

ASSESSMENT OF ECOLOGICAL EFFECTS OF PROPOSED ZONING CHANGE OF 190, 236, AND 268 STRATTON STREET, LOWER HUTT



 providing
outstanding
ecological
services to
sustain
and improve our
environments



ASSESSMENT OF ECOLOGICAL EFFECTS OF PROPOSED ZONING CHANGE OF 190, 236, AND 268 STRATTON STREET, LOWER HUTT



View from the driveway of 268 Stratton Street, showing regeneration of indigenous vegetation underneath planted Eucalyptus species.

Contract Report No. 5743

September 2021

Project Team:

Sarah Herbert - Site visit, report author
Keely Paler - Report author
Trent Bell - Technical advice (herpetofauna)
Dorothea Burn-Murdoch - GIS
Kelvin Lloyd - Peer review

Prepared for:

Catharina Fisher and neighbours,
268 Stratton Street,
Normandale,
Lower Hutt 5010

CONTENTS

1.	EXECUTIVE SUMMARY	1
2.	INTRODUCTION	2
3.	ECOLOGICAL CONTEXT	3
	3.1 Overview	3
	3.2 Local context	3
	3.3 Site description	7
4.	METHODS	7
	4.1 Vegetation and habitat survey	7
	4.2 Fauna survey	7
5.	TERRESTRIAL VEGETATION AND HABITATS	7
	5.1 Regenerating indigenous broadleaved forest (Vegetation Type 1, c.5.87 ha)	8
	5.2 <i>Eucalyptus</i> - Tasmanian blackwood/indigenous broadleaved forest (Vegetation Type 2, c.0.53 ha)	10
	5.3 <i>Pinus radiata</i> /indigenous broadleaved forest (Vegetation Type 3, c.14.93 ha)	10
	5.4 <i>Eucalyptus</i> -macrocarpa/indigenous broadleaved forest (Vegetation Type 4, c.1.23 ha)	10
	5.5 Mixed indigenous-exotic broadleaved scrub (Vegetation Type 5, c.9.74 ha)	10
	5.6 <i>Eucalyptus</i> treeland/mixed indigenous-exotic broadleaved scrub (Vegetation Type 6, c.0.34 ha)	10
	5.7 Enhanced mixed indigenous-exotic broadleaved scrub (Vegetation Type 7, c.0.14 ha)	10
	5.8 Gorse-māhoe-ponga scrub (Vegetation Type 8, c.4.10 ha)	11
	5.9 Gorse scrub (Vegetation Type 9, c.2.93 ha)	11
	5.10 Pasture (Vegetation Type 10, c.8.59 ha)	11
	5.11 Pūrei riparian wetland (Vegetation Type 11, c.0.03 ha)	11
	5.12 Harakeke-toetoe/kiokio wetland (Vegetation Type 12, c.0.03 ha)	11
6.	AQUATIC HABITATS	11
7.	FLORA	12
8.	FAUNA	13
	8.1 Birds	13
	8.2 Long-tailed bats	14
	8.3 Herpetofauna	14
	8.4 Aquatic fauna	15
	8.5 Terrestrial invertebrates	15
	8.6 Introduced pest mammals	15

9.	ECOLOGICAL VALUES	16
9.1	Summary of terrestrial ecological values	16
9.2	Summary of aquatic ecological values	16
10.	PROPOSED PLAN CHANGE AND POTENTIAL OUTCOMES	17
10.1	Future land uses potentially resulting from proposed rezoning to Rural Residential	17
11.	POTENTIALLY ADVERSE ECOLOGICAL EFFECTS	18
11.1	Overview	18
11.2	Disturbance, modification, and/or loss of vegetation	18
11.3	Introduction and spread of pest plants	21
11.4	Mortality of and/or disturbance to avifauna	21
11.5	Injury to and/or mortality of indigenous lizards	21
11.6	Sedimentation and contamination of freshwater habitats	22
12.	OPPORTUNITIES TO AVOID, MINIMISE, REMEDY OR MITIGATE POTENTIAL ADVERSE EFFECTS	22
12.1	Overview	22
12.2	Disturbance, modification, and/or loss of indigenous vegetation	22
12.3	Assessment of the ecological significance and value of the proposed no-development areas on the properties	23
13.	CONCLUSIONS	28
	ACKNOWLEDGMENTS	28
	REFERENCES	30
	APPENDICES	33
1.	Vascular plant species recorded at 190, 236, and 268 Stratton Street, Normandale	33
2.	Fauna species recorded at 190, 236, and 268 Stratton Street, Normandale	37
3.	Additional opportunities to avoid, minimise, remedy or mitigate potential adverse effects arising from future residential development	39
	<u>Disturbance, modification, and/or loss of indigenous vegetation</u>	39
	<u>Introduction and spread of pest plants</u>	40
	<u>Mortality and disturbance of indigenous avifauna</u>	40
	<u>Injury to and/or mortality of indigenous lizards</u>	41
	<u>Sedimentation and contamination of freshwater habitats</u>	41
4.	Site photographs	42

Reviewed and approved for release by:



Kelvin Lloyd
Principal Ecologist
Wildland Consultants Ltd

© *Wildland Consultants Ltd 2021*

This report has been produced by Wildland Consultants Ltd for the landowners of 190, 236, and 268 Stratton Street, Normandale (Catharina Fisher and neighbours). All copyright in this report is the property of Wildland Consultants Ltd and any unauthorised publication, reproduction, or adaptation of this report is a breach of that copyright.

1. EXECUTIVE SUMMARY

Urban Edge Planning Ltd on behalf of the landowners at 190 Stratton Street, 236 Stratton Street, and 268 Stratton Street, Normandale, are seeking the rezoning of the three properties from General Rural Activity Area to Rural Residential Activity Area. This rezoning would allow for a moderate increase in housing density, which is consistent with the zoning of surrounding sites.

This report is focused on the potential biodiversity effects of the proposed rezoning of these three properties, while also considering the potential adverse effects stemming from actual residential development that would be enabled by the rezoning. To inform this report, the landowners have provided an indicative development plan for the properties which allows an initial assessment to be conducted. However, an assessment of ecological effects for residential development would still be carried out at the resource consenting stage based on a finalised set of plans.

Initial assessment of residential development potentially stemming from rezoning suggests that, if executed in an ecologically sensitive manner, the ecological effects would be low. This is because the indicative development plan avoids disturbance to the highest quality indigenous vegetation types present on the properties. Care has been taken in this plan to minimise disturbance to other habitat types containing indigenous vegetation by siting new driveways on existing vehicle tracks where possible, as well as locating six of the ten proposed building sites in pasture, and another of the proposed building sites on the site of an existing building. The land owners have agreed to the introduction of no-development areas to ensure the ongoing retention of areas of more significant indigenous vegetation and habitats. Given that there is currently no legal protection of Significant Natural Areas (SNAs), or areas with Significant Natural Resources (SNRs), within the Hutt City District, the proposed protection of indigenous vegetation under the private plan change exceeds the current level of protection in the current General Rural Activity Area.

A field survey of the site was undertaken and the proposed no-development areas were reviewed. Minor modifications are suggested to ensure that the areas proposed for protection align with the ecological values on the properties and the locations of potential SNAs and SNRs identified by Hutt City Council.

2. INTRODUCTION

Urban Edge Planning Ltd on behalf of the landowners at 190 Stratton Street, 236 Stratton Street, and 268 Stratton Street, Normandale, is currently working on a private plan change application to Hutt City Council to seek rezoning of the three properties from General Rural to Rural Residential. This allows a reduction in lot size per dwelling from a minimum of 15 hectares to two hectares. Rezoning would allow for a moderate increase in housing density on the sites and align with the zoning of surrounding sites.

The properties are located in the Wellington Ecological District within the catchment of Korokoro Stream. They lie on the western fringe of Hutt City adjacent to the eastern boundary of the Belmont Regional Park (Figure 1). The properties comprise areas of *c.*20 hectares (190 Stratton Street), *c.*13 hectares (236 Stratton Street), and *c.*17 hectares (268 Stratton Street). All three properties are bounded by Stratton Street to the west and 236 and 268 Stratton Street are bounded by a formed, unsealed, and closed off section of Normandale Road to the east. The properties are characterised by a mixture of regenerating indigenous forest, permanent streams, scrub, pasture, and low-density housing. The properties at 236 and 268 Stratton Street contain areas of plantation forest near the eastern boundary. Hutt City Council's initial work on Significant Natural Areas (SNAs) identified two potential SNAs on the properties (Figure 1) but the permanent streams and other areas of regenerating indigenous vegetation may also have ecological value.

To this end, Urban Edge Planning has requested Wildland Consultants Ltd undertake an ecological assessment of the property and to identify any ecologically significant areas on site that warrant protection from development.

This report provides an assessment of the ecological effects of the proposed development, and includes:

- Maps and descriptions of the vegetation and habitat types present;
- An assessment of the ecological values of vegetation and habitat types, including the identification of any ecologically significant areas as defined by Policy 23 of the Regional Policy Statement (GWRC 2013) on site that warrant protection from development;
- Descriptions of the magnitude and extent of potential ecological effects resulting from the proposed plan change; and
- Opportunities to avoid, minimise, or mitigate potential adverse ecological effects.

3. ECOLOGICAL CONTEXT

3.1 Overview

190 Stratton Street, 236 Stratton Street, and 268 Stratton Street are located in the suburb of Normandale, Lower Hutt within the Wellington Ecological District. The District is described by McEwen (1987) as being characterised by steep hills and valleys, with frequent high winds and gales. Prevailing winds are from the north and northwest, and annual rainfall of 900-1,400 mm.

Valleys in the District have young alluvial, peaty or stony soils with varying degrees of drainage, generally more friable and better structured than hard packed coastal soils. Upper slopes are moderately fertile, with loess depths varying across the region, which results in variable erosion and weathering regimes.

Historic natural vegetation largely comprised widespread broadleaved/podocarp forest, with kahikatea (*Dacrycarpus dacrydioides*), tōtara (*Podocarpus totara*), and mātai (*Prumnopitys taxifolia*) on hills; rimu (*Dacrydium cupressinum*)-northern rātā (*Metrosideros robusta*)/kohekohe (*Dysoxylum spectabile*) forest nearer coast; and miro (*Prumnopitys ferruginea*)-rimu/tawa (*Beilschmieda tawa*) forests at higher levels.

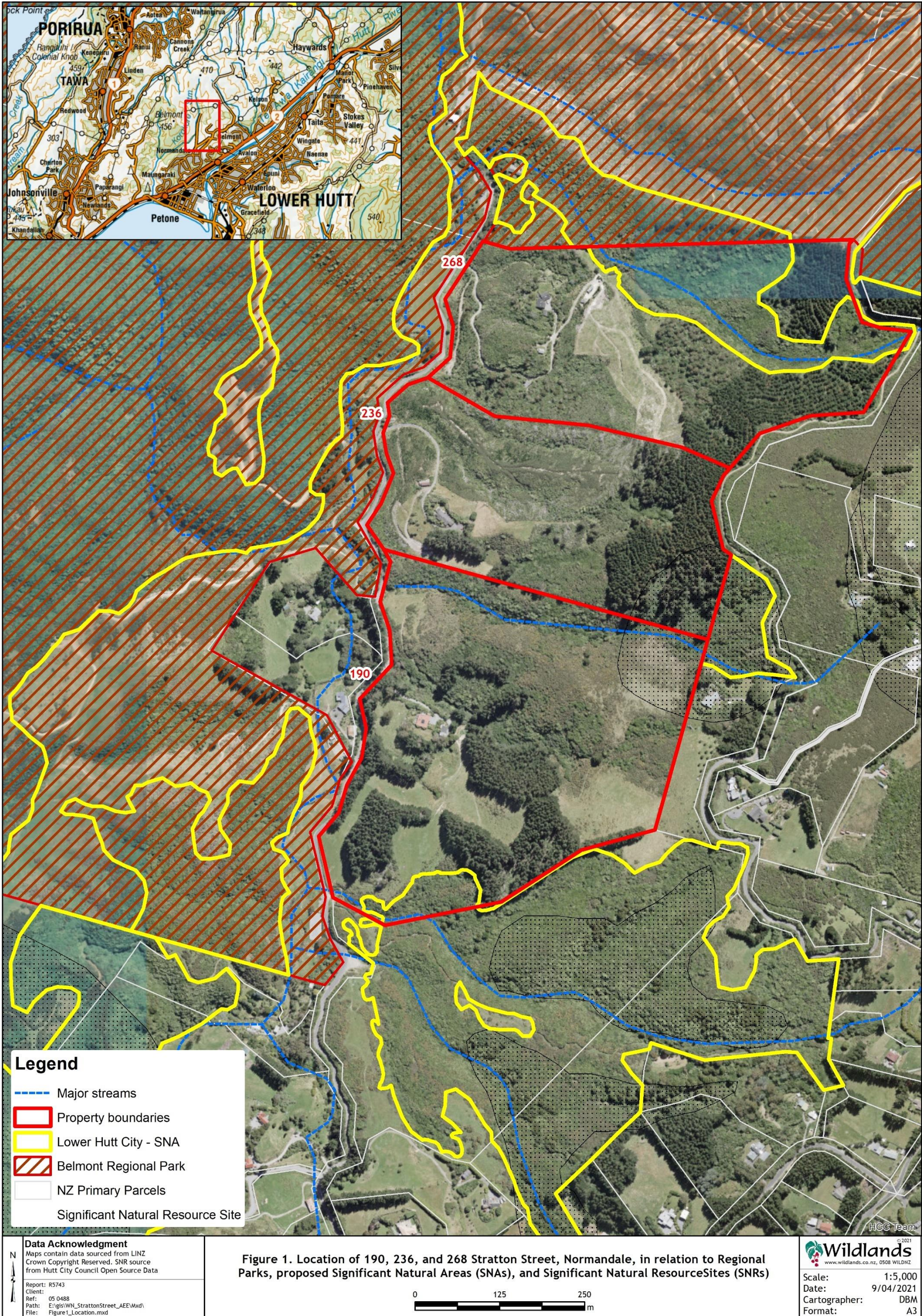
Extensive farming in the region, both historical and present, has removed much of this indigenous forest, and urban encroachment is continuing. Podocarp trees have largely been logged out of many remaining remnants and gorse (*Ulex europaeus*) and Darwin's barberry (*Berberis darwinii*) are common invasive species (McEwen 1987).

