



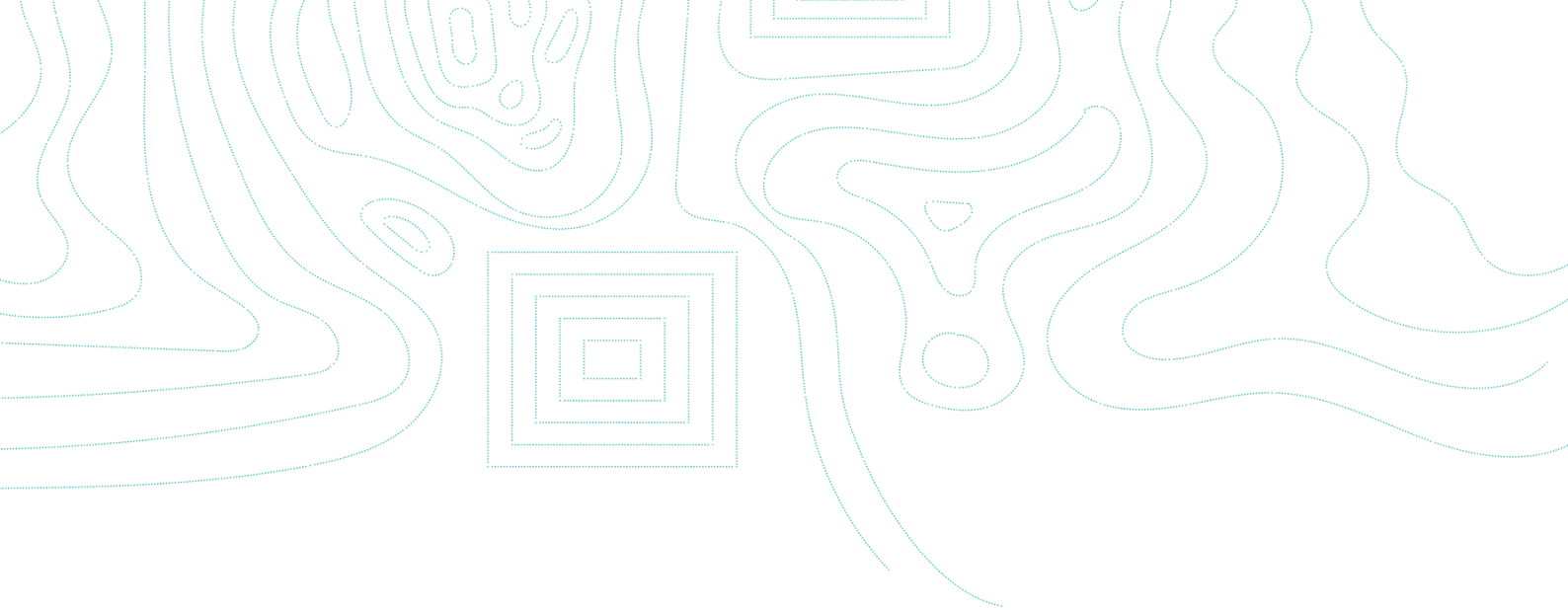
BlueGreen



Cannons Point Eastern Stage 4

Ecology

Prepared by Dr Vaughan Keesing
19 December 2024



Document Quality Assurance

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Executive Summary

Site survey, databases and literature research show that there are few ecological features and few values on site. The site has been farmed and largely clear since at least 1940. I have found and mapped one natural inland wetland and a reasonable quality stream although without fish. The remnant vegetation is low quality young mahoe clusters on the steep escarpments or else isolated broadleaf sub canopy trees and exotic trees and gorse and broom. There is little habitat of any value. Most of the area is pasture grass. Grazing and weed invasion has kept the mahoe areas depauperate and if the current land use was to continue (farming) then the most likely outcome for those values present is their loss.

Copper and northern grass skink may be present in the rocky escarpment slope substrate under the loose mahoe canopies. It seems unlikely however, given the isolation and age of the features. If present it is likely that, given the residential closeness and absence of predator management, they are in low abundance.

The proposed development appears to require removal of all of the terrestrial vegetation and recontouring of the escarpments. This effect (0.2ha of mahoe clusters in total) is of very low ecological significance (less than minor, and does not trigger the NPS IB direction to manage effects in non SNA areas).

The stream and natural wetland are avoided and as part of the development the stream corridor to be in reserve will receive riparian native appropriate planting. This will be an ecological benefit.

A range of recommendations are made to mitigate or avoid potential effects, mostly in relation to reducing the risk of harm to fauna during vegetation clearance and earthworks. These include:

- A process at vegetation removal to avoid nesting native bird species;
- A process to reduce potential harm to skink during vegetation and earthworks;
- A quality earthworks sediment management plan to protect the stream and wetland;
- A 10m buffer about the natural wetland to be fenced / flag taped during construction.

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1.0 Introduction

Cannon Point Development limited has been systematically developing, in stages, the terrace above Totara Park. The development involves a change from rural farming use to housing. This stage (stage 4) is for the eastern block (east of Tacoma Road).

Cannon Point Development limited now approach the eastern stage and have employed BlueGreen Ecology to assess and report on the ecological values and the potential effects of the proposed development.

The eastern stage involves a carriage way along the lower terrace, access to the upper tiers and 120 lots.



Figure 1: Stage 4 scheme plan.

Figure 1 Proposed scheme layout as per Vecta 2024.

The following assessment considers the habitats present and their condition and what is affected prior to decisions for the possible requirement for fauna surveys.

This assessment begins by describing the project and site location (Section 1.2). It then describes the assessment methodology (Section 2.0) and the results (Section 3). This is followed by an assessment of the ecological significance and values of the site (Sections 4 and 5) and an assessment of effects (Sections 6 and 7). The assessment finishes with recommendations to avoid, minimise, remedy, and mitigate potential adverse ecological effects (Section 8), and a conclusion (Section 9).

The ecological components covered in this report include field derived terrestrial vegetation, desk top derived avifauna (birds), herpetofauna (lizards and frogs), bats,

terrestrial invertebrates, freshwater habitat (wetlands and waterways), and freshwater fauna.

1.1 Assumptions & Limitations

I have applied the following assumptions to our Ecological Impact Assessment.

- I assume indigenous vegetation clearance will only occur along the northern SNA boundary where Geotech considerations require it. And that any other native vegetation on inter tier escarpments generally will remain.
- I assume there will be no direct or indirect effects to the Stream other than a permitted activity crossing that appropriately considers fish passage.
- Field work was not undertaken for bats, lizards, birds and terrestrial and aquatic invertebrates on the assumption that the literature for bats in the Hutt valley which has not registered them for many decades is correct and because the vegetation removal is of common early seral types in which threatened or rare invertebrates and bats are highly unlikely and the stream is not being directly impacted, indeed enhanced.

