

Attachment 3: Ecological Assessment

PRELIMINARY ECOLOGICAL ASSESSMENT

GABITES BLOCK,

MAYMORN



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MAYMORN

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COVER ILLUSTRATION: MIXED NATIVE AND EXOTIC VEGETATION ON GABITES BLOCK, MAYMORN.

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1 INTRODUCTION

Maymorn Developments Limited are in the process of applying for a plan change to the land use zone on a property on Maymorn Road, Upper Hutt (Figure 1). Currently, the property is zoned Rural Hill and Rural Valley Floor under the Operative Upper Hutt District Plan 2004. Changing the zoning will allow for the property to be developed for a combination of large lot sections, and residential sections. Master planning has not yet been undertaken.

The site currently supports a single dwelling and disused agricultural buildings, which are positioned in the southwest corner of the site. The property can be divided into two zones (Figure 1). The 'lower zone' that is predominantly grazed flats and covers approximately 22 ha along the western side of the site, bisected by a waterway with modified reaches, and the 'upper zone', which is predominantly vegetated hill country.

A portion of a draft Significant Natural Area (SNA) (UH041) extends into the northwestern corner of the site. In addition, there are several other draft SNAs located in the vicinity of the property, including on the eastern boundary.

A modified waterway, a tributary of the Mangaroa River, flows through the 'lower zone'. The waterway is highly modified and has been straightened and realigned through the site. In addition, there are constructed farm drains that flow into the channel. Several waterways are located within the 'upper zone', following the topography of the area.

Bioresearches was commissioned to provide an ecological values and constraints report for the proposed plan change to accompany the suite of assessment documents required for the plan change process. The current report describes the ecological features and values present at the site and describes potential ecological constraints to the project proposal.

This report combines the information collected during a desktop exercise and site investigation by a Bioresearches ecologist in September 2021, but also draws on existing information from a previous freshwater ecological assessment to assess wetlands undertaken by Bioresearches in July 2021.

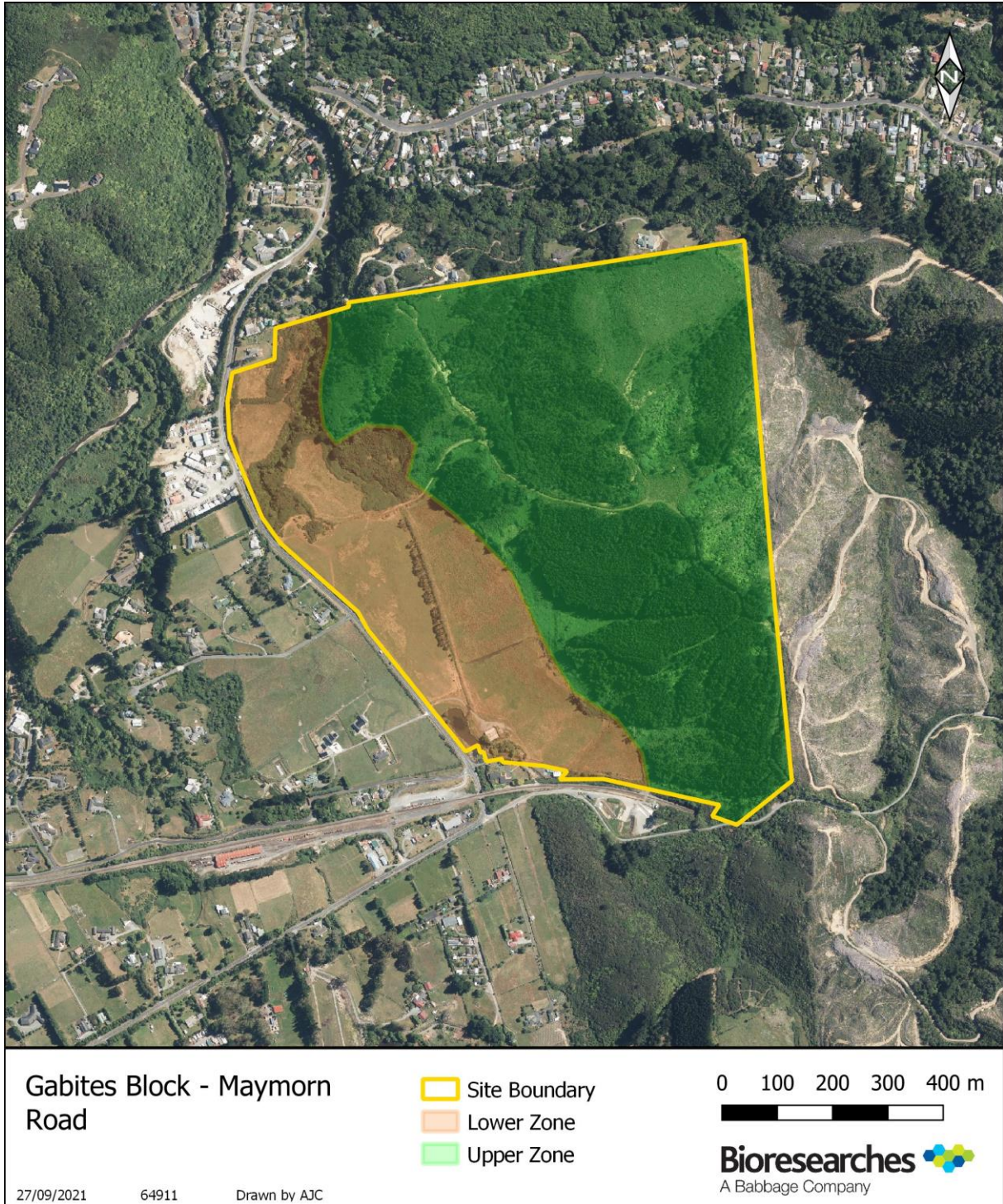


Figure 1. Gabites Block, Maymorn Road, Upper Hutt.

2 EXISTING ENVIRONMENT

2.1 Site description

The site is ca. 75 ha in size, broadly trapezium-shaped, and is situated south of Plateau Road and east of Maymorn Road, approximately 7 km northeast of Upper Hutt City centre. The site is zoned Rural Valley Floor and Rural Hill under the Operative Upper Hutt District Plan 2004.

The topography of the site is represented by an area of flat lower-lying land (ca. 100 m asl) covered in pasture immediately east of Maymorn Road. The landform then becomes rolling hill country, climbing gradually in elevation to the east, reaching 180 m asl along a central ridgeline. The hill country is covered by pine plantation forest and smaller fragments of mixed native and exotic bushland. The site is traversed by several streams and flow paths. In the lower zone, large portions of the waterways have been modified. In the upper zone, the waterways flow through gully systems. The waterways in the site flow in a generally northerly direction and converge with Blaikie Stream before entering the Mangaroa River (Figure 2).

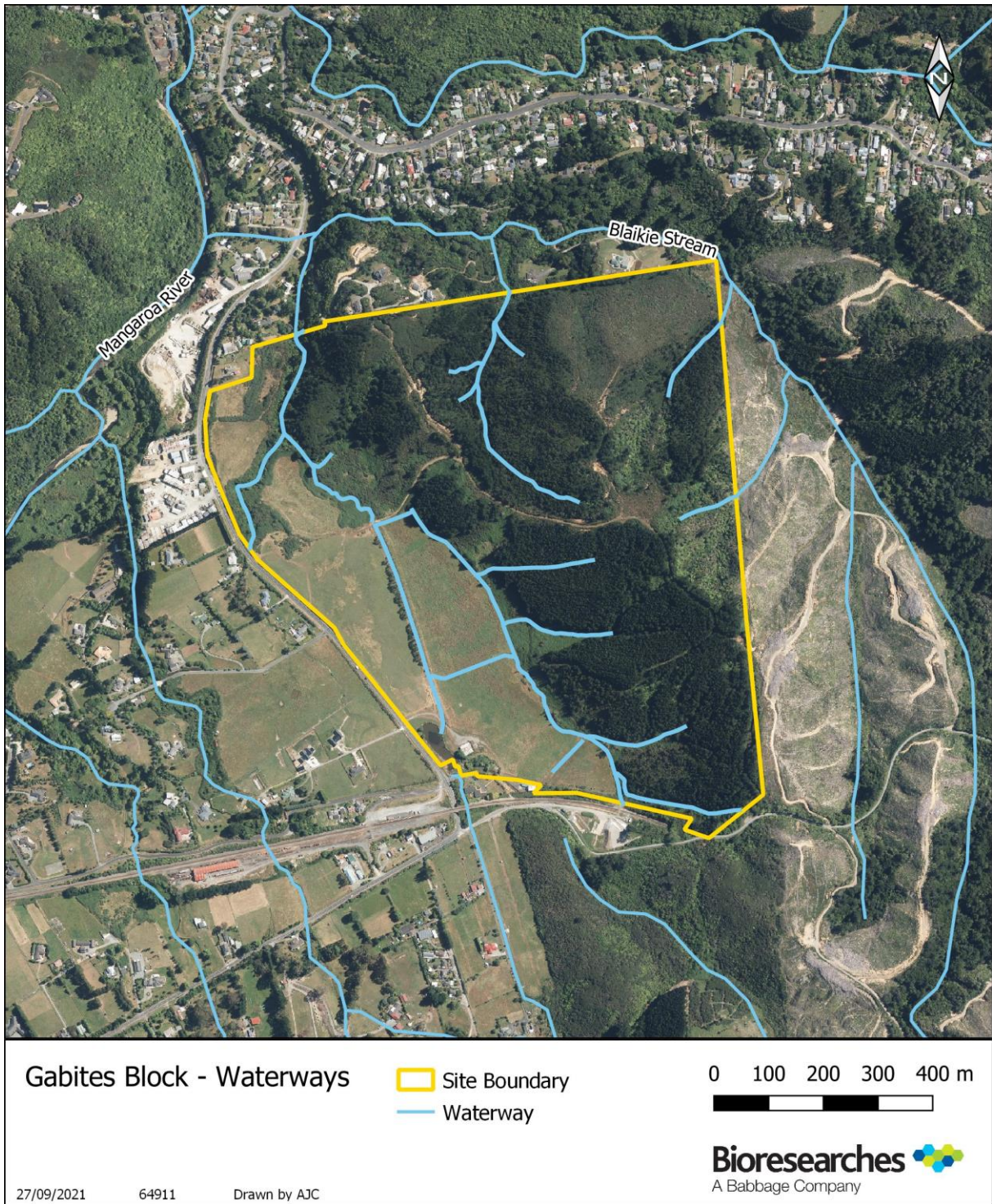


Figure 2. Waterways within the Gabites Block and surrounding area.

3 STATUTORY CONTEXT

This section summarises the legislation, policy, plans and strategies relevant to the ecological assessment of the project area. The ecological values described in this report allow significant ecological issues and adverse effects to be identified as they relate to the Resource Management Act 1991 (RMA). The identification of significant values and subsequent management recommendations to mitigate adverse effects are consistent with standards and objectives of the following legislative, policy statement and regional plan documents.

3.1 Legislation

3.1.1 Resource Management Act 1991 (RMA)

The purpose of the RMA is to achieve sustainable management. Important elements of this are the maintenance of indigenous biodiversity and protection of significant indigenous vegetation and habitats. The RMA requires that any adverse effects of development be avoided in the first instance, and where avoidance is not reasonably practicable, impacts should be minimised, remedied or mitigated. These elements are given effect in Sections 5, 6 and 7, and Schedule 4 sets out the requirements for effects assessments.