3.2 Local context

Ecological District

Ecological Domains ('Ecodomains') have been identified by Greater Wellington Regional Council as landscape units which share similar ecological and physical processes. The subject properties at Stratton Street are located within Ecodomain 56 "Western Hills".

Although rainfall in these hills is more seasonal than in coastal areas, the friable, well-structured soils hold more moisture year-round. Erosion is minimal although weaker fault-induced crush zones and interglacial fossil gullies exist in places. Wind flow is turbulent with channeling and eddying in gullies. Complex topography of moderately steep hillslopes with smooth ridgelines due to the old eroded peneplain surface, broad basins, gullies, fossil gullies, and fault-defined valleys creates diverse microclimates. Frost is patchy and can be heavy in basins such as Karori, Tawa, and Johnsonville where cold air collects. Native vegetation is dominated by podocarp/tawa forest with understorey species indicating moist, fertile conditions in gullies.



Legend

- Major streams
- Property boundaries
- Lower Hutt City - SNA
- Belmont Regional Park
- NZ Primary Parcels
- Significant Natural Resource Site

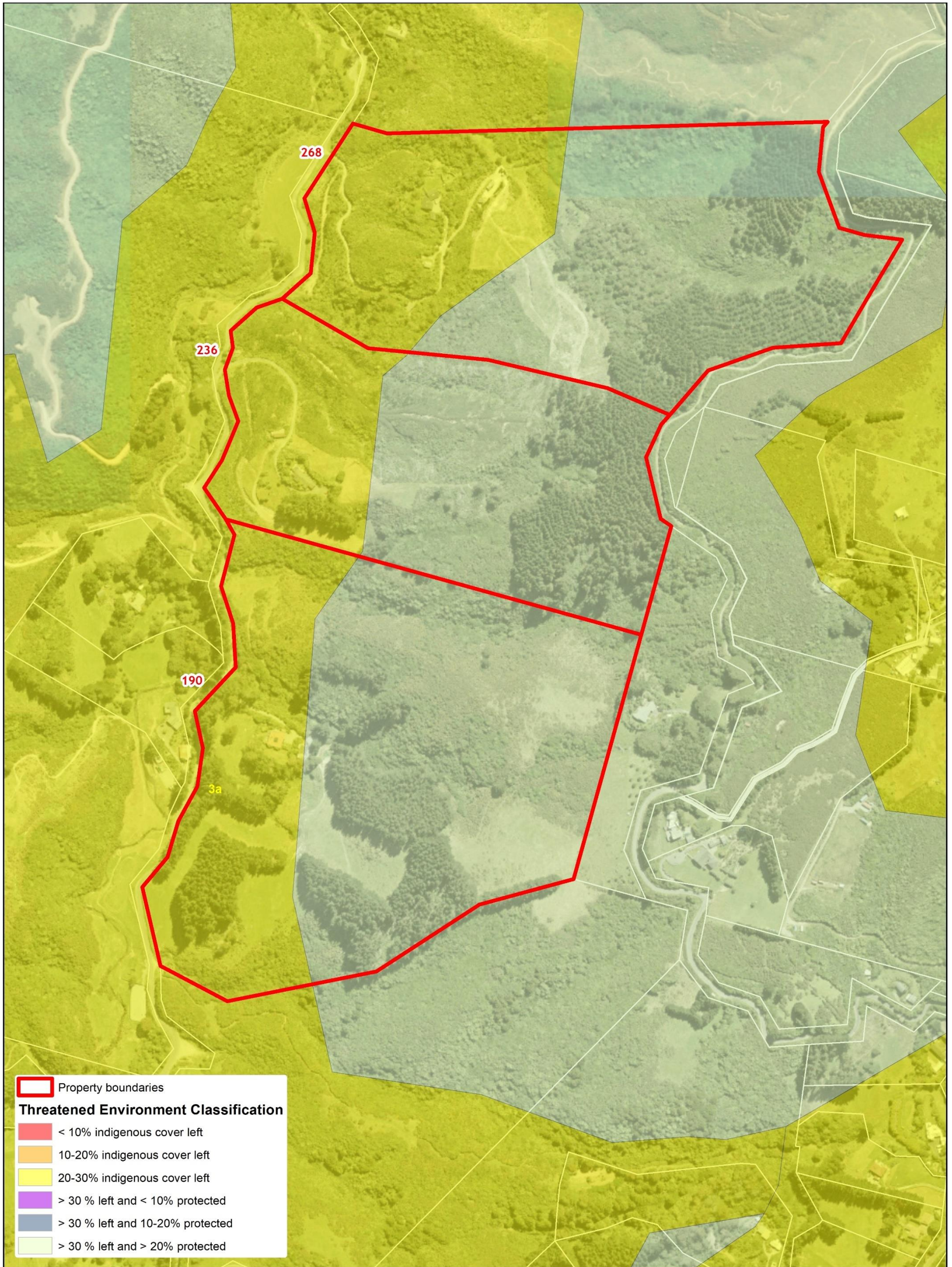
Data Acknowledgment
 Maps contain data sourced from LINZ Crown Copyright Reserved. SNR source from Hutt City Council Open Source Data

Report: R5743
 Client:
 Ref: 05 0488
 Path: E:\gis\WN_StrattonStreet_AEE\Map\ Figure 1_Location.mxd
 File:

Figure 1. Location of 190, 236, and 268 Stratton Street, Normandale, in relation to Regional Parks, proposed Significant Natural Areas (SNAs), and Significant Natural Resource Sites (SNRs)

Wildlands
 www.wildlands.co.nz, 0508 WILDNZ

Scale: 1:5,000
 Date: 9/04/2021
 Cartographer: DBM
 Format: A3



Data Acknowledgment
 Maps contain data sourced from LINZ
 Crown Copyright Reserved

Report: R743
 Client:
 Ref: 05 0488
 Path: E:\gis\WN_StrattonStreet_AEE\Mxd\
 File: Figure2_ThreatenedEnvironments.mxd

Figure 2. Threatened Environment Classification of lands within 190, 236, and 268 Stratton Street, Normandale

0 100 200 m

Wildlands © 2021
 www.wildlands.co.nz, 0508 WILDNZ

Scale: 1:4,000
 Date: 9/04/2021
 Cartographer: DBM
 Format: A3

Threatened Environment Classification

The Threatened Environment Classification is a combination of three national databases: Land Environments New Zealand (LENZ), Land Cover Database (LCDB) and the protected areas network (reflecting areas legally protected for the purpose of natural heritage protection). The classification combines this information into a simple and practical GIS tool, which illustrates the degree to which indigenous vegetation has been cleared and/or legally protected (Cieraad *et al.* 2015, Walker *et al.* 2015).

According to the Threatened Environment Classification, At Risk (20-30% indigenous vegetation cover remaining) land environments occur on the western third of all three subject properties, which is considered to be a threatened environment (Walker *et al.* 2015; Figure 2). The remainder of the properties are situated within the Less Reduced and Better Protected (>30% indigenous vegetation remaining, and >20% protected) land environments, which are not considered threatened (Walker *et al.* 2015; Figure 2).

Key Native Ecosystems

The three properties are surrounded by the Belmont-Korokoro Key Native Ecosystem (KNE) to the north, west, and south¹. The three sites are separated from this KNE by Stratton Street on their western boundary, but the northern boundary of 268 Stratton Street and the southern boundary of 190 Stratton Street are immediately adjacent to areas of this KNE.

Significant Natural Resource Sites

Chapter 14E of the Hutt City Council District Plan identifies areas that contain Significant Natural Resources (SNRs; Figure 1). Two of the three properties (190 and 236 Stratton Street) are partly affected by an identified SNR (SNR38 - Normandale Road Bush). Chapter 14E includes objectives, policies and rules to protect identified SNRs from inappropriate subdivision, use and development. However, as a result of two Environment Court decisions from 2004 the rules do not apply to identified SNRs on private land.

Draft Significant Natural Areas

Hutt City Council has undertaken some initial work to identify and assess Significant Natural Areas (SNAs) within the district. This work identified two potential SNAs on the subject properties: LH001.00 (Western Hutt hills forest remnants) and LH001 (Belmont Regional Park) (Figure 1).

- LH001.00 (Western Hutt hills forest remnants) comprises moderately large areas of indigenous scrub and indigenous forest that are contiguous with Belmont Regional Park, Belmont-Speedys Reserve KNE (Key Native Ecosystem) site, and/or Belmont-Dry Creek KNE site. The site provides habitat for Threatened, At Risk, and regionally uncommon species.

¹ GWRC KNE and Wetland programme locations: <https://gwrc.maps.arcgis.com/apps/webappviewer>

- LH001 (Belmont Regional Park) comprises very large areas within Belmont Regional Park and parts of three KNE sites: Belmont-Dry Creek, Belmont-Speedys Reserve, and Belmont-Korokoro. Vegetation types present include pukatea (*Laurelia novae-zelandiae*)/tawa forest, rimu-rātā/tawa-kohekohe forest, tawa-kohekohe forest, tawa/miro forest, pukatea-mātai (*Prumnopitys taxifolia*)/ tawa forest, *Coprosma areolata* shrubland, and regenerating broadleaved species forest. Numerous important streams originate here and the site provides habitat for a diverse range of indigenous plants and animals, including Threatened, At Risk, and regionally uncommon species. LH001 includes indigenous vegetation on Acutely Threatened land environments with <10% indigenous vegetation remaining.

These areas do not currently have any legal standing and there are no policies or objectives relating to these.

Korokoro Stream and all tributaries are identified in Schedule F1 of the Natural Resource Plan (GWRC, 2019) as being a significant indigenous ecosystem due to providing habitat for indigenous fish species of conservation interest.

3.3 Site description

This plan change involves three Stratton Street properties, each of which includes a mixture of regenerating indigenous forest, permanent streams, scrub, pasture, plantation forest and low-density housing¹.

4. METHODS

4.1 Vegetation and habitat survey

The sites were surveyed on 26 February 2021, during which time all vegetation and habitat types were described and mapped, with the exception of curtilage areas surrounding the existing houses. The current ecological values of these vegetation and habitat types were also assessed. All vascular plant species observed were recorded (Appendix 1). Vegetation and habitat types were digitised onto aerial imagery using ArcGIS 10.7.

4.2 Fauna survey

Targeted fauna surveys were beyond the scope of this report, however the suitability of the vegetation at the site to provide habitat for key indigenous fauna species was assessed and all fauna species observed at the site were recorded (Appendix 2).

5. TERRESTRIAL VEGETATION AND HABITATS

Twelve major terrestrial habitat types (shown in Figure 3) were identified during the site survey:

¹ Specifically, one house per property.

1. Regenerating indigenous broadleaved forest
2. Eucalyptus-Tasmanian blackwood/indigenous broadleaved forest
3. *Pinus radiata*/indigenous broadleaved forest
4. Eucalyptus-macrocarpa/indigenous broadleaved forest
5. Mixed indigenous-exotic broadleaved scrub
6. Eucalyptus treeland/mixed indigenous exotic broadleaved scrub
7. Enhanced mixed indigenous-exotic broadleaved scrub
8. Gorse-māhoe-ponga scrub
9. Gorse scrub
10. Pasture
11. Pūrei riparian wetland
12. Harakake-toetoe/kiokio wetland

Where applicable, subtypes have been used to delineate subtle differences (such as differences in canopy height, or differences in the species assemblage of non-dominant plant species) occurring within major habitat types.

5.1 Regenerating indigenous broadleaved forest (Vegetation Type 1, c.6.12 ha)

- 1a: Regenerating broadleaved forest with a canopy height of 5-10 metres. The dominant canopy species was māhoe (*Melicytus ramiflorus* subsp. *ramiflorus*), but mamaku (*Cyathea medularis*), kanono (*Coprosma grandifolia*), and patē (*Schefflera digitata*) were also common. Putaputawētā (*Carpodetus serratus*) and kōtukutuku (*Fuchsia excorticata*) were present at lower abundance, with the latter being more common in riparian areas. Common subcanopy species were rangiora (*Brachyglottis repanda*) and kawakawa (*Piper excelsum* subsp. *excelsum*). The undergrowth was mostly comprised of the following ferns: mouku (*Asplenium bulbiferum*), kiwikiwi (*Cranfillia fluviatilis*), *Polystichum neozelandicum* subsp. *zerophyllum*, and piupiu (*Lomaria discolor*). Scattered tawa seedlings were present, indicating regeneration towards a later successional forest type. The most common liane was pōhuehue (*Muehlenbeckia australis*), with some supplejack (*Ripogonum scandens*) also being present. Also see Plate 1, Appendix 4.
- 1b: Similar to Subtype 1a, but with greater māhoe dominance and a less diverse canopy layer.
- 1c: Similar to Subtype 1a, but with a c.15 metre canopy and greater plant diversity. Kiekie (*Freycinetia banksii*), *Astelia* sp., and adult and seedling nīkau (*Rhopalostylis sapida*) are present in addition to the species recorded in Subtype 1a.

