

Memorandum

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Attention: Simon Barr, Nelson Airport Limited

Date: 1 March 2023

From: Dr Tanya Blakely (Freshwater), Scott Hooson (Terrestrial Vegetation and Habitats), Dr Tommaso Alestra (Marine), Dr Leigh Bull (Avifauna)

Message Ref: Stage 3: recommendations for managing ecological effects

Project No: BM210724 – Nelson Airport Ecology

Introduction

Nelson Airport Limited (NAL) is seeking to give notice to the Nelson City Council (NCC) of its requirement to alter its existing designations to provide for the extension of its main runway. The proposed runway extension is required to ensure NAL can provide for the expected needs of future aircraft types, remove operating constraints experienced by existing aircraft, and improve safety through the provision of Runway End Safety Areas (RESA).

This memorandum is the third and final stage of ecological assessments for NAL, to inform its Notice of Requirement (NOR) application to the NCC.

Prior to preparing this memorandum, Boffa Miskell was engaged to:

1. Stage 1: Carry out a high-level assessment to inform the Options Assessment of the NOR and identify the preferred option from an ecological perspective. This assessment is provided in the Report titled “Nelson Airport Designation Notice of Requirement, Ecological Assessment” (“**Ecological Options Assessment**”) dated 18 August 2022.
2. Stage 2: Complete an effects assessment on the ecological values of vegetation and habitats, freshwater, marine and avifauna of Option A (northern) and Option B (southern) extensions, and score each of these options on a 7-point scale to contribute to a broader multi-criteria analysis (MCA) for the project. The findings of the ecology MCA were provided to NAL in the “Multi-criteria analysis for Ecology” (“**MCA Ecology Addendum**”) memorandum provided to NAL on 8 February 2023.

This memorandum should be read in conjunction with the Ecological Options Assessment and MCA Ecology Addendum.

The conclusions in the Ecological Options Assessment and the subsequent MCA Ecology Addendum confirmed that Option A, the northern extension, is the preferred option from an ecological perspective. This is largely based on the following:

- Option B will have Moderate level of effects on both marine ecology and avifauna due to reclamation of c.3.6 ha of low-moderate ecological value intertidal habitat in an embayment of Waimea Inlet, and resultant permanent loss of foraging habitat for a number of *Threatened* and *At Risk* coastal bird species.

- Option A does not require any reclamation and, by comparison to Option B, is expected to have only Negligible / Very Low level of effects on marine ecology. Low level of effects (minor adverse effects) on avifauna may occur due to permanent loss of foraging and roosting habitat for the *Threatened* bush falcon, and increased disturbance of coastal avifauna communities, which include *Threatened* and *At Risk* species.
- Option A is expected to have Low level of effects (minor adverse effects) on both vegetation and habitats and freshwater ecology, due to loss of indigenous dominated saltmarsh vegetation, piping or infilling of Maire Stream Tributary and resultant loss of freshwater habitat, potential inanga spawning habitat, ecological connectivity to upstream reaches.
- Option B is expected to have only Negligible / Very Low level of effects on vegetation and habitats and freshwater ecology.

We used a conservative approach when assessing the potential ecological effects of Option A and Option B, to address limitations noted in the Ecological Options Assessment and the MCA Ecology Addendum. This meant that the highest possible magnitude of effect has been considered, based on realistic assumptions and conservative approach to the assessment¹, when scoring potential ecological effects of each option. When potential effects on all ecological values (vegetation and habitats, marine, freshwater ecology, and avifauna) are considered, overall and without mitigation, Option B is expected to have up to Moderate levels of effect (or “moderate / major adverse effect”), while Option A is expected to have up to Low levels of effect (or “minor adverse effect”). Option A is, therefore, the preferred option overall, as far as effects on ecological values are concerned.

Purpose of this memorandum

Following the above and the MCA for the project, Option A was identified as the preferred option across the range of disciplines. This memorandum provides a summary of our assessment of the ecological effects of the northern runway extension (Option A); and provides recommendations of potential measures to avoid, remedy, mitigate any adverse ecological effects associated with the proposed change to NAL's existing designations / extension to the existing runway.

