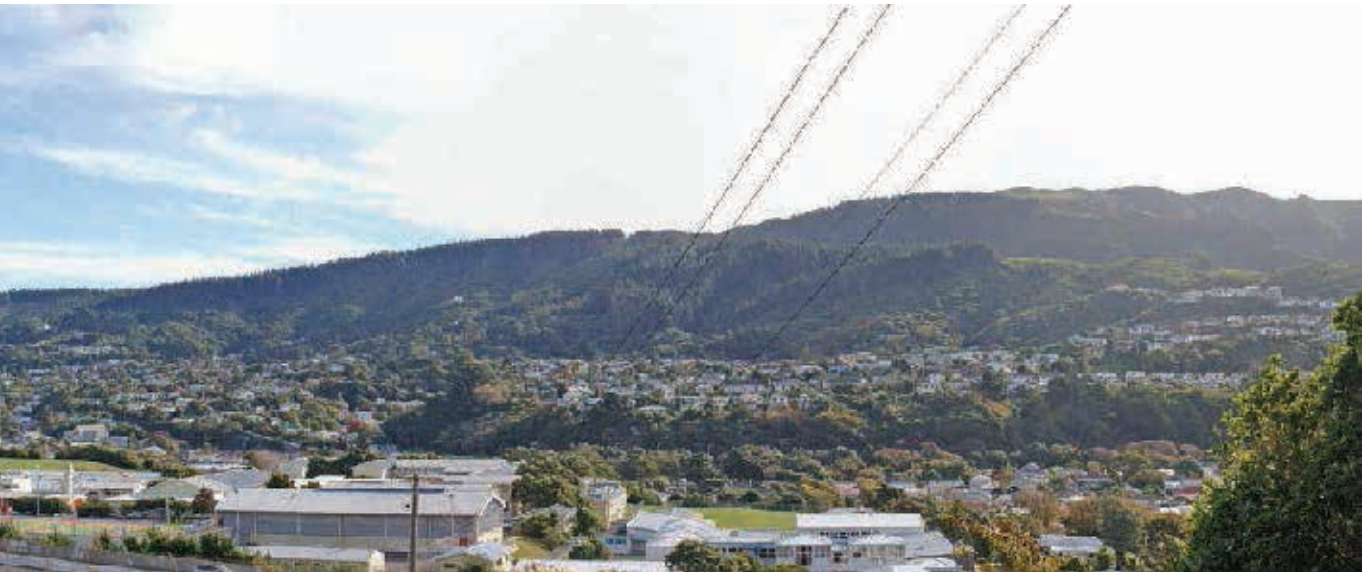
Views from the North

Viewpoint 1 - Lyndhurst Park

Views from the north are available from the residential areas of Tawa (refer to representative view from Lyndhurst Park). The vegetated ridgeline of Marshall Ridge, with regenerating native vegetation and pine plantations forms a prominent green backdrop to the residential setting of Tawa. Houses on the lower toe slopes of the ridge are visible in the middle ground of the view. A small part of the exposed upper ridgeline of the Johnsonville ridge is also visible.

Viewpoint 2 - Allen Terrace

A view from the northeastern part of Tawa is available from Allen Terrace. The view looks across the Tawa College sports fields towards the residential area of Tawa. Residential properties are visible on the lower toe slopes of Marshall Ridge. The vegetated mid and upper slopes of the ridge form the middle ground of the view, with pine plantations flanking the area of regenerating vegetation. The higher exposed ridgeline of Bests Ridge is visible beyond.



Viewpoint 3 - Pikitanga Reserve

From the north, the view from Pikitanga Reserve looks west towards the pine covered slopes of the Glenside Character Area, and the regenerating vegetation and pines covering Marshall Ridge in the Tawa Character Area. The higher, exposed pastoral ridgeline of Bests Ridge forms the horizon beyond this in the centre of the view. Residential development in Tawa is visible in the lower valley in the centre of the view.

Views from the South-East

Viewpoint 4 - Gladys Scott Place

From Gladys Scott Place, residential properties form the foreground of the view, before the landform descends towards the residential area of Tawa. Houses in Tawa occupy the valley and can be seen ascending the lower toe slopes of the ridge. The pine covered slopes of the Glenside spur form a dominant element and the ridgeline in the left of the view. In the centre, regenerating vegetation on the slopes of Marshall Ridge can be seen, with a small part of the exposed open ridgetop of the Johnsonville Character Area. Pylons along the open expanse of Bests Ridge are visible beyond. Pine plantations on Bests Ridge form the horizon in the right hand side of the view.