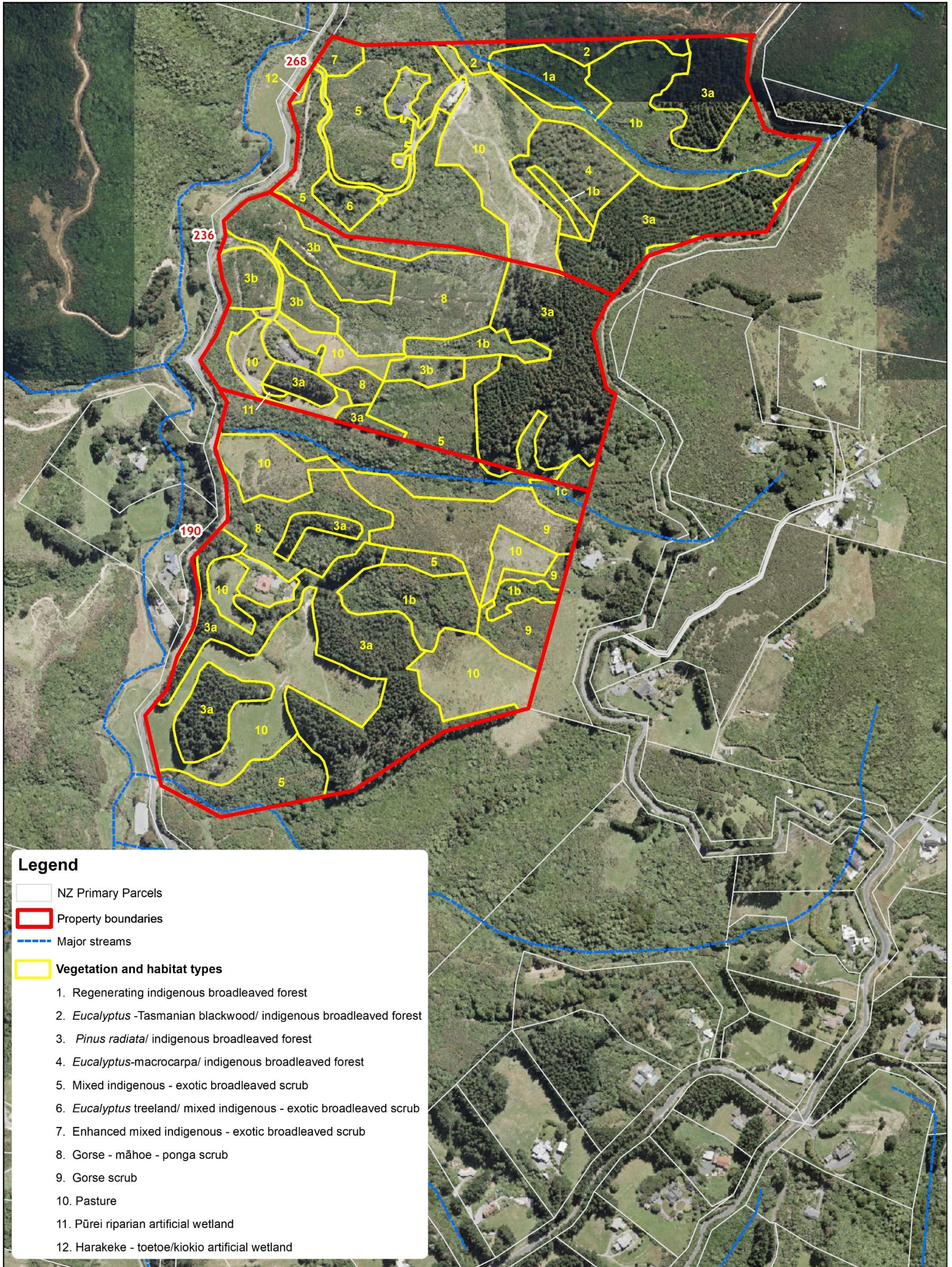


Figure 3. Vegetation and habitat types present at 190, 236, and 268 Stratton Street, Normandale, Lower Hutt.

Data Acknowledgment
 Maps contain data sourced from LINZ
 Crown Copyright Reserved

Report: R5743
 Client:
 Ref: 05 0488
 Path: E:\gis\WN_StrattonStreet_AEE\Mxd\
 File: Figure3_VegetationHabitat1.mxd

0 112.5 225
 m

Wildlands
 www.wildlands.co.nz, 0508 WILDNZ

Scale: 1:4,500
 Date: 28/04/2021
 Cartographer: DBM
 Format: A3

- 5.2 *Eucalyptus* - Tasmanian blackwood/indigenous broadleaved forest (Vegetation Type 2, c.0.53 ha)
- 2: Planted eucalypt (*Eucalyptus* sp.) and Tasmanian blackwood (*Acacia melanoxylon*) forest with a subcanopy comprised of māhoe, hangehange (*Geniostoma ligustrifolium* var. *ligustrifolium*), gorse (*Ulex europaeus*), patē, rangiora, and kanono. Blackberry (*Rubus* sp.), tātarāmoa (*Rubus cissoides* agg.), and kōwaowao (*Zealandia pustulata*) are also present.
- 5.3 *Pinus radiata*/indigenous broadleaved forest (Vegetation Type 3, c.14.93 ha)
- 3a: c.20 metre tall radiata pine (*Pinus radiata*) forest planted on hillslopes with an indigenous subcanopy to c.3 metres tall. The subcanopy mostly comprises māhoe, kanono, māpou (*Myrsine australis*), and ponga (*Cyathea dealbata*). Groundcover is similar to 1a, but huruhuru whenua (*Asplenium oblongifolium*) replaces mouku.
- 3b: c.4-5 metre tall mixed radiata pine and indigenous broadleaved forest. Pines planted and/or wilding. Subcanopy is similar to Subtype 3a.
- 5.4 *Eucalyptus*-macrocarpa/indigenous broadleaved forest (Vegetation Type 4, c.1.23 ha)
- 4: Planted c.10-20 metre *Eucalyptus* sp. and macrocarpa (*Cupressus macrocarpa*) with a c.3 metre subcanopy comprised of hangehange, māhoe, makomako (*Aristotelia serrata*), kanono, patē, rangiora, porokaiwhiri (*Hedycarya arborea*), and ponga. Groundcover is similar to Subtype 3a. See Plate 2, Appendix 4.
- 5.5 Mixed indigenous-exotic broadleaved scrub (Vegetation Type 5, c.9.74 ha)
- 5: A c.2-3 metre tall mixture of gorse, māhoe, māpou, rārahu (*Pteridium esculentum*), makomako, kanono, tī kōuka (*Cordyline australis*), tarata (*Pittosporum eugenioides*), whauwhaupaku (*Pittosporum eugenioides*), rangiora, karamū (*Coprosma robusta*), pigeonwood, and Himalayan honeysuckle (*Leycesteria formosa*). Water fern (*Histiopteris incisa*), Canadian fleabane (*Erigeron canadensis*), puha (*Sonchus oleraceus*), mouku, and kamu matau a Maui (*Carex uncinata*) common in the ground layer. Blackberry is common around foot tracks. See Plate 3, Appendix 4.
- 5.6 *Eucalyptus* treeland/mixed indigenous-exotic broadleaved scrub (Vegetation Type 6, c.0.34 ha)
- 6: Similar to Vegetation Type 5, but overtopped by *Eucalyptus* species.
- 5.7 Enhanced mixed indigenous-exotic broadleaved scrub (Vegetation Type 7, c.0.14 ha)
- 7: Similar to Vegetation Type 5, but with indigenous trees and shrubs planted that are not found in the other vegetation types present.

- 5.8 Gorse-māhoe-ponga scrub (Vegetation Type 8, c.4.10 ha)
- 8: Gorse scrub with mahoe and ponga in gullies. Canopy height c.1-4 metres.
- 5.9 Gorse scrub (Vegetation Type 9, c.3.93 ha)
- 9: Gorse scrub with occasional emergent radiata pine. Canopy height c.1-2 metres.
- 5.10 Pasture (Vegetation Type 10, c.8.59 ha)
- 10: Mixture of exotic pasture grasses and herbs. Patches of mātātā (*Paesia scaberula*), rārahu, and gorse present.
- 5.11 Pūrei riparian wetland (Vegetation Type 11, c.0.03 ha)
- 11: A small area of riparian wetland that has been fenced off to separate it from surrounding pasture. A mixture of pūrei (*Carex secta*), *Juncus* sp., tree ferns, and exotic herbs, e.g. monkey musk (*Erythranthe guttata*), dock (*Rumex* sp.). A few kuta (*Eleocharis sphacelata*) were present despite the lack of open standing water. Watercress (*Nasturtium officinale*) was present in the stream itself, and a c.10 metre tall grey willow (*Salix cineria*) was located on the stream margin. This wetland is likely to be an artificial by-product of previous earthworks that created the flat area beside the wetland, dam, and perched culvert. See Plate 4, Appendix 4.
- 5.12 Harakeke-toetoe/kiokio wetland (Vegetation Type 12, c.0.03 ha)
- 12: A small area of wet pasture including kiokio (*Parablechnum novae-zelandiae*), toetoe (*Austroderia toetoe*), lotus (*Lotus pedunculatus*), creeping buttercup (*Ranunculus repens*), selfheal (*Prunella vulgaris*), an unidentified rush species, and pānakenake (*Lobelia angulata*). Greater bindweed (*Calystegia silvatica*) is being controlled by the landowner. Several harakeke (*Phormium tenax*) have been planted, and the only *Coprosma propinqua* seen during the site visit was encountered in this wetland. This wetland is not natural in origin; rather it has slowly appeared since the Hutt City Council rerouted streams and created a bund during the improvement and sealing of Stratton Street in 1990 (Catharina Fisher pers. comm.). See Plates 5 and 6, Appendix 4.

6. AQUATIC HABITATS

Two artificial wetlands (described as Vegetation Types 11 and 12 in Section 4 above) are present on the properties. The landowners have identified eight tributaries of Korokoro stream that run through the three properties (Figure 4), however the GWRC streams mapping layer only identified three major streams on the properties (Figures 1, 3 and 5). The majority of these streams run through regenerating indigenous forest or scrub and are in good condition, with vegetated margins and little erosion. One perched culvert was noted in the stream immediately south of the pūrei wetland at 236 Stratton Street (Figure 3) which may restrict the passage of native fish species. However,

removal of the perched culvert, or modification to the dam in which it sits, may result in drainage of the wetland immediately upstream.

7. FLORA

Sixty-eight indigenous and 40 exotic plant species were recorded during the survey (Appendix 1).

Kānuka (*Kunzea robusta*) has a national-level threat classification of Threatened-Nationally Vulnerable and mānuka (*Leptospermum scoparium* agg.) is classified as At Risk-Declining, as per de Lange *et al.* (2018). Kānuka and mānuka are members of the Myrtaceae family which is at risk of infection by myrtle rust (*Austropuccinia psidii*), a potentially devastating rust which has no known treatment. Along with other species in the Myrtaceae family, the threat status of kānuka and mānuka have been elevated as a precautionary measure based on the potential threat posed by myrtle rust. However, kānuka and mānuka are currently common and widespread in the local environment, and to date have not been greatly affected by myrtle rust, thus we place little weight on their threatened status. While kuta (*Eleocharis sphacelata*) is not nationally threatened, it is considered to be a ‘regionally critical’ threatened species (de Lange *et al.* 2018, Crisp 2020b).

One individual grey willow was encountered near the wetland at 236 Stratton Street. This plant species is listed in the National Pest Plant Accord (NPPA)¹. A few young wilding conifers (radiata pine, *Pinus radiata*) were present within the properties at 190 and 236 Stratton Street (Habitat Type 3b, Figure 3). All wilding *Pinus* species are considered pest organisms by the Greater Wellington Regional Council to be managed by progressive containment (GWRC 2019).

The following plant species considered to be Harmful Organisms by the Greater Wellington Council were also present on one or more of the three properties (GWRC 2019):

- African club moss (*Selaginella kraussiana*)
- Blackberry
- Buddleia (*Buddleja davidii*)
- Gorse
- Greater bindweed²
- Himalayan honeysuckle (*Leycesteria formosa*)
- Purple pampas (*Cortaderia jubata*)
- Pink ragwort (*Senecio glastifolius*)
- Ragwort (*Jacobaea vulgaris*)³
- Spanish heath (*Erica lusitanica*)

¹ Plants listed on the NPPA are ‘Unwanted Organisms’ under the Biosecurity Act 1993.

² This species is being controlled in the wetland on 268 Stratton Street (Catharina Fisher, pers. comm.).

³ Synonymous with *Senecio jacobaea* listed in GWRC (2019).

