

22 June 2023  
Job No: 1015509.3000

Manawa Energy Limited  
Private Bag 12055  
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Attention: Ms L Mead

Dear Lisa

## **Kaimai HEPS - Wetland summary**

### **1 Introduction**

Tonkin & Taylor Ltd (T+T) is providing technical support to Manawa Energy Ltd (Manawa Energy) in relation to its applications for resource consents for the Kaimai Hydro-Electric Power Scheme (Kaimai HEPS, “the Scheme”).

Manawa Energy is seeking to identify and classify any ‘wetlands’ that may be captured by the National Policy Statement for Freshwater Management (NPS-FM).

This letter report has been prepared in line with our existing contract (ref 1015509.300 dated 21 June 2022) and provides the following:

- 1 A summary of wetlands in the Scheme, and whether they meet the definition of a natural inland wetland as defined in the NPS-FM (Section 2).
- 2 Where wetlands are in relation to scheme assets (and associated maps) (Section 2 and Appendix A).
- 3 Commentary on potential impacts on the wetlands arising from the on-going operation of the Scheme (Section 3).

#### **1.1 Method**

Specialist T+T staff visited the Kaimai HEPS between 1 and 3 November 2022 to identify and assess potential wetland habitats within the Scheme, with a focus on areas immediately upstream, downstream or adjacent to Kaimai HEPS assets or elements (such as storage lakes). Consistent with the direction in the Bay of Plenty Regional Natural Resource Plan (RNRP) (2021), a “person with appropriate expertise” completed the assessment of Kaimai HEPS.

## 1.2 Definitions

The National Environmental Standards Freshwater (NES-F) -F provide rules specific to the taking, use, damming, diversion or discharge of water within, or within a 100 m setback from, a natural inland wetland. Both the RMA (1991) and the RNRP have the following definition of a wetland:

*“includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.”*

The NPS-FM provides the following definition of wetland:

*natural inland wetland means a wetland (as defined in the [Resource Management] Act) that is not:*

*(a) in the coastal marine area; or*

*(b) a deliberately constructed wetland, other than a wetland constructed to offset impacts on, or to restore, an existing or former natural inland wetland; or*

*(c) a wetland that has developed in or around a deliberately constructed water body, since the construction of the water body; or*

*(d) a geothermal wetland; or*

*(e) a wetland that:*

*(i) is within an area of pasture used for grazing; and*

*(ii) has vegetation cover comprising more than 50% exotic pasture species (as identified in the National List of Exotic Pasture Species using the Pasture Exclusion Assessment Methodology (see clause 1.8)); unless*

*(iii) the wetland is a location of a habitat of a threatened species identified under clause 3.8 of this National Policy Statement, in which case the exclusion in (e) does not apply.*

## 2 Results

Thirteen potential wetland areas were identified in three locations within the Scheme, including:

- Lake McLaren and surrounds (seven possible wetland areas).
- Ruahihi Canal and tributaries (three possible wetland areas).
- Lake Mangaonui and surrounds (three possible wetland areas).

Maps of the wetland locations are provided in Appendix A.

### 2.1 Lake McLaren and surrounds

Five wetlands were identified and assessed during the field visit within the Lake McLaren area, and an additional two wetlands were identified from a desktop assessment. Six of the wetland areas are on the true left bank and one on the true right (Figure Appendix A.1).

The six wetland areas on the true left bank are all visible on the earliest aerial imagery of Lake McLaren (1943) and were likely present as seep or spring wetlands in the natural landscape prior to the formation of the Scheme (Figure 2.1).