3.1.2 Wildlife Act 1953

The Wildlife Act (1953) provides statutory protection for all native wildlife (lizard, frog, bat and bird species), excluding those species listed in Schedules 1–5. This includes several invertebrates (terrestrial and freshwater).

3.1.3 Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-FW).

The Freshwater NES sets requirements for carrying out certain activities that pose risks to freshwater and freshwater ecosystems. Carrying out such activities requires compliance with the standards, which are designed to:

- protect existing inland and coastal wetlands
- protect urban and rural streams from in-filling
- ensure connectivity of fish habitat (fish passage)
- set minimum requirements for feedlots and other stockholding areas
- improve poor practice intensive winter grazing of forage crops
- restrict further agricultural intensification until the end of 2024
- limit the discharge of synthetic nitrogen fertiliser to land, and require reporting of fertiliser use.

3.2 National policy statements

3.2.1 National Policy Statement for Freshwater Management 2020 (Freshwater NPS 2020)

The National Policy Statement for Freshwater Management 2020 sets out the objectives and policies for freshwater management under the RMA. It came into effect on 3 September 2020 and replaces the National Policy Statement for Freshwater Management 2014 (amended 2017). The statement provides national direction for decisions regarding water quality and quantity, and integrated management of land, freshwater and coastal environments under the RMA. It contains national objectives for protecting ecosystems, indigenous species and the values of outstanding water bodies and wetlands.

3.2.2 Proposed National Policy Statement for Indigenous Biodiversity (pNPSIB)

The Proposed National Policy Statement for Indigenous Biodiversity (NPSIB) (MfE 2011) sets out the objective and policies to manage natural and physical resources so as to maintain indigenous biological diversity (biodiversity) under the RMA. It outlines a system for the management of biodiversity outside of public conservation land.

3.3 Regional plans and policies

3.3.1 Wellington Regional Policy Statement (RPS)

The Regional Policy Statement (RPS) sets out the framework and priorities for resource management in the Wellington region. The Resource Management Act 1991 (the Act) requires all regional councils to produce an RPS for their region. The RPS also sets out the process of how to identifying Significant Natural Areas (SNAs), which are areas of indigenous ecosystems and habitats with significant indigenous biodiversity value.

3.3.2 Greater Wellington Proposed Natural Resources Plan (PNRP)

The Proposed Natural Resources Plan for the Wellington Region is produced by the Wellington Regional Council in accordance with the Resource Management Act 1991 (the RMA). It sets out the objectives, policies, and methods for managing the coast, soil, discharges to land, fresh water and air.

3.3.3 Upper Hutt Council's District Plan (UHDP)

The Upper Hutt District Plan (UHDP) is the primary document that manages land use and development within Upper Hutt. The Plan sets out the different land zones in the district and outlines how actual and potential adverse effects of activities on the environment will be managed appropriately. Chapters 5 and 19 deal specifically with the Rural zones and the Rural zone rules, respectively, while Chapters 12–15 and 24–28 deal with environmental aspects.

4 ECOLOGICAL ASSESSMENT

4.1 Preliminary ecological assessment methods

The assessment was carried out by experienced ecologists (report authors) over the period spanning July to September 2021, within which two site visits were undertaken (23/06/2021 and 21/09/2021).

A combination of desktop and ground-truthing exercises were used as part of the assessment. The desktop exercise involved reviewing historical aerial imagery of the site and surrounding landscape; reviewing existing literature on the site and reviewing historical records of fauna and flora held in various biodiversity databases (e.g., Department of Conservation Amphibian and Reptile Distribution Scheme [ARDS] database, *iNaturalist.org*, *ebird.org*, NIWA New Zealand Freshwater Fish Database, DOC NZ bat database).

During the July site visit, the project site was inspected to ascertain whether there were any natural wetlands. Stream features in the low-lying areas of the property were inspected and the quality of any freshwater habitat was visually assessed. Over land flow paths (OLFPs or waterways) traversing the area were ground-truthed and classified under the definitions in the Greater Wellington Proposed Natural Resources Plan (PNRP). Areas that contained hydrophytic vegetation were assessed under the criteria within the National Policy Statement for Freshwater Management 2020 (NPS-FM), including using the methodology as described in the Landcare Vegetative tool for wetland delineation (Clarkson, 2014).

The September site visit focused on gathering ecological information from all other areas of the site, including the hill slopes and gully systems to the east of the lower-lying pasture areas. Opportunistic observations of flora and fauna were recorded and the quality of habitats for indigenous wildlife (e.g., birds, bats, lizards and aquatic organisms) described. Over land flow paths were ground-truthed and classified under the definitions in the PNRP and notes on the water quality and habitat for aquatic fauna were also recorded. All identified wetlands were assessed under the criteria within the NPS-FM, including using the methodology as described in the Landcare Vegetative tool for wetland delineation (Clarkson, 2014).

The results and discussions with respect to vegetation, indigenous wildlife and aquatic habitats are described in each of the relevant sections below.

4.2 Assigning ecological values

Following the criteria adapted from Roper-Lindsay *et al.* (2018) for assigning ecological value and adapted based on expert opinion, all habitats, flora, and fauna present on-site, irrespective of whether they are affected by the project, were assigned a value ranging from 'Low' to 'Very High'. Using this standard framework and matrix approach is good practice and provides a consistent and transparent ecological assessment. Values were assigned taking into consideration species (Table 1) and other attributes of importance for vegetation or habitats (Table 2) and freshwater (Table 3). An overall ecological value was assigned using Table 4.

Table 1. Factors to be considered in assigning value to species (Roper-Lyndsay *et al.* 2018).

Determining factor	
Very High	Nationally threatened species, found in the ZOI ¹ either permanently or seasonally
High	Species listed as 'At-Risk' – declining, found in the ZOI, either permanently or seasonally
Moderate	Species listed as any other category of 'At-Risk' found in the ZOI either permanently or seasonally
Moderate	Locally (Ecological District) uncommon or distinctive species
Low	Nationally and locally common indigenous species
Negligible	Exotic species, including pests, species having recreational value

Table 2. Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/ habitat/ community (as per Table 4 of Roper-Lyndsay *et al.* 2018).

Matters	Attributes to be considered
Representativeness	<p><i>Criteria for representative vegetation and habitats:</i></p> <ul style="list-style-type: none"> • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified.
Rarity/distinctiveness	<p><i>Criteria for rare/ distinctive vegetation and habitats:</i></p> <ul style="list-style-type: none"> • Naturally uncommon or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection <p><i>Criteria for rare/ distinctive species or species assemblages:</i></p> <ul style="list-style-type: none"> • Habitat supporting nationally threatened or At-Risk species, or locally uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity and Pattern	<ul style="list-style-type: none"> • Level of natural diversity, abundance, and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations - pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation

¹ ZOI (Zone of Influence) is Roper-Lindsay *et al.* (2018) define the Zone of Influence (as “the areas/resources that may be affected by the biophysical changes caused by the proposed project and associated activities.”

Ecological context	<ul style="list-style-type: none"> • Site history and local environment conditions which have influenced the development of habitats and communities • The essential characteristics that determine an ecosystems integrity, form, functioning and resilience (from 'intrinsic value' as defined in RMA) • Size, shape, and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning - high level, key species identification, habitat as proxy
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Table 3. Attributes to be considered when assigning ecological value or importance to a freshwater site or area site (as per Table 7 of Roper-Lyndsay *et al.* 2018).

Matters	Attributes to be considered
Representativeness	<ul style="list-style-type: none"> • Extent to which site/catchment is typical or characteristic • Stream order • Permanent, intermittent, or ephemeral waterway • Catchment size • Standing water characteristics
Rarity/ distinctiveness	<ul style="list-style-type: none"> • Supporting nationally or locally (i.e., ecological district scale) Threatened, At Risk or uncommon species • National distribution limits • Endemism • Distinctive ecological features • Type of lake/ pond/ wetland/ spring
Diversity and pattern	<ul style="list-style-type: none"> • Level of natural diversity • Diversity metrics • Complexity of community • Biogeographical considerations - pattern, complexity, size, shape
Ecological context	<ul style="list-style-type: none"> • Stream order • Instream habitat • Riparian habitat • Local environmental conditions and influences, site history and development • Intactness, health and resilience of populations and communities • Contribution to ecological networks, linkages, pathways • Role in ecosystem functioning – high level, proxies

Table 4. Assigning value to areas (Roper-Lyndsay *et al.* 2018)

Value	Determining Factors
Very High	Area rates 'High' for at least three of the assessment matters of Representativeness, Rarity/distinctiveness, Diversity and Pattern, and Ecological Context. Likely to be nationally important and recognised as such.
High	Area rates 'High' for two of the assessment matters, and 'Moderate' and 'Low' for the remainder OR area rates 'High' for one of the assessment matters and 'Moderate' for the remainder. Likely to be regionally significant and recognised as such.
Moderate	Area rates 'High' for one of the assessment matters, 'Moderate' or 'Low' for the remainder OR area rates as 'Moderate' for at least two of the assessment matters and 'Low' or 'Very Low' for the remainder. Likely to be important at the level of the Ecological District.
Low	Area rates 'Low' or 'Very Low' for majority of assessment matters, and 'Moderate' for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates 'Very Low' for three assessment matters and 'Moderate', 'Low' or 'Very Low' for the remainder.

4.3 Vegetation

The vegetation assessment involved both a desktop exercise and field visits to broadly determine the diversity of plant species present on-site and establish the value of the vegetation in the context of the surrounding landscape.

4.3.1 Desktop assessment

A desktop review of various online GIS databases was undertaken to determine the extent of ecological protection overlays (e.g., covenants, conservation land, SNAs), 'ecosystem type' classifications, and visualise historical land-use using historical aerial images. The scheduling of SNAs and classification of ecosystems provides a means for Councils to protect and maintain indigenous biodiversity within Districts and Regions.

The assessment revealed no legal vegetation protections (e.g., Department of Conservation (DOC), QEII National Trust, Nature Heritage Fund Covenants, Regional Councils, or Nga Whenua Rahu) on-site, and the presence of two Draft Significant Natural Areas (SNAs), identified by Upper Hutt City Council, in the vicinity of the site.

The first Draft SNA (Site number: *UH041*; Site name: *Maymorn Road Forest and Scrub*) represented a "small area of primary beech forest and broadleaved scrub is located between Maymorn Road and Plateau Road" that occurs to the north of the site, though a narrow finger (ca. 1.28 ha of the total SNA extent) of this SNA extends into the site along the north-western property boundary (Figure 3). The other Draft SNA (Site number: *UH031*; Site name: *Pakuratahi Forest KNE*) bounds the eastern and southern boundaries of the site and is described as "Western side of the Rimutaka Range, east of Upper Hutt [supporting] indigenous forest, regenerating indigenous scrub, wetland, sub-alpine and alpine scrub" (Figure 3).