Although this report has been prepared for the context of the NOR, this report also considers, for completeness, the matters that we understand would be considered in any subsequent phases, including detailed design and preparation of an outline plan of works for those authorised by NAL's designations.

The proposal (northern extension)

NAL is proposing to extend the existing airport runway. The proposed runway extension is required to ensure NAL can provide for the expected needs of future aircraft types, remove operating constraints experienced by existing aircraft, and improve safety through the provision of RESAs. This requires an extension to NAL's existing designations under the Nelson Resource Management Plan (NRMP).

NAL's objectives for altering its existing designations are to:

- *Extend the operational runway length in order to ensure that over the next 30 years the aeronautical capacity of the airport and runway system can safely and efficiently:*
 - *provide increased operational resilience and reliability; and*
 - *enable forecast demand and accommodate future aircraft types.*

¹ Further details on methodology, limitations and assumptions, and the findings of our assessment are described in the Ecological Options Assessment and MCA Ecology Addendum.

- *Enable an efficient, flexible and sustainable approach to developing Airport infrastructure, facilities and services and prepare for future aircraft types.*
- *Minimise the effects of aircraft noise impacts on the surrounding community as far as practicable whilst also minimising adverse environmental and cultural effects.*

The proposal consists of a northern displacement of the existing runway to provide for a 240 m southern RESA, together with an extension of the runway length from 1,347m to 1,510m and a 240 m northern RESA, as shown Figure 1. The proposed extension would extend the main sealed runway into the adjacent golf course land. Edge lighting would be extended along the northern runway extension.

The northern RESA will be well graded and grassed, which will require infilling or piping of c.475 m of Maire Stream Tributary². The southern RESA will likely remain a mix of paved area and grass, as shown in Figure 1.



Figure 1. Northern Runway Extension. Source: Planz Consultants.

Existing environment and ecological values

The following provides a summary of the existing environment within the northern runway extension; areas within the existing NAL Designation are excluded from these descriptions. Full details on the existing environment can be found in the Ecological Options Assessment.

Vegetation and habitats: the vegetation and terrestrial habitats within the Nelson Golf Club are almost entirely mown exotic grassland, except an unvegetated area at the northern end of the designation extension comprised of buildings, sheds and hard surfaces; an area of highly modified exotic vegetation to the west; and saltmarsh vegetation surrounding Maire Stream Tributary.

The saltmarsh vegetation along Maire Stream Tributary is of Moderate ecological value; all other vegetation and terrestrial habitats are of Negligible ecological value.

Rank exotic grassland habitats within eastern areas may provide habitat for skinks requiring surveys and management if works are required in this area. However, these areas of habitat are within the existing NRMP DAA1 Designation so potential effects of the northern extension option on skinks are not discussed further.

Freshwater: Maire Stream Tributary flows through the golf course and c.475 m² of this waterway is within the proposed northern designation extension. The lower reaches of this waterway are tidal. While channelised and relatively modified due to urban development and golf course activities, Marie Stream Tributary likely supports numerous *At Risk* freshwater fish species and may provide spawning habitat for inanga. Maire Stream Tributary is considered of High ecological value.

There are several constructed waterbodies within the golf course. The ecological value of these as habitat for freshwater fauna is unknown, as no field surveys were undertaken and there are no records detailing any previous studies of these waterbodies. The constructed waterbodies do not appear to be connected to other freshwater habitats or the sea, so it is unlikely that they would support populations of any migratory fish species (i.e., species that need a connection between freshwater habitats and the sea to complete

² The value of c.475 m is based on the most recent spatial data and mapping, which replaces the previous estimated length of c.400 m discussed in the Ecology Assessment dated 18 August 2022.

lifecycles). However, it is possible that these waterbodies support populations of non-migratory fish species, such as upland bully (*Not Threatened*) and shortfin eel (*Not Threatened*, migratory) could also be present (noting that shortfin eel is a long-lived migratory species but capable of moving between waterbodies during high rainfall events, when surface flooding or wet grasses are present). The riparian vegetation is dominated by exotic species, including water lilies and irises; exotic grasses and herbs, including creeping buttercup and creeping bent, and the rushes soft rush and jointed rush, were also present on the margins.

