

1 Silverwater Drive

Earthworks Assessment of Ecological Effects
Prepared for Build Rich Ltd

13 September 2021



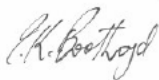


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Cover photograph: 1 Silverwater Drive facing north and overlooking the proposed earthworks area, © Lee Shapiro, 2021

Executive Summary

Build Rich Ltd plan to undertake earthworks across an area of 13,400 m² at 1 Silverwater Drive, Silverdale, Auckland. Boffa Miskell Ltd were engaged to undertake an assessment of potential ecological effects within the proposed area for earthworks which involved assessing terrestrial ecological values, classifying any watercourses present and an evaluation of potential wetland features.

The following key findings were made during ecological surveys:

- All watercourses within the proposed area for earthworks were classified as ephemeral and they appear to only receive surface flows.
- Two potential 'wetland' features were identified within the proposed area for earthworks. Our assessment concluded that neither are 'natural wetlands' with one feature assessed as forming part of an ephemeral stream channel and the other a result of relocated soil that contained seed for wet-tolerant plant species moved during recent earthworks.
- The site is largely covered in exotic grasses and pest plants and there a small number of mature macrocarpa trees present within the site that may provide potential habitat value for regionally and nationally common native birds.
- The site does not contain suitable habitat for native geckos but has suitable habitat for native skinks, and the presence of an 'At Risk – Declining' native skink species within 10 km of the site means that a native skink survey will be required to determine if any are present.

The freshwater and terrestrial ecological values of the proposed earthworks area (excluding lizard values) have been assessed as Low, the magnitude of effect on these ecological values assessed as Moderate and the overall level of ecological effects from the proposed earthworks assessed as Low.

If 'At Risk – Declining' native skinks are found within the proposed earthworks site during surveys, then the mitigation will include salvage and translocation to a suitable site. Successful salvage would reduce the magnitude of effects from High to Low and the overall ecological effects of the proposed earthworks on 'At Risk – Declining' native skinks would be reduced from Very High to Low.

With the implementation of appropriate silt control measures, vegetation clearance protocols for nesting birds and mitigation measures for native skinks (if present) the proposed earthworks at 1 Silverwater Drive will have a Low to Very Low overall level of effect on the ecological values of the site.

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1.0 Introduction

1.1 Background and Approach

Build Rich Ltd plan to undertake earthworks at 1 Silverwater Drive, Silverdale (Lot 7 DP 545151) which represents the first stage of a larger project to develop the site for residential housing. The proposed earthworks activity will comprise the filling of the northernmost gully in the site, with fill material sourced from the adjoining site to the north that they're currently developing. The earthworks will be undertaken across an area of 13,400 m².

Boffa Miskell Ltd have been engaged to undertake an ecological site survey at 1 Silverwater Drive to inform an Assessment of Ecological Effects (AEE) to accompany an application for an earthworks consent for this property.

Our assessment focused on determining the ecological values present and an assessment of potential ecological effects within the proposed area for earthworks. The proposed area for earthworks includes a gully and an area of flat ground at the base of the gully. As well as assessing terrestrial ecological features of the site the assessment also focused on classifying any watercourses present and included an evaluation of prospective wetland features with respect to the Resource Management Act (RMA) and National Policy Statement for Freshwater Management 2020 (MfE, 2020a) definition. The assessment of prospective wetland features included the use of protocols for identification of natural wetlands, to determine if any provisions of the recent National Environmental Standard for Freshwater 2020 (MfE, 2020b) apply.

2.0 Site location and characteristics

2.1 Site location

The property is located at 1 Silverwater Drive, Silverdale (Lot 7 DP 545151), Auckland. The total property area is 10.29 ha but our assessment is specific to the 1.34 ha (13,400 m²) within the property where earthworks are proposed, as well as the haul roads and access points associated with these works (Figure 1).

2.2 Site characteristics

The overall property is sloping from east to west with undulating terrain. The property has historically been grazed by livestock but livestock appear to have been absent for several years as the property has a dense cover of kikuyu and gorse.



3.0 Ecological Site Survey

3.1 Watercourses

The site walkover was undertaken on 9 July 2021 and it was noted that flow paths and other watercourses that were previously identified within the subject site in Bioresarches (2016) are overgrown by kikuyu and gorse. No flowing water was found in any watercourses, which was consistent with observations from the Bioresarches (2016) survey.

