



Osbornes Drain

Habitat Restoration and Enhancement Plan Investigation Report

(Operative Plan - 23 Feb 2018)

2018

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TABLE OF CONTENTS

1.0	BACKGROUND	3
1.1	Acknowledgement	3
1.2	Purpose of Document	3
1.3	Consent Requirements	3
1.4	Drainage System Description	3
1.5	Cultural Significance/effect	4
2.0	WORKING PARTY ADVICE	7
3.0	ENHANCEMENT OPTIONS	9
4.0	SCHEDULE OF COSTS	10
5.0	IMPLEMENTATION PROGRAM	11
6.0	PLAN REVIEW	12
7.0	REFERENCE DOCUMENTS	13
7.1	Cultural Impact Assessment	13
7.2	Mahaanui Iwi Management Plan	13
7.3	Te Waihora Joint Management Plan	13
7.4	National Water Conservation (Te Waihora/Lake Ellesmere) Order 1990	13
7.5	Consultants Reports	13
7.6	Design standards	13
7.7	LIDAR Data	13
7.8	Consent CRC172231	13
8.0	APPENDIX 1 – MAHINGA KAI RESOURCES OF TE WAIHORA	14

1.0 BACKGROUND

1.1 Acknowledgement

The Habitat Restoration and Enhancement Plan is being developed in recognition of the long-term and historical degradation of the wetlands downstream of the Pump House in the discharge zone as a result of the constructed Pump House discharge channel.

1.2 Purpose of Document

The purpose of this document is to inform the development of a Habitat Restoration and Enhancement Plan for the section of Osbornes Drain downstream of the Pump House.

1.3 Consent Requirements

The requirements of this plan are set out in Consent CRC172231 conditions 17 and 18. These are provided below:

Condition 17 *The Consent Holder shall investigate, develop and prepare a report which will inform the development of a Habitat Restoration and Enhancement Plan for the section of Osbornes Drain downstream of the Pump House within twelve months of the commencement of this Consent. The Consent Holder shall seek the advice of the Department of Conservation, Te Rūnanga o Ngāi Tahu, Te Taumutu Rūnanga and Wairewa Rūnanga when undertaking its investigation and preparing the report.*

Condition 18 *The Habitat Restoration and Enhancement Plan investigation and report shall include:*

- a. The various enhancement options including costings to provide mahinga kai habitat downstream of the pump house and in particular to discourage further upstream eel migration into Osbornes Drain; and*
- b. An implementation program.*

1.4 Drainage System Description

The Osbornes scheme has a rating area of approximately 1758 ha, servicing the area between Halswell Cannel and Hudson Roads with the main drainage outlets for this scheme via the Osbornes Pump Station. The ultimate receiving environment for this area is Te Waihora (Lake Ellesmere).

The total length of classified drains within the scheme is 9 km.

Below is a summary of the drainage schemes history taken from the publication 'Osbornes Drain and Pumping Scheme – An Evaluation' July 1989

1868	Regular lake openings began
1889	Halswell Canal constructed
****	Drain re-routed through stone-faced bank direct to the lake
1955	Double, manually operated flood gate installed within stop bank
1962/63	Osbornes Pump Scheme initiated by North Canterbury Catchment Board
1967/68	Scheme constructed under supervision of the Ellesmere County Council
1968	First pump reading was taken late May 1968

Prior to European settlement most of the area was a shallow bay covered by the high levels of Te Waihora (Lake Ellesmere). The land drain running through the catchment (Osbornes drain) originally flowed into the Halswell Canal via a wooden floodgate in the stone face bank. Improvements in the

Halswell drainage system keep the canal levels high so the drain was rerouted through the stone face bank directly to the Lake. In 1955 a double, manually operated, floodgate was installed.

The upgrade of this land drainage scheme was initiated by the then North Canterbury Catchment Board in 1962/63 and was constructed under the supervision of the then Ellesmere County Council. The scheme provided for two pumps with a combined capacity of approximately 1.7 cubic meters per second; designed to cope with all floodwaters, except under extreme rainfall. The main canal is designed to act as a ponding area. From an economic return perspective, the capital works had a return on investment of 3 years. However this did not consider the impact of drainage water on lake health and cultural impact.