Marine: the marine habitats of Waimea Inlet adjacent to the northern extension are characterised by fast water flow, sand and cobble benthic substrates, with meadows of the *At Risk* seagrass *Zostera muelleri*. These habitats likely support diverse and abundant invertebrate communities. Seagrass meadows provide nursery and feeding grounds for many species of coastal fish. Artificial hard substrates (seawalls and revetments) are likely colonized by a small number of common estuarine species including limpets, barnacles and ephemeral green algae. These marine habitats are considered of High ecological value.

Avifauna: as noted above, the habitat within the northern extension comprises primarily golf course and several constructed waterbodies, with adjacent sand beaches and intertidal areas of Waimea Inlet. The avifauna assemblage using the terrestrial and freshwater habitats (within the golf course) is dominated by introduced or native *Not Threatened* species. However, bush falcon (*Threatened*), NZ pipit, red-billed gull and pied shag (all *At Risk*) were recorded associated with terrestrial and freshwater habitats within the golf course.

Coastal habitats to the north and west of the northern extension, and adjacent to (west of) the existing designation, provide habitat for a variety of coastal birds, including *Threatened* and *At Risk* species. The majority of the habitats to the north of the proposed extension are in an off-lead dog area and the birds present are likely regularly exposed to disturbance. Habitats adjacent to the existing runway are outside of the off-lead dog area and were found to have the highest mean number of birds found during surveys. In the broader context, Nelson Haven, Tāhunanui Beach, Sand Island off Nelson Airport and Waimea Inlet are important areas for waders and coastal birdlife, a number of which are classified as *Threatened* or *At Risk*.

Terrestrial avifauna is largely comprised of *Not Threatened* and *Introduced* species, which are considered of Low and Negligible ecological value, respectively. But, due to their threat statuses, NZ pipit is considered of High ecological value and bush falcon is Very High ecological value.

Freshwater avifauna included *At Risk* species of High ecological value; while coastal species included numerous *Threatened* and *At Risk* species of Very High and High ecological value, respectively.

Ecological effects

The following provides a summary of the assessment of effects on terrestrial vegetation and habitats, freshwater and marine ecology, and avifauna assemblages, detailed in the Ecological Options Assessment.

We used the Environment Institute of Australia and New Zealand (EIANZ) Ecological Impact Assessment (EclA) guidelines³ to assess the **ecological values** and the **magnitude of potential effect** to determine an overall **level of effect** for terrestrial vegetation and habitats, freshwater, marine and avifauna assemblages (terrestrial, freshwater and coastal).

Further details on methodology, limitations and assumptions, and the findings of our assessment are described in the Ecological Options Assessment and MCA Ecology Addendum.

Vegetation and habitats: the northern extension is expected to have minor adverse effects on vegetation and habitats. This is due to the loss of 0.17 ha of indigenous dominated saltmarsh vegetation along Maire Stream Tributary. This saltmarsh habitat is a natural wetland and the potential loss / effects of this will need to be

³ Roper-Lindsay, J., Fuller, S. A., Hooson, S., Sanders, M. D., & Ussher, G. T. (2018). *Ecological impact assessment (EclA). EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems* (2nd ed.). Environment Institute of Australia and New Zealand.

considered in the context of the requirements of the National Environmental Standards for Freshwater (NES-F), which we understand will be considered at a future stage when regional resource consents are sought.

