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Appendix H – Ecological Impact Assessment

Moa Point Sludge Minimisation Facility

Ecological Impact Assessment

Prepared for Wellington City Council
Prepared by Beca Limited

26 July 2022

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Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
1	Sandy Huang	Draft for Technical Review	22/06/22
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Document Acceptance

Action	Name	Signed	Date
Prepared by	Sandy Huang		26/07/2022
Reviewed by	Claire Webb		26/07/2022
Approved by	Wayne Estment		26/07/2022
on behalf of	Beca Limited		

Executive Summary

Wellington City Council is proposing to alter an existing designation for a new Sludge Minimisation Facility (SMF) at Moa Point, Wellington. This report sets out an assessment of the ecological values of the site that may be impacted by the development of the SMF to determine ecological effects and the need for any management measures. Additionally, this report is based on the results of a past preliminary ecological assessment and an assessment of lizards and threatened plants, undertaken by Beca Limited in 2021 and Wildlands Consultant Limited in 2022, respectively.

The terrestrial vegetation, herpetofauna, and avifauna were identified as important ecological features at the site. It was determined that the proposed works to develop the SMF will produce the following ecological effects:

- Permanent loss of the broader terrestrial vegetation.
- Permanent loss of terrestrial habitat and disturbance of avifauna and herpetofauna.
- Injury or mortality of avifauna and herpetofauna.

Overall, very low to low levels of ecological effects are associated with the permanent loss of the broader terrestrial vegetation, herpetofauna habitat, avifauna habitat, and the injury or mortality of avifauna. However, there is a moderate level of effect associated with the injury or mortality of herpetofauna.

Therefore, it is recommended to prepare and implement a lizard management plan to reduce effects on herpetofauna to very low or low levels. The assessment of both the ecological effects and the proposed management for the injury or mortality of herpetofauna has been detailed by Wildlands (2022), and is summarised in this report.

Additional management measures have been proposed to further reduce potential injury or mortality to Northern and white-flippered blue penguins during the clearance of vegetation and loose rocks from the embankment. This includes avoiding vegetation clearance during penguin breeding and nesting season and undertaking a survey (potentially with detector dogs) for adults and active nests prior to works.

1 Introduction

1.1 Purpose and Scope

Wellington City Council (WCC) is proposing to alter an existing designation for a new sludge minimisation facility (SMF) at Moa Point, Wellington. As part of the Notice of Requirement (NOR) process, Beca Limited (Beca) and Wildland Consultants Limited (Wildlands) were previously engaged to prepare a preliminary ecological assessment and an assessment of lizards and threatened plants, respectively. Based on the results of these past investigations, Beca has further prepared an ecological impact assessment (EcIA) to support the NOR. This includes determining key ecological values at the site, and any potential effects that may occur as a result of developing the SMF.

The scope of this EcIA includes:

- Reviewing the preliminary ecological assessment prepared by Beca in 2021 (Beca Ltd, 2021; see Appendix A)
- Summarising the results from the lizards and threatened plants assessment prepared by Wildlands in 2022 (Wildlands, 2022).
- Undertaking a desk-top review of publicly accessible reports or information.
- Assessing the ecological values and impacts at the site.

1.2 Proposed Activity

1.2.1 New Moa Point SMF

Currently, sewage waste in Wellington City is transferred to either Moa Point Wastewater Treatment Plant (WWTP) or the Karori Western WWTP. Following a range of treatments at Moa Point WWTP, any remaining solid sewage (sludge) from the sewage waste is mixed with solid waste at the Southern Landfill. However, it is expected that within the next two – three years, there will be insufficient solid waste being received at the Southern Landfill to adequately mix with the sludge in accordance with the conditions of the existing resource consent.

Therefore, it is proposed to develop a new SMF adjacent to the existing Moa Point WWTP to address the sludge management concerns.

1.2.2 Construction Activities

The construction of the proposed SMF is programmed to commence in 2023 and is anticipated to be completed by 2026. This includes the removal of the ridgeline between the access road to the upper WWTP and the flat area of the site, the clearance of vegetation and loose rock matter from the embankment for slope stabilisation, and vegetation clearance between the new SMF and existing WWTP for ground pipe installation. Following the completion of works, some vegetation may be reinstated, where practical.

On a conservative basis, it has been estimated that 50% of the vegetation within the Site extent will be permanently lost (approximately 0.33 ha). Thus, while clearance activities may be subject to changes based on the final construction methodology, it is anticipated that any alterations will lead to a reduction in the final extent of permanent vegetation loss assessed in this report.

1.3 Site Location and Ecological Context

The proposed SMF Site (hereafter referred to as the Site) is located in Moa Point, Wellington City. It is located off Stewart Duff Drive, between the existing Moa Point WWTP and the Wellington International airport.

The Site was formerly a rocky peninsula which was quarried from as early as 1938 to the 1950s as part of the construction for the Wellington International Airport. During this time, the Site was cleared of vegetation and earthworked to develop existing buildings and facilities. It is currently managed as an industrial site with steep, grassy embankments.

Historically, the Site was surrounded by kohekohe, tawa forest, which is considered to be regionally endangered (Singers et al., 2018; Singers & Rogers, 2014). However, much of this forest has been cleared, with any remaining remnants that are nearby, in Strathmore Park or Rangitatau Historic Reserve at least 120 m away from the Site. This is consistent with the wider Sounds – Wellington Ecological District, which has undergone extensive modification with a large proportion of land converted to farmland for sheep and cattle, or urbanised, as in the case of Wellington City (McEwen, 1987).

Despite land modification, the Sounds – Wellington Ecological District is known to still contain important plants including Cook Strait endemics (e.g. *Hymenanthera obovate*, *Aciphylla squarrosa* subspecies, *Raoulia* sp.[c.f. *R*. *hookeri*], *Craspedia uniflora* ssp. *maritima*), South Island species that just reach the south of the Northland (e.g. *Coriaria sarmentosa*, *Pellaea* sp.), and rare North island species that are more common in the South Island (e.g. matagouri [*Discaria toumatou]*, *Carex diandra*, *Hypsela rivalis*). Additionally, there are records of lizards in Wellington City, and the Wellington Harbour is considered an important feeding ground for a large number of seabirds in winter (McEwen, 1987).