The key feature of this drainage district is the Osbornes Pump Station. It is the responsibility of the Osbornes Drainage Committee with contractors utilised for maintenance. The pumping hours range dramatically over the year. Approximately 50% of the pumping hours occur during the months of July and August, and 75% of the pumping hours occur between the months of June and September.

The majority of the infrastructure assets in this scheme are open channels. As mentioned above, there is also a pump station.

The Osbornes catchment is low lying flat land. Prior to European settlement a map shows most of the area as a shallow bay covered by High lake levels. Pasture for grazing is the predominate land use with the catchment followed by dairying and lifestyle blocks.

A scheme map is provided in Figure 1 and a scheme schematic in Figure 2 below.

1.5 Cultural Significance/effect

It is recognised that Te Waihora is an area of considerable cultural significance. Under the Ngāi Tahu Claims Settlement 1998, ownership of the lake bed of Te Waihora was returned to Te Rūnanga o Ngāi Tahu.

Te Rūnanga o Ngāi Tahu and the Department of Conservation share management responsibilities for Te Waihora and have prepared a joint management plan. The joint management plan was prepared by Te Rūnanga o Ngāi Tahu with advice from the Te Waihora Management Board (local Papatipu Rūnanga representatives) and the Canterbury Conservancy of the Department of Conservation in accordance with the provisions set out in sections 167 to 182 and schedule 12 of the Ngāi Tahu Claims Settlement Act 1998.

Te Waihora is also subject to a Water Conservation Order which recognises the outstanding amenity and intrinsic values that the lake provides, including Ngāi Tahu historical, spiritual and cultural characteristics and significance in accordance with tikanga Ngāi Tahu, including in respect of kaitiakitanga and mahinga kai.

Any activity that may affect water or the environment of Te Waihora are of significant interest to Te Rūnanga o Ngāi Tahu. This is recognised and acknowledged by Selwyn District Council. The Cultural Impact Assessment prepared by Te Taumutu Rūnanga for the consent application is a key reference document.

