VIRIDIS
Environmental Consultants

Te Ara Tipuna

Draft Ecological Survey and Management Plan Protocol

Prepared for: Te Ara Tipuna Charitable Trust

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Author(s)	
	Angela Tinsel
	Senior Ecologist
Reviewer(s)	
	Mark Delaney
	Director | Lead Ecologist

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Appendix A Areas of Ecological Significance Potentially Affected

1 INTRODUCTION

Te Ara Tipuna Charitable Trust engaged Viridis Limited (Viridis) to prepare a Draft Ecological Management Plan for the proposed Te Ara Tipuna trailway. Te Ara Tipuna will involve establishing and maintaining a 500km path providing for pedestrians, cyclists and horse trekkers around the coast of Te Tairāwhiti, or the East Cape, from Gisborne to Opotiki, with an inland loop around Hikurangi Maunga. The location of the proposed Te Ara Tipuna is shown in Figure 1.

The trail will be aligned where possible with existing recreation tracks, beaches above high tide, farm tracks and unformed legal (paper) roads. In other areas it will be located alongside SH35 and formed local roads. The proposed route crosses public, whenua Maori and private land. The trail is generally proposed as a shared pathway using wayfinding. Depending on local conditions and where there is a functional need, the trail construction may involve the use of boardwalks, simple wooden tracks or gravel tracks. There will also be establishment of toilets and shelters throughout the network to provide amenities for users and potentially the construction of carparks at key points for day or multi-day trips.

Due to the extensive length of the track and the multitude of areas and landscapes it covers, the initial design prepared for the consent application was at a high level. More detailed design is to be undertaken on a staged basis.

The path traverses areas managed by three different councils – the Bay of Plenty Regional Council, Ōpōtiki District Council and Gisborne District Council. Resource consent is required from these councils under the Tairāwhiti Resource Management Plan 2023, the Bay of Plenty Natural Resources Plan 2017, and the Ōpōtiki District Plan 2021. The requirements of national environmental standards (e.g. the NES-F and the NPS – Indigenous Biodiversity (NPS-IB)) and legislation (such as the Wildlife Act 1953 (Wildlife Act)) will also apply to development activities.

Resource consent from the Councils has been applied for under the relevant planning documents and draft consent conditions (v1, February 2024) have been developed. In terms of ecology, these draft conditions require:

> *Pre-construction Ecological Survey:*
>
> *(a) At the start of detailed design for a Stage of Work, an updated ecological survey shall be undertaken by a Suitably Qualified Person. The purpose of the survey is to inform the detailed design of the ecological management plan by:*
>
> *i. Confirming whether the ecological values within the ecological areas identified in the Ecological Assessment provided with the application are still present;*
>
> ii. *Confirming whether the project will or may have a moderate or greater level of ecological effect on ecological species of value, prior to implementation of impact management measures, as determined in accordance with the EIANZ guidelines.*
>
> *If the ecological survey confirms the presence of ecological features of value in accordance with condition X(a)(i) and that effects are likely in accordance with condition X(a)(ii) then an Ecological Management Plan (or Plans) shall be prepared in accordance with Condition X for these areas (Confirmed Biodiversity Areas).*

Ecological Management Plan:

(b) An EMP shall be prepared for any confirmed ecological area (confirmed through Condition X) prior to the Start of Construction for a Stage of Work. The objective of the EMP is to minimise effects of the Project on the ecological features of value of confirmed ecological area as far as practicable.

While detailed Ecological Management Plans (EMPs) will be required for specific areas of the trail, as per the above conditions, it has been requested by the Councils that a draft EMP be submitted as part of the application.

The intention of this draft EMP is to:

- Set out a general methodology and more detailed fauna and habitat specific assessment guidance for pre-construction ecological assessments and surveys for each detailed design and construction stage; and
- Inform stage specific EMPs for each 'confirmed ecological area', including templates for fauna and habitat management plans and guidance on how to minimise, mitigate and offset ecological effects.

This plan has been prepared using a desk top assessment and a review of background information available on the proposal and region and builds on the Ecological Impact Assessment undertaken by TEC and Atkins (2023). Note that no ecological features have been formally identified or assessed in the preparation of this report. The identification, mapping and assessment of these features and potential impacts in relation to the project will be undertaken as part of the ecological surveys and Ecological Management Plan preparation required by resource consent conditions for the detailed design of each stage.

Figure 1. Location of Te Ara Tipuna (map source: LINZ, NZ Topo250)

2 ECOLOGICAL CONTEXT

2.1 Ecological District

Te Ara Tipuna is mainly within the Waiapu, Pukeamaru and Motu ecological districts (EDs). A very small part of the trail is within the Ōpōtiki ED. The key features of these EDs are described by the Department of Conservation (DoC) (1987) and are summarised below.

The eastern section of the trail and much of the Hikurangi Loop is within the Waiapu ED. This ED includes coastal lowlands and hills east of the Raukumara Range with rare indigenous forest remnants. The original hill country forest probably included mainly podocarp-hardwood, with some red beech (*Fuscospora fusca*) and silver beech (*Lophozonia menziesii*) on the highest land and black beech (*Fuscospora solandri*) on lower, mostly broken terrain. There is evidence of former extensive kahikatea (*Dacrycarpus dacrydioides*) dominated podocarp forest on alluvial flats, and semi-coastal and coastal forest on lower country. Much of the district farmed, with increasing areas of exotic forest on severely eroded slopes.

The northern part of the trail is within the Pukemaru ED. This has diverse topography, mainly hills with some steep and wide flat bottomed river values and narrow coastal terraces. The vegetation is a mosaic of pasture, scrub and indigenous forest. The original forest cover was fairly extensive – mostly podocarp-hardwood-beech forest with black and hard beech (*Fuscospora truncata*) at lower altitudes and red beech, silver beech and black beech higher up. Tawa (*Beilschmiedia tawa*) is the main hard wood, mangeao (*Litsea calicaris*), tāwari (*Ixerba brexioides*) and kamahi (*Pterophylla racemosa*) also occur. Pōhutukawa (*Metrosideros excelsa*) and pūriri (*Vitex lucens*) are present in coastal areas and kahikatea dominant forest on alluvial terraces.

The north-western part of the trail and part of the Hikurangi Loop are within the Motu ED. This is steep rugged country, deeply and finely incised with some peaks above the treeline. The highest point is Mount Hikurangi. Vegetation shows an altitudinal sequence of forest types from coastal pōhutukawa and pūriri, through low altitude conifer-tawa-hard beech forest rich in tanekaha (*Phyllocladus trichomanoides*), podocarp-red beech to silver beech forest.

Part of the trail closest to Ōpōtiki is within the Ōpōtiki ED. This ED is characterised by recent coastal alluvial plans and terraces and sandstone headlands. It is now mostly developed for agriculture and horticulture, but was originally forested with small areas of wetland in valley floors. Indigenous vegetation is now restricted to very limited remnants, mainly inland and narrow strips of coastal pōhutukawa forest.

2.2 Summary of Ecological Values, Effects and Mitigation

2.2.1 Background

The proposed trailway will traverse a variety of ecosystem and habitat types and could potentially affect a variety of flora and fauna. Much of the trail is along or adjacent to the coastline. Habitat types potentially affected include dunelands, beaches, coastal cliffs, coastal wetlands, streams, rivers and their riparian margins, forests, and natural inland wetlands.

These environments could be affected during the construction phase through direct habitat loss (e.g. vegetation removal), sediment runoff during construction or exacerbation of erosion, discharges (e.g. from machinery during construction, or from infrastructure such as toilets and huts). They could also be

affected through use in the long term – e.g. through increased edge effects, spread of weeds and pests, litter, faecal waste from people and horses, and trampling.

An ecological impact assessment (EcIA) for Te Ara Tipuna has already been prepared and submitted with the resource consent application (TEC and Atkins, 2023). Findings from that assessment fed into the design of the proposed alignment and as much as possible areas of ecological significance were avoided. Overall, the EcIA found that the potential ecological impacts of the proposed trail way can be adequately mitigated through track alignment, construction methods and mitigation measures to have an overall low ecological effect.

This section summarises the findings of the EcIA on areas of ecological significance, provides information on the types of ecological effects that may occur due to track construction and summarises the types of mitigation proposed to address these effects.

2.2.2 Areas of ecological significance

Areas of ecological significance considered in TEC and Atkins (2023) were those identified in the relevant council plans and others managed outside of council plans (Te Tapuwae O Rongokako Marine Reserve – Pouawa, Ngā Whenua Rāhui Kawenata covenanted areas and QEII National Trust covenanted areas). While the proposed alignment avoids most of those areas, a number were identified as being potentially affected, with a magnitude of ecological effects from moderate to high without mitigation. Mitigation measures were expected to reduce the effects on all the identified sites of ecological significance to low. Figure 2 identifies and shows the location of the sites of ecological significance identified as potentially affected by Te Ara Tipuna and Appendix A provides describes each of the sites and summarises the mitigation measures proposed to address these effects (as per TEC and Atkins, 2023).

2.2.3 Terrestrial ecology

Vegetation clearance and disturbance associated with trail construction has the potential to affect areas of remnant native forest, regenerating forest, rare plant species and the habitats of protected native fauna such as birds, bats and lizards. The value of these areas of vegetation and habitat that the trail passes through and the potential effects will be assessed in the detailed design phase of each stage. Where the potential level of effects is moderate or higher, the first step will be to consider whether the design can be modified to first avoid the effect and then to reduce the level of effect to low or negligible. Where this is not possible, an Environmental Management Plan will be developed, which will outline the mitigation or offset required to address the potential effects. This could include fauna management plans for bats, lizards or birds, implementation of arborist advice, restoration of an area, replanting, offset planting and weed control.

Figure 2. Locations of Sites of Ecological Significance Potentially Affected by Te Ara Tipuna identified by TEC and Atkins, 2023 (map source: LINZ, NZ Topo250)

2.2.4 Freshwater ecology

The trail has been designed to avoid wetlands and leave a 10 m buffer around them. However, the focus of the initial EcIA was on larger areas of ecological significance and it is possible that smaller areas of wetland have not been identified. The detailed design stage will include identification and assessment of other potential wetland areas that may be affected, and where possible the trail will be adjusted to avoid them.

The trail will cross many streams and rivers. Many of these crossings will utilise existing bridges and additional bridges are proposed in other areas and generally works within watercourses will be avoided as much as possible. However it is possible that in other areas, particularly smaller streams, that culverts may be proposed in the detailed design stage and stream beds will be disturbed. This could have potential impacts on freshwater habitats and instream fauna. The ecological surveys undertaken during the detailed design phase will identify these areas and where the potential level of effects is moderate or higher, the first step will be to consider whether the design can be modified to first avoid and then reduce the level of effect to low or negligible. Where this is not possible, an Environmental Management Plan will be developed, which will outline the mitigation required to address the potential effects. In some cases fish and/or Hochstetter's frog relocation may be required.

Freshwater habitats may also be affected by erosion, sediment and other discharges, and it is important that mitigation measures such as keeping works away from waterways where practicable, managing earthworks to avoid sediment runoff and placing features such as toilets in appropriate locations.

2.2.5 Coastal ecology

Most of the trail is located close to the coast and therefore there is potential for coastal habitats such as sand dunes, beaches, foreshore areas, estuaries and coastal wetlands and their associated fauna to be affected. The ecological surveys undertaken during the detailed design will identify these areas and where the potential level of effects is moderate or higher, the first step will be to consider whether the design can be modified to first avoid and then reduce the level of effect to low or negligible. Where this is not possible, an Environmental Management Plan will be developed, which will outline the mitigation required to address the potential effects. Mitigation could include implementing bird and lizard management plans, fencing of sensitive areas to reduce the risk of accidental damage during works, sediment and erosion control, discharge managements or leaving buffer zones.

2.2.6 Other mitigation opportunities

Long term use of the trail has the potential to effect habitats and organisms living nearby. A passport system is proposed for track users to help educate them on appropriate track behaviour and things they can do to minimise their impact on the environment. There is also the opportunity for further education using signs along the track. Community involvement through planting days, community restoration projects, weed and pest control and fauna relocation are other ways to improve ecological values, educate and obtain community by-in. Other methods to improve habitat values could include provision of penguin nesting boxes, creating skink refuges, and leaving rotting logs in vegetated areas for invertebrate habitat.

3 PRE-CONSTRUCTION ECOLOGICAL SURVEY

3.1 Introduction

This section sets out a general methodology for pre-construction ecological surveys for each detailed design stage to identify potential 'confirmed ecological areas' and to determine whether an ecological management plan is required. The ranking framework provided by the Environment Institute of Australia and New Zealand (EIANZ) "Ecological Impact Assessment guidelines (EcIAG) for use in New Zealand: terrestrial and freshwater ecosystems" (Roper-Lindsay et. al. 2018) will be used to assign value to the ecological features and components potentially impacted, and determine the magnitude and level of effect. If an updated version of the EcIAG is published, the updated version should take precedence.

Initially, a desktop review of the proposed stage and route would be undertaken to identify the areas on which to focus on during the ecological survey. Site visits to the proposed route will then be undertaken, focusing on those areas identified in the desk top assessment as potentially having ecological values that may be impacted by the pathway, and surveying them to assess their ecological value and the potential magnitude of effects on those values.