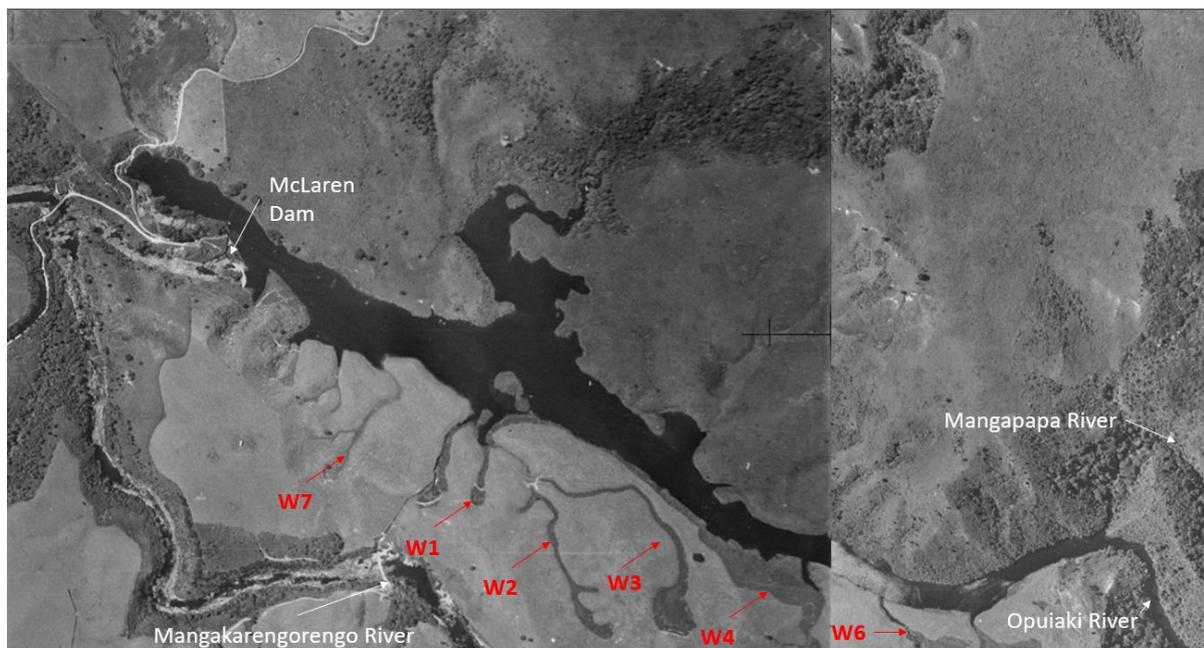


Figure 2.1: Aerial imagery from 1943 showing the location of potential wetland areas around Lake McLaren.

W1 is a seepage wetland, and comprised predominantly exotic soft rush (*Juncus effusus*) and Yorkshire fog (*Holcus lanatus*), both of which are typical of disturbed wetland habitats in pasture environments. W1 is a wetland under the RMA/RNRP definition. Due to the species composition present at the time of the assessment, it is unlikely W1 would meet exclusion (e) in the NPS-FM and thus can be considered a 'natural inland wetland' as defined by the NPS-FM.

W2 is a seepage or spring wetland, characterised by a mix of exotic wetland rushes/grasses including soft rush, Yorkshire Fog and Mercer grass (*Paspalum distichum*), and native wetland sedges including purei (*Carex secta*), baumea (*Machaerina rubiginosa*), and sharp spike sedge (*Eleocharis acuta*). W2 is a wetland under the RMA/RNRP definition, and is considered to be a 'natural inland wetland' under the NPS-FM.

W3 is a seepage or spring wetland, characterised by predominantly native wetland vegetation including purei, baumea, and *Isolepis* sp., with exotic sharp-fruited rush (*Juncus acuminatus*) and Mercer grass. W3 is a wetland under the RMA/RNRP definition, and is considered to be a 'natural inland wetland' under the NPS-FM.

W4 is partially fed by springs/seeps, but also influenced by the water level in Lake McLaren. The vegetation was assessed from the opposite bank, and likely comprised native sedges (purei, rautahi (*Carex geminata*), baumea) with an exotic willow (*Salix* sp.) canopy. W4 is a wetland under the RMA/RNRP definition, and is considered to be a 'natural inland wetland' under the NPS-FM.

W5 is on the true right bank of Lake McLaren and appears to have developed due to the formation of Lake McLaren. The vegetation of W5 was predominantly native wetland species (baumea, rautahi, sharp spike sedge, harakeke (*Phormium tenax*), tī kōuka (*Cordyline australis*), and kahikatea (*Dacrycarpus dacrydioides*)). W5 is a wetland under the RMA/RNRP definition, but is considered to meet exclusion (c) criterion in the NPS-FM.