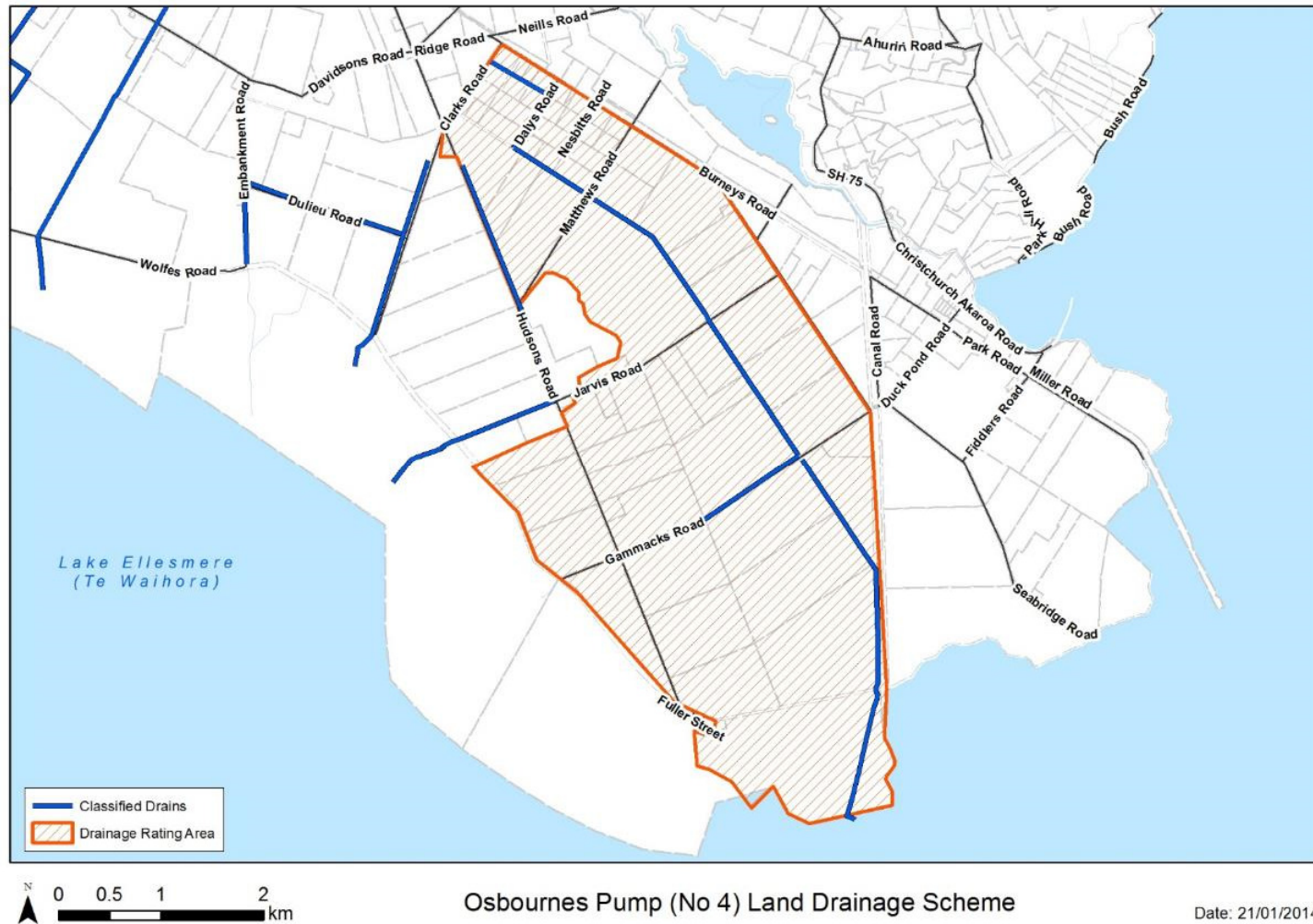


Figure 1 Scheme Map

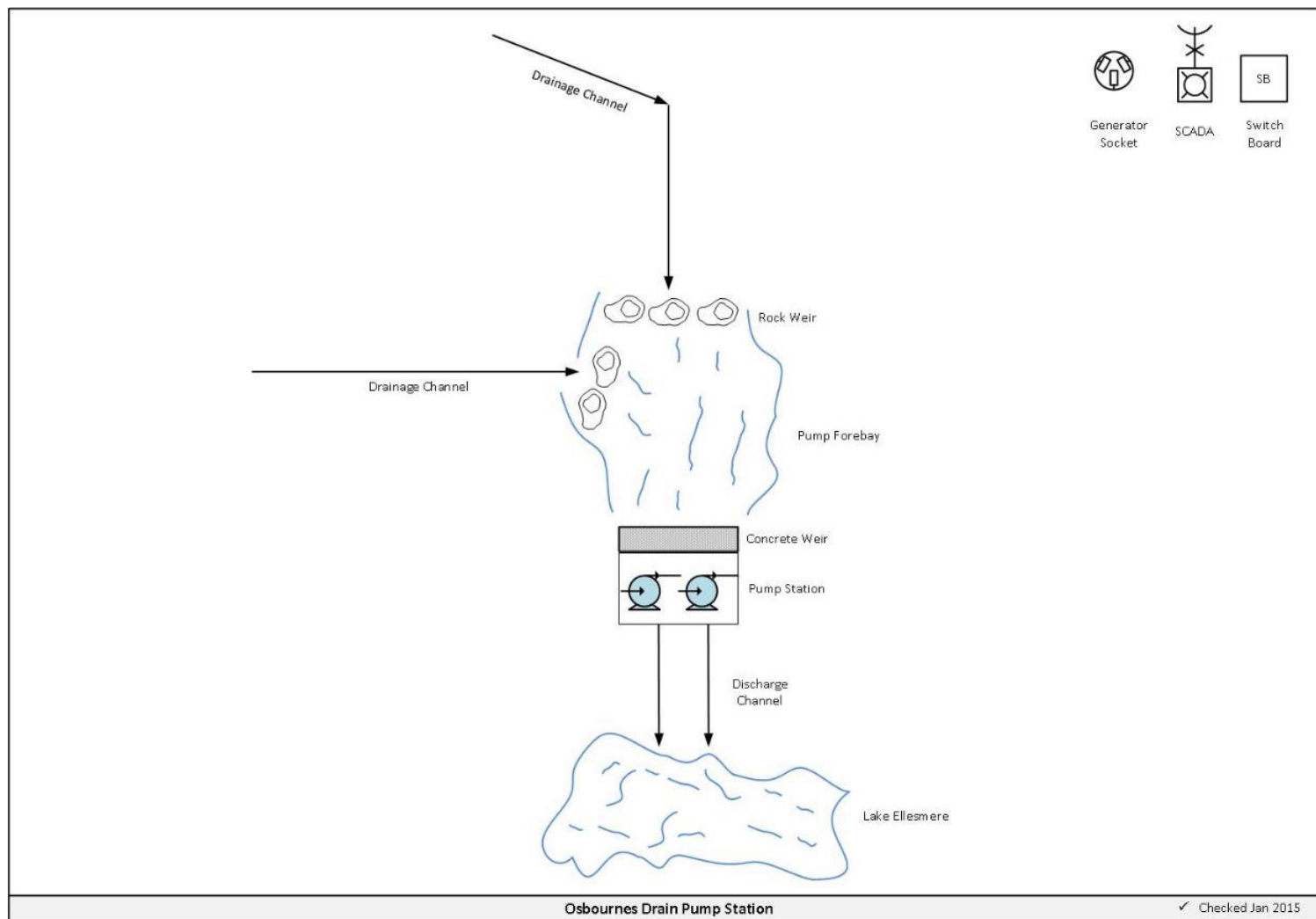


Figure 2 Scheme Schematic

2.0 WORKING PARTY ADVICE

The Working Party met on the 2nd February 2017 to discuss the aspirations for the Habitat Restoration and Enhancement Plan. The working party worked through a skeleton version of this report providing feedback on its contents and providing direction for further work. The below figures are copied from white board sketches on the day along with brief 'notes' of the discussion under each.

