

S128 RMA Review Report – AUTH890227 - Whangamarino Weir

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File Number:	60 67 31A
Consent:	AUTH890227
Consent Holders:	The Department of Conservation and Auckland/Waikato Fish & Game Council
RC Code:	RC23818
Date of s129 RMA Notice:	23 March 2017

1 Introduction

The Department of Conservation ('DOC') and Auckland/Waikato Fish & Game Council ('F&G') collectively referred to as 'Consent Holders' hold resource consent AUTH890227 (Appendix 1) that authorises the damming of the Whangamarino River to raise minimum water levels in the Whangamarino Wetland to assist with restoring approximately 1,500 hectares of wetland habitat. Damming of the Whangamarino River occurs by the use of the Whangamarino Weir ('the Weir').

Resource consent AUTH890227 expires on 30 March 2027. On 23 March 2017, the Resource Use Directorate of the Waikato Regional Council ('RUD') served notice on the Consent Holders under section 129 (1) of the RMA, of its intention to review all conditions of resource consent AUTH890227 under section 128(1) RMA (WRC doc#10148502) ('the Review') for the purposes of:

- avoiding or mitigating any adverse effects (relating to ground and surface water levels and gradients, wetland wildlife and habitat values and river processes) beyond the level of effects authorised; and
- reviewing the effectiveness of the conditions to allow determination of the significance of any adverse effects relating to ground and surface water levels and gradients, wetland wildlife and habitat values and river processes.

The decision and associated considerations for initiating the Review is documented in WRC document number 10009482. The document recommends reviewing specific conditions and adding further conditions as appropriate.

As part of the Review process, the Consent Holders provided technical information which has been reviewed by technical experts engaged by WRC. This has led to a decision, dated 15 May 2024, to process the Review on a non-notified basis (WRC document number 29576176).

The most recent reports provided by the Consent Holders include a summary technical and a planning report:

- Collaborations, a consultancy acting on behalf of the Consent Holders, have prepared a report titled "Whangamarino Weir – Current Environmental State Assessment", dated 12 March 2024 ("Collaborations Report"). The Collaborations Report *"provides an overview of the Whangamarino Wetland in relation to hydrology, sediment, ecology and land drainage, and what role the Whangamarino Weir ('the Weir') may have in some of these topics."* The overview aims to inform an assessment of adverse effects and to provide a base scenario to identify and screen potential future weir options.
- Mitchell Daysh, on behalf of the Consent Holders, have prepared a report titled "Whangamarino Weir – Review of AUTH890277", dated 15 March 2024 ("MD Planning Report") which provides planning advice to the Consent Holders to address requirements of s95 RMA and s104 RMA for the Review. The report also included the latest proposed consent conditions at that time. (These conditions have since been updated and amended as detailed later in this report).

This report sets out the subject site and background of resource consent AUTH890227, evaluates the technical information available for this Review, recommends amendments to existing consent conditions to ensure adverse effects are not greater than the effects authorised and addresses statutory requirements for this Review.

2 Site

The Weir is located in the Whangamarino River at the downstream end of the Whangamarino Wetland (shown in Figure 1).



Figure 1: Approximate location of the weir, shown by the red pin.

The Consent Holders' MD Planning Report describes the Whangamarino Wetland:

“Whangamarino Wetland refers to the 7,000 hectare (“ha”) wetland complex (the second largest freshwater wetland in the North Island) situated on the floodplain of the lower Waikato River.

Whangamarino comprises extensive freshwater wetlands (bog, fen, swamp, marsh [as shown in Figure 2]) and is fed by the Pungarehu Stream, Whangamarino River and Maramarua River. In addition to the natural rivers that flow into Whangamarino, the wetland receives inflows from Lake Waikare via the Pungarehu Canal.

As described in the Lake Waikare and Whangamarino Wetland Catchment Management Plan (2018), the Whangamarino Wetland is:

- *Located approximately 45 km north of Hamilton and lies to the east of State Highway 1, between Te Kauwhata and Mercer;*
- *A large lowland freshwater wetland comprised of marsh, swamp, fen and bog. The Whangamarino Wetland contains extensive areas of peat bog, a comparatively rare wetland type in New Zealand;*
- *Listed as a wetland of international significance under the Ramsar Convention (in December 1989, 5,690 ha of the wetland became formally recognised under the Ramsar Convention as a wetland of international importance); and*
- *Contained within three shallow basins drained by the Maramarua and Whangamarino rivers and the Reao Stream.*

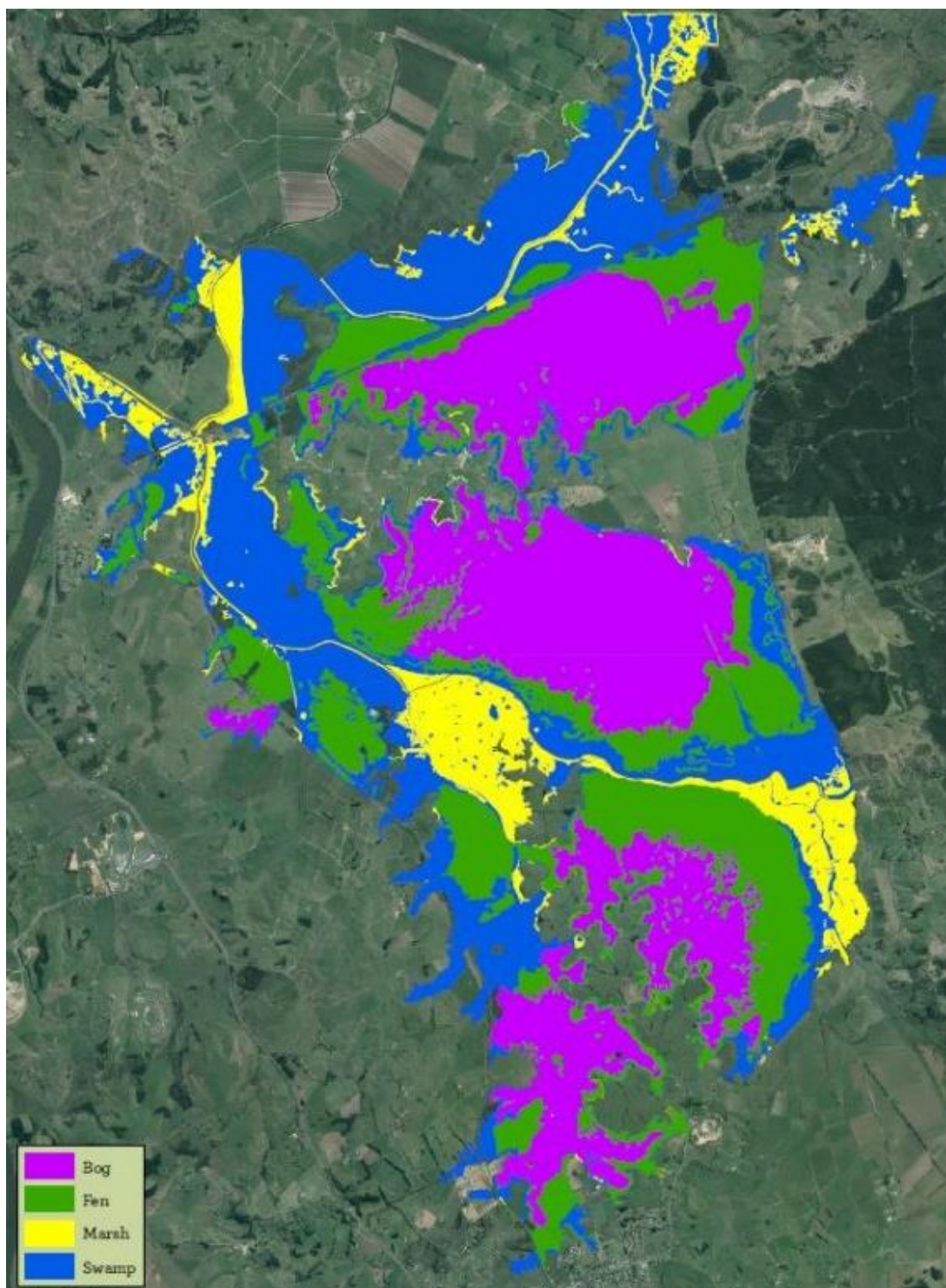


Figure 2 Wetland Types in the Whangamarino Wetland (Source: MD Planning Report).

Proposed Plan Change 1 (“PC1”) to the Waikato Regional Plan (“Regional Plan”) identifies the Whangamarino Wetland as being an “outstanding waterbody with significant values, including habitat for threatened species and sensitive raised bog ecosystems”.

*The MD Planning Report further states: “The Whangamarino Wetland provides important habitat for a high diversity of indigenous plants and fauna, including 10 threatened plant species. The wetland is now the only known location for the nationally critical swamp helmet orchid (*Corybas carsei*) and contains the largest population in New Zealand of the threatened (nationally critical) Australasian bittern/matuku (*Botaurus poiciloptilus*), which is critically endangered (estimated <1000 individuals).*

Their range has declined by approximately 50% over the last 100 years but the Whangamarino Wetland remains an important habitat for the bittern. The Current State Assessment notes that numbers in the Whangamarino Wetland, formerly a core habitat for bittern, appear to have declined by 89% over 35 years.

The Whangamarino Wetland also forms a critical part in the Lower Waikato Waipā Control Scheme ("LWWCS"). The establishment of the LWWCS was initiated by the Waikato River Authority in 1961, and its inception was due to the large-scale floods that occurred in the 1950s. These flooding events caused wide scale and significant social and economic costs across the district and to an extent, the region. The objective of the LWWCS is to provide flood protection to rural agricultural land in the Waipā and Lower Waikato valleys and to provide protection for the towns of Te Kuiti, Ōtorohanga and Huntly. The LWWCS was originally funded on the basis of 75% from Government subsidy, 12.5% from sand royalties and 12.5% from landowner contributions that were advanced in the form of loans which were to be repaid in 2003. Flood protection is achieved by a combination of the following:

- *Stopbanks providing direct protection to specific areas, including floodgates and pump stations for evacuating water from behind stop-banked areas;*
- *Willow clearing along river and stream channels where infestation severely restricted flood capacity;*
- *Improvements to the channel of the Waikato River, including river training and dredging; and*
- *Control of the ponding and storage within Lake Waikare and the Whangamarino Wetland."*

Figure 3 shows flood and drainage schemes adjacent to the Whangamarino Wetland and Figure 4 provides an overview of land ownership in the wetland.

The MD Planning Report also advises that the Whangamarino Wetland is of high cultural significance to a number of iwi and hapū groups.

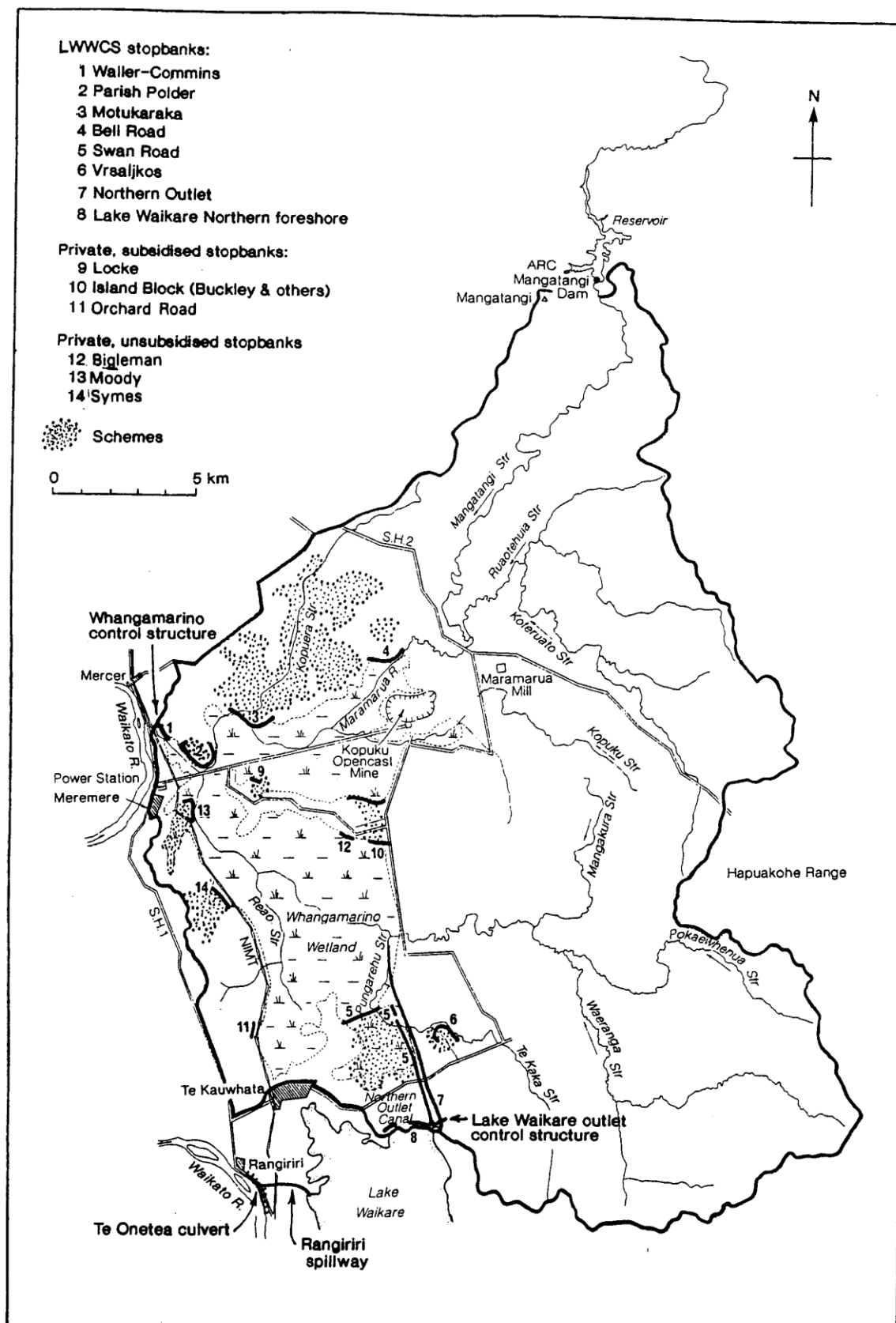
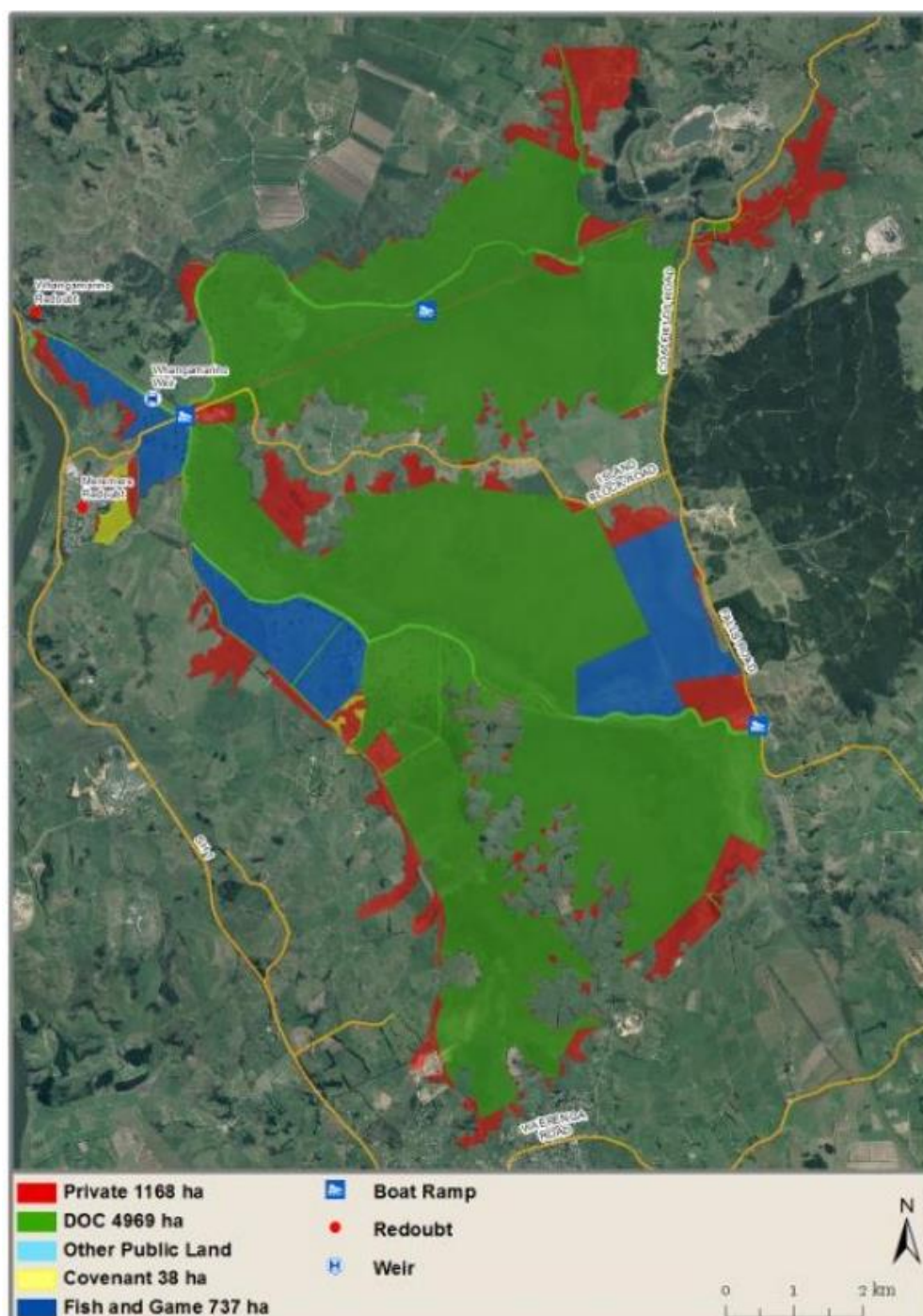


Figure 3 Flood and Drainage Schemes adjacent to the Whangamarino wetland



3.1.1 *Hearing Decision in 1991*

During the original hearing for the Weir consent the Hearings Committee (“the Committee”) was uncertain about the effects of the weir and considered that these should be identified through monitoring and included a review condition in the consent to address any identified effects.