It is likely the two wetlands that were identified during the desktop assessment (W6 and W7) resemble W2 or W3 in terms of hydrological function and vegetation assemblages. Both are wetlands under the RMA/RNRP definition, and can be considered 'natural inland wetlands' under the NPS-FM. However, based on repeat aerial imagery W7 can be considered to meet exclusion (e) in the NPS-FM.

Photographs of Lake McLaren wetlands W1 to W6 are provided in Photograph 2.1. W6 and W7 were identified during the desktop assessment and were not visited.



Photograph 2.1: Wetlands associated with Lake McLaren. November 2022. Refer to Figure 2.1 and/or Appendix A Figure A1 for locations.

## 2.2 Ruahihi Canal and tributaries

Two wetlands were identified upstream of the Ruahihi Canal on Tributary 1/Mairoa Stream, and one wetland complex downstream of the Ruahihi Canal on the Otawhiti Stream alignment (Figure Appendix A.2). None of the wetlands identified around the Ruahihi Canal are visible on the earliest aerial imagery taken in 1943 (Figure 2.2).

W1 on the Mairoa Stream/Tributary 1 is on the true left bank and appears to have formed on a delta in the ponded area upstream of the Mairoa Stream/Ruahihi Tributary 1 gates. W1 was characterised by exotic wetland species including water forget-me-not (*Myosotis scorpioides*) sharp-fruited rush, soft rush, blue sweet grass (*Glyceria declinata*), and Mercer grass, with some native *Eleocharis* sp. W1 is a wetland under the RMA/RNRP definition, and can be considered a 'natural inland wetland' under the NPS-FM.

W2 has formed on a sandy point bar on the Mairoa Stream/Tributary 1 and is likely influenced by the water levels in the ponded area. The vegetation in W2 is dominated by native rautahi. W2 is a wetland under the RMA/RNRP definition, and can be considered a 'natural inland wetland' under the NPS-FM.

W3 is a seepage wetland downstream of the Ruahihi Canal on the old alignment of the Otawhiti Stream. The seepage is likely sourced from the canal drainage system. W3 is characterised predominantly by exotic species including sweet vernal (*Anthoxanthum odoratum*), Yorkshire fog, Mercer grass, white clover (*Trifolium repens*), and soft rush, which are typical of a disturbed wetlands in pasture areas. W3 is a wetland under the RMA/RNRP definition, but meets exclusion (e) in the NPS-FM.

