MORPHUM ENVIRONMENTAL LTD

Engineers & Consultants

1043 Linwood Road

Ecological Impact Assessment

Document Status (Draft – Client Issue)

Prepared for The Ministry of Education by Morphum Environmental Ltd

Engineers & Consultants

Document Control

Client Name: The Ministry of Education

Project Name: 1043 Linwood Road

Project Number: P02612

Document: Ecological Impact Assessment

Revision History

Status	Date Issued (dd/mm/yyyy)	Author	Reviewed By	Released By
Draft – Client Issue	21/08/2020	Jason Smith	Mark Lowe	
Final	21/08/2020	Jason Smith	Mark Lowe	Mark Lowe

Reviewed and Released by:

Reviewer: Mark Lowe **Signature:** 

Executive Summary

Morphum Environmental Limited was engaged by the Ministry of Education to prepare an Ecological Impact Assessment to support the lodgement of a Notice of Requirement for the construction and operation of a Primary School and Early Childhood Education Centre at 1043 Linwood Road, Kingseat.

The Kingseat Precinct provides for the expansion of the rural village of Kingseat. Accordingly, The Ministry of Education has forecast the need for a new primary school and early childhood education centre to meet expected population growth.

As with other areas in the Manukau Ecological District, farming activities have cleared much of the site's original vegetation. The dominant land cover types present are associated with the past and current agricultural use of the site. Where present, vegetation is reflective of the agricultural use of the site, the largest extents of vegetation are macrocarpa shelter belts on the periphery of farm paddocks.

The magnitude of these effects has been conservatively assessed as either Low or Negligible using the Environmental Institute of Australia and New Zealand's Ecological Impact Assessment Guidelines (2018). Considering the ecological values potentially present at the site, and the magnitude of impacts, the overall level of effects ranges from Low to Very Low for ecological effects.

Although the site has been heavily modified, it retains some ecological value. Ecological features of note include a number of ephemeral streams, an artificial pond and shelter belt vegetation. Vegetation, where present, contributes to ecosystem services such as habitat provision for native fauna adapted to moving across agricultural landscapes. The paucity of quality habitat values and areas is reflected in the native species of birds, lizards, bats and fish considered likely to utilise the site. Avifauna species present are consistent with those that can comfortably travel distances over open fields between forested patches, or make use of fields, farmland and shelter belt vegetation as habitat. Suitable lizard habitat was limited and, if present, lizard populations are likely limited to copper or plague skinks. The subject site contains no old growth trees with cavities or loose bark that may be utilised as roosts and is not proximate to any waterways that could be utilised as movement corridors by native long-tailed bats. Given the lack of habitat and a lack of connectivity to the downstream environment, the site's ability to support native freshwater fish is likely limited to a low number of eels. Whilst onsite fauna observations were limited to common species, the use of this area by threatened species such as long-tailed bats and long-finned eel, whilst considered unlikely, cannot categorically be ruled out.

It is acknowledged that the construction and operation of a school has the potential to have adverse ecological effects. The redevelopment of the subject site would likely require the demolition and construction activities involving land disturbance and potentially minor vegetation clearance, with associated noise, vibrations and traffic movements. Notwithstanding the actual values identified, vegetation removal may affect the fauna that potentially utilise this area as habitat. There is a low probability that vegetation clearance could result in the direct mortality of individuals, displacement of nesting sites, reduced connectivity between foraging and nesting areas and potentially impacting reproductive success. For all land disturbing activities, there is the potential for sediment to be discharged offsite the receiving environment. This potential effect would be mitigated through the existing requirement (standard E11.6.2(2)) for would require that industry best practice erosion and sediment controls. The redevelopment of the site for educational purposes could increase impervious surface coverage. Unmitigated, increases in impervious surfaces and associated stormwater discharges have the potential to alter hydrology resulting in increased peak flow discharges and potential increased stream erosion and associated effects on water quality, habitat and fauna. The increases in impervious surfaces also has the potential to impact on water quality though the generation and transport of urban contaminants. The existing regional provisions, and supporting best-practice technical guidance from

Auckland Council, that relate to stormwater management would mitigate the potential effects from stormwater discharges from the site.

The redevelopment of the site could also potentially provide for positive environmental effects, through the reduction of agricultural nutrients and contaminants to the receiving environment and the opportunity increase native vegetation cover as part of the associated landscaping.

Land disturbance activities would require regional consent under the provisions of the Auckland Unitary Plan: Operative in Part. The provisions of the Wildlife Act will also apply to the management native fauna. These provisions enable effects to be managed such that the actual level of effect would be Low: noticeable, but that will not cause any significant adverse impacts.

As such it is not considered necessary to recommend that any condition be imposed on the Designation to address any of the identified effects.

Contents

Figures

Tables

1.0 Introduction

1.1 Scope

Morphum Environmental Limited (Morphum) was engaged by the Ministry of Education (The Ministry) to prepare an Ecological Impact Assessment (EcIA) to support the lodgement of a Notice of Requirement for the construction and operation of a Primary School and Early Childhood Education Centre at 1043 Linwood Road, Kingseat.

The new educational facilities are required to meet expected population growth and related school demand projections given the urban zonings that apply to the Kingseat area. Accordingly, The Ministry has forecast the need for a new primary school at Kingseat with a potential long-term master plan roll of 800-900. Depending on the speed of this growth, a new school may be required to open by 2025.

The area defined by hatching on the Proposed Designation Plan in Figure 1 will be designated for *"Educational Purposes – Primary School (Years 0-8) and Early Childhood Education (preschool)"*. The land area to be designated is approximately 4.4 ha.

Morphum understands that an EcIA is required to identify the ecological values of the site, describe the potential impacts that the construction and operation of a school on the site may have on those values and recommend mitigation measures, including possible designation conditions; with particular reference to the provisions Kingseat Precinct (I418) of the Auckland Unitary Plan: Operative in Part (AUP:OP).

Figure1: Designation Plan

It is recommended that this EcIA is reviewed and revised or an addendum prepared, following any changes to the envisioned activities or designs to ensure the recommendations herein remain relevant.

1.2 Site Overview

The subject site is located at 1043 Linwood Road, Kingseat. The underlying title is legally described as Lot 2 DP 417814 (CT identifier 468658) and is approximately 8 ha in total. Approximately 4.44 ha has been acquired for the school, as shown in Figure 1, the balance of the land has been retained by Kingseat Village Limited. A new title is yet to be issued; The Ministry is in the process of extinguishing an existing easement for right to convey water in favour of other land associated with a bore water take. Once this process has been competed a new title will be issued for the school site.

The subject site is currently used for a range of low-intensity rural-residential activities typical of the peri-urban environment. The site is predominantly used as a horse-riding school and horses are kept both within a series of farm buildings and the in the open farm paddocks where a small number of calves are also present. The subject site also features a residential dwelling and a dressage arena.

Although the original natural ecology has been heavily modified or removed through past and current farming activities, the site still contains some ecological value. Ecological features of note include a number of ephemeral streams, an artificial pond and shelter belt vegetation as presented in the Map attached as Appendix 1.

The ephemeral streams are tributaries of an unnamed stream that flows to the Whatapaka Creek to the west. All potential watercourses have been classified in accordance with the criteria of the Auckland Unitary Plan: Operative in Part (AUP:OP) as outlined in the Winter Watercourse Classification Report attached as Appendix 2. Although confirming the transition from ephemeral to intermittent, and intermittent to permanent, was outside the scope of the Winter Watercourse Classification Report; field observations place the unnamed stream as intermittent through the property at 842 Kingseat Road and the transition from ephemeral to intermittent is likely to be within the property at 1060 Linwood Road.

Whatapaka Creek is scheduled in the AUP:OP as SEA-M2-30a. SEA-M2-30a is part of a much larger SEA that applies to the Southern Manukau Harbour that is noted for its shell banks and roosts for coastal wading birds. Within the Whatapaka Creek portion there are areas of healthy mangrove forest.