An artificial pond in the headwaters of the main tributary (immediately south of a group of macrocarpa trees) identified in the Bioresarches (2016) report was completely dry and kikuyu-covered in the recent site visit (aside from what appears to be a track around the margin).

There are several small flow paths that run from the eastern boundary of the property and join a watercourse that extends from the centre of the proposed earthworks area to the northern boundary of the property (Figure 1). All of the watercourses and flow paths within the area proposed for earthworks and immediately adjacent and above this area in the catchment were investigated to classify them according to the AUP(OP) criteria for permanent intermittent rivers and streams and ephemeral streams (Auckland Unitary Plan Practice and Guidance note 2021; Table 1).

Along the length of each watercourse representative sites were investigated using a shovel to cut away kikuyu to reveal the stream bed to classify the watercourse. The watercourses and flow paths comprised well-defined to deeply incised channels overgrown with kikuyu and gorse the entire cross-sectional width, and no water was found in any of these channels (Figures 2a - h). In several locations there were deep holes (>2 m deep) within the channel of the watercourse/flow path and these also had no water in them (Figure 2d). The watercourses within the site were classified as ephemeral due to the stream bed being above the water table at all times, and they appear to only receive surface flows.

Table 1. AUP(OP) criteria for permanent intermittent rivers and streams and ephemeral stream (taken from Auckland Unitary Plan Practice and Guidance note 2021).

Criterion	Definition
Permanent river or stream	
1	Evidence of continuous flow
Intermittent river or stream, or ephemeral stream	
Ceases to flow when bed is above water table. To be intermittent, a river must exhibit at least 3 of the following	
1	Evidence of natural pools
2	Well defined channel. Banks and bed can be distinguished
3	Surface water present (more than 48hrs after a rain event)
4	Rooted terrestrial vegetation not present across the entire cross-sectional width of channel
5	Organic debris present in floodplain
6	Evidence of substrate sorting processes, including scour and deposition
Ephemeral stream	
1	Stream bed above the water table at all times.
2	Water present only during and shortly after rain fall





Figures 2a-h: Photos from watercourse investigations at 1 Silverwater Drive, Silverdale in July 2021

3.2 Wetland assessment

3.2.1 RMA and NPS-FM wetland definitions

The RMA (1991) definition of a 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 (NPS-FM), which sets out the policy framework for the NES-F, uses the RMA definition to describe a “**natural wetland**”, subject to the following exclusions:

- (a) a wetland constructed by artificial means (unless it was constructed to offset impacts on, or restore, an existing or former natural wetland);
- (b) a geothermal wetland; or
- (c) 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 in the NPS-FM 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 grazing.

Hydrophytes (hydrophytic vegetation) is defined as plant species capable of growing in soils that are often or constantly saturated with water during the growing season.

The hydrophyte categories (wetland indicator status ratings: Clarkson (2013) and subsequent updates) are:

- Obligate (OBL): occurs almost always in wetlands (estimated probability >99% in wetlands)
- Facultative Wetland (FACW): occurs usually in wetlands (67–99%)
- Facultative (FAC): equally likely to occur in wetlands or non-wetlands (34–66%)
- Facultative Upland (FACU): occurs occasionally in wetlands (1–33%)
- Upland (UPL): rarely occurs in wetlands (<1%), almost always in ‘uplands’ (non-wetlands).

3.2.2 Wetland evaluation

A wetland evaluation in accordance with NPS-FM protocols follows a consecutive, hierarchical sequence of tests, each requiring an increasing level of detail (Figure. 3). The first step is to determine the project area and then decide if ‘normal circumstances’ are present, i.e. typical climatic/hydrological conditions, and no recent disturbances or modifications to the project area.

The assessment is completed if (a) the feature is assessed as a wetland, or (b) the feature fails the ‘prevalence index’ test and is therefore not a wetland. In summary, these tests comprise:

- Rapid test: if all dominant species have a wetland indicator status of OBL or FACW, the feature is a wetland.
- Dominance test: Species recorded in the plot are ranked in order of abundance. If >50% of the dominant species (ie, which together make up more than half the vegetation cover) are OBL, FACW or FAC (provided all/ most dominant species are not FAC).

