REPORT

Tonkin+Taylor

Healthy Waters - Te Ararata Flood Resilience Works -Walmsley Road Bridge Replacement

Draft Ecological Management Plan

Prepared for
Auckland Council
Prepared by
Tonkin & Taylor Ltd
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1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Auckland Council's Healthy Waters department (Healthy Waters) to prepare an Ecological Management Plan (EMP) for the proposed Te Ararata Walmsley Road bridge replacement works (the Project). The Project is flood resilience works and has been developed to support a resource consent application under the Severe Weather Emergency Recovery (Auckland Flood Resilience Works) Order 2024.

As part of the overall Programme, Healthy Waters identified a combination of interventions within the Te Ararata catchment (overall referred to as the Te Ararata Project) to collectively address the flood resilience issues further outlined in the Assessment of Effects on the Environment (AEE).

A detailed description of the proposed work and indicative methodology is provided in the AEE prepared for the application. The Project is located within the existing Walmsley Road bridge, Te Ararata Creek, Black Bridge Reserve and Walmsley Road Reserve (Figure 1.1). Overall construction of the Project is anticipated to take approximately 10 – 12 months, with closure of the existing Walmsley Road bridge required for approximately seven months during this period.

The proposed works will impact a number of ecological features as identified in the Ecological Impact Assessment for Te Ararata Improvements Flood Resilience Works - Walmsley Road Bridge (EcIA) prepared for the Project (T+T, 2024). Effects management have been recommended to minimise the impacts of the project on ecological features.

The Ecological Management Plan (EMP) is a requirement of resource consent [numberxxxx] and has been developed in accordance with recommendations described in the EcIA. The EMP includes a Freshwater Fauna Management Plan (FFMP), Avifauna Management Plan (AMP), Mokomoko Management Plan (MMP) and a Vegetation Management Plan (VMP). It should be read alongside the [draft Landscape Plans] which are also relevant to effects management.

Figure 1.1: Site location and surrounding area.

1.1 Purpose and scope of the EMP

This EMP has been developed to outline protocols to avoid, minimise and remedy, potential adverse effects on the ecological and biodiversity values within the Project area associated with the proposed works, including:

- Freshwater Fauna.
- Avifauna.
- Mokomoko (lizards).
- Vegetation.

Each of the fauna management plans within this EMP includes good practice methods for fauna salvage and relocation that have been developed internally at T+T over time. The methods have been developed using project-based learnings, are in general accordance with New Zealand fauna sampling protocols (where applicable), and where necessary in line with current scientific literature.

1.2 Resource consent conditions

The consent conditions relevant to this EMP are conditions XXX to XXX of consent BUN / LUSxxxxx and are provided in full in Table 1.1.

Table 1.1: Relevant conditions which relate to the management of native fauna and vegetation

#	Condition wording	Relevant section of EMP or reference to related plans and documents

1.3 Proposed works

A detailed description of the full project works can be found in the Assessment of Effects on the Environment (AEE) report. In brief, and of relevance to this assessment, the project works comprise the following key components:

- Road closure and temporary bailey bridge construction (Figure 1.2).
- Works within Te Ararata Creek, including demolition and removal of the existing Walmsley Road Bridge twin culvert and reshaping of the upper stream banks under the bridge footprint which will then be lined with rip rap.
- Vegetation clearance, including within riparian margins and the removal of trees.
- Earthworks associated with temporary and permanent works, including within the riparian margins, and to enable the formation and operation of laydown areas and a site compound predominantly within Black Bridge Reserve.

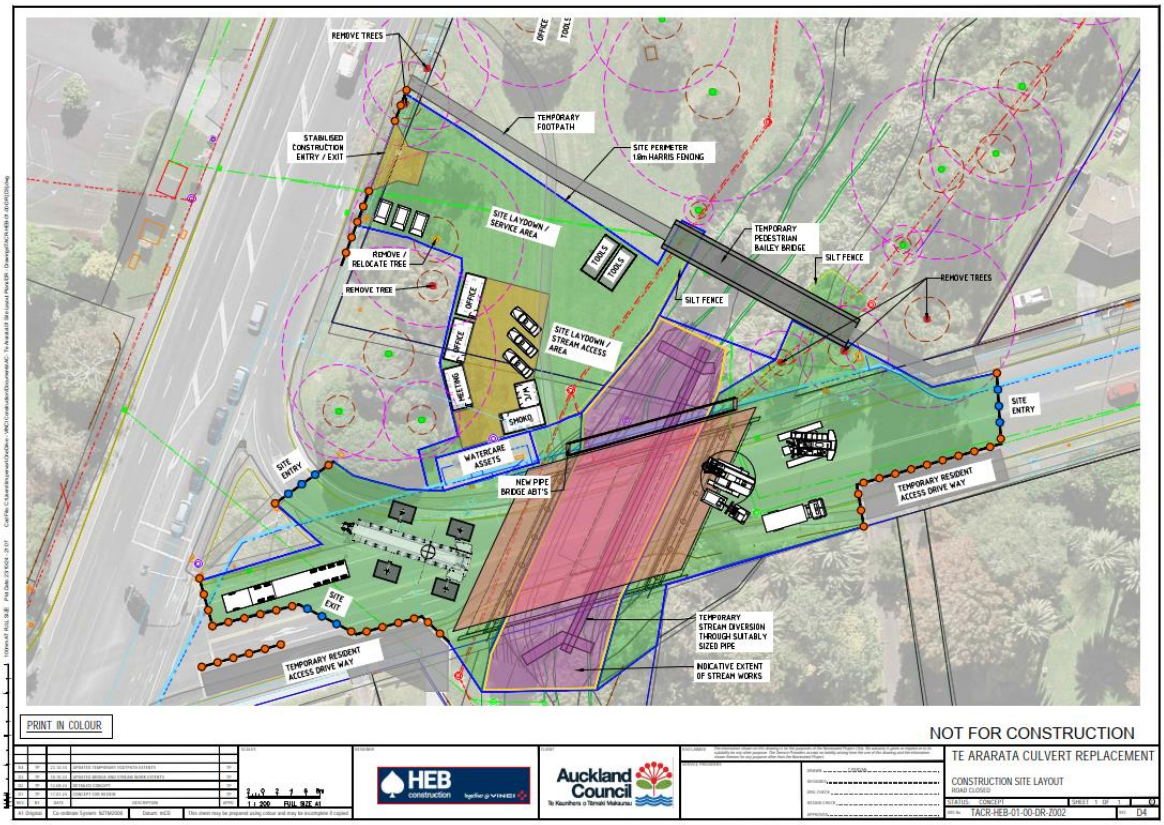

Figure 1.2: Extent of work required by the road closure of Walmsley Bridge.

1.4 Associated documents

The EMP should be read in conjunction with the EcIA prepared for Te Ararata Improvements Flood Resilience Works - Walmsley Road Bridge (T+T, 2024). Also of relevance are the Landscape Plans (ref to be added when finalised), and Erosion and Sediment Control Plan (ref to be added when finalised).

Where required, Wildlife Act Authorities will be held for works that may result in the handling and relocation of native herpetofauna. Those Wildlife Act Authorities will also have certain conditions which must be complied with that maybe different to what is outlined within this EMP.

1.5 Iwi input to EMP implementation

Ongoing engagement with local iwi representatives will occur where requested, to enable the local iwi's chosen kaitiaki to participate in and oversee the construction and operational phases of the Project. Kaitiaki will be invited to participate in vegetation clearance protocols, lizard salvage, bird nest checks and offset and compensation planting alongside the Project Ecologist.

1.6 Responsibilities

Healthy Waters is ultimately responsible for the implementation of this EMP. Delivery of, and compliance with, this EMP will be the responsibility of the Construction Site Manager (i.e. the Contractor's representative on site). They will coordinate with the Project Ecologist(s) or a suitably qualified ecologist, hereafter referred to as the ecologist, who has been approved by the Project Ecologist and is familiar with this EMP. The Project Ecologist will be suitably qualified and experienced in fish, avifauna, herpetofauna and vegetation management. Further management plan specific requirements are detailed in the respective management plans.

Responsibilities of all parties involved in the implementation of the EMP are included but not limited to those outlined in Table 1.2, with contact details provided in Table 1.3.

Table 1.2: Responsibilities of those implementing the EMP

Title	Name	Responsibility
Project owner (Healthy Waters)		• Overall manager of the wider project, including overseeing the implementation of the EMP at a high level.
Project Manager		• Co-ordinates communication between the Contractor and Project Ecologist. • Project Ecologist to provide regular updates on fauna and vegetation management to the Project Manager.
Contractor/Construction Site Manager		• Delivery of and compliance with this EMP. • Implementation of the EMP including the following: – Reading and understanding the EMP. – Facilitating a project start-up meeting with the Project Ecologist before construction commences. – Contacting the Project Ecologist and iwi representatives a minimum of three weeks before any potential in-stream or vegetation clearance works are scheduled and

Title	Name	Responsibility
		confirmation of in-stream works with at least seven days' notice. – Establish with the Project Ecologist the areas scheduled for vegetation clearance during the upcoming earthworks season. – Maintain clear lines of communication with the Project Ecologist regarding changes to the works schedule. – Briefing new personnel about the contractor's responsibilities under this EMP.
Iwi		• TBC in consultation with iwi
Project Ecologist(s)		The Project Ecologist(s) is to be engaged by the project owner to provide technical advice to the Construction Site Manager / contractor and assist the project engineer with compliance against this EMP. The Project Ecologist(s) will: • Read and understand the EMP. • Ensure any required permits are attained and on hand during survey works. • Assist with vegetation management if more than technical advice is required. • Undertake any required fauna management measures (i.e. fish salvage, and relocation works) and lead pre-salvage communication with DOC / MPI ahead of these works in line with permit requirements. • Complete any required reporting.

Table 1.3: Contact details for personnel involved in the implementation of this EMP

Title	Name	Organisation	Phone	Email

1.7 Accidental discovery protocol of At Risk or Threatened species

All personnel working on site are responsible for alerting the Construction Site Manager and the Project Ecologist in the discovery of any 'At Risk' or 'Threatened' flora and fauna not otherwise identified in this EMP on the same working day as the discovery.

The discovery of 'At Risk' or 'Threatened' flora or fauna not otherwise identified in this plan will be notified to the DOC Local Area Manager (Tāmaki Makaurau / Auckland Office: 0800 275 362). The Construction Site Manager must determine a course of action that is based on the advice of the Project Ecologist. The course of action must consider the outcomes of consultation with iwi representatives and DOC and submitted for certification to DOC and the relevant territorial authority.

2 Summary of ecological values and effects management

Ecological values present within the Walmsley Road Bridge project footprint are described in detail in the Ecological Impact Assessment that has been prepared for the Project (T+T, 2024).

Freshwater ecological values within the project footprint range from low to very high; features of interest present include Te Ararata Creek and native freshwater fauna. In the absence of effects management, there could be freshwater effects related to sediment and contaminant discharge, instream modification, injury or mortality of native freshwater fauna and barriers to fish passage.

Terrestrial ecological values ranged from low to very high and included native riparian vegetation, exotic forest, rank grass, urban forest birds, native copper skinks and ornate skinks. Overall, a total of 741 m^2 of temporary vegetation loss is expected as a result of the works.

These effects are proposed to be managed through a range of management plans and remediation planting. An Erosion Sediment Control Plan (ESCP) has been developed to mitigate the impacts of sediment and contaminant discharge on aquatic habitats and fauna during works, which adheres to best practice in accordance with the GD05 guidelines – Auckland Council Guideline Document for Erosion and Sediment Control. Adaptive management during the construction programme will be undertaken to assist with the on-going erosion and sediment control management.

Instream modification and fish passage barriers are limited to temporary effects, with reinstatement of the stream channel and fish passage to be enabled post construction.

Within the EMP, an Avifauna Management Plan (AMP), a Mokomoko (lizard) Management Plan (MMP), a Freshwater Fauna Management Plan (FFMP) and Vegetation Management Plan (VMP) are proposed to manage effects on birds, lizards, fish and vegetation. Remediation planting has been proposed to manage the loss of vegetation as a result of the works.