The ecological value of the ecological features that are potentially affected by the proposed path will be assessed in line with Chapter 5 of the EcIAG, on a scale from '*Negligible*' to '*Very High*'. The ranking system considers the matters of representativeness, rarity / distinctiveness, diversity and pattern and ecological context to determine ecological value.

Criteria for describing the magnitude of effects are given in Chapter 6 of the EcIAG. The level of effect can then be determined through combining the value of the ecological feature/attribute with the score or rating for magnitude of effect to create a criterion for describing level of effects (Table 1). A moderate or higher level of effect requires careful assessment and analysis of the individual case. For moderate levels of effects or above prior to mitigation, measures need to be introduced to avoid through design, or appropriate mitigation needs to be addressed (Roper-Lindsay et al. 2018), and preparation of an Ecological Management Plan will be required.

Table 1. Criteria for describing the level of effects (from Roper-Lindsay et al. 2018).

Magnitude of Effect	**Ecological Value**				
	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*	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

Notes: Where text is italicised, it indicates 'significant effects' where mitigation is required.

3.2 Pre-Construction Survey Methodology

Table 2. Methodology for undertaking pre-construction ecological surveys at the detailed design stage (note that further detail on assessing potential effects is provided in Chapters 4 – 10).

Step	Checklist	Decision
1. Desktop assessment to identify potential ecological features affected		

Check whether the route crosses or comes close to any previously identified areas of ecological significance and involves any construction or path widening within or close to these areas	1. Check the Ecological Impact Assessment (TEC and Atkins, 2023)
	2. Check the relevant local planning documents for other identified and scheduled areas
	Bay of Plenty Regional Council and Ōpōtiki District Council area:
	• Bay Explorer GIS database, under "Plans" open:
	  ○ "Regional Coastal Environment Plan – Operative" and turn on the Indigenous Biological Diversity Area (IBDA) A and B layers
	  ○ "Regional Policy Statement" and turn on the Coastal Environment – Natural Character layer
	  ○ "Opotiki District Plan", "Operative 2021" and turn on "Natural Form"
	Gisborne District Council area:
	• Tairawhiti Maps GIS database:
	  ○ Turn on the "Coastal Management", "Freshwater", and "Natural Resources" layers
		If the route does involve works close to or within identified areas of ecological significance undertake site visit to assess potentially affected features

Review aerial imagery and construction plans to identify whether vegetation clearance is required	Check for a variety of vegetation types that may be of ecological value: • Native forest • Native or exotic trees that may be > 15 cm dbh (possible bat habitat) • Scrub • Dense weedy vegetation, rank grass or rough open areas with clumps of vegetation (possible lizard or pipit nesting habitat) • Coastal dune vegetation Note that managed pasture / grass areas are generally of low ecological value and are unlikely to provide significant indigenous fauna habitat.	If vegetation providing ecological values is proposed to be cleared, undertake site visit to assess potentially affected features

Step	Checklist	Decision
Review aerial imagery, contour and stream data alongside construction plans to identify whether any construction or path widening crosses or comes close any streams, rivers or wetlands	• Use contours and aerial imagery to identify potential wetlands (e.g. low lying areas with vegetation that appears to differ from the surrounding area) • Use contours and stream data to identify any stream crossings not already identified, including small streams that may not show up on topography maps • Check whether any culverts or stream bed disturbance is proposed in the plans • Consider proposed locations of toilets in relation to freshwater features • Check for areas of earthworks within 100 m of streams, waterways or wetlands	Where proposed works and path come close to or are within potential wetlands, streams or rivers, undertake site visit to assess potentially affected features. Where earthworks are proposed within 100 m of freshwater features, review erosion and sediment control plans.
Review aerial imagery and plans to identify whether construction or works are required within or close to dune, beach, foreshore or coastal wetland areas	• Are any works or new accessways proposed across sand dunes? • Could works disturb nesting bird habitat? • Are coastal wetlands potentially affected? • Are works proposed within the riparian margins of estuary or river mouths where there may be salt water influence?	If yes, undertake site visit to assess potentially affected features
2. Site assessment of identified potential ecological features, ecological values and level of effect[1]		
Identified areas of ecological significance	• Assess the ecological values of the area affected, the magnitude of effects of the proposed works and the overall level of effect in line with the EcIAG methodology and Chapters 4 to 10. • Document the assessment undertaken	If the assessment identifies a moderate or higher level of effect prior to mitigation on an area of ecological significance, and the proposed works or route cannot be modified to avoid this affect, then this is a "Confirmed Biodiversity Area" under the resource consent conditions and an EMP is required.
Areas of proposed vegetation clearance	• Use Chapters 4 – 7 and the EcIAG methodology to assess the ecological values of the vegetation, lizard, bat and bird habitat values, the magnitude of effects of the proposed works and the overall level of effect in line with the EcIAG methodology	If vegetation clearance will result in a moderate or higher level of effect on fauna or vegetation prior to mitigation, and the proposed works or route cannot be modified to avoid this affect,

[1] In cases where recent high quality drone footage of the proposed route is available, this may provide enough information to assess ecological features without need for an ecology site visit to some areas identified as requiring further assessment in the desktop study.

Step	Checklist	Decision
	• Document the assessment undertaken	then this is a "Confirmed Biodiversity Area" under the resource consent conditions and an EMP is required.
Freshwater environments, including streams, rivers and wetlands	• Assess any potential wetland areas identified in the desk top study using the methodology outlined in Chapter 8 to confirm whether they are actual natural inland wetlands • Use Chapters 7, 8 and 10 and the EcIAG methodology to assess the ecological values of the freshwater features potentially affected, the magnitude of effects of the proposed works and the overall level of effect in line with the EcIAG methodology • Document the assessment undertaken	If proposed works will result in a moderate or higher level of effect on any stream, river or wetland or associated fauna such as birds, fish or amphibians prior to mitigation, and the proposed works or route cannot be modified to avoid this affect, then this is a "Confirmed Biodiversity Area" under the resource consent conditions and an EMP is required.
Coastal habitats	• Use Chapters 4, 5, 7, 9 and 10 and the EcIAG methodology to assess the ecological values of the coastal features potentially affected, the magnitude of effects of the proposed works and the overall level of effect in line with the EcIAG methodology • Document the assessment undertaken	If proposed works will result in a moderate or higher level of effect on any coastal habitats or associated fauna such as birds, lizards or fish prior to mitigation, and the proposed works or route cannot be modified to avoid this affect, then this is a "Confirmed Biodiversity Area" under the resource consent conditions and an EMP is required.

4 VEGETATION MANAGEMENT PLAN

4.1 Introduction

The purpose of this Vegetation Management Plan (VMP) is to help guide the assessment of actual and potential adverse effects on native vegetation types due to the construction and operation of Te Ara Tipuna. It summarises the broad vegetation types that may be present along the route, comments on the potential effects of the path on vegetation, gives guidance on how to assess the potential effects on vegetation during the pre-construction ecological assessments for each stage and discusses the ways that any identified effects may be mitigated.

Significant fauna that may be affected by vegetation removal such as herpetofauna, bats and birds are addressed in the specific fauna management plans.

4.2 Vegetation Types

Te Ara Tipuna potentially passes through a variety of vegetation types, including:

- Native forest remnants ranging from coastal pōhutukawa and pūriri, to kahikatea to low altitude conifer-tawa-hard beech forest and podocarp-hardwood forest;
- Scrub and regenerating vegetation such as mānuka (*Leptospermum scoparium*) and kānuka (*Kunzea* sp.);
- Sand dune vegetation; and
- Plantation forest.

Some rare flora are known to occur in the area. Lists of rare flora can be found in Gisborne District Council's Tairāwhiti Resource Management Plan 2017 (Schedule G7B), Ecological Regions and Districts of New Zealand (DoC 1987) and on the New Zealand Plant Conservation Network website (www.nzpcn.org.nz).

4.3 Potential Effects on Vegetation

Vegetation may be affected by the construction and use of Te Ara Tipuna through a variety of direct and indirect effects.

Direct effects:

- Vegetation and habitat loss through vegetation clearance;
- Mortality or injury to species during vegetation clearance;
- Noise, vibration, earthworks or dust effects.

Indirect effects:

- Effects on vegetation health – e.g. through damage to tree roots;

- Increase of habitat edge effects[2] where vegetation has been removed, altering the composition and health of adjacent vegetation, which may affect habitat suitability for flora and fauna;
- Reduced connectivity and habitat fragmentation due to loss and reduction of available habitat types. Connectivity between areas of vegetation is important to facilitate ecological function, and loss of connectivity can impair reproductive function for both flora and fauna communities;
- Discharge of sediment to aquatic receiving environments that may affect the quality of wetland and stream habitats;
- Spread of weed species, e.g. through physical relocation of plant fragments and seeds by walkers, bikers and horses and increased edge effects;
- Potential spread of plant pathogens.

4.4 Assessment of Vegetation Values and Effects

An initial review of aerial imagery and works plans for each stage should be undertaken initially by an ecologist to identify any areas of potential vegetation clearance. Where this review indicates that indigenous vegetation or potential habitat for indigenous fauna such as bats, lizards and birds will occur, a site visit will be undertaken to determine the ecological values and the potential magnitude of effect of the proposed works on those values in line with EcIAG methodology described in Section 3.

An assessment by an arborist may also be required to understand whether the proposed works will indirectly (e.g. root damage) affect vegetation or a significant single tree.

Where the overall level of effects on vegetation is considered to be *moderate* or higher, then mitigation is required to address these effects.

4.5 Effects Management

4.5.1 Avoidance and minimisation

During the initial design stage, efforts were made to reduce the amount of vegetation clearance through route selection. The detailed design stage for each section of track provides another opportunity to modify the route or methodology to minimise the loss of indigenous vegetation or fauna habitat and reduce the potential for increased edge effects and fragmentation. The preference is to avoid vegetation loss as much as possible.

Where works are to occur close to vegetated areas of high ecological value or potential bird or bat nesting or roost habitat, then these areas should be clearly marked by flagging tape, spray paint or fencing and a buffer maintained to avoid inadvertent clearance and to minimise potential damage to branches and roots.

[2] 'Edge effects' are indirect, typically adverse effects that result from changes to an area of vegetation or habitat as a result of adjacent impacts (e.g., increased light, desiccation). Exposing previously interior vegetation to edges can result in changes in composition, through increased light penetration, damage as a result of change in stressors from wind and other weather, and can result in invasion of weed species.

4.5.2 Remediation and mitigation

Where avoidance of vegetation loss is not possible, remediation and mitigation are required to ensure that the overall level of ecological effect is no more than *low*. Suitable mitigation measures will be determined on a site by site basis but could include:

- Reinstatement and restoration of vegetation in disturbed areas through planting;
- Consideration of clearance and felling methodologies to minimise damage to vegetation immediately adjacent to the clearance;
- Implementation of fauna management plans where vegetation clearance may affect birds, bats or lizards – e.g. pre-clearance surveys for bats or birds, lizard relocation, avoiding clearance within breeding season;
- Where suitable sites exist, leaving large fallen and decaying logs and a proportion of cleared, non-weedy, vegetation in-situ to provide habitat for invertebrates and other fauna;
- Weed control where weeds are present and may spread due to increased edge effects or traffic on the path way;
- Erosion and sediment control where removal of vegetation will expose soil;
- Relocation of small seedlings and plants where feasible;
- Seeking and implementing arboricultural advice within native regenerating and mature forest habitat types or adjacent to significant trees on how to minimise tree damage and accommodate the works;
- Use of mulch generated from vegetation clearance to assist in erosion / sediment control or for site rehabilitation and ecological restoration purposes, taking care to ensure that wood chips will not enter streams and gullies (i.e. try to avoid placing mulch within 10 m of streams or wetlands) and that weed species are not included. Care also needs to be taken to minimise the potential for wood waste leachate to enter waterways from any mulch storage piles.

4.5.3 Offsetting

Where there are residual significant ecological effects or a net loss of biodiversity associated with vegetation clearance after the avoidance, remediation and mitigation hierarchy has been applied, then additional steps, such as biodiversity offsetting, may be required to deliver 'No Net Loss' or a 'Net Positive Impact' on biodiversity or ecological values. Biodiversity offsets are of three main types:

- "restoration offsets" which aim to rehabilitate habitat (e.g. through revegetation);
- "enhancement offsets", which aim to restore degraded habitat (e.g. through control of pests or weeds, enrichment planting, fencing out stock), and
- 'averted loss offsets' which aim to reduce or stop biodiversity loss (e.g. future habitat degradation) in areas where this is predicted.

Offsets are often complex and expensive, require time to plan for and implement, and are not carried out until management options addressing earlier steps in the hierarchy (in particular, avoidance of adverse effects) have been exhausted.

The ecological values and magnitude of effects assessed during the ecological surveys and the degree of residual ecological effects after mitigation will inform the required amount of offsetting required, where appropriate. This potential offsetting will likely take the form of restoration planting, typically at a higher ratio to the amount of vegetation removal that takes into account the age and ecological value of the vegetation lost and the time lag associated with maturing of planted areas.

If offsetting is required, then the following key offsetting principles should be applied as a minimum:

- **Landscape context:** an offset action is undertaken where this will result in the best ecological outcome, preferably close to the impact site or within the same ecological district.
- **Time lags:** the delay between loss of extent or values at the impact site and the gain or maturity of extent or values at the offset site is minimised.
- **Additionality**: An offset achieves gains in extent or values above and beyond gains that would have occurred in the absence of the offset.