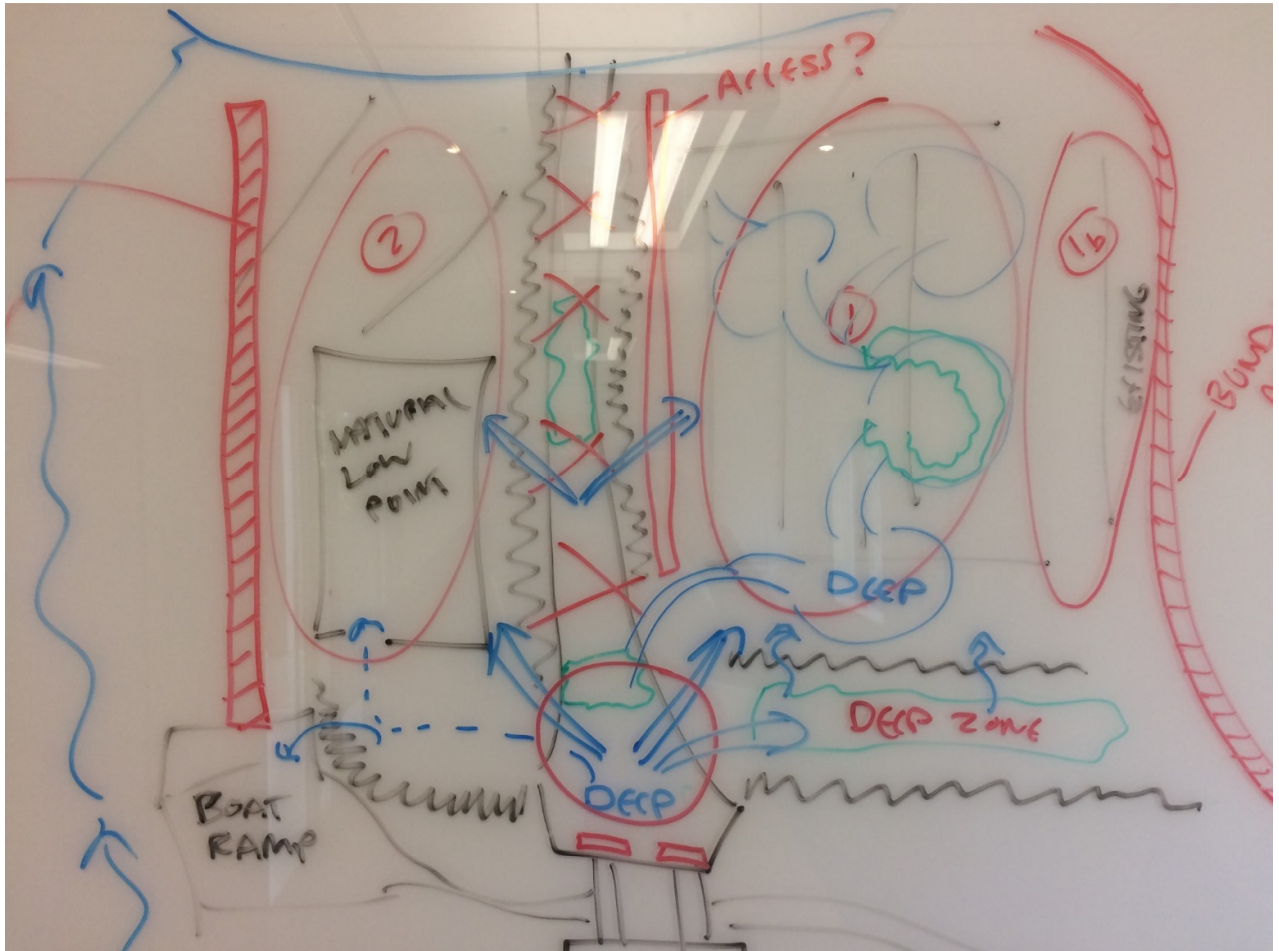


Figure 1 – Initial ideas on potential site layout considerations

The formation of natural habitat to discourage the need / desire of eel (short and long fin) to migrate further upstream is of critical importance as is the development of Mahinga kai habitat.

The working party identified two initial wetland locations (1) and (2) above for consideration. The form of the wetland was agreed to mimic nature with varying zones of shallow and deeper water in a meandering pattern. The wetland should be developed sympathetically with the natural contour of the land.

A site visit, in the early stages of developing the plan, with all working party members will be critical to ensuring a successful project.

Provide for enhanced bittern habitat and ensure that this is in place before any bittern habitat is removed. This was discussed as part of the discussion on the potential to remove Raupo in a number of places. It was noted that wild life is a measure of success.

Promote the establishment of salt-marsh plants once stock are removed.

Access to the lake shall remain and in the future educational information / boards etc could be put in place to explain the work that was put in place and the reasons why.

There was a desire for much of this work to be designed in house

An assessment of consent requirements will be required early on in the process.

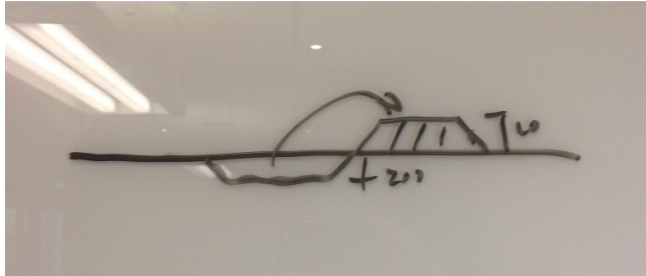


Figure 2 – Idea of 'low impact' wetland formation

The above figure illustrates a shallow excavation with the 'cut' material forming a low bund. It is expected that the wetland will be constructed in a sympathy with the natural contours of the land and the existing natural features of the site.