There are no terrestrial SEAs within the site.

1.3 I418 Kingseat Precinct

The subject site is subject to the Kingseat Precinct (I418) of the AUP:OP. The purpose of the Kingseat Precinct is to provide for the integrated and comprehensively planned expansion of the rural village of Kingseat. The site is partially located with sub-precincts B and C; the Residential Mixed Housing Suburban Zone and Residential - Single House Zones. No specific future school site is identified.

Kingseat Precinct Plan 2 is a development plan that shows indicative future roads generally aligning with the west, south and east boundaries of the site (see Figure 2 below).

The Precinct Plan includes objectives and policies that relate to ecological matters, including Objective 1 and Policies 3, 5 and 11. In brief, these objectives and policies require an integrated stormwater management approach that maintains, protects and/or enhances natural features:

(5) Undertake subdivision and development in a manner that maintains, protects and/or enhances those elements identified on the Kingseat Precinct plans and relevant planning maps that contribute towards protecting and/or enhancing:

(a) the existing amenity and character values of the coastal environment of the Whatapaka Inlet, significant watercourses and riparian margins, significant trees and vegetation;

…

(11) Subdivision and development should avoid, remedy or mitigate any adverse effects of urban development in the Kingseat precinct by:

(c) protecting, maintaining and/or enhancing significant vegetation; protecting, maintaining and /or enhancing all perennial streams requiring riparian margins identified on the Kingseat Precinct plan 2;

(e) protecting, maintaining and/or enhancing coastal ecosystems, character and significant coastal values of the Whatapaka Inlet and Manukau Harbour including the needs of migratory birds. This includes limiting development to low density lots adjoining the coast, maintenance of setbacks and establishment of indigenous vegetation, in a manner that recognises the cultural heritage values of the coastal and stream environment;

(f) maintaining water quality by managing earthworks to avoid siltation and sedimentation of watercourses and adjoining properties; and

…

Figure 2: I418 Plan 2 and Aerial image of the subject site.

2.0 Current Ecological Values

An initial site walkover was undertaken on 6 April 2020, with detailed site characterisation and mapping taking place on 15 July 2020. The site visit was undertaken by a suitably qualified and experienced environmental scientist. During these surveys all vegetation types and potential watercourses within the subject site were surveyed, described and any fauna observations were also recorded.

2.1 Ecological Context

The subject site is within the Manukau Ecological District, which is characterised as containing alluvial flats and terraces which in pre-human times supported stands of kahikatea swamp forest, freshwater wetlands and lowland conifer and podocarp/broadleaved forest (Lindsay *et al.* 2009).

The subject site is recorded as having an Ecosystem Potential Extent of WF7, Pūriri forest (Auckland Council, 2019a). WF7, Pūriri forest, has a Regional IUCN threat status of Critically Endangered (Singers *et al.,* 2017). Much of the Manukau Ecological District, including the subject site, is now highly modified with original ecosystems mostly drained and converted to farmland; only 3% of all indigenous ecosystems remain within the Manukau Ecological District.

Landcare Research Land Cover Database (LCDB) version 5 describes the land cover of the subject site as both "High Producing Exotic Grassland" for the farm paddocks and "Built Up Area - Settlement" for the area around the farm buildings. High producing exotic grasslands are described by The Ministry for the Environment (2010) as exotic grasslands with highly productive vegetation likely to be predominantly used for agricultural grazing and covering 22% of New Zealand's land area. Built up areas are considered as commercial, industrial or residential buildings, including associated infrastructure and amenities. The LCDB description provides a generally accurate description of the subject site.

The surrounding catchment is rural. Impervious surfaces, where present, are mostly associated with farming activities or the road network. The exact location of stormwater discharges from the impervious surfaces on the subject site is unknown, although it is considered likely that discharges are directed to the artificial pond in the site's south-western corner. The artificial pond is understood to have historically been used for the storage and treatment of effluent from the site's former use as a piggery. There are no observable piped inlets to the artificial pond.

Stormwater discharges from the subject site would be a result of the over-topping of the artificial pond. Any discharges would be to the ephemeral stream on the neighbouring property at 1060 Linwood Road. The unnamed streams transition from ephemeral to intermittent is likely to be within 1060 Linwood Road, before flowing to the Whatapaka Creek estuarine environment and the southern Manukau Harbour.

2.2 Existing Vegetation

As with other areas in the Manukau Ecological District, farming activities would have cleared much of the site's original vegetation. The current land cover of the site is summarised in Table 1 and indicative site photos are provided in Figure 3 below.

The dominant land cover types are those associated with the past and current agricultural use of the site, being heavily influence by anthropogenic modifications. The farm paddocks form the dominant land cover type, followed by the farm buildings and then the dressage arena.

Where present, vegetation is reflective of the agricultural use of the site, the largest extents of vegetation are macrocarpa (*Hesperocyparis macrocarpa)* shelter belts on the periphery of farm paddocks. Native trees of tall stature are few and are limited to several individual specimen trees in the garden of the residential building. The lack of any native vegetation community, as well as, the current land use likely prevent any regeneration.

Auckland Council GeoMaps database identifies no notable or otherwise scheduled trees, or SEAs, within the subject site.

Table 1: Land Cover

Land Cover Class	Area (m^2)	Percentage of Site Area	Description
Farm paddocks	35,000	80	This land cover class includes all of the vegetation currently used for pastoral farming, it is comprised largely of pasture grass species used to support the grazing of stock.
Impervious surfaces	4,300	10	This land cover class includes the farm buildings previously used as a piggery and now used as a stable, the residential dwelling and driveway. Impervious surfaces are corrugated roofing iron or compacted gravel.
Dressage arena	2,200	5	This land cover class includes the dressage arena, comprised of saw dust/wood-shavings loam.
Shelter belts	1000	2	This land cover class includes the macrocarpa shelter belts located in several areas throughout the site.
Amenity planting	800	2	This land cover class includes the small gardens around the residential dwelling, driveway planting and the willows (*Salix spp.*), oaks (*Linnaean spp.)* around the artificial pond.
Artificial pond	320	1	This land cover class is the measured surface area of the artificial pond. The pond has largely been over-grown with bank-side macrophyte cover.

There is a significant incursion of pest plants and weeds typical of a rural environment. Pest plants identified during the site visits included arum lilly (*Zantedeschia aethiopica),* bindweed (*Convolvulus spp.),* blackberry (*Rubus fruiticosus agg.),* gorse *(Ulex spp.),* scottish thistle (*Cardus acanthoides)* and tobacco weed / woolly nightshade (*Solanum mauritianum).*

The site contains a sparse vegetation, that is not considered to be of botanical note. The onsite vegetation is considered to be of limited ecological value, under the EIANZ criteria attributes of Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context). Whilst limited, where present vegetation would still contribute to ecosystem services such as habitat provision native fauna adapted to moving across agricultural landscapes.

Figure 3: Overview of the Subject Site (Clockwise from top left: indictive view of the farm paddocks and macrocarpa shelter belt; primary entranceway with agapanthus amenity planting; the dressage arena; the artificial pond)

2.3 Fauna

Given the paucity of potential habitat at the subject site, detailed fauna surveys were considered beyond the scope of the project. Ecological values of the site that relate to fauna have been described based from field observations in conjunction with a review of the available literature and the relevant ecological databases.

2.3.1 Avifauna

The site supports little by way of native or exotic vegetation, with most of the site being given over to agricultural activities. This is reflected in the species of birds recorded from the site, which are typical assemblage of species that can comfortably travel distances over open fields between forested patches, or make use of fields, farmland and shelter belt vegetation in rural settings.

Incidental birdlife was noted during the site visits. Bird species present were common garden species, no threatened or risk species were recorded, refer to Table 2 below. Other species are likely to be present or utilise the area on an intermittent basis depending on seasonal food sources and species-specific behaviours (migration patterns).