- If both the Rapid test and the Dominance test failed to identify the area as a wetland or are inconclusive, soils and hydrological characteristics are evaluated. If hydric soils are present or the site has saturated soils/ a water table near the soil surface, the 'Prevalence Index' test is applied.
- Prevalence Index (PI) test: a plot-based algorithm derived from the species composition and cover abundance of plants is calculated. The vegetation is considered to be hydrophytic (wetland) if $PI \leq 3.0$.

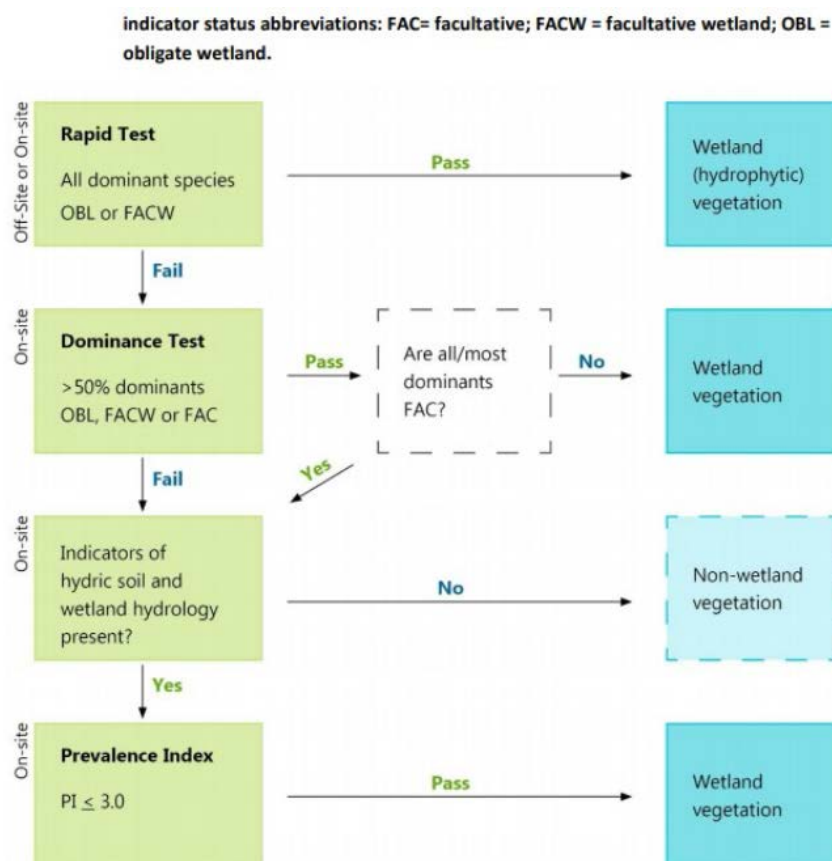


Figure 3. Key steps in hydrophytic vegetation determinations (from NPS-FM Wetland Delineation protocols).

3.2.3 Wetland features

The site assessment undertaken by Bioresearches (2016) noted the presence of rushes and sedges in and around the margins of watercourses and artificial ponds, which would potentially meet the definition of a natural wetland in accordance with NPS-FM protocols. However, in the absence of grazing, the swathes of kikuyu and gorse now present on the subject site have evidently overwhelmed these previously rush-dominated patches.

The site walkover was undertaken on 9 June 2021 during a period of light rain, with frequent, light to moderate rainfall in the two weeks before the survey (NIWA cliflo database¹). Field assessments by Boffa Miskell staff included inspection of areas identified as flow paths and

¹ <https://cliflo.niwa.co.nz/> stations queried include Whenuapai, Whangaparaoa and Motat.

flood-prone areas according to hydrological modelling (Auckland Council GIS viewer) to determine if these areas meet the definition of a natural wetland according to NPS-FM criteria and guidelines (Figure 3).

Two small, discrete areas with prospective wetland characteristics in the north-western corner of the proposed site for earthworks were distinguished by visual observation (Figure 1; henceforth referred to as Features 1 and 2). At each of these sites vegetation composition was assessed in a single 2 m × 2 m quadrat (Figures 4 and 5; Table 2) and the presence of hydric soils (i.e. soils which have been wet for sufficient time so that they develop under anoxic conditions; Fraser et al. 2018) was also assessed.