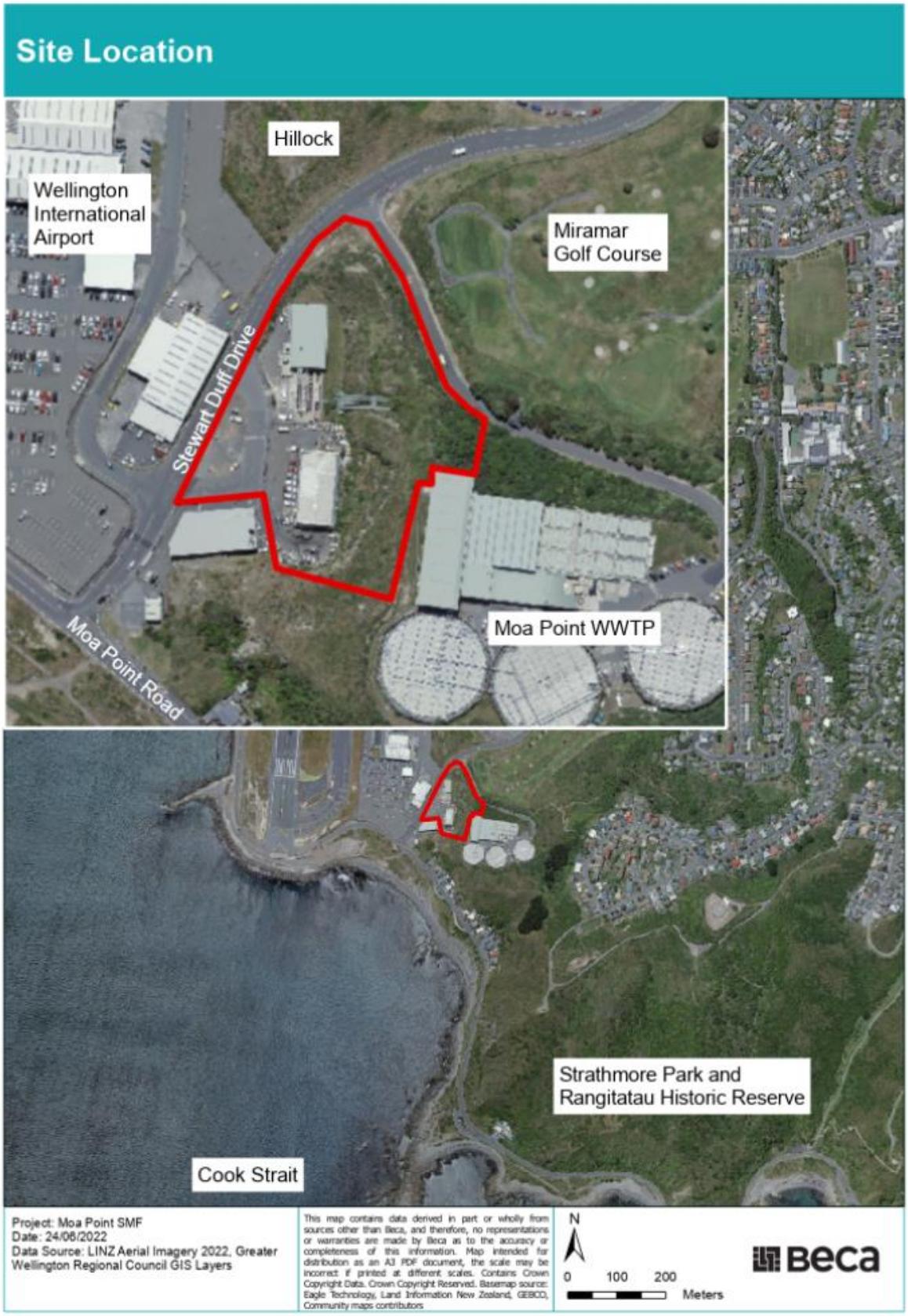

Figure 1. Moa Point SMF site location and its surroundings. The indicative work extents of the Site are outlined in red, and remnants of kohekohe, tawa forest are in hashed pink.

2 Methodology

2.1 Desktop Review

A desk-based study was undertaken using ecological information from the following sources:

- Preliminary Ecological Assessment prepared by Beca (Beca Ltd, 2021).
- Lizards and threatened plants assessment prepared by Wildlands (Wildlands, 2022).
- Wellington International Airport Coastal Bird Survey by the National Institute of Water and Atmospheric Research (NIWA) (Thompson, 2021).
- Wellington Penguin Detection Report by AJ Wildlife Detection Dogs (Judkins, 2021).
- Greater Wellington Regional Council geospatial layers including potential and current ecosystem extent.
- Department of Conservation (DOC) database, including ecological districts; herpetofauna records; and vegetation records.
- iNaturalist records for threatened species and herpetofauna.
- NZ Bird Atlas and eBird fauna records.
- Google Earth and Land Information New Zealand (LINZ) aerial imagery.
- Other publicly accessible reports or information.

2.2 Field Investigation

A site visit was undertaken by Beca on the 26 October 2021 as part of the preliminary ecological assessment to provide a high-level indication of baseline ecological condition (Beca Ltd, 2021). Subsequently, site visits were also undertaken by Wildlands on 3 March 2022, and 7 – 10 March 2022, to survey for lizards and threatened plants (Wildlands, 2022).

2.3 Assessment Methodology

A desktop assessment of ecological effects was undertaken in accordance with Environment Institute of Australia and New Zealand (EIANZ)'s Ecological Impact Assessment (EcIA) guidelines for use in New Zealand: terrestrial and freshwater ecosystems (Roper-Lindsay et al., 2018).

The EIANZ guidelines set out a methodology to assign ecological value to species and ecosystems based on four assessment criteria which are consistent with significance assessment criteria set out in the *Proposed National Policy Statement for Indigenous Biodiversity (2019) Appendix 1: Criteria for identifying significant indigenous vegetation and significant habitat of indigenous fauna.* These are reproduced in this report as Appendix B: Table B1 -Table B3.

- Attributes are considered when considering ecological value or importance. They relate to matters such as representativeness, the rarity and distinctiveness, diversity and patterns, and the broader ecological context.
- Determining Factors for valuing terrestrial species; terrestrial species span a continuum of very high to negligible, depending on aspects such as whether species are native or exotic, have threat status, and their abundance and commonality at the site impacted
- Ecological Values are scored based on an expert judgement, qualitative and quantitative data collected.