Gorse, blackberry, ragwort, pink ragwort, Himalayan honeysuckle, and African club moss are widespread, but the other species were more restricted in distribution, thus may be easily controlled.

8. FAUNA

8.1 Birds

Three indigenous bird species were recorded during the site visit:

- Kererū (*Hemiphaga novaeseelandiae*)
- Tūī (*Prosthemadera novaeseelandiae novaeseelandiae*)
- Pīwakawaka (North Island fantail; *Rhipidura fuliginosa placabilis*)

One of the land owners also reports the following indigenous bird species occur on the properties (Catharina Fisher, pers. comm.):

- Bush falcon (*Falco novaeseelandiae* “bush”)
- Ruru (morepork; *Ninox novaeseelandiae novaeseelandiae*)
- Riroriro (grey warbler; *Gerygone igata*)
- Korimako (bellbird; *Anthornis melanura melanura*)
- Kōtare (New Zealand kingfisher; *Todiramphus sanctus vagans*)
- Pīpīwharau (shining cuckoo; *Chrysococcyx lucidus lucidus*)
- Silvereye; tauhou (*Zosterops lateralis lateralis*)
- Pūtangitangi (paradise shelduck; *Tadorna variegata*)
- Kāhu; swamp harrier (*Circus approximans*)
- Spur-winged plover (*Vanellus miles novaehollandiae*)
- Miromiro (pied tomtit; *Petroica macrocephala toitoi*¹)

A further ten exotic bird species were either recorded on the properties during the site visit or reported as being present (Catharina Fisher, pers. comm.; see Appendix 2).

Bush falcon are classified as ‘At Risk - Recovering’ (Robertson *et al.* 2017). This national threat ranking is due to clearance of indigenous vegetation and the intensification of land-use practices, which have significantly reduced the amount of habitat suitable for breeding. Habitat degradation has also affected prey populations, and cats and mustelids have been filmed preying on adults and chicks. None of the other indigenous bird species are classified as ‘Threatened’ or ‘At Risk’ (Robertson *et al.* 2017).

Four exotic bird species were recorded during the site visit:

- California quail (*Callipepla californica bunnescens*)
- Australian magpie (*Gymnorhina tibicen*)
- Eastern rosella (*Platycercus eximius*)
- Eurasian blackbird (*Turdus merula*)

¹ Miromiro have only been observed once on the properties, thus are unlikely to be a resident bird species.

8.2 Long-tailed bats

Long-tailed bats (*Chalinolobus tuberculatus*) are classified as ‘Threatened-Nationally Critical’ (O’Donnell *et al.* 2018). They are known to favour forest edge and riparian habitats of both indigenous and exotic forest types, having adapted to roosting in exotic tree species such as pine (*Pinus* sp.) and macrocarpa (*Cupressus macrocarpa*). They also forage over farmland and urban areas (O’Donnell *et al.* 2021).

There are no confirmed records of long-tailed bats within 19 kilometres of the site in the Department of Conservation bat distribution database (Version June 2020). Several bat surveys within 10 kilometres of the site have failed to detect bats, including a survey undertaken in 2016 around five kilometres southwest of the site. No suitable indigenous roost trees exist at the site and it is considered highly unlikely that bats are resident at this site.

8.3 Herpetofauna

No herpetofauna (amphibians or reptiles) were encountered during the site visit. There are no lizard records in the Department of Conservation’s BioWeb Herpetofauna Database or iNaturalist within the project area, although the database includes records of lizards recorded within a 10-kilometre radius. Lizards known from elsewhere within the eastern side of the Wellington Ecological District (Bell and Wiles 2015) include the ngahere gecko (*Mokopirirakau* “southern North Island”, nationally and regionally At Risk-Declining¹), barking gecko (*Naultinus punctatus*, nationally At Risk-Declining and regionally Threatened-Vulnerable), Raukawa gecko (*Woodworthia maculata*, nationally and regionally Not Threatened), copper skink (*Oligosoma aeneum*, nationally Not Threatened, regionally Threatened-Critical), ornate skink (*O. ornatum*, nationally and regionally At Risk-Declining) and northern grass skink (*O. polychroma*, nationally and regionally Not Threatened). All indigenous lizards are protected by the Wildlife Act 1953 and disturbance to their habitats is likely to require a Wildlife Act Authority (DOC Lizard TAG 2019).

Some of these species are likely to be present locally, especially ngahere gecko, barking gecko, copper skink, ornate skink, and northern grass skink. The most frequently recorded species in close proximity has been the barking gecko, although the other species are likely present too but not reported. The scrub habitats and forest-pasture boundaries provide suitable habitat for northern grass skink. Copper skink and ornate skink may be present in scrub, forest-pasture boundaries, and forest. However, the presence of these latter two species is likely to depend on the abundance of rodents and predatory mammals on the properties (Herbert, 2020). Because the three properties were covered with scrubby pasture in 1969 (Catharina Fisher, pers. comm.), it is possible that arboreal geckos (most likely to be barking gecko and ngahere gecko) may be absent due to historical forest clearance, despite suitable forested and scrub habitat types currently being present on the property.

¹ National threat classifications are as per Hitchmough *et al.* (2016) and regional threat classification are as per Crisp (2020b).

In general, lizard populations are often (but not always) in low densities in mainland New Zealand due to predation pressure and habitat modification. Indigenous lizards are highly cryptic and can be particularly difficult to find without adequate survey effort, especially when in low numbers.

8.4 Aquatic fauna

Tributaries of the Korokoro Stream flow in a westerly direction across the properties. These streams on the property are in good condition and are likely to support aquatic fish and macroinvertebrates. Aquatic fauna records for the Korokoro Stream catchment held in the New Zealand Freshwater Fish Database (Crow 2017) are presented in Table 1. A total of 10 indigenous fish species and one indigenous invertebrate have been recorded from the catchment, including six species classified as ‘At Risk-Declining’ by Goodman *et al.* (2014). The introduced and naturalised brown trout has also been recorded within the Korokoro catchment. Eel elvers (*Anguilla* spp.) and kōura (*Paranephrops* sp.) have been observed in the streams on 268 Stratton Street (Catharina Fisher, pers. comm.).

Table 1: Aquatic fauna species recorded within the Korokoro Stream catchment (NIWA 2021).

Common Name	Scientific Name	Threat Category
Brown trout	<i>Salmo trutta</i>	Introduced and naturalised
Shortfin eel	<i>Anguilla australis</i>	Not Threatened
Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk-Declining
Redfin bully	<i>Gobiomorphus huttoni</i>	At Risk-Declining
Bluegill bully	<i>Gobiomorphus hubbsi</i>	At Risk-Declining
Common bully	<i>Gobiomorphus cotidianus</i>	Not Threatened
Inanga	<i>Galaxias maculatus</i>	At Risk-Declining
Giant kōkopu	<i>Galaxias argenteus</i>	At Risk-Declining
Kōaro	<i>Galaxias brevipinnis</i>	At Risk-Declining
Common smelt	<i>Retropinna retropinna</i>	Not Threatened
Banded kōkopu	<i>Galaxias fasciatus</i>	Not Threatened
Kōura	<i>Paranephrops</i> sp.	Not Threatened

8.5 Terrestrial invertebrates

Four indigenous terrestrial invertebrate species were recorded at the site or reported by the landowner (*). These were:

- Wellington tree wētā (*Hemideina crassidens*)* - Not Threatened¹
- Huhu beetle (*Prionoplus reticularis*)²
- Pūriri moth (*Aenetus virescens*)²
- Red admiral butterfly (*Vanessa gonerilla*)²

8.6 Introduced pest mammals

¹ Threat classification as per Trewick *et al.* (2016).

² None of these species have been assigned a national threat classification.

European rabbits (*Oryctolagus cuniculus cuniculus*) and brushtail possums (*Trichosurus vulpecula*) reportedly occur on the properties. Whilst Greater Wellington Regional Council undertook ground-based bait possum control a few years ago, possums numbers are starting to bounce back (Catharina Fisher, pers. comm.). Goats (*Capra hircus*) have been eradicated in the area, and there is no evidence that deer (*Cervus elaphus*) or pig (*Sus scrofa*) occur on the property (Catharina Fisher, pers. comm.). There are 6-7 Timms traps in operation on 268 Stratton Street. Other pest animals likely to be present on the properties include ship rats (*Rattus rattus*), Norway rats (*R. norvegicus*), mice (*Mus musculus*), and hedgehogs (*Erinaceus europaeus*). Mustelids (stoats, *Mustela erminea*; ferrets, *M. furo*; and weasels, *M. nivalis vulgaris*) and feral and domestic cats (*Felis catus*) may also use the site occasionally.

9. ECOLOGICAL VALUES

9.1 Summary of terrestrial ecological values

The properties contain a combined area of c.5.9 hectares of regenerating indigenous broadleaved forest. Although relatively young¹ secondary forest, the presence of tawa seedlings indicate that this forest has a successional trajectory towards the podocarp-tawa forest that would have originally covered the Western Hills Eco-Domain. In addition to this, another c.30.9 hectares support indigenous broadleaved scrub or forest types that could be reasonably expected to eventually regenerate into podocarp-broadleaved indigenous forest representative of the Western Hills (Habitat Types 2-8).

The small amounts of kuta in damp areas of the properties are ecologically significant because they have been classified as ‘regionally critical’ threatened species. At least five indigenous bird species, including the ‘At Risk-Recovering’ bush falcon, were either observed during the site visit, documented by landholders, or are likely to use the properties. Depending on the abundance of pest mammal species on the properties and the historical proximity of scrub or forested habitat types to the properties, up to five lizard species may be present, including three nationally ‘At Risk-Declining’ species and one regionally ‘Threatened-Critical’ species. At least four indigenous invertebrate species use the properties.

9.2 Summary of aquatic ecological values

Ecologically Significant aquatic habitats (which includes wetlands and riverbeds) within the Greater Wellington Region have been identified by the Proposed Natural Resources Plan for the Wellington Region (GWRC 2019).

There are eight tributaries of the Korokoro stream and two small wetlands on this property. The streams are in mostly good condition, being predominantly in ungrazed

¹ Aerial photography from 1969 shows that the three properties were covered in scrubby pasture, therefore this forest type is estimated to be not older than 50 years old. Reference for aerial photography:
<https://retrolens.co.nz/map/#/1758046.5181193934/5438641.634594201/1759557.3437564652/5439654.425218894/2193/12>

areas of the properties and bordered by indigenous and/or exotic woody vegetation along most of their length. Based on their good condition, and existing records from Korokoro stream, up to 10 indigenous fish species and one indigenous invertebrate may be present in these streams. Six of these species are classified as ‘At Risk-Declining’. Korokoro Stream and all of its tributaries are listed in Schedule F1 of the regional Natural Resources Plan as a significant indigenous river ecosystem due to it providing habitat for indigenous fish species of conservation interest¹ (GWRC 2019). While only the tributary near the southern border of 190 Stratton Street has been mapped by Greater Wellington Regional Council², the other lengths of stream running through the properties shown in Figure 3 of this report are considered to be ecologically significant because they (1) drain into Korokoro stream, and (2) are likely to provide habitat for ‘At Risk-Declining’ indigenous freshwater fish.

The two artificial wetlands appear to have been created via other works on, or immediately adjacent to, the properties. Thus, it appears likely they are ‘induced’ wetlands and therefore have been precautionarily considered to be ‘natural wetlands’ as defined by the National Policy Statement - Freshwater Management 2020 (MfE 2021). Neither of these wetlands are listed as Significant Natural Wetlands in Schedule F3 of the Natural Resources Plan (GWRC 2019). Nevertheless, efforts have been made by the landowners to enhance both of these artificial wetlands; indigenous species have been planted in the harakeke-toetoe/kiokio wetland on 268 Stratton Street (Catharina Fisher, pers. comm.) and the pūrei riparian wetland on 236 Stratton Street has been fenced off to exclude stock. Should further investigation using the standard wetland delineation protocol (Clarkson 2013) determine conclusively that either one or both of the wetlands meet the definition of a ‘natural wetland’, then they will be protected by the provisions of the National Policy Statement for Freshwater Management and the National Environmental Standards for Freshwater.

10. PROPOSED PLAN CHANGE AND POTENTIAL OUTCOMES

It is proposed that 190, 236, and 268 Stratton Street are rezoned under the Hutt City Council’s District Plan from a General Rural zone to a Rural Residential zone. This allows a reduction in lot size per dwelling from a minimum of 15 hectares to two hectares, and would allow an increase in housing density on the properties. It is noted that rezoning the properties to Rural Residential would bring the zoning of these three properties into alignment with the zoning of surrounding sites.

10.1 Future land uses potentially resulting from proposed rezoning to Rural Residential

Should the proposed rezoning proceed, Figure 4 illustrates an indicative development plan for the three properties. This plan currently includes the potential placement of up to ten extra house sites as well as new sections of driveway and accessways off Stratton Street. It should be noted that this is an indicative layout plan only and does not form part of the rezoning request.

¹ Defined as being ‘Threatened’ or ‘At Risk’ as per the national Threat Classification System (Townsend *et al.* 2008).

² See the GWRC Web Map Viewer at: https://mapping.gw.govt.nz/GW/GWpublicMap_Mobile

There are few places suitable for building sites or driveways on these properties due to the steepness of the terrain. The number of lots that it is anticipated that each property could be sub-divided into is:

- 268 Stratton Street - up to four lots (three additional housing site plus one existing house).
- 236 Stratton Street - up to three lots (two additional housing sites plus one existing house).
- 190 Stratton Street - up to six lots (five additional housing sites plus one existing house).