3 Freshwater Fauna Management Plan

3.1 Purpose and scope

The purpose of this Freshwater Fauna Management Plan (FFMP) is to set out a range of measures to avoid and/or minimise effects to freshwater fauna potentially impacted by the construction activities associated with the project, as discussed in the EcIA (T+T, 2024). Where works in watercourses (streamworks) are required throughout the construction period, these measures will be applied.

This FFMP includes good practice methods for fish salvage and relocation that have been developed internally to T+T over time. The methods have been developed based on project-based learnings, are in general accordance with New Zealand freshwater fauna sampling protocols (where applicable), and where necessary in line with current scientific literature.

3.2 Responsibilities and competencies

Auckland Council Healthy Waters are ultimately responsible for the implementation of the FFMP and any requirements of the resource consent conditions.

Delivery of, and compliance with, this FFMP will be the responsibility of the Construction Site Manager who will liaise with the Project Ecologist to implement this FFMP. The Project Ecologist will be suitably qualified and experienced in freshwater fauna management. The Construction Site Manager and Project Ecologist are yet to be appointed at the time of writing the FFMP.

It is important for the Construction Site Manager to read and understand the FFMP so that the protocols are adhered to correctly during construction works. The responsibilities of the Construction Site Manager include but are not limited to:

- Reading and understanding the FFMP.
- Facilitating a project start-up meeting with the Project Ecologist, before the earthworks season commences each year to determine which stream and wetland habitats are scheduled for works each season to enable forward planning and avoid delays in the construction schedule.
- Contacting the Project Ecologist and iwi representatives a minimum of three-weeks before any potential stream or and sub-tidal channel areas are scheduled for in-stream works, and confirmation of in-stream works with at least seven days' notice.
- Ensure the opportunity for iwi representatives to participate in and support relocations, and to exercise kaitiakitanga responsibilities, as well as to ensure cultural aspects are addressed.
- Maintaining clear lines of communication with the Project Ecologist regarding changes to the works schedule.
- Briefing new personnel about the contractor's responsibilities under this FFMP.

3.2.1 At Risk or Threatened species discovery framework

All personnel working on site are responsible for alerting the Project Ecologist and Construction Site Manager in the discovery of any 'At-Risk' or 'Threatened' freshwater fauna not otherwise identified in this FFMP on the same working day as the discovery. Salvage activities will be undertaken under the supervision of an ecologist who will be able to identify 'At-Risk' or 'Threatened' species. Photographic identification sheets will be developed and made available to non-ecologists working on site to allow them to identify freshwater species known to be present on site. If freshwater species are encountered that are not on the identification sheet then an ecologist will be notified immediately to determine if the species is 'At-Risk' or 'Threatened'.

3.2.2 Permits

The FFMP must be implemented by suitably qualified and experienced ecologists and in accordance with relevant permits and approvals which will include:

- A Ministry for Primary Industries (MPI) Special Permit to catch fish for the purpose of relocating aquatic life.
- An approval from MPI pursuant to section 26ZM (2) (a) of the Conservation Act 1987 to transfer any freshwater aquatic life to a location where they already occur (normally within the same catchment).

The following additional permits and approvals may also be required depending on how the FFMP is implemented:

- A Department of Conservation (DOC) permit to operate an electric fishing machine. This will only be required if electric fishing is identified as an effective capture method.

An approval pursuant from DOC to section 26ZM (3) (a) of the Conservation Act 1987 may be required from DOC to transfer any freshwater aquatic life to a location where they don't already occur. This approval would only be necessary in the event that a previously undetected Threatened or At Risk species is found within the project site.

3.3 Summary of freshwater fauna values and effects

3.3.1 Freshwater fauna ecological values

Eight native fish species have been recorded in Te Ararata Creek on the New Zealand Freshwater Fish Database (NZFFD) (Table 3.1) and through previous surveys in Te Ararata Creek (LEAD Alliance, 2024). Three of these species, longfin eel (*Anguilla dieffenbachii*), giant kōkopu (*Galaxias argenteus)* and inanga (*Galaxias maculatus*), have a national conservation status of At Risk – Declining (Dunn et al., 2018); giant kōkopu is also classified as Threatened – Regionally Critical in Auckland (Bloxham et al., 2023). Redfin bully (*Gobiomorphus huttoni*) has a national conservation status of Not Threatened, but its regional classification is At Risk – Regionally Declining. Smelt (*Retropinna retropinna*) has a national threat classification of Not Threatened but is Threatened – Regionally Vulnerable.

Mosquitofish *Gambusia affinis*, a non-native invasive species, have also been recorded in Te Ararata Creek.

Table 3.1: Records of native fish species present within Te Ararata Creek retrieved from the NZFFD and LEAD Alliance (2024)

Common name	Scientific name	National conservation status	Regional conservation status
Shortfin eel/tuna	*Anguilla australis*	Not Threatened	Regionally Not Threatened
Common bully	*Gobiomorphus cotidianus*	Not Threatened	Regionally Not Threatened
Banded kōkopu	*Galaxias fasciatus*	Not Threatened	Regionally Not Threatened
Redfin bully	*Gobiomorphus huttoni*	Not Threatened	At Risk – Regionally Declining
Smelt/pōrohe	*Retropinna retropinna*	Not Threatened	Threatened – Regionally Vulnerable

Common name	Scientific name	National conservation status	Regional conservation status
Longfin eel/tuna	*Anguilla dieffenbachii*	At risk – Declining	At Risk – Regionally Declining
Inanga	*Galaxias maculatus*	At risk – Declining	At Risk – Regionally Declining
Giant kōkopu	*Galaxias argenteus*	At risk – Declining	Threatened – Regionally Critical

3.3.2 Freshwater fauna ecological effects

The Project involves the demolition and removal of the existing twin culvert beneath Walmsley Road Bridge, the widening and stabilisation of the existing stream banks, and subsequent construction of a new two-lane bridge. The existing twin culvert will be demolished one side at a time. Te Ararata Creek will be sand-bagged and diverted through a closed pipe system ("diversion pipe") in a staged manner so as to create a dry working environment during works. These works have the potential to result in injury or mortality to native fish in the absence of effects management. Effects will be avoided to the extent practicable by salvage and relocation of fauna prior to construction commencing.

3.4 Fish salvage and relocation

3.4.1 Salvage timing

The timing of fish salvage work will depend on the construction schedule and weather conditions. The Project Ecologist shall consult with the Construction Site Manager to plan the staging and sequence for work area isolation, freshwater fauna salvage and diversion. The Construction Site Manager must communicate intended in-stream works at least three weeks in advance and confirm the in-stream works with at least seven (7) days' notice.

3.4.2 Salvaging footprint

The salvaging footprint will be limited to the immediate area that is to be dammed and dewatered to enable the diversion pipe to be installed.

3.4.3 Salvage methods

The implementation of the fish salvage methods described in the following sections will reduce the potential effects of mortality or injury during the construction activities associated with the project. It will not be possible to completely avoid the mortality of all freshwater fauna, however, the objective of the salvage approach will be to minimise mortality as much as practical and allow the recovery of any fish populations as quickly as possible.

Salvaging will include a range of methodologies (described in subsequent sections below) and following good practice with reference to the standard survey protocols for New Zealand freshwater fauna where appropriate as they relate to electric fishing machine (EFM) techniques (e.g. Joy et al, 2013). However, it is recognised that these survey protocols are designed to collect reproducible data rather than maximise the capture of aquatic life and it would therefore not be appropriate to strictly adhere to them during fish salvage operations.

Once the work area is isolated, salvage will generally occur as a three-stage process, starting with trapping, then electric fishing, followed by searches of the site once the stream flow has been diverted.

3.4.3.1 Work area isolation

Before the construction of the dam structures and diversion pipe, the affected stream reach will be isolated using temporary fish exclusion screens. These screens will in brief:

- Be temporary and installed prior to fish salvage and the construction of the stream diversion and dam structures by the contractor.
- Ensure that both upstream and downstream extents of the work area are isolated, minimising the risk of native fish moving into the designated works area.
- Be installed to minimise the ability of fish to swim under, or around the screen, but shall not impede water flow. The exclusion screens will be embedded in the stream bed and banks and firmly secured.
- Extend well above the water surface to allow for increases in water level.
- Preferably be constructed from fine (4 mm) mesh, although larger mesh (e.g. 8 mm) may be used if there is a risk of the mesh blocking due to instream organic debris. If the mesh used in the construction of the exclusion screen is to be shade cloth the percent shade should range between 50 – 70%. The mesh material will be supported by wire netting, with construction being similar to a super silt fence.
- Be inspected and, where required, maintained daily by the contractor to ensure the screen's structural integrity is maintained until the fish salvage and stream diversion works in that section are completed.
- If an exclusion screen fails or becomes overtopped with water the methodology outlined within this FFMP will need to be repeated.
- Allow the Project Ecologist to capture and relocate any fish from within the area prior to work beginning.
- The locations of the exclusion screens will be agreed upon with the Construction Site Manager and Project Ecologist once an implementation programme is agreed.
- By erecting immediately prior to fish salvage this will reduce the risk of the screens being compromised, for example, due to increased flows from a wet weather event.

Once fish salvage (from within the exclusion area) is completed and the Project Ecologist is satisfied with the level of capture effort, the construction of the diversion structures and the diversion pipe can begin. Once the construction of this structure is completed the temporary fish screens can be removed.

3.4.3.2 Trapping

Fish removal using nets will be initiated on the first night following installation of the fish exclusion barriers.

Depending on the water depth and area of wetted habitat, the trap density used will nominally be nine fyke nets and 18 Gee's minnow traps per 150 m stream reach. This is a higher density than recommended in the New Zealand native fish monitoring protocols (Joy et al, 2013) because the objective of this exercise is fauna salvage rather than monitoring.

The actual trap density used in each reach will depend on the available habitat, channel size and water depth. For example, fewer traps will be set in the reach if the channel width is narrow and pool habitats are small. Only Gee's minnow traps will be deployed where there is insufficient water depth or channel width to deploy fyke nets. All fyke nets used will have an internal exclusion system to separate larger fish from smaller fish and reduce the risk of predation.

Where there is a risk of night-time anoxia (e.g. slow-flowing macrophyte dominated streams), traps will not be fully submerged so as to allow the fish to have the ability to surface breathe. Each trap will be checked the following morning, with any captured fish, held and relocated according to the relocation protocol below. Trapping effort for every 150 m reach will be set to a minimum of one night per reach and will then proceed, depending on the following situations (refer to Dunn et al., 2018 for threat classifications):

- If native fauna with a conservation status of 'Threatened' are captured, trapping will continue until no further 'Threatened' are captured.
- If native fish with a conservation status of 'At Risk' are captured, then further trapping will be undertaken until the catch numbers are less than 10% of the initial catch rate for 'At Risk – Declining' species.
- If non-threatened native fauna are captured at densities of greater than 10 fish per 150 m reach, then trapping will continue until a reduction of > 50 % between the highest and the lowest number of individuals captured on any one night is achieved or a maximum of four nights (whichever is achieved first).
- If the Project Ecologist considers the site suitable, then the second or third night of trapping prior to dewatering may be done after partial dewatering has occurred in accordance with the dewatering protocol (Section 3.4.3.4).

3.4.3.3 Electric fishing

Electric fishing may be undertaken following trapping where water depths are between approximately 100 mm and 600 mm, and where stream conditions are suited to this method (consideration will be given to conductivity, water clarity, visibility, water velocities and if present macrophyte cover).

In brief, the electric fishing protocols are:

- Electric fishing will occur for a minimum of three passes.
- After three passes, if the number of species captured has decreased by > 50% between each of the three passes, then it will be considered appropriate to begin diverting the stream.
- If native fish with a conservation status of 'Threatened' or 'At Risk' are captured, then further electric fishing passes will be undertaken until no further 'Threatened' or 'At Risk – Declining' individuals are captured.
- For native freshwater fauna without 'Threatened' or 'At Risk' conservation status, if the number of fish captured between any two consecutive passes decreases by < 50% then further electric fishing passes will be undertaken until the decrease is > 50%, or ≤ 10 individuals are captured in a pass within the isolated area (note these reduction rates do not apply to non-threatened juvenile gobiidae[1]).
- If after multiple passes the specific reduction rates have not been meet, at the discretion of the Project Ecologist construction can commence to install the dam and diversion pipe structures, and the salvage work shift a dewatering approach as set out in the following section.