Viewpoint 5 - Caribbean Drive

A view from the southeast from Caribbean Drive in Grenada North looks towards the Tawa Character Area. The Tawa mid slopes and ridgeline (Marshall Ridge) form the skyline in the left of the view. Power pylons can be seen crossing through the area of pines in the left of the view and on the skyline on Bests Ridge beyond in the centre of the view. A small part of the open pastoral Johnsonville ridgeline area can also be seen, with pine plantation on Bests Ridge forming the backdrop. The residential area of Tawa is visible on the toe slopes of the valley in the middle ground of the view.

Views from the South

Viewpoint 6 - Mark Avenue

The view from Mark Avenue north of Paparangi lies directly east of the Site. The view is directly towards the Glenside Character Area. The existing residential development within the site is visible on the lower toe slopes, with pastoral land, regenerating vegetation in gullies, and pines on the mid and upper slopes. The steep hummocky pastoral landform of the site forms a prominent feature in the view. Settlement in Churton Park and Johnsonville can be seen on the toe to mid slopes in the left hand of the view, with Bests Ridge forming the skyline. To the right, houses in Grenada form the foreground of the view, with distant views towards Tawa and Porirua beyond.

Viewpoint 7 - Above Amesbury Drive

A near view to the south of the Site is available from the walkway above Amesbury Drive. The view looks north into Stebbings Valley, with the open pasture covered slopes of the Johnsonville character area visible to the right. The pine covered ridgeline to the south and north of the character area is also visible. The distinctive hummocky landform of the Johnsonville toe slope are visible towards the centre, with the open valley floor below. Transmission lines can be seen crossing the land to the south of the site. Recent residential development in the north of Churton Park is visible in the foreground.

Viewpoint 8- Churton Park Reserve

A more distant view from the south is possible at Churton Park Reserve. The open park area and residential development in Churton Park beyond forms the foreground. The pine plantation covering the southern part of the ridgeline within the Johnsonville Character Area is visible to the right. Transmission lines to the south of the site are visible crossing the horizon on this ridge and on the open pasture covered Bests Ridge on the left hand side. In the centre, houses on Trafford Terrace form the horizon, screening the open ridgeline of the Site beyond.