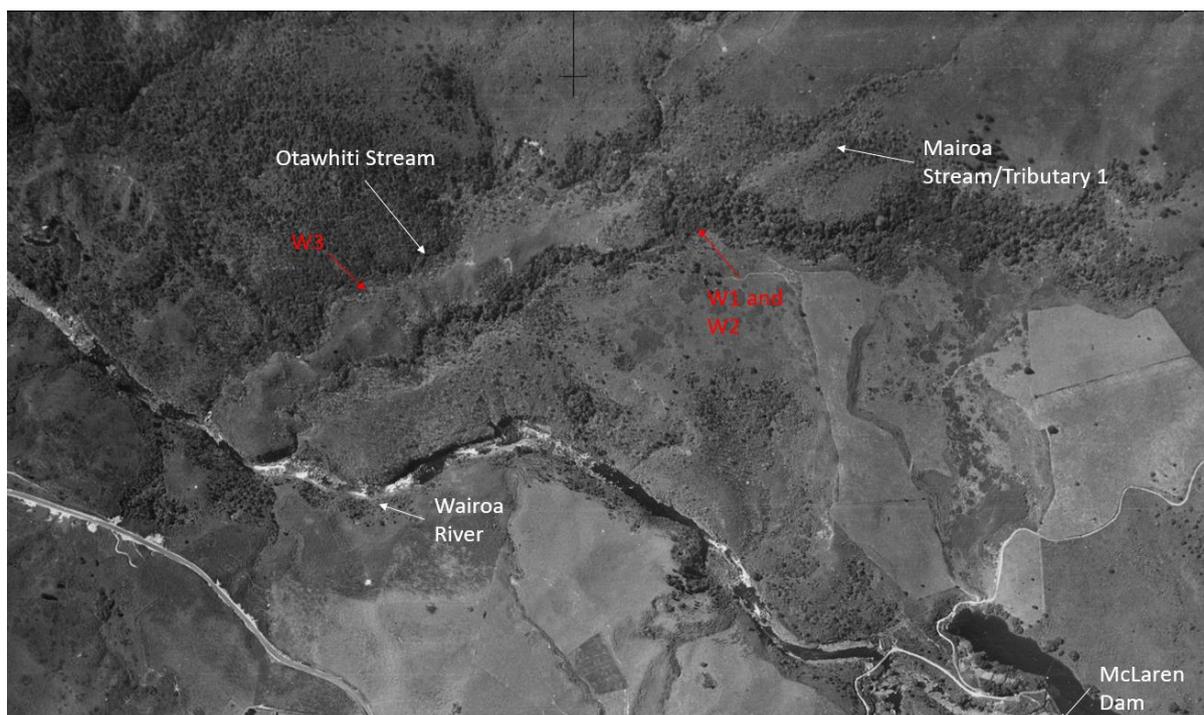
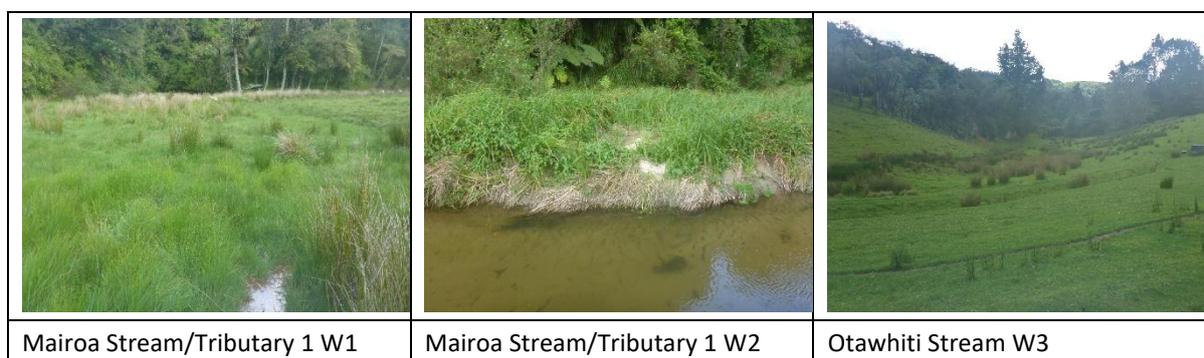


Figure 2.2: Aerial imagery from 1943 showing the approximate locations of potential wetland areas around the Ruahihi Canal

Photographs of Ruahihi Canal wetlands W1 to W3 are provided in Photograph 2.2.



Photograph 2.2: Wetlands associated with the Ruahihi Canal and Tributaries. November 2022. Refer to Figure 2.2 and/or Appendix A Figure A2 for locations.

## 2.3 Lake Mangaonui and surrounds

Two wetlands were identified upstream of Mangaonui Dam on the western arm of Lake Mangaonui (Mangaonui Stream), and one was identified downstream of the Mangaonui Dam (Figure Appendix A.3). None of the wetlands identified around Lake Mangaonui are visible on the earliest aerial imagery following the formation of Lake Mangaonui in 1979 (Figure 2.3).

W1 has formed since the formation of Lake Mangaonui and relies on the water level in the lake to maintain its hydrological function. W1 is primarily characterised by native wetland species such as purei, harakeke, toetoe (*Austoderia fulvida*), and koromiko (*Veronica stricta*). W1 is a wetland under the RMA/RNRP definition, and is considered a 'natural inland wetland' under the NPS-FM, but also meets exclusion (c) in the NPS-FM.