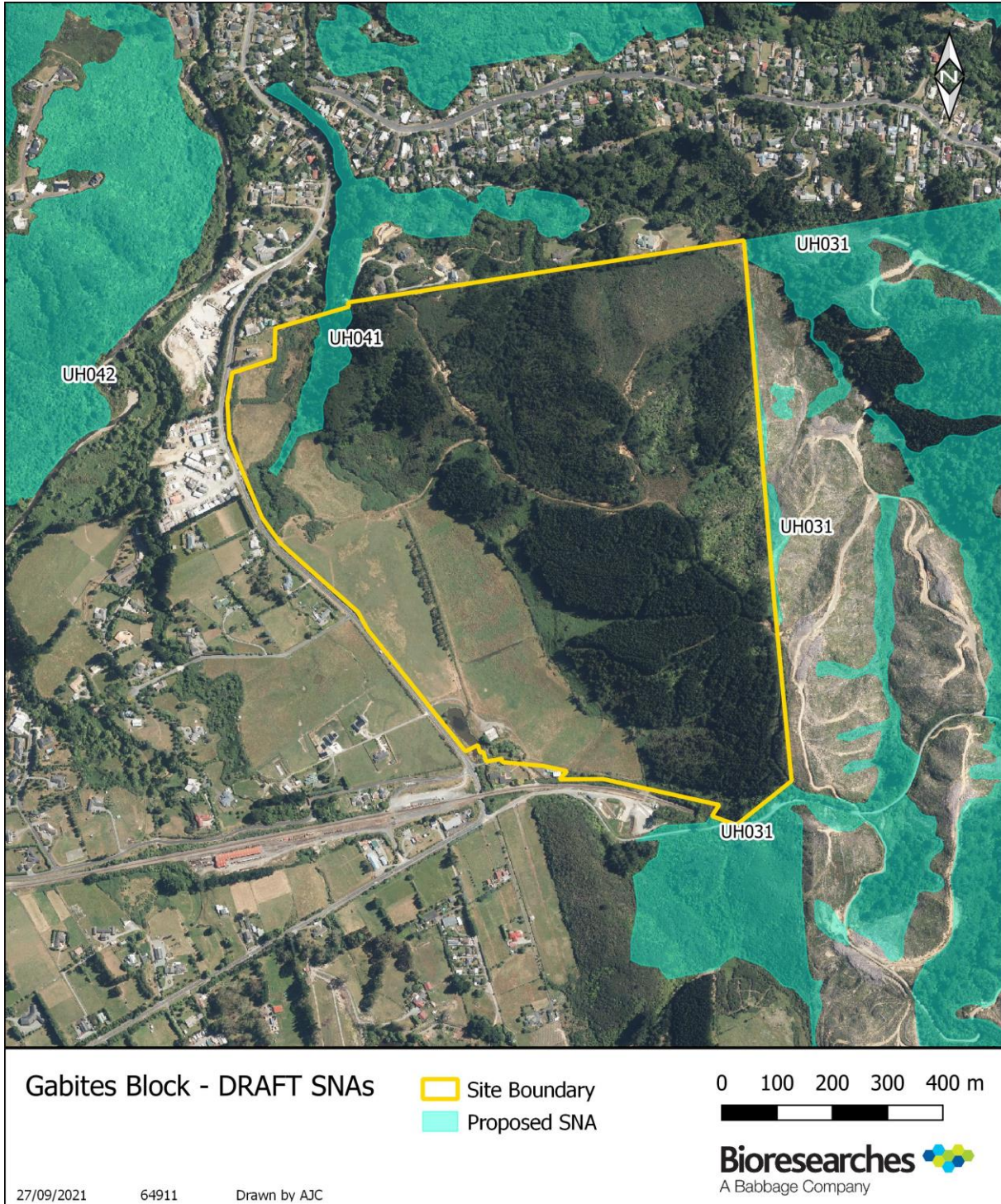


Figure 3. Draft Significant Natural Areas (SNAs) in the vicinity of the site.

4.3.2 Vegetation descriptions

For simplicity, the vegetation communities on-site were described in the context of discrete vegetation types, including native vegetation, native scrub, exotic scrub, and pine dominant (Figure 4). Descriptions of each vegetation type are provided below. Plants listed as 'At Risk' or 'Threatened' were noted as their presence triggers ecological significance under the Resource Management Act 1991 (RMA 1991).

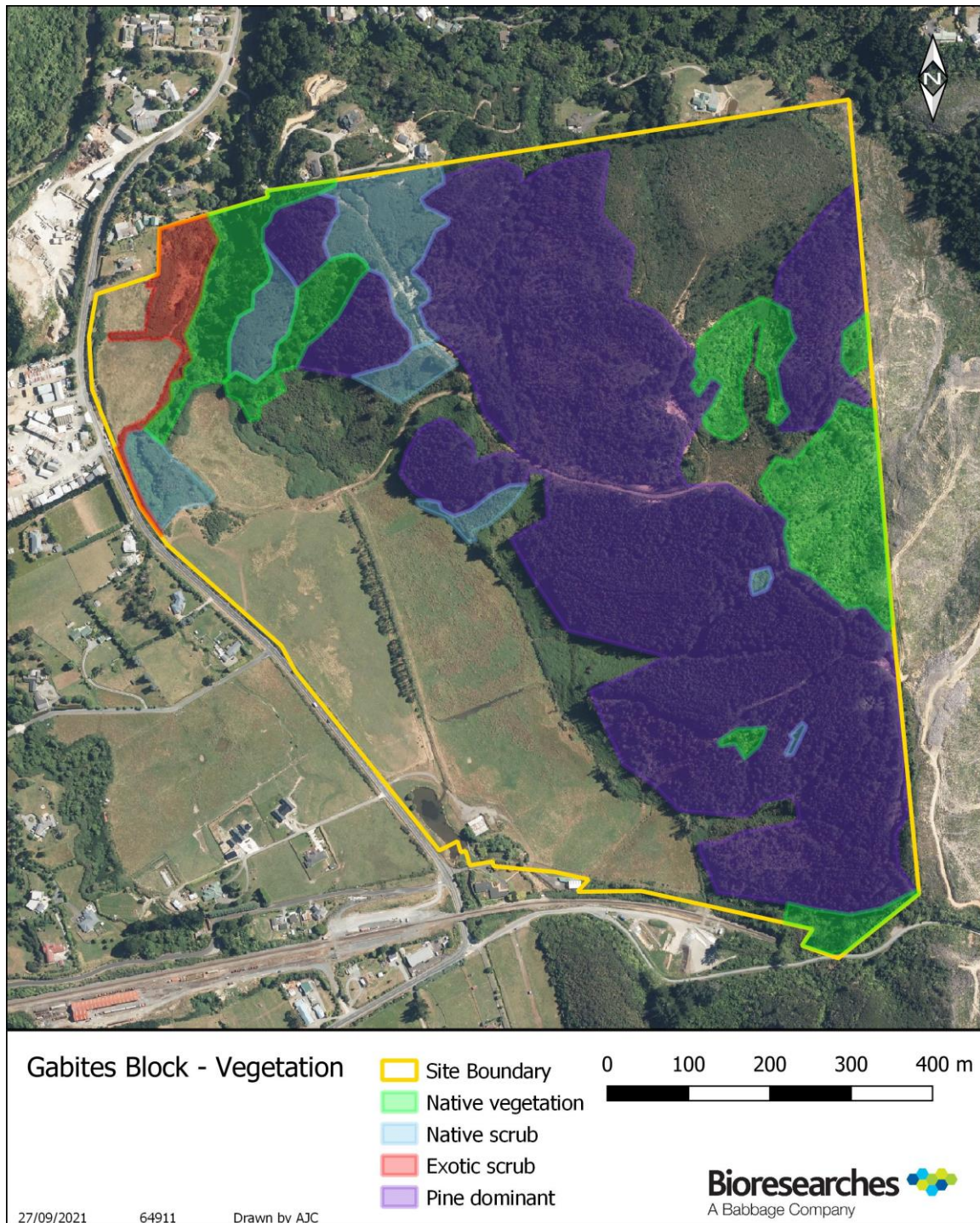


Figure 4. Vegetation types within the Gabites Block

4.3.2.1 Existing DRAFT SNA Vegetation

The existing SNA vegetation in the northwest of the site largely followed the alignment of the waterway. Vegetation extended from the wetted margin, up the steeply incised banks, and onto the lower slopes on the true right of the channel (Figure 5). Vegetation was dominated by subcanopy species; however, there were also mature canopy trees including beech, kahikatea, and totara. Other native species present included mahoe, seven finger, rangiora, and tree ferns.

In addition, native vegetation coverage continued upstream in the gully the flows from Maymorn Road. Vegetation here was mixed with beech, mahoe, five finger, red matipo, *Pittosporum* sp., *Veronica salicifolia*, *Coprosma repens*, and tree ferns. In addition, blackberry and old man's beard were abundant, and gorse and broom were present around the edges.

The prevalence of native vegetation in this area also identifies it as potentially significant and the vegetation meets the *Representativeness*, *Rarity*, and *Ecological context* criteria for assigning SNAs as set out in Policy 23 of the Regional Policy Statement. It is recommended that this area of vegetation be retained as part of the larger draft SNA area.

Vegetation in this area is considered to have high ecological value.



Figure 5. Vegetation within the draft SNA in the northwest of the site.

4.3.2.2 Existing native vegetation

There were six other areas of native dominated vegetation within the site (Figure 4). These areas consisted of young native bush, dominated by understory and subcanopy species. Species present included seven finger, rangiora and tree ferns (Figure 6). Mānuka was present in these areas as well as occasional wilding pines. Based on the vegetation type and structure observed on-site, these areas could provide habitat for native fauna, including lizards and birds. While not as botanically diverse as the SNA vegetation, they represent areas of young successional native vegetation with species and tiers expected for this vegetation type.

The existing native vegetation is considered to meet the *Representativeness* and *Diversity* criteria set out in Policy 23 of the Regional Policy Statement, indicating it could be considered SNA.

Vegetation in these areas is considered to have high ecological value.



Figure 6. Native vegetation in the gully on the eastern boundary of the site. Photo taken from adjacent forestry block looking west.

4.3.2.3 Existing native scrub

There were four main areas of native dominant scrub throughout the site (Figure 4). These areas were dominated by dense, established but young mānuka, approximately 1.5–3 m in height (Figure 7). Within the mānuka, gorse, broom, and pines were present in varying densities. Based on the vegetation type and structure observed on-site, these areas could provide habitat for native fauna, including lizards and birds.

The scrub does support extensive areas of mānuka, which is listed as an ‘At Risk - Declining’ species due to its potential susceptibility to myrtle rust (a fungal disease that affects plants in the Myrtaceae family). An ‘At Risk – Declining’ conservation status would technically meet the *Rarity* criterion set out in Policy 23 of the RPS, be attributed high value under the EIANZ 2018 guidelines, and trigger “significance” under the RMA 1991. However, myrtle rust is now widespread throughout most of the North Island and across the northern and western areas of the South Island, and it is recognised that there is some resistance to the fungus in New Zealand Myrtaceae species. There is no current evidence to demonstrate large-scale diebacks in species of Myrtaceae and consequently, Biosecurity New Zealand is no longer collecting, analysing, or reporting myrtle rust data. Targeted surveillance and control activities have also ceased.

Considering the above and the widespread and common status of mānuka, the areas of scrub on-site are not considered to meet any criteria set out in Policy 23 of the Regional Policy Statement and are not considered “significant” under the RMA 1991. However, the scrub areas could potentially meet the *Rarity* criterion where ‘At Risk’ or ‘Threatened’ native lizards are confirmed to be present.

The ecological value of the native dominated scrub is considered to be moderate.



Figure 7. Manuka dominated native scrub in the ‘upper zone’ of the site

4.3.2.4 Pines

The remainder of the ‘upper zone’ was dominated by wilding pines (Figure 4). A review of aerial images showed the area was clear-felled approximately 20 years ago. The wilding pines are likely to have established shortly after clearance. Within these areas, the pines were very dense, and the

understorey was devoid of vegetation (Figure 8). Occasionally tree ferns were present where pines were slightly less dense.

The ecological value of the pine dominated area is considered to be low.