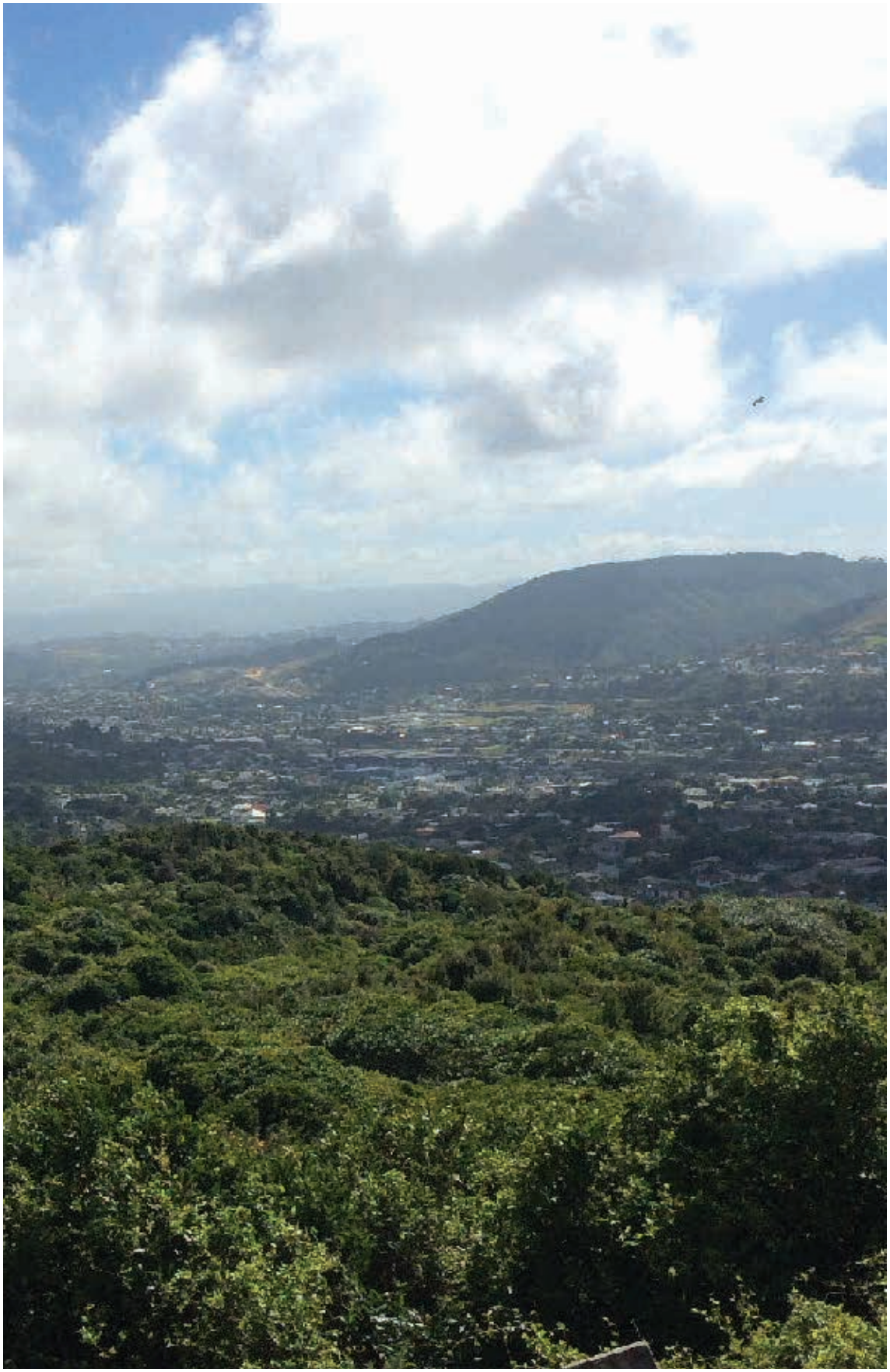
Distant views

Viewpoint 9 - Above Cedarwood Street, Woodridge

A very distant view towards the Site from the southeast is available from Woodridge. The view looks out across recent residential development in Woodridge, and the ridgetops to the east of Grenada North and housing on the ridgeline of Mark Avenue, towards the Glenside Character Area. The rolling pastoral mid slopes and open ridgetops are visible, along with the pine plantations to the north. Beyond this, the western side of the Johnsonville Character Area is just visible, with transmission lines on Bests Ridge and the airstrip block pine plantation visible, with the ridgeline of Colonial Knob forming the horizon beyond.

Viewpoint 10 - Chapman Street, Newlands

A long distance view towards the site from the south is available from Chapman Street, Newlands. Residential development in Johnsonville is visible on the left, with houses ascending the toe slopes of the valley towards Churton Park. The horizon is formed by Bests Ridge, with Colonial Knob forming a feature in the centre. To the right of this, the Site is visible, with a view directly into Stebbings Valley in the distant centre, and the open slopes of the Johnsonville Character Area, as well as the open toe and mid slopes and pine forested ridgeline of the Glenside Character Area.



View from Site over Redwood Bush out towards Tawa valley

10.0 Summary

10.1 This report is the first phase of work for Upper Stebbings, involving information collation to identify key issues to provide a better understanding of the characteristics and attributes of the Site. The information and analysis in this report will be used to inform the next phase of work, a structure plan for the Site.

10.2 The Site lies to the north of Churton Park, to the south of Tawa, and to the west of State Highway 1, on the fringe of the Wellington Outer Green Belt. The elevated land within the site is covered by the policies of the Ridgelines and Hilltops overlay in the Wellington City District Plan, which identifies the Site as having high visibility within local communities, forming an open space backdrop to suburban development. The Site does not lie within an Outstanding Natural Feature or Outstanding Natural Landscape. At a local level the Site lies at the junction of three Landscape Character Areas: Churton Park, Tawa and Johnsonville. Locally distinctive characteristics of these areas include the open pastoral ridgetops contrasting with native or pine covered slopes. Within these character areas, at a site level, this report has identified four distinct Landscape Character types: the valley floor, toe slopes, mid slopes and ridgetops.