4.6 Planting Plans

Any planting proposed as part of the management of effects on vegetation (e.g. in site reinstatement or to offset residual ecological effects) will need to be detailed in a planting plan. Planting plans should include the following minimum details:

- The area proposed to be planted.
- The purpose of the planting (e.g. habitat restoration, buffer planting).
- Location and extent of planting illustrated on a plan.
- Site preparation required – e.g. fencing from stock, weed and animal pest control.
- Appropriate species to the ecological region and habitat.
- Use of eco-sourced plants where possible.
- Density of planting.
- Size of plants.
- Where any Myrtaceae species are to be planted (e.g. mānuka, kānuka, pōhutukawa), how spread of myrtle rust (*Austropuccinia psidii*) will be avoided.
- Time of planting – late autumn or winter is usually best, although in some areas this may increase exposure to frost.
- Maintenance required to ensure successful establishment, including fertiliser, releasing plants, weed and pest control, monitoring, replacement planting, mulching.
- Any long term protection measures e.g. fencing or covenant.

5 LIZARD MANAGEMENT PLAN

5.1 Introduction

Reptiles / ngārara comprise a significant component of New Zealand's terrestrial fauna. There is currently 135 endemic herpetofauna taxa recognised in New Zealand (Hitchmough et al., 2021), 85.9% of which are considered 'Threatened' or 'At-Risk'.

The purpose of this Lizard Management Plan (LMP) is to identify and address actual and potential adverse effects on native reptiles associated with the construction of Te Ara Tipuna. It specifies the management measures required to minimise and mitigate anticipated adverse impacts, which will be achieved through:

- Minimising adverse effects on lizards associated with vegetation or site clearance activities;
- Using current best practice methodologies to capture indigenous lizards from vegetation in the project footprint immediately prior to and during vegetation clearance; and
- Relocating captured individuals to suitable habitats (avoid and minimise mortality of wildlife protected by the Wildlife Act).

5.2 Statutory Context

All indigenous reptiles are legally protected under the Wildlife Act, and vegetation and landscape features that provide significant habitat for native reptiles are protected by the Resource Management Act 1991 (RMA) (Section 6(c)). This includes ostensibly low value exotic vegetation that can support populations of native lizards. Statutory obligations require management of resident reptile and amphibian populations if they are threatened by a disturbance.

A Wildlife Act Authority (WAA) is required to capture, handle, and relocate indigenous lizards.

5.3 Species Potentially Present

A review of DoC's Herpetofauna database (accessed 22/04/2024), iNaturalist records, Purdie (2022) and NZHS (undated) was undertaken to identify the lizard species that may potentially be found along Te Ara Tipuna. The species and their habitat types are summarised in Table 3.

Overall, there is the potential for native lizard species to be present in suitable habitat along the full length of the Te Ara Tipuna. Therefore, the ecological assessments of each stage should assess the potential for suitable habitat to be present, and as much as possible the disturbance or removal of suitable habitat should be avoided. Where this is not possible, lizards should be relocated by a suitably qualified and certified herpetologist / ecologist to a nearby suitable habitat.

Table 3. Lizard species potentially found along Te Ara Tipuna (* indicates DoC herpetological database records within 10 km of trail).

Common name	Binomial name	Conservation status	Habitat type
Barking gecko*	*Naultinus punctatus*	At Risk - Declining	Forested habitats including swamps, scrubland, sub-alpine scrub, mature forest, scrubby/regenerating habitats.

Common name	Binomial name	Conservation status	Habitat type
Ngahere gecko*	*Mokopirirakau* "southern North Island"	At Risk - Declining	Forested habitats, including swamps, scrubland, and mature forests (beech, podocarp, and broadleaf).
Forest gecko*	*Mokopirirakau granulatus*	At Risk - Declining	Primarily arboreal (tree-dwelling), closely associated with a range of different habitats, including swamps, scrubland, regenerating habitats, mature forests (beech, podocarp, and broadleaf), and rock fields.
Pacific gecko	*Dactylocnemis pacificus*	Not Threatened	Swamps, scrubland, mature forests, rocky coastlines, back-dunes, rocky islets, and rock outcrops. In these habitats, they often take refuge within creviced rock and clay banks, tree hollows, under loose bark, in dense ground vegetation (such as *Gahnia* spp.), and in epiphytes.
Raukawa gecko*	*Woodworthia maculata*	Not Threatened	Strongly associated with coastal habitats. Often associated with rocky habitats, however, can be found in variety of habitats, from sandy or rocky coastlines right through to inland beech and broadleaf forests.
Copper skink*	*Oligosoma aeneum*	At Risk - Declining	Forest, scrubland, beaches, pasture, gardens, thick rank grass, under rocks, logs and other debris.
Ornate skink*	*Oligosoma ornatum*	At Risk - Declining	Forested areas, shrubland and heavily vegetated coastlines. Often found amongst leaf litter, in dense low foliage, thick rank grass and under rocks or logs.
Striped skink*	*Oligosoma striatum*	At Risk - Declining	Native forest, rank pasture hardwood and pampas shelterbelts. Primarily arboreal but also found under rotting logs.
Shore skink*	*Oligosoma smithi*	At Risk - Declining	Dunelands, rocky coastal platforms, pebble/boulder beaches. Often utilise debris washed up onto the high tide mark as refugia, including driftwood, beach-wrecked animals, and clumps of seaweed.
Northern grass skink*	*Oligosoma polychroma*	Not Threatened	Preferring open areas including coastal vegetation, rock piles, grassland, flaxland, shrubland, screes, forest margins tussock and modified urban / suburban habitats. Often takes refuge in dense vegetation or under rocks and logs.

The introduced plague skink (*Lampropholis delicata*) is also likely present along the proposed trail. These occur across a wide range of habitats, including gardens, industrial sites, road and railway clearings, rough pasture, open coastal habitats, as well as clearings around forests and shrublands. The plague skink is not protected by legislation, and is not subject to this management plan.

5.4 Potential Effects on Lizards

Some vegetation clearance will be required during construction of Te Ara Tipuna. If indigenous lizards are present within the affected area, potential adverse effects on lizards may include:

Direct effects:

- Mortality during vegetation clearance or habitat disturbance
- Injury during physical clearance works

Indirect effects:

- Loss of habitat
- Habitat fragmentation
- Temporary noise disturbance

Managing effects on lizards requires mitigation through a salvage and relocation programme. Note that any loss of indigenous lizard habitat is expected to be offset through revegetation planting proposed to offset vegetation loss in Section 4, however additional measures may be required to offset lizard habitat loss if the revegetation planting area is not associated with the lizard habitat.

5.5 Assessment of Lizard Habitat Values and Effects

Habitat types where lizard fauna may be found in the route of Te Ara Tipuna include:

- Forested areas including mature forest, regenerating forest and scrubland;
- Wetland vegetation;
- Dense low lying vegetation and ground cover;
- Rank grass and weedy areas;
- In rock piles and under rocks, logs and other vegetation; and
- Coastal areas, including dunelands, sandy or rocky coastlines, pebble/boulder beaches, driftwood.

A review of aerial imagery, topography, site photos, and works plans for each stage should be undertaken initially by an ecologist to identify whether potential herpetofauna habitat may be disturbed by the proposed work. If potential habitat is affected, or there is uncertainty, a site visit should be undertaken to confirm whether lizard habitat is present, the ecological values and the potential magnitude of effect of the proposed works on those values in line with EcIAG methodology described in Section 3. Where the overall level of effect is considered to be moderate or higher prior to mitigation, measures need to be introduced to avoid effects through design, or appropriate mitigation needs to be addressed, and preparation of a stage specific Ecological Management Plan, including the Reptile Management measures outlines in Section 5.6 below, will be required.

5.6 Reptile Management

5.6.1 Habitat avoidance

During the initial design stage, efforts were made to reduce the amount of vegetation clearance and habitat modification required through route selection. The detailed design for each section of track will be staged, and this provides another opportunity to identify potential reptile habitat and avoid habitat clearance as much as possible.

Any areas to be avoided are to be clearly delineated (with flagging tape or fencing) to reduce the chance of accidental clearance or works outside of the designated footprint.

5.6.2 Salvage

Where it is not possible to avoid clearance of potential reptile habitat, salvage and reptile relocation will be undertaken immediately prior to and during work. Salvage will be conducted under the supervision of a suitably qualified, experienced and permitted ecologist or herpetologist. Alternative methods can be used to those detailed below (e.g. use of Artificial Cover Objects, ACOs). Any use of alternative methods will need to be detailed in the finalised EMP for each stage.

Timing

Work in potential reptile habitats should occur between September and April (inclusive). Lizard salvage activities are confined to warmer months when lizards are the most active and likely to be detected if present.

All lizard management activities are required to be undertaken during fine, calm, and dry weather.

Trapping, day searches and spotlighting are to be undertaken in the week leading up to vegetation removal, and destructive searches immediately prior to and during vegetation clearance.

Trapping

Baited pitfall traps and "Gee's minnow" funnel traps will be installed in an approximate 10 m x 10 m grid[3] across all areas of potential habitat[4]:

- Pitfall traps will be used where terrestrial species like skinks are being targeted. They will be covered with Onduline ACOs installed for one week before opening, to settle into the environment.
- Gee's minnow traps will be installed in areas where substrate/terrain do not allow for pitfall trapping, or where geckos are potentially present (geckos can escape from pitfall traps and funnel traps can be installed in trees and scrub to catch arboreal species).
- Each trap will be baited with fruit and will contain a wetted sponge to reduce risk of desiccation.
- Traps are to be placed in shaded areas away from potential inundation with water, and checked daily, to limit adverse effects on lizards (stress, desiccation, drowing etc.).
- Funnel traps set on the ground are generally set a little into the substrate. For example, on the forest floor the leaf litter may be cleared away to provide a small indent and then pushed up around the trap. For traps set within rocky areas, the trap opening is generally set so that it is below some rocks. Funnel traps may also be set high-up on vegetation to capture arboreal species, and in this case need to be secured firmly so they do not fall or get blown out of the bush/tree.

[3] As the potential habitats present within and around the site are typically small and fragmented, a standard 10x10 m grid for pitfall/gee minnow trapping may not be feasible at all sites (e.g. some of the sites are smaller than 10x10 m, in which case only a single pitfall/gee minnow would be installed). So, to ensure sufficient salvage effort, a minimum of four pitfalls/gee minnows will be installed at each potential habitat.

[4] Note that alternative methods can be utilised (e.g. ACOs). Any use of alternative methods will need to be detailed in the finalised EMP for each stage.

Trapping will discontinue after:

a) a minimum of five days of trapping overall; and

b) a minimum of three consecutive, fine-weather days with no captures or observations.

Active searches

During trap checks, manual diurnal (day) searches will be undertaken for lizards across all potential reptile habitat types within the works footprint. Diurnal searching is a proven technique for detecting both diurnal and lizards in New Zealand (Whitaker 1994; Lettink and Hare, 2016).

Diurnal searches would involve systematically lifting debris (e.g., logs, rocks, and organic and inorganic material), searching through vegetation foliage, thickets, and log piles by hand or with the assistance of tools (e.g., rakes; Bell, 2017), and searching beneath flaking tree bark or within tree cavities to reveal lizards. Where possible, dense vegetation thickets or log piles would be dismantled in a piecemeal fashion down to ground level to ensure all potential retreat sites have been searched.

Where large immovable structures (e.g., logs) are identified in the footprint, but cannot be effectively searched, these would be marked (e.g., dazzled, painted) and re-inspected during the supervised vegetation clearance and machine-assisted search stage of the salvage operation.

Where arboreal geckos are potentially present, nocturnal (night) searches must also be undertaken on at least two nights.

Destructive habitat searches

After trapping is complete, destructive habitat searches will be carried out in conjunction with the vegetation clearance or works contractor[5]. Destructive searches will include the sensitive dismantling of any rock or debris piles, the overturning of any larger debris, and the hand searching of any vegetation. Where practicable, rocks and debris will be removed from the site following dismantling, to reduce the likelihood of recolonization prior to works. The project ecologist or herpetologist would work alongside vegetation clearance contractors and machine operators during the vegetation removal process to recover lizards from difficult to access locations.

At no stage should areas identified as potential lizard habitat be mulched *in situ* by lowering a mulch-head directly onto standing vegetation. Mulching standing vegetation is highly destructive and eliminates all opportunities to recover individuals or for the lizards to vacate the vegetation of their own accord before the vegetation is destroyed.

Lizard handling and containment

Native lizards would be captured and handled by the DOC-authorised project ecologist or herpetologist only. Lizards will be held individually in cloth bags in a secure, vented container or in temporary containment box(es), filled with vegetation matter and leaf litter and misted with water out of the sun. Lizards will be held temporarily for the period of the active searches or trap inspections and then transported to the release site as soon as possible.

[5] Where pre-construction trapping and searches have not found native lizards to be present, the project ecologist or herpetologist may decide that the area is unlikely to support lizard populations and that destructive searches during vegetation clearance are not necessary.

Release site selection

All captured lizards are required to be released into suitable habitat, as defined by the following criteria:

1. **Habitat size and complexity** – ensure the relocation habitat is representative (equal quality) or of better quality, than the original capture site(s).
2. **Vicinity to original population** – limit the distance that lizards are relocated from their original capture site(s). Distances up to 1.5 km would meet this criterion.
3. **Habitat that has long-term security** from further development or modification, such as DOC or Council-managed reserves, or legal protection through covenanting or local plan rule provisions.
4. **Habitat that is enhanced**, using accepted techniques such as provision of extra refuges suitable for the species or long-term predator control.