3.4.3.4 Dewatering and spoil searches

Following the completion of fishing and once the Project Ecologist has indicated dewatering can commence, construction of the pipe diversion structures can commence. A fish exclusion screen will be installed on all pumps used during dewatering activities. This screen will have a maximum mesh

[1] Determined to be gobiidae species ≤ 40 mm in size.

size of 3 mm and will have intake velocities of < 0.3 m^3/s to avoid entrainment of fish. The Project Ecologist will supervise the dewatering of the channel to inspect the streambed and channel base, under-bank margins and any other in-stream habitat for freshwater fauna that may have been missed. Any fish captured during dewatering and/or muck-out will be relocated in accordance with the relocation protocols in Section 3.4.4.

3.4.3.5 Biosecurity and pest fish

All equipment used will be clean, sterilised and/ or allowed to dry for no less that one week prior to use ensuring that all plant material (seeds and plant material that is able to regenerate) and freshwater fauna (e.g. planktonic larvae) is either removed or dead, reducing the risk of transferring freshwater pest plants or animals into the catchment.

Any pest fish caught will be humanely euthanized using clove oil (50 mL per 10 L of water) or benzocaine (3.3% solution in ethanol, 50 mL per 10 L of water). All euthanized pest fish will be buried within the riparian margin of the watercourse in which they were caught.

3.4.4 Relocation protocols

3.4.4.1 Handling, transportation and relocation

Following capture, all freshwater fauna will be relocated in a lidded container of an appropriate volume of clean stream water for the number caught. An aerator will be installed into the container and any freshwater fauna will be transferred to the relocation site within approximately one hour of capture. If for any reason freshwater fauna have to be held for longer than one hour, holding tanks will be insulated to maintain suitable water temperatures and water will be either changed or filtered to maintain water quality.

Whilst contained, freshwater fauna will be constantly monitored and if any individual shows signs of stress (e.g. loss of righting response, and for fish gulping air, and/or gaping) the water will be changed to provide more oxygen and/or the fish will be moved to the relocation site immediately. Sensitive fish species, e.g. galaxiidae or gobiidae species, will be kept in a separate bucket to eels and kōura, to avoid any further disturbance to these species.

Large eels (> 500 mm) will be contained separately within separate holding bins or alternatively in wetted mesh sacks and kept hydrated to avoid injury to other smaller captured fish.

Fish will be handled with wet hands at all times to minimise potential injury. As a general principle, any handling of all freshwater fauna will be minimised in order to reduce potential stress. When freshwater fauna are being released into relocation sites, care will be taken to ensure that the temperature differential between the transportation container and the receiving environment does not noticeably differ. The water temperature will be equilibrated by gradually mixing water from the receiving water body into the transport container over a minimum of five minutes.

3.4.4.2 Relocation sites

Fish will be relocated either immediately upstream or downstream of the project footprint. There is plentiful habitat of a similar nature to the habitat affected by the project works.

3.4.4.3 Mortality monitoring

If mortality occurs during the implementation of the handling, transportation, and relocation protocols described in Section 3.4.4.1, in the first instance the water in the holding tanks / bins will be cycled with fresh stream water to provide more oxygen to the captured freshwater fauna. Then the salvage and handling protocols will be reviewed and any updates to protect captured freshwater

fauna within the protocols will be made to the FFMP (following the adaptive management process outlined in Section 3.5).

Any mortality of freshwater fauna while in holding tanks / bins will be recorded with species identified, length and any physical signs of stress / harm (e.g. reddening of the gills, skin abrasion, loss of / tears in fins) detailed.

Furthermore, within the vicinity of each relocation site, a minimum of 10 minutes will be spent observing the relocation site once freshwater fauna have been released to identify any mortality. This observation period must include walking upstream and downstream of the relocation site.

Any mortality will be recorded, with species identified, length and any physical signs of stress/harm (e.g. reddening of the gills, skin abrasion, loss of / tears in fins) detailed. If during the 10 minute observation period, mortality is observed to be high (i.e. mortality of released fauna > 30 %), any further relocation attempts to that site will be halted, dead fish removed from the site, and the cause of the high mortality investigated (e.g. through collecting relocation site water quality information) and a review of the handling and relocation protocols within the FFFMP will be completed and if needed any updates to the protocols will be made (following the adaptive management process outlined in Section 3.5). Whilst undertaking the protocols outlined within this FFMP, the stress of captured freshwater fauna will be monitored and appropriate responses to signs of an increase in stress will be implemented.

Site construction staff will be advised to report any observations of distressed fish following salvage and relocation efforts to the Project Ecologist. To confirm that there has been no mortality from lasting effects of electric fishing (e.g. spinal injuries and associated internal haemorrhages) a site visit by the Project Ecologist will be undertaken within two days after the time of release at the relocation sites. If during this site visit dead fish are observed, the fish will be removed from the site, and a review of the salvage, handling and relocation protocols within the FFMP will be completed and if deemed necessary any updates to the protocols will be made (following the adaptive management process outlined in Section 3.5).

Any occurrences of high fish mortality shall be reported to Auckland Council with an approach to determining the likelihood of the mortality event and any amendments to the FFMP outlined as per the adaptive management process in Section 3.5.

3.5 Adaptive management

To achieve the desired outcome, changes may need to be made to this FFMP. Detailed construction programmes and methodologies have not yet been developed and they will determine the most effective salvage methodologies to use. Further information on the presence and abundance of freshwater fauna may also come to light during the construction phase and this will be incorporated into salvage methodologies.

If changes are required, these will be communicated to the Construction Site Manager and Auckland Council Regulatory prior to implementing any changes. The rationale behind any changes made must be based on best practice management techniques and stay in line with salvage philosophies identified in this plan.

3.6 Reporting

A compliance letter shall be supplied to the Construction Site Manager and Auckland Council Regulatory by the Project Ecologist which documents the outcomes of all salvage and relocation activities. The letter shall be supplied within ten working days of completion of freshwater fauna salvage at the final stage of works. The compliance letter will contain a summary of all native freshwater fauna captured including:

- Date and time of capture and release.
- Capture method.
- Capture and release locations (including GPS coordinates).
- Number and size of individuals of each species released.
- Detail any observed mortality and the adaptive management methods undertaken to amend the FFMP.
- Representative species photographs.
- All records of aquatic fauna captured and translocated will also be forwarded to the Ministry of Primary Industries, DOC, and uploaded to the NZFFD in accordance with conditions attached to any permits or authorities.

4 Avifauna Management Plan

4.1 Purpose and scope

This Avifauna Management Plan (AMP) sets out management measures to avoid, minimise and remedy potential adverse effects on avifauna as a result of the Project.

Most native avifauna identified as potentially present within the Project footprint are protected by the Wildlife Act 1953, while the Resource Management Act 1991 (RMA) affords protection to significant habitats for indigenous fauna. Furthermore, several species potentially present on site are classified as 'Threatened' or 'At Risk' under the Department of Conservation (DOC) National Threat Classification System (NZTCS) (Robertson et al. 2021).

This AMP includes the following information:

- Responsibilities and competencies of the staff involved in avifauna management.
- Potential avifauna within the proposed footprint and their ecological values.
- Potential effects to avifauna as a result of construction.
- Management measures to avoid, remedy and minimise effects to avifauna.
- Avifauna bird nest check and salvage protocols.
- Reporting requirements.

4.2 Statutory context

The RMA requires an assessment of effects on ecological values EcIA as part of an Assessment of Environmental Effects (AEE). In addition, most native birds are legally protected under the Wildlife Act 1953 (Wildlife Act).

4.3 Responsibilities and competencies

Delivery of, and compliance with this AMP will be the responsibility of the Construction Site Manager who will liaise with the Project Ecologist to implement this AMP. The Project Ecologist will be suitably qualified and experienced in avifauna monitoring. The Construction Site Manager and Project Ecologist are yet to be appointed at the time of writing the AMP.

It will be important for the Construction Site Manager to read and understand the AMP so that the protocols are adhered to correctly during construction works. The responsibilities of the Construction Site Manager include but are not limited to:

- Reading and understanding the AMP.
- Facilitating a project start-up meeting with the Project Ecologist before the works commences to determine habitats scheduled for clearance to enable forward planning and avoid delays in the construction schedule.
- Contacting the Project Ecologist and iwi representatives a minimum of seven days before any potential avifauna habitat areas are scheduled for clearance.
- Ensure the opportunity for iwi representatives to participate in and support relocations, and to exercise kaitiakitanga responsibilities, as well as to ensure cultural aspects are addressed.
- Maintaining clear lines of communication with the Project Ecologist regarding changes to the works schedule.
- Briefing new personnel about the contractor's responsibilities under this AMP.

4.4 At Risk or Threatened species discovery framework

All personnel working on site are responsible for alerting the Construction Site Manager and the Project Ecologist in the discovery of any 'At Risk' or 'Threatened' avifauna nesting on site not otherwise identified in this management plan on the same working day as the discovery.

The discovery of 'At Risk' or 'Threatened' avifauna within the project footprint not otherwise identified in this plan will be notified to the DOC Local Area Manager (Tāmaki Makaurau / Auckland Office: 0800 275 362) and relevant iwi representatives immediately. The Construction Site Manager must determine a course of action that is based on the advice of the Project Ecologist. The course of action must consider the outcomes of consultation with iwi representatives and DOC and submitted for certification to DOC and Auckland Council Regulatory.

4.5 Summary of avifauna values and effects

4.5.1 Terrestrial avifauna ecological values

The desktop assessment undertaken as part of the EcIA returned records for a total of 15 native terrestrial birds at the site, two of which are classified as nationally At Risk (Robertson et al. 2021) and regionally At Risk and Threatened (Woolly, 2024), with the remaining classified as Not Threatened (Appendix A).

Four native species were identified during the site visit, riroriro (*Gerygone igata*), tauhou (*Zosterops lateralis*), pīwakawaka (*Rhipidura fuliginosa*) and tūī (*Prosthemadera novaeseelandiae*). The suite of terrestrial bird species expected at this site are common urban forest birds.

Two nationally At Risk species were identified as potentially being present at site, North Island kākā (*Nestor meridionalis septentrionalis*; nationally At Risk – Recovering; At Risk – Regionally Recovering) and tarāpunga/red-billed gull (*Chroicocephalus novaehollandiae*; At Risk – Declining; Threatened – Regionally Vulnerable). Both species may intermittently forage or roost at the site but are unlikely to nest at the site.

Tūī and kererū (*Hemiphaga novaeseelandiae*) were considered of **moderate** ecological value as keystone pollinators and seed dispersers. North Island kākā was considered of **moderate** ecological value and tarāpunga as **high** ecological value due to their threat classifications. All other species were considered of **low** ecological value.

4.5.2 Avifauna ecological effects

Potential adverse effects on avifauna include:

- Temporary habitat loss of native riparian planting (571 m^2) and exotic forest (170 m^2) (total of 741 m^2).
- Injury or mortality during habitat clearance.

The loss of approximately 741 m^2 constitutes a relatively minor loss of habitat for native terrestrial birds (there is over 10,000 m^2 of similar habitat along the upstream Te Ararata Creek riparian zone).

Habitat removal during the peak forest bird breeding season (September to January inclusive) can result in direct harm to nests, eggs and nestlings. Most native birds are protected by the Wildlife Act 1953.