In the discussion section of the decision, the Committee considered that activities authorised previously such as land drainage schemes should be protected from the impact of the weir. The Committee acknowledged that the flood storage area of the wetland would be reduced by four percent and considered that reduction to be acceptable.

The Committee acknowledged that water from Lake Waikare contains a high silt concentration but expected that silting of the river channel would not occur to any greater degree than at the time of the decision.

In respect to ecological effects, the Committee anticipated that the increase in the water level would benefit the wetland ecosystem (e.g. raising the water level would benefit the relatively unmodified peat bogs by reducing desiccation of this area). While the enhancement of the wetland ecosystem would also benefit native species, the Committee accepted that it may also enhance the habitat of introduced species. The Committee concluded that the effects on flora and fauna should be monitored and pests managed.

3.1.2 *Review Hearing Decision in 1996*

During the review hearing for the Weir consent the Committee remained uncertain about the effects of the weir as previous monitoring was insufficient to make an assessment. This included uncertainty about the effects on flora and fauna and on adjacent private land. The Committee considered that monitoring should continue, and the conditions of this consent should be reviewed again when sufficient data was available.

During the Hearing the Committee acknowledged that causes other than the weir (natural and artificial) can contribute to flooding and drainage problems. The Committee concluded that at the time of the Hearing there was more ponding available than required by the Lower Waikato Flood Control Scheme and hence the weir would not compromise the integrity of the scheme.

The Committee maintained the view that the probability of silt from the upper catchment being retained in the wetland was relatively small.

An advice note on the consent following the review reflects the Committee’s expectation:

“If the adverse effects of the exercise of this consent are more significant than predicted by the grantees in applying for this consent, then the Regional Council will expect the weir height to be reduced and/or compensation to be paid by the Grantees to any person or body affected.”

In summary, the decision makers considered that there was uncertainty regarding the effects of the weir however, it was anticipated that monitoring would determine these effects. The decision makers expected that there would be acceptable effects on the flood and drainage schemes, provided that the schemes operated as designed.

3.2 *Initiation of the Review*

The Review (subject to this report) was initiated in 2017. The report, recommending the initiation of a review (‘Initiation Memo’), documented as WRC document number 10009482, provides the reasons for the Review:

- Sedimentation / Water Levels / Weir Performance: *“... the weir has likely resulted in adverse effects on the flood control scheme beyond the effects anticipated. The decision makers specifically included a review condition to address any effects identified by monitoring in order to mitigate that effect. Therefore, I consider it appropriate to review the conditions of this consent related to sedimentation and water levels by identifying the causes of sedimentation and their relationship with the weir, determining the level of effects and considering appropriate mitigation actions and changes to consent conditions if appropriate. ...the relevant monitoring conditions including conditions relating to the monitoring plan and reporting requirements should be reviewed to ensure effective and conclusive monitoring of effects. Also, the monitoring condition related to the weir performance should be reviewed as it is likely that the condition cannot physically be complied with. If appropriate, groundwater monitoring may need to be included in the monitoring plan due to its linkage to surface water levels and as such siltation.”*
- Vegetation: *“...there is a lack of information to determine the level of effects on vegetation changes. ...the monitoring, monitoring plan and reporting conditions should be reviewed to ensure monitoring is effective to achieve the objective of vegetation monitoring and that the monitoring plan is clear and provides sufficient certainty”.*
- Pest Management: *“...conditions related to pest management should be reviewed to ensure that pest management is ensured in accordance with the assumption made by the decision makers”.*
- Other: *“Other matters which affect the assessment of effects or are unclear or uncertain are the review and reporting periods and it is my opinion that relevant conditions should be reviewed and amended to ensure greater certainty”.*

As detailed in the Initiation memo a decision was made to review, amend, delete and add conditions as appropriate to ensure adverse effects relating to ground and surface water levels and gradients, wetland wildlife and habitat values and river processes are addressed in line with the assumptions made by decision makers.

In response to the initiation of the Review, the Consent Holders initially proposed amendments to consent conditions as documented in WRC document numbers 12893782, 12896459 and 13334019. These were later superseded by the conditions proposed in the MD Planning Report and additional proffered consent conditions as discussed below.

3.3 Interim Assessment and Further Technical Work

In November 2020, following an information gathering phase, WRC undertook an interim assessment of effects and potentially affected parties ('Interim Assessment'), documented as WRC document number 13368877). In response, the Consent Holders proposed further technical work to assess effects in further detail. A workplan was agreed to by the Consent Holders, WRC (RUD) and WRC (ICM) in May 2021 (WRC document number 21522077) and technical workshops were held to consider technical issues during this further assessment phase.

The further technical work resulted in the Collaborations Report and the MD Planning Report.

3.4 Notification Decision

On 15 May 2024, on the basis of the available technical information, a decision was made to process the Review on a non-notified basis (WRC document number 28385917). Amongst other considerations, the decision was made based on the Consent Holders proffering conditions to maintain the existing weir invert (maximum height of 2.95 mRL) and the existing berm height (except for minor repairs). The proffered conditions would ensure (amongst others) that adverse effects on water levels, flood storage and drainage would be no more than minor above the effects authorised. It was also assessed that there are no affected parties.

4 Consultation

4.1 Waikato Tainui

As advised by the Consent Holders, DOC has and continues to engage with Waikato Tainui over various issues in the wetland including the Review. As part of the engagement, Waikato Tainui have reviewed the Collaborations and MD Planning Reports. In response Waikato Tainui advised that the documents address their concerns. Waikato Tainui support DOC's ongoing engagement with mana whenua and keeping Waikato Tainui informed and acknowledges DOC's efforts in promoting the overall health of the wetland (WRC doc# 28935168).

4.2 Integrated Catchment Management

The Consent Holders engaged with ICM on technical matters and a technical expert from ICM attended the technical workshops. ICM also provided technical comments on the draft consent conditions for this Review including cross section survey locations and ICM consent information to provide the opportunity for the parties to collaboratively address individual consent monitoring requirements.

4.3 Landowners

The Consent Holders agreed to consult with landowner as part of a statutory timeframe extension under s37A(5) RMA for making a notification decision (WRC document number 21523284). Some initial updates on progress to landowner representatives occurred but not to the extent agreed to. The consent holders have not provided an update on this consultation since the workshop held in November 2023.

4.4 Previous Submitters

No consultation was undertaken with submitters to the original consent application or the 1996 s128 RMA review.

5 Process Matters

A summary of process matters is as follows:

Date	Event	WRC Document Number
23 March 2017	s129 RMA Notice	10148502
15 May 2024	Non-notification Decision	28385917

28 May 2025	Time Extension to achieve all statutory timeframes	21523284, 32244901
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6 Statutory Considerations

When reviewing the conditions of a resource consent, section 131 RMA requires the consent authority to have regard to the matters in section 104 RMA and to whether the activity allowed by the consent will continue to be viable after the change.

Further, sections 106 to 116 RMA (which relate to conditions, decisions, and notification) and sections 120 and 121 RMA (which relate to appeals) apply, with all necessary modifications, to a review under section 128 RMA as if the review were an application for a resource consent; and the consent holder were an applicant for a resource consent.

6.1 Effects on the Environment – RMA Section 104(1)(a) and (ab)

6.1.1 *Existing Environment*

The existing environment has been described in the notification decision report ('Notification Report') (WRC doc#29576176, Appendix 1, section 1.2) and I will not repeat it here.

Most importantly, the existing environment includes the authorised effects from existing lawful activities, including the Whangamarino Weir consent (AUTH890227 subject to this Review) and authorised flood and drainage schemes.

The authorised maximum weir height is 3.14 mRL and the authorised maximum weir berm height is 4.04 mRL. The authorised effects of the Whangamarino Weir are documented in the hearing decision in 1991 (WRC doc# 3949770) and the review hearing decision in 1996 (WRC doc# 768369) (and summarised in the Notification Report and referred to in section 6.1.2.1 below).

In summary, the original and 1996 decision makers considered that there was uncertainty regarding the scale of effects of the weir including effects on private land and it was anticipated that monitoring would determine these effects. The original decision makers expected that there would be acceptable effects on the existing flood and drainage schemes (4% reduction in flood storage), provided that the schemes operated as designed.

There are 14 flood and drainage schemes adjacent to the Whangamarino wetland. Of these, eight are part of the Lower Waikato Waipa Control Scheme (LWWCS), three are private but subsidised schemes and three are private unsubsidised schemes. The location and names of each scheme are shown in Figure 3 of this report.

In respect to ecological effects, the Committee anticipated that the increase in water level would benefit the wetland ecosystem but may also enhance the habitat of introduced species. The Committee concluded that the effects on flora and fauna should be monitored, and pests managed.

6.1.2 *Effects of the Weir and Amendments to Consent Conditions*

The Review Initiation Memo (WRC doc# 10009482), stated that the Review applies to all conditions of resource consent AUTH890227 and is for the purpose of:

- avoiding or mitigating any adverse effects beyond the level of effects authorised; and
- reviewing the effectiveness of the conditions to allow determination of the significance of any adverse effects.

In this section, I will first summarise the actual effects of the weir (in comparison to the anticipated and authorised effects) and any remaining uncertainties. I will make general recommendations on how these could be addressed. I will then review the existing conditions and discuss whether changes to the conditions are required to avoid or mitigate effects (beyond the effects authorised) and/or whether the conditions are effective to address uncertainties and allow the determination of the significance of an adverse effect.

6.1.2.1 Effects Assessment

The principal issues relating to the effects of the weir are:

1. The effects from increased water levels
2. The effects from increased sedimentation
3. The effects on drainage
4. The effects on the wetland ecosystem

While the effects are listed separately, they are interrelated. Increased water levels reduce the flood storage capacity associated with the LWWCS flood protection scheme, increases the frequency and duration of spill over to adjacent flood protected areas which in turn increases flooding, and results in reduced drainage and/or increased pumping requirements. Sedimentation is further exacerbated by increased water levels, and results in consequential effects such as increased spill over and reduced drainage. Increased spill over of sediment laden water into the adjacent wetland can affect the wetland ecosystem.

An assessment of effects (including references) is documented in section 2 of the Notification Report and is attached as Appendix 2 to this report.

Roger Seyb and Graham Levy, Senior Technical Directors at Beca, have been engaged by WRC to provide technical advice (including advice for amending consent conditions, WRC document numbers 30068646, 30069228, 30284252) and, consistent with the Notification Report, will be referred to as the WRC Peer Reviewers.

Water Levels

The existing consent authorises the weir to have a maximum weir invert height of 3.14 mRL and a maximum weir berm height of 4.04 mRL. However, the existing weir is lower and has a height of approximately 2.95 mRL (invert height) and 3.6 mRL – 3.8 mRL (berm height). As assessed in the Notification Report, the current weir height has already resulted in the adverse effects authorised by the consent (4% reduction of flood storage capacity). Exercising the maximum authorised weir height would result in greater effects to a more than minor degree.

To ensure that the effects on water level remain as authorised, the Consent Holders have proffered a consent condition to maintain the weir at its current height which would limit the weir berm level to a maximum of 3.8mRL and the maximum weir invert height to 2.95 mRL (WRC doc#29130944).

In considering amendments to consent conditions to achieve the consented level of effect, the WRC Peer Reviewers made further recommendations to maintain the weir berm at an approximate uniform level to avoid flow modifications including concentration of flows at low sections of the weir (other than the vee invert).

Figure 5 shows the existing berm level/access track as per results of a 2022 survey. The WRC Peer Reviewers advised that some low sections should be repaired (as approximately shown in Figure 5 in red). The Consent Holders advised that the repairs have already been undertaken.

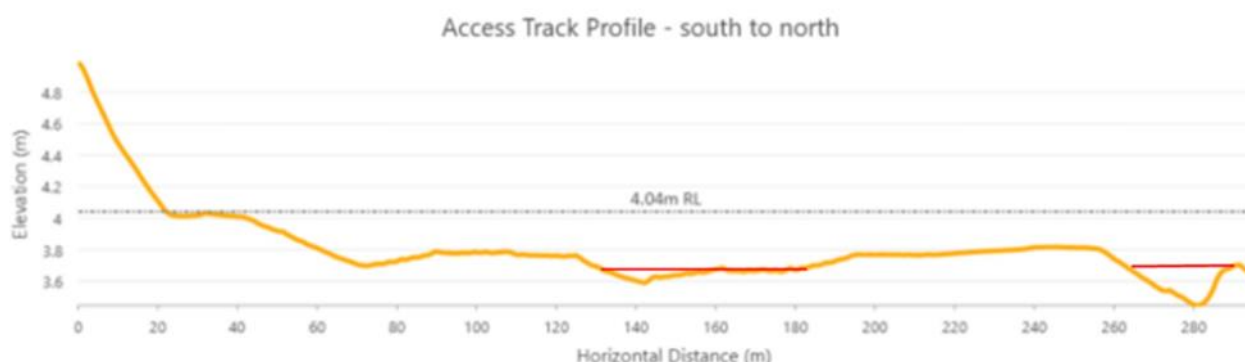


Figure 5 Survey of existing weir berm / access track (orange line) and indication of low sections that may be repaired (red line).

The WRC Peer Reviewers also recommend the establishment of two water level recorder sites near the Pungarehu Stream/Pungarehu Canal interface and the Swan Road drainage scheme to continuously measure water levels. This would provide a better understanding and confirm the predicted hydraulic behaviour/water levels in the Pungarehu Stream and characterise conditions for sedimentation in the adjacent wetland and drainage effects on the Swan Road drainage scheme.

There also remains uncertainty in respect to water levels and associated reduction in the available flood storage and resulting spill over into the wetland (more frequent and earlier) during times of discharge from the Northern Outlet Control Structure which coincide with backwater flow from the Waikato River due to the Whangamarino Control Structure being open. Analysis of the water level data including hydraulic profiles from downstream of the weir to upstream of the Swan Road pumpstation during various flow conditions would assist with identifying the extent of inundation and loss of flood storage for a range of scenarios.

The recommended changes to conditions would address remaining uncertainties and confirm the level of assessed effects.

Recommended changes to conditions:

- Limit the weir berm height to the existing level (maximum of 3.8 mRL)
- Establish two water level recorder sites near the Pungarehu Stream/Pungarehu canal interface and the Swan Road drainage scheme

- Undertake a detailed hydraulic analysis and comparison to surveyed bank levels to identify the potential for overtopping into the adjacent wetland areas under various Lake Waikare outflow and Whangamarino River tailwater conditions

Sedimentation

As discussed in the Notification Report, sedimentation due to the weir is greater than anticipated, particularly in the area of the Whangamarino River/ Pungarehu Stream confluence but less so in the Northern Outlet Canal. As explained in the Notification Report the increased sedimentation may have consequential effects on drainage and the ecosystem. This is further discussed below. The Peer Reviewers advised that further sedimentation in the Whangamarino River would be expected if the weir invert level was raised above 2.95 mRL and an even greater increase in sedimentation would likely occur if the weir berm level was raised. Therefore, the Consent Holders have proffered a condition to maintain the exiting levels i.e., a maximum weir invert height of 2.95 mRL and a maximum weir berm height of 3.8 mRL with the berm maintained at a uniform level.

Greater sedimentation at the Whangamarino River/ Pungarehu Stream confluence has the potential to increase water levels and reduce waterway capacity which in turn would lead to more frequent overflows of sediment-laden water into the wetland and on private property with potential consequential adverse effects on ecology and drainage respectively. These effects and associated amendments to conditions are further discussed in sections 'Drainage' and 'Ecology' below.

The Peer Reviewers consider that *"there is uncertainty about the spatial and temporal extent and change of sedimentation in the Whangamarino River main channel and the Pungarehu Stream. It appears that sedimentation may have stabilised."* To confirm this, the Peer Reviewers recommend identifying any trends by a more in-depth assessment of the data spatially and over time. To assist such assessment, the Peer Reviewers recommend continued and additional regular surveys of cross sections of the Whangamarino River and the Pungarehu Stream to monitor sedimentation. This would also confirm associated effects on water levels in the streams, and the potential for the sediment laden water to spill out of the main channel into the wetland or adjacent private properties.

Recommended changes to conditions:

- Continued and additional regular river cross section surveys of riverbeds and banks and associated trend analysis (spatial and temporal) to track changes in sedimentation within the watercourses over time
- Undertake a detailed hydraulic analysis and comparison to surveyed bank levels to identify the potential for overtopping into the adjacent wetland areas under various Lake Waikare outflow and Whangamarino River tailwater conditions

Drainage

As discussed in the Notification Report, adverse effects on drainage over and above the effects authorised have been assessed as less than minor if the weir invert does not exceed a height of 2.95 mRL and the existing weir berm is maintained at a uniform level with a maximum height of 3.8 mRL.

To ensure that the overall effects on all drainage schemes remain less than minor, the Consent Holders have proffered a consent condition that limits the existing weir invert to 2.95 mRL and maintains the existing weir berm level at a uniform height and a maximum height of 3.8 mRL (refer to Figure 5).

Further, and as discussed previously to address remaining uncertainty, the establishment of water level recorder sites near the Pungarehu Stream/Pungarehu Canal interface and the Swan Road drainage scheme, to continuously measure water levels, would provide a better understanding and confirm the predicted hydraulic behaviour/water levels in the Pungarehu Stream and associated drainage effects on the Swan Road drainage scheme.