1.2 Site location, history and project description

The proposed Cannon Point subdivision is located within Lot 2001 DP 588162 near Tōtara Park, Upper Hutt. The development has been broken down to a number of stages, and this is an application for and assessment of the eastern stage, stage 4.

The proposed project site is located in the Wellington Region within the Upper Hutt City District. It is located within the Wellington Ecological District (ED 39.01), which is characterised by steep, strongly faulted hills comprised of greywacke/argillite. The district was historically vegetated primarily with podocarp-broadleaf forest; however, much of the area has been cleared for farming and development.

Historically, the site itself was likely to have been vegetated with rimu-mataī broadleaf forest and rimu/tawa-kāmahi forest but beech too was present (and remains a common canopy species in the wider hills) (LCDB 5, 2020).

The Land Cover Database broadly classifies the current vegetation above the project area as an assemblage of broadleaved indigenous hardwood, indigenous forest, and urban parkland/open space (Landcare Research Ltd, 2019). The terraces are pasture. The SNA hill slopes are, however, largely mahoe and tree fern gullies.

The hill country north and the escarpments are recognised by the Upper Hutt City Council in its proposed SNA layer (Figure 2).



Figure 2 UHCC draft SNA layer and indication of the area of the eastern stage (the property boundary following the hill side SNA line).

The land environment classification of the stage is classified as “At Risk”- one with 20-30% indigenous cover left. Indigenous biodiversity in these environments has been much reduced and habitats are seriously fragmented but are not acutely threatened.

While historically the terrace (and hills) were mature broadleaf native forest with podocarp elements, since at least 1940's the terrace has been cleared farmland. Retrolens shows that in 1942 the eastern stage land was open pasture (Figure 3).

While the terrace sup hill appears to have scattered trees the hill slope itself is a young mixed scrubland and the gullies without the current dense tree fern cover.



Figure 3 1942 showing from west to east the majority of the eastern stage. Note the one stream still had at that stage a riparian cover until the lower plain (now residential).

2.0 Assessment Methods

2.1 Desktop

The desktop investigation included a review of scientific literature (published and unpublished), the District Plan and associated Ecological Site information, relevant websites (such as Ebird, Inaturalist etc). Ecological databases were also accessed. These included: the LENZ Threatened Environments Classification (Landcare Research Ltd, 2012), the NIWA-administered New Zealand Freshwater Fish Database (NZFFD; (National Institute of Water and Atmospheric Research, n.d.)¹, the Ornithological Society of New Zealand's (OSNZ) Atlas of Bird Distribution in New Zealand (Robertson et al., 2007), and the DOC-administered herpetofauna distribution (BioWeb) database²

2.2 Terrestrial vegetation

To establish the native (and exotic) plant assemblages, communities and botanical values present, the I undertook walking transects to observe and record species within the proposed development area. Given the regenerative nature, age and simplicity of the vegetation and the limited expected potential effects no other more quantitative survey data collection (such as RECCE plots (McNutt, n.d.)) was considered necessary. Species present within the understory, subcanopy, canopy and emergent vegetation tiers were recorded, as well as canopy height and estimated composition (proportions of species in each tier).

The descriptions of the various assemblages were compiled to create a vegetation map that describes the plant communities within the proposed development area. The nomenclature describing the vegetation follows (Atkinson, 1985).

The area of proposed vegetation clearance was estimated by totalling the amount of vegetation contained within the proposed earthworks site, including any temporary works, using aerial photography.

2.3 Avifauna

The Stage 2, west side assessment included a project wide desktop investigation which provides sufficient information to inform the current assessment. General observations were also made in the field on the suitability of habitats within the project area for different avifauna species. A roaming inventory has been opportunistically compiled of bird species seen and heard while on site.

2.4 Herpetofauna

Again earlier stage desktop investigation remains relevant as do the observations made during the numerous site walkovers of habitat suitability within the project area. No lizard surveys were undertaken.

2.5 Bats

No bats have been recorded within the area and the vegetation is not considered suitable for roosting bats. Therefore, no bat surveys or valuation has occurred for this assessment.

2.6 Terrestrial invertebrates

Sampling for terrestrial invertebrates was not conducted as the habitats present did not register as risk given their simplicity and age as such surveys in peri-urban early seral habitats are most often inconclusive. The desktop investigation was used to inform the current assessment.

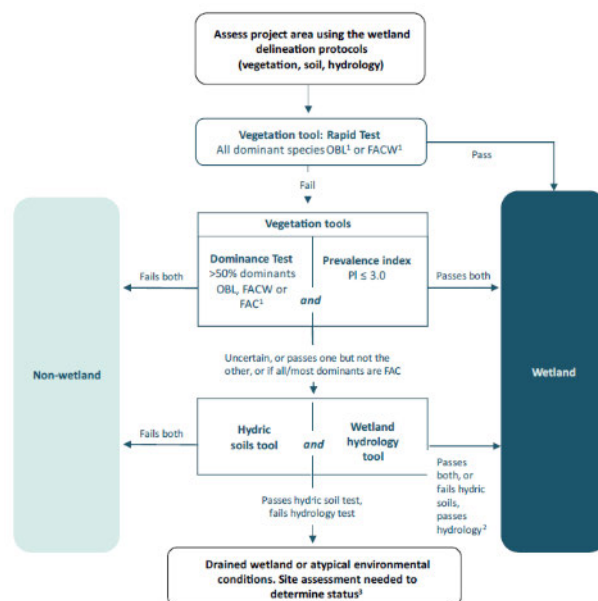
2.7 Wetland verification and delineation

Potential wetlands were noted during an initial site walkover in 2021 and from online historic imagery. The site visit for this assessment December 2024 by suitably qualified ecologists surveyed the two potential wetland areas. During the visit, a general walkover of the site was conducted to establish any further potential natural wetland areas.

The Proposed Natural Resources Plan [decisions version] (PNRP) and the NPS FM (2020) wetland definitions are sufficiently similar as to be the same and I follow the NPS IB MfE delineation protocol (2020 as amended 2024).

The definition of a natural wetland does not differentiate between wetlands dominated by indigenous or exotic vegetation. Therefore, no assessment or testing of the indigenouness of the potential wetlands has been undertaken (irrespective of the importance placed on indigenous ecosystems in Policy 23 of the RPS).

The identification follows the MfE algorithm:



2.7.1 Pasture Dominance Test

Before the dominance and prevalence test the PNRP and the NPS FM (2020) both have wetland exclusions under the definitions of natural wetland. Both accept that potential wetland dominated by pasture are not natural wetland. The property was a farm and remains as grazing for cattle. A Pasture Dominance Test is conducted (using pasture species outlined in Stewart et al., (2014) as recognised by MfE (2020), although I consider this an overly restrictive list which does not account for the common pasture community assemblage in Wellington such as creeping bent), which considers that if a plot is more than 50% pasture cover, it is not a natural wetland, irrespective of the Prevalence/Dominance outcomes).