4.6 Avifauna effects management

4.6.1 Approach

Measures to avoid, minimise and remedy potential effects of the project works on native birds are summarised below:

- Provision of maps showing delineation of bird habitat to be cleared.
- Pre-construction and vegetation clearance briefing with Project Ecologist and contractor personnel.
- Seasonal restrictions on the timing of vegetation clearance where practical.
- Pre-vegetation clearance checks for native bird species during the peak breeding/nesting season when vegetation clearance activities are required (and if peak bird breeding season cannot be avoided).
- Incidental discovery and harm protocols. These protocols include best practice methodologies commonly used on construction projects and adapted in this AMP for local site conditions.
- Habitat remediation. Native vegetation removed due to site works will be re-instated following completion of construction works. A minimum of 741 m^2 native remediation planting is proposed.

4.6.2 Seasonal constraints

During the breeding season there is the potential for direct harm to nests, eggs and chicks during vegetation clearance activities. To avoid or minimise effects on native birds, vegetation clearance outside of the peak bird breeding season is recommended. Where vegetation clearance must be undertaken the forest bird peak bird breeding season (September to January inclusive), protocols for vegetation removal (Section 4.6.3) must be adhered to.

4.6.3 Protocols for vegetation removal

To enable programme delivery, vegetation clearance may need to be undertaken during bird breeding season for species potentially on site. However, to avoid the loss of native bird nests, eggs and chicks associated with this clearance, the following protocols will be followed:

- Constructor to notify the Project Ecologist at least three weeks prior to any bird habitat clearance during the peak bird breeding seasons.
- Project Ecologist to notify iwi of any upcoming bird nest checks. Iwi will be invited to assist and attend any bird nest check works.
- Pre-construction briefing with Project Ecologist and contractor personnel.
- Prior to bird nest surveys, a surveyor will mark out the required area of vegetation clearance.
- The Project Ecologist or suitably qualified ecologist will undertake the following to identify breeding birds, nests and eggs prior to vegetation clearance:
  - Bird behaviour will be observed from a distance to determine bird nest presence.
  - Careful and thorough transect walks will be undertaken within potential bird nesting habitat areas within the project area (and 10 m buffer to the boundary) searching for breeding birds, nests, and eggs.
  - If no active nests are found, vegetation clearance in the searched area may proceed (within three days, otherwise an additional nest check is required).
  - Where active nests are found, then individual trees and/or immediate surrounding habitat (within 10 m for nationally 'Not Threatened' species and 30 m for nationally 'At

Risk' or 'Threatened' species) are to be left in situ, clearly marked, and cordoned off from any works or machinery until nesting birds have fledged or nests are naturally abandoned. Following confirmation that the area is free of active nests by the Project Ecologist, vegetation clearance or works may occur within three days of the area being checked.

- Climbing arborists may be required to assist with bird nest surveys where trees are too tall or dense to effectively assess from the ground.
- Where work ceases for more than three consecutive days, the site must be re-inspected for bird breeding and nesting activity.

4.6.4 Accidental discovery protocols

If a bird nest, eggs and/or chicks are discovered during vegetation clearance by site contractors, the following protocols will be followed:

- The contractor will contact the Project Ecologist immediately.
- If a nest is found and deemed to be active, then individual trees and immediate surrounding habitat (within 10 m for nationally 'Not Threatened' species and 30 m for nationally 'At Risk' species) are to be left in situ, clearly marked, and cordoned off from any works and machinery until nesting birds have fledged or nests naturally abandoned.
- No works or personnel are to enter within the exclusion zone until chicks have fledged or the nest has been naturally abandoned, as confirmed by the Project Ecologist.
- Climbing arborists may be required to assist with bird nest checks where vegetation is too tall or dense to properly assess.
- Once the area is deemed free of active nests by the Project Ecologist, vegetation clearance or works may continue.

4.6.5 Accidental bird injury and mortality during construction

In the event of finding a dead or injured native bird during vegetation clearance or construction works, the following procedures will be implemented:

- Injured native birds will be placed in a cool, dark, material-lined box or bag by or under the direction of the Project Ecologist to ensure any birds are handled appropriately.
- Any accidental bird injuries and/or mortality will be reported to the Project Ecologist no longer than two hours after the injured or dead bird is found.
- The local DOC office or DOC hotline (if after hours) will be contacted no more than two hours after the injured or dead bird is found. The DOC hotline is 0800 DOCHOTLINE (0800 362 468).

DOC and veterinary advice shall be sought in conjunction with the Project Ecologist when considering the rehabilitation requirements of any injured native birds (for example, legislative requirements will need to be considered). If the bird is dead or euthanised by the vet, it must be taken to the local DOC office as soon as practicable if requested by the local DOC office.

4.6.6 Adaptive management

To achieve the desired outcome (managing effects on avifauna), changes may need to be made to this AMP. The rationale behind any changes must be based on best practice management techniques to manage adverse effects on avifauna. If any changes are required, Auckland Council as the consenting authority will be notified in writing (email or letter) prior to implementing any changes.

4.7 Reporting

A compliance letter shall be supplied to the Construction Site Manager, Auckland Council Regulatory and the Department of Conservation by the Project Ecologist. Reporting will be completed within three months of all construction site works being completed (does not include revegetation works). The compliance report will contain a summary of the following:

- The name and qualifications of the person carrying out the pre-construction bird nest checks.
- Dates of any bird nest checks.
- The location, species and outcome of any observed bird-breeding and nests.
- The number and species of any accidental bird injury and/or mortality that occurred during construction.
- Measures taken to avoid, minimise or mitigate adverse effects on any bird breeding or nesting sites.
- Photographs of any bird management measures, including photographs of any active native bird nesting.

5 Mokomoko (Lizard) Management Plan

See Appendix B for the Mokomoko (Lizard) Management Plan (MMP) which was prepared separately to this EMP and provided to the DOC alongside a supporting Wildlife Act Authority Application. The MMP includes measures for three sites within Te Ararata Creek, including Walmsley Road Bridge.

6 Vegetation Management Plan

6.1 Introduction

This section outlines the management processes to avoid, minimise or remedy adverse effects on vegetation and habitat values during the construction phase of the Project.

Management actions are recommended in order to avoid, minimise and remedy effects on vegetation and include design measures, vegetation mapping, vegetation clearance protocols and vegetation salvage. All proposed management actions outlined in this report shall take into account the outcomes of consultations with DOC and the iwi partners.

6.2 Responsibilities and competencies

Delivery of, and compliance with, the Vegetation Management Plan (VMP) will be the responsibility of the Construction Site Manager who will liaise with the Project Ecologist and specialist ecologists as required.

It will be important for the construction contractor to read and understand this section so that the protocols are adhered to correctly during construction works. The responsibilities of the construction contractor include, but are not limited to:

- Reading and understanding the VMP.
- Facilitating a project start-up meeting with the Project Ecologist and the Site Manager before vegetation clearance commences for each stage of the Project.
- Ensure the opportunity for iwi partners to participate in and support any vegetation or habitat salvaging and relocation as deemed necessary, to ensure appropriate exercise of kaitiakitanga responsibilities and to ensure that cultural concerns are addressed.
- Maintaining clear lines of communication with the Project Ecologist regarding changes in the works schedule.
- Ensuring reporting requirements under the VMP are met.
- Briefing new personnel about the contractor's responsibilities under this plan.

6.3 At Risk or Threatened species discovery framework

All personnel working on site are responsible for alerting the Project Ecologist and the Construction Site Manager in the event of the discovery of any 'At-Risk' or 'Threatened' flora and fauna not otherwise identified in this management plan on the same working day as the discovery.

The discovery of 'At Risk' or 'Threatened' flora within the project footprint not otherwise identified in this plan will be notified to the DOC Local Area Manager (Tāmaki Makaurau / Auckland Office: 0800 275 362) and relevant iwi representatives immediately.

The Construction Site Manager must determine a course of action that is based on the advice of the Project Ecologist. The course of action must consider the outcomes of consultation with iwi representatives, DOC and Auckland Council Regulatory (as appropriate).

6.4 Summary of vegetation values and effects

6.4.1 Vegetation values

Vegetation types present in the project footprint include native riparian planting and exotic forest.

Native riparian plantings were approximately 5 m in height and dominated by typical riparian planting species. Canopy species included mānuka (*Leptosperum scoparium*), kānuka (*Kunzea robusta*), pūriri (*Vitex lucens*), tī kōuka (*Cordyline australis*), karaka (*Corynocarpus laevigatus*), māhoe (*Melicytus ramiflorus*), lemonwood (*Pittosporum eugenioides*) and ngaio (*Myoporum laetum*). The understory was dominated by harakeke (*Phormium tenax*) on the peripheries, with occasional native ferns, ground covers and seedlings including trembling brake (*Pteris tremula*), mercury bay weed (*Dichondra repens*) and purei (*Carex secta*). Kohekohe (*Didymocheton spectabilis*) seedlings were naturally established. Introduced species included German ivy (*Delairea odorata*), brush wattle (*Paraserianthes lophantha*) and nasturtium (*Trapaeolum majus*). Introduced she-oak (*Casuarina cunninhamiana*) trees and saplings occurred on the eastern side of Te Ararata Creek in Walmsely Road Reserve. This ecosystem type supports native forest birds and skinks.

Exotic forest was dominated by flame tree (*Erythrina x sykesii*) and phoenix palm (*Phoenix canariensis*). The understory was dominated by common introduced species including bear's britches (*Acanthus mollus*), nasturtium and tradescantia (*Tradescantia fluminensis*). The western side of Te Ararata Creek was dominated by introduced grasses and herbs including kikuyu grass (*Cenchrus clandestinus*), nasturtium, montbretia (*Crocosmia x crocosmiiflora*), creeping buttercup (*Ranunculus repens*) and broad-leaved doc (*Rumex obtusidolius*). This ecosystem type supports native forest birds and skinks. It protects and buffers Te Ararata Creek.

Of the species recorded, kānuka, mānuka and pōhutukawa are classified as Nationally Not Threatened (De Lange et al. 2024) but regionally, kānuka and pōhutukawa are classified as At Risk – Declining, with mānuka classified as Threatened – Regionally Vulnerable (Simpkins et al. 2022). The threat classifications are raised due to the potential threat of myrtle rust (*Austropuccinia psidii*). They are otherwise common in the local and wider environment. All other species are classified as nationally Not Threatened or introduced.

As a result of their threat classifications, kānuka, mānuka, ngaio and pōhutukawa are of **moderate** ecological value. All other identified species are of **low** ecological value due to their threat classification, age / size (five to six metres) and having been planted.

6.4.2 Effects on vegetation

Potential adverse effects on terrestrial vegetation include:

- Temporary loss of native riparian plantings (571 m^2).
- Temporary loss of exotic forest (170 m^2).
- Potential loss of one specimen pōhutukawa tree.

6.5 Effects management

A range of measures will be implemented during construction to avoid and minimise adverse effects on vegetation, including on 'Threatened' and 'At-Risk' species and ecosystems. These include:

- Vegetation clearance protocols (Section 6.5.1).
- Remediation planting including the replacement of regionally 'Threatened' and 'At-Risk' plant species (Section 6.5.2).
- The transplantation of a single pōhutukawa specimen tree (Section 6.5.3).

Removal of vegetation can expose soil, making it more prone to erosion, resulting in increased sedimentation into streams. In addition, the accumulation or storage of sawdust, chip or mulch near or over waterways can leach dissolved organic matter that can promote heterotrophic growths or deplete dissolved oxygen in stream water.

Prior to vegetation clearance, sediment control measures will be undertaken to avoid or minimise effects on Te Ararata Creek and freshwater fauna due to effects on water quality. Procedures for minimising the area and duration of soil exposure from vegetation clearance are outlined in the ESCP.

Any adverse effects arising from vegetation clearance will be minimised by following procedures for:

- Minimising the area and duration of soil exposure from vegetation clearance.
- Minimising the volume of vegetation to be mulched.
- Locating wood residue piles with an appropriate separation distance from Te Ararata Creek.

Vegetation clearance will only commence after all pre-clearance management measures have been undertaken or are in place and these measures confirmed by the Project Ecologist and iwi.

During vegetation clearance activities, construction methodology refinements, maintenance of physical delineation barriers and erosion and sediment control measures, as described within this VMP, will be ongoing.

6.5.1 Vegetation clearance protocols

6.5.1.1 Appropriately experienced arborists

Vegetation removal will be undertaken by suitably experienced arborists to reduce tree damage and to accommodate construction.