Recommended changes to conditions:

- Limit the weir invert to 2.95 mRL
- Limit the weir berm height to a uniform and maximum level of 3.8 mRL
- Establish water level recorder sites near the Pungarehu Stream/Pungarehu canal interface and the Swan Road drainage scheme

Wetland vegetation

Ms Reeves (WRC wetland expert) advised that increased sediment deposition would have significant negative effects on all wetland types. Mr Levy advised (refer to RUD Interim Assessment¹) that sedimentation has been exacerbated in the mineralised wetland, most notably in the mineralised wetland adjacent to the Pungarehu Stream. However, there is uncertainty about the hydraulic behaviour of the Northern Outlet canal and Pungarehu Stream and whether the water levels can exceed the channel top of bank levels and contribute sediment directly to the wetland prior to entering the Whangamarino River.

As discussed in the Notification Report, wetland vegetation changes have been positive thus far and the increased sedimentation has not yet had an effect on adverse vegetation changes. However, there is a potential for long term negative trends in wetland vegetation changes.

To address the uncertainty, I recommend monitoring water levels and sedimentation in the Northern Outlet canal and Pungarehu Stream and if spillover of sediment laden water occurs to the wetland, then monitor potential changes to wetland vegetation.

Recommended changes to conditions:

- Continued and additional regular river cross section surveys of riverbeds and banks and associated trend analysis (spatial & temporal) to track changes in sediment movement within the watercourses over time
- Undertake a hydraulic analysis and comparison to surveyed bank levels to identify the potential for overtopping into the adjacent wetland areas under various Lake Waikare outflow and Whangamarino River tailwater conditions
- Establish two water level recorder sites near the Pungarehu Stream/canal to confirm hydraulic behaviour and a more precise estimate of water levels in the Pungarehu Stream

¹ WRC Memo - Resource Use Directorate Assessment of Effects - s128 RMA review of resource consent AUTH890227 (Whangamarino Weir), dated 30 November 2020 and document as WRC document number 13368877

- Monitor wetland vegetation changes in areas of the wetland where sedimentation may potentially occur

Wetland Birds

Whangamarino wetland is home to the Nationally Critical and elusive Australasian bittern/matuku (*Botaurus poiciloptilus*), a key wetland bird considered when consent was granted. In the Notification Report it was assessed that adverse effects on bittern habitat as a result of the weir are not greater than anticipated. Therefore, I do not consider that conditions require amending to avoid or determine effects.

Mudfish

The consent decision makers raised uncertainty about effects on the endangered black mudfish and whether it would be outcompeted by the exotic mosquito fish which occupies a similar habitat. In the Notification Report it was assessed that adverse effects on mudfish are not greater than anticipated by the decision makers. Therefore, I do not consider that conditions require amending to avoid or determine effects.

Pests

At the original hearing, the decision makers decided that pests must be managed. Current consent conditions require considerations on how to best manage pests. In the Notification Report it was assessed that pests have been managed appropriately. I consider that the existing condition requires amending to clarify that pests must be management (as per original decision) and reporting of it.

Water Quality

As discussed in the Notification Report, black water events have occurred in the Whangamarino River. Contributing factors such as temperature, organic matter, sedimentation and water level are being investigated by multiple agencies. Investigations thus far indicate that increased water levels (e.g., due to the weir) correlate with conditions that may contribute to blackwater events in the Whangamarino River.

Investigations are ongoing and Mr Sandwell (WRC Water Quality scientist) advised that the complexity of the factors contributing to the black water events would need careful consideration before identifying monitoring needs (personal communication, 6 August 2024).

As contributing factors and exact monitoring needs are unknown at this stage, amending the conditions to include monitoring requirements to determine the potential contribution of the weir to black water events would not be appropriate. However, as discussed above, conditions will be amended to limit the weir height and thus limit water levels in the wetland. Further, monitoring at the Pungarehu Stream / canal interface for sedimentation and associated spillover into the wetland has been recommended to address other effects.

While I consider that amendments to conditions would not be appropriate at this stage, I consider that the potential contribution of the weir to black water events in the Whangamarino wetland should be considered when applying for a replacement consent in 2027.

Fish Passage

As detailed in the Notification Report, the decision makers intended to ensure fish passage and included a condition to achieve this. A 2014 consent compliance report assessed that the weir was

designed to allow safe passage for fish and the design was approved by WRC staff on 30 April 1998². The Notification Report states that a recent assessment notes some impediment to fish passage.

I consider that no changes to the condition is required as the condition is clear in that it requires fish passage.

6.1.2.2 Changes to Conditions

As part of the Review, the Consent Holders proposed amendments to conditions for consideration and further discussion in April 2018 (WRC doc#12297190), August 2018 (WRC doc#12893782), November 2018 (WRC doc#13333825), March 2024 (in section 4 of the Planning Report) and ultimately in April 2025 (WRC dco#31305437, version 6). Also, in April 2024, the Consent Holders proffered conditions that would limit the weir vee invert to a maximum height of 2.95 mRL and the weir berm level to the existing level (3.6 – 3.8mRL) (WRC doc#29130944).

In this section I will review each condition of consent AUTH890227, consider the technical advice from WRC engaged experts, the proposed and proffered consent conditions and recommend changes if considered appropriate to achieve the purpose of the Review. I note that I have worked collaboratively with the Consent Holders on the amendments to the conditions and the finally amended set of conditions has been agreed to by the Consent Holders. I will show the final recommended conditions in bold (either the conditions I recommend remaining unaltered or the amended recommended conditions). I note that the final set of conditions will be numbered differently.

Any amendments will be within the scope of the purpose of the Review:

- avoiding or mitigating any adverse effects beyond the level of effects authorised; and
- reviewing the effectiveness of the conditions to allow determination of the significance of any adverse effects

This may include amendments to the conditions to make them more clear, certain, defensible or enforceable to achieve the purpose of the Review.

Condition (a) states:

Any erosion control works which become necessary as a result of the exercise of this consent shall be undertaken as directed by the Regional Council at the expense of the Grantees.

I do not consider that this condition is clear or certain. Despite this, erosion control works have been undertaken in accordance with the condition in the past with no issues. However, improvement in respect to clarity and certainty would ensure that adverse effects are avoided.

There are two matters to address: erosion upstream of the weir that may affect the structural integrity of the weir and erosion downstream of the weir occurring due to deterioration of the weir. The Consent Holders propose to address any erosion within 100 m upstream of the Weir. The distance is considered appropriate by the Peer Reviewers.

² Site Compliance Audit Report, dated 20 May 2014, WRC document number 3089828

The consent holder must remediate any erosion, within 100 metres upstream of the weir, that is affecting the weir's structural integrity, as soon as practicably possible.

The WRC Peer Reviewers advised that erosion could occur downstream at a distance greater than 100 m, for example, if a channel is created due to a non-uniform weir berm which concentrates flows through low sections. This matter is addressed in amended condition (d) below.

Condition (b) states:

Subject to condition (l), the maximum weir height at the weir crest shall not exceed 3.14 metres Moturiki datum.

Essentially, condition (l) requires the consent holder to maintain the weir height at a height of RL 2.95 m for at least two years. However, if the consent holder is satisfied that the conservation outcomes are not being met the weir height may be increased to RL 3.14 m.

As discussed in section 6.1.2.1 above, a weir vee invert height of RL 2.95 m has not resulted in adverse effects greater than the effects authorised. However, increasing the weir invert height would likely result in effects greater than anticipated. To ensure effects remain as authorised, the consent holder has proffered a condition that would limit the weir vee invert height to RL 2.95 m. Therefore, I recommend changing condition (b) as follows:

The maximum height of the weir vee invert must not exceed RL 2.95 metres.

Advice Note: The relative level (RL) in all consent conditions is Moturiki Vertical Datum, 1953

Condition (c) states:

The weir shall be designed in such a way to satisfy the Waikato Regional Council that it will ensure the free passage of fish over the weir structure.

WRC was previously satisfied that the Weir allowed for the safe passage of fish although a recent assessment by the Consent Holders raises some uncertainty. Regardless of the uncertainty, the condition is clear and does not require amendment to ensure fish passage.

The consent holder proposes to add the following advisory note to the condition, acknowledging that WRC was previously satisfied with the fish passage the Weir provides: *"Advice Note: The Waikato Regional Council has previously approved the design of the weir and has previously approved as built engineering drawings of the weir structure"*.

I consider the advice note appropriate and recommend adding it with a footnote referring to the relevant WRC document:

The weir shall be designed in such a way to satisfy the Waikato Regional Council that it will ensure the free passage of fish over the weir structure.

Advice Note: The Waikato Regional Council has previously approved the design of the weir and has previously approved as built engineering drawings of the weir structure³.

Condition (d) states:

The weir shall be designed by a suitably qualified engineer acceptable to the Waikato Regional Council. The weir design shall be in a general accordance with Figure 4 titled "Department of Conservation Whangamarino Wetlands proposed weir site, proposed flat vee weir Rock/Gabion" of the evidence of E T Burke, as modified by Figure "A" annexed, so as to achieve the equivalent hydrological performance reflected in the geometry of Figure 4 as modified by Figure "A". The heights recorded in Figure 4 shall not be exceeded but may be lowered. The weir shall be to an adequate structural standard to withstand expected loads under normal operating conditions. Additionally, it shall be designed to withstand loads under the 1% annual accedence probability flood in the Whangamarino river as calculated at the Cableway recorder site, without any failure that could result in hazards to life or damage to private property adjacent to or downstream of the structure. The design of the weir in terms of its hydraulic capacity shall be to the satisfaction of the Waikato Regional Council.

The "evidence of E T Burke, as modified by Figure "A"" is shown in Figures 4 and 5 below.

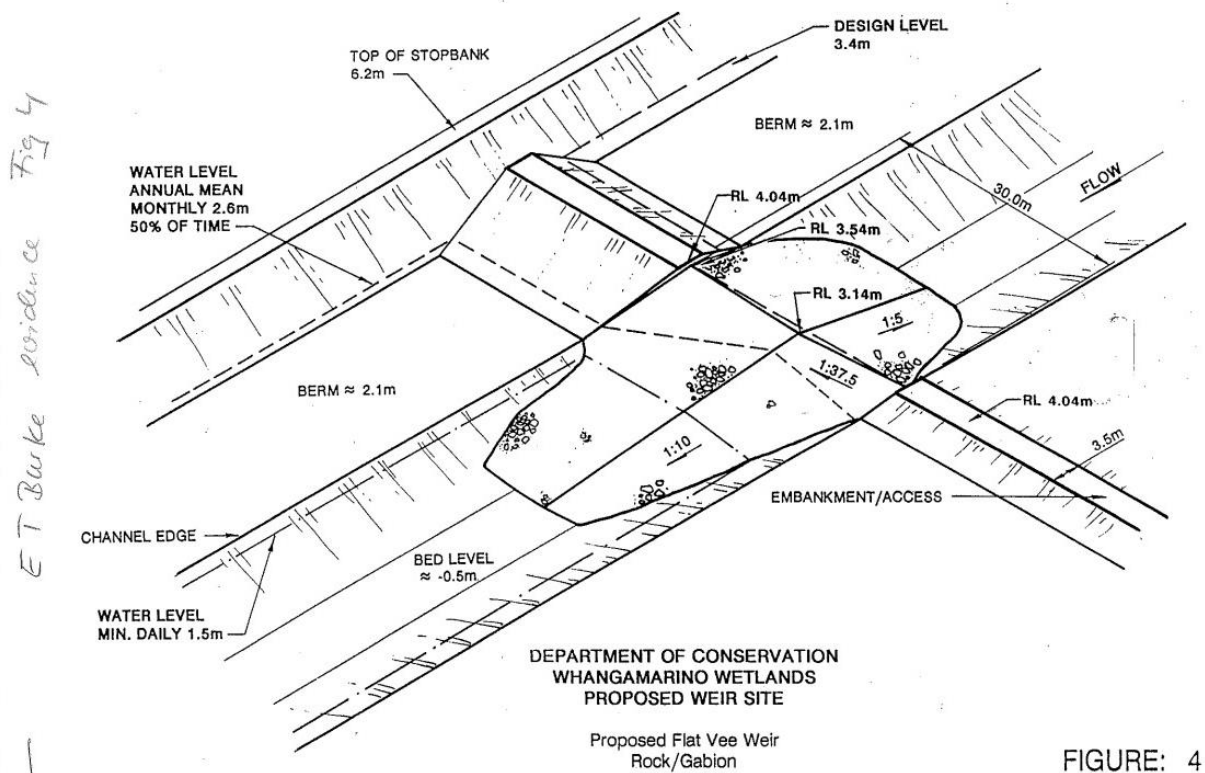


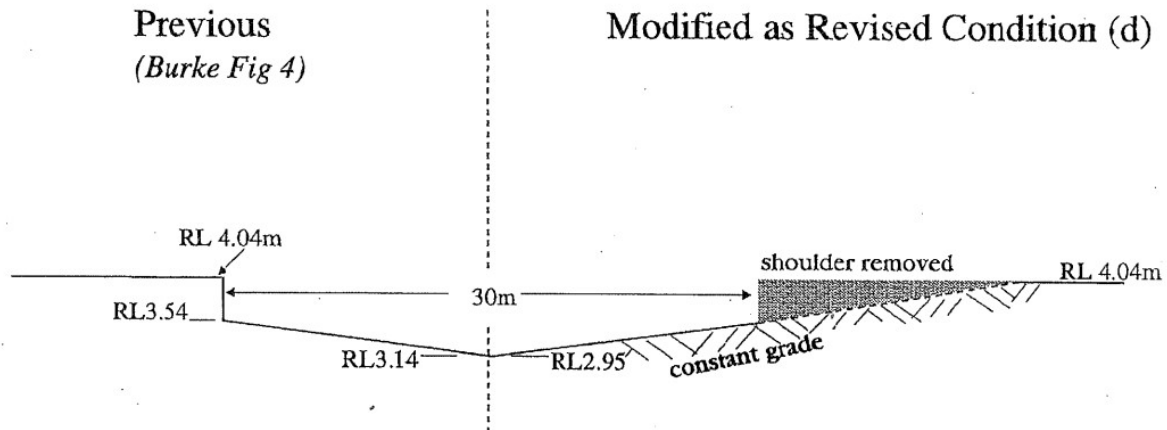
Figure 6 Evidence of E T Burke, Figure 4

³ Site Compliance Audit Report, dated 20 May 2014, WRC document number 3089828



Annexed

Figure A: Modified Whangamarino Weir Profile At Crest of Weir



(Diagram not to scale)

Date drawn 23/9/97

Figure 7 Evidence of E T Burke, Figure 4 modified by Figure A

The condition requires the following:

- The Weir must be designed by a suitably qualified engineer acceptable to the Waikato Regional Council
- The Weir must be in general accordance with Figure 6 and as modified by Figure 7
- The height of the weir crest must not exceed 3.14 mRL
- The height of the weir berm must not exceed 4.04 mRL
- The Weir must be designed and constructed to ensure structural integrity and withstand expected loads during normal operating conditions
- The Weir must be designed and constructed to withstand loads under the 1% annual exceedance probability flood in the Whangamarino river as calculated at the Cableway (now referred to as Ropeway) recorder site and avoid erosion at downstream properties.
- The hydraulic capacity of the Weir must be to the satisfaction of the Waikato Regional Council

The current design and construction of the existing weir satisfies the condition requirements (refer WRC documents 3089828, 9079287, 9079567). Therefore, any design or construction requirements would only apply to upgrade works when elements of the structure are not replaced in a like for like manner.

The assessment of effects in section 6.1.2.1 of this report concluded that the weir vee invert must not be higher than RL 2.95 mRL and the weir berm height must be uniform and not higher than 3.8 mRL. These heights would avoid adverse effects beyond the level of effects authorised. The berm height is based on a recent survey of the existing weir berm and a recommendation by the WRC Peer Reviewers.

The Consent Holders have proffered conditions that limit the weir vee invert height and weir berm heights as discussed. They further propose conditions that require the structure to be maintained in accordance with the current weir design and ensure its structural integrity

To achieve the intent of condition (d) and avoid adverse effects beyond the level of effects authorised I recommend amendments to the condition as proposed by the Consent Holders as detailed below. I note that the maximum weir crest height is already specified in amended condition (b) and does not need repeating.

The consent holder must maintain the weir to preserve the integrity and stability of the structure. In particular, the weir must be designed and maintained to withstand loads under the 1% annual exceedance probability flood in the Whangamarino River as calculated at the Ropeway recorder site, without any failure that could result in hazards to life or damage to private property adjacent to or downstream of the structure.

The consent holder must ensure that the level of the weir berm, outside of the main vee invert, does not exceed a maximum height of RL 3.8 metres and it must be maintained at an approximate uniform level.

Advice note: The requirement for a uniform level seeks to avoid erosion and associated preferential flow path outside of the main vee invert.

Condition (e) states:

The weir structure reconstruction shall be overseen by a registered engineer who has expertise in the installation of structures such as the weir authorised by this consent. Reconstruction in all these conditions shall be taken to mean full reconstruction or staged reconstruction but not including maintenance of the weir structure.

No upgrade works are necessary, authorised or planned. Ensuring that maintenance of the weir berm (other than minor like for like replacements) is overseen by a suitable engineer, the following condition is proposed by the Consent Holders (the reference to conditions 1, 4 and 5 relate to the heights of the weir vee invert and weir berm and to the weir's structural integrity):

For any maintenance works on the weir that results in changes to the weir geometry, a suitably qualified and experienced Chartered Engineer must certify the structural integrity of the weir and must state whether the maintenance works have been undertaken in accordance with sound engineering practice and whether conditions 1, 4 and 5 of this resource consent are met. A copy of this certificate must be forwarded to the Waikato Regional Council within two months of completion of the maintenance works.