Once ecological values have been identified and valued, the severity of potential impacts is assessed by determining the change from baseline ecological values likely to occur as a result of the proposal/project along the lines of a magnitude of effect as determined by the criteria set out in Appendix B: Table B4.

Finally, once these two factors have been determined (the ecological value and the magnitude of effect), an overall level of effect on each of the identified ecological values is assessed (Appendix B: Table B5).

3 Ecological Values

3.1 Terrestrial Vegetation and Threatened Plants

There is moderate vegetation coverage on the steep, rock embankments within the Site extent. According to Wildlands (2022), the vegetation consists of: gorse-pōhuehue-mingimingi shrubland; mown exotic grassland; gorse/kikuyu-pōhuehue grassland; Buffalo grass grassland; and karo/wharariki-taupata-cape ivy shrubland types. While the species composition of the shrublands are predominantly native and early successional, the grasslands are mainly made up of exotic species (see Wildlands [2022], for full species list). Some weeds are also present, such as gorse (*Ulex europaeus*) and agapanthus (*Agapanthus praecox*). Additionally, a strip of planted exotic and native trees also line the verge between the Site and Stewart Duff Drive, and between the Site and the road leading to the WWTP.

Notably, pōhutukawa (*Metrosideros excelsa*) is present within the Site, and despite its widespread distribution, is considered to be Threatened – Nationally Vulnerable due to its susceptibility to myrtle rust (*Austropuccinia psidii*) (De Lange et al., 2018). However, little weight has been placed on its nationally threatened status as it is widespread in the local environment, is planted extensively, and to date the population has not been greatly affected by myrtle rust (see Wildlands [2022] for more details on the assessment of threatened plants).

The broader terrestrial vegetation is assessed as having **Low** ecological value, based on low ratings for representativeness, diversity and pattern, and for rarity / distinctiveness, and a moderate rating for ecological context (see Table 1).

Table 1. Scoring and justification for assigned ecological value to the terrestrial vegetation at the Site.

Matters	Rating	Justification
Representativeness	Low	Species composition includes mixed exotic and native species. Species assemblage is not typical of the ecological region, with expected species and tiers missing (as indicated by comparisons with the kohekohe, tawa forest in the wider surroundings) likely due to the historic land modification. Minor amount of weeds present.
Rarity / distinctiveness	Low	Indigenous species present. Pōhutukawa has a threat status of Threatened – Nationally Vulnerable but is locally and nationally common and recognised as vulnerable to the emerging myrtle rust threat rather than exhibiting population decline nationally. Most of the specimens located at the Site are likely planted and not a naturally occurring species of the original ecosystem type of the area. The vegetation provides moderate quality habitat for non-threatened herpetofauna species.
Diversity and pattern	Low	Vegetation diversity and pattern have been influenced by historic land modification and current land use. The Site comprises largely of regenerating mixed/native shrublands and grassland and is relatively homogenous within the Site.
Ecological context	Moderate	Historic land modification and current land use conditions limit the development of the vegetation and its provision of ecosystem services. Contributes to the wider ecological network of vegetation by the coast. Habitat provision for indigenous herpetofauna throughout the entire embankment (see Section 3.3). Limited habitat provision for indigenous avifauna along the bottom of the embankment (see Section 3.3).

3.2 Herpetofauna

Two indigenous herpetofauna species were observed at the Site by Wildlands during their surveys from 7 – 10th March 2022, the northern grass skink (*Oligosoma polychroma*; Not Threatened) and the Raukawa gecko (*Woodworthia maculata;* Not Threatened). Based on herpetofauna records within 10 km of the Site, from the last 30 years (DOC, 2021; iNaturalist, 2020), it is also possible for other species, including Threatened or At Risk species, to be present at the Site, despite being undetected during the survey. The ecological value of herpetofauna has been assessed as **Moderate** and further detailed in Wildlands (2022).

3.3 Avifauna

No avifauna was observed during the site visits by Beca or Wildlands, and there are no available records within the Site extent (eBird, 2020). However, a high number of coastal birds have been observed in proximity to the Site, along the Wellington coastline, based on surveys undertaken in 2021 (Judkins, 2021; Thompson, 2021; see Table 2).

Table 2. List of species recorded during avifauna surveys undertaken in 2021 by Judkins (2021) and Thompson (2021). Conservation status assigned according to Robertson et al. (2021).

Common name	Scientific Name	Conservation Status
Reef heron	*Egretta sacra*	Threatened - Nationally Endangered
Banded dotterel	*Charadrius bicinctus*	Threatened – Nationally Vulnerable
Caspian tern	*Hydroprogne caspia*	Threatened – Nationally Vulnerable
Northern blue penguin	*Eudyptula minor minor*	At Risk - Declining
White-flippered blue penguin	*Eudyptula minor albosignata*	At Risk - Declining
Red-billed gull	*Chroicocephalus novaehollandiae*	At Risk - Declining
White-fronted tern	*Sterna striata*	At Risk - Declining
Pied shag	*Phalacrocorax varius*	At Risk - Recovering
Variable oystercatcher	*Haematopus unicolor*	At Risk - Recovering
Little shag	*Phalacrocorax melanoleucos brevirostris*	At Risk - Relict
Black shag	*Phalacrocorax carbo*	At Risk - Naturally Uncommon
Little black shag	*Phalacrocorax sulcirostris*	At Risk - Naturally Uncommon
Australasian gannet	*Morus serrator*	Not Threatened
Black-backed gull	*Larus dominicanus*	Not Threatened
Spotted shag	*Phalacrocorax punctatus*	Not Threatened
White-faced heron	*Egretta novaehollandiae*	Not Threatened

All of the species present in the surrounding area are coastal wader and other shorebird species that prefer open coastal sites in proximity to mud and sandflats as well as open grassy areas close to feeding areas. The Site is mostly comprised of concrete ground, building structures, and an embankment covered by shrubs and grass, as such, suitable shorebird habitat is limited. While some species, such as shags (*Phalacrocorax* spp.) and herons (*Egretta* spp.), nest and roost on trees, the trees present within the Site are too small to act as suitable nesting and roosting habitat.