Table 2: Bird Species Observed

Common name	Scientific name	Threat Status (Robertson et al. 2017)
Australian magpie	*Gymnorhina tibicen*	Introduced and naturalised
Australasian harrier	*Circus approximans*	Not Threatened
Chaffinch	*Fringilla coelebs*	Introduced and naturalised
Common Myna	*Acridotheres tristis*	Introduced and naturalised
Eurasian Blackbird	*Turdus merula*	Introduced and naturalised
Grey warbler	*Gerygone igata*	Not Threatened
House Sparrow	*Paser domesticus*	Introduced and naturalised
New Zealand Kingfisher	*Todiramphus sanctus vagans*	Not Threatened
North Island Fantail	*Rhipidura fulginosa placabilis*	Not Threatened
Pheasant	*Phasianus colchicus*	Introduced and naturalised
Pukeko	*Porphyrio melanotus melanotus*	Not Threatened
Silvereye	*Zosterops lateralis*	Not Threatened
Skylark	*Alauda arvensis*	Introduced and naturalised
Song thrush	*Turdus philomelos*	Introduced and naturalised
Spur wing plover	*Vanellus miles*	Not Threatened
Song thrush	*Turdus philomelos*	Introduced and naturalised
Starling	*Sturnus vulgaris*	Introduced and naturalised
Tui	*Prosthemadera novaeseelandiae novaeseelandiae*	Not Threatened
Welcome swallow	*Hirundo neoxena neoxena*	Not Threatened

Not recorded but, expected to be present at the site, are the morepork (*Ninox novaeseelandiae*) and shining cuckoo (*Chrysococcyx lucidus*). Natives species expected to be present at different times of the year include kereru (*Hemiphaga novaeseelandiae*) and paradise shelduck (*Tadorna variegata*). None of the native species are classified as Threatened or At Risk.

The citizen science platforms ebird and Inaturalist were searched for more detailed records. No observations were recorded on the subject site. The nearest avifauna observations were for the black-billed gull (*Chroicocephalus bulleri)* and the white-faced heron (*Egretta novaehollandiae*). Both species are considered to be generalists, adapted to a range of habitats, including farm and sport fields in both rural and urban areas. Their presence in the area is most likely to be associated and reflect the sites proximity to the habitat and foraging opportunities for these species in the estuarine environment of the Manukau Harbour further to the north. It is not considered likely that the subject site supports either of these species

on a more than a temporary basis.

2.3.2 Herpetofauna

Lizards were not systematically surveyed across the site. Over the winter months lizards enter a period of reduced activity, coupled with the lack of high-quality lizard habitat across the site, it was considered that there was a low likelihood that any systematic survey would detect any native species. Casual observations and occasional searching of suitable habitat did not detect skinks. Geckos were not specifically searched for but are unlikely to be present given the history of vegetation modification on the site.

Suitable lizard habitat was limited to isolated areas of rank grassland, mixed forest edge (shelter belt) environments as well as piles of farm refuse and vegetation trimmings scattered throughout the site, as indicted by Figure 4, below.

It is considered possible that terrestrial lizards may be present on site, with copper skink (*Cyclodina arnea)* being the most likely. Copper skinks are known to persist in other parts of Auckland in similar habitat. Copper skink are not considered threatened or at risk by the Department of Conservation (Hitchmough *et al.* 2015).

Geckos are unlikely to have persisted due to historic vegetation clearance, farming and land management.

The site's history of habitat modification and distance to any areas of substantial native vegetation make it extremely unlikely that native lizards would recolonise the site naturally.

The exotic plague skink (*Lampropholis delicata*) may be present, given its wide distribution in the Auckland Region.

Figure 4: Suitable Copper Skink Habitat (rank grass, shavings for the dressage arena and piles of discarded wood)

2.3.3 Bats

A detailed bat survey was not undertaken. Given the timing of the site visits, in the cooler months, coupled with the lack of habitat across the site, it was considered that there was a low likelihood that any systematic survey would detect any native species.

Populations of the native long-tailed bat (*Chalinolobus tuberculatus)* are known in the south Auckland area, most notably the Hunua Ranges. A small number of observations have been recorded around Patumahoe area, 6.5 km to the south. Native bats can forage over 50 km in a single night, putting the subject site within the theoretical home range of any Patumahoe population.

Long-tailed bats prefer to roost in larger, older, canopy trees with cavities, epiphytes and loose bark. No such habitat is present on the subject site, no old growth trees with cavities or loose bark that may be utilised as roosts are located on the subject site. Any long-tailed bats present are therefore likely utilising the areas as temporary foraging. Long-tailed bats feed on the wing, utilising waterways and forest-edge as foraging grounds and movement corridors where invertebrate life is likely to be more abundant. As such the site is not considered high-quality foraging habitat.

Short-tailed bats prefer deep-forest habitat and are associated with old growth indigenous forest. The only known population of short-tailed bats known to the Auckland Region is found on Little Barrier Island. As such their presence within the subject site is considered extremely unlikely.

2.3.4 Freshwater Values

As noted above, all potential watercourses have been classified in accordance with the criteria of the AUP:OP in the Winter Watercourse Classification Report attached as Appendix 2.

Only the artificial pond, believed to have been used as a treatment and storage device as part of the site's historic use as a piggery, is considered to provide aquatic habitat beyond periods immediately following heavy rainfall. Given the lack of habitat and a lack of connectivity to the downstream environment, the site's ability to support native freshwater fish is likely limited to a low number of eels (*Anguilla spp.)*. No freshwater fish were observed during field work.

The ephemeral streams onsite are tributaries of an unnamed stream that flows to the Whatapaka Creek. Ephemeral streams do not have permanent flowing water but do provide a range of ecosystem services such as flood and sediment attenuation The ephemeral streams onsite likely support the functioning and ecological values of Whatapaka Creek, SEA-M2-30a, primarily through sediment retention.

The artificial pond and ephemeral streams are considered to be of limited ecological value, under the EIANZ criteria attributes of Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context. Whilst limited, onsite watercourses would still contribute to ecosystem services. There is the potential for the artificial pond to provide a habitat provisioning function for a low number of eels and ephemeral streams would influence the chemical, physical and biological characteristics of downstream waters.

2.3.5 Pests

No pest animals were noted on site. It is considered likely that, at a minimum, rats (*Rattus rattus, Rattus norvegicus & Rattus exulans)* and mice (*Mus musculus*) survive within the area.

2.4 Summary of Ecological Values

The current ecological values of the site have been described based from on-site, in-field observations in conjunction with a review of the available literature and databases. A summary of this information is presented in Table 3 based on the Environment Institute of Australia and New Zealand (EIANZ) 2018 Ecological Impact Assessment guidelines set out in Appendix 3. Whilst onsite fauna observations were limited to common species, the use of this area by threatened species such as long-tailed bats and

native freshwater fish, whilst considered unlikely, cannot categorically be ruled out. Therefore, in preparing an assessment in Table 3, a conservative approach has been taken where it is assumed such species may be found on the subject site.

Table 3: Assessment of Current Ecological Values

Impact	Ecological Value (EIANZ, 2018)	Reasoning
Vegetation	**Low**	Area rates Low or Very Low for majority of assessment matters (Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context). Limited ecological value other than as for habitat for tolerant native species.
Avifauna	**Low**	Species presence limited to nationally and locally common indigenous species. Limited ecological value other than as for habitat for tolerant native species, or those species moving across the landscape.
Herpetofauna	**High**	Actual species presence is likely to be limited to not threatened or pest species. Although without detailed surveys the presence of other species cannot be categorically ruled out.
Bats	**Very High**	Actual species presence is unlikely, although potential intermittent use by long-tailed bats cannot be categorically ruled out; notwithstanding actual habitat and foraging values are low.
Freshwater	**Low**	Area rates Low or Very Low for majority of assessment matters (Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context).
Native Freshwater Fish	**High**	The artificial pond may support a small number of longfin eel which are classified as Threatened At-Risk – Declining.