10.3 The areas of remnant forest within the site are all significant under the Regional Policy Statement. These forest types have suffered considerable loss historically and these remnants are of high ecological value which we believe supports their protection. Areas of seral scrub and low forest also occur. These have lower value currently, but provide opportunities for rehabilitation. The valley floor contains a large (2.9ha) and highly modified remnant of a natural wetland. This wetland also presents an opportunity for restoration.

10.4 The main stem of Stebbings Stream, and the tributaries of Stebbings and Porirua Streams which flow through native forest are considered to have high ecological value, although fish species are limited by substantial fish barriers in Stebbings Stream, and under-road culverts in the case of the Porirua Tribs. The remaining waterways are all in pasture, pine or scrub and currently have low to moderate value due to their modification and ongoing grazing.

10.5 In terms of fauna, only common lizards and common birds were found during surveys within the site boundary. Indigenous bird diversity and abundance was highest in the forest remnants, with a number of common and robust species also seen in the pasture.

10.6 It should be noted that around one third of the site was inaccessible for surveys. Access to these areas would allow confirmation of mapped vegetation and of stream condition. The bird survey was also carried out in late summer and autumn and a spring survey would be helpful to confirm the presence of resident species.

10.7 The major ridgelines forming the Site, Bests Ridge and Marshall Ridge, provide a sense of enclosure to the lower lying areas of the site and are highly visible from the suburban areas of Churton Park, Tawa, and State Highway 1. Accordingly, areas of higher landscape and visual value are the upper mid slopes and ridgetop areas, which are not only highly visible, but also distinctive landscape features in themselves. These areas currently form a very strong definition between the neighbourhoods of Churton Park and Tawa, and an important backdrop to these communities.

Modified natural wetlands (grazed) occurring on the valley floor have significant potential for restoration

Opportunities

10.8 The nature of development in Churton Park, where large dwellings sit on small allotments, with limited green space, contrasts with the well vegetated earlier era of development in Tawa. The Site provides an opportunity to approach the development of the Site in a different manner to the current approach to development in the neighbouring Churton Park residential area. An alternative approach would involve retaining key landscape and ecological elements and features as the basis for a development framework. Ecological opportunities exist to protect and enhance the central wetland area, along with the management of stormwater into waterways. There are opportunities for landscape and recreation in the creation of a very strong public open space network which would provide the separation between and definition of neighbourhoods within Upper Stebbings.

Riparian vegetation in pasture

11.0 References

Boffa Miskell Ltd. (2001). Wellington's ridgetops and hilltops: The natural and amenity values. Prepared by Boffa Miskell Ltd for Wellington City Council.

Boffa Miskell Ltd. (2004). Northern Growth Management Framework - Stebbings Stream: Stream investigation (Report No. W04076). Prepared by Boffa Miskell Ltd for Wellington City Council.

Boffa Miskell Ltd. (2006). Northern growth management framework south Stebbings review - a review of the ecology of the south Stebbings area, and a summary of plans and policies relevant to the protection and enhancement of sites of ecological value. Boffa Miskell Ltd on behalf of GWRC.

Boffa Miskell Ltd. (2008). Westchester Drive Link, Churton Park, Wellington. Assessment of Ecological Effects. BML Report_W07138A. Prepared by Boffa Miskell for Wellington City Council.

Boffa Miskell Ltd. (2010). Westchester Road Extension, Baseline Stream Report and Establishment of Biological and Water Quality Monitoring Triggers. BML Report_W07138C. Prepared by Boffa Miskell for Wellington City Council.

Boffa Miskell Ltd. (2012). Westchester Road Extension - Construction Monitoring of Stebbings Stream; Quarterly Activity Reports #01 to #05; 1 Mar 2011 - 31 May 2012. BML Reports_W07138D. Prepared by Boffa Miskell for Wellington City Council.

Boffa Miskell Ltd. (2014). Wellington landscape character description 2014 (Report No. W14006). Prepared by Boffa Miskell Ltd for Wellington City Council.

Dawson, D. G., & Bull, P. C. (1975). Counting birds in New Zealand forests. Notornis, 22(2), 101–109.

EcoGecko Consultants Ltd. (2014). Lizard survey of Wellington City Council - Administered Parks & Reserves: Final Report. Report prepared for the Wellington City Council.

Friends of Tawa Bush Reserves Inc., & Wildland Consultants. (2016). Strategic plan friends of Tawa bush reserve.