2.7.2 Dominance Test

A wetland species Dominance Test which considers the dominant species in the plot and their wetland affinity rating can aid in determining if an area is a natural wetland.

This test ascertains the “dominant” species following a 50/20 rule, whereby all species are ranked according to their percentage cover, and the highest covering species are sequentially selected until cumulative coverage immediately exceeds 50%. Any other species which comprise at least 20% coverage are also selected. The “Dominance Test” threshold is then met if more than 50% of the dominant species are OBL, FACW, or FAC.

2.7.3 Prevalence Test

To determine if an area could be considered a wetland where it has not done so in the dominance test, each vegetation species identified is allocated to a prescribed category based on their degree of affinity for water, as described by Clarkson (2013). These categories are:

- OBL: Obligate. Almost always is a hydrophyte, rarely in uplands (estimated probability >99% occurrence in wetlands)
- FACW: Facultative Wetland. Usually is a hydrophyte but occasionally found in uplands (estimated probability 67–99% occurrence in wetlands)
- FAC: Facultative. Commonly occurs as either a hydrophyte or non-hydrophyte (estimated probability 34–66% occurrence in wetlands)
- FACU: Facultative Upland. Occasionally is a hydrophyte but usually occurs in uplands (estimated probability 1–33% occurrence in wetlands)
- UPL: Obligate Upland. Rarely is a hydrophyte, almost always in uplands (estimated probability <1% occurrence in wetlands)

Using these data, a Prevalence Index Score was calculated for each plot. Mathematically, this score must fall between 1 and 5, with 1 indicating entirely wetland species (OBL), and 5 indicating entirely upland species (UPL). A score below 3 is indicative of a wetland/hydrophilic community, though Clarkson (2013) cautions that a score between 2.5 and 3.5 is not reliable for determining a hydrophilic community on vegetation measures alone.

2.7.4 Hydric soils and hydrology

Two tools are available – Frazer et al 2018 – for soils and Lambie et al 2021, neither are included by reference in the NPS FM (2020) suite of methods to be used.

2.8 Aquatic Habitat

This section outlines the methodology used to collect (and analyse) information on the aquatic ecosystems.

2.8.1 Stream verification

The stream is similar in form and size and condition to those visited for stage 2 in the west stage and data from that survey is assumed relevant for this stream.

Habitat characteristics were noted and described including both instream (e.g. substrate, hydraulic components, etc) and along the banks (e.g. erosion, riparian vegetation, buffer width).

A rapid physical habitat assessment (RPHA) was completed in each waterway in accordance with Clapcott (2015). This process involves assessing and scoring the condition of each of ten habitat parameters and summing the total to provide a condition score out of 100.

2.8.1.1 Water quality

Water quality parameters were not measured as they are not relevant to this assessment.

2.8.1.2 Riparian condition/vegetation

The riparian condition and vegetation was noted and described where/if it differed from terrestrial assessment vegetation descriptions. The width of functionally effective riparian buffer was estimated.

2.8.1.3 Periphyton/diatoms/aquatic macrophytes

No detailed periphyton or macrophyte surveys have been undertaken (being inappropriate in winter); however, species present and approximate coverage were noted.

2.8.1.4 Macroinvertebrate community

No macroinvertebrate community samples were collected due to the limited potential for adverse effects to the benthos, and because it was considered possible to estimate the macroinvertebrate community composition without sampling from experience with similar habitats in the district sufficiently so to “value” the fauna.

2.8.1.5 Freshwater fish

No fish community was surveyed as early survey in Stages 1 and 2 did not record fish and the downstream water habitat is entirely within a piped system and so fish passage was considered highly unlikely.

2.9 Assessing Ecological Significance

2.9.1 Terrestrial Environment

A requirement of an ecological impact assessment is to carry out an assessment of significance under Section 6(c) of the Resource Management Act (RMA). The terrestrial values on site have been assessed against the criteria in Policy 23 of the Wellington Regional Policy Statement (Greater Wellington Regional Council, 2013). Table 1 outlines those criteria. Under Policy 23, indigenous vegetation and habitats of indigenous fauna are considered significant if they meet one or more of the criteria.

2.9.2 Freshwater Environment

2.9.2.1 2.3.2.1 Wetland Determination and Regulations

The PNRP definition of “natural wetland” includes the following add-on:

“Note that, because of the rarity of wetlands in the Wellington Region, all natural wetlands will meet the representative and rarity criteria listed in Policy 23 of the Regional Policy Statement 2013 and therefore meet the definition of significant natural wetland”.

The PNRP defines a “natural wetland” as a “permanently or intermittently wet area, shallow water and land water margin that supports a natural ecosystem of plants and animals that are adapted to wet conditions, including in the beds of lakes and rivers.” The meaning of “natural” becomes crucial and is not defined in the PNRP. However, under the “natural processes” and “natural lake” definitions the suggestion is that the feature is formed by non-human processes that are the result of the surrounding topography, hydrology, winds, and other “natural” processes. In essence, it has, or could have, formed and persisted in the absence of human modification/activity. Irrespective of the lack of a definition of “natural”, the PNRP acknowledges that natural wetlands do not include damp gully heads or wetted pasture, or pasture with patches of rushes (there are other exceptions but those relate to the source of the water).

Policy 23 of the Regional Policy Statement 2013 (RPS) is used to identify significant indigenous ecosystems and habitats of indigenous fauna as prescribed by Section 6(c) of the RMA. Policy 23 pronounces that any wetland in the Wellington Region is considered significant if it is indigenous, and meets specifications in at least one of its five categories (representativeness, rarity, diversity, ecological context, and Tangata whenua values). However, the current PNRP states that all features found to be “natural wetland” are by default significant (because of rarity in Policy 23). However, this is erroneous because Policy 23 is directed to indigenous species features while the “natural wetland” definition in the PNRP does not make a distinction between exotic or indigenous features. Therefore, in this assessment, I focus on the ecological values present.

2.9.2.2 Streams and rivers

Streams and rivers in the Wellington Region have been assessed for significance by GWRC in the RPS against four criteria, and significant waterways are listed in Schedule F1 of the PNRP. Those criteria are:

- – *High macroinvertebrate community health;*
- – *Habitat for indigenous Threatened/At Risk fish species;*
- – *Habitat for six or more migratory indigenous fish species; and*
- – *Inanga spawning habitat (reach of tidal influence).*

2.10 Evaluation of the Level of Ecological Value & Effects

The methodology for assessing the level of the ecological effects associated with the proposed development earthworks follows that outlined in the EIANZ Ecological Impact Assessment Guidelines (Roper-Lindsay et al., 2018). This is considered to represent the best practice approach in New Zealand. In summary this evaluation method requires:

- An assessment of the ecological values of the communities, habitats and ecosystems (Table 1 and Table 2) and species (Table 3);
- An assessment of the magnitude of the effects on these values based on criteria listed in Table 4;
- The application of a matrix (Table 5) which determines the level of effect based on the ecological value of the site or species assessed.