Habitat enhancement of release site

Introducing new individuals into an already occupied environment could lead to competition and/ or resource availability issues. To mitigate these potential risks, management measures to enhance the relocation site, and its immediate surrounds, to increase the overall carrying capacity of the area are recommended where the number of relocated lizards is greater than ten.

Enhancement measures could include revegetation planting, provision of supplementary refuges (e.g., logs), or long term predator control.

5.7 Accidental discovery, injury or mortality

Should incidental finds of lizards occur outside of the proposed salvage programme, the project herpetologist should be notified as soon as possible. If the lizards are not at immediate risk, works in the area will halt until the herpetologist can arrive and salvage the lizard. If the lizard is at immediate risk of injury or death due to on-site activities, it will be salvaged by the construction team and placed in a container (with air holes, vegetation and food) until the herpetologist can arrive. Guidance will be provided to the construction team on this process by the herpetologist.

The following steps would be implemented if any injured or dead native lizards are found during the salvage operation:

- The project herpetologist would report any injured or dead lizard found during implementation of the LMP;
- Any lizard death of ‘Threatened’, ‘At Risk’ species shall be sent to Massey University Wildlife post-mortem service for necropsy (the body would need to be chilled if it can be delivered within 48 hours, frozen if longer than 24 hours to deliver);
- Appropriate measures shall be undertaken to minimise further lizard deaths;
- Injured lizards found during salvage would be taken to a suitably qualified vet as soon as possible for assessment and treatment. Injured lizards would be kept in an appropriate portable enclosure (as described above) under the direction of the project herpetologist to ensure the animal is handled appropriately until the lizard(s) can be assessed and treated;
- Lizards assessed by the vet or alternative specialist as uninjured, or otherwise in suitable condition for release, would be transported to the relocation site in the portable enclosure and released; and

- Euthanasia of injured lizards shall only be undertaken under direction from DOC.

5.8 Reporting

A works-completion report would be prepared by the ecologist following completion of vegetation removal / works for submission as per resource consent and WAA permit requirements and an ARDS report (Amphibian Reptile Distribution Scheme, DoC) completed for submission to DoC.

6 BAT MANAGEMENT PLAN

6.1 Introduction

The purpose of this bat / pekapeka management plan is to identify and address actual and potential adverse effects on native bats associated with the construction of Te Ara Tipuna. It specifies the management measures required to minimise and mitigate anticipated adverse effects, which will be achieved through minimising clearance of potential bat roost trees and where such trees will be felled, using current best practice methodologies to confirm whether bats are present prior to felling.

New Zealand has two species of endemic bats on the mainland. The most widespread is the long-tailed bat (*Chalinolobus tuberculatus*, Threatened – nationally critical), although colonies are assumed to be small and their health is largely unknown (O'Donnell et al., 2023). The lesser short-tailed bat has three described subspecies; the northern lesser short-tailed bat (*Mystacina tuberculata aupourica,* Threatened – nationally vulnerable), the central lesser short-tailed bat (*Mystacina tuberculata rhyacobia,* At-risk – declining) and the southern lesser short-tailed bat (*Mystacina tuberculata tuberculata,* Threatened – nationally increasing) (O'Donnell et al., 2023). The central short-tailed bat is known to occur in the East Cape.

Bats roost in tree hollows and under split bark of native and exotic trees, and also in rocky overhangs. Bats go into a 'torpor' in cold weather and stay in their roosts. They wake up as soon as the weather becomes warmer. Over the breeding season, large communal roosts occur in similar habitat. Bats tend to utilise linear features in the landscape, including vegetation edges, gullies, waterways, and road corridors as they transit between roosts and foraging sites. Long-tailed bats in particular are known to be highly mobile, with large home ranges (>5,000 ha) and can travel large distances (~25 km) each night during foraging. Short-tailed bats require specific habitat consisting of good-quality forest vegetation, and have adapted to ground hunting. They are one of the few bats in the world that spends large amounts of time on the forest floor, using their folded wings as 'front limbs' for scrambling around.

6.2 Statutory Context

New Zealand bats are absolutely protected species under the Wildlife Act. It is an offence to catch alive or kill, hunt, possess, molest, or disturb bats under the Act. Any projects where tree or vegetation removal overlaps with the occurrence of bats, there is a risk of killing or injuring any bats that may be present.

6.3 Species Potentially Present

A review of data in DoC's bat database (accessed July 2023), found that there is a wide spread of long-tailed bat records across the East Cape. While most records are from more inland areas away from the coast, there are a number of records from coastal areas, and many records are within 25 km of the coast. There are few records for the short-tailed bat on the East Cape, with all being in forested areas well away from the coast. One record for short-tailed bat is close to the proposed Hikurangi Loop. Therefore there is potential for long-tailed bats to be present in trees within the full route of Te Ara Tipuna. There is also potential for short-tailed bats to be present in the area of the Hikurangi Loop.

6.4 Potential Effects on Bats

Removal or modification of trees that provide bat habitat in the footprint of Te Ara Tipuna has the potential to cause:

- Mortality or injury during felling;
- Habitat loss;
- Disturbance.

The highest risk of injuring or killing bats or trapping them within their roosts is when they are heavily pregnant, when young are still dependent on the roost (late November – February) and when bats are more likely to be in torpor (May – September).

During winter bats use torpor (a type of hibernation) more often than during other times of year, so if trees are cut down in winter, bats may be unable to rouse from torpor and to fly away in time to escape. Additionally, it is significantly harder, sometimes impossible, to detect bats roosting in trees during torpor. For these reasons, trees with potential bat roost features must not be cut down in winter. Bats also use torpor for short periods during summer, for example, if the weather gets cold, so the risk of killing or injuring bats that cannot escape falling trees exists at any time of the year.

6.5 Managing Effects on Bats

6.5.1 Assessment of trees for bat roost potential

Where trees greater than 15 cm Diameter at Breast Height (DBH) are proposed to be removed, a suitably qualified ecologist will inspect the trees to determine whether they have potential bat habitat. The steps for assessment are outlined in Table 3 below. Note that bats can roost in native or exotic vegetation – therefore it should not be presumed that exotic species such as pine trees will not support bats. Roosts have been found in many exotic species including, but not limited to, pine (*Pinus* spp.), poplar (*Populus* spp.), oak (*Quercus* spp.), acacia (*Acacia* spp.), black locust (*Robinia pseudoacacia*), willow (*Salix* spp.) and eucalyptus (*Eucalyptus* spp.).

If, following inspection, it is determined that there is potential bat habitat within a tree, then where possible the route should be altered to avoid removal or disturbance of that tree. If the tree is required to be felled or modified, then further assessment of the habitat or monitoring with Automatic Bat Detectors (ABMs) is required (note that this further assessment must be undertaken October – April during fine weather and when the temperature is 10^{o}C or greater).

Table 4. Does the vegetation proposed to be removed have potential bat roost characteristics? (adapted from DoC, 2021)

Step	Decision
1. Is the tree ≥ 15 cm DBH?	If yes, further assessment is required (step 2) If no, the tree is unsuitable bat roost habitat.
2. On visual inspection, does the tree (dead or alive) have features that indicate roost potential? These features include: • Hollows • Cavities • Knot holes • Cracks • Flaking, peeling and decorticating bark • Epiphytes • Broken or dead branches or trunk • Cavities / hollows / shelter formed by double leaders. This may require climbing the tree if you can't see all of it from the ground.	If yes, go to step 3. If unsure, further assessment is required. Use an approved person at Competency Level 3.3. If no potential roost features are present, the tree is unlikely to be suitable bat roost habitat, but if upon felling you find a bat, follow Section 6.5.3.
3. Does the tree have to be removed entirely?	If yes, continue to Step 4 to find out whether bats are currently roosting in the tree. If no, consider leaving the tree in place, cutting off specific limbs only or relocating the tree. If any felling or partial felling or tree relocation takes place you must proceed to Step 4.
4. Are bats currently roosting in the tree? (follow a, b or c or a combination)[6]	
a) are potential features being used by roosting bats? *(an approved person at Competency Level 3.3 or a tree climber working with an approved person at this level is to inspect these features)*	If yes, the tree MUST NOT BE FELLED until bats have vacated it. If no, the tree can be removed on the day of the tree inspection (following step 5). If bats continue to use the roost, then the tree must not be cut down until the bats leave the roost. Re-consider whether this tree must be felled and seek advice from DoC. *Note: this assessment can only be undertaken October 1st to April 30th when the temperature is 10 °C or greater.*
b) Is bat activity recorded using an Automated Bat Monitoring unit (ABM) at any time during two consecutive, valid survey nights preceding tree	If yes (bats are detected), survey must continue on subsequent nights until no bat activity is recorded for two consecutive nights (to indicate bats have left the area)

[6] Refer to DoC (2021) for more detailed methodologies for each of these steps.

Step	Decision
felling? At least two nights are required as it is possible for bats to enter or leave a roost without echolocating, or to not leave the roost for a night (*an approved person at Competency Level 3.1 should undertake this assessment)*	prior to felling. OR roost features of each tree must be visually assessed via climbing as in 4 a). If bat activity is consistent in the area and 2 nights with zero bat passes cannot be obtained, Go to 4c or 4a. If no bats are detected for two consecutive nights, the vegetation can be removed on the day immediately following the survey nights using the method in 5. *October 1st to April 30th and when conditions meet the requirements for standard ABM weather.*
c) Are bats observed entering the vegetation? This involves watching vegetation to identify bats returning to or exiting roosts. It should only be used in combination with previous ABM monitoring (4b). At least two nights are required as it is possible for bats to enter or leave a roost without being detected, or to not leave the roost for a night. (*an approved person at Competency Level 3.2 should undertake this assessment)*	If yes (bats are seen at either watch), it is a confirmed roost. Removal of a roost should be avoided to minimise effects of vegetation removal on bats. Techniques used previously to ensure previously active roosts are no longer active have included the following: Watches must continue on subsequent nights until no bats are observed entering or exiting the roost for two consecutive nights (to indicate the roost is no longer active) prior to felling. If no bats are observed entering or exiting for two consecutive nights, the vegetation can be removed on the day immediately following the survey nights using the method in 5. *October 1st and April 30th only AND when weather parameters meet*
Notes: Bat Competencies: 2.1 Bagging storage, handling, measuring, weighing, sexing, aging, temporary marking and releasing appropriately: For long-tailed bats: 50 individuals For short-tailed bats: 50 individuals 3. High risk activities – Roost felling: 3.1 Assessing roost tree use using Automatic Bat Monitors - Demonstrate correct timing, placement, and interpretation of data for 10+ times according to DOC's Tree Felling Protocols. 3.2 Undertake roost watches/emergence counts at 10+ occupied roosts where the entrance is visible. 3.3 In at least two different forest/habitat types, including the forest/habitat type where trees are going to be assessed: evaluate 10+ potential roost features in trees (e.g., cavities, peeling bark, epiphytes).	

6.5.2 Confirmed roost trees

If bats are confirmed within a tree via any of the methods in Step 4 above, it must not be felled and the following actions will be taken:

- The tree will be clearly marked, and the immediate area cordoned off with safety fencing and signage erected in a 10 m radius around the roost, alerting any person approaching the area that a bat roost is present and to stay clear.

- All relevant project staff will be briefed to ensure that the tree is not removed. The ecologist will determine whether all tree clearance works should be suspended or whether inspections and clearance can continue away from the roost.
- The project methodology will be reviewed to confirm whether removal or alteration of the tree can be avoided.
- If removal or alteration of the tree is required, further monitoring must continue using the methodologies in Step 4 above, until the ecologist can confirm that no bats are roosting within the tree.
- If the tree is a maternity roost tree removal works shall be scheduled to only occur within the period 1 March to 31 April inclusive.

6.5.3 Accidental discovery or mortality

If a bat is found during tree removal, the following procedures will be implemented:

- Felling of the tree must stop immediately if safe to do so, and DoC and an approved bat ecologist at Competency Level 2.1 must be consulted;
- If any bats are found on the ground or in the tree once felled, they should be placed in a cloth bag in a dark, quiet place at ambient (or slightly warmer) temperature and be taken to a veterinarian for assessment as soon as possible. A maximum of two bats should be kept in one bag. After delivering the bat to the vet, contact an approved bat ecologist at Competency Level 2.1 in consultation with the vet and DOC (0800 DOC HOT, 0800 362 468).
- If the bat is dead or has been euthanised by the veterinarian, it will be taken to the local DOC office as soon as practicable (required under the Wildlife Act).

Further details on these protocols can be found in DoC (2021).

6.5.4 Reporting requirements

A works-completion report would be prepared by the ecologist following completion of vegetation removal / works for submission as per resource consent requirements and bat records submitted to DoC for inclusion in the bat database.

7 AVIFAUNA (BIRDS) MANAGEMENT PLAN

7.1 Introduction

The purpose of this bird management plan is to identify and address actual and potential adverse effects on native birds associated with the construction of Te Ara Tipuna. It specifies the management measures required to minimise and mitigate anticipated adverse effects, which will be achieved through minimising clearance of potential bird nesting habitat, and where such habitat will be affected, using current best practice methodologies to avoid nesting birds.