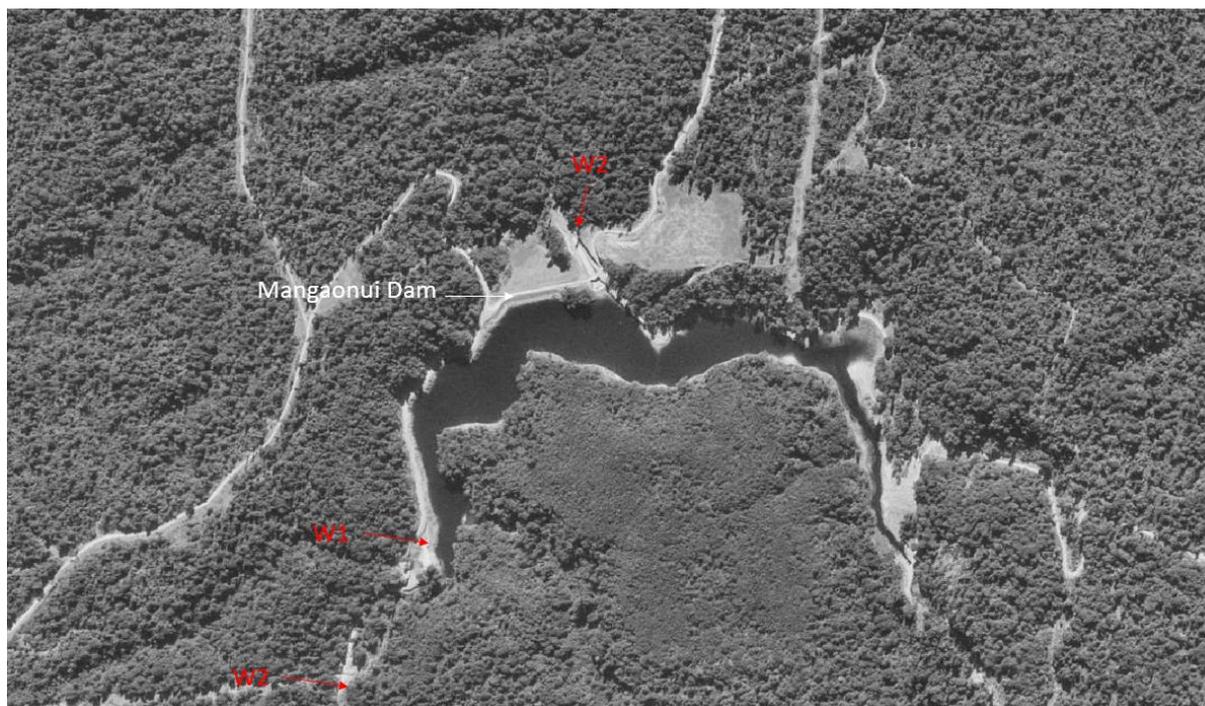


Figure 2.3: Historic aerial imagery from 1979 showing the approximate locations of potential wetland areas around the Lake Mangaonui.

W2 is a seepage wetland on the true left bank of the Mangaonui Stream, upstream of the K5 Power Station. W2 is characterised predominantly by exotic wetland herbs and rushes (spearwort (*Ranunculus flammula*), marsh bedstraw (*Galium palustre*), jointed rush (*Juncus articulata*), Yorkshire fog, sallow sedge (*Carex lurida*), and *Glyceria* sp.) with a minor native sedge component (*Isolepis reticularis*). W2 is a wetland under the RMA/RNRP definition, and is considered a ‘natural inland wetland’ under the NPS-FM.

W3 is located downstream of the Mangaonui Dam and is a seepage of spring wetland, but is also partially fed by the seepage from the Mangaonui under-dam drainage. W3 was characterised by exotic species (spearwort, Yorkshire fog, and lotus (*Lotus pedunculatus*)) with some native sedges (*Isolepis reticularis*) (Figure 2.3) W2 is a wetland under the RMA/RNRP definition, and can be considered a ‘natural inland wetland’ under the NPS-FM.