Figure 8. Dense wilding pine forest with no understory vegetation

4.3.2.5 Exotic scrub

The northwestern extent of the 'lower zone' contained a large amount of exotic scrub (Figure 4). Vegetation in this area was largely limited to the area between Maymorn Road, the lower portion of the waterway, and the gully flowing into the waterway. Scrub was present around the native dominated gully vegetation. Species present in the exotic dominated scrub included gorse, broom, and blackberry.

The ecological value of this area is considered to be low (botanically) but since the vegetation could support protected native lizards it is conservatively considered low value. A future lizard survey will determine this with certainty.

4.3.2.6 Pasture

The remainder of the 'lower zone' consisted of pasture grass currently used for grazing and hay making (Figure 9). Few small areas of scrub were present within the pasture, and a line of planted eucalypts was present in the middle of the area, on the true right bank of the straightened main waterway. The area between the waterway and the hilly area was boggy and contained abundant rushes. Discussions regarding potential wetland values are addressed in the sections below.

The ecological value of the pasture and associated vegetation is considered to be negligible.



Figure 9. Pasture within the ‘lower zone’ of the site.

4.4 Avifauna

The avifauna of the site and surrounding landscape was investigated through (1) a desktop assessment involving a review of historic records of birds within five kilometers of the project area held in published literature (Robertson *et al.*, 2007) and online databases (e.g., *ebird.org*; *iNaturalist.org*), and (2) birds reported during the site visit on 21 September 2021. The primary aim of the avifauna investigation was to determine the presence of ‘Threatened’ or ‘At Risk’ bird species and assess the significance of native bird habitat features within the project area.

4.4.1 Desktop assessment

Approximately 50 species of birds have been reported within 5 km of the site (*iNaturalist* data; accessed 20 September 2021). Of these, five species that could occur on-site are listed as ‘Threatened’ or ‘At Risk’, including whitehead (*Mohoua albicilla*; ‘At Risk-Declining’), black shag (*Phalacrocorax carbo*; ‘At Risk-Naturally Uncommon’), New Zealand falcon (*Falco novaeseelandiae*; ‘At Risk-Recovering’), New Zealand dabchick (*Poliiocephalus rufopectus*; ‘At Risk-Recovering’), and New Zealand pipit (*Anthus novaeseelandiae*; ‘At Risk-Declining’). Other ‘Nationally Vulnerable’ and ‘At Risk’ wading-, shoreline-, water-, and seabirds have been reported from the wider surrounding landscape, but these records have little relevance to the subject site because it does not support habitat for these birds.

Information from *eBird* revealed five “hotspots²” (*Upper Hutt--Plateau Rd*; *Tunnel Gully--Tane's Track*;

² “Hotspots” are public birding locations suggested by *eBird* users.

Kaitoke Regional Park--Hutt River; Tunnel Gully Reserve Mt Clime; and Upper Hutt--Harcourt Park camp ground) within 5 km of the site. Bird lists from these hotspots included ~30 species each, and no additional 'At Risk' or 'Threatened' species were recorded.

4.4.2 Opportunistic sightings on-site

Opportunistic observations of birds were recorded during a site visit on 21 September 2021. A total of 14 species were observed (Table 5), however, this figure is likely to be an underestimate given the opportunistic manner of the surveys and the much wider range of species that have been reported from the surrounding landscape. None of the birds observed are 'At Risk' or 'Threatened' species.

The young regenerating and mature native vegetation on-site provide suitable roosting, foraging, and nesting habitat for a range of common native birds. Furthermore, the lower lying areas that support open areas of pasture grass, riparian margins, and open water (pond) habitats provide a variety of habitats for birds. It is likely that a wider diversity of native birds than were recorded during the site inspection, frequent the site (e.g., ruru/ morepork, *Ninox novaeseelandiae*; whitehead; NZ falcon).

The ecological value of the area for birds is considered to be moderate-high, due to the possibility of 'At Risk-Declining' species being present and utilising the site.

Table 5. Avifauna observed on-site and corresponding NZ conservation status (Robertson *et al.*, 2017).

Common name	Species name	Conservation Status
House sparrow	<i>Passer domesticus</i>	Introduced and Naturalised
Fantail	<i>Rhipidura fuliginosa placabilis</i>	Not Threatened
Grey warbler	<i>Gerygone igata</i>	Not Threatened
Australasian harrier	<i>Circus approximans</i>	Not Threatened
Tui	<i>Prothemadera n. novaeseelandiae</i>	Not Threatened
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened
Pukeko	<i>Porphyrio melanotus melanotus</i>	Not Threatened
Spur winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened
Pheasant	<i>Phasianus colchicus</i>	Introduced and Naturalised
Blackbird	<i>Turdus merula</i>	Introduced and Naturalised
Song thrush	<i>Turdus philomelos</i>	Introduced and Naturalised
Welcome swallow	<i>Hirundo neoxena neoxena</i>	Not Threatened
Goose	<i>Anser spp.</i>	Introduced and Naturalised
Mallard/duck	<i>Anas superciliosa x platyrhynchus</i>	Introduced and Naturalised

4.5 Herpetofauna

Herpetofauna (reptiles and amphibians) comprise a significant component of New Zealand’s terrestrial fauna. One hundred and ten (110) endemic terrestrial taxa are currently recognised (van Winkel *et al.*, 2018) and over 85% of these are considered ‘Threatened’ or ‘At Risk’ of extinction (Hitchmough *et al.*, 2021; Burns *et al.*, 2018). All indigenous reptiles and amphibians are legally protected under the Wildlife Act 1953, and its subsequent amendments, and vegetation and landscape features that provide significant habitat for native herpetofauna are protected by the RMA 1991. All herpetofauna searches undertaken as part of this project were conducted under Bioresearches’ valid Wildlife Act Authority (37604-FAU).

4.5.1 Desktop assessment

The indigenous herpetofauna of the Wellington Region includes 16 terrestrial taxa, of which eight are found on the mainland (c.f. islands), and a further three introduced (exotic) species are also known to occur (van Winkel *et al.*, 2018). Five indigenous species and one exotic species have been reported within 10 km of the project area yet only one species (*Oligosoma aeneum*) has been reported within 5 km (DOC ARDS *Herpetofauna* database; accessed August 2021) (Figure 10, Table 6). The *O. aeneum* record is from 2009 and represents a single individual found approximately 620 m north of the site.

No lizards or frogs have been reported from the site itself.

Table 6. Terrestrial herpetofauna of the Greater Wellington Region (mainland only) potentially present on-site. Corresponding NZ and Regional conservation statuses and reported occurrence within 5 km of the project area also shown.

Common name	Species name	NZ threat status ¹	Regional threat status ²	Reported within 5 km of the site
<i>Mokopirirakau</i> “southern North Island”	Ngahere gecko	At Risk – Declining	Declining	
<i>Naultinus punctatus</i>	Elegant gecko	At Risk – Declining	Vulnerable	
<i>Woodworthia maculata</i>	Raukawa gecko	Not Threatened	Not Threatened	
<i>Woodworthia</i> “Marlborough mini”	Minimac gecko	At Risk – Declining	Naturally Uncommon	
<i>Oligosoma aeneum</i>	Copper skink	At Risk – Declining	Critical	✓
<i>Oligosoma polychroma</i>	Northern grass skink	Not Threatened	Not Threatened	
<i>Oligosoma ornatum</i>	Ornate skink	At Risk – Declining	Declining	
<i>Oligosoma zelandicum</i>	Glossy brown skink	At Risk – Declining	Declining	
<i>Ranoidea aurea</i>	Green & golden bell frog	Introduced & Naturalised	NA	
<i>Ranoidea raniformis</i>	Southern bell frog	Introduced & Naturalised	NA	
<i>Litoria ewingii</i>	Whistling tree frog	Introduced & Naturalised	NA	

¹ Hitchmough *et al.*, 2021; Burns *et al.*, 2018; ² Crisp (2020).

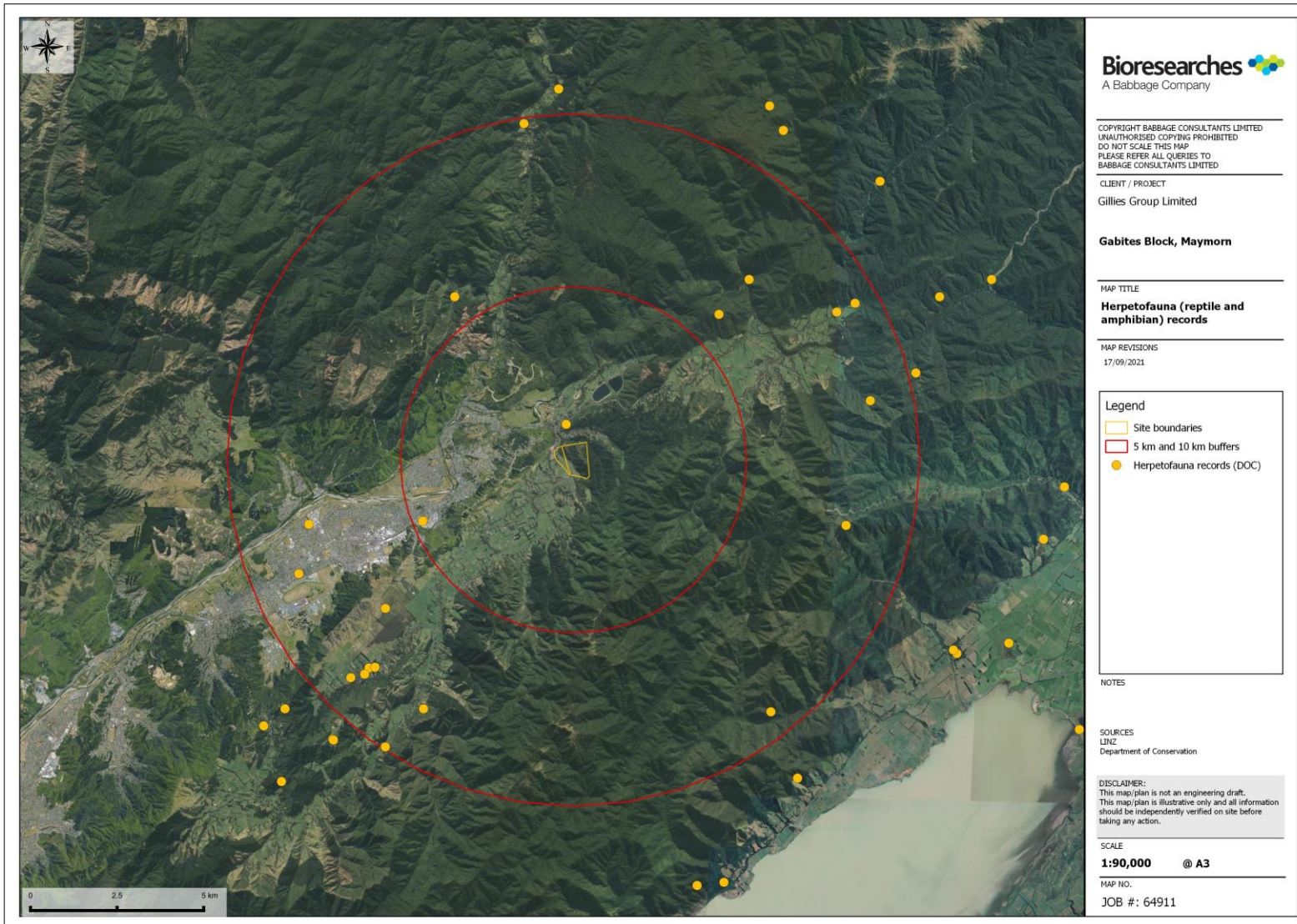


Figure 10. Herpetofauna (reptile and amphibian) records from the wider landscape surrounding the site. Records obtained from the Department of Conservation Amphibian and Reptile Distribution Scheme databases (accessed August 2021).