6.5.1.2 Demarcation of clearance extent

To ensure native vegetation outside of the areas marked in the vegetation clearance plans are not mistakenly removed or damaged, the extent of vegetation clearance will be clearly physically delineated. The boundaries will be delineated by the Construction Site Manager using temporary fencing / marking. The Contractors / Construction Site Manager will ensure no vegetation will be removed outside of this boundary. Furthermore, no construction materials or waste will be deposited into vegetation outside of the fencing.

Project arborists and construction contractors where practicable will ensure that vegetation is felled into the Project footprint to minimise impacts on the remaining vegetation.

6.5.1.3 Seasonal restrictions on vegetation clearance

Vegetation clearance should be undertaken during the earthworks season (1 October – 1 May) due to seasonal constraints for salvaging and relocating lizards.

Vegetation clearance should also be undertaken where practicable:

- Outside of peak bird breeding season to avoid and minimise potential direct mortality or injury to eggs, nesting chicks and fledglings.
- In the event that vegetation clearance is required during peak bird breeding season, refer to Section 4: Avifauna Management Plan for further additional management actions that will need to be implemented.

Additional to the bird breeding constraints, clearance of certain habitat types will also be limited to suitable weather as defined in the Mokomoko Management Plan (Section 5) when lizards are likely to be more active (and therefore more likely to be detected if present).

6.5.1.4 Minimising impacts on adjacent vegetation

In addition to the above, the methodology to further reduce effects during vegetation clearance for the removal and pruning of vegetation includes:

Where practicable vegetation will be directionally felled away from the physically marked boundary (refer to Section 6.5.1.2) to prevent vegetation damage to the vegetation immediately adjacent to the Project footprint, unless deemed to be unsafe and hazardous. Methods for undertaking vegetation removal will be site specific and commonly will include use of an excavator, grapple and chainsaw on suitable land, and directionally felling trees using experienced arborists.

An excavator will be required to assist with lizard management. An excavator will be required to scrape ground covers and lift large rocks and/or logs which native lizards use for cover. An ecologist will be on site to direct any machine-assisted lizard salvage (refer to Section 0 MMP).

6.5.2 Remediation planting

Following construction, remediation planting will be undertaken to reinstate native vegetation that will be cleared. Remediation planting includes approximately 500 to 1,000 m^2 (to nearest 100 m) of streamside and bank planting (Boffa Miskell, 2024).

The planting schedule closely resembles the species composition of the existing native vegetation, including regionally 'At Risk – Declining' kānuka and 'Regionally Endangered' mānuka. The planting composition has been developed to target a forest trajectory to pūriri forest. The planting includes enhancement planting at year 5. The planting has been undertaken in accordance with Ngaa Hau o Maangere Ngahere Planting Guide (Maaehe, 2023).

6.5.3 Pōhutukawa transplant

A single specimen pōhutukawa tree is present within the footprint. Transplantation of this tree has may be undertaken to avoid the removal of the tree. The method for transplanting the tree is described in the arborist report (The Tree Consultancy, 2024). Replacement pōhutukawa will be established at the reserve if the pōhutukawa is not transplanted or if the transplantation is unsuccessful.

7 Applicability

This report has been prepared for the exclusive use of our client Auckland Council Healthy Waters, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council Regulatory as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

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Chris Bauld
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Appendix A Avifauna species list

Table Appendix A.1 : List of native terrestrial bird species present or potentially present in or near the project site (data from iNaturalist, eBird and on-site observations).

Species name	Common name	National threat classification (Robertson et al. 2021)	Regional threat classification (Woolly et al. 2024)	Observed on site	Ecological value (EIANZ criteria; Roper-Lindsay et al. 2018)
Acridotheres tristis	Common myna	Introduced	Introduced	✓	Negligible
Anas platyrhynchos	Rakiraki / mallard	Introduced	Introduced		Negligible
Carduelis carduelis	European goldfinch	Introduced	Introduced		Negligible
Chloris chloris	European greenfinch	Introduced	Introduced		Negligible
Chroicocephalus novaehollandiae	Tarāpunga / red-billed gull	At Risk - Declining	Threatened – Regionally Vulnerable		High
Chrysococcyx lucidus	Pīpīwharauroa / shining cuckoo	Not Threatened	Not Threatened		Low
Columba livia	Rock pigeon	Introduced	Introduced		Negligible
Egrett novaehollandiae	Matuku moana / white-faced heron[2]	Not Threatened	Not Threatened		Low
Fringilla coelebs	Chaffinch	Exotic	Exotic		Negligible
Gerygone igata	Riroriro / grey warbler	Not Threatened	Not Threatened	✓	Low
Gymnorhina tibicen	Australian magpie	Introduced	Introduced		Negligible
Hemiphaga novaeseelandiae	Kererū	Not Threatened	Not Threatened		Moderate
Hirundo nexoena	Warou / welcome swallow	Not Threatened	Not Threatened		Low
Larus dominicanus	Karoro / Southern black-backed gull	Not Threatened	Not Threatened		Low
Nestor meridionalis septentrionalis	North Island kākā	At Risk - Recovering	At Risk - Regionally Recovering		Moderate
Ninox novaeseelandiae	Ruru/morepork	Not Threatened	Not Threatened		Low
Passer domesticus	House sparrow	Introduced	Introduced		Negligible
Platycercus eximius	Eastern rosella	Introduced	Introduced		Negligible
Porphyrio melanotus	Pūkeko	Not Threatened	Not Threatened		Low
Prosthemadera novaeseelandiae	Tūī	Not Threatened	Not Threatened	✓	Moderate

Species name	Common name	National threat classification (Robertson et al. 2021)	Regional threat classification (Woolly et al. 2024)	Observed on site	Ecological value (EIANZ criteria; Roper-Lindsay et al. 2018)
Rhipidura fuliginosa placabilis	Pīwakawaka/ North Island fantail	Not Threatened	Not Threatened	✓	Low
Spilopelia chinensis	Spotted dove	Introduced	Introduced		Negligible
Sturnus vulgaris	Common starling	Introduced	Introduced		Negligible
Todiramphus sanctus vagans	Kōtare / sacred kingfisher	Not Threatened	Not Threatened		Low
Turdus merula	Eurasian blackbird	Introduced	Introduced		Negligible
Turdus philomelos	Song thrush	Introduced	Introduced		Negligible
Vanellus miles	Spur-winged plover	Not Threatened	Not Threatened		Low
Zosterops lateralis	Tauhou / silvereye	Not Threatened	Not Threatened	✓	Low

Appendix B Mokomoko (Lizard) Management Plan

REPORT

Tonkin+Taylor

Mokomoko Management Plan

Blue Green Network: Te Ararata

Prepared for
Auckland Council
Prepared by
Tonkin & Taylor Ltd
Date
October 2024
Job Number
1017033.2003 v1

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Document control

Title: Mokomoko Management Plan					
Date	**Version**	**Description**	**Prepared by:**	**Reviewed by:**	**Authorised by:**
August 2024	1.1	Final Mokomoko Management Plan for issue	S Heggie-Gracie	R Behrens J Quinn	C Bauld
October 2024	1.2	Updates following DOC review	S Heggie-Gracie	J Quinn	C Bauld

Distribution:

Auckland Council	1 copy
Department of Conservation	1 copy
Tonkin & Taylor Ltd	1 copy

Table of contents

1 Introduction

Auckland Council (AC) is proposing the implementation of flood resilience works at a number of sites across Tāmaki Makaurau/Auckland. These works comprise part of the Blue Green Network upgrades in response to significant storm events and associated flooding across Tāmaki Makaurau in 2023. In general, these works involve the upgrading of instream structures for higher flow capacities, floodplain management and associated enabling works. The projects may be consented through an 'Orders in Council' – a number of laws changed to help communities continue to recover from severe weather events during early 2023. However, they may also be consented through the usual consenting process.

One of the target sites is located along Te Ararata Creek, Māngere East (see Figure 1, Appendix A). There are three key aspects to the works:

- Access to Mahunga Drive culverts (referred to as Mahunga Drive).
- Upgrade of Walmsley Road Bridge (referred to as Walmsley Road Bridge).
- Debris trap upstream of Walmsley Road (referred to as Upstream of Walmsley).

The proposed works will require the removal of planted native and exotic vegetation which may provide habitat for native mokomoko/skinks (Photograph 1.1 to Photograph 1.6). All three areas provide potential mokomoko habitat.

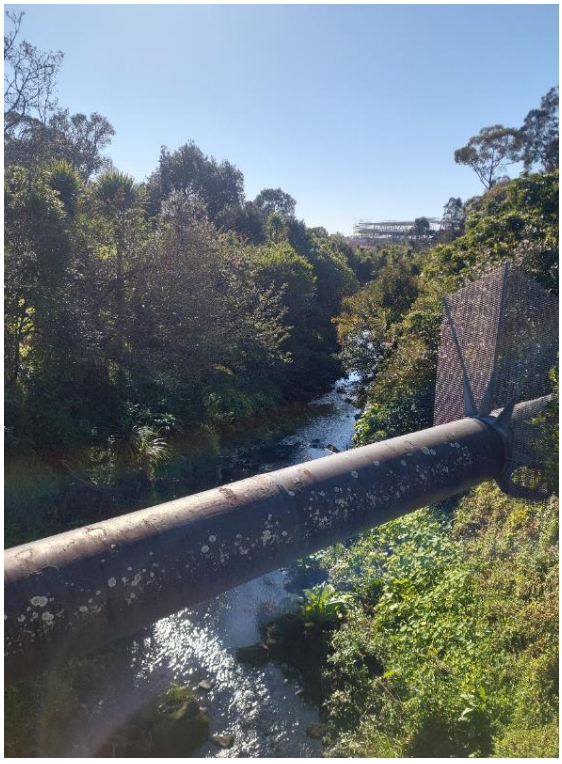
Native mokomoko are protected by the Wildlife Act 1953. This Mokomoko Management Plan (MMP) has been prepared to outline measures to avoid, remedy and mitigate impacts to native mokomoko and to support a Wildlife Act Authority (WAA) application to the Department of Conservation (DOC).

This MMP has been prepared in accordance with our Statement of Work (SoW) dated 14 June 2024[1].

[1] T+T (2024). Statement of Work (SoW). Te Ararata Stage 2: Design. Stream works. Contract number CW218687. Auckland Council.

Photograph 1.1: Mahunga Drive culverts with native shrubland providing potential mokomoko habitat (10 July 2024).

Photograph 1.2: Mahunga Drive native riparian plantings which may provide habitat for native mokomoko. (*10 July 2024*).



Photograph 1.3: Walmsley Road Bridge, overlooking native riparian habitat (10 July 2024).

Photograph 1.4: Walmsley Road Bridge potential moderate quality mokomoko habitat (10 July 2024).

Photograph 1.5: Native riparina planting at the Upstream of Walmsley site (10 July 2024).

Photograph 1.6: Tradescantia (Tradescantia fluminensis) providing potential mokomoko habitat at the Upstream of Walmsley site (10 July 2024).

1.1 Scope

The scope of this MMP is to provide the mokomoko ecological values, potential effects and effects management measures to avoid, remedy and / or mitigate potential impacts to native mokomoko. This MMP includes the following:

- Responsibilities of personnel involved in mokomoko management.
- Summary of mokomoko ecological values, effects and effects management.
- Salvaging protocols for mokomoko.
- Mokomoko relocation protocols including relocation site description.
- Adaptive management protocols.
- Reporting requirements.
- A figure showing descriptions of potential mokomoko habitats and relocation site.
- Key principles for mokomoko salvage.

Note, that at this time, the design and construction approach for the project is still being finalised. An ecological impact assessment report (EcIA) will be prepared and lodged with the resource consent application. This MMP will be submitted with the application as a draft, with the intention that it can be updated in response to queries from Auckland Council and any clarification that may come from DOC. The MMP has been prepared based on information available at this time and is considered to be an accurate indication of the extent of impact expected from the project works.

1.2 Responsibilities

Responsibilities of all parties involved in implementing the MMP are outlined in Table 1.1.