Advice note: this condition only applies to major maintenance works that alters weir geometry, it does not apply to minor day to day maintenance works that does not alter weir geometry (for example, removing obstructions and re-tying gabion baskets).

I agree with the proposed amendments and recommend changing the condition accordingly.

Condition (f) states:

The consent holders shall inform the Waikato Regional Council in writing of the date on which any reconstruction or repair commences and also the date on which completion of reconstruction or repair of the structure occurs.

The Consent Holders propose to inform WRC of any planned maintenance works, 5 days prior to works commencing. I agree with the proposed condition and recommend the following amendments to condition (f):

The consent holder must inform the Waikato Regional Council, in writing, of the details of any maintenance works at least 5 working days prior to the works commencing. The details must include, as a minimum:

(a) Details of the works;

(b) Expected starting and expected completion dates;

(c) Any changes to the weir geometry must be identified on a plan and long section of the existing levels including information that the weir invert and weir berm achieve the heights specified in conditions 1 and 5 of this consent.

Condition (g) states:

The consent holder shall provide the Regional Council with engineers' drawings of the as built weir structure as soon as practicable but no later than two months from the date of completion of the reconstruction.

To ensure any maintenance works which result in changes to the weir geometry do not exceed the maximum weir vee invert and berm heights as specified in this consent and as such avoid effects beyond the effects authorised, the Consent Holders propose a condition which requires evidence that the weir does not exceed the maximum heights. I agree with the proposed condition and recommend it:

If any maintenance works result in any changes to the weir geometry, the consent holder must survey the weir vee invert and berm heights within one month of completion of the works. The survey must be in general accordance with the requirements and measurement for cross sections set out in the WRC document “*Technical Specifications for stopbanks surveys*”, recorded as WRC document number 10821970, or any successor document. The resulting survey plan must be submitted to the Waikato Regional Council within two months of completion of the works.

Condition (h) states:

The Waikato Regional Council may give notice pursuant to section 128 of the Resource Management Act 1991, of its intention to review any or all of the conditions of this consent two years from the date of completion of reconstruction (the two years shall include the collection of data from two summer periods) and at five yearly intervals thereafter. In the exercise of its

discretion as to whether or not the conditions of consent will be reviewed, the Waikato Regional Council shall take into account the length of time that the weir has been operating at its full height and the results contained in the Monitoring Report provided by the joint consent holders. The review shall be undertaken for any of the purposes detailed in section 128 of the Resource Management Act 1991 and specifically for considering the effect of the weir on both ground and surface water levels on adjacent private land and ecological values in the wetlands.

In the Initiation Memo, it was noted that the Consent Holders raised uncertainty with the review period identified by WRC. Therefore, I consider that the review period should be clarified to provide greater certainty when a review may occur so the purpose of the review can be achieved.

I note that the consent is due to expire in March 2027. Based on the review period identified by WRC for this Review, the next review opportunity would be between January and March 2027. This period would coincide with the expiry of the consent and a review of consent would not achieve anything. However, I also note that s124 RMA allows Consent Holders to continue to exercise the consent beyond the expiry date if they have applied for a new consent at least six months before the expiry of the consent. In that case, the Consent Holders may continue to exercise the consent until the new consent is granted or declined and all appeals are determined. Given that there are a number of interested parties to the consent it would be likely that the determination of a potential new consent may take some time and result in the existing consent to be exercised well beyond the expiry date. To provide for review opportunities during this time I recommend amendments to condition (h) as follows:

The Waikato Regional Council may between January and March 2027 and at five yearly periods thereafter serve notice on the consent holder under section 128(1) of the Resource Management Act 1991, of its intention to review the conditions of this resource consent for the following purposes:

a) to review the effectiveness of the conditions of this resource consent in avoiding or mitigating any adverse effects on the environment from the exercise of this resource consent and if necessary to avoid, remedy or mitigate such effects by way of further or amended conditions; or

b) to review the adequacy of and the necessity for monitoring undertaken by the consent holder.

Advice Note: Costs associated with any review of the conditions of this resource consent will be recovered from the consent holder in accordance with the provisions of section 36 of the Resource Management Act 1991.

I consider that the recommended condition would be in accordance with the requirements of condition (h) but also clearly state the review period. The Consent Holders also propose this condition.

Conditions (i), (j) and (k):

Conditions (i), (j) and (k) require a monitoring plan, monitoring and reporting. As these conditions are interlinked, I will discuss them collectively. In the Initiation Memo, it was concluded that the monitoring requirements including the monitoring plan and reporting do not achieve the intended outcome (to determine effects) and some provisions are unclear and uncertain.

Conditions (i) states:

A Monitoring Report as set out in condition (j) hereafter shall be provided initially on an annual basis by the consent holders to the Regional Council, and thereafter at two yearly intervals. The date from which the year shall run will commence three months prior to the reconstruction of the weir. The Report shall be audited by an independent body or person to be selected by the consent holders and the results of this audit shall form part of the Monitoring Report.

Conditions (j) states:

The consent holder shall retain a suitably qualified and independent and experienced person to prepare a monitoring plan. The person appointed shall be approved by the Waikato Regional Council. The objective of this plan is to address what affects the weir is having on private land in respect of both ground and surface water levels and gradients, wetland wildlife and habitat values and river processes. In respect of this objective the plan will address the following matters:

3. *River siltation and vegetation encroachment monitoring measuring river and bank cross sections at the following sites;*
 - i. *(Whangamarino Riverbed level 50 and 100 metres upstream of the weir and 100 and 200 metres below the weir.*
 - ii. *Whangamarino Riverbed level upstream of the confluence with the Maramarua River at reference NZMS260S12:953308.*
 - iii. *Whangamarino Riverbed level at Cableway.*
 - iv. *Whangamarino Riverbed level at Falls Road.*
 - v. *Kopuku Streambed level.*
 - vi. *Maramarua at NZMS260S12:010349.*
 - vii. *Maramarua at NZMS260S12:000345.*
 - viii. *A long section of the full length of the Whangamarino River be constructed at intervals to be determined by the suitably qualified and independent expert.*
4. *Vegetation monitoring;*
 - i. *The consent holder shall supply to the Waikato Regional Council aerial photographs of three sites, one on the Maramarua River at reference NZMS260S12:999334; one on Whangamarino River at reference NZMS260S13:980275; and one on the Pungarehu Stream at reference NZMS260S13:030234. The photographs shall be taken annually between 1 September and 30 November.*
5. *Noxious pests;*
 - i. *The consent holder shall review on an ongoing basis methods for controlling noxious pests such as koi carp, feral cats, stoats, opossums, rats and willows in the wetland area.*
6. *Weir performance;*
 - i. *The consent holder will undertake monitoring to establish the relationship between water levels upstream of the weir and discharge over the weir under free flow conditions. The conformance of the as built weir to the theoretical weir rating system given by Table 3 of the evidence of Mr E T Burke of December 1991 shall be established.*

Condition (k) states:

Copies of the Monitoring Report shall be provided to the Waikato Regional Council pursuant to condition (j), and shall be made available to adjacent private land owners and any other person who request such a copy

Essentially, conditions (i), (j) and (k) require the following:

- Preparation of a monitoring plan by a suitable professional approved by WRC
- The monitoring plan's objective is to determine the effects of the weir on private land in respect to ground and surface water levels and gradients, the effects on wetland wildlife and habitat values and the effects on river processes
- To achieve the objectives, the following monitoring is required:
 - River and bank cross-sections at 8 sites to determine river sedimentation and vegetation encroachment
 - Annual aerial photographs at 3 sites to monitor wetland vegetation;
 - Ongoing review of methods for controlling noxious pests
 - Monitoring of the weir rating (relationship between upstream water levels and the discharge over the weir at free flow) to confirm conformance with the evidence by E T Burke
- Two yearly reporting of monitoring results
- Peer review of the monitoring report by an independent peer reviewer chosen by the consent holder
- Submission of the monitoring report to Waikato Regional Council
- Availability of the monitoring report to any persons that requests a copy of the report

I do not consider that the proposed conditions sufficiently address the remaining uncertainties related to the effects of the weir. As discussed in the assessment of effects in section 6.1.2.1 of this report, water level monitoring, cross section surveys and analysis and reporting of that information is necessary to confirm the level of effects and address any remaining uncertainties. Therefore, I recommend the following monitoring:

- Water level monitoring near the Swan Road drainage scheme and at the confluence of the Pungarehu Stream and Whangamarino River and analysis and reporting of the information. The monitoring should occur in the locations where increased sedimentation has occurred and where there is a lack of information on the frequency of and conditions for spillover of (sediment laden) water into the wetland and the Swan Road drainage scheme.
- Continued and additional regular river cross section surveys of riverbeds and banks and associated trend analysis (spatial & temporal) to track changes in sedimentation within the watercourses over time
- Monitor wetland vegetation changes in areas of the wetland where sedimentation may potentially occur

In summary, I recommend the following monitoring and timelines:

Due Date	Monitoring Details
31 July 2025	Install and operate two continuous water level recorders near the Pungarehu Stream/canal interface & farm bridge
1 August 2025 – 31 July 2026 and yearly thereafter	Water level data assessment period
March 2026	Bed/bank level cross section surveys every 5 years
31 July 2026 and every 5 years thereafter	Report cross survey information to WRC
31 July 2026	Submit vegetation monitoring plan for WRC approval
31 August 2026 and yearly thereafter	Analyse and assess water level data for a one-year period and report to WRC
1 September 2026 – 30 March 2027 and every 5 years thereafter	Wetland vegetation monitoring
30 September 2026 and every two years thereafter	Report on pest management
January – March 2027 and every 5 years thereafter	Consent review opportunity

I recommend reporting of the monitoring results. Subject to the Local Government Official Information and Meetings Act (LGOIMA), the monitoring information would be available to any person on request.

Further, I consider that pest management must continue to be considered and recommend a condition that requires pest management as well as reporting of the management undertaken, its effectiveness and recommendations for effective ongoing pest management.

Based on the above, the recommended monitoring conditions are as follows:

Water Level Monitoring

By 30 June 2025, the Consent Holder must install and operate two continuous water level recorders at the following locations:

- a) At or near the confluence of the Pungarehu Stream and the Whangamarino River at or near Pungarehu Stream (ICM) cross section 4 (approximately NZTM 1792992mE, 5864001mN); and**
- b) At or near the “farm bridge” that is located approximately 500 metres downstream of the Swan Road pump station (approximately NZTM 1793377mE, 5862374mN).**

The installation and operation of the water level recorder must be in general accordance with the National Environmental Monitoring Standard (NEMS) document titled: “Water

Level - Water Level Field Measurement Standard⁴, Version: 4.0.0, dated 1 October 2024 or any subsequent version or successor document.

The purpose of the water level recorder is to record water levels continuously to determine, in conjunction with water level records from the Whangamarino River Ropeway recorder and Whangamarino River Falls Road recorder, the frequency of events, seasonal conditions and the hydraulic profile along the Pungarehu Stream under a range of flow conditions leading to spillover of water into the adjacent wetland and potential effects on the Swan Road drainage scheme.

Prior to installation of the water level recorders, the consent holder must submit the following information for Waikato Regional Council certification in a technical certification capacity:

- a) Proposed water level recorder locations as set out in condition 9;
- b) Design of each water level recorder to ensure structural integrity and to meet the annual water level range;
- c) Operating framework to obtain continuous measurement data; and
- d) Any other information to demonstrate that the requirements of condition 9 will be met.

The information must be in sufficient detail to ensure that the purpose of the water level recorders set out in condition 9 is achieved.

The consent holder must analyse and assess the water level data to determine the frequency of events and seasonal conditions leading to spillover of water into the adjacent wetland and potential effects on the Swan Road drainage scheme. The consent holder must submit the assessments by 30 July 2026, covering the one-year period between 1 July 2025 and 30 June 2026. Subject to condition 12, the analysis, assessment and reporting must continue on the same annual basis. Each assessment must:

- (a) Provide an analysis of water level statistics (stage/frequency exceedance) at the water level recorder sites;
- (b) Include four to six *hydraulic profiles* from downstream of the Whangamarino weir to upstream of the Swan Road pump station representing a range of seasonal low flows and a selection of flow events in the Whangamarino River and Pungarehu Stream over the monitoring year;
- (c) Present any data gaps and describe the reasons for those gaps; and
- (d) Compare the data from the two water level recorder sites described in condition 9, to the Whangamarino River Ropeway recorder and Whangamarino River Falls Road

⁴ <https://www.nems.org.nz/documents/water-level>

recorder and assess whether there are reliable relationships between the water levels at the recorder sites and if so, describe the conditions during which they apply.

For the purposes of condition 11 (b) “*hydraulic profiles*” means the comparative water levels at a point in time taken from up to six water level recorders, from Northern Outlet Control Gate to the Whangamarino Control Structure.

Waikato Regional Council will, upon request from the consent holder, agree (in a technical certification capacity) to ceasing continuous water level monitoring, analysis and reporting required by condition 9 and condition 11 if:

- (a) The purpose of the monitoring has been achieved; and
- (b) The assessment required by condition 11 demonstrates a relationship between the water level recorder sites required by condition 9 and the Whangamarino River Ropeway recorder and Whangamarino River Falls Road recorder.

Following certification from the Waikato Regional Council under condition 12, the water level recorders required by condition 9 may be removed.

Advice note: The purpose of condition 12 is to limit water level monitoring to only the period necessary to achieve the objective of the water level monitoring.

Survey Cross Section

The consent holder must survey cross-sections, or obtain the data from survey cross sections, of the watercourse bed and banks to assess changes and trends in bed and bank levels within the watercourses over time. The surveys must be carried out at the following locations and at the same locations during each survey:

- (a) Whangamarino River – twelve sections (DOC cross sections 15, 3, 2, 14, 13, 20, 1, 21, 22, 12, 11, 10, 9, 23 as shown in Schedule 1);
- (b) Maramarua River – six sections (DOC cross sections 19, 6, 18, 5, 17, 16 as shown in Schedule 1); and
- (c) Kokupu Stream – one section (DOC cross section 4 as shown in Schedule 1)
- (d) Mineralised wetland –six sections (ICM cross sections 1, 2, 3, 4, A and B for the Pungarehu Stream as shown in Schedule 1)
- (e) Swan Road pump station (ICM cross section 6 for Northern Outlet Canal as shown in Schedule 1).

The surveys must be undertaken in March 2026 and every five years thereafter unless otherwise approved by Waikato Regional Council in writing. Waikato Regional Council may, on request, certify a lesser survey frequency after three rounds of surveys and/or certify a different survey month to align with survey requirements of other consents or

to allow for seasonal constraints. In considering the request, Waikato Regional Council will consider whether the purpose for which the surveys are undertaken can still be achieved.

The surveys must be conducted by a suitably qualified and experienced surveyor. The surveys must have a horizontal accuracy of 100 mm and a vertical level of accuracy of 50 mm to the survey datum. Also, the surveys must be in general accordance with the requirements and measurement for cross sections set out in the WRC document *“Technical Specification for stopbanks surveys”* (WRC document number 10821970).

The consent holder must provide the survey information within four months of each survey. The survey information must include, as a minimum:

- (a) Raw data;
- (b) A diagram of each cross section;
- (c) A longitudinal section along each of the Whangamarino River, the Maramarua River and the Pungarehu Stream / Canal;
- (d) Identification of bed level changes; and
- (e) Assessment of effects from bed level changes.

Vegetation Monitoring

The consent holder must monitor changes in wetland vegetation composition in the areas of the wetland potentially affected by sedimentation as a result of overtopping due to the presence of the weir. The purpose of the monitoring is to determine how, and to what extent, the weir is impacting wetland vegetation over time.

The consent holder must engage a suitably qualified and experienced person to prepare a wetland vegetation monitoring plan to achieve the purpose of monitoring required by condition 14. The plan must be submitted to Waikato Regional Council for certification by 30 July 2026. The basis of WRC’s certification will be limited to a technical assessment as to whether or not the plan, and any updates to the plan, have been developed in sufficient detail so as to meet the monitoring purpose.

The monitoring plan must include details of:

- a) The monitoring locations, including:
 - i. the vegetation plot locations shown in Schedule 2;
 - ii. additional locations if the monitoring and analysis required by conditions 11 and 13 have identified sedimentation in wetland locations not already monitored by the vegetation plots shown in Schedule 2;
- b) The monitoring design;
- c) Timing;

d) Analyses; and

e) Reporting.

The first round of vegetation monitoring required by condition 14 must be undertaken in the period 1 September 2026 to 30 March 2027, and repeated every five years thereafter.

Pest Species Reporting

The consent holder must, if feasible and effective (as determined by the consent holder in accordance with condition 17 (b)(ii)), undertake pest management in the wetland. By 30 September 2026, and every two years thereafter, the consent holder must report on the management of pest species in the wetland. The report must include, as a minimum:

- a) Identification of pest species occurring within the wetland;
- b) Discussion of what pest management is feasible and effective; and
- c) Details of pest management undertaken within the two year period, including methods and frequencies.