4.5.2 Herpetofauna assessment

The ground-based herpetofauna assessment used visual encounter methods (Lettink, 2012; Hare, 2012) to opportunistically detect the presence of herpetofauna, as well as ‘habitat qualification’ methods to determine likelihood of occurrence. No dedicated surveys (i.e., those involving the deployment of survey equipment) as it was the wrong time of year for lizard surveys. It is recommended a lizard survey be undertaken prior to obtaining any resource consents for the site.

The visual encounter survey involved visually scanning potential basking sites (e.g., patches of sunlight on vegetation, understorey shrubs and leaf litter) and searching beneath and within potential refuge structures (e.g., beneath fallen logs, dense piles of leaf litter, flaking bark on trees, crevices in tree trunks) on-site.

‘Habitat qualification’ involved visually assessing the habitat types and determining, based on expert experience and opinion, the quality of the habitat and likelihood of occurrence of local herpetofauna.

4.5.2.1 Herpetofauna results and discussion

The site investigations on 21 September 2021 did not detect the presence of lizards; however, the areas of established vegetation on-site are considered suitable habitats for several species of native lizards. The established native trees and shrubs, and their canopy foliage, offer potentially suitable habitat for arboreal geckos such as ngahere and barking gecko. While the denser undergrowth and leaf litter layer beneath tree and shrub canopies offer habitat for terrestrial skinks and possibly Raukawa gecko. It is not surprising that lizards were not observed during the one-day site investigation given that native lizards are often cryptic and secretive and many species that could potentially occur on-site are nocturnal.

The existence of numerous native lizard records from the wider surrounding landscape, including some ‘At Risk’ taxa, and the presence of suitable habitat for lizards on-site indicates there is a reasonable likelihood that native lizards will occur on the property. Of the species known locally, the northern grass skink, brown skink, and copper skink are the most likely to be present on-site, given their ability to occupy a diverse range of habitat types, from forests edges to urban parkland, residential gardens, and even occurs on the fringe of industrial areas. Their commonness in and around the Wellington Region is probably related to their ability to persist in modified environments by taking advantage of surrogate habitats (e.g., rank pasture/ grassland and refuging beneath discarded domestic debris) and their apparent ability to cooccur with predatory mammals.

In the absence of a dedicated lizard survey, the ecological value of the site for native lizards is conservatively assigned as moderate-high, due to the possibility that ‘At Risk-Declining’ lizards may occur. It is recommended a lizard survey be completed to confirm the lizard values, and any recommendations as a result of the survey incorporated into future resource consent applications.

4.6 Bats (pekepeke)

Two endemic species of bats (pekepeke) are found in New Zealand, including the long-tailed bat (LTB; *Chalinolobus tuberculatus*) and short-tailed bat (STB; *Mystacina tuberculata*); the latter is represented by three subspecies (O'Donnell *et al.*, 2017). Both species are listed as 'Threatened' or 'At Risk' under the New Zealand threat classification system (i.e., LTB - 'Nationally Critical' and Southern STB – 'At Risk – Recovering') (Townsend *et al.*, 2008; O'Donnell *et al.*, 2018). Their threat statuses reflect the drastic and ongoing decline in populations across much of New Zealand, due to the loss and fragmentation of habitats and adverse impacts of pest mammals (e.g., rodents, cats), with some population recovery from conservation management apparent in Southern STB populations.

Bats generally roost in hollows, under split bark associated with mature and dead native and exotic trees, and over the breeding season, large communal (maternity) roosts occur in hollows in mature native or exotic trees or occasionally in caves (O'Donnell, 2001; Borkin & Parsons, 2011). Bats typically use linear landscape features such as vegetation edges, gullies, watercourses, and road corridors to transit between roosting and foraging sites (Borkin & Parsons, 2009). They can have large home ranges (> 100 km²) and will travel large distances each night during foraging bouts.

The 'Threatened' (LTB) and 'At Risk' (STB) conservation statuses of bats mean that sites known to support bats or bat habitat are considered 'significant' under the RMA 1991. In such cases, avoidance, remediation, and/ or mitigation measures pertaining to bats must be demonstrated as part of the ecological component of a resource consent application.

4.6.1 Desktop assessment

Bat records held in the Department of Conservation's National bat database were reviewed to determine the likely presence of bats both on-site and within the wider surrounding landscape. Both LTBs and STBs have been recorded in the Wellington Region (DOC National Bat database), but most of the records are from the Tararua Forest Park (Tararua Ranges), approximately 26 km northeast of the site. The two bat records closest to the site include observations of "unknown" bat species from the 1980s, one of which lies ~400 m to the northwest and the other 12 km to the southwest of the site (DOC National Bat database) (Figure 11).

Since the 1980s, little bat survey effort has been invested in the Hutt Valley area. Where surveys have been carried out in the surrounding landscape, they have not detected the presence of bats. Though non-detection should not be interpreted as absence as bat activity is strongly influenced by environmental variables and detection is sensitive to the correct placement of survey equipment.

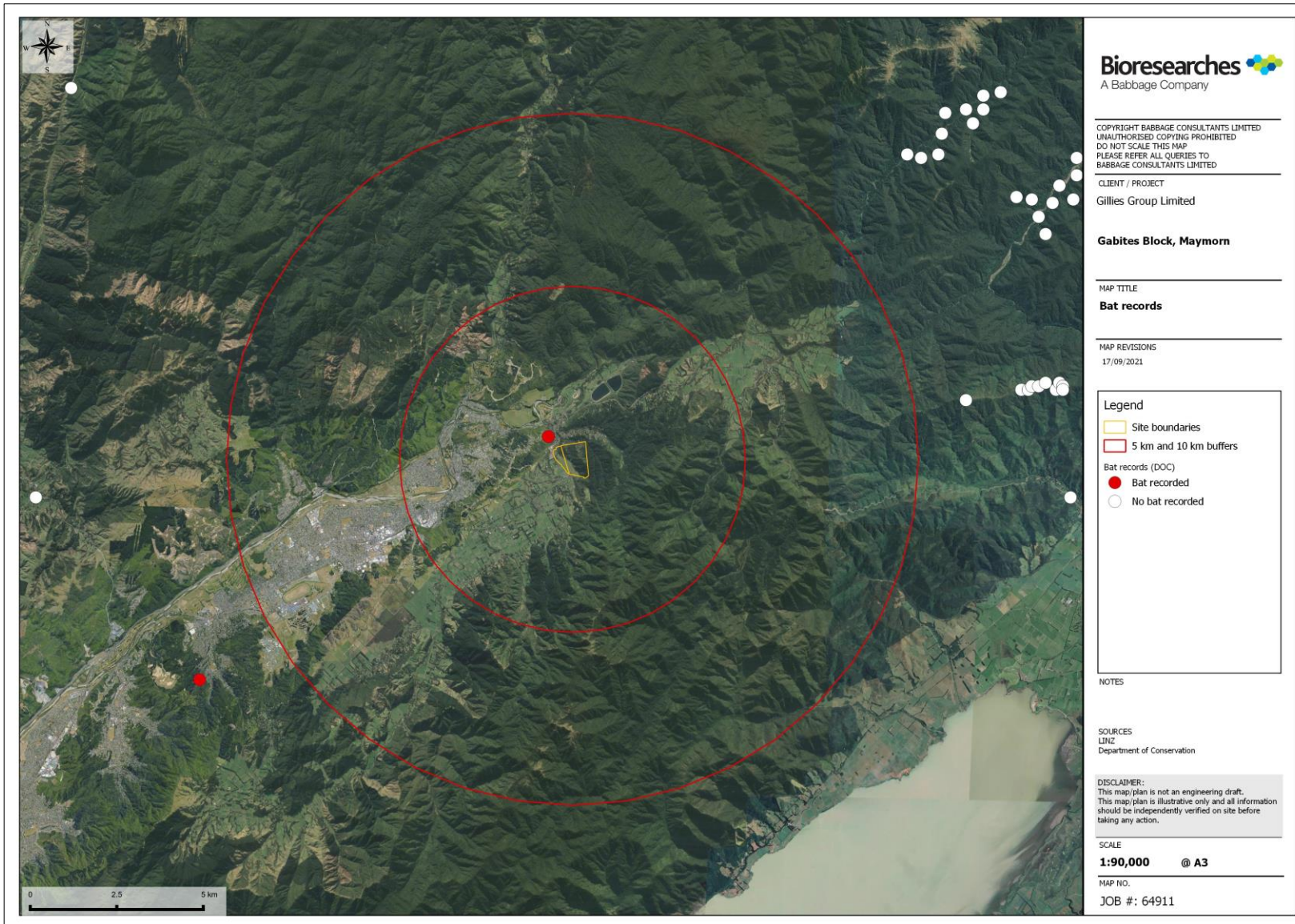


Figure 11. The distribution of long-tailed bat records across the wider landscape surrounding the site (DOC bat database).

4.6.2 Bat roost and habitat assessment

As previously mentioned, bats typically fly and feed along linear landscape features (e.g., vegetation edges) and over waterbodies such as streams, wetlands, and ponds. They roost in holes and cavities in larger mature trees, including exotic species such as pine, but may also roost solitarily under flaking bark of younger trees (e.g., 120 mm diameter at breast height).

The site inspection identified a number of these habitat features on-site, most notably the larger native trees inside the patch of draft SNA, the large mature pine trees, and the network of waterways across the property. The site is also sufficiently rural that urban influences such as light spill and residential noise, which can reduce bat activity, would not affect the site. These factors, combined with verified records of bats in the wider surrounding landscape—albeit historical—suggest that bats could potentially be resident on-site or at least use site temporarily/ seasonally.

In the absence of a dedicated survey, the ecological value of the site for bats is conservatively assigned as Very High, due to the possibility that 'Threatened/ At Risk' bats may occur. It is recommended a formal bat survey be undertaken at an appropriate time of year to confirm the values of the site for bats. A survey should be undertaken prior to any resource consent applications being lodged.

4.7 Pest mammals

The presence and abundance of pest mammals (e.g., rodents, possums, hedgehogs, mustelids, and cats) not addressed as part of this assessment. However, the presence of at least some of these taxa on-site is likely given the widespread occurrence of pest mammals in most terrestrial ecosystem types on mainland New Zealand (King, 2005). Deer and feral pig tracks and scat were observed on the site.

The adverse ecological impacts of pest mammals on native flora and fauna are well documented and much of New Zealand's biota has suffered severe range contractions or extinctions because of predation and competition pressures. There is little doubt that exotic mammals are influencing the structure, function or composition of local indigenous plant and faunal communities on-site.

4.8 Freshwater environments

Prior to the site investigation, a map of the site was created from Greater Wellington Regional Council's Map viewer, which defined the predicted river classes and outstanding water bodies (including wetlands).

Site assessments were undertaken on 23 June and 21 September 2021, by qualified freshwater ecologists to determine if any natural wetlands were present on-site. Stream features within the property were inspected and the quality of any freshwater habitat was visually assessed. Overland flow paths were ground-truthed and classified under the definitions within the Greater Wellington Proposed Natural Resources Plan (PNRP). Areas that contained hydrophytic vegetation were assessed, under the criteria within the NPS-FM, including using the methodology as described in the Landcare Vegetative tool for wetland delineation (Clarkson, 2014).