Table 1.1: Responsibilities of those implementing the MMP

Title	Responsibility
Project owner (Auckland Council – Healthy Waters)	• Overall manager of the wider project, including overseeing the implementation of the MMP at a high level.
Project Manager	• Co-ordinates communication between the Contractor and Project Ecologist.
Contractor/construction site manager	• Delivery of and compliance with this MMP. • Implementation of the MMP including the following: – Reading and understanding the MMP. – Facilitating a project start-up meeting with the Project Ecologist before construction commences. – Contacting the Project Ecologist and Project Iwi a minimum of one month before any potential mokomoko habitat areas are scheduled for clearance. – Maintaining clear lines of communication with the Project Ecologist regarding changes to the works schedule. – Briefing new personnel about the contractor's responsibilities under this MMP.
Project Ecologist	The Project Ecologist is to be engaged by the project owner to provide technical advice to the construction site manager/contractor and assist the Project Manager with compliance against this MMP. The Project Ecologist will: • Read and understand the MMP. • Ensure any required permits are attained and on hand during survey, salvage and relocation works. • Co-ordinate with Project Iwi to ensure mokomoko salvage to allow iwi involvement and provide opportunity for tikanga to be followed. • Undertake any required mokomoko salvage and relocation works and lead pre-application meeting with DOC ahead of these works to confirm permit requirements and the relocation site. • Project Ecologist to provide regular updates on mokomoko management to the Project Manager. • Complete any required reporting.
Project Iwi	Project iwi have been engaged for this project. The Project Iwi will: • Communicate with the Project Ecologist. • Read and understand the MMP. • Input to proposed mokomoko management measures. • Lead and implement any tikanga required for mokomoko management measures. Project Iwi will be invited to assist in any mokomoko survey and/or salvage works.

2 Summary of mokomoko values, effects and effects management

2.1 Mokomoko ecological values

Based on a desktop assessment, copper (*Oligosoma aeneum*) and ornate skinks (*O. ornatum*) were considered potentially present at site.[2]

A site visit was undertaken on 10 June 2024 to assess the Mahunga Drive, Walmsey Road Bridge and Upstream of Walmsley Road Bridge footprints. The habitat assessment confirmed potential habitat at all three sites, comprising planted native riparian vegetation, rank grass, rocks, exotic ground covers and occasional debris (Appendix A Figure 1). Planted native riparian vegetation was approximately three to five meters tall and comprised harakeke (*Phormium tenax*), mapou (*Myrsine australis*), nīkau (*Rhopalostylis sapida*), tī kōuka (*Cordyline australis*), mānuka (*Leptospermum scoparium*), kānuka (*Kunzea robusta*) and other typical native planted species.

During Artificial Cover Object (ACO) deployment on 21 August 2024, a single copper skink was incidentally recorded in riparian vegetation at the Walmsley Bridge area. The ACO's were in place for four weeks prior to checking. Results from three ACO checks across all the project footprint areas are as follows:

- 23 September 2024: One copper skink at Mahunga Drive, one ornate skink at Walmsley Road Bridge.
- 2 October 2024: One copper skink at Walmsley Bridge (upstream).
- 8 October 2024: No native lizards.

Copper and ornate skinks are classified as 'At Risk – Declining' both nationally (Hitchmough et al. 2021) and regionally (Meltzer et al. 2022). Due to their threat classification, they are considered of **high** ecological value.

2.2 Effects on mokomoko

Potential effects on native copper and ornate skinks includes the following:

- Temporary loss of lizard habitat including exotic-dominated forest, native riparian plantings and rank grassland.
- Injury or mortality during habitat clearance.

The design for each area is yet to be finalised and therefore the extent of vegetation clearance is currently unknown. Most habitat loss is likely to be temporary, as each area will be remediated with native plantings following works completion.

- At Mahunga Drive, vegetation loss is likely to be limited as existing access tracks can be used to access culverts. Nonetheless native riparian vegetation removal may be required if culvert works are extensive (i.e. complete replacement of culverts).
- Walmsley Bridge habitat clearance is likely to involve the loss of native riparian vegetation.
- Upstream of Walmsley Bridge habitat clearance is likely to involve the loss of native riparian vegetation, rank grassland and exotic-dominated vegetation (including tradescantia (*Tradescantia flumenensis*) and willows (*Salix sp.*)).

In total, there is approximately 1.7 ha of potential mokomoko habitat comprising native riparian planting (1.3 ha) and exotic-dominated vegetation (0.4 ha) within the boundaries of the three sites. Not all vegetation will be cleared for the proposed works, however this maximum extent has been

[2] DOC Herpetofauna Database. Copper skink ID 647297 (700 m from site, observation date 1972). Ornate skink ID 715994 (approximately 1 km from site, observation date 1978).

assumed as a precautionary measure. In particular, the works Upstream of Walmsley Bridge are currently being proposed to avoid all riparian vegetation to the east of Te Ararata Creek. This would reduce the maximum extent of vegetation loss considerably.

Skink density estimates can vary widely depending on habitat quality. For instance, Bell et al. (2018) estimated copper skink densities between 1.96 (garden habitat) and 20.48 (rank grassland) per 100 m^2 in a garden in Wellington.

Given the proposed maximum clearance extent of 1.7 ha is most similar to 'garden habitat' (native riparian planting and exotic-dominated vegetation) it could be expected that, if present, up to 340 skinks could be affected by the proposed works. Please note this is a coarse estimate and actual population densities will depend on species present (i.e. copper skink or ornate skink) pest mammal density, micro-habitat availability, food resources and previous site modifications.

2.3 Effects management for mokomoko

To manage potential adverse effects on mokomoko the following is proposed (and described in detail further in this MMP):

- Mokomoko salvage before habitat clearance as per the protocols in this MMP.
- Mokomoko relocation site habitat enhancement measures comprising logs and/or rocks.
- Mokomoko relocation site habitat enhancement through pest animal management if certain thresholds of mokomoko salvage are met.
- Habitat remediation across the project footprint, including provision and reconstruction of mokomoko habitat including rocks and plant species that support native mokomoko.
- Mokomoko monitoring if certain thresholds of mokomoko salvage are met, both at the relocation site and the project footprint/remediation site (following mokomoko habitat reconstruction).

In accordance with EIANZ guidelines for Ecological Impact Assessments (Roper-Lindsay et al. 2018), and as per the EcIA prepared for this project (still in preparation[3]) (T+T, 2024), a **high** ecological value combined with a **low** magnitude of effect (following the above efforts to avoid, remedy and mitigate impacts), results in an overall **low** level of effect on native mokomoko.

3 Salvaging protocols

3.1 Iwi engagement

Project Iwi form part of the project team and have expressed interest in being involved in mokomoko surveys. Iwi will be engaged to support and provide tikanga for any mokomoko surveys. Iwi shall be contacted a minimum of two weeks before surveys commence. The Project Ecologist has attended the site with Project Iwi. Project Iwi have assisted in the deployment of ACOs for the mokomoko survey and reviewed the relocation site.

3.2 Salvaging timing and weather conditions

Mokomoko salvaging will be undertaken between 1 October and 30 April inclusive, when mokomoko are active and more likely to be detected during salvage operations. Mokomoko salvage will only be undertaken during suitable weather conditions as defined below.

[3] See Section 1.1.

For the purpose of this management plan, suitable weather is defined as minimum average daytime temperatures of 12°C, with no more than light winds and <5 mm rain per day.

3.3 Salvaging footprint

The salvaging footprint will be clearly delineated prior to mokomoko salvage. Efforts will be made to minimise the loss of potential mokomoko habitat through reducing the footprint to the extent practicable.

3.4 Artificial cover objects

Artificial Cover Objects (ACO) were deployed in accordance with standard ACO deployment protocols (Department of Conservation, 2012a). ACOs were deployed in suitable microhabitats targeting ground-dwelling mokomoko. Each ACO consisted of a corrugated Onduline sheet measuring approximately 400 mm x 330 mm. ACOs were deployed on the 21 August 2024 in each of the Mahunga (30), Walmsley Road Bridge (30) and Upstream of Walmsley (50) sites. ACOs shall settle in for a minimum of six weeks prior to ACO surveys or vegetation removal.

3.4.1 Level of effort

ACOs were installed across Mahunga, Walmsley Road Bridge and Upstream of Walmsley sites distributed approximately every 10 m targeting potential micro-habitats. Checking of ACOs will commence two weeks prior to habitat clearance and will be checked a minimum of three times with at least one day in between checks.

Where mokomoko are found during the last check at any one of the three areas, an additional ACO check will be required (ensuring at least one day between checks) at that area.

3.5 Line-trimming of rank grass

Prior to manual habitat salvaging commencing in the rank grass area, the grass habitat shall be reduced through the use of a line-trimmer. Following habitat reduction, manual salvaging can commence in this area. An ecologist shall be on-site to check the rank grass immediately following reduction. There is no specific level of effort required for this salvage method. Line trimming shall be undertaken until all rank grass has been reduced and skinks can naturally disperse from this area.

3.6 Manual habitat salvaging

Manual habitat searches will be undertaken before and after habitat clearance and will include:

- Turning over or pulling apart cover objects (such as the rocks present in the footprint).
- Raking of litter or ground cover (e.g. rank grass, fern skirts, harakeke).
- Habitat searches (harakeke mounds).
- Lifting human refuse (e.g. wooden fenceposts, rubbish).

Manual salvaging will be undertaken in coordination with ACO checks prior to habitat clearance. As a result, manual salvaging will be undertaken over a minimum of three separate days prior to clearance, as well as on the day of clearance.

3.6.1 Level of effort

A minimum of two person-hours of manual searching will be undertaken across each of Mahunga, Walmsley Road Bridge and Upstream of Walmsley footprints within two weeks prior to habitat clearance. Where native mokomoko are found, an additional two person-hours of manual searching

will be undertaken across the footprint per 200 m^2. Searching will continue until no native mokomoko are found after two person-hours of manual searching per 200 m^2.

3.7 Machine-assisted salvage

Machine-assisted salvage will be undertaken once the ACOs and manual search efforts are complete. Machine-assisted salvage will comprise the use of an excavator with a toothed-bucket. Following machine-assisted removal of ground cover, an ecologist will be on site to check for any remaining native mokomoko. Machine-assisted salvage will be undertaken until all potential dense mokomoko ground cover has been removed.

Machine-assisted salvage can increase the risk of injury or mortality to native mokomoko. The machine-operator will co-ordinate with the Project Ecologist and any other site ecologists to ensure machine-assisted salvage is undertaken with best-practice methods to reduce mokomoko injury and mortality to the extent possible.

3.8 Data collection

Each individual mokomoko found will be assigned an ID and the following information will be recorded. Data collected is consistent with DOC's Amphibian and Reptile Scheme Database (ARDs) requirements:

- Date and time of capture.
- General weather conditions.
- Capture methodology.
- Capture location and relocation location (GPS co-ordinates).
- Macro and micro habitat types at capture location and at relocation site.
- Species, reproductive status for females, age class, tail status (regenerating/lost/original), overall health and condition, Snout to Vent Length (SVL).
- A minimum of one photograph of each captured mokomoko, including at least one photograph of the dorsal surface and one side-profile of the mokomoko head.
- Note: SVL and/or photographs will not be measured if an individual appears stressed (i.e. highly lethargic, eyes closed or shutting). Stressed individuals will be immediately released to the relocation site.

3.9 Capture, handling and transport

The following steps will be overseen by at least one of the personnel listed on the Wildlife Act Authority. Capture, handling and transport of mokomoko will be undertaken in accordance with the following methodologies:

- All field equipment that native mokomoko may come into contact with (e.g. plastic enclosures, collection bags, scales, etc.) will be sterilised prior to and between uses.
- Hand sterilisation will be undertaken between handling individuals.
- Salvaged mokomoko will either be placed in cloth bags (only during salvage, not during transportation), or in suitable ventilated plastic containers.
    - Vegetation/leaf litter will be added to plastic containers to shelter and protect mokomoko during transportation.
    - Cloth bags will be kept in the shade to ensure a constant ambient temperature is maintained for the mokomoko.