The possible house sites and driveway routes are shown in Figure 4. Many of the possible new driveways are along existing vehicle tracks. The indicative development plan shows that the existing access points onto and off Stratton Street could be used to access additional lots on 268 and 236 Stratton Street. 190 Stratton Street has a much longer road frontage with other possible access points in addition to the present one. Each property has permanent streams and areas of indigenous vegetation, and the property owners have expressed their willingness to retain and protect these areas (Figure 4). The areas proposed for protection by the land owners occur in areas of regenerating indigenous broadleaved forest, mixed indigenous-exotic broadleaved scrub, enhanced mixed indigenous-exotic broadleaved scrub, and gorse-mānuka-ponga scrub (i.e. Habitat Types 1, 5, 7 and 8 as described in Section 4 and illustrated in Figure 3).

11. POTENTIALLY ADVERSE ECOLOGICAL EFFECTS

11.1 Overview

Throughout this section, both the potential adverse effects of the proposed zoning change, as well as any resulting subdivision and residential development that could occur on the properties as a result of zoning change, are addressed. Essentially, the proposed rezoning will have little effect on the ecology of the sites, but any resulting intensification of housing is likely to have associated ecological effects. These effects can be summarised as:

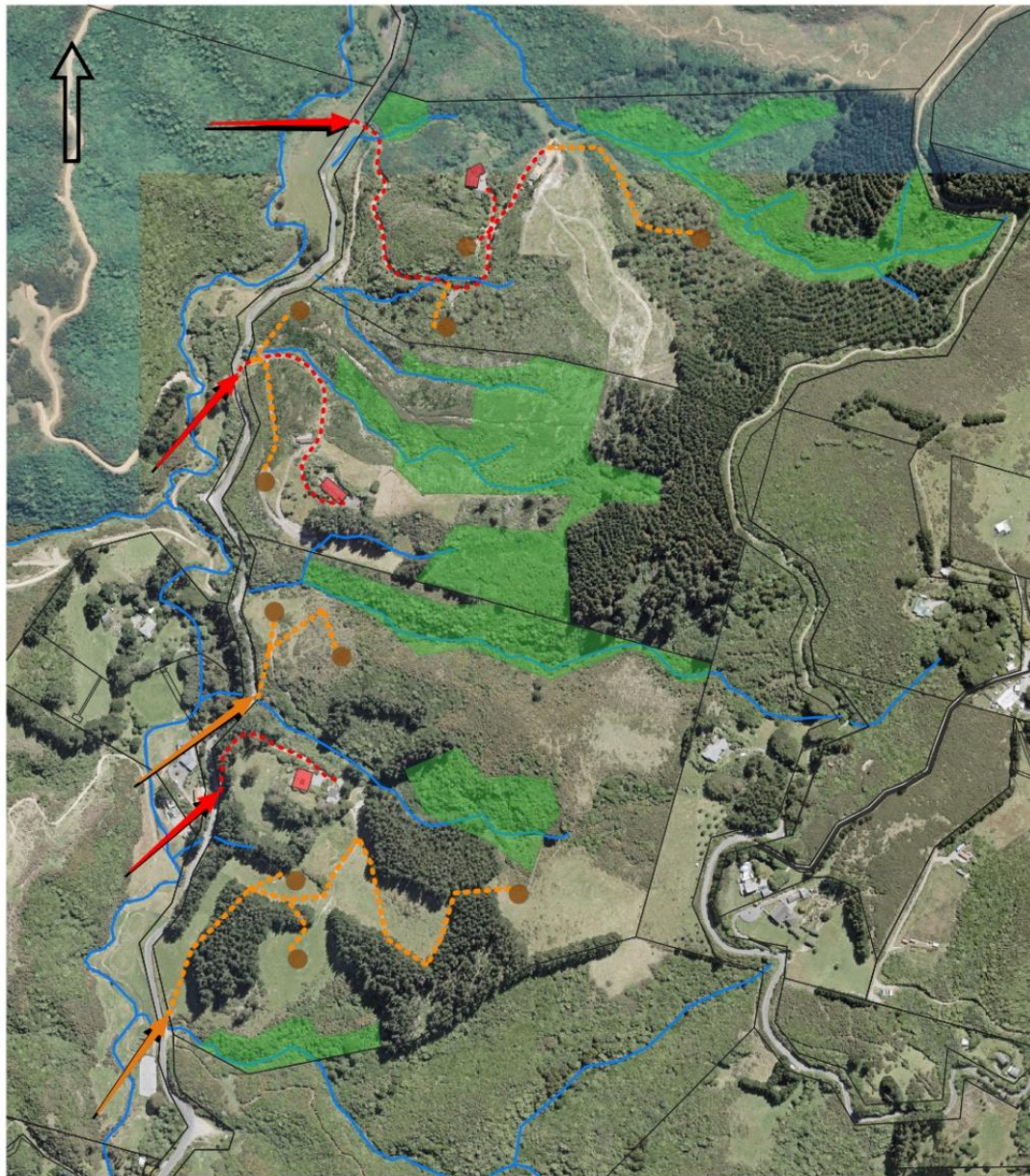
- Disturbance, modification, and/or loss of indigenous vegetation.
- Introduction and spread of pest plants.
- Mortality and disturbance of indigenous avifauna.
- Injury to and/or mortality of indigenous lizards.
- Sedimentation and contamination of freshwater habitats (streams and wetlands).

Each of the effects of a potential future increase in housing density at the sites is addressed in more detail below.

11.2 Disturbance, modification, and/or loss of vegetation

Vegetation clearance or disturbance will likely be required to establish additional house sites and driveway routes. However, the indicative development plan indicates that care would be taken to avoid construction works in areas dominated by indigenous vegetation, including the draft SNA and SNR areas that lie within the property boundaries. In addition, many of the possible new driveways are along existing vehicle tracks. Nevertheless, under the indicative plan, regenerating indigenous vegetation occurring underneath *Pinus radiata* or *Eucalyptus-macrocarpa* plantations (Forbes 2015) and in areas of mixed indigenous-exotic broadleaved scrub is likely to be cleared or disturbed as a result of construction works. Increased numbers of people living on the property may have direct and indirect adverse ecological effects on the ecological values of significant areas of vegetation due to increased trampling of the undergrowth and dumping of rubbish/garden waste within ecological sites.

Given the amount and type of indigenous vegetation present on the properties, intensification of housing resulting from rezoning could be achieved with minimal disturbance or clearance of indigenous vegetation, and if so the magnitude of this effect will likely be low.



Legend:	
	Property boundary
	Existing house
	Existing driveway
	Existing accessway
	Possible house site
	Possible new driveway
	Possible new accessway
	Possible protected vegetation
	Stream

**190, 236 & 268 Stratton Street,
Normandale
Rezoning to Rural Residential Activity
Area**

Indicative development plan - Nov 2020

Figure 4. Indicative development plan for 190, 236 and 268 Stratton Street. Supplied by Urban Edge Planning. Note that this is not a finalised plan therefore is subject to change.

11.3 Introduction and spread of pest plants

The proposed zoning variation, and potential resulting intensification of residential development may result in the introduction of pest plants, which could threaten the ecological values of indigenous vegetation on and adjacent to the property. These potential adverse ecological effects could be addressed with subdivision consent conditions specifying prohibitions on the planting of particular pest plant species. The impact of rezoning on the risk of introducing or spreading pest plants is however very low.

11.4 Mortality of and/or disturbance to avifauna

Removal of vegetation at the site (including exotic plantation tree species) as required for a future increase in housing density will result in the localised loss of feeding and breeding habitat for indigenous bird species (Pawson *et al.* 2010). Most bird species recorded at the property are all common and widespread and there is adjacent similar habitat to which displaced birds can disperse. Given the relatively small areas and types of vegetation likely to be disturbed, the magnitude of this effect will be low.

Noise and movement associated with construction may disturb or temporarily displace bird species. However, the level of these effects is likely to be very low as most of the bird species present are common and all are mobile and to some extent habituated to human disturbance. Disturbance during the breeding season is unlikely to result in more than a low level of adverse effects as any breeding individuals would be able to produce extra clutches to compensate for failed breeding attempts.

Additional dwellings may result in increased numbers of domestic and/or stray cats on the properties (Aguilar and Farnworth 2013, Woolley and Hartley 2019). Domestic (and feral) cats are known predators of avifauna, lizards, bats, and aquatic fauna. Although it may be beneficial to prohibit cat ownership in future residences, feral cats may already frequent the properties and it is difficult to gauge the additional adverse effects that would be caused by additional cats being kept on the properties.

11.5 Injury to and/or mortality of indigenous lizards

Up to five indigenous lizard species are potentially present within the properties, although it is noted that the landowners have not encountered lizards at the site (Catharina Fisher, pers. comm.). Rezoning of the properties will have a negligible effect on lizards, but a future increase in housing density is likely to have adverse ecological effects on lizards if they are present.

Intensively grazed areas of exotic grassland present on parts of the properties do not provide habitat for lizards, unless there are areas of rank grassland, non-palatable indigenous vegetation, rocks, or other debris providing terrestrial cover. It is in these micro-habitats that lizard populations are able to persist locally in otherwise unfavourable habitats. However, construction of additional dwellings in these habitats is likely to impact lizards living in adjacent habitats through the potential introduction of domestic cats and increased rodent populations in close proximity to buildings.

The risk to lizards is likely to be low given the relatively small areas of vegetation that would be disturbed under the indicative development plan. However, because of the uncertainty surrounding whether lizards are present, and what their population densities are, the risk to lizards cannot currently be quantified and would need to be addressed as part of the processes for gaining resource consent for any future subdivision by a targeted survey effort. While the effects of development projects on indigenous lizards must be accounted for under Section 31 of the Resource Management Act 1991, indigenous lizards are also protected by the Wildlife Act 1953 thus disturbance to their habitats is likely to require a Wildlife Act Authority (DOC Lizard TAG 2019)¹.

11.6 Sedimentation and contamination of freshwater habitats

It is probable that all water from the site drains into tributaries of Korokoro Stream. Intensified residential development may result in a minor increase in the area of impermeable surfaces on the property. Surface run-off from impermeable surfaces can increase the amount and rate of stormwater flow. After heavy rainfall events, large amounts of fast-moving water flows into gullies and streams, creating a scouring effect that is harmful to aquatic fauna and can result in streambank erosion and sedimentation. Roofs, roads, and driveways are the main contributors to surface run-off. Whilst the cumulative adverse ecological effects of this within a catchment can be significant, the proposed subdivision of this property is unlikely to result in a significant increase in surface run-off and therefore the magnitude of this effect is considered to be low. It would nevertheless be beneficial to ensure that run-off from hard surfaces is channelled into swales or small-scale detention bunds.

12. OPPORTUNITIES TO AVOID, MINIMISE, REMEDY OR MITIGATE POTENTIAL ADVERSE EFFECTS

12.1 Overview

Of the ecological effects discussed above, only the protection of significant areas of native vegetation are relevant mitigation strategies for the proposed zoning change of the properties. Therefore, opportunities to mitigate adverse ecological effects related to potential future residential development on the properties are not discussed here (however, see Appendix 3 for initial suggestions as to how effects of development could be mitigated).

12.2 Disturbance, modification, and/or loss of indigenous vegetation

The indicative development plan shows a development form and density that avoids disturbance to the highest quality indigenous vegetation types present on the properties (i.e. Vegetation Type 1 - regenerating indigenous forest). It also minimises disturbance to other habitat types containing indigenous vegetation by siting new driveways on existing vehicle tracks where possible, as well as locating six of the ten proposed building sites in pasture, and another of the proposed building sites on the site of an

¹ Further information about applying to develop land on which indigenous lizards are present can be found here: <https://www.doc.govt.nz/get-involved/apply-for-permits/interacting-with-wildlife/applying-to-develop-land-with-native-lizards-and-frog-species/>

existing building. In addition, provision for the protection of significant areas of indigenous vegetation from development has been indicated (Figure 4). While the proposed areas of vegetation to be protected are generally ecologically appropriate, the following modifications are suggested (and illustrated in Figure 5):

- Widening the proposed protection area around Vegetation Type 1c on 190 and 236 Stratton Street so that it covers all of this vegetation type.
- Refining the boundaries of the proposed protection area on 190 and 236 Stratton Street to more closely fit the mapped areas of Vegetation Types 1b, 5, and 8.
- Extending the proposed protection area in the northeastern corner of 268 Stratton Street so that it covers a greater proportion of the adjacent areas of Vegetation Type 1b (with the exception of the area of 1b within the area of Vegetation Type 4) and Vegetation Type 2. These modifications will protect a greater area of the proposed SNA on this property.

With these modifications, the total area of protected vegetation across all properties would cover *c.*11.82 hectares. For stream margins that fall outside the proposed protection areas, riparian planting with ecologically appropriate indigenous plants is recommended.

12.3 Assessment of the ecological significance and value of the proposed no-development areas on the properties

At the time of writing, terrestrial Significant Natural Areas had not been formally scheduled in the Lower Hutt District Plan by the Lower Hutt City Council. Although some preliminary work has been carried out to identify potential terrestrial SNAs, the Lower Hutt City Council has decided not to proceed with the protection of SNAs on private properties. Therefore, there are currently no rules in place that define which areas of land within Lower Hutt are ecologically significant, as per the Policy 23 criteria from the Regional Policy Statement for the Greater Wellington region (GWRC 2013, 2016).