4.8.1 Watercourse Definitions

The RMA interprets wetland as:

***wetland** includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions*

The National Policy Statement for Freshwater Management 2020 (NPS-FM) then defines a **natural wetland** as:

'A wetland (as defined in the Act) that is not:

- 1. a wetland constructed by artificial means;*
- 2. a geothermal wetland;*
- 3. any area of improved pasture that, at the commencement date, is dominated by (that is more than 50% of) exotic pasture species and is subject to temporary rain-derived water pooling.'*

Improved pasture is defined as:

'An area of land where exotic pasture species have been deliberately sown or maintained for the purpose of pasture production, and species composition and growth has been modified and is being managed for livestock.'

4.8.2 Desktop assessment

Desktop assessments of historic aerial images show that the site has gone through significant land use changes and little of the original landform or function remains. The 1949 and 1966 aerial imagery (Source: *Retrolens*) show the area as farm and bare ground with significant works areas (sheds and accommodation), a stream flowing through the centre of the site and to the west of the site (Figure 12).

The 2002 imagery shows the site was used for agriculture (southern half) and oxidation ponds (northern half) with no natural stream channels (Figure 13). The 2008 imagery shows the ponds were

filled by 2008 and the site was cleared (southern half) and used for hay (northern half), with straight channels and drains. The 2011–2015 imagery clearly shows the entirety of both areas had been planted with pasture species and were used for hay production, except where the modified stream channel and drain bisected the area (Figure 13).

There is no historical evidence that the site supported a natural wetland, and the imagery illustrates that the natural hydrology and soils on the site will now illustrate little (south) and no (northern area) evidence of the original landform.



Figure 12. Aerial image of the site in 1966 showing cleared ground and sheds. Image from *Retrolens*



Figure 13. Aerial image of the site in 2002 showing oxidation ponds and the site in 2015 showing ponds filled and site used for hay baling. Images from Google Earth.

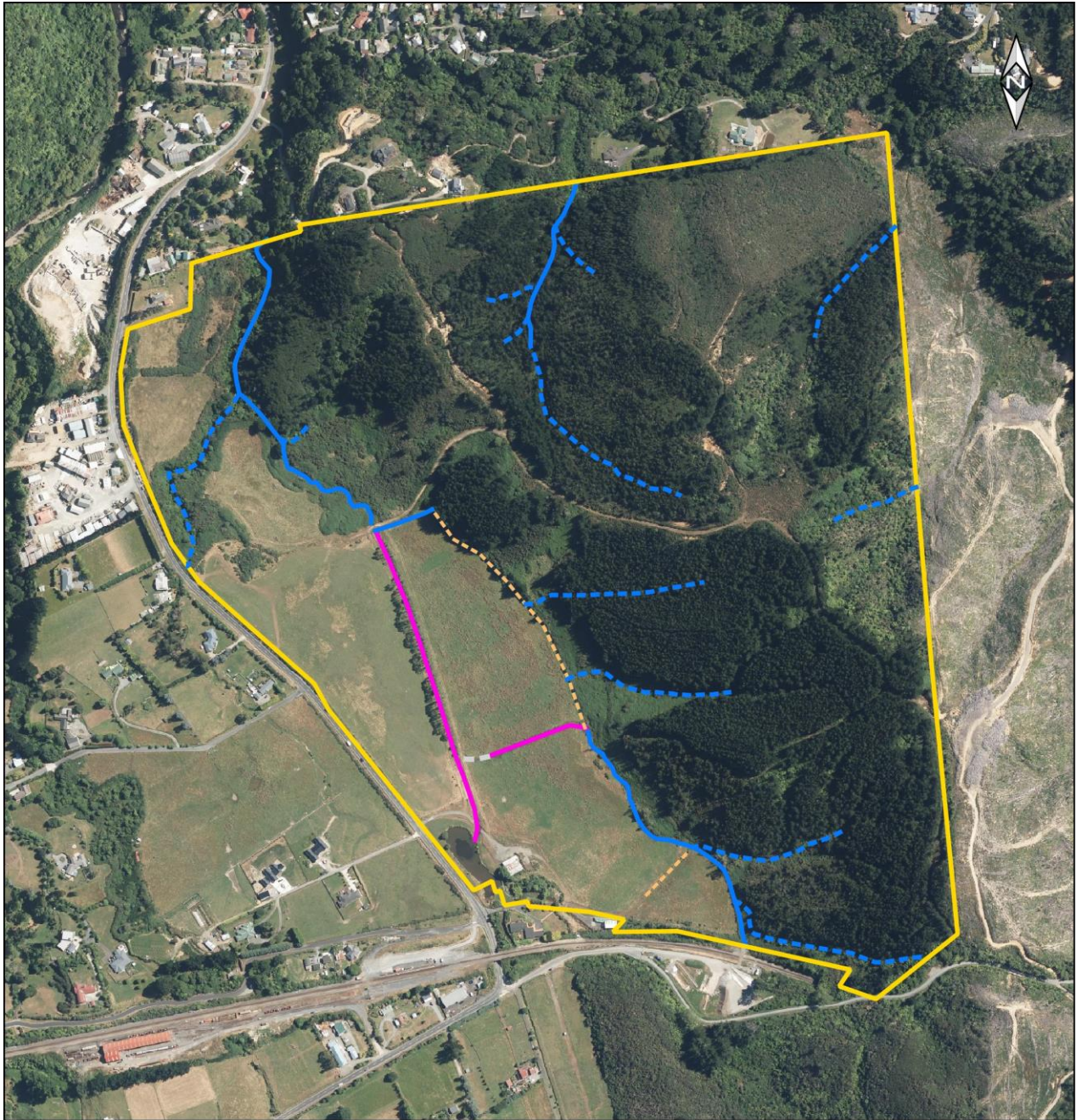
The streams in the ‘lower zone’ are shown as partly ‘highly modified rivers/ streams’ in the Regional Plan (Figure 14), in accordance with the definitions with GWRP:

A highly modified river or stream is one which has been modified and channelled for the purpose of land drainage and has the following characteristics:

- * it has been channelled into a single flow, and*
- * the channel has been straightened, and*
- * the channel is mechanically formed with straight or steeply angled banks, and*
- * it exhibits these characteristics for at least its entire length through a property, and*
- * it is not managed as part of a stormwater network and is not a water race.*

The waterways classified as ‘farm drains’ in Figure 14 meet the definition of a drain as per the Proposed Natural Resources Plan:

Watercourses designed and constructed for the purposes of land drainage of surface or subsurface water.



**Gabites Block -
Waterway Classification**

- Site Boundary
- Highly modified permanent stream
- Permanent stream
- Underground flow
- Intermittent stream
- Farm drain
- Wetland
- Pond

0 100 200 300 m

27/09/2021 64911 Drawn by AJC

Figure 14. Classification of waterways within the site.

4.8.3 Existing freshwater ecology

The ecological values of the waterways within the site, except for the farm drains, are considered to be moderate due to the likelihood 'At Risk' species are utilising them at least on occasion. Most of the waterways in the 'upper zone' are intermittent and likely dry during warm months; however, they are directly connected to permanent surface waterways. The ecological values of the farm drains are considered to be negligible.

4.8.3.1 Lower zone

The streams and drains on the property have all been highly modified and the flows diverted around the oxidation ponds. The stream that originally ran through the site has been diverted west through the centre of the site in a single flow and then through a straightened channel running south to north in the west of the site (Figure 15) before it flowed through two culverts into the natural, highly incised alignment that follows the topography of the area. A drain is present in the southern section of the site, and a second drainage channel along the eastern boundary of the northern half of the site, around the boundary of what was previously the bund of the ponds.

Habitat within the straightened alignment was defined by gravel substrates with riparian vegetation largely limited to the row of eucalypts on the true right bank, gorse, and broom. Fish and macroinvertebrate habitat was limited. The drainage channels, although flowed clear, were dominated by fine sediment/ clay substrate. It is likely that flow greatly decreases in the drainage channels during summer months.

Below the culverts, the stream followed a more natural alignment. Just downstream of the culverts was a cascading waterfall, approximately 3 m in height. It likely presents a barrier to most fish species, except for eels and koaro. The channel was highly incised (Figure 16), up to approximately 8–10 m in parts, and contained varied instream habitat. Riparian vegetation was native dominated. A second gully flowed from the western boundary of the site into the main channel. It was considered likely that water does not flow permanently in this gully and therefore, it was considered to be intermittent.

The ecological value of the artificially straight portion of the waterway and the natural alignment upstream of the artificial portion is considered to be moderate. The instream habitat was moderately diverse, while the lack of riparian vegetation and fish barrier downstream would limit the fish species likely to be present.

The ecological value of the natural alignment of the waterway is considered to be high. The riparian vegetation was dominated by mature natives and instream habitat was diverse. Several 'At Risk – Declining' fish could potentially be present and therefore, it is recommended all crossings of permanent or intermittent waterways be designed with fish passage in mind.

The ecological value of the farm drains is considered to be negligible. Instream habitat was of low quality and riparian vegetation absent. It is likely these drains experience periods of drying.



Figure 15. The straightened portion of the permanent waterway bisecting the lower zone



Figure 16. The natural alignment portion of the waterway, note the deep incised channel.

4.8.3.2 Upper zone

There were several waterways in the 'upper zone' of the site, influenced by the topography of the hill country. Most of these waterways were considered intermittent, and likely flow for most of the year, except over the dry summer months. Most of these waterways were within the pine dominated areas and the channels were moderately incised and dominated by pine needles. It is unlikely they present any significant fish habitat, due to the small size and intermittent nature.

One channel was considered more permanent, and it flowed in a northerly direction, flowing out of the property at approximately the midway point on the northern boundary. The channel appeared to be permanent from below a small waterfall approximately 200 m south of the northern boundary.

There was an area of hydrophytic vegetation (Figure 22) on the true left side of the permanent waterway's upper extent (near the waterfall). This area was approximately 10 m in length and 2 m in width and was dominated by *Carex geminata* with a very small amount of *Machaerina rubiginosa*. The hydrophytic vegetation was growing in a flatter area of stream that had defined, incised channels upstream and downstream. Water was flowing in the channel downstream of the vegetated area. Therefore, the area was more appropriately identified as a shallow area of stream and not a natural wetland. It appeared that an uprooted pine tree, coupled with the significant amounts of pine needles and slightly flatter topography, had resulted in the stream slowing and spreading slightly, allowing the sedges to establish.

The ecological values of the intermittent waterways are considered to be predominantly low. Intermittent waterways, by definition, do not contain water all year round, and therefore, it is unlikely high value biotic communities are able to establish within them. Fish are considered unlikely to be present in the intermittent waterways despite some being within high quality native vegetated gullies.

The ecological value of the permanent waterway in the upper zone is considered to be moderate. The waterway flows within pine dominated vegetation and contained significant pine needle detritus. Some fish and invertebrate habitat was present; however, it is considered unlikely it will support a diverse biotic community.



Figure 17. Hydrophytic vegetation on a waterway in the upper zone. The waterway was channelised up and downstream of this area

4.8.3.3 Freshwater fish

A review of the NIWA Freshwater Fish Database revealed no records for the waterways within the site. Fish recorded within the wider Mangaroa River catchment are given in Table 7. These include four ‘At Risk – Declining’ species. However, due to barriers present within the waterways, it is likely only eels and koaro—fish with climbing ability—are present in the site.

Table 7. Fish recorded in the Mangaroa River catchment and corresponding conservation status (Dunn *et al.*, 2018). Records retrieved from the New Zealand Freshwater Fish Database.