Rocky outcrops at the toe of the embankment could potentially provide some low quality, nesting habitat for the Northern and white-flippered blue penguins (*Eudyptula minor minor* and *albosignata*), due to the crevices created by the rocks and vegetation. However, there is a lack of habitat connectivity and safe pathways between locations of the recorded adult penguins / nests along the coastline and the Site, due to the airport runway and parking, and road corridor. Moreover, given the large amount of the high-quality nesting and

roosting habitat that exists along the coastline, there is little incentive for the penguins to risk injury and mortality to search for nesting habitat inland, particularly, to establish a nest within the Site which is of poorer habitat quality compared to the coastline.

Overall, the majority of coastal birds recorded nearby are unlikely to be present at the Site due to a lack of suitable habitat. Although some penguin habitat is available within the Site; there is a strong lack of habitat connectivity to the wider penguin habitat. However, given the At Risk threat status of Northern and white-flippered blue penguins, their presence at the Site has been assessed as possible on a conservative basis. Therefore, the ecological value of avifauna is assessed as **High**.

4 Assessment of Ecological Effects

4.1 Key Ecological Effects

Potential adverse ecological effects due to the proposed SMF development include the following:

- Permanent loss of terrestrial vegetation.
- Permanent loss of terrestrial habitat and disturbance of avifauna and herpetofauna.
- Injury or mortality of avifauna and herpetofauna.

The assessment of ecological effects and proposed management for the injury or mortality of herpetofauna has been detailed by Wildlands (2022), and will be summarised in this this report.

4.2 Magnitude of Effects

4.2.1 Loss of Terrestrial Vegetation

The slope stabilisation and ground pipe installation will require vegetation clearance within the Site, which will result in the permanent loss of approximately 0.33 ha of vegetation.

Much of the affected vegetation will be exotic grasslands and native shrublands, and will therefore lead to a small loss of botanical value associated with nationally and locally common indigenous species. It will also reduce the overall provision of ecosystem services by the vegetation network along the Wellington Coast; however, any reductions are expected to be proportionally small, given the large amount of vegetation in the immediate surroundings and wider environment.

Furthermore, there will be a small increase in edge effects acting on the remaining vegetation and increased vulnerability to the introduction of pest plants; however, the ecological function and integrity of the remaining vegetation will stay intact

Overall, the magnitude of effect is assessed as **Low**.

4.2.2 Risk of Herpetofauna Injury/ Mortality and Loss of Habitat

Habitat for indigenous skinks and arboreal geckos will be permanently lost due to the clearance of vegetation and loose rocks from the embankment during slope stabilisation, and the vegetation clearance during ground pipe installation. As such, habitat loss is estimated to be similar to the vegetation clearance area at approximately 0.33 ha. However, the proportion of habitat loss is considered small given the wider availability of skink and gecko habitat provided by the adjacent park and reserve. Therefore, the magnitude of effect is assessed as **Low** for herpetofauna habitat.

Potential injury / mortality of herpetofauna can arise from the clearance of potential lizard habitat through the earthworks and works for slope stabilisation and ground pipe installation. This will produce a **Moderate** magnitude of effect on the known population present on site, as the northern grass skink and Raukawa gecko are both very abundant and widespread throughout the lower North Island and upper South Island, and losses would represent only <1% of the population (Wildlands, 2022).

4.2.3 Risk of Penguin Injury/ Mortality and Loss of Nesting Habitat

It is unlikely that Northern and white-flippered blue penguins will inhabit the Site and potential adverse effects are assessed as a precaution due to their threat status and suitable habitat features at the Site. Likely presence, limited accessibility to the Site, availability of preferable habitat, as well as scale of works were considered in this assessment.

Potential penguin habitat is limited to the area along the bottom of the embankment, as such, habitat loss is estimated to be approximately >0.03 ha and of low quality due to the surrounding land use. However, the

proportion of habitat loss is small given the wider availability of high-quality penguin nesting and roosting habitat across the coastline. Therefore, the magnitude of effect is assessed as **Negligible**.

Furthermore, most native fauna species are protected under the Wildlife Act 1953 and require effects management to avoid injury, killing or disturbance effects.

Earthworks and vegetation clearance have the potential to impact nesting penguins and their eggs or chicks. The Northern and white-flippered blue penguin populations are generally restricted to offshore islands and are in decline in areas without targeted conservation actions. Additionally, it is estimated that most penguin sites have less than 100 breeding individuals (BirdLife International, 2022), as is the case for the Wellington Coastline based on survey results from Judkins (2021). The potential for presence of penguins at the Site is **Low**, due to limited accessibility, but cannot be ruled out without survey as penguins are known to travel inland to find suitable, safe nesting habitat. As a precautionary approach, a pre-works nest survey is recommended and discussed further in Section 4.4.

4.3 Overall Level of Effects

The overall level of effects acting on the ecological values at the Site have been assessed using **Error! Reference source not found.** from Appendix A and are outlined below in Table 3.

Table 3. A summary of the overall ecological effects (unmitigated).

Potential Ecological Effect	Ecological Component	Ecological Value	Magnitude of Effect	Overall Level of Effect (unmitigated)
Permanent loss of terrestrial vegetation	Terrestrial Vegetation	Moderate	Low	**Low**
	Threatened Plants	N/A (Wildlands, 2022)	N/A (Wildlands, 2022)	**N/A** (Wildlands, 2022)
Permanent loss of fauna habitat	Herpetofauna	Moderate (Wildlands, 2022)	Low	**Low**
	Avifauna	High	Negligible	**Very Low**
Injury or mortality of fauna	Herpetofauna	Moderate (Wildlands, 2022)	Moderate (Wildlands, 2022)	**Moderate** (Wildlands, 2022)
	Avifauna	High	Low	**Low**

4.4 Proposed Effect Management

4.4.1 Lizard Management Plan

As a moderate level of adverse ecological effect is anticipated for herpetofauna, management is required to reduce the effect to low levels. The management of lizards will be guided by a Lizard Management Plan (LMP).

The LMP will be prepared and implemented by an appropriately qualified and experienced herpetologist. This will include lizard management before and during works for slope stabilisation and ground pipe installation, and any encountered native lizards will be relocated to a suitable alternation location. See Wildlands (2022) for further details on the LMP.

The implementation of activities in the LMP is likely to lead to a ‘Low’ or ‘Very Low’ level of effects for lizards (Wildlands, 2022).