There was some uncertainty around the characteristics of both of these features and as to what each of the features would be classified as, and so a further site visit was made to clarify this. The second site visit was on 9 August 2021 and in attendance were BML ecologists and consultant ecologist Jason Smith from Morphum Environmental (representing Auckland Council).

3.2.3.1 Feature 1

Feature 1 appears to be a part of an adjacent ephemeral stream channel (Figures 1 and 4). The feature itself is within a channel with banks, though vegetation covers the bed. Vegetation met the 'dominance test' (i.e., more than half the dominant species were OBL, FACW or FAC wetland plants, Table 2), and while soil investigations found no hydric soils present, water was present close to the soil surface within the channel. In addition, patches of standing water were found near the northern boundary of the subject site, amongst deep kikuyu and gorse scrub, though the overgrowth of vegetation obscured the extent of wet area.

A quadrat survey was undertaken within Feature 1 to calculate the 'prevalence index' of wetland vegetation in accordance with NPS-FM protocols. The plot scored as wet-tolerant vegetation, though the score was marginal (2.95 where the threshold is less than 3). The feature meets the criteria of a wetland under the NPS-FM protocols. During the second site visit (9 August 2021), the feature was assessed by BML ecologists and the Auckland Council representative and there was consensus that this feature forms part of an adjacent ephemeral stream channel and is not a wetland.



Figure 4 (a & b). Feature 1 vegetation and soil (high groundwater table).

3.2.3.2 Feature 2

Feature 2 was located in the vicinity of an artificial pond mapped in Biosearches (2016). This site was completely dry but contained a small (5 – 10 m²) patch of rushes and other wet tolerant vegetation (Figure 5). It was evident that 'normal circumstances' were not present within and adjacent to Feature 2 as there was evidence of recent soil disturbance and modification through soil movement. Despite soil disturbance we did still proceed with the delineation protocol, and the feature met the 'dominance test', though while a c.10 – 15 cm layer of hydric soil was found in the soil profile, organic topsoil was found beneath it, indicating that this feature is likely to be the result of soil disturbance. It is likely the surface (hydric) soil deposit contained a seedbank from a previous wet site and the soil has been deposited in this location as there was obvious soil disturbance.

A quadrat survey was undertaken within Feature 2 to calculate the 'prevalence index' of wetland vegetation in accordance with NPS-FM protocols. The plot scored as wet-tolerant vegetation (Table 2) and meets the criteria of a wetland under the NPS-FM protocols. However, the feature appears to be the result of soil disturbance and so a further site visit was made to the site to clarify this. During the second site visit (9 August 2021), the feature was assessed by BML ecologists and the Auckland Council representative and there was consensus that this feature is not a wetland and is the result of soil having been deposited in this location and that the surface (hydric) soil deposit contained a seedbank from a previous wet site.



Figure 5 (a & b). Feature 2 vegetation and soil (hydric soil overlying organic soil)

Table 2: Wetland survey results from field surveys using the NPS-FM wetland delineation protocols.

Feature 1 (section of ephemeral watercourse)

6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Wetland Status	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)
ranrep	70	Y	<i>Ranunculus repens</i>	Creeping Buttercup	FAC	Yes	3	210
hollan	15	N	<i>Holcus lanatus</i>	Yorkshire Fog	FAC		3	45
lotped	1	N	<i>Lotus pedunculatus</i>	Lotus	FAC		3	3
pasdis	10	N	<i>Paspalum distichum</i>	Mercer Grass	FACW		2	20
cencla	5	N	<i>Cenchrus clandestinus</i>	kikuyu	FACU		4	20
Dominance Test: (proportion OBL, FACW, FAC)	1							
Prevalence Index score:	2.95049505							

Feature 2 (disturbed soil likely moved to this site)