Conditions (I) states:

- i. *The consent holder undertakes to reconstruct and maintain the weir with the lowest point on the vee notch of the weir at a height of 2.95 metres Moturiki Datum, for a period of not less than two years ("the interim period"). The interim period shall commence on the day reconstruction of the weir is completed. The design of the weir is intended to achieve a targeted minimum water level in the wetland of 3.2 metres RL Moturiki datum measured at the Cableway water level recorder.*
- ii. *At the expiry of the interim period the consent holder shall produce a report of the performance of the weir in achieving conservation and recreation outcomes*.*
- iii. *If at any time after the expiry of the interim period the consent holder is satisfied that the conservation and recreation outcomes are not being met, the consent holder may increase the targeted minimum water level to 3.4 metres RL Moturiki datum at the Cableway water level recorder by increasing the lowest point of the vee notch of the weir to a maximum of 3.14 metres.*
- iv. *If at any time after the expiry of the interim period the Waikato Regional Council considers that the monitoring information referred to in condition j(1) and (2) demonstrates that there has been an adverse change in ground water and surface water levels on private land the consent holder shall, following consultation with the Waikato District Council, consider lowering the embankment to the weir to mitigate any such effects.*

**The conservation and recreation outcomes the consent holder is seeking from the weir are set out in the statements in support of the application for the permit.*

Essentially, the condition requires:

- The vee invert of the weir must not exceed a height of RL 2.95 m for at least two years (to achieve a minimum water level of RL 3.2 metres at Ropeway)
- Any time after two years the consent holder must produce a report discussing whether the intended (specified) conservation and recreation outcomes have been achieved
- If they have not been achieved the height of the vee invert may be raised to RL3.14 metres (to achieve a minimum water level to 3.4 metres RL Moturiki datum at Ropeway)
- If after at least two years, the ground and surface water monitoring conditions (which were deleted in 2011) demonstrate adverse effects on private land, lowering of the weir to mitigate these effects may be considered

As discussed above, to ensure the effects of the weir remain as authorised, the Consent Holders have proffered a consent condition that limits the weir vee invert to RL 2.95 m. As such, the height of the weir vee invert cannot be increased and therefore condition (I) can be deleted.

An Advice Note in the Consent Certificate states:

If the adverse effects of the exercise of this consent are more significant than predicted by the grantees in applying for this consent, then the Regional Council will expect the weir height to be reduced and/or compensation to be paid by the Grantees to any person or body affected.

An advice note on a consent is explanatory and not a binding condition. Nevertheless, the effects assessment for this Review has determined that adverse effects are not more significant than predicted provided the weir vee invert and berm heights are limited as discussed. This has been provided for in the recommended consent conditions and proffered by the Consent Holders. Therefore, the advice note can be deleted.

There are no other conditions on resource consent AUTH890227 that have not been discussed above and I do not consider that any additional new conditions are required other than the conditions discussed in this section. A clean copy of all conditions is included in Appendix 3.

Conclusion of Condition Changes

Changes to the existing conditions are recommended. The changes focus on the remaining uncertainties to determine the level of effects and confirm the level of effects as assessed. The assessment of effects in section 6.1.2.1 and further discussed in section 6.1.2.2 identify these uncertainties and how they can be addressed. The uncertainties mainly relate to hydrological and sedimentation effects in the upper wetland (at the confluence of the Whangamarino River and Pungarehu Stream/Pungarehu Canal and near the Swan Road drainage scheme) and how they affect spillover of (sediment laden) water and associated effects on the flood protection scheme, private properties and the mineralised wetland. Conditions proffered by the Consent Holders to limit the weir invert and weir berm heights are also included.

While the recommended conditions have been drafted to address uncertainties and confirm the predicted level of effects, they would also provide valuable information for consenting the existing or an alternative structure.

The conditions proposed by the Consent Holders (various versions) have been considered in drafting the recommended conditions. The Consent Holders and WRC with input from their technical experts, have collaboratively developed the conditions which resulted in the final set discussed above and shown in Appendix 3. These conditions have been agreed to by the Consent Holders.

6.2 National Environmental Standards – RMA Section 104(1)(b)(i)

There are ten National Environmental Standards (NES) that have come into effect - the National Environmental Standards for Air Quality; Sources of Human Drinking Water, Electricity Transmission Activities, Telecommunication Facilities, Assessing and Managing Contaminants in Soil to protect Human Health, Plantation Forestry, Freshwater, Marine Aquaculture; Outdoor Storage of Tyres; and Greenhouse Gases from Industrial Process Heat.

The MD Planning Report discusses the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F) and one of its purposes to protect natural inland wetlands:

“The Freshwater NES came into effect in September 2020. The Freshwater NES regulates activities that pose risks to the health of freshwater and freshwater ecosystems in New Zealand and gives effect to the requirements of the NPS-FM (particularly in respect of wetland and stream management).”

“Regulation 38 and 39 enable vegetation clearance, earthworks, land disturbance and the taking, use, damming, diversion, or discharge of water within (and in proximity to) natural inland wetlands where they are associated with restoration, maintenance and biosecurity activities (as a permitted or restricted discretionary activity); Regulation 42 requires wetland utility structures to obtain resource consent as a restricted discretionary activity. Under Regulation 43 and Regulation 44, the maintenance of wetland utility structures is provided for as either a permitted or restricted discretionary activity.”

“In respect of the Whangamarino Weir, the Freshwater NES:

- *Permits the damming and diverting of water within a natural inland wetland for the purpose of wetland restoration. The definition of ‘restoration’ includes intervention or management designed at restoring hydrological functioning, provided all the conditions are met (which would require further analysis). If the weir did not meet these, the damming and diverting of water would likely fall as a restricted discretionary activity;*
- *Permits the damming and diversion of water within a natural inland wetland where it is associated with the maintenance of a wetland utility structure, or the construction of a wetland utility structure. The definition of ‘wetland utility structure’ includes structures whose purpose is recreation, conservation and restoration; with the Whangamarino Weir providing recreation, conservation and restoration benefits (as set out in the Current State Assessment).*

The Freshwater NES, therefore, enables the damming and diverting of water where it is for the purposes of achieving recreation, conservation and restoration purposes.”

The consent to dam the Whangamarino River is existing and no changes to the consented activities are proposed or recommended. Therefore, the NES-F does not apply. Also, no other NES is relevant to this Review.

6.3 National Policy Statement (NPS) – RMA Section 104(1)(b)(iii)

There are currently eight national policy statements (NPS) in effect – relating to Freshwater Management, Renewable Electricity Generation, Electricity Transmission, Urban Development, Coastal, Highly Productive Land, Greenhouse Gas Emissions from Industrial Process Heat and Indigenous Biodiversity.

The MD Planning report discusses that the NPSs relevant to this Review are the NPS for Highly Productive Land (“NPS-HPL”), the NPS for Indigenous Biodiversity (“NPS-IB”) and the NPS for Freshwater Management (“NPS-FM”). I concur with the assessment and consider none of the other NPSs relevant.

6.3.1 NPS-FM

The MD Planning Report states:

“The NPS-FM came into effect on 3 September 2020 and was last amended in January 2024. It replaced the National Policy Statement for Freshwater Management 2014 (amended 2017) that preceded it, and every local authority is required to give effect to the NPS-FM as soon as reasonably practicable.

This consent review is the first time the Whangamarino Weir has been considered in the context of the direction provided in the NPS-FM in respect of freshwater management.”

Policy 6 of the NPS-FM requires that *“there is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted”*. Policy 15 requires that *“Communities are enabled to provide for their social, economic, and cultural well-being in a way that is consistent with this National Policy Statement”*.

I have assessed the recommended amendments to consent conditions against the NPS-FM and consider that they are not contrary to this policy statement. The existing extent and values of the Whangamarino Wetland will be maintained and communities will continue to be able to provide for their social, economic and cultural well-being.

6.3.2 NPS-HPL

The NPS-HPL came into force in October 2022. It seeks to recognise and protect highly productive land from inappropriate use and development so that it can be utilised for land-based primary production purposes. The management of such land must also be integrated with freshwater management.

Many properties surrounding the Whangamarino Wetland are farmland and classified as highly productive land. Any effects on highly productive land that may arise from the proposed amended conditions for the Whangamarino Weir consent must be considered alongside the direction in the NPS-FM (which requires no further loss of extent of natural inland wetland, protects their values, and promotes their restoration).

The assessment in section 6.1.2.1 concludes that adverse effects from elevated water levels and reduced drainage over and above the effects authorised are no more than minor, provided recommended consent conditions are implemented. As such, the effects are anticipated to be the

same as currently authorised, noting that some uncertainties remain which are addressed in recommended changes to consent conditions. Overall, I consider that the recommended amendments to conditions are consistent with the provisions of the NPS-HPL.

6.3.3 NPS-IB

The NPS-IB came into force in August 2023. It seeks to protect indigenous biodiversity consistently across New Zealand to ensure that there is, at least, no overall loss of indigenous biodiversity.

I agree with the MD Planning Report that the NPS-IB to be relevant to this Review. The objective of the NPS-IB is that there is, at least, no overall loss in indigenous biodiversity across New Zealand. This is to be achieved:

- (i) through recognising the mana of tangata whenua as kaitiaki of indigenous biodiversity; and*
- (ii) by recognising people and communities, including landowners, as stewards of indigenous biodiversity; and*
- (iii) by protecting and restoring indigenous biodiversity as necessary to achieve the overall maintenance of indigenous biodiversity; and*
- (iv) while providing for the social, economic, and cultural wellbeing of people and communities now and in the future.*

There are 17 policies in support of the objective. Also, the NPS-IB states that, if there is a conflict between the NPS-IB and the NPS-FM 2020, then the NPS-FM prevails.

I have assessed the recommended amendments to consent conditions against the NPS-IB and consider that conditions will ensure that there will be no loss of indigenous biodiversity while providing for the social, economic, and cultural wellbeing of people and communities.

6.4 Regional Policy Statement – RMA Section 104(1)(b)(v)

The Regional Policy Statement (RPS) is a high-level broad-based document containing objectives and policies of which the purpose is to provide an overview of the resource management issues of the region and to achieve integrated management of the natural and physical resources of the region. It became operative on 20 May 2016.

The RPS seeks:

- integrated management of natural and physical resources;
- the maintenance or enhancement of the mauri and values of freshwater bodies, including safeguarding the significant values of wetlands, ecosystem processes and indigenous species habitat; and enabling people to provide for their social, economic, and cultural wellbeing and for their health and safety;
- the protection of soil resources including prioritising high class soils for primary production;
- ecosystems in a healthy and functional state;
- the protection of regionally significance infrastructure (e.g., the LWWCS);
- hazard risk reduction (e.g, from flooding); and
- preservation of natural character and natural features (i.e., Whangamarino wetland being an outstanding natural feature).

I have assessed the amendments to consent conditions against the RPS provisions and consider that they are consistent with the policy document.

6.4.1 *Te Ture Whaimana o te Awa o Waikato (Vision and Strategy (V&S))*

In September 2010 The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010 and the Ngāti Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010 inserted the V&S into the Waikato RPS and WRC must have particular regard to it. The V&S prevails over any inconsistent provisions in a National Policy Statement.

The V&S applies to activities in the Waikato River; or activities in the catchment that affect the Waikato River. The 13 objectives state the desired outcomes. Overall, they require some positive benefit contributing to the restoration of the Waikato River catchment proportionate to the effects of the activity.

I consider that the recommended amendments to consent conditions will not adversely affect the existing values of the wetland but improve knowledge and associated management of the wetland and as such will benefit the Waikato River.

6.5 Waikato Regional Plan (Regional Plan) – RMA Section 104(1)(b)(vi)

The MD Planning Report states that *“the Regional Plan was notified in 1998 and made (partially) operative in September 2007. As such, it cannot be said that the Regional Plan gives full effect to the higher order statutory planning documents. The Regional Plan provides direction regarding the use, development and protection of natural and physical resources in the Waikato region, and modules covering Matters of Significance to Māori, Water, River and Lake Beds, Land and Soil, Air, and Geothermal Resources”*.

Relevant objectives and policies seek:

- the provision of fish passage;
- to avoid, remedy or mitigate adverse effects of flooding or the loss of aquatic habitat;
- to avoid, remedy or mitigate adverse effects on water quality, habitat and flow regimes;
- the maintenance or enhancement of the extent and quality of the Waikato Region’s wetlands;
- that the relationship of tāngata whenua as kaitiaki with water is recognised and provided for;
- to avoid significant adverse effects and remedy or mitigate cumulative adverse effects on the mauri of water, waahi tapu sites and other identified taonga;
- to avoid the loss of extent of wetlands, protect their values and promote their restoration;
- structures be managed to ensure bed stability;
- to preserve natural character of river and lake beds and their margins and to protect them from inappropriate use and development

I have assessed the amendments to consent conditions against the relevant objectives and policies of the Regional Plan and do not consider that they are contrary to the provisions.

6.6 Other Matters – RMA Section 104(1)(c)

There are other matters which are relevant in the determination of the Review. As stated in the MD Planning Report these are:

- *Tai Tumu Tai Pari Tai Ao, the Waikato-Tainui Environment Plan;*
- *Whaia te Mahere Taiao a Hauraki, the Hauraki Iwi Environmental Plan;*
- *Te Mana o Te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020;*
- *Waikato Conservation Management Strategy;*
- *Lower Waikato Zone Plan;*
- *Lake Waikare and Whangamarino Wetland Catchment Management Plan.*

The MD Planning Report discusses each in section 3.2.5 of the report and concludes that the effects from the Whangamarino Weir is not inconsistent with the provisions. I concur with the conclusion and consider that the recommended consent conditions are not inconsistent with the documents.

6.7 Part 2 Matters

Current case law (Davidson, Court of Appeal, 2018), holds that if it is clear that the regional plan, or the relevant policies in the plan, have been prepared having regard to Part 2, and with a coherent set of policies designed to achieve clear environmental outcomes, then reference to those policies should suffice and reference to Part 2 is, in most cases, unnecessary because it would likely not add anything, nor result in a different outcome.

The Regional Plan was notified more than 25 years ago and as such does not give effect to higher order statutory planning documents such as the NES-F, relevant NPS's or the RPS. Therefore, I have considered Part 2 of the RMA.

The MD Planning Report assesses the Review against sections 6, 7 and 8 RMA and concludes: *"Overall, it is considered that the statutory planning framework supports the continued existence of the Whangamarino Weir, subject to conditions ensuring that the effects remain within the ambit of those anticipated by the original decision makers"*.

It then further concludes: *"The purpose of the RMA is to promote the sustainable management of natural and physical resources. The Whangamarino Weir is fundamental to the sustainable management of the Whangamarino Wetland. With respect to sustaining the potential of natural and physical resources and safeguarding the life-supporting capacity of water and ecosystems, the relevant technical assessments demonstrate that the effects of the Whangamarino Weir are being appropriately avoided, remedied or mitigated, and within the level of effects anticipated by the original decision makers"*.

I concur with the assessment and consider that the recommended amendments to consent conditions are consistent with Part 2 and the overall purpose of the RMA.

7 Conclusion

Resource consent AUTH890227 authorises the Whangamarino Weir and associated damming of the Whangamarino River to raise minimum water levels in the Whangamarino Wetland to assist with restoring approximately 1,500 hectares of wetland habitat. A Review of conditions was initiated on 23 March 2017. The purpose is to review the effectiveness of conditions to allow determination of the significance of any adverse effects and to avoid or mitigate any adverse effects beyond the level of effects authorised.

The main effects of consideration are the effects from increased water levels and sedimentation, the effects on drainage and the wetland ecosystem.

Based on the recommended changes to the existing consent conditions including the Consent Holders' proffered conditions I consider adverse effects on water levels, flood storage and drainage over and above the effects authorised to be no more than minor. I note that sedimentation at the Pungarehu confluence has been assessed as greater than anticipated, however consequential effects are currently assessed as less than minor. The effects on ecology are also assessed as no more than minor.

I consider that the recommended monitoring sufficiently addresses remaining uncertainties and confirm the level of effects as assessed.

I also consider the recommended changes to consent conditions consistent with the Waikato Regional Council's relevant policies and plans, other relevant documents, and the statutory provisions of the RMA.

8 Viability of Activity

In accordance with section 131 RMA I have considered whether the authorised activity to dam the Whangamarino River would continue to be viable after the recommended changes. In doing so, I have worked with the Consent Holders to develop a set of conditions that address the purpose of the Review and are agreed to by the Consent Holders. No concerns have been raised that the recommended conditions would result in the activity no longer being viable.

9 Consent Conditions

A clean set of the recommended consent conditions are included in Appendix 3.

10 Recommendation

I recommend that, in accordance with section 132 RMA, the conditions of resource consent AUTH890227 shown in Appendix 1 of this report be replaced with the conditions shown in Appendix 3 of this report for the following reasons:

- The replaced conditions will ensure that the effects of the activity remain as authorised
- The activity will remain viable
- The replacement of conditions is not contrary to any relevant plans or policies
- The replacement of conditions is consistent with the purpose and principles of the Resource Management Act 1991



Signed:

Christin Atchinson

Principal Consents Advisor

Resource Use

Date: 30 June 2025

11 Decision

That the replacement of conditions is granted in accordance with the above recommendations.

A handwritten signature in black ink, appearing to read 'D. Palmer'.

Signed:

Date: 4 July 2025

Diane Palmer

Team Leader

Resource Use

Acting under authority delegated subject to the provisions of the RMA 1991 which at the time of decision had not been revoked.

Appendix 1 AUTH890227 - Resource Consent Certificate

WAIKATO REGIONAL COUNCIL

RESOURCE CONSENT

File No. 60 67 31A
Resource Consent No. 890227

Pursuant to the Resource Management Act 1991, the Waikato Regional Council (hereinafter referred to as the Council), hereby grants consent to:

**Minister of Conservation and
Auckland/Waikato Fish & Game Council
Private Bag 3072
HAMILTON**

(hereinafter referred to as the Grantee)

This consent authorises the Grantee to: dam the Whangamarino River at or about map and reference NZMS 260 S12:949-310.

On the land described as: Pt 427, River Bank Reserve, Blk VI Maramarua SD.

For a term to expire on: 30 March 2027.