7.2 Statutory Context

The provision of management to avoid, minimise and mitigate adverse effects on native wildlife and associated habitat is a requirement under the RMA and almost all native birds are legally protected under the Wildlife Act.

7.3 Species Potentially Present

A review of the local planning documents, wildlife databases (e.g. DoC databases, Bioweb, eBird and iNaturalist) and literature (Coleman, 2010) was undertaken to identify the native bird species potentially affected by the path (note that this is indicative only and further assessments will be undertaken at the detailed design stage). The birds potentially present in the area of the trail, their conservation status and brief notes on their habitats and where they nest are presented in Table 5. Note that this list is indicative only and further assessments of bird habitat would be undertaken at each design stage. The focus is on those birds that may nest or rely on habitat in areas that the trail may intersect, rather than, for example, seabirds that may be sighted in these areas but spend most of their lives and breed away from the areas of the path. Those that have an “At Risk” conservation status aren’t considered threatened, but could quickly become so if conservation management reduces, if a new threat arises, or declines continue unabated. Those with a “Threatened” conservation status have the greatest risk of extinction.

As much of the path is close to the coast, a variety of bird species present in coastal environments are expected to be present and have the potential to be affected, for example shags, dotterels, oystercatcher, gulls, terns, little blue penguins. Most of the native coastal bird species potentially present have an “At Risk” status, and the Caspian tern and reef heron have a “Threatened” status.

The path will pass close to wetlands or lakes in ponds in some areas. Birds that may be found in these areas include some “Threatened” species (e.g. Australasian bittern, grey duck and dabchick) and several “At Risk” species such as the royal spoonbill, marsh crake and the fernbird.

Where the path passes through forest habitats, birds usually associated with forested areas such as tūī, fantail, kereru, ruru, whitehead, grey warbler, bellbirds will potentially be present and more rarely “At Risk” species such as robins and kaka and Threatened species such as long tailed cuckoo may be present.

Birds that could be present in a variety of habitats include weka and New Zealand falcon, which have At Risk classifications and the Australasian harrier and kingfisher. In more open pastoral habitats, paradise shelduck, spur winged plover, pūkeko and the “At Risk Declining” pipit may be present.

Table 5. Native bird fauna potentially present along Te Ara Tipuna

Common name	Binomial name	Conservation status	Habitat type
Wide range of habitat types			
Kingfisher / kōtare	*Todiramphus sanctus vagans*	Not Threatened	Forest, river margins, farmland, lakes estuaries and rocky coastlines. Nesting October – January in holes/tunnels in trees, cliffs, banks and cuttings.
Weka	*Gallirallus australis greyi*	At Risk, Relict	Variety of habitats from the coastline to above the tree-line, including wetlands, rough pasture, shrubland, and native and plantation forests. Nest August-January in dense vegetation, usually under an object or within a burrow.
Pūkeko	*Porphyrio melanotus melanotus*	Not Threatened	Typically found near sheltered fresh or brackish water (e.g. vegetated swamps, streams or lagoons), especially adjacent to open grassy areas and pasture. Nest year round in nests often build near or over water.
Welcome swallow	*Hirundo neoxena neoxena*	Not Threatened	Most habitats except forested. Often close to coast or wetlands. Nesting on shaded ledges or man made structures August – February.
Australasian harrier / kāhu	*Circus approximans*	Not Threatened	Coastal fringe, estuaries, wetlands pine forest, farmland, high country. Nesting September to April in nests on the ground, in low bushes, long grass, scrub or wetlands.
New Zealand falcon / kārearea	*Falco novaeseelandiae*	At Risk, Recovering	Wide variety of habitats from coast to above the treeline, including forest, tussock, rough grazed hill country and pine forest. Nest August – May in a simple scrape in the ground with varying amounts of cover, on a ledge or within an epiphyte in a tree.
Black backed gull	*Larus dominicanus*	Not Threatened. Not protected under the Wildlife Act.	Coastal and inland non-forested habitats.
Coastal areas			
Little blue penguin, kororā	*Eudyptula minor*	At Risk, Declining	Coastal. Nest July – February close to the sea in burrows or in caves, rock crevices, under logs or in or under a variety of man-made structures. Nesting is followed by a moulting period, where individuals must remain dry on land while they complete their moult. Peak moulting is generally between January and March, but it can extend into April.
Variable oystercatcher	*Haematopus unicolor*	At Risk, Recovering	Coastal – variety of coastal habitats such as sandy beaches, sand spits, dunes, mud flats, paddocks. Nest October to March on sand or grassy areas or bare ground slightly inland.

Common name	Binomial name	Conservation status	Habitat type
New Zealand dotterel, tūturiwhatu	*Charadrius obscurus*	At Risk, Recovering	Coastal. Mainly breed August to February on sandy beaches and sandspits (usually near stream-mouths), some on shell banks in harbours, a few on gravel beaches. Nests simple scrapes in substrate.
Banded dotterel	*Charadrius bicinctus*	At Risk, Declining	Coastal. Nest July to January in riverbeds, herbfields, beaches and farmland.
White-fronted tern	*Sterna striata*	At Risk, Declining	Coastal and river beds. Nests October – January in large dense colonies on shingle river beds, sand dunes, stacks and cliffs (in a scrape in shingle, sand or bare rock).
Caspian tern / taranui	*Hydroprogne caspia*	Threatened, Nationally Vulnerable	Coastal – sheltered bays and harbours. Nesting in colonies or as isolated pairs September - January on open coastal shellbanks, sandspits, occasionally brained rivers. Nest a shallow scrape in sand or shingle.
Pied shag / Kāruhiruhi	*Phalacrocorax varius*	At Risk, Recovering	Coastal. Mainly forage in coastal marine waters, harbours and estuaries, some lakes and ponds. Nest August to March in trees along coastal cliffs year round, but peaking February-April and August-October.
Little shag / kawaupaka	*Microcarbo melanoleucos*	At Risk, Relict	Coastal and freshwater habitats including lakes, rivers, ponds, streams. Nest in trees over-hanging water, on ledges or sea cliffs.
Black shag / māpunga	*Phalacrocorax carbo*	At Risk, Relict	Coastal waters, estuaries, harbours, rivers, streams, lakes and ponds. Nest year round in trees or shrubs, on the ground in swamps, coastal cliffs and headlands and on artificial structures.
Red-billed gull / Tarāpunga	*Chroicocephalus novaehollandiae*	At Risk, Declining	Coastal. Nesting occurs mid-September to February in dense colonies, mainly restricted to the eastern coasts of the North and South Islands on stacks, cliffs, river mouths and sandy and rocky shores
Reef heron / matuku moana	*Egretta sacra*	Threatened, Nationally endangered	Coastal. Nest September - December in dark places low to the ground, e.g. in rocky caverns and under old bridges.
Royal spoonbill / kōtuku ngutupapa	*Platalea regia*	At Risk, Naturally uncommon	Estuaries and wetlands. Nests in colonies in the exposed canopy of tall kahikatea trees, on the ground near estuaries, rivers and harbours, in reeds, in low shrubs, and on steep rocky headlands
White faced heron / Matuku moana	*Egretta novaehollandiae*	Not Threatened	Rocky shores, estuary mudflats, lakes, ponds, damp pasture and sports fields. Usually nest in the tops of large trees like pine and macrocarpa as early as June.

Common name	Binomial name	Conservation status	Habitat type
Banded rail / Moho pererū	*Gallirallus philippensis*	At Risk, Declining	Mainly mangroves and saltmarshes in estuaries. Nest September to March on rough platform of rush and reed fragments, usually in jointed rush thickets.
Wetlands, lakes, ponds			
Marsh crake	*Zapornia pusilla*	At Risk, Declining	Freshwater and brackish wetland habitats. Small breeding population near Hicks Bay. Nests September to December concealed under sedges or in dense reeds
Spotless crake	*Zapornia tabuensis*	At Risk, Declining	Freshwater wetlands dominated by dense emergent vegetation, particularly raupo (Typha orientalis). May forage on open mud near dense vegetation. Nest August – February in wetland vegetation.
Fernbird / mātātā	*Poodytes punctatus*	At Risk / Declining	Wetlands – in dense vegetation. Nest Nov – Feb in dense vegetation, usually < 1m above ground or water.
Australasian bittern / matuku-hūrepo	*Botaurus poiciloptilus*	Threatened, Nationally critical	Wetlands. Nest August – May amongst dense wetland vegetation.
Pied stilt	*Himantopus himantopus*	Not Threatened	Coast and wetlands. Nest June to February on ground near water usually in colonies.
Grey teal / tētē-moroiti	*Anas gracilis*	Not Threatened	Freshwater lakes, lagoons and swamps. Nest June - January in tree hollows and on the ground under tall grasses.
New Zealand scaup / pāpango	*Aythya novaeseelandiae*	Not Threatened	Lakes. Nest October to March on the ground, well concealed, near the water.
New Zealand dabchick / weweia	*Poliocephalus rufopectus*	Threatened, Nationally increasing	Freshwater lakes and ponds. Nest June-March on freshwater lakes and pools, anchoring the nest to aquatic vegetation or building it in a small cave, partially underwater.
Australasian shoveler / kuruwhengi	*Spatula rhynchotis*	Not Threatened	Freshwater wetlands, estuaries, lakes. Nests October – February in long grass near water.
Black swan / kakīānau	*Cygnus atratus*	Not Threatened	Lakes, ponds, estuaries. Nest July - March on water's edge in large mound of vegetation.
Open habitats			
Paradise shelduck / pūtangitangi	*Tadorna variegata*	Not Threatened	Widely distributed on pastoral landscapes. Nest August - February in tree holes or tree bases, rock crevices, under buildings or debris piles.
Spurwinged plover	*Vanellus miles novaehollandiae*	Not Threatened. Not protected	Variety of open habitats with low vegetation. Nest June-November in a variety of open habitats such as

Common name	Binomial name	Conservation status	Habitat type
		under the Wildlife Act.	pasture, cropland, parks, wetlands, saltmarsh with a simple scrape on the ground.
New Zealand pipit / pīhoihoi	*Anthus novaeseelandiae*	At risk, declining	Rough open habitats from coast to alpine shrublands. Nest August-February under tussocks and grass clumps within fern, and partly or fully covered with vegetation.
Forest habitats			
Whitehead / pōpokotea	*Mohoua albicilla*	Not Threatened	Forest and shrubland. Nests September to January in tree forks, hidden in dense canopy vegetation
Fantail / pīwakawaka	*Rhipidura fuliginosa placabilis*	Not Threatened	Forest, scrub, gardens. Nests August - March in trees.
Grey warbler / riroriro	*Gerygone igata*	Not Threatened	Forest, scrub, gardens. Nests August to January in outer branches of trees 2-4m off ground, usually in small leaved trees such as manuka, kānuka and *Coprosma* spp.
Kererū	*Hemiphaga novaeseelandiae*	Not Threatened	Forest, shelterbelts, urban parks, and rural and suburban gardens. Nests year round, but mainly September – April, in trees.
Morepork / ruru	*Ninox novaeseelandiae*	Not Threatened	Forest and vegetation patches. Nests September – May in cavities of live or dead trees, broken logs, tree forks, epiphytes, holes in earth banks, among tree roots.
Silvereye / tauhou	*Zosterops lateralis lateralis*	Not Threatened	Widespread in most habitats. Nests August to February high in trees, shrubs and tree ferns.
Shining cuckoo / pīpīwharauroa	*Chrysococcyx lucidus*	Not Threatened	Forest and scrub, farmed and urban areas. Lay eggs in grey warbler nests.
Long-tailed cuckoo / koekeoā	*Eudynamys taitensis*	Threatened, Nationally Vulnerable	Native forest or scrub. Migratory. Lays eggs in nests of whitehead, brown creeper and yellowhead.
Tūī	*Prosthemadera novaeseelandiae novaeseelandiae*	Not Threatened	Forest, scrub, gardens. Nesting September to Febuary in nests high in trees in the canopy or subcanopy.
Bellbird / korimako	*Anthornis melanura*	Not Threatened	Forest, scrub, farm shelter belts, urban parks and gardens. Nest September – February in trees under dense cover.
Kaka	*Nestor meridionalis*	At Risk, Recovering	Native forest. Nest November to June high in trees.
North Island Robin / toutouwai	*Petroica longipes*	At Risk, Declining	Mature forest, tall scrub, and exotic plantations. Nest September to March on tree trunks; in trunk forks, at trunk-branch junctions, on epiphytes next to trunks

Common name	Binomial name	Conservation status	Habitat type
Tomtit / miromiro	*Petroica macrocephala*	Not threatened	All mature native forest types, regenerating forests, exotic plantations. Nest August to March in thick vegetation or shallow cavities.
Rifleman / tititipounamu	*Acanthisitta chloris*	Not threatened	Found predominantly in mature forest, especially beech, kauri, kamahi and podocarp forest. Nest August to February in enclosed spherical nests mainly within existing cavities like burrows, hollows, holes in buildings, rocks, trees.

7.4 Potential Ecological Effects on Avifauna

The route of Te Ara Tipuna intersects a variety of bird habitat types. Although much of the trail will utilise existing trail and road infrastructure, there may be some effects on native bird fauna. The potential effects as a result of construction works associated with the trail include:

- Direct removal or degradation of habitat used for nesting or foraging;
- Disturbance of nesting bird species during construction through noise or activity;
- Direct mortality of nesting birds and chicks.