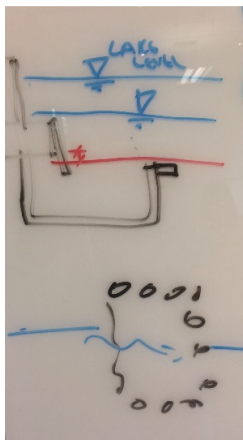


Figure 3 – Ideas to limit eel migration

The *upper sketch* in figure 3 above shows a level/elevation drop between the pump station pipe outlet and the proposed normal water level. This 'step' would provide a barrier to fish passage (be it limited) between the outlet channel and the pump discharge pipe.

Consideration of the wetland and its operation under different lake level scenario's will be an important consideration throughout this project.

The *lower sketch* shows a x-section through a formed gravel bund where water is passed through providing a filtering process while at the same time limiting fish passage.

3.0 ENHANCEMENT OPTIONS

Mahinga kai habitat

One of the key objectives of this plan is to provide Mahinga kai habitat.

Mahinga kai, as defined in the Te Waihora Joint Management Plan, is the customary gathering of food and natural materials and the places where those resources are gathered.” (Section 167, NTCSA).

The principal mahinga kai species of Te Waihora are outlined in appendix 1 which is taken from the Joint Management Plan. Many of these species are recorded in an 1880 document (Taiaroa, 1880) that identifies the food and natural materials gathered at that time and those that were used as tohu.

It is proposed that the works will promote the establishment of mahinga kai species.

Discourage further upstream eel migration into Osbornes Drain

Another of the key objectives of the plan is to discourage migration of eels upstream into Osbornes drain. The below measures are proposed to be further investigated and developed and implemented in line with resource consent CRC172231.

- Ensure efficient seal on Osborne drain pump house flap gate
- Provide enhanced habitat downstream of the pump house discharge to provide a preferred habitat
- Formation of natural barriers to upstream migration where possible (in addition to the first measure if practicable)

Habitat and Water Quality Enhancement

It is proposed that a Wetland / wetland swale(s) be constructed to facilitate habitat and water quality enhancement. This will include where appropriate:

- Work in collaboration with working party members to realise the collective vision of the group (refer also section 2.0 of this report).
- Eco sourcing of plants wherever possible and allowing for natural regeneration,
- Minimise earthworks (Work with the natural contours of the land),
- The inlet and outlet locations be considered and sympathetic to the existing ecology

4.0 SCHEDULE OF COSTS

A summary of estimated 'high level' costs are provided in the table below:

Consultants	\$10,000 (if in house design / partnerships)
Earthworks	\$120,000 (minimal earthworks and structures)
Planting	\$10,000 (if in kind labour and natural rejuvenation)
 Total	 \$140,000

Budgets proposed for the 2018-28 Long Term Plan are provided in the table below. These costings are subject to consultation and were put in place prior to the writing of this report.

Project Description	Proposed Budget
Restoration plan	\$20,000
Consent Renewal	\$40,000
Renewals	\$350,000
WQ Improvements	\$125,000

Consideration of alternative funding sources should also be considered if supported by the Working Party. This may include grants from external funders or funding from partner organisations (including in kind support)

5.0 IMPLEMENTATION PROGRAM

The timeline for the implementation of the Habitat Restoration and Enhancement Plan is provided below:

24 Feb 2018	'Habitat Restoration and Enhancement Plan <u>Investigation</u> Report' operational
25 Feb 2018	Development of the 'Habitat Restoration and Enhancement Plan' operational
	Commence plan development with field inspection and onsite workshop with working party members and advisors
	Develop the plan with ongoing review and input from the working party
26 Feb 2019	'Habitat Restoration and Enhancement Plan' operational
	Implementation Step 1 (TBC)
	Implementation Step 2 (TBC)
	Implementation Step 3 (TBC)
	<i>It is likely that the works will be completed in stages to allow monitoring, lessons to be learned, and enhancements made for following stages.</i>
24 Feb 2024	Complete implementation of the 'Habitat Restoration and Enhancement Plan'.