4.4.2 Avoidance of Avifauna Breeding Season and Nest Survey

To avoid injury / mortality to nesting Northern and white-flippered blue penguins, and their eggs or chicks during works, the clearance of vegetation and loose rock along the bottom of the embankment should ideally be avoided during peak breeding season. For Northern and white-flippered blue penguins, this is between July to February (inclusive) (New Zealand Birds Online, 2013).

If works cannot be avoided within the breeding season, the Site, particularly, the crevices created by the vegetation and rocks, must be inspected for active nests by a qualified specialist one week prior to the works. Given the low likelihood of Northern and white-flippered blue penguins to be present within the Site, it is expected that an expert visual survey for tracks and signs will be sufficient. However, a specialised dog survey utilising detector dogs can be undertaken together with the visual survey at the request of the Council.

If any active nests of Northern and white-flippered blue penguins are found, the area cannot be cleared and must be clearly marked, and 100 m buffer cordoned off until the nesting birds have fledged, or the nest has been naturally abandoned.

5 Conclusion

The proposed works to develop the SMF at the Site have the potential to impact the terrestrial vegetation, and indigenous herpetofauna and avifauna inhabiting the Site. These impacts include the following:

- Permanent loss of the broader terrestrial vegetation.
- Permanent loss of terrestrial habitat and disturbance of avifauna and herpetofauna.
- Injury or mortality of avifauna and herpetofauna.

The ecological effects associated with the permanent loss of the broader terrestrial vegetation, herpetofauna habitat, avifauna habitat, and injury or mortality of avifauna are expected to be very low to low. However, there is a moderate level of effect associated with the injury or mortality of herpetofauna.

Therefore, it is recommended to prepare and implement a lizard management plan to reduce effects on herpetofauna to very low or low levels. The assessment of both the ecological effects and the proposed management for the injury or mortality of herpetofauna has been detailed by Wildlands (2022), and is summarised in this report.

Additional management measures have been proposed to further reduce potential injury or mortality to Northern and white-flippered blue penguins during the clearance of vegetation and loose rocks from the embankment. This includes avoiding vegetation clearance during penguin breeding and nesting season and undertaking a survey (potentially with detector dogs) for adults and active nests prior to works.

6 References

Beca Ltd. (2021). *Moa Point Sludge Minimisation Facility – Ecological Preliminary Assessment Memorandum*.

BirdLife International. (2022). *Species factsheet: Little Penguin (Eudyptula minor)*. http://www.birdlife.org

Dawson, J., & Lucas, R. (2012). *Field guide to New Zealand's native trees* (2nd ed.). Craig Potton.

De Lange, P. J., Rolfe, J. R., Barkla, J. W., Courtney, S. P., Champion, P. D., Perrie, L. R., Beadel, S. M., Ford, K. A., Breitwieser, I., Schönberger, I., Hindmarsh-Walls, R., Heenan, P. B., & Ladley, K. (2018). Conservation status of New Zealand indigenous vascular plants. In *New Zealand Classification Series 22*. https://www.doc.govt.nz/documents/science-and-technical/nztcs22entire.pdf

DOC. (2021). *Bioweb Herpetofauna Database*. Department of Conservation.

eBird. (2020). *eBird Basic Dataset. Version: EBD_relNov-2020*. https://ebird.org/home

Hitchmough, R. A., Barr, B., Knox, C., Lettink, M., Monks, J. M., Patterson, G. B., Reardon, J. T., Winkel, D. van, Rolfe, J., & Michel, P. (2021). Conservation status of New Zealand reptiles. In *New Zealand Threat Classification Series 35*. Department of Conservation. https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs35entire.pdf

iNaturalist. (2020). *iNaturalist Herpetofauna*.

Judkins, A. (2021). *Wellington Penguin Detection Report*.

McEwen, M. (1987). Ecological Regions and Districts of New Zealand. In *New Zealand Biological Resources Centre*. https://www.doc.govt.nz/documents/science-and-technical/ecoregions1.pdf

New Zealand Birds Online. (2013). *New Zealand Birds Online: The digital encyclopedia of New Zealand Birds*. https://www.nzbirdsonline.org.nz/

Robertson, H. A., Baird, K. A., Elliott, G. P., Hitchmough, R. A., McArthur, N. J., Makan, T., Miskelly, C. M., O'Donnell, C. J., Sagar, P. M., Scofield, R. P., Taylor, G. A., & Michel, P. (2021). Conservation status of New Zealand birds. In *New Zealand Threat Classification Series 36*. Department of Conservation.

Singers, N. J. D., Crisp, P., & Spearpoint, O. (2018). *Forest ecosystems of the Wellington Region*. https://www.gw.govt.nz/assets/Our-Environment/Environmental-monitoring/Environmental-Reporting/Forest-ecosytems-of-the-Wellington-region-reduced.pdf

Singers, N. J. D., & Rogers, G. M. (2014). *A classification of New Zealand's terrestrial ecosystems*. www.doc.govt.nz

Thompson, D. (2021). Wellington International Airport Coastal Bird Survey. In *NIWA CLIENT REPORT No: 2021355WN*. NIWA.

Wildlands. (2022). *Lizard and Threatened Plant Surveys at a Proposed Sludge Minimisation Facility at Moa Point, Wellington*. Wildland Consultants contract report 6177. Prepared for Beca Limited. 26 p.

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Appendix A – Preliminary Ecological Assessment

To:	Jennifer Beardsall	**Date:**	26 July 2022
From:	Sandy Huang	**Our Ref:**	3258521-1535441118-94
Copy:	Niger Auger		
Subject:	Moa Point Sludge Minimisation Facility – Ecological Preliminary Assessment		

1 Background

1.1 Purpose and Scope

Wellington City Council (WCC) is seeking resource consents for the development of a new sludge minimisation facility (SMF) at Moa Point. To support consents, Beca Limited (Beca) has been engaged to prepare a preliminary ecological investigation of the Site and determine potential ecological features and constraints.

The scope of this memorandum includes:

- A desk-based review of publicly accessible reports or information.
- A site visit to the location of the proposed works on the 26th of October 2021.
- An assessment of the ecological values and potential constraints at the Site.