7.5 Assessment of Avifauna Habitat Values and Effects

A review of aerial imagery, topography, site photos, and works plans for each stage should be undertaken initially by an ecologist to identify whether potential avifauna habitat as described in Table 5 above may be disturbed by the proposed work. If potential habitat is affected, or there is uncertainty, a site visit should be undertaken to confirm whether avifauna habitat is present, the ecological values and the potential magnitude of effect of the proposed works on those values in line with EcIAG methodology described in Section 3. Where the overall level of effect is considered to be moderate or higher prior to mitigation, measures need to be introduced to avoid effects through design, or appropriate mitigation needs to be addressed, and preparation of a stage specific Ecological Management Plan, including the effects management measures outlined in Section 7.6 below, will be required.

7.6 Managing Effects on Avifauna

7.6.1 Vegetation clearance

For all bird species, the most sensitive time of year (in regard to disturbance) is the nesting season. Therefore, as much as possible vegetation clearance should occur outside of the main bird breeding (September to March inclusive) to minimise any disturbance risk that vegetation removal would have on nesting birds.

If vegetation clearance is unavoidable during the main native bird nesting season, an experienced ecologist or ornithologist must visually inspect all trees and shrubs proposed for removal before, and no more than 24 hours prior to, felling or removal, to identify any active nests of indigenous birds. This includes checking cavities and hollows for nesting birds (e.g. morepork, kingfisher).

Should any nesting of indigenous birds be observed, a 10 m buffer of vegetation must be required to remain around the nest site until an experienced ecologist or ornithologist has confirmed that the nest has failed or the chicks have hatched and naturally left the nest site.

7.6.2 Coastal areas

Some coastal birds nest as early as July (e.g. banded dotterel) and can nest in inconspicuous scrapes in sand, gravel or grass. Where works are proposed in coastal habitats such as dunes, beaches and grassed foreshore areas that will disturb these areas (e.g. earthworks, construction of structures) from July to March inclusive, an experienced ecologist or ornithologist shall visually inspect the area prior to the proposed work to identify any active nests of indigenous birds. If bird nests are observed within 50 m of the proposed work, the ecologist or ornithologist will set up temporary fencing around the nest (at least 20 m from the nest)[7] and no works are to occur within the 20 m exclusion zone. The ecologist or ornithologist will continue to monitor the nest weekly and works can commence within the exclusion zone when either the nest has failed or the chicks have fledged.

The little blue penguin breeding season generally commences in July when adults begin searching for nest locations. Egg laying and chick rearing follow, with adults coming and going from nest sites until approximately late February. This is then followed by a moulting period, where individuals must remain dry on land while they complete their moult. Peak moulting is generally between January and March, but it can extend into April. As a result, there are few time periods where penguins are likely to be absent from coastal areas. Little blue penguin nests are situated close to the sea in burrows excavated by the birds or other species, or in caves, rock crevices, under logs or in or under a variety of man-made structures including nest boxes, pipes, stacks of wood or timber, and buildings. Therefore, where trail construction activities are likely to disturb such areas of habitat, immediately prior to works commencing, a penguin survey is to be conducted by an ecologist or ornithologist of the area within 10 m of the proposed works. If no penguins are found, a penguin exclusion fence should be erected around the perimeter of the works area. If penguins are found, in addition to erecting a penguin exclusion fence[8] around the perimeter of the works area, an area of at least 5 m radius around the nest or moulting penguin should be established, and fenced, providing direct unimpeded access for the penguins to reach the sea. The fence should remain in place, and the nest or moulting penguin undisturbed until the penguins have vacated. If a penguin should appear in the middle of the works site once works have begun, works within a 5 m radius of the penguin should cease immediately. The area should be fenced off while still providing direct unimpeded access for the penguins to reach the sea and all workers should be notified. DoC should then be notified.

7.6.3 Wetland and lake areas

The route of the trail has been designed to avoid clearing vegetation or undertaking earthworks or land disturbance within 10 m of a natural inland wetland, which mean that disturbance to birds associated

[7] Exclusion fencing for nesting birds like dotterel and oystercatchers is to ensure people and machinery do not enter the exclusion zone and should be constructed from materials that do not make the nest more conspicuous to avian predators or move in the wind, not obstruct the ability for birds or chicks to access the beach and water to forage.

[8] Penguin exclusion fencing is to keep penguins out of potentially suitable habitat that does not contain active nests or moulting birds during the works and should be constructed of materials suitable for excluding penguins

with wetlands should be avoided, as most wetland birds nest within wetlands. Removal of vegetation is also covered by the requirements in Section 4 above.

If wetland habitat will potentially disturbed by proposed works within the nesting season, then a nesting survey will be required as per Section 7.6.1 above.

7.6.4 Open areas

The New Zealand pipit has an "At Risk-Declining" conservation status and nests in rough open areas, such as under tussocks and grass clumps within fern, and partly or fully covered with vegetation from August-February. The ecological assessment for each stage should assess the potential for such habitat to be present within the works footprint using aerial images (or on the ground assessment if aerials do not provide sufficient information), and if works are to be undertaken within the breeding season then an ecologist must inspect the area immediately prior to works commencing. If a pipit nest is identified within 50 m of the proposed works, then a 20 m exclusion fence will be installed to exclude people and machinery. The ecologist or ornithologist will continue to monitor the nest weekly and works can commence within the exclusion zone when either the nest has failed or the chicks have fledged.

7.6.5 Accidental discovery or mortality

Where a bird nest is identified during works, works will stop until an ecologist has inspected the nest to determine whether it is active and of a native species.

Where an injured bird is observed during works:

- Works will stop until an ecologist can assess the injured bird and
- The local DOC office or DOC hotline (0800 362 468, if after hours) will be contacted no longer than two hours after the injured or dead bird is found
- Injured native birds will be taken immediately to a vet approved by DOC for assessment
- Birds will be placed in a cool, dark, material-lined box/bag by or under the direction of a project ecologist to ensure the bird is handled appropriately

7.7 Reporting

Where avifauna management is required through a stage specific EMP, a completion report would be prepared by the ecologist following completion of works as per resource consent requirements.

8 FRESHWATER ECOLOGY MANAGEMENT PLAN

8.1 Introduction

The purpose of this Freshwater Ecology Management Plan (FEMP) is to help guide the assessment of actual and potential adverse effects on freshwater habitats such as streams, rivers, lakes and wetlands due to the construction and operation of Te Ara Tipuna. It provides information on identifying smaller streams and wetlands within the proposed path that may not have been already identified, comments on the potential effects of the path on freshwater environments and gives guidance on ways that the potential ecological effects can be mitigated.

Freshwater effects and mitigation are also considered in the following chapters of this EMP and other plans:

- Te Ara Tipuna Trailway Construction Management Plan (CPS 2023) which covers construction methodologies to avoid or minimise impacts on freshwater environments
- Avifauna Management Plan (Section 7)
- Section 10 Sediment, Erosion and Discharges

8.2 Statutory Context

Legislation affords protection to native freshwater fish. The Freshwater Fisheries Regulations 1983 and the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 requires fish passage to be provided past structures like culverts.

Native freshwater fauna salvage requires a Ministry for Primary Industries (MPI) Special Permit under Section 97 of the Fisheries Act 1996. An authorisation from Fisheries New Zealand is required under section 26ZM (2) (a) of the Conservation Act 1987 to transfer any freshwater aquatic life to an appropriate freshwater waterbody in the same catchment. DoC approvals are also required to transfer fish to public conservation land and for electric fishing.

A WAA is required to capture, handle, and relocate Hochstetter's frogs.

The relevant regional plans also contain rules and standards relating to structures and works within watercourses and wetlands.

8.3 Habitats and Species Potentially Present

Over the 500 km path, there will be many stream and river crossings and wetlands present close to the track of the path. Whilst the initial design of the track has been designed to avoid significant wetland ecosystems identified in local planning documents and utilises many existing stream and river crossing structures, there are likely to be smaller wetlands and streams that have not yet been identified and that will need to be considered at the detailed design phase.

Wetlands have been significantly affected by land use changes in New Zealand over the last 150 years, with approximately 90% of them having been lost through draining, burning and clearing of vegetation for farmland and reclamation for urban and industrial uses. There are a variety of different wetland types, with the main ones in New Zealand being bogs, fens, swamps, marshes and shallow water.

Wetlands potentially contain a range of at risk or threatened bird and lizard species as identified in Sections 6 and 7 above.

Streams and wetlands in the East Cape area are known to contain a variety of fish species. A review of the NZ Freshwater Fish Database (accessed 16/8/2023) found a number of native freshwater fish species within 10 km of the proposed pathway. A search of the DoC herpetofauna database (22/04/2024) also found a number of records for Hochstetter's frogs in streams close to the route of the path. This identified a number of Threatened or At Risk species potentially present near the route of the Te Ara Tipuna. The species found are summarised in Table 6.

Table 6. Native fish and amphibian fauna found within 10 km of Te Ara Tipuna

Common name	Binomial name	Conservation status[9]	Habitat type[10]
Black flounder	*Rhombosolea retiaria*	Not Threatened	Estuaries, lowland lakes and lower reaches of rivers
Common smelt	*Retropinna retropinna*	Not Threatened	Shoals and open water in rivers and streams, mainly at low elevations
Lamprey	*Geotria australis*	Threatened, Nationally Vulnerable	Adults hide in crevices under large rocks, larvae / juveniles bury themselves in sand. Climber.
Long-finned eel	*Anguilla dieffenbachii*	At Risk - Declining	Rivers, lakes and headwaters, rare in swamps. Strongly associated with in-stream cover.
Short-finned eel	*Anguilla australis*	Not Threatened	Lowland swamps, lakes and slower areas of streams and rivers.
Inanga	*Galaxias maculatus*	At Risk - Declining	Backwaters or gently flowing areas of lowland rivers, lakes and streams. Climber.
Banded kokopu	*Galaxias fasciatus*	Not Threatened	Small, overgrown, tannin stained streams, often in lowland wetlands or swampy forest. Climber.
Short jawed kokopu	*Galaxias postvectis*	Threatened, Nationally Vulnerable	Pools in cascading boulder streams with forest cover.
Giant kokopu	*Galaxias argenteus*	At Risk - Declining	Gently flowing or swampy pools, streams and lake edges with thick riparian vegetation.
Koaro	*Galaxias brevipinnis*	At Risk - Declining	Favours clear, small to medium-sized cobble streams. Moderate to fast flowing, with canopy shading.
Torrentfish	*Cheimarrichthys fosteri*	At Risk - Declining	Riffles during the day, emerging at night to feed in slower water.
Common bully	*Gobiomorphus cotidianus*	Not Threatened	Prefers slower water, common in lakes.
Cran's bully	*Gobiomorphus basalis*	Not Threatened	Inland cobbled streams.
Bluegill bully	*Gobiomorphus hubbsi*	At Risk - Declining	Swift, shallow riffles in large gravels rivers.

[9] Dunn *et al.*, 2017

[10] McQueen, 2013

Common name	Binomial name	Conservation status[9]	Habitat type[10]
Red finned bully	*Gobiomorphus huttoni*	Not Threatened	Typically found near the coast. Can climb and penetrate inland.
Giant bully	*Gobiomorphus gobioides*	At Risk – Naturally Uncommon	Lower reaches of waterways. Hides beneath logs and vegetation during the day.
Hochstetter's frog	*Leiopelma hochstetteri*	At Risk - Declining	Small forested streams and wet seeps with plentiful rocky/woody debris. The DoC database shows a number of records from streams near to the coast on the western and northern sides of East Cape and in the Hikurangi area.

8.4 Potential Freshwater Ecological Effects

Potential adverse effects on freshwater habitats during construction of Te Ara Tipuna include:

Direct effects:

- Mortality or injury of instream fauna during stream works
- Discharge of contaminants such as sediment, wet concrete or from machinery during works close to wetlands or streams

Indirect effects:

- Loss of habitat
- Changes to hydrology in wetlands or watercourses
- Increased erosion and discharge of sediment in the longer term
- Barriers to fish passage
- Temporary noise disturbance
- Disturbance of fauna species (e.g. birds, lizards) close to wetland areas

8.5 Assessment of Freshwater Ecological Values and Effects

A review of aerial imagery, topography, site photos, and works plans for each stage should be undertaken initially by an ecologist to identify whether the proposed works and path come close to or cross potential wetlands, streams or rivers or whether there is potential for discharges from works or toilets close to these environments. If potential freshwater features are affected, or there is uncertainty, a site visit should be undertaken to confirm the ecological values of the freshwater environments and the potential magnitude of effect of the proposed works on those values in line with EcIAG methodology described in Section 3. Where the overall level of effect is considered to be moderate or higher prior to mitigation, measures need to be introduced to avoid effects through design, or appropriate mitigation needs to be addressed, and preparation of a stage specific Ecological Management Plan, including the effects management measures outlines in Section 8.6 below, will be required.

8.6 Managing Effects on Freshwater Environments

8.6.1 Identification and assessment of freshwater environments that may be affected

Streams

During the detailed design stage for each section of the path, it is important that all potential stream and river crossings are reviewed by an ecologist, including small intermittently flowing streams, to assess for potential disturbance to instream habitat[11]. Small streams in particular may not have been identified during the initial design phase and can provide important habitat for fish and Hochstetter's frogs.