- The saltmarsh vegetation along Maire Stream Tributary is of **Moderate ecological value**; all other vegetation and terrestrial habitats are of **Negligible ecological value**.
- The northern extension would result in the permanent loss of existing vegetation and habitats. The loss of saltmarsh vegetation equates to approximately 0.09% of this vegetation type in the Ecological District, which is considered a **Low magnitude of effect**. The loss of other vegetation and terrestrial habitats is considered a **Negligible magnitude of effect**.
- Based on the above, the level of effect is considered **Low**, for saltmarsh, and **Very Low** for all other vegetation and terrestrial habitats lost.

Freshwater: the northern extension, and particularly the construction of the northern RESA, would result in a loss of c.475 m of freshwater habitat of Marie Stream Tributary, which likely supports *At Risk* freshwater fish species and may be inanga spawning habitat. These works could also result in the loss of ecological connection with the upstream 500 m of Maire Stream Tributary. This would have a minor adverse effect without mitigation. The loss of river extent and values should be avoided, where practicable (Policy 7 of the National Policy Statement for Freshwater Management (NPS-FM), unless the Council is satisfied that there is a functional need for the activity in that location; and the effects of the activity are managed in accordance with the effects management hierarchy (as outlined in section 3.24 of the NPS-FM). Further, habitats of indigenous freshwater species should be protected according to Policy 9 of the NPS-FM; and the NES-F regulations stipulate design criteria and rules around ensuring continued fish passage.

- Maire Stream Tributary is considered of **High ecological value** based on existing habitats and species that these may support.
- The northern extension would require piping or infilling of Maire Stream Tributary resulting in the loss of c.475 m of freshwater habitat, which is c.0.7-1.4% of remaining coastal stream reaches (i.e., lower reaches of waterways within 1.5 km of the coast) at the Waimea Inlet scale; and c.7.7-16.2% habitat loss at the project scale. Potential effects include loss of freshwater habitat, loss of potential inanga spawning habitat, an increase in impervious surfaces, and increased contaminant inputs. Additionally, the potential loss of ecological connectivity to a further c.500 m of upstream freshwater habitat may affect persistence of upstream populations of freshwater fishes. This is considered a **Low magnitude of effect** at the Waimea Inlet scale. At the project scale, the level of effect would be Low-High (loss of 7.7%-16.2% freshwater habitat).
- Based on the above, the level of effect is considered **Low**.

Marine: there are not expected to be any significant adverse effects on marine ecology, assuming that discharges of sediment and contaminants into the CMA during both construction and operation of the runaway are avoided or minimised.

- The marine habitats of Waimea Inlet adjacent to the northern extension are considered of **High ecological value**.
- There will not be any direct adverse effects on marine ecology. Where good practice construction and operational measures are put in place. This is considered a **Negligible magnitude of effect**.
- Based on the above, the level of effect is considered **Negligible**.

Avifauna: ecological effects on the avifauna assemblages vary, with up to minor adverse effects on avifauna species overall, due to permanent loss of foraging and roosting habitats and increased disturbance of coastal species. Policy 11(a)(i) of the New Zealand Coastal Policy Statement requires avoidance of adverse effects on activities on indigenous taxa that are listed as Threatened or At Risk in the New Zealand Threat

Classification System lists. As identified in this assessment, there are a number of such avifauna species that may be impacted by the northern extension and this policy should be considered.

- Terrestrial avifauna is largely comprised of *Not Threatened* and *Introduced* species, which are considered of **Low and Very Low ecological value**, respectively. But NZ pipit is considered of **High ecological value** and bush falcon is **Very High ecological value**.
- Freshwater avifauna included *At Risk* species of **High ecological value**.
- Coastal species included numerous *Threatened* and *At Risk* species of **Very High and High ecological value**, respectively.
- The northern extension will:
 - Result in permanent loss of foraging and roosting habitat for terrestrial *Introduced* and native *Not Threatened* species, and NZ pipit (*At Risk*) and bush falcon (*Threatened*). At the scale of Waimea Inlet, this loss of habitat is considered a **Negligible magnitude of effect**.
 - Result in permanent loss of non-breeding habitat for freshwater species. At the scale of Waimea Inlet, this loss of habitat is considered a **Negligible magnitude of effect**.
 - Have indirect effects on coastal avifauna assemblages through increased disturbance, noting that these are already subject to high levels of disturbance from current activities. At the scale of Waimea Inlet, this loss of habitat is considered a **Negligible magnitude of effect**.
- Based on the above, the level of effect is:
 - Terrestrial: **Very Low** for *Introduced* and *Not Threatened* species; **Very Low** for NZ pipit; **Low** for bush falcon.
 - Freshwater: **Very Low**
 - Coastal: **Very Low** for *At Risk* species; **Low** for *Threatened* species.