Subject to the following conditions:

CONDITIONS

- (a) Any erosion control works which become necessary as a result of the exercise of this consent shall be undertaken as directed by the Regional Council at the expense of the Grantees.
- (b) Subject to condition (l) the maximum weir height at the weir crest shall not exceed 3.14 metres Moturiki datum.
- (c) The weir shall be designed in such a way to satisfy the Waikato Regional Council that it will ensure the free passage of fish over the weir structure.
- (d) The weir shall be designed by a suitably qualified engineer acceptable to the Waikato Regional Council. The weir design shall be in a general accordance with Figure 4 titled “Department of Conservation Whangamarino Wetlands proposed weir site, proposed flat vee weir Rock/Gabion” of the evidence of E T Burke, as modified by Figure “A” annexed, so as to achieve the equivalent hydrological performance reflected in the geometry of Figure 4 as modified by Figure “A”. The heights recorded in Figure 4 shall not be exceeded but may be lowered. The weir shall be to an adequate structural standard to withstand expected loads under normal operating conditions. Additionally, it shall be designed to withstand loads under the 1% annual accedence probability flood in the Whangamarino river as calculated at the Cableway recorder site, without any failure that could result in hazards to life or damage to private property adjacent to or downstream of the structure. The design of the weir in terms of its hydraulic capacity shall be to the satisfaction of the Waikato Regional Council.
- (e) The weir structure reconstruction shall be overseen by a registered engineer who has expertise in the installation of structures such as the weir authorised by this consent. Reconstruction in all these conditions shall be taken to mean full reconstruction or staged reconstruction but not including maintenance of the weir structure.
- (f) The consent holders shall inform the Waikato Regional Council in writing of the date on which any reconstruction or repair commences and also the date on which completion of reconstruction or repair of the structure occurs.
- (g) The consent holder shall provide the Regional Council with engineers' drawings of the as built weir structure as soon as practicable but no later than two months from the date of completion of the reconstruction.
- (h) The Waikato Regional Council may give notice pursuant to section 128 of the Resource Management Act 1991, of its intention to review any or all of the conditions of this consent two years from the date of completion of reconstruction (the two years shall include the collection of data from two summer periods) and at five yearly intervals thereafter. In the exercise of its discretion as to whether or not the conditions of consent will be reviewed, the Waikato Regional Council shall take into account the length of time that the weir has been operating at its full height and the results contained in the Monitoring Report provided by the joint consent holders. The review shall be undertaken for any of the

purposes detailed in section 128 of the Resource Management Act 1991 and specifically for considering the effect of the weir on both ground and surface water levels on adjacent private land and ecological values in the wetlands.

- (i) A Monitoring Report as set out in condition (j) hereafter shall be provided initially on an annual basis by the consent holders to the Regional Council, and thereafter at two yearly intervals. The date from which the year shall run will commence three months prior to the reconstruction of the weir. The Report shall be audited by an independent body or person to be selected by the consent holders and the results of this audit shall form part of the Monitoring Report.
- (j) The consent holder shall retain a suitably qualified and independent and experienced person to prepare a monitoring plan. The person appointed shall be approved by the Waikato Regional Council. The objective of this plan is to address what affects the weir is having on private land in respect of both ground and surface water levels and gradients, wetland wildlife and habitat values and river processes. In respect of this objective the plan will address the following matters:

1. ~~Ground Water monitoring;~~

- ~~(i) The consent holders shall retain a suitable qualified, registered independent and experienced expert to determine a ground water monitoring plan including all necessary base monitoring. The plan and reasons for the monitoring to be undertaken shall be provided to the Waikato Regional Council. The plan shall be implemented to the satisfaction of the Waikato Regional Council. Where the plan envisages monitoring on private land the monitoring process shall be discussed with the owner of such land.~~

2. ~~Surface Water monitoring;~~

- ~~(i) The consent holder shall record ground water and ground surface levels for every site included within the monitoring programme and the level of any surface flooding if it occurs at the sites monitored. Photographs will also be taken of each site during each visit to record land use of the site, any changes in the appearance of the site and to show the extent of any surface flooding.~~

3. River siltation and vegetation encroachment monitoring measuring river and bank cross sections at the following sites;

- (i) Whangamarino Riverbed level 50 and 100 metres upstream of the weir and 100 and 200 metres below the weir.
- (ii) Whangamarino Riverbed level upstream of the confluence with the Maramarua River at reference NZMS260S12:953308.
- (iii) Whangamarino Riverbed level at Cableway.
- (iv) Whangamarino Riverbed level at Falls Road.
- (v) Kopuku Streambed level.
- (vi) Maramarua at NZMS260S12:010349.
- (vii) Maramarua at NZMS260S12:000345.
- (viii) A long section of the full length of the Whangamarino River be constructed at intervals to be determined by the suitably qualified and independent expert.

4. Vegetation monitoring;

- (i) The consent holder shall supply to the Waikato Regional Council aerial photographs


22/03/2011

of three sites, one on the Maramarua River at reference NZMS260S12:999334; one on Whangamarino River at reference NZMS260S13:980275; and one on the Pungarehu Stream at reference NZMS260S13:030234. The photographs shall be taken annually between 1 September and 30 November.

5. Noxious pests;

- (i) The consent holder shall review on an ongoing basis methods for controlling noxious pests such as koi carp, feral cats, stoats, opossums, rats and willows in the wetland area.

6. Weir performance;

- (i) The consent holder will undertake monitoring to establish the relationship between water levels upstream of the weir and discharge over the weir under free flow conditions. The conformance of the as built weir to the theoretical weir rating system given by Table 3 of the evidence of Mr E T Burke of December 1991 shall be established.

The consent holder shall provide a report to the Waikato Regional Council that details all the data collected in respect of the matters 1 to 6 described above. This report shall also summarise this data and provide comment on the effect of the weir in respect of these matters. The report shall be provided to the Waikato Regional Council initially on an annual basis by the consent holders, and thereafter at two yearly intervals. The consent holder shall also provide the Monitoring Report to the Waikato District Council as the same time as the Waikato Regional Council.

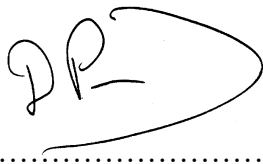
- (k) Copies of the Monitoring Report shall be provided to the Waikato Regional Council pursuant to condition (j), and shall be made available to adjacent private land owners and any other person who request such a copy
- (l)
 - (i) The consent holder undertakes to reconstruct and maintain the weir with the lowest point on the vee notch of the weir at a height of 2.95 metres Moturiki Datum, for a period of not less than two years (“the interim period”). The interim period shall commence on the day reconstruction of the weir is completed. The design of the weir is intended to achieve a targeted minimum water level in the wetland of 3.2 metres RL Moturiki datum measured at the Cableway water level recorder.
 - (ii) At the expiry of the interim period the consent holder shall produce a report of the performance of the weir in achieving conservation and recreation outcomes*.
 - (iii) If at any time after the expiry of the interim period the consent holder is satisfied that the conservation and recreation outcomes are not being met, the consent holder may increase the targeted minimum water level to 3.4 metres RL Moturiki datum at the Cableway water level recorder by increasing the lowest point of the vee notch of the weir to a maximum of 3.14 metres.
 - (iv) If at any time after the expiry of the interim period the Waikato Regional Council considers that the monitoring information referred to in condition j(1) and (2) demonstrates that there has been an adverse change in ground water and surface water levels on private land the consent holder shall, following consultation with the Waikato District Council, consider lowering the embankment to the weir to mitigate any such effects.

*The conservation and recreation outcomes the consent holder is seeking from the weir are set out in the statements in support of the application for the permit.

NOTE: If the adverse effects of the exercise of this consent are more significant than predicted by the grantees in applying for this consent, then the Regional Council will expect the weir height to be reduced and/or compensation to be paid by the Grantees to any person or body affected.

Dated at Hamilton this 29th day of October 1997.

For and on behalf of the
Waikato Regional Council



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Appendix 2 Assessment of Effects (from Notification Report WRC doc#29576176, Appendix 1, Section 2)

Assessment of Effects

The principal issues relating to the effects of the weir are:

1. The effects from increased water levels
2. The effects from increased sedimentation
3. The effects on drainage
4. The effects on the wetland ecosystem

While the hydrological effects under 1 – 3 above are listed separately, they are interrelated. Increased water levels reduce the flood storage capacity associated with the LWWCS flood protection scheme, increases the frequency and duration of spill over to adjacent flood protected areas which in turn increases flooding, and results in reduced drainage and/or increased pumping requirements. Sedimentation is further exacerbated by increased water levels, and results in consequential effects such as increased spill over and reduced drainage.

Collaborations, a consultancy acting on behalf of the Consent Holders, have prepared a report titled "Whangamarino Weir – Current Environmental State Assessment", dated 12 March 2024 ("Collaborations Report"). The Collaborations Report *"provides an overview of the Whangamarino Wetland in relation to hydrology, sediment, ecology and land drainage, and what role the Whangamarino Weir ('the Weir') may have in some of these topics."* The overview aims to inform an assessment of adverse effects and to provide a base scenario to identify and screen potential future weir options.

I note that the Collaborations Report is based on technical information related to the existing weir with a weir invert of 2.95 mRL and a weir berm height of 3.6 – 3.8 mRL but that the consent authorising the weir allows a maximum weir invert of 3.14 mRL and a maximum weir berm height of 4.04 mRL.

Mitchell Daysh, on behalf of the Consent Holders, have prepared a report titled "Whangamarino Weir – Review of AUTH890277", dated 15 March 2024 ("Planning Report") which provides planning advice to the Consent Holders to address requirements of s95 RMA and s104 RMA for the subject s128 RMA review.

Throughout the preparation of the report Mr Ghassan Basheer on behalf of the WRC Integrated Catchment Management Directorate (ICM), being the operator of the LWWCS flood protection scheme, Mr Graham Levy, Senior Technical Director (Water Resources) at Beca on behalf of the WRC Resource Use Directorate (RUD) and Mr Gerry Kessels, Principal Ecologist at Bluewattle Ecology on behalf of RUD and myself have provided information and/or commentary at workshops and via written or verbal correspondence on the draft reports in accordance with an agreed work plan (WRC doc# 21522077).

Upon receipt of the reports, ICM provided further technical comments and/or clarifications (WRC doc #29122561, #29122753).

Mr Roger Seyb, also Senior Technical Director (Water Resources) at Beca and Mr Levy (Technical Peer Reviewers) have peer reviewed the final reports, specifically the Collaborations Report, to advise RUD on technical aspects of the review as they relate to hydrological, drainage and sedimentation effects (Peer Review Report) (WRC doc# 29124325, 29121550 and 29125316). They also considered the further technical comments and/or clarifications provided by Mr Basheer on behalf of ICM. Mr Kessels has also peer reviewed the reports and provided RUD with ecological advice (WRC doc#29124921).

The advice by the Technical Peer Reviewers builds on previous technical advice, documented as WRC document numbers 12548184, 13238166, 15241959, 15244310, 15754620, 15834551, 15839692, 15842468, 15840890, 15933269, and a resulting interim assessment of effects related to hydrology, drainage and sedimentation (Interim RUD Assessment), undertaken by RUD in 2020 (WRC doc#29598650). In their Peer Review Report, the Technical Peer Reviewers set out the key matters and conclusions made in the Interim RUD Assessment, identified and discussed further information and additional information analysed since 2020 and updated the conclusions made in the Interim RUD Assessment.

The below assessment of effects related to water levels, sedimentation and drainage should be read in conjunction with the Interim RUD Assessment as it includes more detailed technical information which I will not repeat but summarise in this assessment.

Water Levels

The Hearings Committee in 1991 aimed to provide for a wetland water level that achieved conservation and recreational goals while having an acceptable effect on flood protections schemes (a maximum 4% reduction in flood storage capacity of the LWWCS was considered acceptable).

As advised by Mr Levy, the relevant water level for flood protection storage is the average of the levels at the Ropeway and Falls Road gauges, representing the average level across the wetland at any given time. Full flood protection storage is provided at an average water level of 3.7 mRL across the wetland at the start of a flood when the Whangamarino control gate shuts. A 4% reduction in flood storage capacity (which the decision makers considered acceptable) equates to an average water level of 4.0 mRL at the beginning of a flood.

The Interim RUD Assessment concluded that *"...55% of the times when the Whangamarino control gates shut, the average water level across the wetland was above 4.0 mRL. Therefore, the effects of the weir on the storage capacity of the LWWCS in the wetland is greater than was anticipated at the time the consent was granted"*. However, the assessment did not consider when the weir was controlling these water levels or any seasonal information.

The Interim RUD Assessment also noted *"that the current crest height of the weir is at approximately 2.95 mRL. That is the weir height at which the assessment on water levels has been made. However, the consent provides for a maximum weir crest height of 3.14 mRL to achieve conservation and recreation outcomes. While the consent holder considers that the conservation outcomes are met at a level of 2.95 mRL (WRC document number 854220), the conditions would currently not prevent raising of the weir crest height up to 3.14 mRL. If that was the case, the level of effects on water levels would be greater than assessed."*

In respect to water levels, the Peer Review Report considers the following further information since the Interim RUD Assessment:

- Water level information for the period 2021-2022, in addition to information already available for the period 2002-2020.
- A review of the Whangamarino Control Structure (Control Gate) water levels versus those at the Ropeway gauge to identify the duration for which the weir is controlling the upstream water levels in the wetland.
- A review of data at the Ropeway and Falls Road water level gauges to identify seasonal water level - frequency relationships.

The Peer Reviewers advise that the Control Gate analysis shows that at 4.0 mRL, the Control Gate or Waikato River levels affect wetland water levels. However, at the higher water levels, the weir continues to have an effect on the amount of flood storage available.

The new water level information confirms the water level assessment in the Interim RUD Assessment, noting that it does not determine whether the increased period at higher water levels is a direct effect of the weir hydraulics or an indirect result of sedimentation in the river channel. However, the further seasonal analysis shows that, during winter, there is a 1% increase in the time (pre vs post weir) that water levels are above 4.0 mRL (the level that equates to the authorised effect on flood storage). This assessment is based on the current weir berm level of 3.6 – 3.8 mRL. The Technical Peer Reviewers advise that if the berm level would be raised to the maximum consented level (4.04mRL) then the frequency of an increased water level above 4.0 mRL would further increase.

Currently, the weir invert is below 2.95 mRL and as a result, water levels are raised below the target of a 3.2 mRL minimum water level in the wetland. The Technical Peer Reviewers advise that raising the weir invert to 2.95 mRL would lead to a slight increase in the wetland water level with no additional effect on the flood storage. Raising the weir invert further to the maximum consented level of 3.14 mRL would likely result in increased sedimentation in the order of a further 0.2 m but the resulting water levels would have limited consequential effects on flood storage and drainage.

The Technical Peer Reviewers conclude:

“Overall, the effect of the weir invert [with an invert level of 2.95mRL] on water levels ...is as expected at the original consent. Raising the weir invert to 3.14mRL (as allowed by the consent) would raise the minimum water level and likely lead to some further minor sedimentation in the main Whangamarino River, but it would have limited effect on the mid-range water levels that begin to affect flood storage – provided the weir berm was kept at its existing level of 3.6 – 3.8 mRL. Raising the weir berm level would increase the frequency and durations of water levels above 3.7 and 4.0mRL and that this would have more than a minor effect on flood storage upstream.”

Based on the assessment I conclude that the adverse effects on flood storage beyond the effect authorised (4% reduction of flood storage capacity) is less than minor at a weir invert between 2.95 mRL and 3.14 mRL at the existing weir berm level of 3.6 – 3.8 mRL. However, if the weir berm level would be raised to the maximum consented level the adverse effects on flood storage above the authorised effects would be more than minor.

To ensure that the effects on water level remain as authorised, the Consent Holders have proffered a consent condition that would limit the weir berm level to the existing level (3.6 – 3.8mRL) (WRC doc#29130944). Figure 7 in the Collaborations Report (and as modified in Figure 2 below) shows the existing berm level/access track as per results of a 2022 survey. The Technical Peer Reviewers advised that these levels should be maintained (except for minor repairs in some low sections as approximately shown in Figure 2 in red) to ensure the loss of flood storage capacity is limited to 4% as currently authorised by the consent.

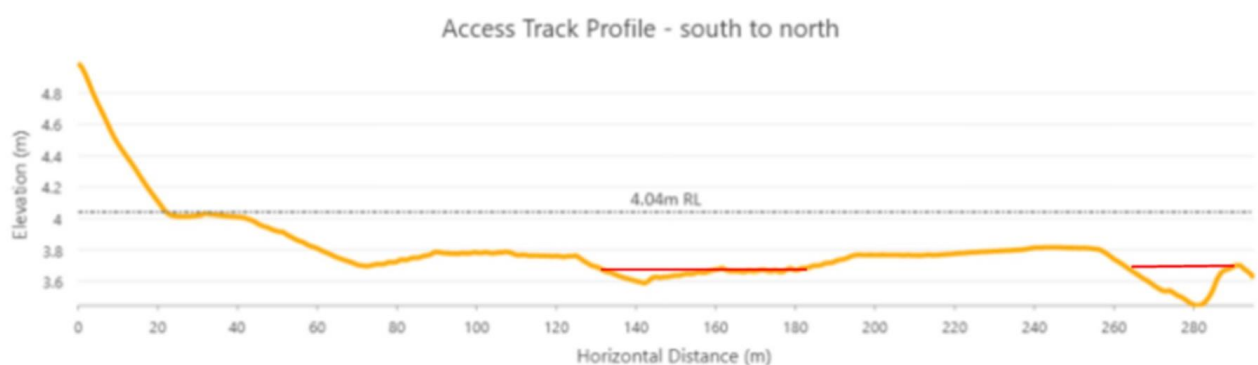


Figure 2 Survey of existing weir berm / access track (orange line) and indication of low sections that may be repaired (red line).

Provided the existing weir berm level is maintained and at its existing level, I consider adverse effects on water levels and associated flood storage capacity to be less than minor.

Sedimentation

The 1991 consent decision acknowledged that water from Lake Waikare contains a high silt concentration but expected that silting of the river channel would not occur to any greater degree than at the time of the decision. In 1996, the Hearings Commissioners anticipated that sedimentation would be relatively small but that sedimentation effects should be monitored by surveying river cross sections.