Notwithstanding the ecological value signed above, the probability of species being present at the subject site is not considered in the EIANZ framework. The site offers no suitable bat roosting habitat and minimal foraging opportunities, such that although Bats have been ascribed a Very High ecological value in Table 3, the actual probability that bats would be found on the subject site is negligible. Habitat and foraging opportunities for herpetofauna are also limited, such that the probability that any threatened species would be found on the subject site is negligible.

3.0 Proposed Activities

This EcIA has been prepared to support the lodgement of a Notice of Requirement for the construction and operation of a school at 1046 Linwood Road, Kingseat. The Ministry of Education's (2016) Standard Methodology for Site Evaluations notes that a site on which the construction and operation of a school has the potential to have adverse effects on the ecological environment will score lower than a site where ecological effects are avoided or are very minor.

No detailed design has been undertaken at this stage, this will be addressed at the outline plan of works stage. A feasibility plan has been prepared by ASC Architects to confirming the feasibility of accommodating the proposed school and ECE on site.

The types of activities considered to likely be required in the construction and operation of a school include:

- Buildings; including classrooms, hall, library, gymnasium, IT units, administration office space, staff workspace, caretaker's facilities, dental clinic, sick bay
- Outdoor play area, sports field, hardcourts, playground structures
- Vehicular, pedestrian and cycle access and egress, parking space for staff, visitors and cycles, onsite student drop off/pick up bays, onsite bus parking
- Landscaping, and
- Infrastructure services including water, sewerage, stormwater, telecommunications and outdoor lighting.

The hours when classes will be held on site are expected to be similar to most other schools, core teaching hours being weekdays between approximately 8:30am - 3:30pm. Some activities, such as community education (night classes), school sporting or cultural events may occur outside of core school hours.

3.1 Construction Activities

The redevelopment of the subject would likely first require the removal of the existing buildings and may necessitate the removal of the remaining vegetation.

Vegetation clearance is not considered to generate adverse environmental effects on vegetation values given the species present and ecological value as assessed in Section 2.2. Exotic species can provide habitat functions, as such vegetation removal may affect the fauna that potentially utilise this area as foraging and habitat. Vegetation clearance could result in the direct mortality of individuals, displacement of nesting sites, reduced connectivity between foraging and nesting areas and potentially impacting reproductive success. The redevelopment and associated landscaping of the site for educational purposes provides the opportunity to increase the native vegetation coverage over the existing situation.

For all land disturbance activities, such as building demolition and construction, there is a risk of uncontrolled sediment discharge to the receiving environment. Sediment is a contaminant as defined in the Resource Management Act (RMA) and has the potential to cause a range of adverse effects in the receiving environment including:

- Smothering of benthic habitat
- Direct mortality of native freshwater fish through asphyxiation from clogged gills
- Changes to water quality, including physio-chemical indicators pH and clarity Reduced amenity and recreational-use values
- Decreased photosynthesis by aquatic plants leading to subsequent decreased levels dissolved oxygen in the stream
- Mobilisation of contaminants (heavy metals) bound to the sediment.

Sediment related effects would not only occur within the ephemeral streams but could accumulate in the wider receiving environment, including Whatapaka Creek.

The demolition and construction activities would involve the use of machinery and traffic that would generate noise and vibrations. Noise and vibrations have the potential to reduce the quality of retained habitat for the duration of works.

There is little published information on the noise and vibration on the species identified as potentially utilising the area as habitat. It is considered that noise and vibration could lead to mobile individuals avoiding the site during construction.

3.2 Operational Activities

3.2.1 Stormwater Management

The redevelopment of the site for educational purposes could likely result in an increase in impervious surfaces. As a positive effect, this is likely to lead to the prevention of further agricultural runoff (nutrients and sediment) from the site. However, an increase in impervious coverage, unmitigated, has the potential to alter hydrology resulting in increased peak flow discharges and adversely impact water quality.

Changes in hydrology can have adverse effect on streams within the catchment, including accelerating river and stream erosion and bank instability, that generate sediment that can accumulate in the receiving environment.

The building material used, and the type of activities undertaken can also generate a range of contaminants that can be mobilised and discharged offsite with the stormwater. Both point source and diffuse discharges can affect freshwater quality and ecosystem health.

Auckland Council provides guidance on applying Water Sensitive Urban Design (WSUD), a stormwater management approach that seeks to promote stormwater management practices that balance land development with the ecosystem services necessary to support it, in Auckland Council Guideline Document 2015/004 *Water Sensitive Design for Stormwater* (GD04). WSUD approaches reduces the potential for adverse effects from point-source stormwater discharges and those associated with a change in land use to occur.

3.2.2 Traffic and Noise

Traffic can create a range of anthropogenic disturbances such as movement, noise and light disturbance. The ongoing operational of the school may generate noise disturbance.

Anthropogenic disturbances may reduce the quality of retained vegetation as habitat for any native species, reducing habitat quality through the determent of nesting sites and foraging, potentially impacting reproductive success. The level of effect of such anthropogenic disturbances will depend on the habitat retained and the landscaping of the site during construction; notwithstanding the existing habitat values of the site and the large extent of similar habitat in the surrounding catchment.

3.3 Summary of Proposed Activities

It is acknowledged that the construction and operation of a school has potential adverse ecological effects. The redevelopment of the subject site would likely require the demolition and construction activities involving land disturbance and potentially minor vegetation clearance and associated noise and vibrations. The operational activities of the school are envisioned to included traffic movements and noise generating activities.

4.0 Ecological Impact Assessment

The current ecological values of the site have been described based on in-field observations in conjunction with a review of the available literature and databases as set out in Section 2 of this report. The likely activities have been described and set out in Section 3. This section utilises the findings of Sections 2 and 3 to provide an assessment of the ecological effects based on the EIANZ guidelines, set out in Appendix 3.

As part of this assessment it is important to highlight to the reader that this EcIA has been prepared to support The Ministry in the Notice of Requirement application of the subject site for the construction and operation of a new school. Should the Ministry of Education be successful, the regional provisions of the AUP will still apply as will the requirements of the Wildlife Act (1953). Further details on these relevant matters have been provided below.

4.1 Relevant Planning Provisions

The regional provisions of the AUP that apply to the likely activities that would be undertaken in the construction and operation of a school are set out in Table 4 below. Should any resource consent be required for any of the activities identified, then Auckland Council would have the ability, through the usual resource consenting process, to place conditions on the consent to mitigate any identified effects.

Table 4: Relevant AUP Provisions

Activity	Relevant Chapter	Specific Activity (outside of overlays)
Land disturbance	E11 Land disturbance - Regional	• Rule E11.4.1 (A4) Greater than 10,000 m^2 up to 50,000 m^2 where land has a slope less than 10 degrees outside the Sediment Control Protection Area as a controlled activity. • Standard E11.6.2(2) requires that best practice erosion and sediment control measures must be implemented for the duration of any land disturbance, regardless of the activity status.
Activities in ephemeral rivers and streams	E3 Lakes, rivers, streams and wetlands	• Rule E3.4.1 (A53) Any activity that is undertaken in, on, over or within the bed of an ephemeral river and streams complying with the standards E3.6.1.1 is a permitted activity.

No specific conditions are being sought on the designation in relation to vegetation clearance. Given the values identified in this report it is not considered that any mitigation would be required for any vegetation clearance. For land disturbance, standard E11.6.2(2) would require that industry best practice erosion and sediment controls (Auckland Council Guideline Document GD2016/005) are in place to mitigate the effects from a potential sediment discharges to the receiving environment.