- Where practical, native mokomoko will be placed into ventilated two litre or larger plastic containers for no longer than four hours for transportation and relocation.
  - Larger individuals will not be placed in the same container as smaller individuals to prevent aggressive interactions or predation.
  - Any injured mokomoko will be kept separate to other mokomoko.
  - Different species will be kept separately.
- Salvaged mokomoko will be released into appropriately prepared and protected habitat suitable for the species being relocated (refer to Section 4).

3.10 Accidental injury and/or mortality of native mokomoko

The following steps will be implemented if any injured or dead native mokomoko (not applicable to introduced plague skinks) are found during mokomoko work:

- The Project Ecologist will notify the local DOC office and project iwi at the earliest opportunity within 24 hours after an injured or dead mokomoko found. If the local DOC office is not available, the DOC emergency hotline will be contacted instead (0800 DOC HOT/0800 362 468).
- Any mokomoko mortality of nationally Threatened, At Risk, or Data Deficient species shall be sent to Massey University Wildlife Post-mortem Service for necropsy if requested by DOC (or alternative address if provided by DOC). The body is to be chilled if it can be delivered within 24 hours, frozen if longer than 24 hours to deliver.
- Injured mokomoko found during salvage will be taken by an ecologist to a suitably qualified vet as soon as possible for assessment and treatment. Injured mokomoko will be kept in an appropriate portable enclosure (i.e., a clean, well-ventilated plastic container) under the direction of the Project Ecologist to ensure the animal is handled appropriately until the mokomoko(s) can be assessed and treated.
  - The veterinary clinic “Pet Doctors St Lukes & Exotic Centre” undertake reptile rehabilitation. The clinic is located at 5 Wagener Place, Mount Albert, Auckland 1025. Injured mokomoko can be taken there in the first instance.
- Mokomoko assessed by the vet or alternative specialist as uninjured, or otherwise in suitable condition for release, will be transported to the mokomoko relocation site and released into habitat suitable for the species being relocated.
- Euthanasia of an injured mokomoko shall only be undertaken under direction from DOC or as advised by the vet.
- The reasons behind the injury or mortality will be assessed by the Project Ecologist. The Project Ecologist will adapt management measures where possible to reduce further injury or mortality.

4 Mokomoko relocation protocols

4.1 Relocation site description

The proposed relocation site is Te Pane-o-Mataaho/Māngere Mountain, which is located approximately 700 m from the project footprints. The Māngere Mountain Education Trust are the landholders for the specific relocation area. Forty ACOs were deployed at the relocation site on 23 September 2024 to assess existing mokomoko populations following approval to use this site. These will be in place for a minimum of six weeks before checking. Project Iwi have been consulted and support the area being used as a relocation site and note that it is a culturally important area.

Key aspects of the relocation site include:

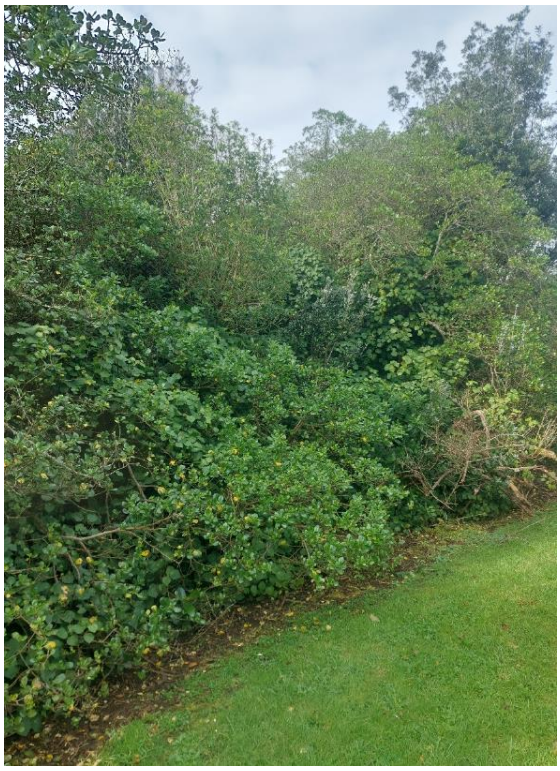
- The habitat is similar to that of the project footprint comprising native-dominated scrubland (Photograph 4.7to Photograph 4.9). Four to five metre tall planted vegetation is also present at the western extent of the area (Photograph 4.10).
- The area is contiguous with 1.6 ha of native forest, shrubland and rockland.
- There are a variety of micro-habitats available, including basking areas, rockland, dense shrubland, and dense forest (i.e. shaded areas).
- There are opportunities to augment existing habitats with logs or log discs from the project footprints.
- The site has long-term protection as it forms part of Māngere Mountain reserve.
- The site has existing pest mammal management targeting rats (Friends of the Farm, predatorfree.org national map).

Māngere Mountain is known to have an existing population of ornate skinks (Porter, 1987), with copper skinks abundant in surrounding garden habitats (at the time of publication). The proposed relocation site is a relatively new planting area (approximately five years old), with abundant harakeke and rocks which are likely to provide suitable micro-habitats for copper skinks. Furthermore, ornate and copper skinks can co-habitat the same area (see Harris et al. 2021). Micro-habitat availability will also be increased through habitat enhancement and increased pest mammal management (if triggered). Proposed monitoring of the relocation site will further inform any species interactions.

Photograph 4.7: Planted native shrubland dominated by harakeke and small-leaved pohuehue (31 July 2024).

Photograph 4.8: Volcanic rocks are distributed throughout the planted native shrubland (31 July 2024).

Photograph 4.9: Abundant harakeke habitat (31 July 2024).



Photograph 4.10: Four to five metre tall native planted forest at the western extent (31 July 2024).

4.2 Habitat enhancement measures

The relocation site will be enhanced through the deployment of a minimum of three logs or log discs for each native mokomoko salvaged.

A number of large (30 cm diameter) exotic trees are likely to be felled as part of the proposed works. The Project Ecologist will identify and mark suitable trees prior to felling to be set aside for habitat enhancement purposes. Logs will be cut into approximately 0.5 m sections or log discs approximately 30 cm in diameter. The Project Ecologist will liaise with arborists to confirm appropriate sizes for logs and ensure logs are suitable for relocation (i.e. will not pose a biosecurity risk).

4.3 Post-relocation monitoring and pest mammal control

Mokomoko monitoring and pest mammal control will be undertaken if any of the following thresholds are met (thresholds are in general accordance with Wildlands, 2019):

- **20 or more** nationally 'Not Threatened' or 'At Risk' native mokomoko are relocated.
- **Any number** of nationally 'Threatened' or 'Data Deficient' native mokomoko are relocated. The identification of 'Threatened' or 'Data Deficient' species will trigger further discussions with DOC on the best method for mokomoko management.

If thresholds are met, a Post Relocation Plan (PRP) will be prepared and implemented. The PRP will include mokomoko monitoring methods and pest mammal control requirements. The PRP will be sent to AC (as the consenting authority) and DOC. A summary of recommended PRP methods is provided below.

4.3.1 Mokomoko monitoring

Monitoring of mokomoko is challenging due to their cryptic nature and difficulty in re-identifying released individuals. However, if thresholds outlined in Section 4.3 are met, the following monitoring is proposed and will be outlined in further detail in the PRP.

The following two aims are proposed for the purposes of monitoring:

- Are native mokomoko present at the relocation site from one to five years post-relocation (presence/absence survey)?
- Are native mokomoko utilising enhancement objects (logs and log discs) following relocation.

Morphometrics such as Snout to Vent Length (SVL), sex, weight, reproductive and tail status will be recorded to provide inference on population trends and mokomoko health (but are not the main focus of the monitoring).

Specifically, monitoring will include the following:

- Annual monitoring using ACOs in a 10 x 10 m grid format across the relocation site and impact sites (note if no lizards are found at any one of the three locations, it is not recommended that mokomoko monitoring is undertaken at that impact site):
  - ACOs will be deployed for at least six weeks before the first check for mokomoko.
  - Three checks of ACOs will be undertaken during November, with at least one day between checks.
  - A total of 25% of the provisioned enhancement objects will be searched for use by mokomoko.
- Monitoring will be undertaken for five years.

- Annual reporting will be required including:
  - Summary of survey methods.
  - Weather data during the monitoring period.
  - Summary of results.
  - Any recommendations following the survey.

4.3.2 Pest mammal management

Pest mammal management will commence within six months of the thresholds outlined in Section 4.3. The PRP will outline the pest mammal protocols which will include the following:

- Pest mammal control (mustelids, possum, rats, hedgehogs and mice) of at least one hectare across the relocation site area for five years.
- Pest mammal control must include the control of mice. Mouse control (bait or trap) stations will be deployed in a grid format of 25 x 25 m (steep cliff areas may prohibit access in some areas).
- Annual audit of bait station or trap performance by chew card or other suitable method.
- Opportunities for the local community to contribute to pest mammal control. The site has existing pest mammal management targeting rats (Friends of the Farm, predatorfree.org national map). Additional pest mammal management will augment existing community pest mammal management.
- At least two pulses of pest mammal control will occur annually.
- No specific trap indices (such as Chew Card Index, Residual Trap Catch Index) have been provided due to the likelihood of pest mammal incursion from surrounding urban areas.
- Summary of pest animal control undertaken, including catch data and maintenance schedules provided from the pest control contractor.

5 Adaptive management measures

In order to achieve the best outcomes for native mokomoko, changes may need to be made to this MMP. The rationale behind any changes must be based on robust management techniques and only following confirmation from the Project Ecologist in liaison with DOC.

6 Reporting

6.1 Compliance reporting

A compliance report will be prepared and submitted to DOC and AC (as the consenting authority), within 30 working days from the clearance of all potential mokomoko habitat.

The report shall include the following:

- Confirmation that mokomoko management was undertaken in accordance with the MMP.
- Salvage and relocation results.
- Representative photographs of the salvage methodologies and mokomoko captures.
- Any other additional reporting requirements stipulated in the relevant Wildlife Act Authority.

Where thresholds outlined in Section 4.3 are met, and a PRP is developed, further compliance reporting will be required. Compliance reporting associated with the PRP will be undertaken annually for the five years of monitoring and include:

- Confirmation that mokomoko monitoring was undertaken in accordance with the PRP.
- Monitoring results.
- Representative photographs of the monitoring methodologies and mokomoko captures.
- Any other additional reporting requirements stipulated in the relevant Wildlife Act Authority.
- Pest mammal trap results.

An Amphibian and Reptile Distribution Scheme (ARDS) card will be completed and sent to DOC and AC (as the consenting authority) where any native mokomoko are recorded.

6.2 Incident monitoring and reporting

Where mokomoko habitat is removed without adhering to the protocols outlined in this MMP, the following actions will be undertaken under direction of the Project Ecologist:

- The area affected is to be quantified and described through a field investigation. The habitat description shall include an assessment of the suitability of the habitat for mokomoko and likely species present.
- A report will be prepared outlining:
  - A description of the incident, including the date, and reasons for the incident occurring.
  - An assessment of whether offset or compensation is required. The quantum of offset or compensation will be determined through a standard ecological impact framework, such as the EIANZ guidelines (Roper-Lindsay et al. 2018). If required, measures to offset or compensate for the loss of any mokomoko (for instance, habitat enrichment or pest mammal control).
  - Photographs of the affected habitat.
  - Recommendations to ensure further protected fauna habitat removal does not occur.
- Incident report to be delivered to DOC and AC (as the consenting authority) within 30 working days of the incident.

7 MMP Implementation programme

The contractor and Project Manager will communicate the habitat clearance programme with the Project Ecologist. This will allow the project team to plan the implementation of the MMP. The contractor and Project Manager will inform the Project Ecologist at least one month prior to habitat clearance and prior to any excavation works that provide habitat for native mokomoko species.