1.2 Proposed Activity

1.2.1 New Moa Point SMF

Currently, sewage waste in Wellington City is transferred to either Moa Point Wastewater Treatment Plant (WWTP) or the Karori Western WWTP. Following a range of treatments at Moa Point WWTP, any remaining solid sewage (sludge) from the sewage waste is mixed with solid waste at the Southern Landfill. However, it is expected that within the next 2 – 3 years, there will be insufficient solid waste being received at the Southern Landfill to adequately mix with the sludge in accordance with the resource consent.

Therefore, a new SMF will be developed adjacent to the existing Moa Point WWTP with the following objectives:

a. To reduce the amount of sludge sent to Southern Landfill by 2026, so that resulting constraints on the landfill's operations and WCC's waste minimisation goals are removed.
b. To enhance the short and long term) resilience of sludge management in Wellington City.

1.2.2 Construction Activities

The removal of existing structures (i.e., buildings and pavement) and construction of the proposed SMF is programmed to commence in May 2022 and is anticipated to be completed by April 2025 (total of 152 weeks).

Steep slopes within the work extents will be actively stabilised by cleaning/scaling loose material and vegetation from the slope; installing rock anchors and mesh on the slope; and reinstating vegetation on the upper part of the cut slope, where possible.

2 Site Description and Ecological Context

The proposed SMF Site (hereafter referred to as the Site) is located in Moa Point, Wellington City. It sits off of Stewart Duff drive, between the existing Moa Point WWTP and the Wellington International airport.

The Site was formerly a rocky peninsula which was quarried from as early as 1938 to the 1950s as part of the construction for the Wellington International Airport. During this time, the Site was cleared of vegetation and earthworked to develop existing buildings and facilities. It is currently managed as an industrial site with steep, grassy embankments.

Historically, the Site was surrounded by kohekohe, tawa forest, which is considered to be regionally threatened: endangered (Singers & Rogers, 2014). However, much of this forest has been cleared, with any remaining remnants that are nearby, in Strathmore Park or Rangitatau Historic Reserve at least 120 m away from the Site. This is consistent with the wider Sounds – Wellington Ecological District, which has undergone extensive modification with a large proportion of land converted to farmland for sheep and cattle, or urbanised, as in the case of Wellington City (McEwen, 1987).

Despite land modification, the Sounds – Wellington Ecological District is known to still contain important plants including Cook Strait endemics (e.g. *Hymenanthera obovate*, *Aciphylla squarrosa* subspecies, *Raoulia* sp.[c.f. *R. hookeri*], *Craspedia uniflora* ssp. *Maritima*), South Island species that just reach the south of the Northland (e.g. *Coriaria sarmentosa*, *Pellaea* sp.), and rare North island species that are more common in the South island (e.g. matagouri, *Carex diandra*, *Hypsela rivalis*). Additionally, there are records of skinks (*Cyclodina ornate* and *Leiolopisma zelandicum*) in Wellington City, and the Wellington Harbour is considered an important feeding ground for a large number of seabirds in winter.

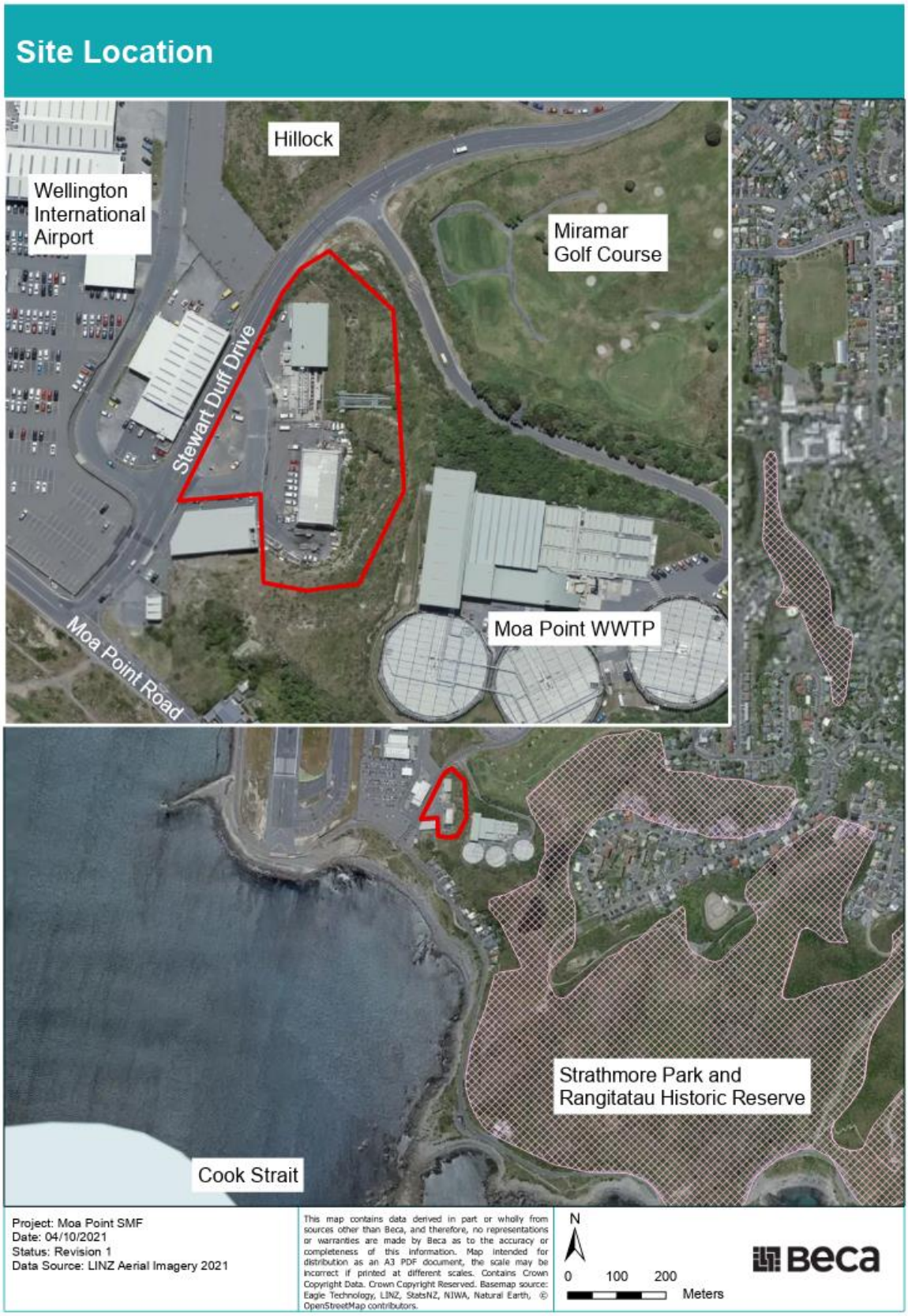

Figure 2. Moa Point SMF site location and its surroundings. The indicative work extents of the Site are outlined in red, and remnants of kohekohe, tawa forest are in hashed pink.