Wetlands

While larger wetland areas have been identified and avoided during the initial design phase, it is possible that there are smaller wetland areas present. These need to be identified by the project ecologist in the detailed design stages so that the route can be modified to avoid them. It may also be necessary to delineate and mark on site wetland edges to ensure that no construction occurs within them and that a 10 m buffer is maintained.

Potential wetland areas should be assessed in accordance with wetland delineation protocols (MfE 2022a, Clarkson 2014) and pasture exclusion methodology (MfE 2022b), to determine whether they met the regulatory definition of 'natural inland wetland' (NPS-FM 2020). Potential wetland areas are assessed based on the prevalence of certain vegetation species and their indicator status ratings, as defined in Clarkson et. al. (2021):

- Obligate wetland (OBL) vegetation, which almost always is a hydrophyte (a plant which only grows in wet environments), rarely found in uplands (non-wetland areas).
- Facultative wetland (FACW) vegetation, which usually is a hydrophyte but can occasionally be found in uplands.
- Facultative (FAC) vegetation, which is commonly either a hydrophyte or non-hydrophyte.
- Facultative upland (FACU) vegetation, which is occasionally a hydrophyte but is usually found in uplands.
- Upland (UPL) vegetation, which is rarely a hydrophyte and is almost always found in uplands.

Where the dominance or prevalence tests show unclear results, hydric soils and hydrology tests should be undertaken in accordance with methodology outlined in MfE (2022a) and Clarkson (2014).

Wetland assessments should also include identifying native and exotic vegetation species, examining the structural tiers within wetland areas, and assessing the quality and abundance of aquatic habitats. Signs of wetland degradation such as pugging and grazing from stock access, structures such as culverts impeding hydrological function, and weed infestation should also be noted.

8.6.2 Stream crossings

Avoidance of instream habitat disturbance

Construction near stream beds and rivers should be minimised as much possible. Where new stream or river crossings are proposed (or alteration to existing crossings), bridges are the preferred methodology

[11] Streams are to be classified in accordance with the relevant council plan definitions.

to minimise the effects on ecology. This will minimise the need for any works within watercourses, except perhaps for the installation of bridge piles.

Culvert design for fish passage

Many of our native fish species have to travel between marine and freshwater environments to complete their life-cycle, i.e., they are diadromous. The majority of the most widespread native fish species that occur in New Zealand's waterways have larvae that rear in the sea and then migrate back into freshwater as juveniles. Their adult populations are, therefore, dependent on the success of the annual upstream migrations of juveniles.

Swimming is the primary mode of movement, however, some species have developed additional modes to help them overcome natural obstructions such as waterfalls and rapids. In New Zealand, several of our native fish species, e.g., eel, banded kōkopu and kōaro, are excellent climbers as juveniles. This allows them to negotiate some obstacles, such as waterfalls, as long as a continuous wetted margin is available for them to climb and access habitats far inland and at relatively high elevations.

If bridges in some circumstances are not suitable and culvert installation is required, design needs to take into account instream fauna. Culverts have the potential to restrict fish passage to upstream habitats if constructed poorly. If culverts are required to be installed on streams with potential fish habitat, they should be constructed to be 'fish-friendly' and in accordance with the New Zealand Fish Passage Guidelines (Franklin *et al*., 2018). Figure 3 gives a basic description of fish friendly culvert design. Where culverts are proposed, a freshwater ecologist will need to assess the potential for fish habitat within the footprint and upstream to assess whether fish passage provision and fish rescue is required and be involved in culvert design to ensure that passage is provided where appropriate.

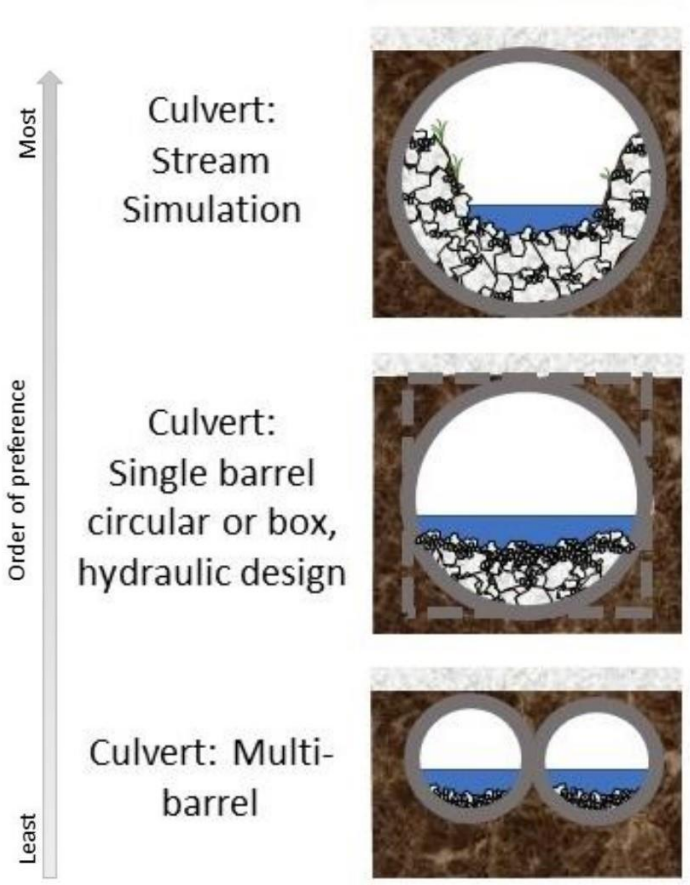

Figure 3. Order of preference for culvert design, based on the degree of connectivity for native fish each design facilitates (modified from Franklin et al., 2018).

8.6.3 Wetlands

The route of Te Ara Tipuna has been designed to avoid coming within 10 m of wetlands, and it is intended that in the detailed design phase any wetlands not already identified will be avoided. In the unlikely situation where adverse effects on wetlands cannot be avoided the value, magnitude and scale of effects will be ascertained during the ecological survey and assessment. Any residual significant adverse effects will be appropriately addressed using the mitigation hierarchy and detailed in the EMP.

8.6.4 Fish relocation

Where it is not possible to avoid disturbance to potential fish habitat (e.g. if a culvert is proposed to be installed), fish salvage and relocation will be required. Salvage will be conducted by a suitably qualified and experienced freshwater ecologist and the required permits will be put in place. Alternative methods can be used to those detailed below. Any use of alternative methods will need to be detailed in the finalised EMP for each stage.

Timing

Fish salvage and relocation will be undertaken immediately prior (within 2-3 days) to the commencement of any instream works.

Fish are generally easier to capture when temperatures are warm, and therefore salvage is best undertaken between December and April inclusive (Joy *et al*., 2013). Additionally, for intermittent streams, stream works undertaken in summer when the streams may be dry would reduce potential effects on fish.

Fish recovery and stream works should be undertaken during a fine weather window. This makes capture of fish easier and reduces the risk of exclusion devices and nets being compromised by periods of high stream flow.

Exclusion devices

Prior to commencing fish salvage, temporary barrier/s will be installed to prevent fish moving into the area of works. The locations of the exclusion screens will be agreed with the earthworks contractor and project freshwater ecologist.

Exclusion devices will be constructed from steel warratahs and shade cloth, or similar. Shade cloth, or a similar material, allows water to continue to flow downstream while preventing fish passage. The exclusion screen will extend at least one metre past the wetted widths of the aquatic habitat and will be embedded into the dry ground or the banks (Figure 4).

Warratahs will be securely hammered into the ground and evenly spaced across the stream to support the shade cloth. Where extra support is necessary, i.e. if the flow is very swift, wire will be threaded horizontally across through the warratahs. Shade cloth will be fastened to the warratahs and wire supports (where applicable) using zip ties. The shade cloth will extend approximately 0.5 m above the water level. Along the stream bed the shade cloth will either be embedded and pinned or securely weighted down, or an apron of the shade cloth will be formed and pinned. This creates a pocket, preventing fish from passing under the barrier.

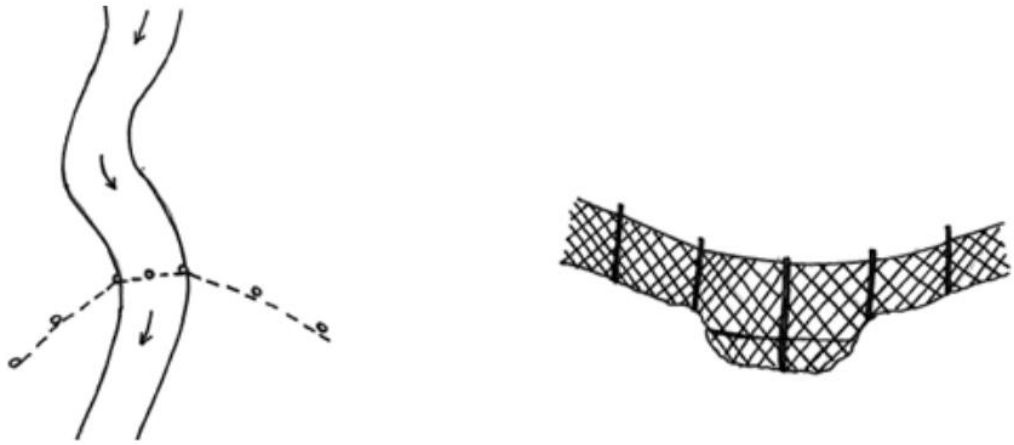

Figure 4. Sketch showing fish barrier installed in a stream to prevent passage into or out of an area.

Ongoing maintenance of the temporary fish barriers by the contractors will be undertaken until stream works are complete.

Fish capture

Fish capture methodologies will depend on the water depth and area of wetted habitat. The *New Zealand Freshwater Fish Sampling Protocols* (Joy *et al*. 2013) will be followed unless specified within this plan.

Baited Gee's-minnow traps and fyke nets will be placed at intervals over the stream works area and left in place overnight. Fine meshed fykes with a separator grill will be used. All nets and traps will be set with an airspace to provide trapped fish access to atmospheric oxygen and will be set in general accordance with the New Zealand Freshwater Fish Sampling Protocols (Joy *et al.* 2013). Floats placed in

the fyke nets if required to ensure an airspace is available. The traps will be checked the following morning, with any captured fish recovered.

Trapping densities will be set, at minimum, one fyke net and two Gee's-minnow traps over 25 m as per Joy *et al.* (2013). However, if sufficient length and depth of water is present, the densities of traps and nets should be increased as the purpose of the trapping is fish recovery. If native fish with a conservation status of "Threatened"or "At Risk" are captured, trapping will continue until no further "Threatened" or "At Risk" individuals are captured.

Where water depth prevents fykes being set, the densities of Gee-minnow traps will be increased and hand-netting of any aquatic habitat (e.g. pools, overhanging vegetation, woody debris) will be undertaken. Hand netting will occur moving up the impact reach to sweep for any fish present within the channel which may not be able to move into the traps due to the shallow water depth. Hand netting will cease when less than two indigenous fish are captured. If water depths are not suitable for Gee's-minnow traps, hand netting will still occur.

A minimum of two electric fishing passes/runs within the target area will be carried out over the trapping period, where stream conditions are suitable for this method. Electric fishing shall be undertaken using an electric fishing machine (EFM 300). When used correctly, the EFM 300 temporarily stuns the fish, allowing them to be caught without damage. At least one electric fishing pass will be undertaken prior to setting any traps or nets and at least one other electric fishing pass will be undertaken following the clearing the traps/nets for the final time. If native fish with a conservation status of "Threatened" or "At Risk" are captured, electric fishing will continue until no further "Threatened" or "At Risk" individuals are captured.

If more than ten native fish are caught during a single trapping effort within the target area, trapping will continue until numbers are depleted to the satisfaction of the ecologist completing the fish salvage and relocation (using an 80% removal rate as a target, based on the Hayne's (1949) regression method). A single trapping effort is considered to be one night of trapping.

Dewatering and muck out

Dewatering will commence provided that the electric fishing minimum performance standards have been met. All pumps used for dewatering will be appropriately screened to prevent fish being entrained in the pump. Screens will have gaps no larger than 3 mm. Native fish, such as eels (*Anguilla* spp.), will burrow into silt substrates when they are disturbed or as water levels decrease. As a result of this, during the dewatering stage, a freshwater ecologist will be present to search through drained habitat, rocks/debris, remaining pools or thick sediment for any remaining fish. Once dewatering is completed an excavator will be used to carefully scrape out any thick layers of sediment, if necessary. Any sediment removed from aquatic habitat will also be manually checked by the freshwater ecologist.

Handling of fish

Fish handling will be in accordance with Section 3.9 of the *New Zealand Freshwater Fish Sampling Protocols* (Joy *et al.* 2013) and the relevant permits.

All fish captured in traps/nets or via electric fishing, will be immediately transferred to waterfilled, lidded containers of an appropriate volume for the number of fish captured. Multiple containers will be used if necessary. Containers will be stored in the shade. Fish will be stored in the containers for no more than one hour. If storage for longer is required, water will be changed at least once per hour

and/or a battery powered air pump will be placed in each container to ensure oxygen levels are sufficient. A water conditioner, such as API stress coat may be added to the water to reduce fish stress. Water conditioner will be added as per manufacturer instructions.

If any individual captured fish shows signs of stress (loss of righting response, exuding excessive mucus, gulping air, and or mouth gaping) the water will be changed to provide more oxygen, or the fish will be moved to the relocation site immediately.