The relevant stormwater provisions would depend on the stormwater management approach undertaken which is subject to detailed design. The AUP also includes a range of provisions that relate to stormwater management include chapters: E1, E8 and the supporting best-practice technical guidance Auckland Council Guideline Document GD2015/004 and GD2017/001. It is also possible that stormwater discharges from the site could be authorised by way of the Region wide Stormwater Network Discharge Consent held by Auckland Council Healthy Waters.

4.2 The Wildlife Act 1953

The Wildlife Act (1953) absolutely protects all native lizards, bats and birds (unless listed as a in Schedule 5). Consequently, a permit under the Wildlife Act would be require for any (potential) harm to these species.

4.3 Summary of Ecological Impact Assessment

The current ecological values of the areas that would be impacted by the likely activities are summarised and assessed in Table 5 below. Table 5 provides an interpretation of effects, assuming an ecological worst-case scenario where the threatened species is present on site. Magnitude is determined by a combination of scale (temporal and spatial) of the effect and degree of change that will be caused in or to, the ecological component and is assessed here after the mitigation measures specified above have been applied.

Table 5: Criteria for Describing Magnitude of Effect (summarised from EIANZ, 2018)

Impact	Ecological Value (EIANZ, 2018)	Magnitude of Effect and Reasoning	Level of Effect (with mitigation)
Vegetation	Low	Low – minor shift away from baseline condition. Any discernible changes would be subject to Outline Plan of Works requirements. Redevelopment landscaping could potential increase native vegetation present.	**Very Low**
Avifauna	Low	Low – minor shift away from baseline condition given the paucity of habitat onsite and the wide spatial extent of similar habitat (rural landuse) in the immediate surrounds. At a species level, any changes would likely be to common species and be subject to the provisions of the Wildlife Act.	**Very Low**
Herpetofauna	High	Low – minor shift away from baseline condition given the paucity of habitat onsite and the wide spatial extent of similar habitat (rural landuse) in the immediate surrounds. At a species level, any changes would likely be to common species and be subject to the provisions of the Wildlife Act.	**Low**
Bats	Very High	Negligible – given the existing roosting and foraging opportunities it is considered that the magnitude of any impacts on bat populations would be barely distinguishable.	**Low**

Impact	Ecological Value (EIANZ, 2018)	Magnitude of Effect and Reasoning	Level of Effect (with mitigation)
Freshwater	Low	Negligible –the redevelopment of the site will need to comply with WSUD principles and employee best practice erosion and sediment control measures. The hydrological and water quality effects of stormwater discharges are likely to be negligible compared to the rural baseline.	**Very Low**
Native Freshwater Fish	High	Negligible – should the artificial pond be removed as part of the site development the loss of this small and degraded area of habitat is unlikely to have a discernible impact on native species.	**Very Low**

No specific conditions are being sought on the designation in relation to vegetation clearance. . Given the values identified in this report it is not considered that any mitigation would be required for any vegetation clearance. For land disturbance, standard E11.6.2(2) would require that industry best practice erosion and sediment controls (Auckland Council Guideline Document GD2016/005) are in place to mitigate the effects from a potential sediment discharges to the receiving environment. As such it is not considered that condition need to be placed on the designation to address this potential effect.

The level of effect on the site's ecological values from the proposed activities has been assessed as Low – Very Low; potentially noticeable but that will not cause any significant adverse impacts.

6.0 Conclusions and Recommendations

It is acknowledged that the construction and operation of a school has the potential to have adverse ecological effects. The magnitude of these effects has been considered as either Low or Negligible using the EIANZ Ecological Impact Assessment guidelines. The magnitude of effect considers the current ecological values of the site and the degree of effects the likely activities would have. Considering both the ecological values and the magnitude of impacts, the overall level of effect ranges from Low to Very Low.

Farming activities have cleared much of the site's original vegetation, the current land cover present is typical and consistent with the past and current agricultural use of the site. The largest extents of vegetation are farm paddocks and macrocarpa shelter belts on the periphery of farm paddocks.

Although the site has been heavily modified, it retains some ecological value. Ecological features of note include a number of ephemeral streams, an artificial pond and shelter belt vegetation. Vegetation, where present contributes to ecosystem services such as habitat provision for native fauna adapted to moving across agricultural landscapes. The paucity of quality habitat values and areas is reflected in the native species of birds, lizards, bats and fish considered likely to utilise the site. Avifauna species present are consistent with those that can comfortably travel distances over open fields between forested patches, or make use of fields, farmland and shelter belt vegetation as habitat. Suitable lizard habitat was limited and, if present, lizard populations are likely limited to Copper or Plague Skinks. The subject site contains no old growth trees with cavities or loose bark that may be utilised as roosts and is not proximate to any waterways that could be utilised as movement corridors by native long-tailed bats. Given the lack of habitat and a lack of connectivity to the downstream environment, the site's ability to support native freshwater fish is likely limited to a low number of eels. Whilst onsite fauna observations were limited to common species, the use of this area by threatened species such as long-tailed bats and long-finned eel, whilst considered unlikely, cannot categorically be ruled out.

The redevelopment of the subject site would likely require the demolition and construction activities involving land disturbance and potentially minor vegetation clearance and associated noise, vibrations and traffic movements. Given the values associated with the vegetation identified in this report, it is not considered that any vegetation clearance, if proposed, would require any tree-specific mitigation measures. The level of effect for any vegetation would be Very Low. The provisions of the Wildlife Act will also remain in effect to ensure that any loss of habitat for native avifauna, lizards and bats is appropriately managed. For all land disturbance activities, such as building demolition and construction, there is the potential for sediment to be discharged from the site to the receiving environment; this would be mitigated through the existing requirement for industry best practice erosion and sediment controls during any land disturbance. The redevelopment of the site for educational purposes could result in increased in impervious coverage. The potential effects of an increase in stormwater quantity and a potential decrease in stormwater quality discharged from the site would be mitigated through the stormwater management approach developed for the site.

Overall, the effects of the proposed activities that would be enable through the Notice of Requirement and Designation on sites ecological values are considered here as Low - Very Low. As such it is not considered necessary to recommend that any condition be imposed on the Designation to address any of the identified effects.

References

Auckland Council (2015) *Water Sensitive Design for Stormwater*, Guideline Document 2015/004.

Auckland Council (2017) *Stormwater Management Devices in the Auckland Region*, Guideline Document 2017/001 Version 1.

Auckland Council (2019a) Retrieved from geomapspublic.aucklandcouncil.govt.nz/viewer/index.html. Website accessed 04/08/2020.

eBird – The Cornell Lab of Ornithology. Waitaramoa Reserve and Portland Reserve 'Hotspots'. Accessed: March 2019. https://ebird.org/. Website accessed 04/12/2019.

Environment Institute of Australia and New Zealand Inc. (EIANZ) (2018) *Ecological Impact Assessment (EcIA): EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems (2nd Edition).* EIANZ, Melbourne, Australia.

Hitchmough, R. Anderson, P., Barr, B., Monks, J., Lettink, M., Reardon, J., Tocher, M., Whitaker.,T. (2013) Conservation status of New Zealand reptiles, 2012 *New Zealand Threat Classification Series 2*. Department of Conservation.

Landcare Research (2020) Land Cover Database (LCDB) version 5, Mainland New Zealand. Retrieved from LRIS portal: https://lris.scinfo.org.nz/layer/48423-lcdb-v41-land-cover-database-version-4-mainland-new-zealand/. Website accessed 03/08/2020.

Lindsay, H. Wild, C. and Byers, S. (2009) *Auckland Protection Strategy A report to the Nature Heritage Fund Committee*, Nature Heritage Fund.

Ministry for the Environment, (2010), Land: Land Use Environmental Snapshot January 2010. Ministry for the Environment.

Ministry of Education, (2016) Ministry's Standard Methodology for Site Evaluations. Ministry of Education Version 6B.