Photographs of Lake Mangaonui wetlands W1 to W3 are provided in Photograph 2.3.



Photograph 2.3: Wetlands associated with Lake Mangaonui. November 2022. Refer to Appendix A Figure A3 for locations.

### 3 Potential impacts associated with continued operation of Kaimai HEPS

Nine of the thirteen identified wetland areas are considered to be ‘natural inland wetlands’ as defined by the NPS-FM. Table 3.1 provides a summary of the potential impacts (in the context of NES-F rules for the taking, use, damming, diversion or discharge of water within, or within a 100 m setback from, a natural inland wetland) of the continued operations of the Kaimai HEPS on the identified wetland areas. Reconsenting of the Scheme does not require any asset upgrades or changes, and Manawa Energy is seeking no significant changes to the discharge operational activities specified under the existing consents. The wetland habitats identified as being potentially or partially reliant on scheme elements (Table 3.1) are therefore not likely to be impacted by continued operation of the Scheme.

The other four wetland areas are wetlands under the RMA (1991), but meet one of the ‘natural inland wetland’ exclusions identified in Section 1.2, and so are not discussed further.

**Table 3.1: Summary of potential ‘natural inland wetlands’ and potential impacts associated with the Kaimai HEPS**

Area	Wetland	Comment
Lake McLaren and surrounds	W1	Not directly linked to scheme elements, maintained through natural groundwater seepage. Not likely to be impacted by the continued operation of the Scheme.
	W2	Not directly linked to scheme elements, maintained through natural groundwater seepage/springs. Not likely to be impacted by the continued operation of the Scheme.
	W3	Not directly linked to scheme elements, maintained through natural groundwater seepage/springs. Not likely to be impacted by the continued operation of the Scheme.
	W4	Partially reliant on Lake McLaren water level, maintained through natural groundwater seepage/springs. Not likely to be impacted by the continued operation of the Scheme.
	W6	Not directly linked to scheme elements, maintained through natural groundwater seepage/springs. Not likely to be impacted by the continued operation of the Scheme.
Ruahihi Canal and tributaries	W1	Potentially/partially reliant on water levels in the ponded area, but not directly linked to Scheme elements. Not likely to be impacted by the continued operation of the Scheme.
	W2	Potentially/partially reliant on water levels in the ponded area, but not directly linked to scheme elements. Not likely to be impacted by the continued operation of the Scheme.
Lake Mangaonui and surrounds	W2	Not directly linked to scheme elements, maintained through natural groundwater seepage. Not likely to be impacted by the continued operation of the Scheme.
	W3	Potentially/partially reliant on under dam drainage, linked to the Mangaonui Dam, but also maintained through natural groundwater seepage/springs. Not likely to be impacted by the continued operation of the Scheme.

## 4 Applicability

This report has been prepared for the exclusive use of our client Manawa Energy Limited, 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.

Tonkin & Taylor Ltd

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Authorised for Tonkin & Taylor Ltd by:



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SENIOR FLUVIAL GEOMORPHOLOGIST



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**Tom Bassett**  
PROJECT DIRECTOR