6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Wetland Status	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)
juneff	25	Y	<i>Juncus effusus</i>	Leafless Rush	FACW	Yes	2	50
hollan	15	Y	<i>Holcus lanatus</i>	Yorkshire Fog	FAC	Yes	3	45
lotped	20	Y	<i>Lotus pedunculatus</i>	Lotus	FAC	Yes	3	60
ranrep	15	Y	<i>Ranunculus repens</i>	Creeping Buttercup	FAC	Yes	3	45
hyprad	1	N	<i>Hypochaeris radicata</i>	Catsear	FACU		4	4
epicin	10	N	<i>Epilobium cinereum</i>	willow herb	FAC		3	30
cencla	1	N	<i>Cenchrus clandestinus</i>	k kuyu	FACU		4	4
lolper	1	N	<i>Lolium perenne</i>	Perennial Rye Grass	FACU		4	4
triirep	1	N	<i>Trifolium repens</i>	White Clover	FACU		4	4
pasdis	5	N	<i>Paspalum distichum</i>	Mercer Grass	FACW		2	10
pasdil	5	N	<i>Paspalum dilatatum</i>	Paspalum	FACU		4	20
Dominance Test: (proportion OBL, FACW, Prevalence Index score:	1							
	2.787878788							

3.3 Terrestrial ecology values

3.3.1 Vegetation

The property is highly modified having been used to graze livestock for extensive periods and is dominated by exotic grasses with a dense cover of kikuyu, and gorse. The site has little native vegetation or vegetation that is of value to native species as habitat or as a food resource apart from the potential presence of native skinks inhabiting areas of rank grass. There is a stand of macrocarpa trees near the northern boundary that may provide potential habitat value for native birds.

3.3.2 Native lizards

Native skinks are known to colonise rank grass if populations are present within wider area and there are opportunities for dispersal. A review of the Department of Conservation Bioweb database records was undertaken to determine whether any known populations of native lizards are present in the surrounding area. Five native lizard species were recorded within 10 km of the site (Table 3), including two skinks and three primarily arboreal (tree-dwelling) geckos. Three of these species are classified 'At Risk- Declining' and one 'At Risk- Relict'. Habitat likely to support geckos is absent within the site, and no survey or management is proposed for this group.

Despite the presence of suitable habitat for native skinks, the site has a long history of disturbance by livestock grazing. Rank grass habitat is also favoured by lizard predators including rats and mice. Initial surveys for native lizards should include pitfall trapping within the proposed area of earthworks area. If native lizards are not found, then no further management action will be required.

We understand that Auckland Council have proposed an update to the Conditions Manual that is related to small scale vegetation removal² and our suggested approach is consistent with this updated guidance. If native lizards are found, then a management plan will be required that includes actions to minimise effects on native lizards during development.

Table 3. Native herpetofauna within 10 km radius of 1 Silverwater Drive.

Species	Common Name	Threat Classification	Distance from site	Habitat use
<i>Oligosoma ornatum</i>	Ornate skink	At Risk - Declining	1.3 km	Grassland, scrubland, forest
<i>Oligosoma aeneum</i>	Copper skink	Not threatened	1.5 km	Grassland, scrubland
<i>Mokopirirakau granulatus</i>	Forest gecko	At Risk - Declining	6.8 km	Scrubland, forest
<i>Naultinus elegans</i>	Elegant gecko	At Risk - Declining	9.0 km	Scrubland, forest
<i>Dactylocnemis pacificus</i>	Pacific gecko	At Risk-Relict	7.9 km	Scrubland, forest

² Auckland Council has identified that there may be circumstances 'where lizards are unlikely to be present and having a herpetologist on site would be unreasonable given the scale/quality of vegetation clearance' Auckland Council advice note 7 September, 2021.

3.3.3 Avifauna

Common native and exotic bird species including white-faced heron, kingfisher, chaffinch, spur-winged plover and pukeko were recorded during casual observations on both site visits. A small number of mature macrocarpa trees present within the site (Figure 1) may provide potential habitat value for native birds including white faced heron, kingfisher and ruru (if present), particularly for nesting during the breeding season. This potential habitat should also be taken into consideration when planning and scheduling vegetation clearance works. If clearance of these macrocarpa trees is undertaken during the main breeding season for native birds (August to March inclusive) then the trees must be surveyed by a suitably qualified and experienced Ecologist/Ornithologist for nesting birds prior to clearance.