Table 7.1: Mokomoko management implementation schedule

Deliverables	Timeframe	Personnel	Completed
Project Start			
Relocation site approval	Prior to works commencing.	AC, DOC	
WAA and MMP approval	Prior to works commencing.	DOC	

Deploy ACOs			
Deploy Artificial Cover Objects (ACOs)	At least six weeks prior to habitat clearance.	Project ecologist, iwi	✓
Pre-clearance management (Inclusive 1 October – 30 April)			
ACO checks of established ACOs and manual habitat searches	Within two weeks prior to any habitat clearance.	Project ecologist, iwi	
Habitat clearance management (Inclusive 1 October – 30 April)			
Habitat clearance supervision	During habitat clearance.	Project ecologist, iwi	
Relocation site enhancement			
Pest mammal control	When trigger thresholds outlined in Section 4.3 are met. Control undertaken for five years.	Contractors	
Deployment of logs/rocks/habitat enhancement items	During mokomoko salvage.	Contractors and Project ecologist and iwi	
Monitoring			
Prepare monitoring plan	When trigger thresholds outlined in Section 4.3 are met.	Project ecologist, AC, DOC, iwi	
Implement monitoring plan	Annual for five years following salvage completion.	Project ecologist, AC, DOC, iwi	
Reporting			
Incident reporting (if required)	Completed within five working days following salvaging incident.	Project ecologist	
Compliance reporting	Completed within 30 working days following salvaging completion.	Project ecologist	
WAA reporting	Dependant on WAA requirements.	Permit holder	
Amphibian and Reptile Distribution Scheme (ARDS) Card	Completed within 30 working days following salvaging completion.	Project ecologist	
Annual monitoring reporting (if triggered)	Completed annually for five consecutive years following salvaging.	Project ecologist	

8 References

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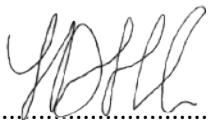
9 Applicability

This report has been prepared for the exclusive use of our client Auckland Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client may submit this report as part of an application for resource consent and that Auckland Council as the consenting authority may use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:



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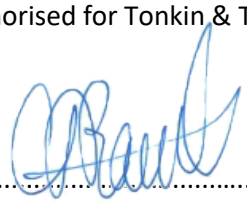
Sam Heggie-Gracie
Ecology Consultant

Authorised for Tonkin & Taylor Ltd by:



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Chris Bauld
Project Director

Technical Review by Rieke Behrens, Senior Ecologist

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Appendix A Figures

LEGEND

- Copper Skink Incidental Observation
- ACO Location
- Rivers & Permanent Streams
- Native Vegetation
- Pōhutukawa Trees
- Exotic Vegetation
- Native Riparian Planting
- Mangrove Forest
- Site Boundary

Coronation Rd
14
Coronation Rd
Black Bridge Reserve
Coronation Rd
Walmsley Road Reserve
Walmsley Rd
Walmsley Rd
Hall Ave
Miller Rd
Molesworth Pl
Hinau Rd
nzie Rd

A3 SCALE 1:1,500

0 25 50 75 100 Meters

LOCATION PLAN

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NOTES:
Rivers & Permanent Streams sourced from Auckland Council Catchment & Hydrology map.
Basemap NZ Hybrid Reference (Vector): Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors. NZ Navigation Map: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors. NZ Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors.

REV	DESCRIPTION	GIS	CHK	DATE
0	First version	MONW	DSMI	16/08/24

PROJECT No.	1017033.2003	
DESIGNED	MONW	AUG.24
DRAWN	MONW	AUG.24
CHECKED	DSMI	AUG.24
APPROVED		DATE

CLIENT **AUCKLAND COUNCIL**
PROJECT **LIZARD MANAGEMENT TE ARARATA**
TITLE WALMSLEY ROAD BRIDGE
SCALE (A3) 1:1,500 FIG No. FIGURE 1. REV 0

LEGEND

- Copper Skink Incidental Observation
- ACO Location
- Rivers & Permanent Streams
- Exotic Vegetation
- Native Riparian Planting
- Site Boundary

Walmsley Rd
Hall Ave
Mckenzie Rd
Hinau Rd
Bader Dr
Wolesworth Pl
Molesworth Pl
Pito Pl
Tarata / Tarata Creek Reserve
Ventura St
Ara Marara
Cessna Cres
Kitea Pl

A3 SCALE 1:1,500

0 25 50 75 100 Meters

LOCATION PLAN

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Exceptional thinking together

NOTES:
Rivers & Permanent Streams sourced from Auckland Council Catchment & Hydrology map.
Basemap NZ Hybrid Reference (Vector): Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors. NZ Navigation Map: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors. NZ Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors.

REV	DESCRIPTION	GIS	CHK	DATE	APPROVED	DATE
0	First version	MONW	DSMI	16/08/24		

PROJECT No.	1017033.2003	
DESIGNED	MONW	AUG.24
DRAWN	MONW	AUG.24
CHECKED	DSMI	AUG.24

CLIENT **AUCKLAND COUNCIL**
PROJECT **LIZARD MANAGEMENT TE ARARATA**
TITLE UPSTREAM OF WALMSLEY ROAD BRIDGE

SCALE (A3) 1:1,500 FIG No. FIGURE 2. REV 0

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LEGEND

- Copper Skink Incidental Observation
- ACO Location
- Access Tracks
- Pōhutukawa Trees
- Native Riparian Planting
- Mangrove Forest
- SEA Marine 2
- Site Boundary

Rymer Pl
Mahunga Dr
Hua-rata / Hastie Avenue Reserve
Market Cove Rd
Glasshouse Lane
Mahunga Reserve No 1
Kingfisher Pl

N

A3 SCALE 1:1,500

0 25 50 75 100 Meters

LOCATION PLAN

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NOTES:
Rivers & Permanent Streams sourced from Auckland Council Catchment & Hydrology map.
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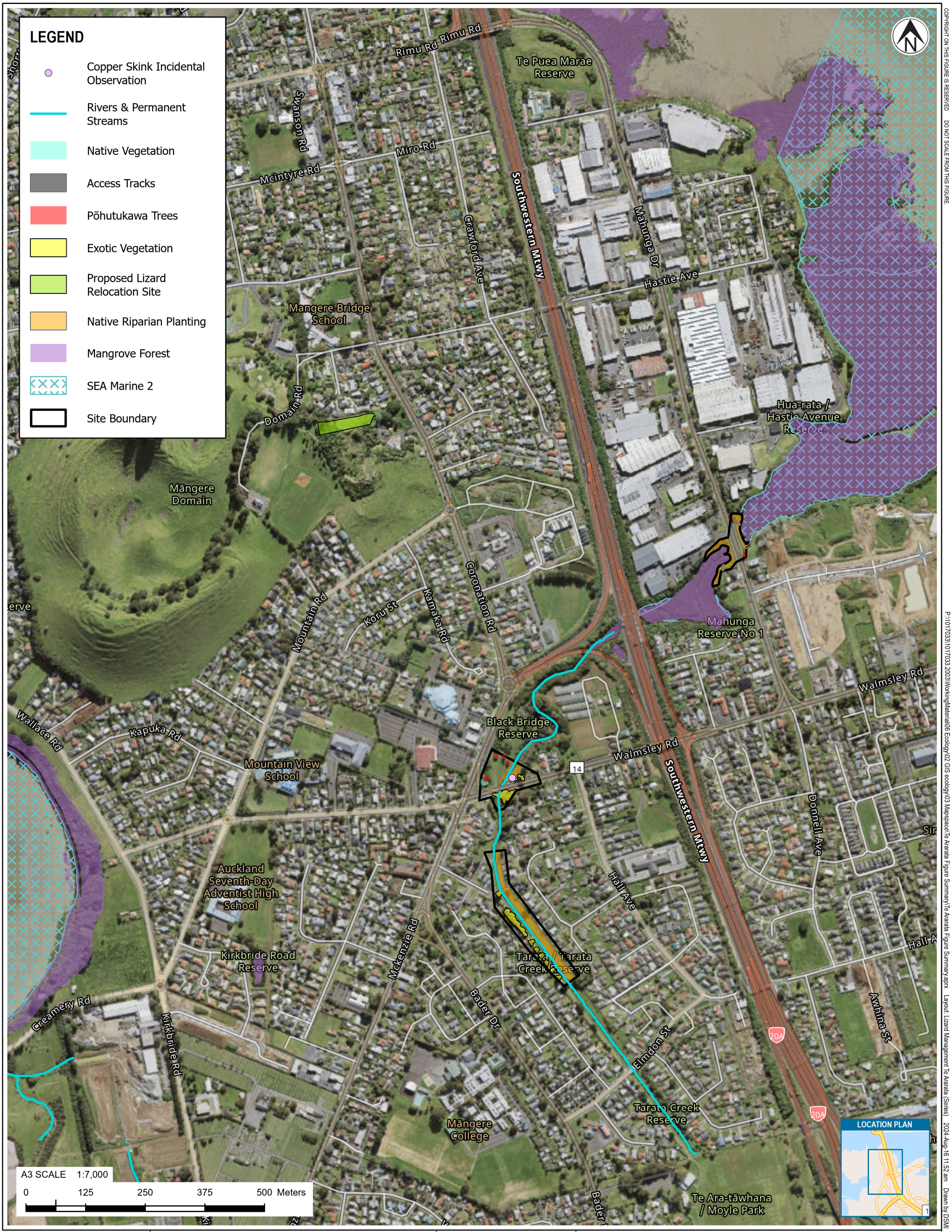
CLIENT **AUCKLAND COUNCIL**
PROJECT **LIZARD MANAGEMENT TE ARARATA**
TITLE MAHUNGA DRIVE
SCALE (A3) 1:1,500 FIG No. FIGURE 3. REV 0



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REV	DESCRIPTION	GIS	CHK	DATE	APPROVED	DATE
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PROJECT No.	1017033.2003	
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DRAWN	MONW	AUG.24
CHECKED	DSMI	AUG.24

CLIENT **AUCKLAND COUNCIL**
PROJECT **LIZARD MANAGEMENT TE ARARATA**
TITLE LIZARD RELOCATION SITE
SCALE (A3) 1:7,000 FIG No. FIGURE 4. REV 0

Appendix B Key principles for mokomoko salvage and transfer

Appendix B Table 1: Key principles for mokomoko salvage and transfer (from Department of Conservation Lizard Technical Advisory Group, 2019)

Principle	Assessment
Mokomoko species' values and site significance must be assessed at both the development and receiving sites	Copper and ornate skinks have been assessed as potentially present at the development site. The development site and receiving sites are undergoing mokomoko surveys currently to assess species presence and estimate relative density.
Actual and potential development-related effects and their significance must be assessed	A summary of effects assessment has been provided in this MMP. A full Ecological Impact Assessment (EcIA) is being developed for this project concurrently. ACOs have been established at the project footprint to further inform lizard values and potential effects.
Alternatives to moving mokomoko must be considered	The footprint of vegetation clearance will be minimised to the extent practicable. However, it is not feasible to avoid some habitat clearance due to the pipe upgrades.
Threatened mokomoko species require more careful consideration than less-threatened species	Copper and ornate skinks are classified as At Risk – Declining. Where a considerable number of individuals are salvaged (more than 20), pest mammal management (including mice control) will be implemented to mitigate impacts to the population.
Mokomoko salvage, transfer and release must use the best available methodology	Salvage methods proposed are based on standard guidelines.
Receiving sites and their carrying capacity must be suitable in the long term	Habitat items will be transferred with each captured mokomoko to provide additional micro-habitat availability at the relocation site. Pest mammal management (if triggered) will likely increase carrying capacity by increasing the number of invertebrates (i.e. food resource) and reduce predation pressure.
Monitoring is required to evaluate the salvage operation	Monitoring has been proposed following the triggers outlined in Section 4.3.
Reporting is required to communicate outcomes of salvage operations and encourage process improvements	Reporting is required as outlined in Section 6.
Contingency actions are required when mokomoko salvage and transfer activities fail	Based on the relatively small project footprint, the low number of mokomoko expected, and cryptic nature of native skinks, post-relocation monitoring is unlikely to definitively conclude the success of the relocation (i.e. an absence of mokomoko during monitoring may be an indication of low detectability rather than a relocation failure). Hence, no contingency actions are proposed.

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