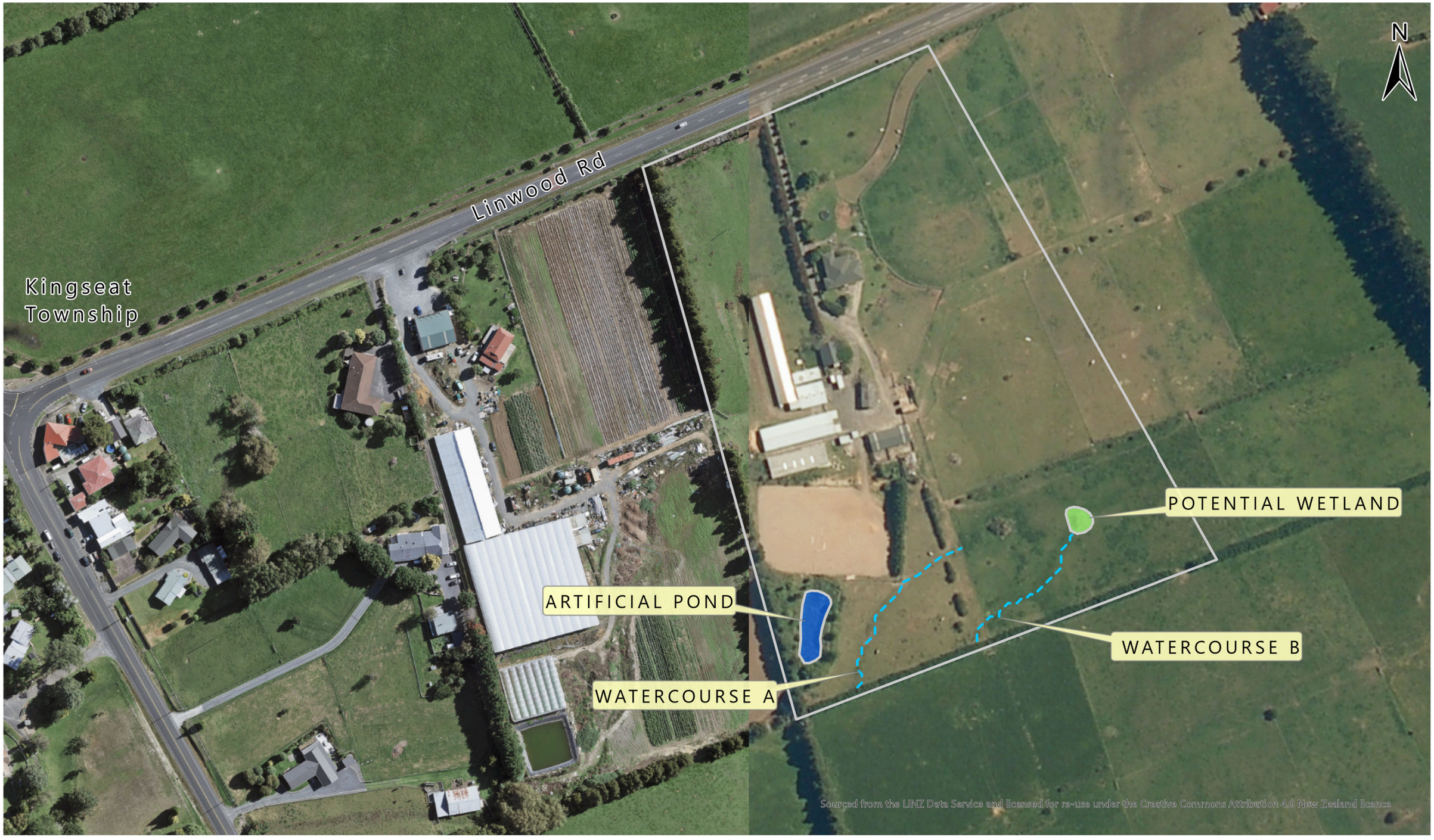
Singers, N. Osborne, B. Lovegroove, T. Jamieson, A. Boow, J. Sawyer, J. Hill, K. Andrews, J. Hill, S. & Webb, C. (2017) *Indigenous terrestrial and wetland ecosystems of Auckland*. Auckland Council.

Robertson, H., Baird, K., Dowding, J., Elliot, G., Hitchmough, R., Miskelly, C., McArthur, N., O'Donnell, C., Sagar, P., Scofield, P and Taylor, G. (2016) Conservation status of New Zealand birds, 2016 *New Zealand Threat Classification Series 19*. Department of Conservation.

Appendix 1 Map

1043 LINWOOD RD WATERCOURSES

MORPHUM ENVIRONMENTAL LTD



Ephemeral Stream
Artificial Pond
Potential Wetland
Site Boundary

Client MINISTRY OF EDUCATION
Project **KARAKA SCHOOL**

0 50 100 m

Project no. P02612
Date 4 Aug 2020

Drawn DB
Approved CU

Z:\Projects\Government\Ministry for Education\P02612 Karaka Sch\GIS\ArcPro\P2616 Karaka School Maps Layout: 1043 Linwood Rd Watercourses

Appendix 2 Winter Watercourse Classification Report

MORPHUM ENVIRONMENTAL LTD

Engineers & Consultants

1043 Linwood Road, Karaka

Winter Watercourse Classification Report

Document Status (Final)

Prepared for Ministry for Education by Morphum Environmental Ltd

09 377 9779 | info@morphum.com | www.morphum.com | Auckland | Waikato | Wellington | Nelson | Melbourne

Engineers & Consultants

Document Control

Client Name: Ministry for Education

Project Name: 1043 Linwood Road, Karaka School

Project Number: P02612

Document: Winter Watercourse Classification Report

Revision History

Status	Date Issued (dd/mm/yyyy)	Author	Reviewed By	Released By
Final	17/07/2020	Jason Smith	Mark Lowe	Mark Lowe

Reviewed and Released by:

Reviewer / Releaser: Mark Lowe **Signature:** 

Contents

Figures

Tables

1. Introduction

Morphum Environmental Ltd (Morphum) was previously engaged by the Ministry of Education (The Ministry) to confirm the location and classification of any watercourses at 1043 Linwood Road, Kingseat (herein the subject site)[1].

Project requirements necessitated that the initial site visit be undertaken outside of the assessment period recommended by Auckland Council (July to October). All on-site watercourses were indicatively classified, although watercourse classification was complicated by the current and historic land use practices at the site and dry conditions. Consequently, watercourses were indicatively classified, with a low level of confidence. A precautionary approach was recommended, and a follow up site visit be undertaken during the recommended classification season to ensure sufficient evidence would be available to enable watercourse classifications to be made with a high level of confidence.

This Winter Watercourse Classification Report provides an assessment of the location and classification of the potential watercourses on the subject site. The intention is for the information contained within the Winter Watercourse Classification Report to be used by The Ministry and it's agents to appropriately incorporate and consider the effects on the watercourses as The Ministry prepares to lodge a Notice of Requirement for the construction and operation of a school at the site.

[1] Morphum. 2020. *Watercourse Classification Report*

2. Methodology

This Winter Watercourse Classification Report builds upon the work of the previously completed *Watercourse Classification Report*.

For the Watercourse Classification Report a desktop survey was first undertaken to determine the location of potential watercourses. A site visit was subsequently undertaken on 6 April 2020. The location of all watercourses was mapped, four watercourses were identified: Watercourse A, Watercourse B, Pond A and Potential Wetland. The four watercourses identified were assessed against the flow classification definitions within the Auckland Unitary Plan: Operative in Part (AUP:OP) to determine the classification. The location of all watercourses is shown on the Map in Appendix 1.

For Watercourse A and B, as well as, Potential Wetland, confidence in the assessment was limited. For Watercourse A and B it was not possible to categorically determine that the watercourses identified had a bed above the water table at all times, given the timing of the classification assessment. It was not possible to categorically determine if the Potential Wetland met the RMA 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*. Pond A was confidently assessed as artificial and as such will not be discussed further in this report.