In summary, the northern extension would result in the permanent loss of vegetation and terrestrial habitats, including loss of saltmarsh habitat; loss of c.475 m of Maire Stream Tributary and potential loss of ecological connectivity to a further c.500 m of upstream habitat; no significant adverse effects on marine ecology; minor adverse effects on avifauna species, largely due to increased disturbance of *Threatened* and *At Risk* coastal species, but also permanent loss of foraging and roosting habitats for terrestrial and freshwater species.

Recommendations

Although Option A has potential adverse effects on a range of ecological values, these effects can be avoided, remedied or mitigated either through conditions applied to the Designation or through standard Outline Plan of Works processes or subsequent consenting pathways. The following section provides recommendations:

- That should form conditions to be applied to the Designation to manage the effects of the runway extension; and
- To inform any additional assessments or specialist surveys required for the Outline Plan or Detailed Design phases, and any subsequent consenting pathways.

Vegetation and terrestrial habitats:

- The northern extension will result in the loss of up to 0.17 ha of saltmarsh vegetation within a natural wetland and this needs to be considered in the context of the requirements of the NES-F to determine a suitable consenting pathway, at a future stage. Where there is no alternative approach and this loss cannot be avoided, minimised or remedied, the ecological effects should be appropriately managed through aquatic offsetting or compensation to ensure no net loss, and preferably a net gain, in saltmarsh vegetation is achieved. This may include creation of a new stream riparian corridor within the site and planting of saltmarsh plant species, and / or enhancement of nearby existing saltmarsh vegetation.
- To inform an appropriate ecological effects management approach, detailed vegetation mapping and survey of the saltmarsh vegetation along Maire Stream Tributary will be required at a future stage.
- It is possible that lizard fauna (specifically skinks) could be adversely affected if activities occur within areas of rank (unmown) exotic grassland within the northern extension (e.g., within riparian vegetation of Maire Stream Tributary). If construction works that require vegetation disturbance or clearance are proposed within these areas of potential lizard habitat, a suitably qualified and experienced herpetologist should conduct a survey prior to commencing works associated with the northern runway extension, to determine if lizards are present. If lizards are present, the Project Herpetologist will prepare a Lizard Management Plan (LMP) and seek an approval from the Department of Conservation under the Wildlife Act 1953 at the Outline Plan and Detailed Design stages. The LMP will detail appropriate measures to manage adverse effects on lizards, which are absolutely protected under the Wildlife Act.

Freshwater:

- The northern extension will result in the loss of c.475 m of freshwater habitat (without mitigation), which likely supports *At Risk* (and possibly *Threatened*) freshwater fish species, and might provide spawning habitat for inanga.
 - Avoiding stream loss (e.g., reclamation, loss of flow permanence, culvert installation, piping) is an explicit requirement of Policy 7, National Policy Statement for Freshwater Management (NPS-FM) and Subpart 2 of the National Environmental Standards for Freshwater (NES-F).
 - Where there is no alternative approach and this loss cannot be avoided, minimised or remedied, the ecological effects should be appropriately managed through mitigation or offsetting to ensure no net loss, and preferably a net gain, in freshwater ecology values is achieved. This may include realigning the stream and planting of riparian margins with species suitable for inanga spawning habitat and to appropriately address loss of saltmarsh vegetation, as described above.
 - Based on a high-level exploration of the Designation, there appears to be sufficient space to provide for the realignment of Maire Stream Tributary, but some ecological enhancement of adjacent sections of waterway to offset any residual significant adverse effects on Maire Stream Tributary may also be required. This will need to be confirmed at a future stage.