The Policy 23 criteria for the assessment of the ecological significance have been applied to the plan change site in order to identify any areas of ecological significance. The Policy 23 criteria are as follows:

- (a) **Representativeness:** the ecosystems or habitats that are typical and characteristic examples of the full range of the original or current natural diversity of ecosystem and habitat types in a district or in the region, and:
 - (i) are no longer commonplace (less than about 30% remaining); or
 - (ii) are poorly represented in existing protected areas (less than about 20% legally protected).
- (b) **Rarity:** the ecosystem or habitat has biological or physical features that are scarce or threatened in a local, regional or national context. This can include individual

- species, rare and distinctive biological communities and physical features that are unusual or rare.
- (c) **Diversity:** the ecosystem or habitat has a natural diversity of ecological units, ecosystems, species and physical features within an area.
 - (d) **Ecological context of an area:** the ecosystem or habitat:
 - (i) Enhances connectivity or otherwise buffers representative, rare or diverse indigenous ecosystems and habitats; or
 - (ii) Provides seasonal or core habitat for protected or threatened indigenous species.
 - (e) **Tangata whenua values:** the ecosystem or habitat contains characteristics of special spiritual, historical or cultural significance to tangata whenua, identified in accordance with tikanga Māori.

According to Policy 23, indigenous ecosystems and habitats¹ are considered to be significant if they meet one or more of the above criteria. However, assessment of significance against criterion (e) is outside of the scope of an ecological assessment because it requires specialist knowledge of tikanga Māori from the perspective of the iwi that assert mana whenua over the land in which the site is located. Therefore, only criteria a-d have been considered for the purposes of assessment of ecological significance in this report.

The value of an ecological unit² within the Wellington Region can also be assigned a rank based on assessment against the first four criteria (representativeness, rarity, diversity, and ecological context) described by Policy 23 of the Regional Policy Statement (Roper-Lindsay *et al.* 2018). We therefore used the processes outlined by Roper-Lindsay *et al.* (2018) to assign a ranking of: ‘Negligible’, ‘Low’, ‘Moderate’, ‘High’, and ‘Very High’. Generally, units ranked as having ‘High’ or ‘Very High’ ecological value would be considered ecologically significant however this is not always the case (for example, Wildland Consultants 2021).

The analysis indicates that five areas of terrestrial vegetation meet the criteria to be considered Ecologically Significant. These areas are identified as Areas B, C, E, F and G in Figure 5. The areas largely align with the proposed no-development areas and confirm the two draft SNAs initially identified by Hutt City Council. The remaining areas of the plan change sites, including the proposed no-development areas A and D (Figure 5), do not meet the criteria and are not considered Ecologically Significant (Table 2).

The two wetlands on the properties were treated precautionarily as ‘natural wetlands’ as defined by the NPS-FM, therefore the analysis found that both wetlands meet the criteria for Ecological Significance. Both wetlands are covered by proposed no-development areas (Areas F and G in Figure 5). However, as outlined earlier, a standard wetland delineation protocol (Clarkson 2013) has not been carried out, therefore it has not been confirmed whether they meet the definition of natural wetlands under the NPS-

¹ For the purposes of this report, an indigenous ecosystem or habitat has been defined as one that is dominated (that is, has $\geq 50\%$ cover) by indigenous vegetation.

² Such as an ecosystem, vegetation type, and/or habitat.

FM, and therefore whether the NPS-FM and National Environment Standards for Freshwater would guide their management.

Therefore, it appears that the extent of the proposed no-development areas covers, and even exceeds, all ecologically significant areas on the properties.

Table 2: Ecological value and significance assessment of the five proposed no-development areas within the properties, plus three further units encompassing the remaining areas (excluding wetlands). Labels A-G assigned to each proposed no-development area are as per Figure 5. The Vegetation Type numbers are as per section 5 and Figures 3 and 5. Ecological value has been assigned a rank (ranging from 'negligible' to 'very high') according to the EIANZ guidelines (Roper-Lindsay *et al.* 2018). Ecological Significance has been assessed against ecological criteria in Policy 23 of the RPS (GWRC 2013).

Area	Vegetation Type(s)	Assessment against ecological criteria (a-d) in Policy 23 of the RPS for significance (criterion met / not met) and ecological value (negligible to very high)	Ecological value	Ecological significance
Proposed no-development area A	7	Criterion a: Representativeness – not met, low Criterion b: Rarity – not met, low Criterion c: Diversity – not met, low Criterion d: Ecological context of an area – not met, moderate	Low	Not Significant
Proposed no-development area B	1a, 1b, 2	Criterion a: Representativeness – met, low-moderate Criterion b: Rarity - met, high Criterion c: Diversity – met, low-moderate Criterion d: Ecological context – met, high	High	Significant
Proposed no-development area C	1b, 1c, 5, 8	Criterion a: Representativeness – not met, low-moderate Criterion b: Rarity – not met, low Criterion c: Diversity – met, low-high Criterion d: Ecological context – met, low-moderate	Moderate	Significant
Proposed no-development area D	1b	Criterion a: Representativeness – not met, low Criterion b: Rarity –not met, low. Criterion c: Diversity – not met, low Criterion d: Ecological context –not met, low.	Low	Not Significant
Proposed no-development area E	5	Criterion a: Representativeness – not met, low Criterion b: Rarity – met, high. Criterion c: Diversity – not met, low Criterion d: Ecological context of an area – met, moderate.	Moderate	Significant
Proposed no-development area F	11	Criterion a: Representativeness – not met, moderate Criterion b: Rarity – met, high Criterion c: Diversity – not met, low Criterion d: Ecological context of an area – met, moderate	Moderate	Significant
Proposed no-development area G	12	Criterion a: Representativeness – not met, low Criterion b: Rarity – met, high Criterion c: Diversity – not met, low Criterion d: Ecological context of an area – not met, low	Moderate	Significant

Area	Vegetation Type(s)	Assessment against ecological criteria (a-d) in Policy 23 of the RPS for significance (criterion met / not met) and ecological value (negligible to very high)	Ecological value	Ecological significance
Remaining areas of the three properties	1b, 3a, 3b, 4, 5, 6, 8, 9, 10	Criterion a: Representativeness – not met, very low-low Criterion b: Rarity – not met, very low-low Criterion c: Diversity – not met, very low-low Criterion d: Ecological context of an area – not met, very low-low.	Low	Not Significant

13. CONCLUSIONS

In general, the ecological effects of rezoning 190, 236, and 268 Stratton Street from General Rural to Rural Residential are likely to be low. If future subdivision and land use:

- (1) avoids the identified no-development areas, and
- (2) the additional measures outlined in this report are taken to minimize, remediate and/or mitigate residual adverse ecological effects,

then the proposed rezoning and development is likely to result in better protection of the ecological values present on the properties than currently exists under general rural zoning.

However, a lizard survey would be required prior to future development, and if indigenous lizards are found, a Lizard Management Plan (LMP) may need to be prepared and implemented. This LMP will provide guidance on how to implement approved mitigation actions (such as salvage and relocation) for affected lizards. The LMP will need to be submitted to and approved by the Department of Conservation, Greater Wellington Regional Council and Hutt City Council prior to any works commencing. A Wildlife Act Authorisation would be required from the Department of Conservation for lizard management. If no lizards are found during the lizard survey, then no further action would be required.

ACKNOWLEDGMENTS

We thank Corinna Tessendorf from Urban Edge Planning for initiating this project and Catharina Fisher for showing us around the properties and for providing additional site information.

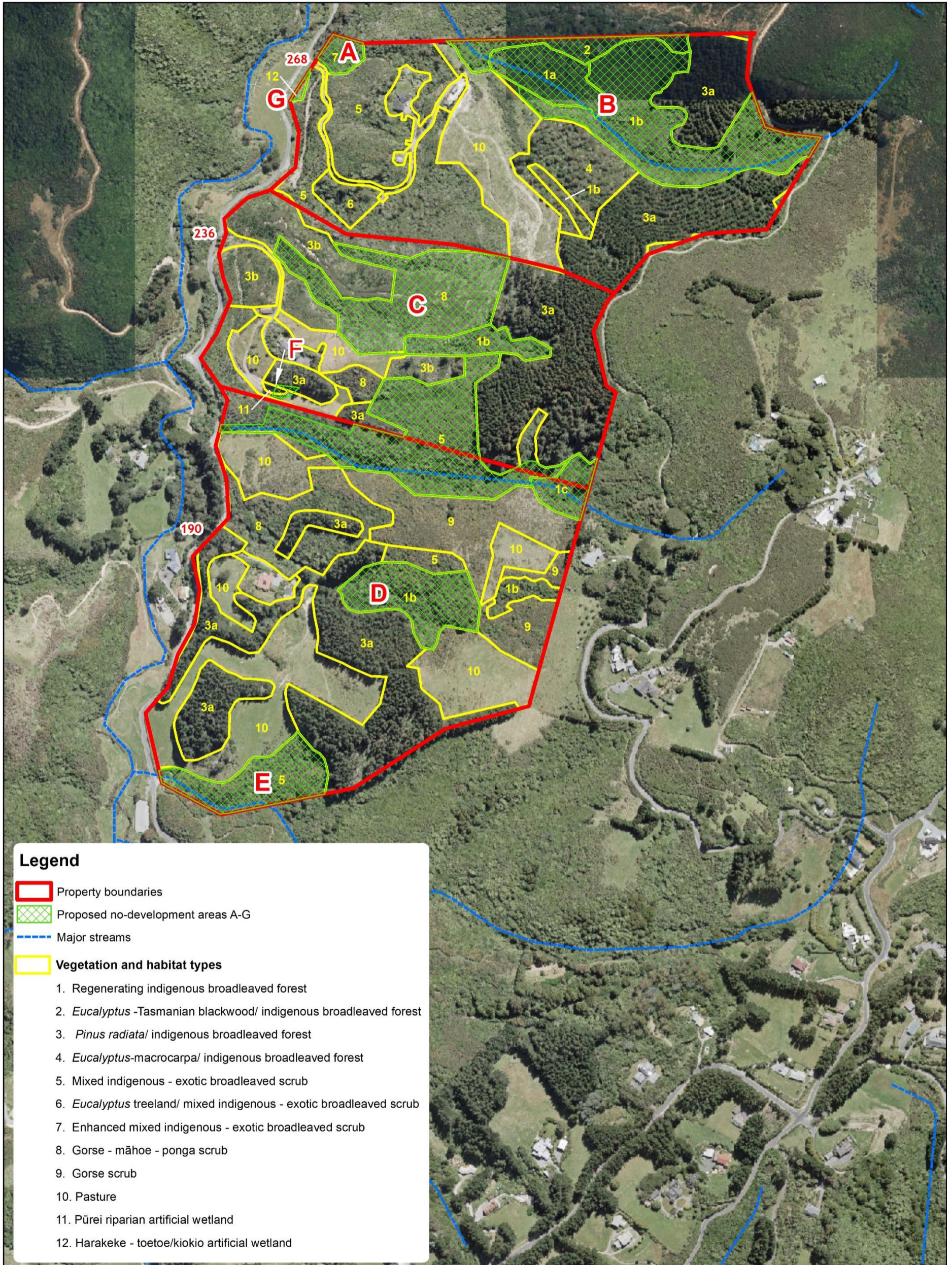


Figure 5: Suggested modifications to proposed no-development areas of vegetation at 190, 236, and 268 Stratton Street

0 112.5 225
m

Data Acknowledgment
Maps contain data sourced from LINZ
Crown Copyright Reserved

Report: R5743
Client:
Ref: 05 0488
Path: E:\gis\WN_StrattonStreet_AEE\Mxd\
File: Figure5_ProtectedAreas.mxd

Wildlands
www.wildlands.co.nz, 0908 WILDNZ

Scale: 1:4,500
Date: 17/09/2021
Cartographer: DBM
Format: A3

REFERENCES

- Aguilar G.D. and Farnsworth M.J. 2013: Distribution characteristics of unmanaged cat colonies over a 20 year period in Auckland, New Zealand. *Applied Geography* 37: 160-167.
- Atkinson I.A.E. 1985: Derivation of vegetation mapping units for an ecological survey of Tongariro National Park, North Island, New Zealand. *New Zealand Journal of Botany* 23: 361-378.
- Bell T. and Wiles A. 2015: Describing lizard and frog distribution and species assemblages using the Ecological Districts framework. *BioGecko* 3: 19-34.
- Cieraad E., Walker S., Price R., and Barringer J. 2015: An updated assessment of indigenous cover remaining and legal protection in New Zealand's land environments. *New Zealand Journal of Ecology* 39: 309-315.
- Clarkson B.R. 2013: A vegetation tool for wetland delineation in New Zealand. *Manaaki Whenua Landcare Research Contract Report No. LC1793*. Prepared for Meridian Energy Limited.
- Crow S. 2017: New Zealand Freshwater Fish Database. Version 1.2. The National Institute of Water and Atmospheric Research (NIWA). (Accessed January 2021)
- Crisp P. 2020a: Conservation status of indigenous lizard species in the Wellington region. *Greater Wellington Regional Council, Publication No. GW/ESCI-G-20/2*, Wellington. 10 pp.
- Crisp P. 2020b: Conservation status of indigenous vascular plant species in the Wellington region. *Greater Wellington Regional Council, Publication No. GW/ESCI-G-20/20*, Wellington. 37 pp.
- de Lange P.J., Rolfe J.R., Barkla J.W., Courtney S.P., Champion P.D., Perrie L.R., Beadel S.M., Ford K.A., Breitwieser I., Schönberger I., Hindmarsh-Walls R., Heenan P.B., and Ladley K. 2018: Conservation status of New Zealand indigenous vascular plants, 2017. *New Zealand Threat Classification Series 22*. Department of Conservation, Wellington. 82 pp.
- DOC Lizard TAG (Department of Conservation Lizard Technical Advisory Group) 2019: Key principles for lizard salvage and transfer in New Zealand. Department of Conservation, Wellington.
- Dunn N.R., Allibone R.M., Closs G.P., Crow S.K., David B.O., Goodman J.M., Griffiths M, Jack D.C., Ling N., Waters J.M., and Rolfe J.R., 2017: Conservation status of New Zealand freshwater fishes. *New Zealand Threat Classification Series 24*. Department of Conservation, Wellington. 11 pp.
- Evans A.M., Clinton P.W., Allen R.B., and Frampton C.M. 2003: The influence of logs on the spatial distribution of litter-dwelling invertebrates and forest floor processes in New Zealand forests. *Forest Ecology and Management* 184: 251-262.
- Forbes A.S. 2015: Non-harvest *Pinus radiata* plantations for forest restoration in New Zealand. *PhD thesis*, University of Canterbury, Christchurch, New Zealand.