Fish will be visually examined for general health (visual skin lesions or heavy fungal burdens) and if considered unhealthy by an appropriately qualified freshwater ecologist, they will be humanely euthanized in accordance with the conditions of the relevant permits.

Large eels (> 500 mm) will be contained individually to avoid injury to other smaller captured fish. Kōura, if present, will also be separated into their own containers.

Captured fish will be securely transported to the relocation site and gently transferred into the stream within two hours of being captured. If large numbers of fish are captured, they will be distributed across multiple release points in the general area to avoid short term overstocking and predation risks.

Relocation sites

All native fish captured will be relocated on the day of capture to suitable alternative habitat. Fish will ideally be relocated to the same waterway into habitat judged suitable by the freshwater ecologist, either up or downstream of the site. If necessary, relocation could be to another stream within the same catchment, as long as the conditions of the permits are met.

Biosecurity

All equipment will be thoroughly cleaned and dried prior to their use. Equipment includes but not limited to; electric fishing machine, waders, fykes nets, Gee minnow traps and transfer buckets. Any pest fish caught will be humanely euthanized and all euthanized pest fish will be disposed of in accordance with the conditions of the relevant permits.

Adaptive management

Due to the high level of intrinsic variability in any fish recovery and relocation, this plan may be slightly modified by an appropriately qualified freshwater ecologist to ensure fish are recovered in a safe and professional manner, as well as in accordance with the New Zealand Freshwater Fish Sampling Protocols (Joy *et al*. 2013).

Records and reporting

For all native freshwater fauna the following information will be recorded:

- Date and time of capture and release;
- Capture method;
- Capture and release locations (GPS coordinates); and
- Number and size of individuals of each species released.

Reporting requirements for any MPI Special Permits, Fisheries New Zealand authorisations, DoC approvals or resource consents held will be adhered to. Details of those reporting requirements, such as

who to report to and reporting frequency, are permit-specific and can be found in each relevant permit or consent.

All records of native fish captured will also be sent to NIWA for inclusion in the New Zealand Freshwater Fish Database.

8.6.5 Hochstetter's frog relocation

Where disturbance to potential Hochstetter's frog habitat is unavoidable, then a suitably qualified and experienced herpetologist / ecologist with the required DoC permits should be consulted to further assess the potential habitat and develop a salvage plan where frogs may be present.

9 COASTAL ECOLOGY MANAGEMENT PLAN

9.1 Introduction

The purpose of this Coastal Ecology Management Plan (CEMP) is to help guide the assessment of actual and potential adverse effects on coastal habitats such as dunelands, beaches, estuaries and coastal wetlands due to the construction and operation of Te Ara Tipuna.

Coastal effects and mitigation are also considered in the following chapters of this EMP and other plans:

- Te Ara Tipuna Trailway Construction Management Plan (CPS 2023) which covers construction methodologies to avoid or minimise impacts on coastal environments
- Section 4 Vegetation Management Plan
- Section 5 Lizard Management Plan
- Section 7 Avifauna Management Plan
- Section 10 Sediment, Erosion and Discharges

9.2 Habitats and Species Potentially Present

Habitats present in the coastal areas that the path may potentially traverse include:

- Sand dunes;
- Beaches;
- Foreshore areas;
- Estuaries;
- Coastal wetlands.

Coastal habitats have generally been significantly modified over time by loss of their natural vegetation cover and development. These habitats support a variety of fauna and flora, including a number of nationally vulnerable and "At Risk" species. Some of these species have been identified and addressed in Sections 5 (lizards) and 7 (birds) in this report. Others, such as the katipō (*Latrodectus katipo*, At Risk - Declining[12], protected under the Wildlife Act), which occurs in sand dune systems under drift wood or associated with coastal grasses, and the spawning grounds of īnanga (a whitebait fish species that spawns in the margins of estuarine areas[13]), have not been addressed specifically in other sections.

9.3 Potential Coastal Ecological Effects

Potential adverse effects on coastal habitats during construction of Te Ara Tipuna include:

Direct effects:

- Mortality or injury of coastal fauna during stream works;
- Discharge of contaminants such as sediment during works.

[12] Servid *et al.* (2020)

[13] Inanga lay their eggs in the base of long, dense grasses and other thick vegetation near the high spring tide level around the saltwater wedge in the mouths of rivers and streams

Indirect effects:

- Loss of habitat (e.g. sand dune vegetation, driftwood, īnanga spawning areas);
- Increased erosion in the short and long term;
- Temporary noise disturbance;
- Disturbance of fauna species (e.g. birds, lizards, katipō) through construction and track use.

9.4 Assessment of Coastal Ecological Values and Effects

During the detailed design stage for each section of the path, it is important that the route and the areas of proposed works and construction are reviewed to identify habitats that may be disturbed, including:

- Previously identified areas of ecological significance;
- Sand dunes;
- Beaches;
- Riparian margins of estuaries (including potential inanga spawning habitat);
- Coastal wetlands.

If potential coastal habitat features are affected, or there is uncertainty, a site visit should be undertaken to confirm the ecological values of the coastal environment and the potential magnitude of effect of the proposed works on those values in line with EcIAG methodology described in Section 3. Where the overall level of effect is considered to be moderate or higher prior to mitigation, measures need to be introduced to avoid effects through design, or appropriate mitigation needs to be addressed, and preparation of a stage specific Ecological Management Plan, including the effects management measures outlines in Section 9.5 below, will be required.

9.5 Managing Effects on Coastal Environments

9.5.1 Avoid and minimise works within the coastal environment

Works and construction within or near to important coastal habitat such as sand dunes, coastal wetlands, and the riparian margins of rivers and estuaries are to be minimised as much as possible by utilising existing accessways and paths and routing the path around ecological features and revising proposed works where ecological effects are likely to occur.

9.5.2 Mitigate potential effects

Where works are required within these areas, a variety of mitigation measures will be used where appropriate, including:

- Implementation of fauna management plans for birds and lizards where their habitat is potentially disturbed;
- Implementation of the vegetation management plan where vegetation is to be removed or disturbed;
- Measures to control erosion and sediment and other discharges;
- Avoiding works within potential īnanga spawning habitat;

- Leaving a 10 m buffer zone where possible around areas of interest identified through the ecological survey;
- Marking areas that must be avoided on site prior to construction.

Once sections of track are completed, education of track users will be important to ensure that ecological values remain intact, such as avoiding bird nesting areas, staying on the track and expected track behaviour. This is proposed to be achieved through implementation of a passport system for track users.

10 EROSION, SEDIMENT AND DISCHARGES

Construction near streams, rivers and the coast has the potential to release contaminants such as sediment into these water bodies or affect stormwater flows and hydrology. The Construction Management Plan (CPS, 2023) outlines the following ways effects such as these will be minimised and mitigated:

- Keeping earthworks to a minimum overall.
- Minimising construction near streams, rivers, wetlands and the coast as much as possible. If required to complete work adjacent to these environments, construction methodology will meet all permitted standards and follow best practice guidelines.
- Preservation of natural drainage channels and allowing flow paths to continue at pre-development levels.
- Use of compostable toilets that are fully contained and do not produce any discharges.
- Location of toilets away from drainage channels and watercourses.
- Disposal of wastewater from hut basins and sinks in septic fields following local authority guidelines.
- Sediment control installed prior to significant earthworks commencing and particularly in areas close to water bodies. Including silt fences, diversion bunds, grassing finished areas immediately following final contouring, monitoring and maintenance.
- Erosion control such as riprap where required.
- Prior to working within 20 m of a water body, all machinery to be checked for leaks. All refuelling should be carried out on a hard sealed surface and more than 20 m from a watercourse.
- Work within wetlands avoided.

In addition to the above, it is important that no concrete contaminated runoff or slurry enters streams, rivers or the sea, such as when piles for board walks or bridges are being installed. Any water that comes into contact with unset concrete, concrete fines, concrete dust or concrete washings becomes highly alkaline and will burn and kill all fish, aquatic insects and plants that come into contact with it. Construction methodologies will need to be developed and applied to address this risk.

During each detailed design stage, the project ecologist should review plans for erosion and sediment control, proposed locations of toilets and any proposed works in close proximity to watercourses and the coast to identify any issues with regards to potential ecological effects. Any further recommendations identified by the ecologist should be included in the site specific EMP.

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Appendix A
Areas of Ecological Significance Potentially Affected

TEC and Atkins (2023) reviewed areas of ecological significance identified in the relevant council plans and other areas managed outside of council plans (Te Tapuwae O Rongokako Marine Reserve – Pouawa, Ngā Whenua Rāhui Kawenata covenanted areas and QEII National Trust covenanted areas) to identify any potentially affected by Te Ara Tipuna. While the proposed alignment avoids most of those areas, a number were identified as being potentially affected. Table A describes each of the sites and summarises the mitigation measures proposed to address these effects.

Table A. Ecological areas of high ecological value potentially affected by Te Ara Tipuna and summary of mitigation measures proposed (summarised from TEC & Atkins, 2023).

Name	Description	Potential level of effect without mitigation	Potential level of effect with mitigation	Mitigation proposed
Waipare and Nuhiti Q Scenic Area (G11) Ngā Whenua Rāhui Kawenata, Tairawhiti Resource Management Plan Protected Natural Area (WP7)	Primary and secondary forest and kānuka regenerating bush areas.	Moderate	Low	Site visit prior to construction. Track location to avoid mature trees and the covenanted area. Ecological survey to determine species of significance on proposed track. Appropriate construction techniques to avoid impact on secondary growth forest. Replanting of ecosourced trees in areas identified as appropriate.
Tawhiti Tairawhiti Resource Management Plan Protection Management Area (WR19)	Most of the area is occupied by quality secondary forest dominated by kanuka. Highly modified remnants of the original forest, mainly tawa, kohekohe, and puriri.	Moderate	Low	Site visit prior to construction. Track location to avoid mature trees. Ecological survey to determine species of significance on proposed track. Appropriate construction techniques to avoid impact on secondary growth forest. Replanting of ecosourced trees in areas identified as appropriate.
Te Koau Tairawhiti Resource Management Plan Protection Management Area (PR1)	Very high value Provides the only continuous latitudinal sequence from coastal and lowland to lower-montane and upper-montane vegetation types in	Moderate	Low	Site visit to inform detailed track design. Ecological survey. Track design to avoid mature trees and areas of significance identified in survey. Appropriate track construction methods. Replanting of ecosourced

Name	Description	Potential level of effect without mitigation	Potential level of effect with mitigation	Mitigation proposed
	the District. Best representative examples of Tawa-puriri and puriri-pohutakawa-tawa forests in the District. This 1250 ha area is of high significance			trees in areas identified as appropriate.
Hikurangi Tairāwhiti Resource Management Plan Protection Management Area WR125	This is a 1128 ha area separated into two units, both units are of high significance. Tawa-dominant forest at low altitudes. At midaltitudes rimu/tawa/red beech dominate Beech forest dominates at treeline. Alpine herbfield and fellfield congregate around the summit.	Low	Low	Site visits and ecological surveys to inform detailed design phase.
Whangara Beach Tairawhiti Resource Management Plan Marine Area of Significant Conservation Value WR55		Moderate. Proposed track alignment transitions from the beach close to the area of significance	Low	Track alignment on beach via unformed track (no construction proposed on dune environment). Where track transitions from the beach the dune environment will be avoided and appropriate construction techniques employed. Construction timed to avoid dotterel nesting season. Pre-construction site visit.
Whangaparaoa Dunefield (G11) Bay of Plenty Regional Coastal Plan ONFL 38; Opotiki District Plan ONF 19	An extensive coastal duneland with intact cover of vegetation, wetlands and river system backing a long open beach.	Moderate	Low	Site visit and detailed design recommended to ensure that construction does not impact areas of significance, such as through sediment runoff. 10 m buffer for wetland included in design.
Orangoihunui Point & Whitianga Bay, Whitianga Bay to Ohae Point	Largely intact coastal headland extending from Tokata Point including the immediate rocky stoney shoreline along to Ohae	Moderate	Low	Site visit to inform detailed design to limit vegetation clearance, appropriate track material and construction methods.

Name	Description	Potential level of effect without mitigation	Potential level of effect with mitigation	Mitigation proposed
Bay of Plenty RC Regional Coastal Environment Plan ONFL 33, Opotiki District Plan ONF 14	Point. The area includes steep coastal escarpments and raised coastal plateau			
Motu River Mouth Bay of Plenty RC Regional Coastal Environment Plan ONFL 32, Opotiki District Plan ONF 13	The Motu River remains an unmodified feature of the coastal edge, with its vegetation cover a mixture of native and exotic species. The river patterns are constantly changing, with the river mouth forming a shingle barrier between the coastal waters and the river course.	Low	Low	Measures to ensure sediment does not enter the waterway during construction.
Oruaiti Beach, offshore rocks and Waikanapanapa Cliff – Bay of Plenty Regional Coastal Plan ONFL 37; Opotiki District Plan ONF 18	The area extends from the rocky shoreline west of Oruaiti Beach to incorporate beach, associated dunes, rocky headland of Te Ahikehe Point and the shoreline east of Waikanapanapa.	Moderate	Low	Site visit and detailed design to ensure construction does not impact area of significance.

Address | Unit A1, 72 Apollo Drive, Mairangi Bay, Auckland 0632
Post | PO Box 301709, Albany, Auckland 0752
Telephone | 64 9 475 5750
Email | contact-us@viridis.co.nz

www.viridis.co.nz