Common name	Species name	Conservation Status
Shortfin eel	<i>Anguilla australis</i>	Not Threatened
Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk – Declining
Koaro	<i>Galaxias brevipinnis</i>	At Risk – Declining
Inagna	<i>Galaxias maculatus</i>	At Risk – Declining
Dwarf galaxiid	<i>Galaxias divergens</i>	At Risk – Declining
Cran’s bully	<i>Gobiomorphus basalis</i>	Not Threatened
Common bully	<i>Gobiomorphus cotidianus</i>	Not Threatened
Redfin bully	<i>Gobiomorphus huttoni</i>	Not Threatened
Brown trout	<i>Salmo trutta</i>	Introduced and Naturalised

4.8.4 Potential Wetlands

Four general areas of potential wetland (Figure 18) were assessed as to whether they met the criteria for a 'natural wetland' and subject to the NES-F regulation relating to wetlands. None of these areas were considered to constitute a natural wetland. One further wetland area was identified and confirmed adjoining the eastern boundary during the September site visit.

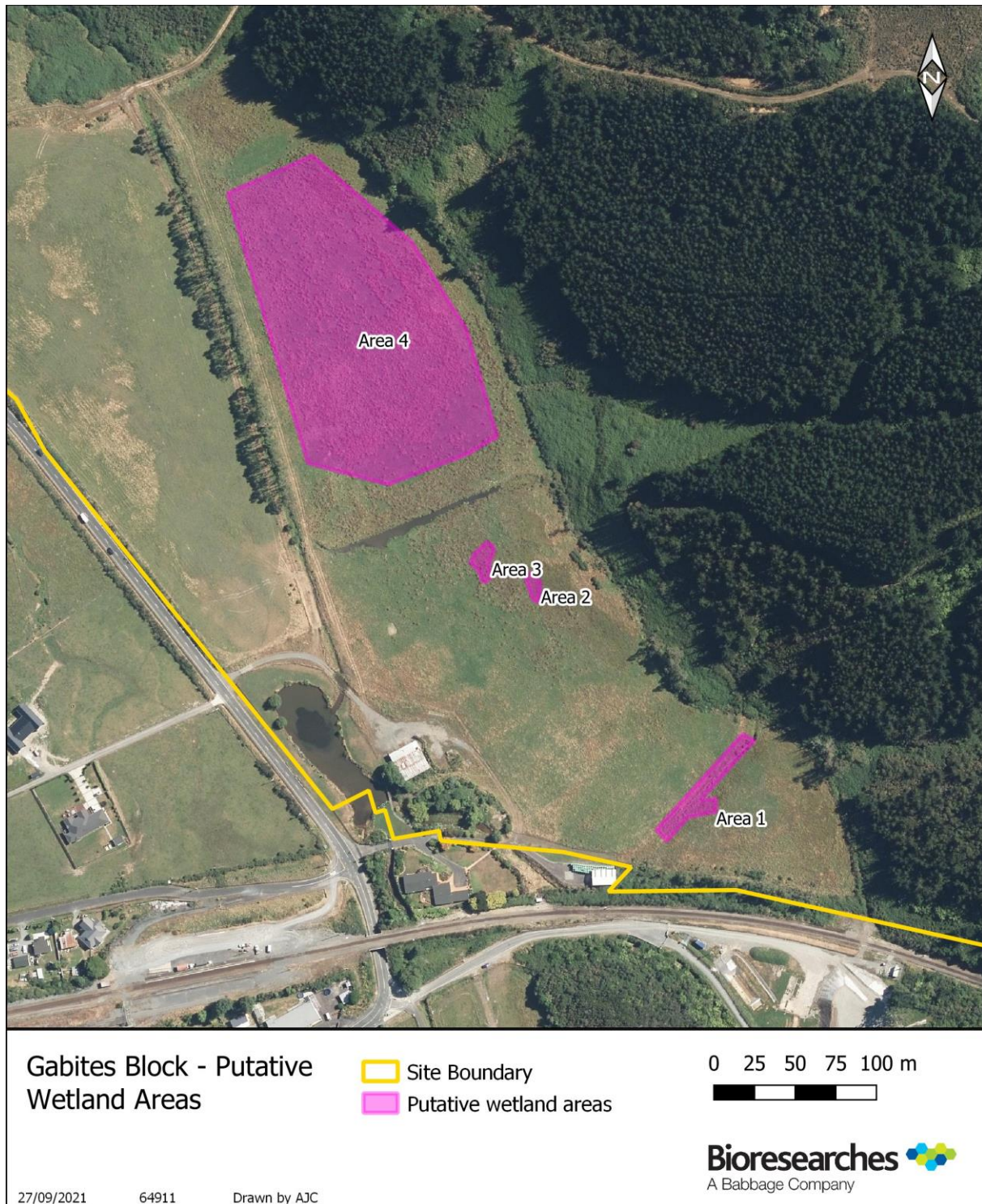


Figure 18. Areas of potential wetland assessed during July 2021.

4.8.4.1 Area 1

The potential wetland located near the drain in the south-eastern sector of the site comprised a linear row of patchy rushes (*Juncus effusus* and *J. sorophorus*) adjacent to the drain, located within the pasture. The drain carried flowing water during and after heavy rain, but the pasture either side was not boggy and firm to walk on. The wetland delineation quadrat was located immediately outside of the drain but placed on the edge to specifically to include the rushes. The 2 m x 2 m vegetative quadrat was dominated by facultative (FAC) and facultative upland (FACU)³ pasture grasses (Figure 19).

Area 1 did not meet the dominance test (>50% dominance) or prevalence index (≤ 3.00) for a wetland, as per the wetland delineation protocols (Table 8), and as such, Area 1 was not classified as a 'natural wetland'. In addition, the area was clearly pasture, dominated by exotic pasture species and would have meet the definition of 'improved pasture'.



Figure 19. Area 1 with linear patches of rushes located adjacent to the southern drain.

³ FAC = commonly occurs as either a hydrophyte or non-hydrophyte; and FACU = facultative upland, occurs occasionally is a hydrophyte but usually occurs in uplands.

Table 8. Wetland delineation plot results within Area 1.

Area 1	Species	Common name	Classification	Cover (%)	Dominant	
Adjacent to the southern drain	<i>Isolepis prolifera</i>	sedge	OBL	2	No	
	<i>Prunella vulgaris</i>	Selfheal	FACU	2	No	
	<i>Trifolium repens</i>	White clover	FACU	10	No	
	<i>Lolium perenne</i>	perennial ryegrass	FACU	40	Yes	
	<i>Holcus lanatus</i>	Yorkshire fog	FAC	20	Yes	
	<i>Juncus effusus</i>	Soft rush	FACW	10	No	
	<i>Ranunculus repens</i>	Creeping buttercup	FAC	10	No	
	<i>Juncus sorophorus</i>	fan flowered rush	FACW	10	No	
	Percent of dominant species that are OBL, FACW or FAC					50%
	Prevalence Index					3.27

4.8.4.2 Areas 2 and 3

Areas 2 and 3 were located next to each other within slightly depressed areas where previous drains to the diverted stream were located. The areas were dominantly pasture grass but within both areas there were patches where budding club-rush (*Isolepis prolifera*), an obligate plant, were noticeable⁴. The vegetative plot was dominated by FAC and FACU pasture grasses (65%), with the club-rush and other rushes subdominant (Table 9; Figure 20). The areas did not meet the dominance test (>50% dominance) or prevalence index (≤ 3.00) for a wetland. More specifically the site met the criteria for improved pasture and was not assessed as a 'natural wetland'.

Table 9. Wetland delineation vegetation plot results within Areas 2 and 3.

Area 2 & 3	Species	Common name	Classification	Cover (%)	Dominant	
Immediately south of modified stream bisecting the property into two areas	<i>Isolepis prolifera</i>	sedge	OBL	20	Yes	
	<i>Taraxacum officinale</i>	Dandelion	FACU	2	No	
	<i>Trifolium repens</i>	White clover	FACU	5	No	
	<i>Lolium perenne</i>	perennial ryegrass	FACU	60	Yes	
	<i>Holcus lanatus</i>	Yorkshire fog	FAC	15	No	
	<i>Juncus effusus</i>	Soft rush	FACW	2	No	
	<i>Ranunculus repens</i>	Creeping buttercup	FAC	5	No	
	<i>Juncus sorophorus</i>	fan flowered rush	FACW	5	No	
	Percent of dominant species that are OBL, FACW or FAC					50%
	Prevalence Index					3.16

⁴ Obligate plants, OBL = almost always a hydrophyte, rarely found in uplands/non-wetlands; and Clarkson *et al.* (2021). New Zealand Wetland Plant List. Hawkes Bay Regional Council and Manaaki Whenua.



Figure 20. Patch of club-rush in pasture within Area 2.

4.8.4.3 Area 4

Area 4 was the northern paddock. The site is the fill over the old ponds and has been maintained and used for stock since the area was re-established as pasture. The paddock is bounded on all sides by highly modified streams or drains and until recently the site has been regularly used for hay production as evident in the aerial photography. A representative vegetative plot was assessed. The site was dominated by pasture grass with *Juncus sarophorus* establishing as a sub-dominant (Table 10). The dominance and prevalence tests were not met within this area and the area was not classified as a natural wetland. In addition, the site meets the criteria of improved pasture with 70% of the site pasture species.

Table 10: Wetland delineation vegetation plot results within Area 4

Area 4	Species	Common name	Classification	Cover (%)	Dominant	
Northern paddock	<i>Trifolium repens</i>	White clover	FACU	5	No	
	<i>Lolium perenne</i>	perennial ryegrass	FACU	50	Yes	
	<i>Holcus lanatus</i>	Yorkshire fog	FAC	15	No	
	<i>Ranunculus repens</i>	Creeping buttercup	FAC	10	No	
	<i>Juncus sarophorus</i>	fan flowered rush	FACW	30	Yes	
	Percent of dominant species that are OBL, FACW or FAC					50%
	Prevalence Index					3.22

4.8.4.4 Eastern Boundary

One area of wetland was present along the eastern boundary of the site, in the ‘upper zone’ (Figure 21, Figure 22). The wetland was located at the bottom of the native vegetated gully on the eastern boundary, and appeared to be an induced wetland, formed when forestry slash had partially dammed the intermittent stream draining the gully. The area was dominated by *Carex geminata*. The dominance and prevalence tests were met (Table 11) within this area and the area was classified as a natural wetland, albeit, induced.

The ecological value of the eastern boundary wetland is considered to be moderate. Wetlands are not abundant in the vicinity of the site; however, the wetland is likely induced by the forestry slash and contained a low diversity of wetland species.

Table 11. Wetland delineation vegetation plot results within the eastern boundary area

Eastern Boundary	Species	Common name	Classification	Cover (%)	Dominant	
Eastern Boundary Wetland	<i>Carex geminata</i>	Cutty grass	FACW	75	Yes	
	<i>Rubus fruticosus</i>	Blackberry	FAC	10	No	
	<i>Cortaderia selloana</i>	Pampas	FAC	10	No	
	<i>Juncus effusus</i>	Soft rush	FACW	5	No	
	Percent of dominant species that are OBL, FACW or FAC					25%
	Prevalence Index					2.2



Figure 21. Wetland area on the eastern boundary of the site. The photo is taken from the bottom of the gully, looking upstream.



Figure 22. Induced wetland located on the eastern boundary of the site

4.9 Summary of ecological features and value assignment

The ecological features identified on-site, and their associated ecological values are summarised in Table 12 below.

Table 12. Summary of ecological features at Gabites Block and assigned ecological values for species and habitats.