- Goodman J.M., Dunn N.R., Ravenscroft P.J., Allibone R.M., Boubée J.A.T., David B.O., Griffiths M., Ling N., Hitchmough R.A., and Rolfe J.R. 2014: Conservation status of New Zealand freshwater fish, 2013. *New Zealand Threat Classification Series 7*. Department of Conservation, Wellington. 12 pp.
- Grainger N., Harding J., Drinan T., Collier K., Smith B., Death R.; Makan T., and Rolfe J. 2018: Conservation status of New Zealand freshwater invertebrates, 2018. *New Zealand Threat Classification Series 28*. Department of Conservation, Wellington. 25 pp.
- GWRC 2013: Regional Policy Statement for the Wellington Region. GW/EP-G-13/21, Greater Wellington Regional Council, Wellington, New Zealand. 212 pp.
- GWRC 2016: Identifying and protecting significant indigenous biodiversity in the Wellington region: a guide to interpreting criteria in the Regional Policy Statement. GW/BD-G-16/51, Greater Wellington Regional Council, Wellington, New Zealand. 33 pp.
- GWRC 2019: Greater Wellington Regional Pest Management Plan 2019-2039. Greater Wellington Regional Council, Wellington, New Zealand. 96 pp.
- Herbert S.M. 2020: Is habitat enhancement a viable strategy for conserving New Zealand's endemic lizards? *PhD thesis*, Victoria University of Wellington, Wellington, New Zealand. Available online: <http://hdl.handle.net/10063/9378>.
- Hitchmough R., Barr B., Lettink M., Monks J., Reardon J., Tocher M., van Winkel D, and Rolfe J. 2016: Conservation status of New Zealand reptiles, 2015. *New Zealand Threat Classification Series 17*. Department of Conservation. Wellington.
- McEwen W.M. (Ed.) 1987: Booklet to accompany SHEET 3: descriptions of Districts in central New Zealand, from Eastern Wairarapa to Akaroa; also Chathams. Ecological Regions and Districts of New Zealand. Wellington, Department of Conservation. 92 pp.
- MfE (Ministry for the Environment) 2021: Essential freshwater interpretation guidance: wetlands definitions. [Exposure Draft circulated 7 April 2021 – Not Final Guidance]. Ministry
- O'Donnell C.F.J., Borkin K.M., Christie J.E., Lloyd B., Parsons S., and Hitchmough R.A. 2018: Conservation status of New Zealand bats, 2017. *New Zealand Threat Classification Series 21*. Department of Conservation, Wellington. 4 pp.
- O'Donnell C.F.J., Borkin K.M., Parsons S., and Toth C. 2021: New Zealand long-tailed bat. *Chapter In: C. M. King and Forsyth D.M. (Eds.): The Handbook of New Zealand Mammals, Third Edition*. Pp 96-107. CSIRO Publishing, Clayton South, Victoria, Australia.
- Pawson S.M., Ecroyd C.E., Seaton R., Shaw W.B., and Brockerhoff E.G. 2010: New Zealand's exotic plantation forests as habitats for threatened indigenous species. *New Zealand Journal of Ecology* 34(3): 342-355.
- Robertson H.A., Baird K., Dowding J.E., Elliott G.P., Hitchmough R.A., Miskelly C.M., McArthur N., O'Donnell C.F.J., Sagar P.M., Scofield R.P., and Taylor G.A. 2017: Conservation status of New Zealand birds, 2016. *New Zealand Threat Classification Series 19*. Department of Conservation, Wellington. 23 pp.

- Roper-Lindsay J., Fuller S.A., Hooson S., Sanders M.D., and Ussher G.T. 2018: Ecological impact assessment (EcIA): EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems. Melbourne: Environment Institute of Australia and New Zealand. 133 pp.
- Trewick S., Johns P., Hitchmough R., Rolfe J., and Stringer I. 2014: Conservation status of New Zealand Orthoptera, 2014. *New Zealand Threat Classification Series 16*. Department of Conservation, Wellington. 15 pp.
- Townsend A.J., de Lange P.J., Duffy C.A.J., Miskelly C.M., Molloy J. and Norton D.A. 2008: *New Zealand threat classification system manual*. Wellington: Department of Conservation.
- Walker S., Cieraad E., and Barringer J. 2015: The Threatened Environment Classification for New Zealand 2012: a guide for users. Dunedin and Lincoln: Manaaki Whenua Landcare Research.
- Wildland Consultants Ltd 2021: Ecological advice on the proposed exotic afforestation of the Hannon property, North Otago. *Wildland Consultants Ltd Contract Report No. 5698b*. Prepared for New Zealand Forest Leasing Ltd. 55 pp.
- Woolley C.K. and Hartley S. 2019: Activity of free-roaming domestic cats in an urban reserve and public perception of pet-related threats to wildlife in New Zealand. *Urban Ecosystems 22*: 1123-1137.

VASCULAR PLANT SPECIES RECORDED AT 190, 236,
AND 268 STRATTON STREET, NORMANDALE

P = Indigenous species planted at this site.

INDIGENOUS SPECIES

Gymnosperms

Podocarpus totara var. *totara* (P) tōtara

Monocot. trees and shrubs

Cordyline australis tī kōuka, cabbage tree
Rhopalostylis sapida nīkau

Dicot. trees and shrubs

Aristotelia serrata makomako, wineberry
Beilschmiedia tawa tawa
Brachyglottis repanda rangiora
Carpodetus serratus putaputawētā
Coprosma areolata
Coprosma grandifolia kanono, raurēkau, raurākau, manono
Coprosma propinqua var. *propinqua* mingimingi
Coprosma rhamnoides
Coprosma robusta karamū, kāramuramu
Corynocarpus laevigatus karaka
Dodonaea viscosa (P) akeake
Elaeocarpus dentatus (P) hīnau, whīnau
Fuchsia excorticata kōtukutuku, kōnini
Geniostoma ligustrifolium var. *ligustrifolium* hangehange
Hedycarya arborea porokaiwhiri; pigeonwood
Kunzea robusta kānuka
Leptospermum scoparium agg. mānuka
Melicytus ramiflorus subsp. *ramiflorus* māhoe
Myrsine australis māpou, matipou, māpau
Myrsine salicina (P) toro
Nestegis lanceolata (P) white maire, maire rauriki
Olearia paniculata (P) akiraho
Ozothamnus leptophyllus tauhinu
Piper excelsum subsp. *excelsum* kawakawa
Pittosporum crassifolium karo
Pittosporum eugenioides tarata; lemonwood
Pittosporum tenuifolium (P) kōhūhū, rautāhiri, rautāwhiri
Pseudopanax arboreus whauwhaupaku, puahou, five finger

<i>Schefflera digitata</i>	patē
<i>Solanum laciniatum</i>	
<i>Sophora microphylla</i> (P)	kōwhai
<i>Sophora tetraptera</i> (P)	kōwhai
<i>Urtica ferox</i>	ongaonga, tree nettle
<i>Veronica stricta</i> var. <i>macroura</i>	koromiko
<i>Veronica stricta</i> var. <i>stricta</i>	koromiko, kōkōmuka

Monocot. lianes

<i>Freycinetia banksii</i>	kiekie
<i>Ripogonum scandens</i>	supplejack, kareao

Dicot. lianes

<i>Muehlenbeckia australis</i>	puka
<i>Parsonsia heterophylla</i>	akakaikiore
<i>Rubus cissoides</i> agg.	tātarāmoa, tātaraheke, bush lawyer

Ferns

<i>Asplenium bulbiferum</i>	mouku, hen and chicken fern
<i>Asplenium flaccidum</i>	makawe, ngā makawe o Raukatauri
<i>Asplenium oblongifolium</i>	huruhuru whenua
<i>Cranfillia fluviatilis</i>	kiwikiwi, kiwakiwa
<i>Cyathea dealbata</i>	ponga, silver fern
<i>Cyathea medullaris</i>	mamaku
<i>Histiopteris incisa</i>	mātātā, water fern
<i>Icarus filiformis</i>	pānako
<i>Lomaria discolor</i>	piupiu, crown fern
<i>Paesia scaberula</i>	mātātā
<i>Parablechnum novae-zelandiae</i>	kiokio
<i>Pellaea rotundifolia</i>	tarawera, button fern
<i>Polystichum neozelandicum</i> subsp. <i>zerophyllum</i>	
<i>Pteridium esculentum</i>	rārahu, bracken
<i>Pteris macilenta</i>	titipo, sweet fern
<i>Zealandia pustulata</i> (= <i>Microsorium pustulatum</i>)	kōwaowao, pāraharaha, hound's tongue fern

Grasses

<i>Austroderia toetoe</i>	toetoe
---------------------------	--------

Sedges

<i>Carex secta</i>	pūrei, makura, pūreirei, pūrekireki, pūkio
<i>Carex uncinata</i>	kamu matau a Maui, kamu
<i>Eleocharis sphacelata</i>	giant spike sedge, ngāwhā, kuta, kutakuta, paopao

Monocot. herbs (other than orchids, grasses, sedges, and rushes)

<i>Arthropodium cirratum</i> (P)	rengarenga
<i>Phormium cookianum</i> subsp. <i>hookeri</i> (P)	wharariki, mountain flax
<i>Phormium tenax</i> (P)	harakeke, flax

Dicot. herbs (other than composites)

<i>Hydrocotyle</i> sp.	
<i>Lobelia angulata</i>	pānakenake

NATURALISED AND EXOTIC SPECIES

Gymnosperms

<i>Cupressus macrocarpa</i>	macrocarpa
<i>Pinus radiata</i>	radiata pine

Dicot. trees and shrubs

<i>Acacia melanoxylon</i>	Tasmanian blackwood
<i>Buddleja davidii</i>	buddleia
<i>Chamaecytisus palmensis</i>	tree lucerne
<i>Erica lusitanica</i>	Spanish heath
<i>Eucalyptus</i> sp.	eucalyptus
<i>Hydrangea macrophylla</i>	hydrangea
<i>Leycesteria formosa</i>	Himalayan honeysuckle
<i>Prunus</i> sp.	ornamental cherry
<i>Quercus rubra</i>	red oak
<i>Rubus</i> sp. (<i>R. fruticosus</i> agg.)	blackberry
<i>Salix cinerea</i>	grey willow
<i>Ulex europaeus</i>	gorse

Dicot. lianes

<i>Calystegia silvatica</i>	greater bindweed
-----------------------------	------------------

Grasses

<i>Cortaderia jubata</i>	purple pampas
<i>Dactylis glomerata</i>	cocksfoot
<i>Ehrharta erecta</i>	veldt grass
<i>Lolium perenne</i>	rye grass

Monocot. herbs (other than orchids, grasses, sedges, and rushes)

<i>Agapanthus praecox</i>	agapanthus
---------------------------	------------

Composite herbs

<i>Achillea millefolium</i>	yarrow
<i>Bellis perennis</i>	lawn daisy
<i>Erigeron canadensis</i>	Canadian fleabane
<i>Jacobaea vulgaris</i>	ragwort
<i>Senecio glastifolius</i>	pink ragwort, holly-leaved senecio
<i>Sonchus oleraceus</i>	puha, sow thistle
<i>Taraxacum officinale</i>	dandelion

Dicot. herbs (other than composites)

<i>Digitalis purpurea</i>	foxglove
<i>Erythranthe guttata</i>	monkey musk
<i>Geranium robertianum</i>	herb Robert
<i>Lotus pedunculatus</i>	lotus
<i>Nasturtium officinale</i>	watercress
<i>Plantago lanceolata</i>	narrow-leaved plantain
<i>Prunella vulgaris</i>	selfheal
<i>Ranunculus repens</i>	creeping buttercup
<i>Rumex</i> sp.	dock
<i>Solanum nigrum</i>	black nightshade
<i>Stachys sylvatica</i>	hedge woundwort
<i>Trifolium repens</i>	white clover

MOSSES

<i>Selaginella kraussiana</i>	selaginella, African club moss
-------------------------------	--------------------------------

FAUNA SPECIES RECORDED AT 190, 236,
AND 268 STRATTON STREET, NORMANDALE

P = Reported as being present by landowner.