2.10.1 Assigning ecological value

For aquatic communities, shown below in Table 1, I have applied the five criteria (representativeness, rarity/distinctiveness, diversity and pattern, ecological context, ecological integrity) as described in the EIANZ guidelines. Each of the five criteria are subjectively scored “High”, “Moderate”, “Low” or “Nil”, based on the assessor’s experience and knowledge of the site. The five scores are then combined to provide a single site score (or score for a freshwater area/site) which ranges from “Very High” to “Negligible” (Table 3). Terrestrial communities are assessed against the same criteria, excluding ecological integrity.

Table 1: Attributes to consider when assigning ecological value or importance to a freshwater site or area (Roper-Lindsay et al., 2018).

MATTER	ATTRIBUTES TO BE CONSIDERED
Representativeness	• Extent to which site/catchment is typical or characteristic • Stream order • Permanent, intermittent or ephemeral waterway • Catchment size • Standing water characteristics
Rarity/Distinctiveness	• Supporting nationally or locally threatened, At Risk or uncommon species • National distribution limits • Endemism • Distinctive ecological features • Type of lake/pond/wetland/spring
Diversity and Pattern	• Level of natural diversity • Diversity metrics • Complexity of community • Biogeographical considerations – pattern, complexity, size, shape

MATTER	ATTRIBUTES TO BE CONSIDERED
Ecological Context	• 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
Ecological Integrity	• Nativeness • Pristineness • Diversity • Resilience

Table 2: Scoring for sites or areas combining values for the five matters in Table 1 (Roper-Lindsay et al., 2018).

MATTER	ATTRIBUTES TO BE CONSIDERED
Very High	• Area rates High for three or all of the five assessment matters listed in Table 1. • Likely to be nationally important and recognised as such.
High	• Area rates High for two of the assessment matters, Moderate and Low for the remainder, or • Area rates High for one of the assessment matters, Moderate for the remainder. • Likely to be regionally important and recognised as such.
Moderate	• Area rates High for one matter, Moderate and Low for the remainder, or • Area rates Moderate for two or more 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 matters and Moderate, Low or Very Low for remainder.

New Zealand biota have been assessed by the Department of Conservation (DOC) for their threat from extinction against a standard set of criteria, which is described in Townsend et al. (2008), and its associated list published for each taxonomic group¹. This provides a consistent basis to assign ecological value to individual species (Table 3).

Table 3. Factors to consider when assigning value to terrestrial and freshwater species (Roper-Lindsay et al., 2018).

ECOLOGICAL VALUE	DETERMINING FACTORS
Very High	• Nationally Threatened species found in the ZOI (zone of influence) either permanently or seasonally.
High	• Species listed as At Risk – Declining, found in the ZOI, either permanently or seasonally.
Moderate	• Locally (Ecological District) uncommon or distinctive species; or

¹ Classifications as listed in: (Dunn et al., 2018) for freshwater fish; (Robertson et al., 2017) for birds; (de Lange et al., 2018) for vascular plants; (Hitchmough et al., 2016) for lizards; and (Grainger et al., 2018) for freshwater invertebrates.

ECOLOGICAL VALUE	DETERMINING FACTORS
	Species listed as any other category of At Risk, found in the ZOI either permanently or seasonally.
Low	Nationally and locally common indigenous species.
Negligible	Exotic species, including pests, species having recreational value.

2.10.2 Assessing the magnitude of Impact

Once the value of the ecosystem components has been determined, the magnitude of the impact is assessed. Magnitude is a measure of the extent or scale of the impact, its duration, and the degree of change that it will cause. A typical scale of magnitude ranges from Very High to Negligible as outlined in Table 4. It is critical to the assessment to establish the base scale for the assessment, which is typically at a catchment scale up to the Ecological District scale. The scale is typically dependant on the feature types being assessed and their contextual function in the landscape.

Table 4: Criteria for describing magnitude of effect (Roper-Lindsay et al., 2018).

MAGNITUDE	DESCRIPTION
Very High	- Total loss of, or very major alteration to, key elements/ features of the baseline conditions, such that the post development character, composition, and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR - Loss of a very high proportion of the known population or range of the element/feature.
High	- Major loss or major alteration to key elements/ features of the baseline conditions such that post development character, composition and/or attributes will be fundamentally changed; AND/OR - Loss of a high proportion of the known population or range of the element/feature.
Moderate	- Loss or alteration to one or more key elements/features of the baseline conditions such that post development character, composition and/or attributes of the existing baseline will be partially changed; AND/OR - Loss of a moderate proportion of the known population or range of the element/feature
Low	- Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character, composition and/or attributes of existing baseline condition will be similar to predevelopment circumstances/patterns; AND/OR - Having a minor effect on the known population or range of the element/feature.
Negligible	- Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation; AND/OR - Having negligible effect on the known population or range of the element/feature.

2.10.3 Assessing level of effect

The overall level of the effect is determined by applying the following matrix, outlined in Table 5, which combines the ecological value (Table 2 and Table 3) and the magnitude of the effect (Table 4).

Table 5: Criteria for describing the level of effect (Roper-Lindsay et al., 2018).

ECOLOGICAL VALUE						
		Very High	High	Moderate	Low	Negligible
MAGNITUDE	Very High	Very High	Very High	High	Moderate	Low
	High	Very High	Very High	Moderate	Low	Very Low
	Moderate	High	High	Moderate	Low	Very Low
	Low	Moderate	Low	Low	Very Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low	Very Low
	Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

3.0 Results – Existing Environment

The communities were mapped (Figure 4) and photographed (Appendix 1) during field survey. Five broad classifications are present. The flat terraces are pasture, the escarpments contain mahoe tree lands and loose tree associations, there is one perennial stream, one wetland feature and inter escarpment upper gorse/weed and scrub areas which are diffuse.

3.1 Terrestrial

3.1.1 Back Hills

On the slopes to the north of the site is regenerating broadleaved forest, with a canopy height of approximately 6-8 m. It is comprised primarily of māhoe (*Melicytus ramiflorus*) along the lower margins and gullies, and tree ferns (*Dicksonia squarrosa*, *Cyathea dealbata*, *Cyathea medullaris*) in the gullies. Also present within this forest is pate (*Schefflera digitata*) and patches of young tawa, a sparse understory of kawakawa (*Piper excelsum*), supplejack (*Ripogonum scandens*), and a ground layer primarily comprised of ferns (*Asplenium* spp. *Parablechnum nova-zealandiae*, *Pneumatopteris pennigera*). There are occasional emergent rewarewa and totara. The stream gully contains the oldest, densest regenerated forest while much of the wider hill slopes are strongly young tree fern.

Along the lower margin (immediately adjacent to the Project Site) the community becomes more fragmented and disturbed and has higher proportions of weed incursion throughout and at the margins; primarily blackberry and cherry. There are also mature planted exotics present (cypresses) along the forest edge. Some areas of the margin have Muehlenbeckia vine and / or bush lawyer.