Goodman, J. M., Dunn, N. R., Ravenscroft, P. J., Allibone, R. M., Boubee, J. A. T., David, B. O., ... Rolfe, J. R. (2014). Conservation status of New Zealand freshwater fish, 2013 (New Zealand Threat Classification Series No. 7). Wellington: Department of Conservation.

Greater Wellington Regional Council. (2015). Proposed Natural Resources Plan for the Wellington Region. Greater Wellington Regional Council.

Heather, B., & Robertson, H. A. (2005). The field guide to the birds of New Zealand. Auckland: Penguin Books.

Hitchmough, R., Barr, B., Lettink, M., Monks, J., Reardon, J., Tocher, M., ... Rolfe, J. (2016). Conservation status of New Zealand reptiles, 2015 (New Zealand Threat Classification Series No. 17). Wellington: Department of Conservation.

Joy, M., David, B., & Lake, M. (2013). New Zealand freshwater fish sampling protocols. Part 1: Wadeable rivers and streams (New Zealand Freshwater Fish Sampling Protocols). Palmerston North: Massey University.

Martin, E., Morar, S. R., & Heath, M. W. (2017). Rivers water quality and ecology monitoring programme: annual data report, 2016/17 (No. GW/ESCI-T-17/95). Wellington: Greater Wellington Regional Council.

Matheson, F., Quinn, J., & Hickey, C. (2012). Review of the New Zealand instream plant and nutrient guidelines and development of an extended decision making framework: Phases 1 and 2 final report (NIWA Client Report No. HAM2012- 081). Hamilton: Prepared by NIWA for the Ministry for Science & Innovation Envirolink Fund.

Maxted, John R. (n.d.). Physical Habitat Assessment - Field Data Sheets. Prepared for Auckland Regional Council.

McArthur, N., Moylan, S., & Crisp, P. (2012). Baseline survey of the diversity, abundance and distribution of birds in Wellington City reserves. Greater Wellington Regional Council.

Melzer, S., & Bell, T. (2014, June). Lizard survey of Wellington City Council-administered parks & reserves: Final report. Unpublished EcoGecko Consultants Ltd report prepared for the Wellington City Council.

Miskelly, C., Empson, R., & Wright, K. (2005). Forest birds recolonizing Wellington. Notornis, 52, 21–26.

O'Donnell, C. F. J. (2000). Conservation status and causes of decline of the threatened New Zealand long-tailed bat Chalinolobus tuberculatus (Chiroptera: Vespertilionidae). Mammal Review, 30(2), 89–106.

O'Donnell, C. F. J., & Sedgeley, J. A. (2001). Guidelines for surveying and monitoring long-tailed bat populations using line transects (DOC Science Internal Series No. 12). Wellington: Department of Conservation.

Park, G. E. (1999). An inventory of the surviving traces of the primary forest of Wellington City. Report for Wellington City Council.

Perrie, A., Morar, S. R., Milne, J. R., & Greenfield, S. (2012). River and stream water quality and ecology in the Wellington region: State and trends (No. GW/EMI-T-12/143). Wellington: Greater Wellington Regional Council.

Robertson, H. A., Baird, K., Dowding, J. E., Elliott, G. P., Hitchmough, R. A., Miskelly, C. M., ... Taylor, G. A. (2017). Conservation status of New Zealand birds, 2016 (New Zealand Threat Classification Series No. 19). Wellington: Department of Conservation.

Romjin, R., Adams, L., & Hitchmough, R. (2012). Lizard strategy for the Wellington region 2012-20. Wellington Regional Lizard Network.

Sedgeley, J., O'Donnell, C., Lyall, J., Edmonds, H., Simpson, W., Carpenter, J., ... McInnes, K. (2012). DOC best practice manual of conservation techniques for bats (Inventory and Monitoring Toolbox: Bats No. DOCDM-131465). Wellington: Department of Conservation.

Stark, J. D., Boothroyd, I. K. G., Harding, J. S., Maxted, J. R., & Scarsbrook, M. R. (2001). Protocols for sampling macroinvertebrates in wadeable streams (p. 65). Wellington: Prepared for the Ministry for the Environment.

Wellington City Council. (2000). Wellington City District Plan. Wellington City Council.

Wellington City Council. (2003). Northern area – a Framework for growth management.

Wellington City Council. (2004). Wellington's Outer Green Belt Management Plan. Wellington: Wellington City Council.

Wellington City Council. (2008). Northern Reserves Management Plan.

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