22 Jun 2023

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## **Appendix A      Maps**

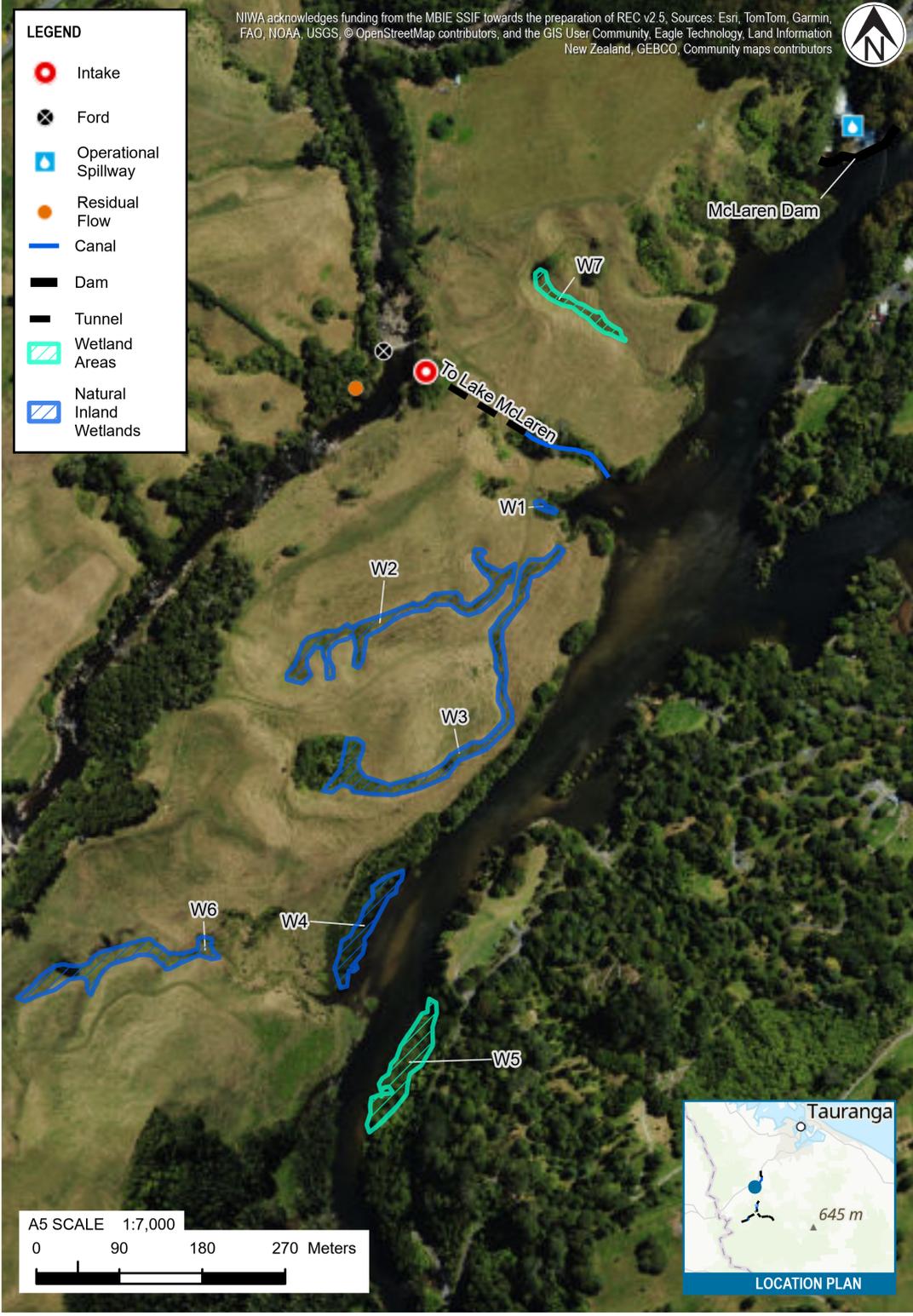
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- Figure Appendix A.1: Wetland areas associated with Lake McLaren and surrounds
- Figure Appendix A.2: Wetland areas associated with the Ruahihi Canal and surrounds
- Figure Appendix A.3: Wetland areas associated with Lake Mangaonui and surrounds



### LEGEND

-  Intake
-  Ford
-  Operational Spillway
-  Residual Flow
-  Canal
-  Dam
-  Tunnel
-  Wetland Areas
-  Natural Inland Wetlands





**LEGEND**

-  Operational Spillway
-  Canal
-  Wetland Areas
-  Natural Inland Wetlands
-  Plots



Ruahihi Canal

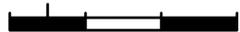
W3

W1

W2

A5 SCALE 1:6,000

0 60 120 180 Meters





**LEGEND**

-  Operational Spillway
-  Power Station
-  Dam
-  Tunnel
-  Wetland Areas
-  Natural Inland Wetlands

W3 —   
Mangaonui Dam — 

Lake Mangaonui

W1 — 

Kaimai 5 Power Station —   
W2 — 