4.0 Assessment of Ecological Effects

4.1 Assessment of Ecological Values

Ecological value has aspects of both quantity (rarity or extent) and quality (integrity, functionality or condition) and incorporates an array of attributes across multiple levels of ecological organisation (species, communities, habitats and ecosystems).

Environment Institute of Australia and New Zealand (EIANZ) impact assessment guidelines (EIANZ 2018) provide a summary scale whereby a site's value is assessed as the extent to which an area or site exemplifies qualities of representativeness, rarity/ distinctiveness, diversity and pattern, and ecological context characteristic of its ecosystem type and then ranked on a scale of Negligible to Very High for how many of those assessment matters are met (Appendix 1; Table A). We have assessed terrestrial and freshwater ecosystems / communities / habitats and species against these criteria to determine the overall value of the features.

We have assessed the subject site as having Low or Very Low Ecological Values for the majority of assessment matters as it is highly modified and dominated by exotic grasses and pest plants. We have assessed the site as having Low freshwater value with only ephemeral watercourses present. We have assessed the site as having Very Low native vegetation ecological value and the only trees present are limited in value to potentially providing local habitat for nationally and locally common native bird species. Based on these components, the freshwater and terrestrial ecological values of the site (excluding lizard values) have been assessed as **Low**.

The site has suitable habitat for native skinks but not native geckos and the presence of an 'At Risk – Declining' native skink species (ornate skink) within 10 km of the site means that a native skink survey will be required to determine the presence of any of these species at the site. In the absence of survey information, the ecological value of the site for native skinks can be assessed under several scenarios, namely:

1. Native skinks are not detected at the site – the ecological value of the site for native skinks is assessed as **Negligible**;
2. Only non-threatened native skinks are detected at the site – the ecological value of the site for native skinks is assessed as **Low**;
3. 'At Risk – Declining' native skinks are detected at the site – the ecological value of the site for native skinks is assessed as **High**³.

³ The EIANZ assessment guidelines (2018) provides recommendations on assigning ecological value to terrestrial native species and species classified as 'At Risk – Declining' are assigned a value of High Ecological Value.

4.2 Magnitude Level of Ecological Effects

EIANZ (2018) provides guidelines for assessing the magnitude of ecological effects, on a scale of Negligible, Low, Moderate, High, or Very High (Appendix 1; Table B). The magnitude of effects and the ecological values are assessed using a matrix to determine the overall level of effects. Magnitude is determined by a combination of scale (temporal and spatial) of effect and degree of change that will be caused in or to the ecological component (EIANZ, 2018).

The project will involve earthworks across an area of 13,400 m² (1.34 ha) which includes the loss of several sections of an ephemeral watercourse. We have assessed the magnitude of effects on freshwater and terrestrial ecological values of the site (excluding magnitude of effects on native lizard values) as **Moderate**.

Prior to a survey being completed for native skinks the magnitude of effects on native lizards can be assessed under several scenarios, namely:

1. Native skinks are not detected at the site – the magnitude of effects on native skinks is assessed as **Negligible**;
2. Only non-threatened native skinks are detected at the site – the magnitude of effects on native skinks is assessed as **High**;
3. 'At Risk – Declining' native skinks are detected at the site – the magnitude of effects on native skinks is assessed as **High**.

4.3 Level of Ecological Effects

EIANZ (2018) guidelines provide a framework for assessing the overall level of ecological effect as a combination of ecological value and effect magnitude (Appendix 1; Table C) and we have used this framework to assess the overall level of effects associated with the proposed earthworks. We have assessed the overall level of effects on the freshwater and terrestrial ecological values (excluding ecological effects on native lizards) from the proposed earthworks as **Low**. This is a result of the **Low** freshwater and terrestrial ecological values (excluding native lizard values) within the site and the **Moderate** magnitude of effect on these values.

Prior to a survey being completed for native skinks the level of ecological effects on native skinks can be assessed under several scenarios, namely:

1. Native skinks are not detected at the site – the level of ecological effects on native skinks is assessed as **Very Low**;
2. Only non-threatened native skinks are detected at the site – the level of ecological effects on native skinks is assessed as **Low**;
3. 'At Risk – Declining' native skinks are detected at the site – the level of ecological effects on native skinks is assessed as **Very High**.