6.0 PLAN REVIEW

It is acknowledged that this plan will form the base document (starting point) for the final 'Habitat Restoration and Enhancement Plan'. This document will therefore be reviewed and revised over the next 12 months as it is being developed further by the Working Party.

The plan will also need to be reviewed throughout the implementation of the Habitat Restoration and Enhancement works.

7.0 REFERENCE DOCUMENTS

The below reference documents shall be taken into account when designing, consenting and constructing the habitat restoration and enhancement measures.

7.1 Cultural Impact Assessment

7.2 Mahaanui Iwi Management Plan

7.3 Te Waihora Joint Management Plan

7.4 National Water Conservation (Te Waihora/Lake Ellesmere) Order 1990

7.5 Consultants Reports

7.5.1 Osbornes Drain Ecology

7.5.2 Osbornes Drain Hydrology and Water Quality

7.5.3 Osbornes Drain Water Quality Improvements

7.5.4 Osbornes Drain Mitigation Measures

Reports can be found on the Selwyn District Council website www.selwyn.govt.nz/osbornes

7.6 Design standards

7.6.1 Auckland Regional Council, Stormwater Management Devices: Design Guidelines Manual, May 2003, Technical Publication No.10;

7.6.2 Christchurch City Council, Waterways, Wetlands and Drainage Guide, Part B: Design, February 2003;

7.6.3 The On-Site Stormwater Management Guideline, October 2004, New Zealand Water Environment Research Foundation.

7.7 LIDAR Data

7.8 Consent CRC172231

8.0 APPENDIX 1 – MAHINGA KAI RESOURCES OF TE WAIHORA

Te Waihora Joint Management Plan

Table 1: Mahinga kai resources of Te Waihora

Kai whenua (from the land)		Manu (birds)	
Māori name	English name	Māori name	English name
aruhe/tauhinu	fern root*	hua kakī ānau	black swan eggs ^o
harakeke	flax*	hua manu	other bird eggs
kākaho	reeds	kakī ānau	black swan ^o
kiore	rat ⁹	karoro	black-backed gull*
kōwhiriwhiri	watercress (introduced)	kereŋu	wood pigeon* ⁺
kūmara	kumara	kōau	black* ⁺ , pied*, little shag*
mānua	sedge*	kōtuku	white heron* ⁺
paru	mud	kuruwhengi/ pāteke	New Zealand shoveller*
pīngao	sand sedge*	matuku	Australasian bittern ⁺
pūhā	sour thistle	pākura/pūkeke	pūkeke* ^o
raupō	bullrush/raupo*	pāpango/ raipo	New Zealand scaup/ black teal ⁺
rongoā	medicinal plants	pateke/ tarawhatu	brown teal* ⁺
tīkōuka	cabbage tree*	pānera /māunu	grey duck* ^o
tororaro	wiggy wig	pōtakitaki	paradise shelduck* ⁺
wīwī/whiwhi/ wewe	rushes*	rīnīwaka	bar-tailed godwit ⁺
Ika (fish)		ruru kōkōu	morepork* ⁺
aua	yellow-eyed mullet	tarāpuka	Red-billed gull ⁺
tranga, mata/ua	whitebait	tete	grey leak*
kanakana/ piharau	lamprey	whiowhio	blue duck ⁺
kōkopu	kōkopu		
mohao	black/common flounder		
pāraki	smelt		
pātiki	3-corner flounder/ whitebelly		
pātiki totara	yellow-belly flounder		
tuna	eel		
ūpokoro	grayling		
kākahi	freshwater mussels		
waikōura	freshwater crayfish		
tuaki	cockles*		

A number of other marine fish species also intermittently inhabit Te Waihora and are sourced as mahinga kai.

⁺ Protected under the Wildlife Act 1953.

* Customary fisheries "Shellfish species" under the Ngāi Tahu Claims Settlement Act 1998.

* Taonga Species under the Ngāi Tahu Claims Settlement Act 1998.

^o Game birds under the Wildlife Act 1953

⁹ While recognising that kiore are a valued mahinga kai species, it is now recognised that they were a significant predator on indigenous wildlife species and their food sources.