3 Methodology

3.1 Desktop Review

A desk-based study was undertaken using ecological information from the following sources:

- Greater Wellington Regional Council geospatial layers including Potential and Current Ecosystem Extents
- Department of Conservation Database, including Ecological Districts; Herpetofauna records; and Vegetation Records
- iNaturalist records for Threatened Species and Herpetofauna
- NZ Bird Atlas and eBird fauna records
- Google Earth and LINZ aerial imagery
- Other publicly accessible reports or information

3.2 Field Investigation

A site visit was undertaken on the 26th October 2021 to ground truth the findings of the preliminary desktop study, provide a high-level indication of baseline ecological condition, and to assess potential ecological constraints regarding the proposed works.

3.2.1 Herpetofauna Field Assessment

A visual assessment of habitat values for native lizards (skinks and geckos) was carried out during the site visit. The habitat assessment focused on identifying suitable groundcover habitat such as rotting logs, deep leaf litter, rock piles, scrub vegetation and artificial debris that may offer suitable refugia for lizard species.

Potential areas for the above assessment were selected based on desktop review findings, and was further refined and finalised based on validated in-field conditions determined during the site walkover.

4 Ecological Values

4.1 Vegetation

There is moderate vegetation coverage on the steep, rock embankments within the Site extents (Figure 3). Fallen rocks are scattered at the base, and intertwined with metal and other debris. The vegetation predominantly consists of rank grass, and exotic and native herbs and shrubs. This includes fennel (*Foeniculum vulgare*), sweet Elyssum (*Lobularia maritima*), harakeke (*Phormium tenax*), karo (*Pittosporum crassifolium*), and *Coprosoma repens.* Weeds such as gorse (*Ulex europaeus*), yellow bush lupinie (*Lupinus arboreus*), and boneseed (*Chrysanthemoides monilifera*) are also common.

Matagouri (*Discaria toumatou*), a regionally rare plant that has a conservation status of At-Risk: Declining, was recently found on the grassy knoll (known as ‘hillock’) to the north of the Site. Based on the proximity of the hillock where the matagouri plant was discovered and its habitat preferences (i.e. in tussock grasslands, coastal environments, and pasture, where the soil is dry or infertile [Dawson & Lucas, 2012]), it is possible for matagouri to be within the Site. However, no matagouri was found within the Site during the site visit, and it is considered unlikely to be present.

Figure 3. Vegetation cover on the steep embankments within the Site.

4.2 Herpetofauna

Due to the mixture of shrub vegetation, grass, rock debris for hiding, and open areas for basking, the embankments within the Site may provide suitable habitat of moderate quality for native skinks and possibly geckos.

A review of relatively recent herpetofauna databases within the last 30 years (DOC, 2021; iNaturalist, 2020) showed no herpetofauna records within the Site, but multiple records in the wider landscape. A total of 78 records consisting of six different species have been observed within 1 km of the Site extents (Table 4). The closet record was for a New Zealand Common Gecko (*Woodworthia maculata*) which was found approximately 10 m to the north of the Site, in 2013. Moreover, the same species has been found 200 m away in the airport and 400 – 600 m away in Strathmore Park, from 1996 to 2013. Two species of conservation importance have also been recorded, including the barking gecko (*Naultinus punctatus:* At-Risk: Declining) and the northern spotted skinks (*Oligosoma kokowai:* At-Risk: Relict).

Majority of the records are from Strathmore Park or Rangitatau Historic Reserve, near the shoreline. While there are some residential strips and roads, between the locations of these records and the embankments within the Site, it is largely vegetated with adequate habitat continuity. Some species, such as common New Zealand skink (Oligosoma polychroma), are able inhabit urban environments and can potentially traverse these residential strips and roads to reach the Site.

Based on the characteristics of the available habitat and past herpetofauna records, skinks and geckos are likely to be present with the Site, in particular the New Zealand Common Gecko. Other species

Table 4. Herpetofauna records within 1 km of the Site from the last 30 years (DOC, 2021; iNaturalist, 2020). Conservation status assigned using Hitchmough et al. (2015).

Common Name	Scientific Name	Conservation Status	No. of Records	Most Recent Record
Barking Gecko	*Naultinus punctatus*	At-Risk: Declining	1	1996
Northern Spotted Skinks	*Oligosoma kokowai*	At-Risk: Relict	2	2018
New Zealand Common Gecko	*Woodworthia maculata*	Not Threatened	31	2014
Common New Zealand Skink / New Zealand Grass Skink	*Oligosoma polychroma*	Not Threatened	35	2014
Gecko	*Gecko* sp.		3	2013
Skink	*Skink* sp.		6	2013

5 Potential Constraints

The Site has been subject to extensive modification and limited indigenous vegetation remains.

Nevertheless, a review of locality, species records, and habitat characteristics has identified possible ecological constraints to proposed works due to the possible presence of a regionally rare plant species and uncertainty regarding the presence of At Risk herpetofauna.

Recommendations to be considered in relation to these constraints are outlined below.

5.1 Vegetation

The findings from the desktop review suggest that there is likely to At-Risk species, namely matagouri, within the works footprint. It is recommended for a qualified ecological is to undertake a field investigation and confirm the presence / absence of At-Risk plant species prior to lodging a consent.

If At-Risk plant presence is detected during this investigation, then an ecological impact assessment will be required to support a resource consent application. The ecological impact assessment would provide recommendations on the management of adverse effects. This may include relocating individual plants to outside of the footprint or undertaking plant propagation to re-establish the vegetation as part of the post-construction revegetation

5.2 Herpetofauna

Based on the desktop review, the overall likelihood of herpetofauna presence within the Site was assessed to be about as likely as not. Given this uncertainty, it is recommended for a qualified herpetologist to undertake a field investigation and confirm the presence / absence of herpetofauna prior to lodging a consent.