For this wintertime re-assessment, a site visit was undertaken, on 15 July 2020, by an experienced Environmental Scientist familiar with the relevant watercourse definitions under the AUP:OP. The site visit was therefore undertaken within the assessment period recommended by Auckland Council (July to October). A high degree of confidence on features and other information that enable confidence in the classification was ascertained.

The previous rainfall recorded at the nearest Auckland Council monitoring point, Karaka at Bungard approximately 3.4 km away, over the preceding week is outlined in Table 1, below.

Table 1: Dates and Depth of Rainfall Over the Previous Week (Karaka at Bungard)

Date	Daily Rainfall (mm)
15/07/2020 (pre-site visit)	11.5
14/07/2020	0
13/07/2020	0
12/07/2020	0
11/07/2020	1.5
10/07/2020	0.5
Total Rainfall (mm)	**13.5**

3. Watercourse Classification

The location of all watercourses is shown on the Map in Appendix 1. The relevant definitions from the AUP:OP are presented in Appendix 2.

3.1 Watercourse A and B

Indicative site photographs of Watercourses A and B are presented in Figure 1 and an assessment against the definition of an ephemeral and intermittent streams is provided in Table 2.

The majority of criteria for an intermittent stream could be assessed with sufficient confidence to determine that Watercourses A and B categorically do not meet the definition of permanent or intermittent stream. It can be concluded with confidence that the water table is above the bed at all times, and therefore that both Watercourse A and B are ephemeral.

Watercourse A	Watercourse B
	
	

Figure 1: Indicative Site Photos (Watercourse A and B)

Table 2: Watercourse Classification

Criterion	Watercourse A	Watercourse B
Clear evidence of extended periods of surface water or base flow	No surface flow, no clear evidence of extended periods of surface water or flow. No evidence of scour, thalweg, aquatic macroinvertebrates, obligate aquatic vegetation or algae growth was noted. *Does not meet criteria*	No surface flow, no clear evidence of extended periods of surface water or flow. No evidence of scour, thalweg, aquatic macroinvertebrates, obligate aquatic vegetation or algae growth was noted. *Does not meet criteria*
Natural Pools	No natural pools were evident. There was no evidence of pugging to suggest stream bed, banks or pools had been trampled *Does not meet criteria*	No natural pools were evident. There was no evidence of pugging to suggest stream bed, banks or pools had been trampled *Does not meet criteria*
Well Defined Channel	No obvious stream bed and / or banks. *Does not meet criteria*	No obvious stream bed and / or banks. *Does not meet criteria*
Surface Water >48 hours	No water was observed, even with heavy rainfall immediately preceding the site visit, suggesting an ephemeral stream. *Does not meet criteria*.	No water was observed, even with heavy rainfall immediately preceding the site visit, suggesting an ephemeral stream. *Does not meet criteria*
Rooted Terrestrial Vegetation NOT in Channel	Rooted terrestrial vegetation was not established within the channel. Vegetation in the immediate area was limited to typical pasture species. *Meets criteria*	Rooted terrestrial vegetation was not established within the channel. Vegetation in the immediate area was limited to typical pasture species. *Meets criteria*
Organic Debris in Floodplain	This criterion could not be assessed with confidence due to the lack of vegetation within riparian margins upstream that would contribute organic debris. *Inconclusive*	This criterion could not be assessed with confidence due to the lack of vegetation within riparian margins upstream that would contribute organic debris. *Inconclusive*
Substrate Sorting	This criterion could not be assessed with confidence due to a lack of substrate variability. The darker colouration of the soils suggests organic enrichment which could result from prolong saturation. *Inconclusive*	This criterion could not be assessed with confidence due to a lack of substrate variability. *Inconclusive*
Ephemeral stream - Stream bed above the water table at all times	Watercourse does not categorically meet the definition of permanent or intermittent stream. It can be concluded with confidence that the water table is above the bed at all times.	Watercourse does not categorically meet the definition of permanent or intermittent stream. It can be concluded with confidence that the water table is above the bed at all times.

3.2 Potential Wetland

Wetlands have many distinguishing features, the most notable being the presence of water at or near the surface, vegetation adapted to or tolerant of saturated soils and distinctive hydromorphic soils. Assessing indicators of the presence of each of these features is widely accepted as a valid way to identify wetlands. The Potential Wetland has clearly been degraded through current and historic land uses practices making classification and delineation challenging.

Figure 2: Indictive Site Photographs (Potential Wetland)

Past land-use management, including vegetation clearance, stock grazing and potentially the sowing of pasture species has removed the natural vegetation. The remaining vegetation is comprised of butter cup (*Ranunculus spp.)*, a fast-growing species able to rapidly colonise areas across a range of different hydrological conditions. The ecology of butter cup species ranges from obligate-wetland through to upland species and as such cannot be used, at the level assessed, as a reliable indicator of the hydrologic regime.

Wetland soils display hydromorphic characteristics resulting from prolonged and repeated saturation. Two Hand Augers (HA1 and HA2) were taken from the Potential Wetland. HA1 was taken from the centre of the Potential Wetland and HA 2 slightly further to the north. Both soil profiles showed a uniform layer of top-soil with a sharp transition to the underlying naturally light-coloured Puketoka formation soil at approximately 30 cm, the recommended sampling depth. The water level in HA1 was at approximately at 15 cm below ground-level, and 10 cm at HA2. Above 30 cm, the soils are not gleyed, nor do they display significant mottling which would be expected where the water table seasonally or temporarily fluctuations and saturates the soils.

Terrain or landscape location is an important practical criterion for identifying those parts of the landscape where wetlands are likely to occur, for example, valley bottoms. However, being within a depression is not in and of itself grounds to conclude that the feature is a wetland.

HA1	HA2
	

Figure 3: HA1 and HA2

Table 3: Wetland Classification

Key Parameter	Potential Wetland	Assessment
Clear evidence of permeant or intermittent surface water	No clear evidence of extended periods of surface water. No evidence of aquatic macroinvertebrates.	*Not a wetland*
Vegetation/plants/ecology	No evidence of obligate wetland or aquatic vegetation or algae growth. The areas were dominated by butter cup (*Ranunculus spp*.). The ecology of butter cup species ranges from obligate wetland through to upland species.	*Inconclusive* – further assessment would be required to get the vegetation classification down to the species level. The current species assemblages is likely to reflect the pressures exerted by grazing livestock and other land use practices associated with rural activities.
Soil and redox activity	The soil at the surface was darker than the surrounding area; however intrusive investigations revealed no gley-ing or significant mottling.	*Not a wetland*
Hydrology and landscape location	Wetland A is located within a depression in the landscape.	*Meets the criteria.*

The Potential Wetland has clearly been degraded through current and historic land uses practices making classification and delineation challenging. The Potential Wetland is considered a natural feature,

as the factors leading to modification can be considered natural (i.e. the stock, the hydrology and the soils). Given the lack of surface water, soil and redox activity, it is the authors professional opinion that the Potential Wetland does not meet the RMA definition of a wetland.

4. Summary

This Winter Watercourse Classification Report builds upon the work of the previously completed *Watercourse Classification Report* providing a wintertime assessment of the location and classification of watercourses at 1043 Linwood Road, Kingseat. Four watercourses have been located and classified.