3.1.2 Front Escarpment

Along the lower terrace back area is the first and main escarpment. This feature has three areas of mahoe tree land and various small clusters of mahoe and hawthorn or gorse or single trees of mapou or tarata or large hawthorn. The three larger slope tree lands are dominated by māhoe (*Melicytus ramiflorus*); but include in the canopy pate, mapou, and wineberry. The under tier and ground tier are depauperate (a consequence of stock access). In the main the ground tier is rocky with small wood debris sparsely covered in English ivy. There are occasional small kawakawa, and saplings of rangiora (*Brachyglottis repanda*),, hangehange (*Geniostoma ligustrifolium*), karamu (*Coprosma robusta*) and mapou (*Myrsine australis*). There is occasional shield fern, creek fern, hounds tongue, and bracken. The epiphytic flora is reduced to hounds tongue and leather leaf fern. Both the ivy as well as areas of mile a minute pose serious vine weed issues for the small steep mahoe areas. There are a range of pasture weeds and grasses also common on the edges (as well as gorse and hawthorn and seedlings and saplings of wild cherry).

The canopy while relative closed is small and all the features are edge habitat, with greatly reduced diversity. In total there are three clusters sized at around 0.2ha (0.04 +0.07+0.08).

The fourth area of mahoe forest is associated and riparian to the stream and covers / shades 70m of the stream. This area too is mahoe dominated but with a better ground and lower tier with grater fern abundance and shrubs. It is an area of 0.16ha.

3.1.3 Terrace flats

These areas remain grazed or used for hay. The species are predominantly cocksfoot, fox tail, rye, zigzag clover and hawkbit / dandelion. There were no indications of wetland.

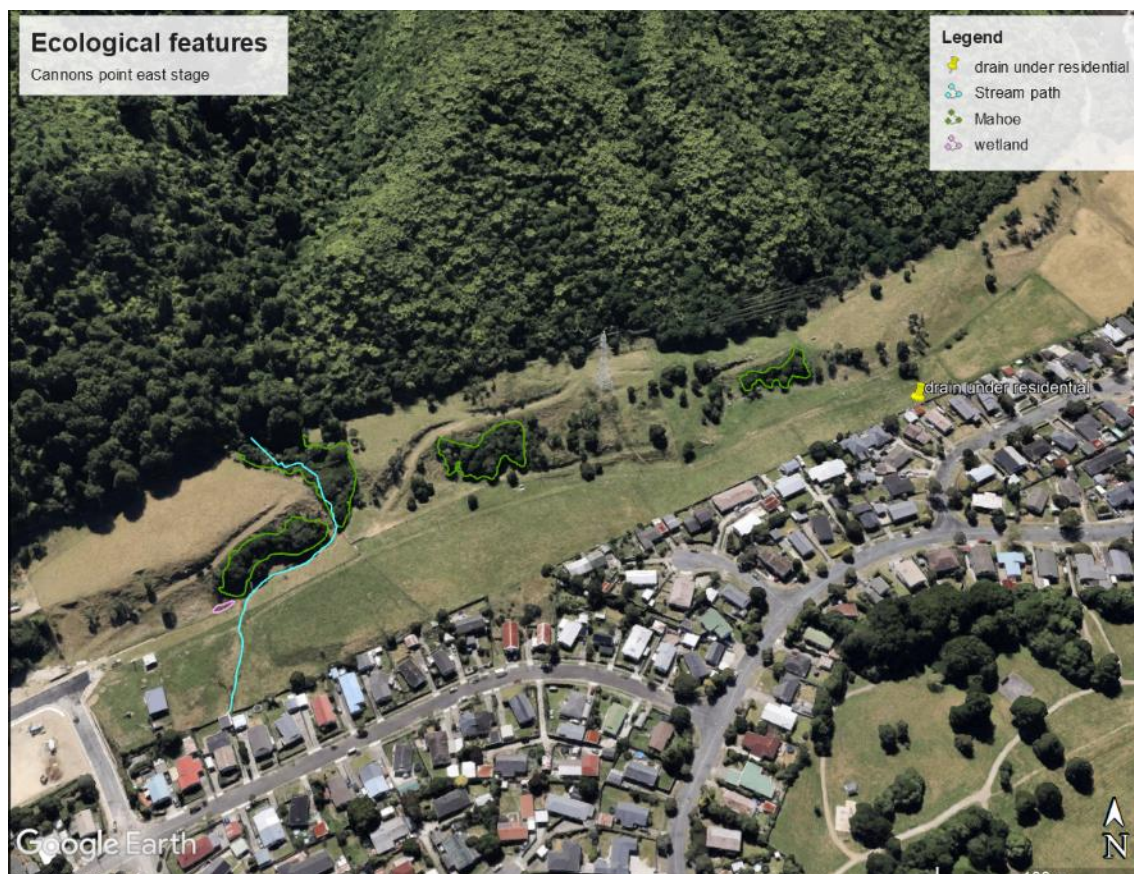


Figure 4. Ecological features mapped on site.

3.2 Wetland

There were two small possible wetland areas, One near the stream and related to what appears to be a seepage from the hill side just below the western most mahoe clusters western edge. Here the seepage has saturated the lower hill slope (prior to a drain) that contain a prominence of monkey musk, with lotus, *Isolepis prolifera*, *Juncus effusus*, *Juncus edgariae*, Yorkshire fog and creeping butter cup. A 2X2 plot recorded 60% coverage of monkey musk, 5% juncus species and only 15% pasture species. Under the MfE rapid test the feature passes as dominated by FACW and OBL species and is clearly not dominated by pasture species. There was therefore no need to progress through the process of dominance and prevalence etc. It is clearly exotic wetland with wetland hydrology. The

areas is mapped and is an area of 3-4m wide and 12m long separated from the stream by 2-3 of pasture and has a drain channel at its base.

The second possible feature was a depression against the toe of the lower escarpment below the third mahoe cluster. It is a horse grazed paddock and is stoney. A plot revealed clover to be 40%, creeping butter cup to be 40%, creeping bent to be 1%, rye grass 15%, Yorkshire fog 1%, plantain 1%, fleabane 1%, dock 1% and so is > 50% pasture species and thus despite the extent of creeping butter cup the area remains pasture.

3.3 Avifauna

The vegetation communities present onsite weakly support a number of avifauna species at least from time to time. The habitats are pre-dominantly terrestrial and provide habitat to both pastoral and forest species.

A potential species list has been generated using data from the OSNZ bird distribution atlas, which was then refined based on the habitats available within the project area (Table 9). This list identifies 36 bird species that could potentially use the area, including 18 indigenous species and 18 exotic species. Three of the indigenous species potentially present from time to time have a threat status of At Risk, those being; New Zealand pipit (*Anthus novaeseelandiae*; At Risk - Declining), whitehead (*Mohoua albigilla*; At Risk - Declining), and New Zealand Falcon (*Falco novaeseelandiae*; At Risk - Recovering). The pipit may use the pasture for foraging, although it will move as activities such as hay making occur. The whitehead is most likely to be within and use the SNA area but may be present within the mahoe forest during fruiting season. Falcons were observed on several occasions during the roaming inventory to the west and may forage for passerines over the pasture of the eastern stage.