Ecological feature	Summary description and where appropriate DOC threat classification system for species.	Ecological value
Pasture	<ul style="list-style-type: none"> Exotic rank grassland on the lowland flats but could provide habitat for ground nesting native birds (e.g., pukeko). 	Negligible
Exotic scrub	<ul style="list-style-type: none"> Dominated by gorse, broom, and blackberry. Abundance of weed plant species. May support native lizards and provide habitat for common native birds (e.g., tui, fantail, etc.). 	Low
Pines	<ul style="list-style-type: none"> Dominated by densely growing wilding pines with an understorey devoid of vegetation. Could potentially provide habitat for bats. Low ecological value unless bats are confirmed to be present. 	Low
Native vegetation	<ul style="list-style-type: none"> Young native bush/ scrub, dominated by understorey and subcanopy species. Not as botanically diverse but represents young successional native vegetation not abundant in the wider vicinity. Could provide habitat for protected native lizards, birds, and bats, including potentially 'At Risk' and 'Threatened' species. 	High
Native scrub	<ul style="list-style-type: none"> Dominated by dense young mānuka (1.5–3 m in height), interspersed with gorse, broom, and pine. Could provide habitat for protected native lizards, including an 'At Risk' species, and common native birds. 	Moderate
Draft SNA vegetation	<ul style="list-style-type: none"> Vegetation dominated by understorey species; however, some mature canopy species present. Could provide habitat for protected native lizards, birds, and bats, including potentially 'At Risk' and 'Threatened' species. Meets <i>Diversity</i> and <i>Representativeness</i> criteria for assigning SNAs. 	High
Native lizards	<ul style="list-style-type: none"> Records of native lizards in the surrounding landscape and the suitability of the habitats on-site for lizards suggests that 	Moderate-high

	<p>several species, including those with 'At Risk' conservation statuses may be present.</p> <ul style="list-style-type: none"> Lizard presence/values to be confirmed with a survey prior to consenting stage. 	
Native birds	<ul style="list-style-type: none"> Common protected native birds utilise the site and the vegetation offers suitable roosting, foraging, and nesting habitat for them. 'At Risk-Declining' birds may be present. 	Moderate-high
Bats	<ul style="list-style-type: none"> No bats have been recorded on-site; however, no surveys have been undertaken. The vegetation and habitat features on-site are suitable for bats and considering there are verified records of bats in the wider surrounding landscape, bats could potentially be resident on-site or at least use site temporally/ seasonally. 	Very high
'Lower zone' permanent waterway	<ul style="list-style-type: none"> Natural alignment with high quality riparian vegetation. Good instream habitat. At Risk fish species known from the catchment and potentially present in the channel. 	High
'Lower zone' artificial alignment and above	<ul style="list-style-type: none"> Reasonable quality instream habitat. Artificially constructed/straightened channel. Highly limited riparian vegetation. Fish barrier at downstream extent of this reach. 	Moderate
Farm drains	<ul style="list-style-type: none"> Low quality instream habitat. Limited to no riparian vegetation. Likely experience drying periods. 	Negligible
'Upper zone' permanent waterway	<ul style="list-style-type: none"> Good instream habitat and 'At Risk' fish species known from the wider catchment. Riparian vegetation dominated by pines with significant pine needle detritus in the channel in some areas. 	Moderate
'Upper zone' intermittent waterways	<ul style="list-style-type: none"> Predominantly in pine forested areas strongly influenced by pine needles in channels. Periodically dry meaning it is difficult for a diverse biotic community to establish. 	Low

Wetland	<ul style="list-style-type: none"> • Relatively uncommon habitat in the wider area. • Likely wetland is induced by forestry slash over stream channel. • Low diversity of wetland species. 	Moderate
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5 ECOLOGICAL CONSTRAINTS ASSESSMENT

This section focuses on identifying potential ecological constraints to the proposed PPC based on the assigned ecological values of the terrestrial and freshwater features identified on-site.

Currently, the property is zoned Rural Hill and Rural Valley Floor under the Operative Upper Hutt District Plan 2004. The proposed PPC would see a change to the zoning to allow for the property to be developed for a combination of large lot sections and residential sections. It is inevitable that future development of the site would require some vegetation removal, construction activities, and/ or works near watercourses, and since master planning has not yet been undertaken the ecological constraints discussed below are general and not specific to any development-related activity.

Where potential ecological constraints have been identified, recommendations have been provided to avoid and minimise anticipated adverse effects as far as practicable (see *6 Recommendations*).

5.1 Potential ecological constraints

The objectives and policies of the UHDP and RPS with respect to indigenous ecosystems and biodiversity require that indigenous ecosystems and habitats with significant biodiversity values are maintained and restored to a healthy functioning state. This is achieved through the identification and protection of ecosystems with significant indigenous biodiversity values.

The ecological features identified in this report with Moderate, High, or Very high ecological value assignments are considered significant and should be protected as far as practicable. Accordingly, these features may be considered ecological constraints to the proposed project. Moderate value features, while considered “significant”, can be managed and potential adverse effects mitigated to reduce the overall level of effect to low during the consenting phase.

Potential adverse effects on significant vegetation, streams, and wetlands are encouraged to be avoided in both the PNRP and RPS. Where effects are unavoidable, consideration of enhancement of similar vegetation, watercourses, or wetlands elsewhere to balance unavoidable effects is usually required and may be acceptable to Council.

5.1.1 Native vegetation

All three categories of native vegetation identified on-site (i.e., Native vegetation, Native scrub, and Draft SNA vegetation) were assessed as having moderate to high ecological value and all native vegetation areas except native scrub met at least one of the criteria used to assess SNAs. Accordingly,

the areas of Native vegetation and Draft SNA vegetation should be retained, enhanced, and protected. Native scrub vegetation does hold ecological values and should be enhanced and protected as far as practicable.

Since these areas are scattered across the property but mostly occur in the 'upper zone' and the northern extent of the 'lower zone', master planning to guide future development should consider and integrate native vegetation areas into the conceptual layout for the site.

It is recognised that the UHDP does provide for the removal of indigenous vegetation as a permitted activity, and such rules would need to be examined more closely during the master planning process.

5.1.2 Native fauna

The current assessment has identified the potential for protected native fauna to occur on-site and therefore, any master planning for future development that involves the clearance of vegetation (exotic or native) will need to consider resident fauna.

Native fauna inhabiting vegetation and habitat features on-site could be placed at risk of direct harm during activities that require the removal or clearance of vegetation (e.g., road or accessway construction, clearance of dwelling platforms, installation of watercourse crossings). Fauna with limited dispersal capabilities, such as lizards, are significantly more at risk of injury, as are birds during the nesting period and bats while roosting. In addition, the removal of vegetation or degradation of habitat quality can lead to an overall reduction in suitable habitat within the local landscape and habitat enhancement may be necessary to balance any unavoidable effects. The presence of bats on-site remains unknown and because bats are listed as 'At Risk/ Threatened', their confirmed presence could be consequential with respect to master planning. Accordingly, it is recommended lizard and bat surveys are undertaken during the resource consenting phase for the site's development.

It is likely that appropriate avoidance, management and mitigation measures would be required to ensure compliance with legal fauna protection mechanisms (e.g., Wildlife Act 1953, RMA 1991) and the objectives and policies of the PNRP, RPS, and UHDP.

5.1.3 Freshwater environments and wetlands

Freshwater environments and wetlands are afforded high protection statuses in New Zealand. New rules to protect and restore New Zealand's freshwater systems, including the National Policy Statement on Freshwater Management (NPS-FM) and National Environmental Standards for Freshwater (NES-FW), came into effect on 3 September 2020. The NPS-FM and NES-FW set out objectives and policies for freshwater management under the RMA and set requirements for carrying out certain activities that pose risks to freshwater and freshwater ecosystems. Carrying out such activities requires compliance with the standards outlined in the NES-FW.

In general, the following potential constraints to the PPC, with respect to freshwater, have been identified:

- Vegetation removal or earthworks within or within 10 m of the eastern boundary wetland, and/ or discharges, damming and/ or diversion of water within 100 m of the boundary wetland should not occur, unless they are for the purposes of restoring this wetland. Any work for activities other than restoration is likely to be a non-complying activity.
- Intermittent waterways in the 'upper zone' should only be altered if absolutely necessary. Damming/ diverting is a discretionary activity. Installing culverts and crossings is likely to be permitted, providing the criteria provided in rules R113 and R114 of the Proposed Natural Resources Plan are met.
- All stream crossings, including intermittent streams, should be designed to facilitate fish passage where fish access to the stream currently exists.
- Sediment runoff to watercourses that may affect water quality and/ or aquatic habitat must be managed appropriately.

6 RECOMMENDATIONS

6.1 Management of protected native fauna

- It is recommended that dedicated surveys for native lizards and bats be undertaken prior to any future resource consenting for the site, to clearly understand the ecological values of the site, and any potential adverse ecological effects resulting from the project proposal.
 - Where native lizards are detected and the development activities likely to have adverse effects on them or their habitat, a site-specific Lizard Management Plan (LMP) should be prepared. The LMP would detail measures required to avoid and mitigate adverse effects on protected native lizards, which is a requirement under the Wildlife Act 1953 and RMA 1991. Lizard management typically, but not always, involves salvaging, relocating, and potentially monitoring relocated native lizards, as well as implementing measures to enhance lizard habitat on-site.
 - It is strongly recommended that a dedicated bat survey be undertaken, using Automatic Bat Monitors (ABMs), to verify or otherwise the presence of bats.
- Where mature tree and scrub removal forms part of any proposed development activities, native bird management should be considered. This would likely take the form of avoiding vegetation clearance during the bird breeding season (September to February, inclusive), as far as practicable, or where not achievable, carrying out a pre-vegetation clearance bird nesting survey and associated nest protection measures.

6.2 Ecological restoration/ enhancement

- The site would benefit significantly from an ecological restoration/ enhancement programme to preserve existing and encourage further biodiversity values.
- Restoration initiatives could include revegetation, weed management, and pest mammal control.
- Long-term control of weeds and pest mammals within any areas of retained native vegetation on-site should be considered by future landowners. Weed and pest control by future landowners would improve the ecological integrity of the vegetation and habitat for biodiversity and facilitate movement of fauna through the wider landscape.
- Channelised watercourses would benefit from appropriate riparian planting. Depending on the land zoning, riparian margins of 10–20 m wide either side of the watercourse may be required as part of the subdivision and resource consenting process. Typically, riparian margins are fenced, planted in native vegetation, and may be afforded protection through covenants or Esplanade Reserves status.
- Any areas of pine forest that are removed to facilitate development of the site, with the exception of building platforms and associated access and outdoor living, should be revegetated with native species appropriate for the area.

6.3 Management of freshwater environments

- The artificial/ straightened section of waterway in the 'lower zone' would benefit from riparian planting. Planting should extend from the edge of the wetted channel and incorporate water edge, ground cover, understory and canopy species.
- Ongoing weed management, particularly of the areas where blackberry has been cleared from the riparian area (i.e., the upper reaches of the natural alignment in the 'lower zone'). This area would also benefit from being planted, particularly the incised gully area.
- Avoid working within, or directly adjacent to the eastern boundary wetland.
- Any crossings of the permanent and intermittent waterways should be designed with fish passage in mind where fish access to the stream currently exists.

6.4 Management of plant pathogens

- It is recommended that any restoration planting have regard to myrtle rust and the potential impacts of introducing or spreading this disease on-site. This would entail the acquisition of plants from a certified myrtle rust-free nursery and reporting of any further confirmed or suspected myrtle rust detected on-site.

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