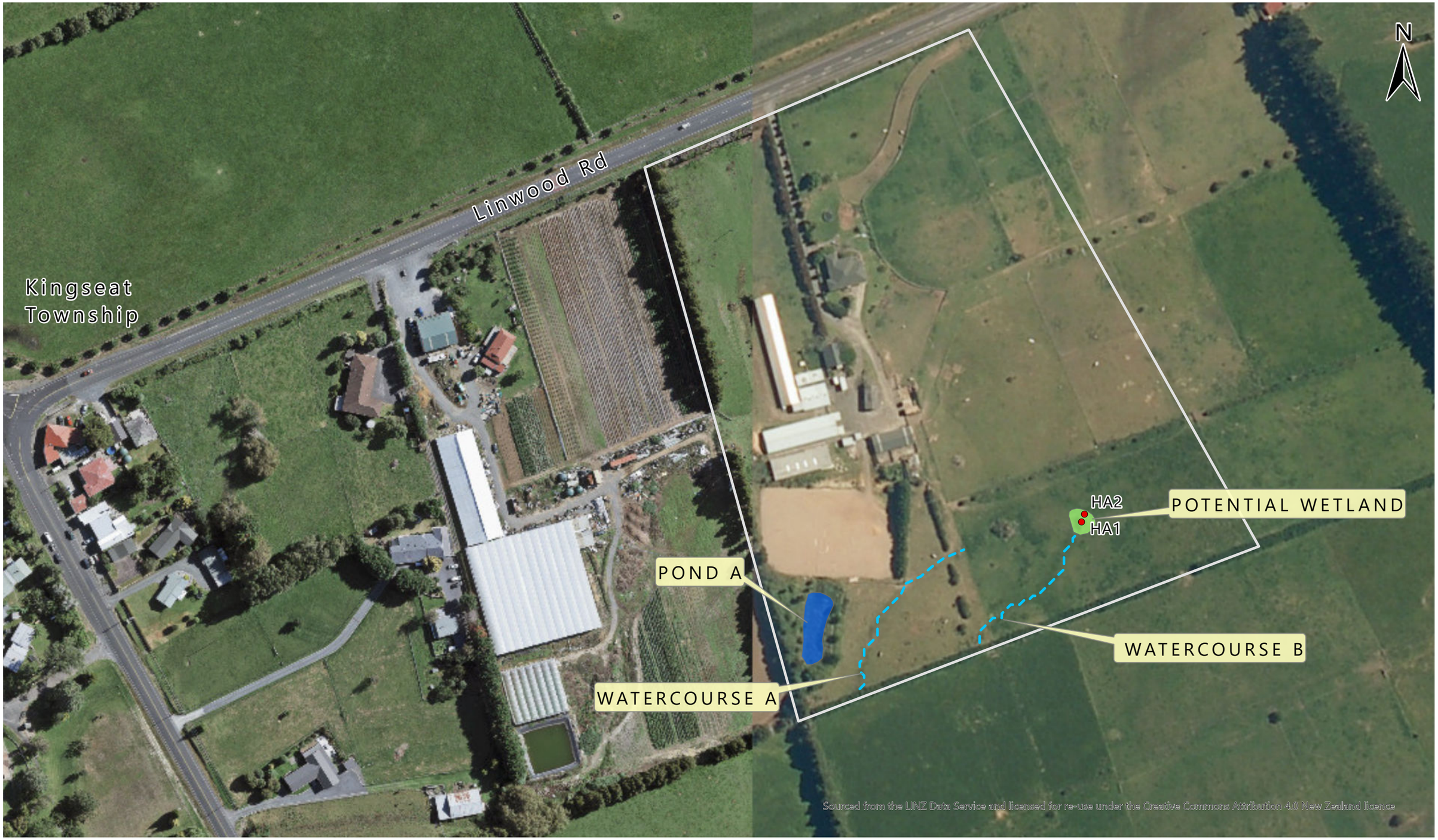
Watercourses A and B were considered as natural, ephemeral streams. Watercourses A and B do not categorically meet the definition of an intermittent stream and have a bed above the water table at all times and therefore, ephemeral.

The Potential Wetland is considered a natural feature, although does not meet the RMA definition of a wetland.

Pond A is considered to be an artificial watercourse. Pond A does not have any natural upstream portions and has no natural contributing catchment and is likely that Pond A was formed to provide a treatment and amenity function.

Appendix 1 Map

1043 LINWOOD RD WATERCOURSES



Z:\Projects\Government\Ministry for Education\P02612 Karaka Sch\GIS\ArcPro\P2616 Karaka School Maps Layout: 1043 Linwood Rd Watercourses

- Ephemeral Stream
- Site Boundary
- Artificial Pond
- Potential Wetland

Client MINISTRY OF EDUCATION
Project **KARAKA SCHOOL**

0 50 100 m

Project no. P02612
Date 17 Jul 2020

Drawn DB
Approved CU

Appendix 2 Definitions (AUP:OP)

River:

A continually or intermittently flowing freshwater body; includes a stream and modified watercourse. Excludes any artificial watercourse (i.e. an irrigation canal, water supply race, canal for the supply of water for electricity power generation, farm drainage canal)

Intermittent stream:

Stream reaches that cease to flow for periods of the year because the bed is periodically above the water table. This category is defined by those stream reaches that do not meet the definition of permanent river or stream and meet at least three of the following criteria:

(a) it has natural pools;

(b) it has a well-defined channel, such that the bed and banks can be distinguished;

(c) it contains surface water more than 48 hours after a rain event which results in stream flow;

(d) rooted terrestrial vegetation is not established across the entire cross-sectional width of the channel;

(e) organic debris resulting from flood can be seen on the floodplain; or

(f) there is evidence of substrate sorting process, including scour and deposition

Ephemeral stream:

Stream reaches with a bed above the water table at all times, with water only flowing during and shortly after rain events. This category is defined as those stream reaches that do not meet the definition of permanent river or stream or intermittent stream.

Artificial watercourse:

Constructed watercourses that contain no natural portions from their confluence with a river or stream to their headwaters. Includes:

- canals that supply water to electricity power generation plants;
- farm drainage canals;
- irrigation canals; and
- water supply races.

Excludes:

- naturally occurring watercourse

Appendix 3 EIANZ Assessment Methodology

Table 6: Assigning Value To Species, Vegetation And Habitats (Summarised From EIANZ, 2018)

Value	Species Values	Vegetation/Habitat Values
Very High	Nationally threatened species found in the (Zone of Influence) ZOI[1] either permanently or seasonally	Area rates High for 3 or four attributes (Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context). Likely to be national important and recognised as such
High	Species listed as At Risk – Declining, found in the ZOI either permanently or seasonally	Area rates High for 2 of the attributes, Moderate and Low for the remainder, or Area rates High for 1 assessment matters, Moderate for the remainder Likely to be regionally important and recognised as such
Moderate	Species listed as any other category of At Risk, found in the ZOI either permanently or seasonally, or Locally (ED) uncommon or distinctive species	Area rates High for 1 assessment matters, Moderate and Low for the remainder, or Area rates Moderate for 2 or more of the attributes, Low or Very Low for the remainder Likely to be important at the level of the Ecological District
Low	Nationally and locally common indigenous species	Area rates Low or Very Low for majority of assessment matters and Moderate for 1 Limited ecological value other than as for habitat for tolerant native species
Negligible	Exotic species, including pest species having recreational value	Area rates Very Low for 3 matters and Moderate, Low or Very Low for remainder

[1] The Zone of Influence (ZOI) refers to all land, water bodies and receiving environments that could be potentially impacted by the project.

Table 7: Criteria for Describing Magnitude of Effect (summarised from EIANZ, 2018)

Magnitude	Description
Very High	Total loss of or major alteration to key features of the baseline condition causing a fundamental change or complete loss of the character, composition, or attributes of the site.
High	Major loss or major alteration to key features of the baseline condition causing a fundamental change of the character, composition, or attributes of the site.
Moderate	Loss or alteration of one or more key features of the baseline condition causing a partial change to the character, composition, or attributes of the site.
Low	Minor shift away from baseline conditions. Change may be discernible but underling character, composition, or attributes of the site will be similar to pre-development.
Negligible	Very slight change from existing baseline condition. Change barely distinguishable.

Table 8: Criteria for Describing Level of Effects (from EIANZ, 2018)

Ecological Value / Magnitude	Very High	High	Moderate	Low	Negligible
Very High	Very High	Very High	High	Moderate	Low
High	Very High	Very High	Moderate	Low	Very Low
Moderate	High	High	Moderate	Very 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