The other 15 indigenous species that use, or are likely to use, the project site are classed as Not Threatened; these species, as well as the introduced species, are all common and widespread in the surrounding landscape.

3.4 Herpetofauna

The DOC BioWeb herpetofauna database has records for seven species of native lizard within 10 km of the site. However, the records for the ornate skink and the pacific gecko within this area are more than 30 years old, and the pacific gecko hasn't been recorded in the wider region since 1987. These species are therefore considered unlikely to be present within the site.

The site could potentially provide habitat for: Barking gecko, Ngahere gecko, Raukawa gecko, Copper skink and northern grass skink.

However, the forest and scrub present within the site is isolated and patchy and simple of form and has had no predator control and is unlikely to house the potential arboreal species (the three geckoes recently recorded).

The rocky escarpment floors with debris within and on the edges of the mahoe clusters do provide good habitat for the copper skink and northern grass skink.

As no surveys have been undertaken at this time, it will be assumed that the presence of suitable habitat indicates the presence of lizards within the study area. Therefore, this assessment will work on the assumption that there is both copper and northern grass skinks present, if only in low densities.

3.5 Bats

Bats may be present in the wider area although records of bats of either species in the Hutt valley are very old and there are none in at least the last 3 decades. That said the project site does not contain any suitable bat habitat (i.e. does not have large trees with cavities and epiphytes). Therefore, bats are considered highly unlikely to be present at the project site.

3.6 Terrestrial Invertebrates

No terrestrial invertebrate data were discovered during the desktop investigation. Habitats within the proposed site are likely to contain an assemblage of common terrestrial invertebrates typical of early regenerating trees and pastoral environments within the area and it is highly unlikely that there are rare or threatened species.

3.7 Streams

3.7.1 Habitat

There is one perennial stream which is currently crossed by a gravel formed farm track. The stream originates in the gully upstream in the draft SNA. It is about 700m long from top until it enters the piped network under the residential totara park area. It is supported by a small catchment of 20 hectares, but that is enough to cause a perennial system.

It is a gravel (70%) and cobble (20%) bed stream with minor macrophyte below the ford (where it is steeper and faster) and has substantive macrophyte (monkey musk and water cress) above the ford and until it enters the shading mahoe forest. The channel is around 0.5m wide, the flows variably 0.1-0.4 m/s, the depth from 20-30mm edge to 100mm central (Ca. 10L/s). Runs make up 80% of the habitat type but pool number increases under the mahoe as does woody debris and leaf COM.

The RPHA score was 74/100 for the upper reach, and 32/100 for the lower reach. Good through to poor.

The stream is unfenced, including through the pasture areas.

3.7.2 Aquatic fauna

The NIWA-administered New Zealand Freshwater Fish Database (NZFFD) does not include fish data for these tributaries of Te Awa Kairangi/Hutt River. Furthermore, because connectivity between the proposed development and Hutt River is believed to be severely

modified and limited (Figure 5), fish data for the wider Te Awa Kairangi/Hutt River was not deemed relevant or useful to understand the community likely within these streams.

The earlier western stage tributaries surveyed via EFM and spotlighting did not record any species. I consider it highly unlikely fish species are present in the stream.



Figure 5. UHCC piped water system map showing that the stream and two drainage areas of the pasture are taken into the below ground piping and fish passage would need to exit the Hutt river come up the council drainage system enter the pipes and access through good navigation the stream (a journey of over 400m).

No macroinvertebrate community data was publicly accessible for the watercourses either within the proposed development or in the vicinity of it. Turning cobble shows a strong EPT representation with *Deleatidium* common. Estimate, based on field observation of the bed, flow macroinvertebrates that the system, at least above the ford has an MCI >120 and QMCI >6. But it is highly unlikely that there are fish present.

I note that kōura (freshwater crayfish; *Paranephrops planifrons*) are likely present and were found in the western systems.

4.0 Values and Statutory Significance

The indigenous terrestrial vegetation has already been assessed on site where it is not pasture (Wildlands for UHCC). The UHCC process has determined (using, I assume, the RPS policy 23 (noting revisions are being processed) criteria) that the hills are significant vegetation areas and / or significant habitat of indigenous fauna. While the escarpment mahoe patches, and loose trees of the wider upper terrace are not.

I understand this Wildlands SNA assessment is a provisional finding (a draft outcome). I agree with that assessment, the various small areas of mahoe and loose trees are not significant in terms of the RAMA section 6c and the city and regional planning processes.

The values however, I consider as **low** given it is a set of small isolated simplified, weed infested, all edge, non representative serial broadleaf forest with no rarity, distinctive feature of contextual role of any importance other than to be a common mahoe seed source of less than minor abundance relative to the extensive (100s ha) SNA dominated by mahoe adjacent. I say this even where there might be copper skink (At Risk declining), for although the EIANZ (2018) raises a habitat value where At Risk taxa are present, it is my opinion that these very small and long time isolated and non remnant features that were clear in the 1940s are most likely to have northern grass skink and if there are copper skink their numbers will be so low as to not be a population but rather random single skink and so I cannot attribute a higher value to the habitat. In a similar vein the pipit and falcon will not use the mahoe clusters and potential white head also will be focused on the much larger better, and same mahoe of the SNA and these fragments are not important to them and so I can not raise the value even if they are present from time to time.

The waterway is not included in Schedule F1 of the PNRP as significant indigenous freshwater ecosystems and has no instream faunal assemblage's indicative of a representative and ecologically important waterway. The tributary in question is also not directly connected to the Hutt River, its flows going subsurface through the terrace for at least 400m in pipe and so it cannot be considered part of the Hutt River connected fish habitat and is not therefore I submit captured by the wider Hutt Catchment significance rating.

That said the upper, within bush, section of the stream until the track crossing has a natural flow path, with natural substrate, a natural flow regime and is fully riparian covered by appropriate native plant species and so has good integrity, representativeness and as expected diversity and pattern and I consider offers **moderate** value (as a recovered stream following distant modification). Below the track culvert / crossing the value due to the level of disturbance is **low**.

The Wetland is a small exotic dominated seepage and does not represent a natural indigenous wetland type or has any particular hydrological or down stream buffering function. The seepage does not enter the stream but the drain and so diffusely percolates into the soils. Given its size, lack of function, and simple low diversity exotic nature I rate this feature as of **low** value.

5.0 Adverse Ecological Effects and their Management

It is my understanding from the scheme plans that all of the existing vegetation other than that associated with the stream (its riparian area) and the lower seepage wetland (i.e. a stream corridor) is to be removed and the entire escarpment areas recontoured.