- To inform an appropriate ecological effects management approach, detailed freshwater surveys completed by a suitably qualified and experienced freshwater ecologist will be required at the time of the Detailed Design phase and regional consenting phase. These additional surveys should include:
 - An assessment of the macroinvertebrate and fish communities present in Maire Stream Tributary and connected waterways.
 - A survey of the saltmarsh and / or riparian vegetation to confirm if this provides spawning habitat for inanga.
- After the Designation has been altered, a suitably qualified freshwater ecologist should provide advice and input into Detailed Design to ensure that the NES-F design standards and monitoring requirements for installation of culverts are adhered to and to ensure fish passage is maintained or improved.
- Prior to construction commencing in or around any freshwater bodies, a suitably qualified and experienced freshwater ecologist should provide advice on best practice measures to ensure construction effects on freshwater habitat values and fauna are avoided or minimised. This may include avoiding works during critical periods of freshwater fauna, avoidance of introduction or spread of freshwater pests, and best practice measures for management of fish mortality, and erosion and sediment control for waterways and waterbodies within and downstream of the works footprint.

Marine:

- Prior to construction of the runway extension commencing, a suitably qualified and experienced marine ecologist should provide advice on best practice erosion and sediment control measures, to avoid or minimise adverse effects from sediment and contaminant discharge and sedimentation on the surrounding freshwater and marine environments. The marine ecologist should provide advice and input at Detailed Design phases to ensure best practice operational stormwater treatment options are included in the design.

Avifauna:

- Avifauna assessments undertaken for the Ecology Options Assessment were based on existing and readily available information (desktop) with limited field surveys, conducted over a single multi-day survey on only one occasion. While this was appropriate for the stage and purpose of these assessments, this presents a snapshot of the species and habitats used and does not account for temporal and seasonal variability often found. The following additional avifauna surveys are required for the Outline Plan and Detailed Design stages for the northern runway extension:
 - determine if any species that were not detected during our surveys use habitats that may be affected by Option A extension, and to:
 - confirm the distributions of foraging shorebirds in the intertidal habitat of Waimea Inlet; and
 - determine if *At Risk* or *Threatened* species are breeding within the northern runway extension area and immediate surrounds.
- These additional avifauna surveys should be conducted by a suitably qualified and experienced ornithologist, and should include:
 - Coastal bird surveys across the wider spatial scale to put into context the number of birds utilising the adjacent coastline relative to the wider inlet. The location of these additional avifauna surveys should include coastal and estuarine sites within and adjacent to the Option A extension, including both Waimea and Māpua arms of Waimea Inlet (Figure 2).
 - Coastal bird surveys over four seasons (spring, summer, autumn and winter) to account for temporal variability in species assemblages, particularly regarding national and international migrant shorebirds.
 - Cryptic marshbird surveys during the breeding season (September to February) in areas of potential habitat immediately within and adjacent to the proposed footprint, including

Tāhunanui Estuary to the north and Jenkins Creek to the south of the Airport, to determine if birds are nesting at these locations.

- Surveys during appropriate breeding seasons to determine whether any *Threatened* or *At Risk* terrestrial avifauna species (such as bush falcon and New Zealand pipit) are breeding within the northern runway extension area and immediate surrounds. Immediate surrounds is considered to be within up to 200 m of the Designation.
- On the completion of these additional avifauna surveys and prior to construction commencing, a suitably qualified and experienced ornithologist will use the information collected during these additional surveys to advise on any required effects management options. This could include the preparation of an Avifauna Management Plan to be developed by the Ornithologist at the Outline Plan and Detailed Design stages.
 - If cryptic marshbirds are found, advice from a suitably qualified and experienced ornithologist on effects management options will be required and should be included in the Avifauna Management Plan.
 - If *At Risk* and / or *Threatened* species (including bush falcon, NZ pipit⁴) are determined to be breeding within the Designation and immediate surrounds, advice from a suitably qualified and experienced ornithologist on effects management options will be required and should be included in the Avifauna Management Plan.
- If additional lighting is proposed within the extended designation, over and above that required for aircraft operations, a suitably qualified and experienced ornithologist should provide advice and input into Detailed Design to avoid or minimise additional light spill into the estuary. Measures may include use of downward oriented and hooded lights.
- A bird strike risk assessment should be carried out by a suitably qualified and experienced wildlife hazard and strike professional. We understand this has already been undertaken as part of Nelson Airport's operational requirements.