The RUD Interim Assessment states: *“Mr Levy advises that consent monitoring data (comparison of channel cross-section surveys between 2003 and 2014) show that the accumulation of sediment upstream of the weir [with the weir being the main contributing factor] is typically 0.6 m, although in the vicinity of the Pungarehu confluence sediment accumulation increases to about 1.2 m. The downstream reach of the Maramarua River has similar (0.6 m) accumulation to the Whangamarino River with a decreasing trend upstream... The increased sedimentation affects hydraulic capacity and water level in the waterways. Mr Levy assesses the hydraulic effect from sedimentation on water levels in the lower reaches of the waterways (but upstream of the weir), with large channels and up to 0.6 m of siltation, as likely to be minor. He considers that it would likely be some time before it would be severe enough to be significant. However, in the upper wetland reaches of the Whangamarino River...and in the Pungarehu Stream...there is greater sedimentation. Mr Levy assesses that this sedimentation has likely already affected the hydraulic conveyance capacity and as such increased the frequency of spill of sediment-laden water to the wetland and to adjacent farmed areas. The implications of the increased frequency of spill on drainage is further discussed [in the RUD Interim Assessment drainage section]”.*

In the Collaborations Report further cross section analysis has been undertaken for the Pungarehu Stream and canal. The Technical Peer Reviewers advise that the analysis confirms increased sedimentation in the area with the base of the channel rising some 0.8m – 1.0 m. Further, *“the section presented closest to the Swan Road drainage scheme shows up to approx. 0.2 m change in bed levels over the period 2005 to 2018.”* The Technical Peer Reviewers conclude that *“sedimentation has occurred near the confluence of the Whangamarino River and the Pungarehu Stream but this appears to be less further to the south near the stream/canal interface”*. They further note that the increase in bed level appear to have stabilised (i.e., are unlikely to increase further) but that *“changes to the current weir levels however may lead to additional sedimentation”*.

The Technical Peer Reviewers conclude that sedimentation due to the weir is greater than anticipated, particularly in the area of the Whangamarino River/ Pungarehu Stream confluence but less so in the Northern Outlet Canal. Further, the Technical Peer Reviewers conclude that further sedimentation in the Whangamarino River would be expected if the weir invert level was raised above 2.95 mRL and an even greater increase in sedimentation would likely occur if the weir berm level was raised.

The Technical Peer Reviewers advise that *“one reason that this sedimentation is important is that the increased water levels and reduced waterway capacity in the upper reaches of Whangamarino River and Pungarehu Stream will lead to more frequent overflows of sediment-laden water into the wetland, with potential adverse effects”*. These effects, being consequential effects of the increased sedimentation, are further discussed in section 2.4 (Ecological Effects) below. Similarly, the increased water levels and reduced waterway capacity may have consequential effects on drainage, particularly the nearby Swan Road drainage scheme. This is further discussed in section 2.3. (Drainage) below.

In summary, sedimentation is greater than anticipated by the decision makers but the below sections discuss what the consequential adverse effects are.

Drainage

It is unclear exactly what level of effect on drainage was anticipated by the decision makers although the decision makers considered effects to be unlikely and if effects did occur then compensation should be paid (outside the RMA process).

The Interim RUD Assessment noted that *“groundwater monitoring conditions were included to determine actual effects. The results of that monitoring for the period 1998 to 2007 was reviewed by Tonkin & Taylor (T&T). T&T assessed that the weir had increased groundwater levels on land adjacent to the downstream end of the wetland, whereas upstream areas appeared to only be affected in some years and to a lesser degree than downstream areas. An AgResearch report concluded that based on monitoring undertaken between 1998 and 2003 the impact of elevated summer groundwater levels on adjacent pasture condition were negligible.”*

The Interim RUD Assessment further stated that higher water levels can affect farm drainage resulting in reduced channel conveyance and more frequent and prolonged flooding. Because the water levels and sedimentation in some locations were assessed as greater than anticipated when the consent was granted it was concluded that there would be consequential effects on drainage which would not have been anticipated by the decision makers.

Because the effects on water levels and sedimentation in some locations were assessed in the RUD Interim Assessment as more than minor, it was concluded that the effects on drainage would be at least minor.

The Collaborations report further considered the effects on drainage and analysed Pungarehu Stream cross sections in an area of increased sedimentation (near the confluence with the Whangamarino River) and river cross sections in the Northern Outlet Canal which is close to the Swan Road drainage scheme (the Swan Road drainage scheme was identified by the Technical Peer Reviewers as potentially affected by reduced drainage due to increased sedimentation).

Further, the Interim RUD Assessment was based on an analysis of land elevation (2010/11 LiDAR data) and expected ponding in flood protected areas. The Collaborations Report provided further information and analysed land levels and potential inundation based on more recent (2022) LiDAR data with a focus on ground levels in the wetland and adjacent farmland, and how much settlement (due to peat subsidence) has occurred in the farmland.

As discussed in section 2.2.2 (Sedimentation), the Technical Peer Reviewers advise that there is increased sedimentation near the confluence of the Whangamarino River and the Pungarehu Stream (0.8 m – 1.0 m). Further upstream, the cross section at the Northern Outlet Canal shows limited change in bed levels (increase of 0.2 m).

The Technical Peer Reviewers further advise that the new water level information also informs the potential effects on drainage at Swan Road: *“There is an increase in the winter water levels at Falls Road [pre vs post weir] and this may indicate that the water level in the Pungarehu Stream has increased also. However, there is uncertainty about the degree of the effect in the Pungarehu Stream as it has not been assessed directly (due to there being no water level data) and the grade and geometry of the stream and canal (rather than the Whangamarino water level) may govern the stream water level. Considering 4.3mRL (as the previously mapped level for effects by Beca on the Pungarehu drainage schemes), the percentage of time above this level at Falls Road increases from 12% before the weir to 27% after the weir. Therefore while, the upper Pungarehu Stream / Northern Outlet canal may not have aggraded, the water level in the lower Pungarehu Stream is higher more frequently and so there may be effects on the Swan Road drainage scheme...”*

The Technical Peer Reviewers have considered whether the Vrsaljkos scheme may be equally affected. They considered that the pumped outlet pipe level and ground level is considerably higher than the Swan Rd scheme. Therefore, the Pungarehu drainage scheme effects would only apply to the Swan Road Drainage Scheme.

Overall, the Technical Peer Reviewers conclude that the effects of the current weir level on the Swan Road Drainage Scheme is as assessed in the RUD Interim Assessment and *“the seasonal water level information from Falls Road demonstrates that there are effects on the Swan Road drainage scheme during winter”*. The Technical Peer Reviewers consider this effect to be minor, however this does not consider the reduced drainage from peat subsidence as discussed below.

The Technical Peer Reviewers further conclude that *“raising the weir vee invert to 3.14mRL would have a minor further effect on the Pungarehu Stream drainage schemes (as the main effect would be a 0.2 m increase in minimum water levels during the summer period). However, raising the weir berm from 3.6-3.8 to 4.04mRL would likely lead to further sedimentation upstream and have a direct effect on winter water levels – in the order of a further 0.3 m”*.

In respect to the concluded level of effect on drainage as a consequential effect of water levels and sedimentation, peat subsidence is an additional matter to explore. To further address wetness and drainage performance, the Collaborations Report contains further information. The Technical Peer Reviewers advise that it *“supports the conclusion that the weir has resulted in increased river/wetland water levels adjacent to many of the schemes, combined with continued subsidence of the farmland as the peat character changes. This potentially increases wetness and drainage challenges, but it remains unclear how much this differs from what was expected during the original hearing. Figure D10 [in the Collaborations Report] seeks to analyse the difference between what was expected, and the current situation, but only for wetland areas, not for farmland. However, in doing so it appears that in most areas the 2022 LiDAR suggests less inundation at 3.8 mRL than was expected at hearing. The Technical report argues that the peat subsidence is more significant than the effects of the weir, and that there are offset considerations with the higher water levels caused by the weir potentially reducing the settlement rate...as a substantial drop in land level has occurred we think that there is likely to be limited recharge effect from the wetland reducing peat settlement and that any effects are likely to be close to the wetland. We agree that the peat subsidence is the more dominant effect on the time that the pumping schemes are operating compared to the weir effects on water levels.”*

Based on the various considerations the Technical Peer Reviewers conclude: *“In summary, even based on the updated LiDAR data and added assessment undertaken, it remains unclear as to whether there are greater effects on the drainage schemes than were expected at the hearing. On balance, it does appear more likely that direct effects of the weir on drainage and land subsidence are less than minor [including the Swan Road Drainage Scheme]. However, as outlined above it is possible that increased sedimentation in the Whangamarino River and Pungarehu Stream (more than expected at the time of consent) may have had a consequential effect on the Swan Road drainage scheme that is more than expected at the time of consent. Should the vee in the weir be raised, we consider there could be a minor effect on the [Swan Road] drainage scheme”*.

Based on the assessment I consider that the adverse effects on drainage over and above the effects authorised would be less than minor if the weir invert does not exceed 2.95 mRL and the existing weir berm (except for some minor repairs as shown in Figure 2) are maintained and at its current level.

If the weir invert would be raised as currently provided for in the consent (max 3.14 mRL) the effects on the Swan Road Drainage Scheme would increase to a minor level. And if the weir berm would be increased as currently provided for in the consent (max 4.04 mRL) drainage effects on all schemes would be more than minor.

To ensure that the effects on all drainage schemes remain less than minor, the Consent Holders have proffered a consent condition that limits the existing weir invert to 2.95 mRL and maintains the existing weir berm level (as shown in Figure 2 and allowing some minor repairs) (WRC doc#29130944).

Ecological Effects

The decision makers anticipated that the water level raised by the weir would have an overall positive effect on the wetland ecosystem and particularly in respect to the relatively unmodified peat bogs by reducing desiccation of this area. The decision makers accepted that the habitat of introduced species may also be enhanced and that these effects should be monitored and managed.

Wetland Vegetation

To confirm (or otherwise) the benefits of the weir to wetland vegetation, conditions require wetland vegetation monitoring.

In 2018, Paula Reeves, then Lakes Management Advisor at WRC ICM, provided advice on wetland vegetation types, effects and monitoring (WRC doc#13606142). In her advice, Ms Reeves describes the various Whangamarino wetland types, their importance and how the increase in water level can potentially affect these types. Ms Reeves further lists activities that can potentially affect each wetland type.

Ms Reeves further advises that *“some information exists regarding the likely effects of the 2000 weir on vegetation at Whangamarino Wetlands. Key findings include the following:*

- *Functioning of the weir since 2000 has raised average minimum water tables which appears to be having a positive effect in some areas of former sedges and wire rush (fen and bog wetland types). There, large patches are in the process of developing towards bog plant communities again, with tangle fern replacing the tall mānuka induced vegetation. However, the long term ability for natural succession to bog to proceed will also depend on the management of other environmental factors, particularly nutrient enrichment. (Clarkson 2015).*
- *Increased water levels since 2000 are likely to have prevented reestablishment of crack willow in marsh habitats where it was controlled between 1999-2008. Vegetation in these areas has changed from crack willow to aquatic vegetation dominated by the native *Persicaria decipiens* and the exotic primrose willow (*Ludwigia peploides* subsp. *montevidensis*). (Bodmin and Champion 2010).”*

The Collaborations Report also considers changes in wetland vegetation extent over an extended time period (1942 – 2017). Changes are assessed pre and post weir installation. The Collaborations Report concludes that pre weir *“there was a significant decline in native Wetland habitats favouring invasive species, commonly found along areas of mineralised swampland and fen habitat (near river margins).”* However, post weir *“there has been a significant slowing in degradation of native habitat types compared to 1963–2002 (noting this is a longer period), and the installation of the Weir and active vegetation management (such as the spraying of willows by DOC) has halted the ongoing habitat degradation in parts of the Wetland”*. Upon peer review of the Collaborations Report, Mr Kessels agrees with the conclusion. I conclude that there has been a positive trend on wetland vegetation changes since installation of the weir, while noting positive effects are not considered in the notification assessment.

I have further considered the effect on wetland vegetation as a result of increased sedimentation. Mr Levy advised (refer to RUD Interim Assessment) that information from the consent review process for Lake Waikare outlet control gate indicates that the combination of high sediment loads from Lake Waikare, with higher water levels in the Whangamarino River and Pungarehu Stream as a result of the weir, have exacerbated sedimentation in the wetland, most notably in the mineralised wetland adjacent to the Pungarehu Stream.

Following peer review of the Collaborations Report, the Technical Peer Reviewers advise that *“one reason that this sedimentation [the increased sedimentation due to the weir in Pungarehu Stream] is important is that the increased water levels and reduced waterway capacity in the upper reaches of Whangamarino River and Pungarehu Stream will lead to more frequent overflows of sediment-laden water into the wetland, with potential adverse effects. This can occur due to NOCG discharge even at times when the rivers are not in flood, and the finer sediment sizes and organic material that dominate in that discharge from Lake Waikare are more likely to settle in the wetland than in the channels. However, the hydraulic behaviour of the Northern Outlet canal and Pungarehu stream is not assessed and therefore it is unclear whether the water levels can exceed the channel top of bank levels and contribute sediment directly to the wetland prior to entering the Whangamarino River.”*

Ms Reeves advised that increased sediment deposition would have significant negative effects on all wetland types. While sedimentation has been exacerbated in the mineralised wetland, vegetation changes have been positive, but it may require further consideration when assessing long term effects.

I consider that effects on wetland vegetation to date have been positive as anticipated by the decision makers.

Water Quality

In recent years there have been concerns over the water quality in the wetland. In late 2022 and early 2023 the waters of the Whangamarino and Maramarua Rivers went anoxic resulting in a fish kill event (blackwater event) which then fueled a botulism outbreak. A blackwater event occurs when there are very low levels of dissolved oxygen in the water. A multi-agency (F&G, DOC, WRC and mana whenua) response has been developed and the contributing factors are being investigated (i.e. temperature, organic matter/sedimentation/water level). From investigations thus far, it appears that increased water levels (e.g., due to the weir) correlate with conditions that may contribute to such events (WRC doc# 26573586). The investigations into multiple variables are ongoing and no clear conclusions have yet been drawn.

There is no evidence at this time to suggest that there are effects on water quality as a result of the weir.

Wetland Birds

Whangamarino wetland is home to the Nationally Critical and elusive Australasian bittern/matuku (*Botaurus poeciloptilus*), a key wetland bird considered when consent was granted. The Collaborations Report states that *“bittern populations have declined in Whangamarino Wetland over the last 50 years”,* however, *“field observations of bittern from call counts show strong correlation with optimal habitat ranges”*. When water levels were higher during the breeding season, bittern boom records increased significantly. The Collaboration Reports concluded that this is directly related to available habitat and thus maintaining higher water levels would improve bittern habitat over spring and summer. Mr Kessels concurs with the assessment and conclusions.

I consider that adverse effects on bittern habitat as a result of the weir are not greater than anticipated.

Mudfish

The decision makers raised uncertainty about effects on the endangered black mudfish and whether it would be outcompeted by the exotic mosquito fish which occupies a similar habitat. The Collaborations Report discusses the limited information available and concludes that *“whilst the weir provides greater ponded habitat to expand their range and colonise new areas, there is also a more sustained water level that would reduce drying of some mudfish habitat and possibly increase chance*

of predation". In a 2011 survey individual mudfish were found in channel areas. Mr Kessels peer reviewed the information and advises that in his opinion, *"the overall effect of the Weir on mudfish habitat may be at worst, net neutral, and at best, create a slight gain in habitat availability for this species"*.

I conclude that adverse effects on mudfish are not greater than anticipated by the decision makers.

Pests

It was acknowledged by the decision makers that pests may increase to the detriment of native species. In the decision reports, reference is made to koi carp, feral cats, stoats, possums, rats and willows and consent conditions require the management of pests.

The Collaborations Report discusses pest management. Mr Kessels advises that the Collaboration report provides information on the increase or decrease of exotic species, how pest species have been controlled and how effective the control has been with some questions remaining in respect to alligator weed and *glyceria* (both are wetland weed species).

Nevertheless, pests are managed as anticipated by decision makers.

Fish Passage

The decision makers intended to ensure fish passage and included a condition to achieve this. The decision report states that parties disagreed on the form of such a structure, but the decision makers considered that a suitable structure can be built.

The Collaborations Report advises that *"of the native species found in the Wetland, all but Black Mudfish are migratory so the connection between the headwaters and the Waikato River is important to complete life stages"*.

A 2015 consent compliance assessment noted that the weir was designed to allow safe passage for fish and the design was approved by WRC staff on 30 April 1998.

Contrary to the consent compliance assessment, the Collaborations Report assessed that only partial fish passage is available: *"The current Weir design has the potential to restrict fish passage as hydraulic jumps can cause water to have a high velocity and turbulent nature. Poor swimming species, such as Inanga, are then unable to navigate upstream past such structures."* Further, *"the Lake et al. 2011 survey also identified that inanga, mullet and smelt were found in very high numbers downstream of the Weir indicating the Weir is a barrier to migration"*.

The Collaborations Report concludes: *"The Weir is a partial fish barrier to all species except climbers (like eels), while the Whangamarino Control Structure when closed is a complete barrier (although this would occur infrequently). The level of effect depends on the season and water levels, with summer and autumn likely to have the greatest risk of a passage barrier due to lower water levels. Fish passage into the Wetland may still be viable along the margins of the Weir and can occur through Te Onetea gate into Lake Waikare. However, further investigations may be needed to confirm the level of effects the Weir has on fish passage given the limited studies available"*

Mr Kessels advised that fish access to the wetland via Te Onetea gate into Lake Waikare, as opined in the Collaborations Report, is unlikely to be a feasible alternative for non-climbing fish such as inanga and no evidence to support this assumption in the Collaborations Report has been provided. I further note that the weir is required to provide for fish passage and an alternative access for fish to the wetland would not satisfy this requirement.