Therefore, there are a number of potential direct and indirect effects on ecological values associated with the construction of the Cannon Point development stage 4. These effects are discussed below.

5.1 Terrestrial Vegetation Loss

The proposal primarily affects grazed pasture habitat, with three small mahoe tree land clusters summing to around 0.2ha and a number of loose trees of common broadleaf sub canopy species and exotic species.

This clearance in three areas sums to 2000 m². The local SNA of the same mahoe broadleaf seral forest is over 300ha and the clearance on the property (stage 4) represents less than 0.07% of the SNA and the broadleaf forest resource. As a magnitude of effect this is a Negligible extent of clearance. Further the clearance is of patches and single trees that are all edge habitat and current grazed under and so under the current land use will not improve and would eventually be lost.

I judge, based on a **Low value** and a **negligible magnitude** of the effect, that this edge clearance is therefore a very **low level of effect**.

The grazed pasture is a predominantly exotic community of negligible ecological value and is a very common agricultural vegetation community in the region. Therefore, given the abundance of that habitat type in the local area the magnitude of effect is considered to be Negligible, and the **Overall Level of Effect is Very Low**.

5.2 Stream

I understand that the only impacts to the stream are related to replacement of the existing crossing with a new culvert to enable the new road access. There are no fish considerations, and the current ford will be replaced, and a bottomless (stream simulation) culvert is recommended which will return suitable substrate. Where the NES culvert provisions are adhered to it is likely that the replacement culvert would be a permitted activity, but regardless the effect is at worst neutral.

Small sediment pulses may be a result of onsite earthworks in this streams catchment, i.e. the small area upstream related to lots 111-116 and lots 88-90 and lots 1n and 87. I assume (as no earthworks consented in the current day can proceed without sediment management) that bunding and excellent stormwater and sediment management will be in action (not as a mitigation recommended but as a requirement of earthworks) and the protection of the stream through bunding, double silt fencing etc should render any sediment discharge zero or infrequent and small scale, which the current habitat and fauna are likely to manage without adverse effect.

Set against removal of farming practices and with suitable and well managed earthworks sediment controls it is likely that there will be a Negligible Magnitude of Effect of sediment discharge to a low and moderate value stream system (low below and moderate above the current crossing) and so in both cases a **Very Low Overall Level of Effect**.

5.2.1 Contaminant Run-Off

The other common aspect of land use change is a change in permeability of the surface and effects on peak flows related to rain fall, velocities and residential contaminants (in the main heavy metals).

The forested upstream catchment, , and expected absence of freshwater fish fauna, coupled with the relatively low vehicle volume and lot-derived run-off expected from this development, suggests there is low risk of adverse ecological effects from contaminants (such as heavy metals, oils, chemicals and herbicides). Therefore, the increase in impermeable surfaces as part of the development is not of ecological concern with regard to downstream water quality. It is expected stormwater, and thus contaminant run-off, will be managed and contained within the stormwater network meaning contaminant loading is not expected to be high or measurable. In summary, a Negligible Magnitude of Effect on the Low and moderate stream values will results in an **Overall Very Low Level of Effect**.

5.3 Wetland

I assume that the wetland in and of itself is avoided as are any discharges to the wetland from earthworks or operational stormwater and that the seepage is retained as it is and so adverse effects are avoided and there will be no loss of extent of values.

5.4 Species Habitat Loss, Disturbance and Displacement

5.4.1 Avifauna

Vegetation clearance will result in negligible habitat loss for avifauna. Most of the species present, or potentially present, on site are common native and exotic species that are able to use a variety of habitats and will occupy the large SNA rather than the edge effected small inter pasture areas on the property. They are also flighted, mobile species, and are able to move and occupy alternative areas of habitat available within the surrounding area when displaced and or disturbed from the area during construction activities.

Three At-Risk species potentially use habitats within or adjacent to the site; the NZ pipit, whitehead and NZ falcon.

There is a low probability that NZ pipit may use the pasture areas for foraging. They also use rough pasture habitats for nesting; however, this requires cover (tussock/long grasses, fernlands, etc) which as yet are not present. There are plentiful habitats in the surrounding areas (farmlands, rough pasture, riverbeds) to which they can easily relocate. Therefore, the magnitude of effect on pipit (High value) is considered to be Negligible, and the **Overall Level of Effect is considered to be Very Low**.

The whitehead (High value) may use the forest and scrub habitats within the site for foraging. However, the areas of clearance are at the more disturbed margins of these communities whom inhabit the large SNA, and are therefore less likely to host whitehead, or be utilised as nesting habitat. Any whiteheads that are displaced can move into the adjacent, large areas of broadleaf forest to the north. Therefore, the magnitude of effect on any whitehead population present would be Negligible and the **Overall Level of Effect would be Very Low.**

Falcon (High value) have been observed over the broadleaf forest to the north of the project site during other surveys, and likely nest and forage within the forest. However, again the small scale of clearance of unattached small mahoe clusters is unlikely to have an impact, especially given the scale of undisturbed forest immediately adjacent. As the margins of the forest are unfenced, and the pasture is grazed, there is likely too much disturbance within the clearance areas for falcon nesting. Therefore, the magnitude of effect is considered to be Negligible and the **Overall Level of Effect to be Very Low.**

Based on these factors, I consider that without mitigation the magnitude of effect of avifauna habitat loss, disturbance and displacement will be Negligible. A Negligible magnitude of effect on Low to High Value avifauna species, results in a **Very Low Overall Level of Effect.**

5.4.2 Herpetofauna

The clearance of the small areas of forest and scrub vegetation but more specifically the earthworks that remove the rocky surface under these fragments may result in a very limited amount of habitat loss for native lizard species, as well as the potential for injury or mortality to any lizards inhabiting the areas of clearance. The At-Risk species potentially present (the copper skink) are (if present) likely to be in very low abundance, especially where pest control is not being undertaken regularly (as is the case for most farms). Northern grass skink, while not At Risk, are protected by the Wildlife act and it is undesirable to harm either species through on site works. The impact of harm to either I judge, given the likely very low presence, to be of a magnitude of low to High value and a "low" value taxa. This makes potential harm to copper skink a low level of effect and to north grass skink a very low level of effect, prior to any effects management.

5.5 Avoid, Minimise, Remedy and Mitigate – Recommendations

The following actions are recommended to avoid, minimise remedy, mitigate and offset any potential adverse ecological effects of construction of the Cannon Point stage 4 development on terrestrial and freshwater habitats, flora, and fauna.

5.5.1 Terrestrial Environment

The loss of around 0.2ha of young mahoe tree land (which is in scattered smaller features) is a very low level of effect (less than minor). Historically no remedy or offset for this level of effect would be required. The NPS IB (2022) guides Councils, with respect to indigenous biodiversity outside of SNA and says (section 3.16(1)) that *"any significant adverse effects of the new subdivision, use, or development on indigenous biodiversity outside the SNA must be*

managed by applying the effects management hierarchy". The level of effect of this habitat clearance is not significant, it is less than minor, therefore the effects hierarchy need not be applied, and the effect can be sustained.