Requirements of the NOR

Of the recommendations above, we suggest the following are required for the Designation:

1. The following additional avifauna surveys are required at the Outline Plan and Detailed Design stages to:
 - a. determine if species that were not detected during our initial rapid surveys use habitats that may be affected by the northern runway extension;
 - b. confirm the distributions of foraging and roosting shorebirds in the intertidal habitat of Waimea Inlet; and
 - c. determine if *At Risk* or *Threatened* species are breeding within the northern runway extension area and immediate surrounds.
2. The purpose of these surveys is to identify the species present and any potential adverse effects on these arising from the construction and operation of the northern runway extension. These additional avifauna surveys should be conducted by a suitably qualified and experienced ornithologist, and shall include to the extent relevant:
 - a. Coastal bird surveys:

⁴ We consider it highly unlikely that bush falcon (Threatened) and NZ pipit (At Risk) are breeding within the designation, however, this needs to be confirmed given the Very High and High ecological value, respectively, of these species. The effects assessment has assumed that breeding habitat of these species is not present within the designation.

- i. across the wider spatial scale, including the coastal and estuarine environment to the south of a line drawn from Port Nelson to Māpua, and including both Waimea and Māpua arms of Waimea Inlet (Figure 2); and
 - ii. over four seasons (spring, summer, autumn, winter) to account for temporal variability in species assemblages, particularly regarding national and international migrant shorebirds.
 - b. Cryptic marshbird surveys during the breeding season (September to February) in areas of potential habitat within and immediately adjacent to the proposed northern runway extension area, including Tāhunanui Estuary to the north and Jenkins Creek to the south of the Airport, to determine if birds are nesting at these locations.
 - c. Terrestrial bird surveys during appropriate breeding seasons to determine whether any *At Risk* or *Threatened* avifauna species (such as bush falcon and New Zealand pipit) are breeding within the northern runway extension area and immediate surrounds. Immediate surrounds is considered to be within 200 m of the Designation.
3. On the completion of these avifauna surveys, and prior to construction of the northern extension commencing, a suitably qualified and experienced ornithologist will use the information collected during these additional surveys to inform appropriate management of any ecological effects due to the construction and operation of the northern extension. This could include the preparation of an Avifauna Management Plan to be developed at the Outline Plan and Detailed Design stages.
4. If construction works that require vegetation disturbance or clearance are proposed within areas of potential lizard habitat within the northern runway extension area (e.g., areas of rank (unmown) exotic grassland within the northern extension, including but not limited to within riparian vegetation of Maire Stream Tributary), a suitably qualified and experienced herpetologist should conduct a survey prior to commencing works associated with the runway extension, to determine if lizards are present. If lizards are present, the Project Herpetologist will prepare a Lizard Management Plan (LMP) and seek an approval from the Department of Conservation under the Wildlife Act 1953, prior to vegetation disturbance and clearance activities. The LMP will detail appropriate measures to manage adverse effects on lizards, which are absolutely protected under the Wildlife Act.

All other recommendations detailed in the “Recommendations” section above will be required at a future stage.