4.3.1 Potential mitigation measures

4.3.1.1 Native skinks

If native skinks ('At Risk-Declining' or non-threatened) are detected within the proposed earthworks site then a management plan will be required and the implementation of the measures in this plan will minimise potential effects on native lizards. Mitigation will include a requirement to salvage native skinks from the site prior to works commencing and then releasing them at an appropriate site with suitable management and habitat enhancement. Undertaking salvage and

release at an appropriate site would potentially reduce the magnitude of effects of the proposed earthworks from **High** to **Low**, therefore reducing the overall ecological effects for 'At Risk – Declining' skinks from **Very High** to **Low** and reduce the overall ecological effects for non-threatened native skinks from **Low** to **Very Low**.

4.3.1.2 Freshwater and avifauna

Typical silt control measures will be used to further reduce any potential impacts on freshwater ecological values outside of the proposed earthworks area. Measures will include chemically treated sediment retention ponds, silt fences, contour drains, clean water diversion bunds and dirty water diversion bunds, where appropriate, in accordance with Auckland Council GD05 – Erosion and Sediment Control Guide for Land Disturbing Activities.

Standard vegetation clearance protocols will be used for the clearance of the macrocarpa trees if they're to be felled during the main breeding season for native birds (August to March inclusive). During the bird breeding season, trees must be surveyed by a suitably qualified and experienced Ecologist/Ornithologist for nesting birds prior to clearance.

Undertaking silt control measures and implementing vegetation clearance protocols for nesting native birds will likely reduce the magnitude of effects of the proposed earthworks on freshwater and terrestrial ecological values (excluding native lizard values) from **Moderate** to **Low**, therefore reducing the overall ecological effects from **Low** to **Very Low**

5.0 Conclusions

Boffa Miskell Ltd have completed an ecological survey and AEE to accompany an application to undertake earthworks across an area of 13,400 m² at 1 Silverwater Drive, Silverdale, Auckland. The site is highly modified having been used previously to graze livestock for extensive periods and is dominated by exotic grasses and pest plant species.

Two potential 'wetland' features were identified within the proposed area for earthworks. Our assessment concluded that neither are 'natural wetlands' with one feature assessed as forming part of an ephemeral stream channel and the other a result of relocated soil that contained seed for wet-tolerant plant species moved during recent earthworks. The freshwater and terrestrial ecological values of the proposed earthworks area (excluding lizard values) have been assessed as Low, the magnitude of effect on these ecological values assessed as Moderate and the overall level of ecological effects assessed as Low. Native skinks surveys are required prior to earthworks to determine their presence or absence.

If 'At Risk – Declining' native skinks are found within the proposed earthworks site during surveys, then the mitigation will include salvage and translocation to a suitable site. Successful salvage would reduce the magnitude of effects from High to Low and the overall ecological effects of the proposed earthworks on native skinks would be reduced from Very High to Low.

We conclude that with the implementation of appropriate silt control measures, vegetation clearance protocols for nesting birds and mitigation measures for native skinks (if present) that the proposed earthworks at 1 Silverwater Drive will have a **Low** to **Very Low** overall level of effect on the ecological values of the site.

6.0 References

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7.0 Appendix 1: EIANZ criteria for ascribing ecological value, magnitude of effect and level of effect

Table A: EIANZ criteria for ascribing ecological value (EIANZ 2018).

Value	Description
Very high	Area rates High for 3 or all of the four assessment matters (representativeness, rarity/ distinctiveness, diversity/pattern, ecological context)
High	Area rates High for 2 of the assessment matters, Moderate and Low for the remainder, or Area rates High for 1 of the assessment matters, Moderate for the remainder
Moderate	Area rates High for one matter, Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder
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 3 matters and Moderate, Low or Very Low for remainder.

Table B: EIANZ criteria for describing magnitude of effect (EIANZ 2018). Magnitude of effect in this table is considered without mitigation.

Magnitude	Description
Very high/severe	- Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will fundamentally change 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 existing baseline conditions such that the 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/medium	- Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; and/or - Loss of a moderate proportion of the known population or range of the element/feature
Low/minor	- Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; and/or - Having a minor effect on the known population or range of the element/feature
Negligible	- Very slight change from the existing 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

Table C. Framework for assessing level of effect (from EIANZ 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

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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