MAMMALS

Introduced (feral)

<i>Erinaceus europaeus</i> (P)	European hedgehog
<i>Felis catus</i> (P)	cat
<i>Lepus europaeus</i> (P)	brown hare
<i>Mus musculus</i> (P)	kiore-iti; house mouse
<i>Mustela erminea</i> (P)	stoat
<i>Mustela nivalis vulgaris</i> (P)	weasel
<i>Oryctolagus cuniculus cuniculus</i> (P)	European rabbit
<i>Rattus norvegicus</i> (P)	pouhawaiki; Norway rat
<i>Rattus rattus</i> (P)	ship rat
<i>Trichosurus vulpecula</i> (P)	brush-tail possum

BIRDS

Indigenous

<i>Hemiphaga novaeseelandiae</i>	kererū; kūkupa; New Zealand pigeon
<i>Ninox novaeseelandiae novaeseelandiae</i> (P)	ruru; morepork
<i>Petroica macrocephala toitoi</i> (P)	miromiro; pied tomtit
<i>Prosthemadera novaeseelandiae novaeseelandiae</i>	tūi
<i>Rhipidura fuliginosa placabilis</i>	pīwakawaka; North Island fantail
<i>Tadorna variegata</i> (P)	pūtangitangi; pari; paradise shelduck
<i>Todiramphus sanctus vagans</i> (P)	kōtare sacred kingfisher; New Zealand kingfisher
<i>Vanellus miles novaehollandiae</i> (P)	spur-winged plover
<i>Zosterops lateralis lateralis</i> (P)	silveryeye; tauhou

Introduced

<i>Anas platyrhynchos</i> (P)	mallard
<i>Callipepla californica bunnescens</i>	California quail
<i>Carduelis carduelis</i> (P)	goldfinch
<i>Fringilla coelebs</i> (P)	chaffinch
<i>Gymnorhina tibicen</i>	Australian magpie
<i>Passer domesticus</i> (P)	house sparrow
<i>Platycercus eximius</i>	eastern rosella
<i>Prunella modularis</i> (P)	dunnock
<i>Turdus merula</i>	Eurasian blackbird
<i>Turdus philomelos</i> (P)	song thrush

FISH

Indigenous

Anguilla sp. (P)

unidentified eel

FRESHWATER INVERTEBRATES

Paranephrops planifrons (P)

kōura; freshwater crayfish

ADDITIONAL OPPORTUNITIES TO AVOID, MINIMISE, REMEDY OR MITIGATE POTENTIAL ADVERSE EFFECTS ARISING FROM FUTURE RESIDENTIAL DEVELOPMENT

Disturbance, modification, and/or loss of indigenous vegetation

Any woody vegetation that is cleared should be retained on site. Transferring felled vegetation to areas within the site but outside of the construction footprint will provide habitat for indigenous fauna. Woody debris plays an important ecological role in ecosystems (c.f. Evans *et al.* 2003) by providing habitat for a wide range of biota, including lizards, invertebrates, lichens, and fungi, and providing microsites for the regeneration of indigenous plants.

Suggestions for remediating or mitigating residual adverse effects on indigenous vegetation are as follows:

- Depending on the species' resilience to disturbance, seedlings and saplings of indigenous large shrub or tree species (particularly species that are less common on the property), and sedges, ferns, herbs and small shrubs that are present in development sites could be transplanted to other areas of the property. Seeds or cuttings could be collected from larger trees and propagated to be planted at the property at a later stage.
- Legal protection of areas of indigenous vegetation on the property from clearance and allowing their natural regeneration would also help to address the loss of indigenous vegetation for the construction of new driveways, accessways, and buildings.
- Ecological restoration in the form of pest plant control, buffer planting, and enrichment planting throughout the proposed protected areas of remaining indigenous vegetation would also provide benefits. It is important that any indigenous plantings are of ecologically appropriate species sourced from the Wellington Ecological District. An Ecological Management Plan (EMP) will be required to guide planting and pest plant control work at the site.

The indicative development plan does not show any new residences, accessways, or driveways within the Draft Significant Natural Areas (SNAs) or Significant Natural Resource Sites (SNRs), thus avoiding any direct effects. Several of the measures listed above are also applicable for minimising indirect effects of future subdivision on vegetation within the adjacent Draft SNAs and SNRs.

Any residual adverse effects on Draft SNAs and SNRs could be mitigated by:

- Removal or control of exotic plant species that potentially threaten the integrity of indigenous vegetation; particularly any plant species listed on the NPPA or GWRCs RPMS (GWRC 2019). It is recommended that plant debris from exotic species that

do not readily reproduce vegetatively¹ remain on site. Exotic plants that reproduce vegetatively would need to be removed from the property or otherwise destroyed to prevent resprouting or spreading. Stumps of tree and shrub species that are prone to resprouting may need to be treated with an appropriate herbicide.

- Planting indigenous species in light gaps caused by removal of large exotic trees to prevent establishment by adventive exotic species.
- Enhancing plant biodiversity and ecological value of existing indigenous habitats by planting appropriate eco-sourced later successional species (e.g. tawa) and/or appropriate indigenous species not currently present at the site.
- Carrying out control for mammalian omnivores and predators that browse indigenous flora or their seeds, and predate on indigenous fauna (most likely to be rodents at this site, and potentially possums (*Trichosurus vulpecula*)).

Introduction and spread of pest plants

The introduction and/or spread of pest plants as a result of increased housing density and human activities on the properties can be avoided or minimised by:

- Ensuring contractor machinery, footwear and clothing are clean and free of seeds prior to site entry.
- Using appropriate and eco-sourced indigenous plants in gardens and landscaping.
- In order to control the spread of pest plants from domestic gardens, no plant species listed in the National Plant Pest Accord (NPPA) or the Greater Wellington Regional Pest Management Strategy (RPMS; GWRC 2019), in any category, should be permitted to be planted or cultivated, either in the ground or in pots. This should be addressed in conditions of subdivision or consent.
- Many species not listed in the NPPA or RPMS can also establish from dumped garden refuse. No dumping of garden waste should be allowed, particularly on the margins of indigenous vegetation. Natural areas, especially along lot boundaries and forest edges, should be surveyed annually for new pest plant incursions. Exotic plants within natural areas should be controlled when they are first recorded in order to increase the likelihood and efficiency of achieving total control.
- Controlling any wilding radiata pines on the properties, preferably at the seedling stage.

Mortality and disturbance of indigenous avifauna

Adverse effects on indigenous birds are likely to be minimised due to the proposed avoidance of high-quality habitats for forest-dwelling indigenous birds. However, suggested further steps to minimise adverse effects on avifauna are as follows:

¹ That is, resprout or regrow from structures such as bulbs, corms, or stems.

- Avoid vegetation clearance and activities generating significant noise during the nesting season (September-February) of resident indigenous bird species.

Adverse effects on indigenous birds (and other indigenous fauna such as lizards and invertebrates) could be remediated or offset by:

- Restoring or enhancing habitat quality for resident indigenous fauna. For example, planting further ecologically appropriate native plant species that provide food for indigenous birds.
- Controlling mammalian predators on the property.

Injury to and/or mortality of indigenous lizards

A lizard survey is recommended prior to application for resource consent for subdivision in order to determine whether indigenous lizard populations are present within the project area, and the potential adverse effects on the lizards as a result of subdivision. In particular, any rank grassland and shrubland areas planned for removal should be surveyed for lizard presence by a suitably qualified and experienced herpetologist.

Lizard surveys will need to be undertaken at an appropriate time of the year (October-May) and utilise appropriate survey methodology for the target species, habitat type and time of year. An expert herpetologist will be able to provide advice on optimum survey effort and techniques.

If no lizards are found during the survey, then no further action will be necessary.

If lizards are found to be present, then depending on lizard abundance, a lizard management plan (LMP) may be required, accompanied by the required Wildlife Act Authority from the Department of Conservation. A LMP is likely to support a rescue and relocation activity to suitable receptor sites elsewhere, along with any additional management requirements such as provision of habitat enhancement, habitat restoration or pest management, and/or monitoring. Habitat enhancement could be provided by provision of wood and/or rock piles along with dense plantings of indigenous vines and shrubs such as *Muehlenbeckia complexa* and *Coprosma* species. Enhancement and predator control strategies should be tailored to suit the protection requirements of whichever lizard species are salvaged (c.f. Herbert 2020).

Sedimentation and contamination of freshwater habitats

The majority of the driveways and building platforms as shown in the indicative development plan avoid the wetlands and streams on the properties, and the existing vegetative buffers are likely to minimise any sediment going into streams. However, a sediment and erosion control plan should be submitted and approved by Council before earthworks are undertaken. Protected corridors could also be established beside streams, and enhanced by ecologically-appropriate planting where required.

SITE PHOTOGRAPHS



Plate 1: Example of the regenerating indigenous broadleaved forest present on the properties (Vegetation Type 1a).



Plate 2: A mixture of gorse and indigenous broadleaved species regenerating underneath a *Eucalyptus-macrocarpa* canopy (Vegetation Type 4, *Eucalyptus* not visible in frame).



Plate 3: Border between pasture (Vegetation Type 10) and mixed indigenous-exotic broadleaved shrubland (Vegetation Type 5) at 268 Stratton Street. Belmont Regional Park can be seen on the hills in the background.



Plate 4: The pūrei riparian wetland at 236 Stratton Street (Vegetation Type 11).



Plate 5: The harakeke-toetoe / kiokio wetland at 268 Stratton Street (Vegetation Type 12). The harakeke has been planted by the landowner.

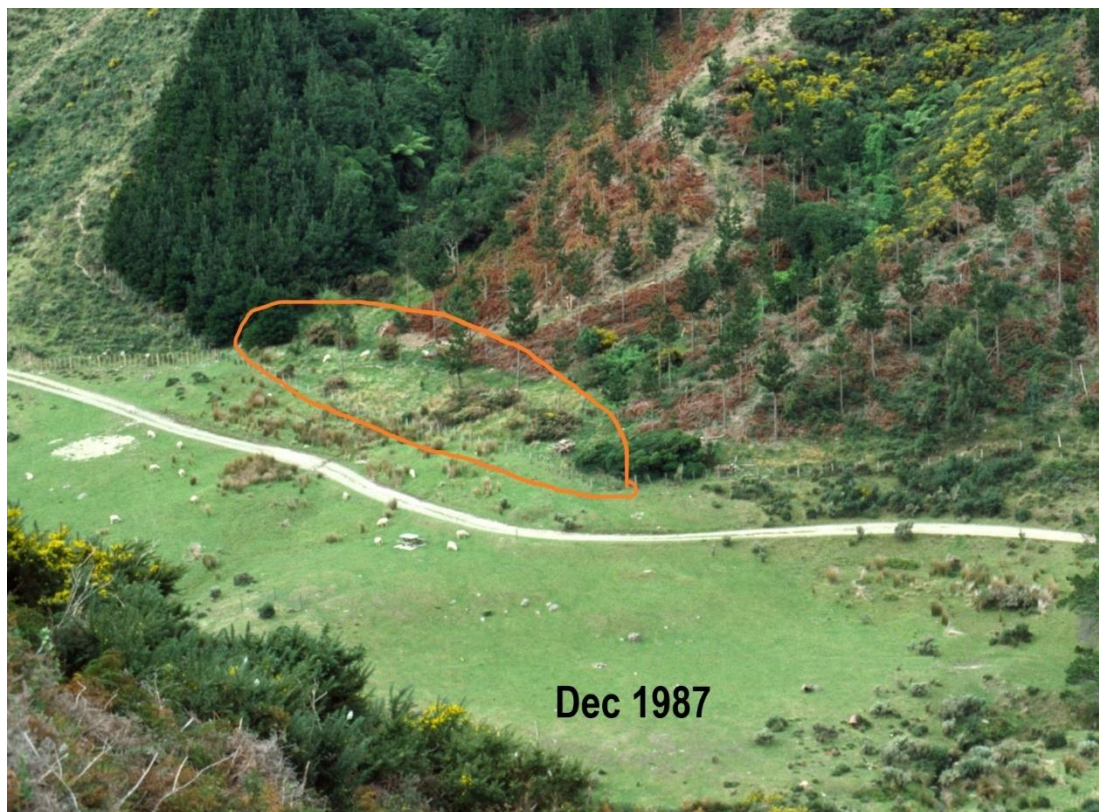


Plate 6: Photograph of the area that is now harakeke-toetoe / kiokio wetland at 268 Stratton Street (Vegetation Type 12) taken in December 1987 by Catharina Fisher.



Wildlands

*Providing outstanding ecological services
to sustain and improve our environments*

Call Free 0508 WILDNZ
Ph: +64 7 343 9017
Fax: +64 7 3439018
ecology@wildlands.co.nz

99 Sala Street
PO Box 7137, Te Ngae
Rotorua 3042,
New Zealand

Regional Offices located in
Auckland, Hamilton, Tauranga,
Whakatane, Wellington,
Christchurch and Dunedin

ECOLOGY RESTORATION BIODIVERSITY SUSTAINABILITY

www.wildlands.co.nz