LEGEND

Area of Waimea Inlet for coastal and estuarine bird surveys, to the south of the red line

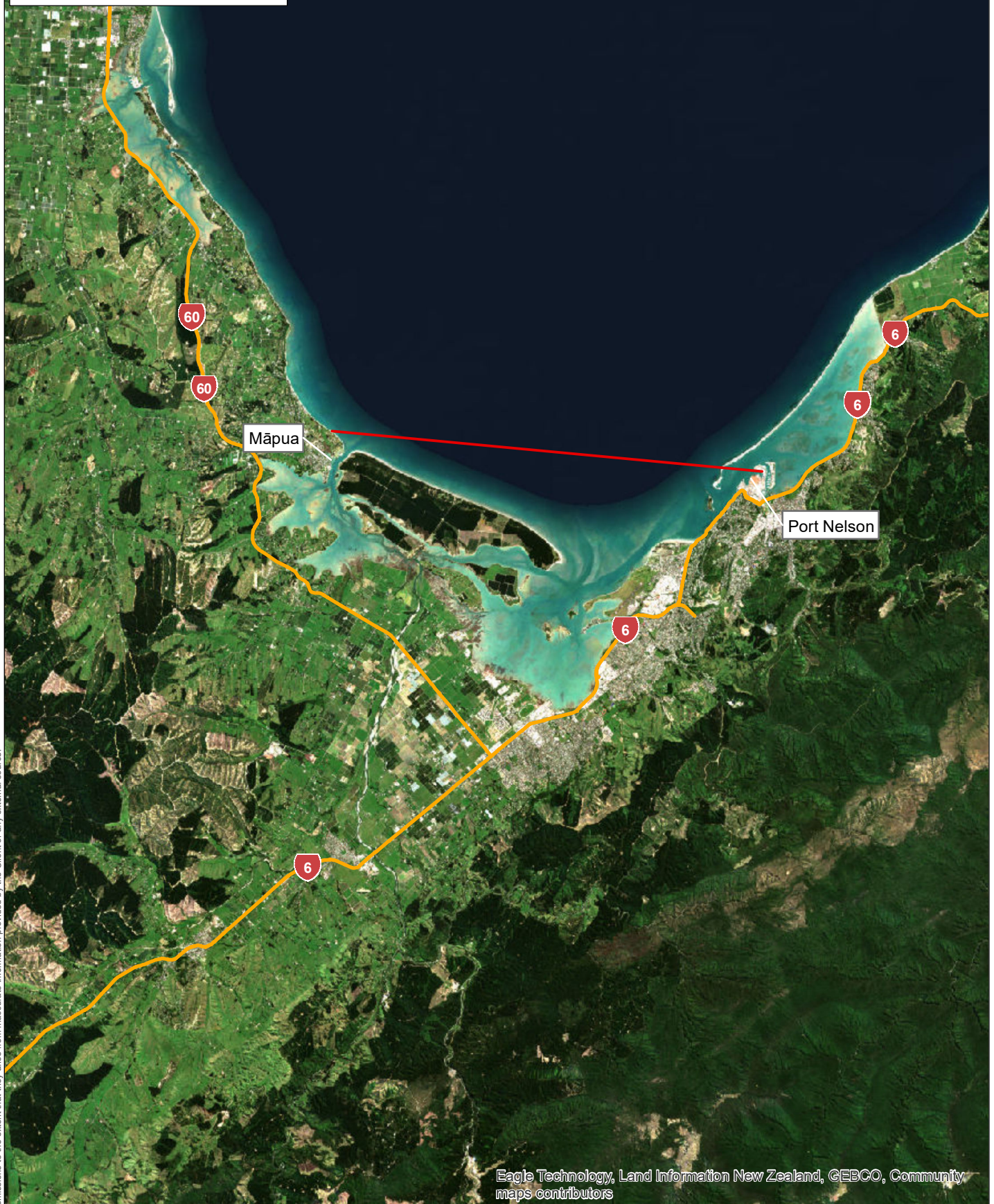
State Highway

Projection: NZGD 2000 New Zealand Transverse Mercator



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Figure 2. Coastal bird surveys and subsequent ecological effects assessments should be conducted at the Waimea Inlet scale, including both Waimea and Māpua arms, where this includes the coastal and estuarine environment to the south of a line (shown in red) drawn from Port Nelson to Māpua.