Nevertheless, the following actions and processes are recommended.

Prior to any vegetation clearance during the nesting season, checks should be made for nesting indigenous avifauna and, if found, measures put in place to ensure the nest is not disturbed (i.e. exclusions zones established, and clearance delayed within that zone).

To avoid potentially introducing exotic weed species into the SNA (or spreading existing weeds), any machinery used during construction should be cleaned before and after entering the site.

To avoid harm to skink as far as practicable prior to vegetation clearance and especially substrate disturbance the consent holder will require the appropriate wildlife authorisation to trap and transfer (and harm) skink present. This should be focused on the three main mahoe stone floor escarpment areas. Such a permit is likely to require pit fall trapping and other active trapping procedures and while such effort may return no lizards it is the process required regardless of this report's assumptions about the presence or not of lizards and would be part of a management action in any case. The transfer location would be in the adjacent SNA.

5.5.2 Stream

Where an appropriate road crossing is established and sufficient protection against earthwork sediment discharge as well as operation stormwater manage then effects of an adverse nature are highly unlikely. Further assistance to the stream, and greater insurance of its viability, would be to plant out the rest of the 301 "reserve" lot in appropriate riparian broadleaf native woody vegetation. Such planting would enhance the habitat for the koura and macroinvertebrates and assist in mitigating any possible future change in water quality.

5.5.3 Wetland

As noted above I assume that the identified natural inland wetland and its seepage are avoided. It may be that these features straddle lots 111 and 301, I am unsure, but if in lot 111 the lower area where the wetland is and a 10m buffer (which would incorporate the seepage) should be identified and a restriction placed on the lot 111 title identifying the wetland, its location and protection.

6.0 Conclusion

There are few ecological features and few values on site. I have found and mapped one natural inland wetland and a reasonable quality stream although without fish. The remnant vegetation is low quality mahoe clusters on the steep escarpments or else isolated broadleaf sub canopy trees and exotic trees and gorse and broom. There is little habitat of any value. Most of the area is pasture grass. Grazing and weed invasion has kept the mahoe areas depauperate and if the land use continued to be farming then the most likely outcome is the loss of these tree lands.

Copper and northern grass skink may be present in the rocky escarpment slope substrate under the loose mahoe canopies. It seems unlikely however, given the isolation and age of the features. If present it is likely that, given the residential closeness and no predator management, they are in low abundance.

The proposed development appears to require removal of all of the terrestrial vegetation and recontouring of the escarpments. This effect (0.2ha in total) is of very low ecological significance and is "less than minor" and so does not trigger the non-SNA NPS IB directive to manage those effects through the effects hierarchy.

The stream and natural wetland are avoided and as part of the development the stream corridor to be in reserve will receive riparian native appropriate planting. This will be an ecological benefit.

A small range of recommendations are made to mitigate or avoid potential effects, mostly in relation to reducing the risk of harm to fauna during vegetation clearance and earthworks. These include:

- A process at vegetation removal to avoid nesting native bird species;
- A process to reduce potential harm to skink during vegetation and earthworks;
- A quality earthworks sediment management plan to protect the stream and wetland;
- A 10m buffer about the natural wetland to be fenced / flag taped during construction.

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Appendix 1: Site Photos



The stream at the track ford.



Lower reach of stream.



Entrance of stream into residential pipe system.



Middle reach of stream seen from wetland.



Natural wetland below seepage



Upper middle reach of stream



Edge of mahoe tree cluster 3.



Floor of cobble and ivy under mahoe canopy cluster.



Western paddocks.



Eastern most paddock and slopes with broom and isolated trees.



Central area and lower escarpment with scattered lemonwood, mapou and mahoe as well as gorse, broom and hawthorn. Arrow points to third mahoe cluster.



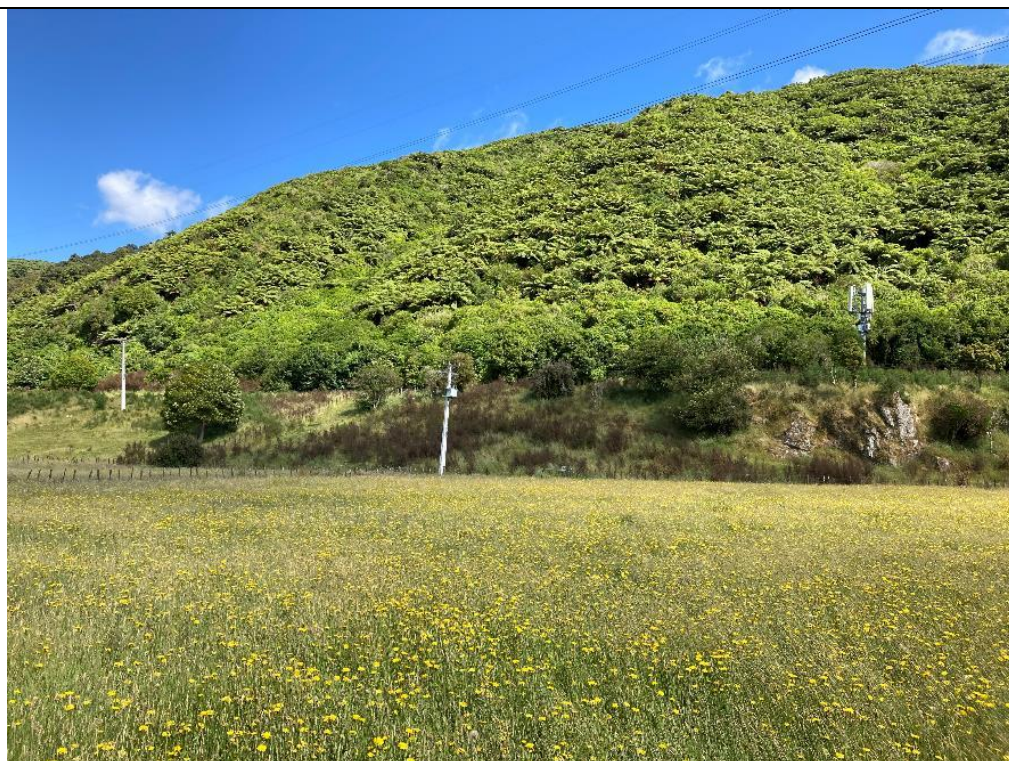
Second potential wetland, but classified as wet pasture.



Middle upper terrace side slope – loose broom and gorse.



Upper terrace pasture.



Cell tower lower slope broom and gorse.



Long pasture ready for hay and lower broom escarpment slope.



Central southern drain into pipes under residential.



Eastern end looking south of lower terrace and pasture.



At western end a lower terrace, no wetland.

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E: s 9(2)(a)

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