I conclude that the effects on fish passage are likely to be greater than anticipated by the decision makers. However, the greater effect is not due to a lack of requirements (i.e. consent conditions), rather it is due to a likely incorrect compliance assessment.

In the Collaborations Report the following fish passage options are recommended:

- Addition of a fish ramp to reduce velocities and grades to pass,
- Additional downstream weirs that reduce hydraulic jumps,
- Adding a fish bypass past the weir,
- Manual relocation of fish congregated at the weir during migration periods, or
- Utilisation of the radial gate to frequently backwater the Weir and enable congregated fish to pass during upstream migration.

Mr Kessels considers these valid solutions to ensure the passage of fish past the weir and fish passage can be enforced via current consent conditions as anticipated by the decision makers.

Conclusions on Ecological Effects

Based on the assessments discussed above, I consider that adverse effects on the wetland ecosystem are as anticipated by the decision makers. Effects on wetland vegetation have been positive and increased sedimentation has not yet had an effect on vegetation changes (but should be considered in respect to future long term trends when considering amendments to consent conditions). Similarly, the effects of water levels and sedimentation on water quality should be further considered at the time of reconsenting.

While bittern populations have declined in the wetland, increased water levels provide increased habitat which correlates with increased bittern records, meaning that higher water levels benefit the species. Effects on mudfish have been assessed as neutral. Fish passage is only partially provided for, and this must be addressed as required by existing consent conditions. Pests are managed as anticipated by decision makers.

Overall Conclusion

Based on the Consent Holders' proposal to maintain the existing weir invert (max of 2.95 mRL) and the existing berm height (as shown in Figure 2 above) I consider adverse effects on water levels, flood storage and drainage to be no more than minor. Sedimentation at the Pungarehu confluence have been assessed as greater than anticipated, however consequential effects are less than minor. The effects on ecology are also assessed as no more than minor.

Appendix 3 Recommended Consent Conditions (WRC document 31305437)

Resource Consent Certificate

Resource Consent: AUTH890227.01.03

File Number: 60 67 31A

Pursuant to the Resource Management Act 1991, the Waikato Regional Council hereby grants consent to:

Minister of Conservation and
Auckland/Waikato Fish & Game Council
PO Box 20025
Te Rapa, Hamilton 3241

(hereinafter referred to as the Consent Holder)

Consent Type: Water permit

Consent Subtype: Dam

Activity authorised: Dam the Whangamarino River

Location: Pt 427, River Bank Reserve, Blk VI Maramarua SD

Spatial Reference: NZMS 260 S12:949-310 or NZTM(E) 1784562.762 NZTM(N)
5869353.904

Consent Expiry: This consent will expire on 30 March 2027

Subject to the conditions overleaf:

Weir Design and Maintenance

1. The maximum height of the weir vee invert must not exceed RL 2.95 metres.

Advice note: The relative level (RL) in all conditions of this resource consent refers to the Moturiki Vertical Datum, 1953

2. The weir shall be designed in such a way to satisfy the Waikato Regional Council that it will ensure the free passage of fish over the weir structure.

Advice note: The Waikato Regional Council has previously approved the design of the weir and has previously approved as built engineering drawings of the weir structure⁵.

3. The consent holder must remediate any erosion, within 100 metres upstream of the weir, that is affecting the weir's structural integrity, as soon as practicably possible.
4. The consent holder must maintain the weir to preserve the integrity and stability of the structure. In particular, the weir must be designed and maintained to withstand loads under the 1% annual exceedance probability flood in the Whangamarino River as calculated at the Ropeway recorder site, without any failure that could result in hazards to life or damage to private property adjacent to or downstream of the structure.
5. The consent holder must ensure that the level of the weir berm, outside of the main vee invert, does not exceed a maximum height of RL 3.8 metres and it must be maintained at an approximate uniform level.

Advice note: The requirement for a uniform level seeks to avoid erosion and associated preferential flow path outside of the main vee invert.

6. For any maintenance works on the weir that results in changes to the weir geometry, a suitably qualified and experienced Chartered Engineer must certify the structural integrity of the weir and must state whether the maintenance works have been undertaken in accordance with sound engineering practice and whether conditions 1, 4 and 5 of this resource consent are met. A copy of this certificate must be forwarded to the Waikato Regional Council within two months of completion of the maintenance works.

Advice note: this condition only applies to major maintenance works that alters weir geometry, it does not apply to minor day to day maintenance works that does not alter weir geometry (for example, removing obstructions and re-tying gabion baskets).

7. The consent holder must inform the Waikato Regional Council, in writing, of the details of any maintenance works at least 5 working days prior to the works commencing. The details must include, as a minimum:
 - (a) Details of the works;
 - (b) Expected starting and expected completion dates;
 - (c) Any changes to the weir geometry must be identified on a plan and long section of the existing levels including information that the weir invert and weir berm achieve the heights specified in conditions 1 and 5 of this consent.

⁵ Site Compliance Audit Report, dated 20 May 2014, WRC document number 3089828

8. If any maintenance works result in any changes to the weir geometry, the consent holder must survey the weir vee invert and berm heights within one month of completion of the works. The survey must be in general accordance with the requirements and measurement for cross sections set out in the WRC document “Technical Specifications for stopbanks surveys”, recorded as WRC document number 10821970, or any successor document. The resulting survey plan must be submitted to the Waikato Regional Council within two months of completion of the works.

Water Level Monitoring

9. By 31 July 2025, the consent holder must install and operate two continuous water level recorders at the following locations:
 - (a) At or near the confluence of the Pungarehu Stream and the Whangamarino River at or near Pungarehu Stream (ICM) cross section 4 (approximately NZTM 1792992mE, 5864001mN); and
 - (b) At or near the “farm bridge” that is located approximately 500 metres downstream of the Swan Road pump station (approximately NZTM 1793377mE, 5862374mN).

The installation and operation of the water level recorder must be in general accordance with the National Environmental Monitoring Standard (NEMS) document titled: “Water Level - Water Level Field Measurement Standard”⁶, Version: 4.0.0, dated 1 October 2024 or any subsequent version or successor document.

The purpose of the water level recorder is to record water levels continuously to determine, in conjunction with water level records from the Whangamarino River Ropeway recorder and Whangamarino River Falls Road recorder, the frequency of events, seasonal conditions and the hydraulic profile along the Pungarehu Stream under a range of flow conditions leading to spillover of water into the adjacent wetland and potential effects on the Swan Road drainage scheme.

10. Prior to installation of the water level recorders, the consent holder must submit the following information for Waikato Regional Council certification in a technical certification capacity:
 - (a) Proposed water level recorder locations as set out in condition 9;
 - (b) Design of each water level recorder to ensure structural integrity and to meet the annual water level range;
 - (c) Operating framework to obtain continuous measurement data; and
 - (d) Any other information to demonstrate that the requirements of condition 9 will be met.

The information must be in sufficient detail to ensure that the purpose of the water level recorders set out in condition 9 is achieved.

11. The consent holder must analyse and assess the water level data to determine the frequency of events and seasonal conditions leading to spillover of water into the adjacent wetland and

⁶ <https://www.nems.org.nz/documents/water-level>

potential effects on the Swan Road drainage scheme. The consent holder must submit the assessments by 31 August 2026, covering the one-year period between 1 August 2025 and 31 July 2026. Subject to condition 12, the analysis, assessment and reporting must continue on the same annual basis. Each assessment must:

- (a) Provide an analysis of water level statistics (stage/frequency exceedance) at the water level recorder sites;
- (b) Include four to six hydraulic profiles from downstream of the Whangamarino weir to upstream of the Swan Road pump station representing a range of seasonal low flows and a selection of flow events in the Whangamarino River and Pungarehu Stream over the monitoring year;
- (c) Present any data gaps and describe the reasons for those gaps; and
- (d) Compare the data from the two water level recorder sites described in condition 9, to the Whangamarino River Ropeway recorder and Whangamarino River Falls Road recorder and assess whether there are reliable relationships between the water levels at the recorder sites and if so, describe the conditions during which they apply.

For the purposes of condition 11 (b) “*hydraulic profiles*” means the comparative water levels at a point in time taken from up to six water level recorders, from Northern Outlet Control Gate to the Whangamarino Control Structure.

12. Waikato Regional Council will, upon request from the consent holder, agree (in a technical certification capacity) to ceasing continuous water level monitoring, analysis and reporting required by condition 9 and condition 11 if:

- (a) The purpose of the monitoring has been achieved; and
- (b) The assessment required by condition 11 demonstrates a relationship between the water level recorder sites required by condition 9 and the Whangamarino River Ropeway recorder and Whangamarino River Falls Road recorder.

Following certification from the Waikato Regional Council under condition 12, the water level recorders required by condition 9 may be removed, and the reporting required by condition 11 may cease.

Advice note: The purpose of condition 12 is to limit water level monitoring to only the period necessary to achieve the objective of the water level monitoring.

Survey Cross Section

13. The consent holder must survey cross-sections, or obtain the data from survey cross sections, of the watercourse bed and banks to assess changes and trends in bed and bank levels within the watercourses over time. The surveys must be carried out at the following locations and at the same locations during each survey:

- (a) Whangamarino River – twelve sections (DOC cross sections 15, 3, 2, 14, 13, 20, 1, 21, 22, 12, 11, 10, 9, 23 as shown in Schedule 1);

- (b) Maramarua River – six sections (DOC cross sections 19, 6, 18, 5, 17, 16 as shown in Schedule 1); and
- (c) Kokupu Stream – one section (DOC cross section 4 as shown in Schedule 1)
- (d) Mineralised wetland – six sections (ICM cross sections 1, 2, 3, 4, A and B for the Pungarehu Stream as shown in Schedule 1)
- (e) Swan Road pump station (ICM cross section 6 for Northern Outlet Canal as shown in Schedule 1).

The surveys must be undertaken in March 2026 and every five years thereafter unless otherwise approved by Waikato Regional Council in writing. Waikato Regional Council may, on request, certify a lesser survey frequency after three rounds of surveys and/or certify a different survey month to align with survey requirements of other consents or to allow for seasonal constraints. In considering the request, Waikato Regional Council will consider whether the purpose for which the surveys are undertaken can still be achieved.

The surveys must be conducted by a suitably qualified and experienced surveyor. The surveys must have a horizontal accuracy of 100 mm and a vertical level of accuracy of 50 mm to the survey datum. Also, the surveys must be in general accordance with the requirements and measurement for cross sections set out in the WRC document *“Technical Specification for stopbanks surveys”* (WRC document number 10821970).

The consent holder must provide the survey information within four months of each survey, by 31 July. The survey information must include, as a minimum:

- (a) Raw data;
- (b) A diagram of each cross section;
- (c) A longitudinal section along each of the Whangamarino River, the Maramarua River and the Pungarehu Stream / Canal;
- (d) Identification of bed level changes; and
- (e) Assessment of effects from bed level changes.

Vegetation Monitoring

- 14. The consent holder must monitor changes in wetland vegetation composition in the areas of the wetland potentially affected by sedimentation as a result of overtopping due to the presence of the weir. The purpose of the monitoring is to determine how, and to what extent, the weir is impacting wetland vegetation over time.
- 15. The consent holder must engage a suitably qualified and experienced person to prepare a wetland vegetation monitoring plan to achieve the purpose of monitoring required by condition 14. The plan must be submitted to Waikato Regional Council for certification by 31 July 2026. The basis of WRC’s certification will be limited to a technical assessment as to whether or not the plan, and any updates to the plan, have been developed in sufficient detail so as to meet the monitoring purpose.

The monitoring plan must include details of:

- (a) The monitoring locations, including:
 - i. the vegetation plot locations shown in Schedule 2;
 - ii. additional locations if the monitoring and analysis required by conditions 11 and 13 have identified sedimentation in wetland locations not already monitored by the vegetation plots shown in Schedule 2;
- (b) The monitoring design;
- (c) Timing;
- (d) Analyses; and
- (e) Reporting.

16. The first round of vegetation monitoring required by condition 14 must be undertaken in the period 1 September 2026 to 30 March 2027, and repeated every five years thereafter.

Pest Species Reporting

17. The consent holder must, if feasible and effective (as determined by the consent holder in accordance with condition 17 (b)), undertake pest management in the wetland. By 30 September 2026, and every two years thereafter, the consent holder must report on the management of pest species in the wetland. The report must include, as a minimum:

- (a) Identification of pest species occurring within the wetland;
- (b) Discussion of what pest management is feasible and effective; and
- (c) Details of pest management undertaken within the two-year period, including methods and frequencies.

Review

18. The Waikato Regional Council may between January and March 2027 and at five yearly periods thereafter serve notice on the consent holder under section 128(1) of the Resource Management Act 1991, of its intention to review the conditions of this resource consent for the following purposes:

- (a) To review the effectiveness of the conditions of this resource consent in avoiding or mitigating any adverse effects on the environment from the exercise of this resource consent and if necessary to avoid, remedy or mitigate such effects by way of further or amended conditions; or
- (b) To review the adequacy of and the necessity for monitoring undertaken by the consent holder.

Advice note: Costs associated with any review of the conditions of this resource consent will be recovered from the consent holder in accordance with the provisions of section 36 of the Resource Management Act 1991.

Schedule 1 Locations of cross-sections of the watercourse bed and banks as required by condition 13

DOC cross sections:

Whangamarino River – twelve sections (DOC cross sections 15, 3, 2, 14, 13, 20, 1, 21, 22, 12, 11, 10, 9, 23)

Maramarua River – six sections (DOC cross sections 19, 6, 18, 5, 17, 16)

Kokupu Stream – one section (DOC cross section 4)

	Previous References Numbers					
Water Body / Location	DOC reference	Opus reference	DML reference	Section	E (NZTM)	N (NZTM)
Maramarua River	6	0	0	0LB	1486483.57	5871105.56
				0RB	1786541.19	5871163.04
Whangamarino River at Falls Road Bridge	23	3	3	3LB	1793400.51	5864567.43
				3RB	1793373.39	5864622.43
Whangamarino River near Pungarehu Confluence	9	4	4	4LB	1792922.96	5864499.12
				4RB	1792965.72	5864517.18
Whangamarino River	10	5	5	5LB	1789824.75	5864956.06
				5RB	1789810.27	5864998.87
Whangamarino River	11	6	6	6LB	1787624.47	5865808.18
				6RB	1787649.91	5865859.68
Whangamarino River	12	7	7	7LB	1784922.70	5867405.42
				7RB	1784984.50	5867449.86
Whangamarino River at Ropeway	22	8	8	8LB	1784944.19	5869103.56
				8RB	1784998.01	5869122.36
Upstream confluence of Whangamarino and Maramarua Rivers	21	9	9	9LB	1784925.88	5869127.18
				9RB	1784972.92	5869146.98

	Previous References Numbers					
Water Body / Location	DOC reference	Opus reference	DML reference	Section	E (NZTM)	N (NZTM)
Whangamarino River – 50 m upstream of Weir	20	10	10	10LB	1784519.69	5869313.77
				10RB	1784567.39	5869417.18
Whangamarino River – Weir	13	11	11	11LB	1784308.20	5869157.95
				11RB	1784520.89	5869417.18
Whangamarino River – 50 m downstream of Weir	14	12	12	12LB	1784425.16	5869375.82
				12RB	1784481.22	5869449.10
Whangamarino River – 1.4 km downstream of Weir	15	13	13	13LB	1783303.09	5870156.87
				13RB	1783326.05	5870205.20
Upper Maramarua River	16	14	14	14LB	1791092.23	5874239.50
				14RB	1791056.21	5874263.14
Upper Maramarua River	17	15	15	15LB	1790849.69	5873752.27
				15RB	1790782.25	5873769.09
Maramarua River – Mid Section	18	16	16	16LB	1788503.59	5870681.16
				16RB	1788480.94	5870722.00
Lower Maramarua River	19	18	17	18LB	1785081.56	5869281.29
				18RB	1785016.92	5869369.36
Whangamarino River – 100 m upstream of Weir	1		18	19LB	1784558.94	5869290.93
				19RB	1784607.24	5869361.99
Whangamarino River – 200 m downstream of Weir	2		19	20LB	1784388.96	5869408.00
				20RB	1784441.00	5869471.29
Whangamarino River – 100 m downstream of Weir	3		20	21LB	1784312.68	5869458.29
				21RB	1784361.88	5869526.03
Kopuku Stream – Coalfields Road Bridge	4		21	22LB	1792376.51	5871680.65
				22RB	1792383.71	5871722.72

	Previous References Numbers					
Water Body / Location	DOC reference	Opus reference	DML reference	Section	E (NZTM)	N (NZTM)
Upper Maramarua River	5		22	23LB	1790673.80	5873260.54
				23RB	1790646.92	5873266.52

ICM cross sections:

Mineralised wetland – six sections (as per ICM resource consent AUTH101727: cross sections 1, 2, 3, B, 4, A for the Pungarehu Stream)

Swan Road pump station - one section (as per ICM consent AUTH101727: cross section 6 for Northern Outlet Canal)

Cross Section	Pungarehu Stream left bank		Pungarehu Stream		Pungarehu Stream right bank	
	Easting	Northing	Easting	Northing	Easting	Northing
Pungarehu Cross Section 1	1792852	5862623	1792960	5862668	1793523	5862890
Pungarehu Cross Section 2	1792833	5862903	1793030	5862965	1793536	5863126
Pungarehu Cross Section 3	1792789	5863094	1793058	5863180	1793441	5863308
Pungarehu Cross Section B	1792660	5863552	1793083	5863478	1793383	5863426
Pungarehu Cross Section 4	1792500	5864064	1792949	5864006	1793409	5863948
Pungarehu Cross Section A	1792143	5864279	1792336	5864404		
Northern Outlet Canal Cross Section 6	1793500	5862224			1793566	5862245

Schedule 2 Locations of vegetation plot monitoring sites as required by condition 15