If herpetofauna presence is detected during this investigation, then an ecological impact assessment will be required to support a resource consent application and also to satisfy Wildlife Act requirements. The ecological impact assessment would provide recommendations on the management of adverse effects, including control measures to avoid adverse effects where possible. It would also be recommended that an ecologist provide advice into the design of the SMF to avoid, remedy, and minimise potential adverse effects on herpetofauna.

6 References

Beca Ltd. (2021). *Moa Point Sludge Minimisation Facility – Ecological Preliminary Assessment* Dawson, J., & Lucas, R. (2012). *Field guide to New Zealand's native trees* (2nd ed.). Craig Potton.

DOC. (2021a). *Bioweb Herpetofauna Database.* Department of Conservation.

DOC. (2021b). *Bioweb Plant Database*. Department of Conservation.

Hitchmough, R. A., Barr, B., Lettink, M., Monks, J., Reardon, J., Tocher, M., Van Winkel, D., & Rolfe, J. R. (2015). Conservation status of New Zealand reptiles. In *New Zealand Threat Classification Series 17*. https://www.doc.govt.nz/about-us/science-publications/conservation-publications/nz-threat-classification-system/

iNaturalist. (2020). iNaturalist Herpetofauna.

McEwen, M. (1987). Ecological Regions and Districts of New Zealand. In *New Zealand Biological Resources Centre*. https://www.doc.govt.nz/documents/science-and-technical/ecoregions1.pdf

MPI. (2020). *National Pest Plant Accord-Manual*. https://www.mpi.govt.nz/dmsdocument/3664-National-Pest-Plant-Accord-manual-Reprinted-in-February-2020-minor-amendments-only

Singers, N. J. D., & Rogers, G. M. (2014). *A classification of New Zealand's terrestrial ecosystems*. www.doc.govt.nz

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B

Appendix B – Ecological Impact Assessment Guidelines

Appendix B: Ecological Impact Assessment Guidelines

Assigning Ecological Value

Terrestrial Habitat / Community

The terrestrial habitat features were assessed considering attributes in Table B1. Features of interest were subjectively given a rating on a scale of 'Very Low' to 'High' for each attribute and assigned a value in accordance with the description provided in Table B2.

Table B 1. Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/ habitat/community.

Matters	Attributes to be assessed
Representativeness	Criteria for representative vegetation and aquatic habitats: 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 Criteria for representative species and species assemblages: Species assemblages that are typical of the habitat Indigenous species that occur in most of the guilds expected of the habitat type
Rarity/distinctiveness	Criteria for rare/ distinctive vegetation and habitats: Naturally uncommon, or induced scarcity Amount of habitat or vegetation remaining Distinctive ecological features National priority for protection Criteria for rare/ distinctive species or species assemblages: 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	Level of natural diversity, abundance, and distribution Biodiversity reflecting underlying diversity Biogeographical considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological context	Site history, and local environmental conditions which have influenced the development of habitats and communities The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (form "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

Table B 2. Rating system for assessing ecological value of a freshwater or terrestrial system (Roper-Lindsay et al. 2018).

Value	Description
Negligible	Feature rates Very Low for at least three assessment attributes and Low to Moderate for the remaining attribute(s).
Low	Feature rates Very Low to Low for most assessment attributes and moderate for one. Limited ecological value other than providing habitat for introduced or tolerant indigenous species.
Moderate	Feature rates High for one assessment attribute and Low to Moderate for the remainder, OR the project area rates Moderate for at least two attributes and Very Low to Low for the rest. Likely to be important at the level of the Ecological District.
High	Feature rates High for at least two assessment attributes and Low to Moderate for the remainder, OR the project area rates High for one attribute and Moderate for the rest. Likely to be regionally important.
Very High	Feature rates High for at least three assessment attributes. Likely to be nationally important.

Species

The EIANZ provides a method for assigning value (Table B3) to species for the purposes of assessing actual and potential effects of activities.

Table B 3. Criteria for assigning ecological values to species (Roper-Lindsay et al. 2018).

Ecological Value	Species
Very High	Nationally Threatened species, found in the ZOI 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 (ED) uncommon or distinctive species
Low	Nationallly and locally common indigenous species
Negligible	Exotic species, including pests, species having recreational value

Assigning Magnitude of Impacts

The magnitude of impacts is determined by the scale (temporal and spatial) of potential impacts identified and the degree of ecological change that is expected to occur as a result of the proposed activity (Roper-Lindsay et al. 2018).

Based on the assessor's knowledge and experience, the magnitude of identified impacts on the ecological values within the project area and zone of influence were assessed and rated on a scale of 'Very High' to 'Negligible' based on the description provided the table below:

Table B 4. Summary of the criteria for describing the 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 existing 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 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	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 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

Assessment also considered the temporal scale at which potential impacts were likely to occur:

- Permanent (>25 years).
- Long-term (15-25 years).
- Medium-term (5-15 years).
- Short-term (0-5 years).
- Temporary (during construction)

Assessing the Overall Level of Effects

The overall level of effect on each ecological feature identified within the zone of influence were determined by considering the and the Value of impacted ecological habitat and species, and the Magnitude of impacts identified above (Roper-Lindsay *et al*. 2018).

Results from the assessment of ecological value and the magnitude of identified impacts were used to determine the level or extent of the overall impacts on identified ecological features within the project area and zone of influence using the matrix below.

Table B 5. Matrix combining magnitude and value for determining the overall level of ecological impacts (Roper-Lindsay et al. 2018).

Effect Level		Ecological and/or Conservation 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

Results from the matrix were used to determine the type of responses that may be required to mitigate potential direct and indirect impacts within the project area and within the zone of influence, considering the following guidelines (Roper-Lindsay *et al*. 2018):

- A 'Low' or 'Very Low' level of impact is not normally of concern, though design should take measures to minimise potential effects.
- A 'Moderate' to 'High' level of impact indicates a level of impact that qualifies careful assessment on a case-by-case basis. Such activities could be managed through avoidance (revised design) or appropriate mitigation. Where avoidance is not possible, no net loss of biodiversity values would be appropriate.
- A 'Very High' level of impact is are unlikely to be acceptable on ecological grounds alone and should be avoided. Where avoidance is not possible, a net gain in biodiversity values may be appropriate.