Comments on a Substantive Application under section 53 of the Fast-track Approvals Act 2024: Wetland Ecology

Fast-track project name	**Mt Welcome, Pukerua Bay, Porirua**
Fast-track application number	FTAA-2603-1181
GW file number	FTA260348

Technical area	**Wetland Ecology**
Date	6 July 2026
Author	Melanie Dixon Principal Ecologist Collaborations
Statement of expertise	I am an ecologist with over 25 years of experience, first for local government then as a consultant. I have a particular focus on wetland ecology. I am employed as the Principal Ecologist for Collaborations, a small consultancy that works across a range of environmental, land and water science fields. I have a BSc. in ecology and botany and a diploma in environmental science, both from Auckland University. I have experience providing evidence for Hearings and Environment Court.
Code of conduct	I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This technical memorandum has been prepared in accordance with that Code. Unless I state otherwise, the opinions I express are within my area of expertise, and I have not omitted to consider material facts that might alter or detract from the opinions that I express.
Documents considered	• Appendix 15: BlueGreen Ecology (2025). Mt Welcome station Ecology: Ecological values, effects and effects management. Report prepared by Bluegreen Ecology Ltd for Pukerua Property Group LP. (dated 20 November 2025 revision 9) “the Ecological Assessment” • Appendix 11 Part A : Envelope Limited (2025). Stormwater Management Plan. Prepared for Pukerua Property Group LP “the stormwater plan” • Envelope Limited (2025). Stormwater Management Plan. (rev 3 dated 4 June 2026). Prepared for Pukerua Property Group LP “the updated stormwater plan” • Appendix 18: Mt Welcome Hydrological Assessment. Rev 0. Prepared by PDF and dated 14-11-2025 “the Hydrological Assessment’.

	• Appendix 23: Blac Limited. (2025). Landscape and Ecology Plans – Part A and B. Prepared for the Mt Welcome development resource consent application, Wellington, March 2026 "the Landscape Plans" • Appendix 30-26 Proposed Stormwater Attenuation plan set. 1753-02 4300 R2 prepared by Envelope Limited. (11-3-2026). "the Stormwater Plans" • Appendix 30-40 Proposed Ecological Remediation and Offset Plan set 1753-02 SK9200 R1 prepared by Envelope Limited. 17-11-2025. "the Remediation and Offset Plans" • Appendix 31-40 Overall Ecological Areas. 1753-02 SK9250 R1 prepared by Envelope Limited. (10-3-2026). "the Overall Ecological Areas Plan" • J Blyth (6/7/2026). Mt Welcome, Pukerua Bay, Porirua – Hydrology Comments on Section 53 Substantive Application. GW File FTA260348. • G Taylor (6/7/2026). Mt Welcome, Pukerua Bay, Porirua – Stream Ecology Comments on Section 53 Substantive Application. GW File FTA260348.

Comments

Summary

In my view, the application (in relation to Natural Inland Wetlands) in its current form:

1. Has not demonstrated "retention wetlands" can successfully remediate and offset wetland loss (or at least not to the extent claimed).

2. Results in a net loss of natural inland wetland extent (even if the retention wetlands are ultimately demonstrated to provide some offset for wetland loss).

3. Does not adequately address project staging, including the delay between wetland loss and offset implementation, and the associated risk that the proposed offsetting may not occur.

Should the Panel be minded to grant this application, I recommend that conditions are imposed to achieve a robust wetland remediation and offset package that:

1. Secures no net loss of wetland extent, in addition to enhancing wetlands that are proposed to be retained.

2. Provides clear separation between ecological and stormwater functions in retention wetlands.

3. Either requires that wetland and offsetting and remediation is completed 'upfront' or requires that offsetting is effectively staged over the lifecycle of the development to reduce delay between wetland loss and offsetting.

4. Includes detailed baseline and hydrological and ecological monitoring, continuing for a period of no less than 5 years after offsetting and restoration is completed.

Agreement with the applicant

Wetland description and delineation

1. I agree that the wetland delineation and wetland descriptions in the ecological assessment provide a reasonable basis for assessing effects of the proposed development.

2. For reference the wetlands are shown in the Overall Ecological Areas Plan with the areas of wetland summarised in Table 1 of the Ecological Assessment which is repeated in Table 1 of this memo, below, for reference. Pasture wetland is discussed further in paragraphs 5 and 6 of this memo.

Table 1: Total Wetland Area (excluding artificial) from Table 1 of the Ecological Assessment

	Area (m^2)	**Area (hectares)**
Wetlands	44,000	4.400
Pasture Wetland	6,310	0.631
Total Wetland	**53,031**	**5.031**

That the standing water portion of the retention wetlands need to be shallow and vegetated, if they are to 'count' towards wetland remediation and offsetting

3. I agree with the author of the Ecological Assessment that permanent water parts of the retention wetlands need to be shallow and vegetated, if they are to 'count' towards wetland remediation and offsetting.

4. I am, however, concerned that the area of shallow water available for wetland plants to establish has been overestimated in the Ecological Assessment, as set out in paragraphs 17-30 of this memo.

Matters in contention and suggested response

The exclusion of pasture wetlands

5. The Ecological Assessment excludes wetlands dominated by pasture from the definition of a Natural Inland Wetland and therefore does not assess their values or the effects of their loss. This interpretation is not consistent with Ministry for the Environment guidance (which I

understand Greater Wellington follows), which states that the purpose of the pasture exclusion in the NPS-FM is to support the continued use of pasture for grazing, rather than its conversion to urban development[1].

6. The site contains approximately 0.63 hectares of pasture-dominated wetland across ten individually mapped wetlands[2]. While these wetlands represent the lowest-quality wetland habitat on the site, and it is appropriate that earthworks have been directed towards them in preference to higher-value wetlands, their loss nevertheless constitutes a loss of wetland extent and therefore requires offsetting, as discussed in paragraph 38.

The value of wetlands, and the magnitude and overall level of effect of wetland loss

7. The wetlands on site form freshwater corridors, contributing to landscape-scale hydrological connectivity, biodiversity values, and ecological resilience. These gully systems are shown as Freshwater Management Areas identified in the Northern Growth Development Area Structure Plan contained in the Porirua District Plan (see Figure 2). The wetlands are located in the headwaters of significant ecological features, namely Taupō Swamp (to the south-west), Muri Road wetland (to the north), and Pauatahanui Inlet to the south.

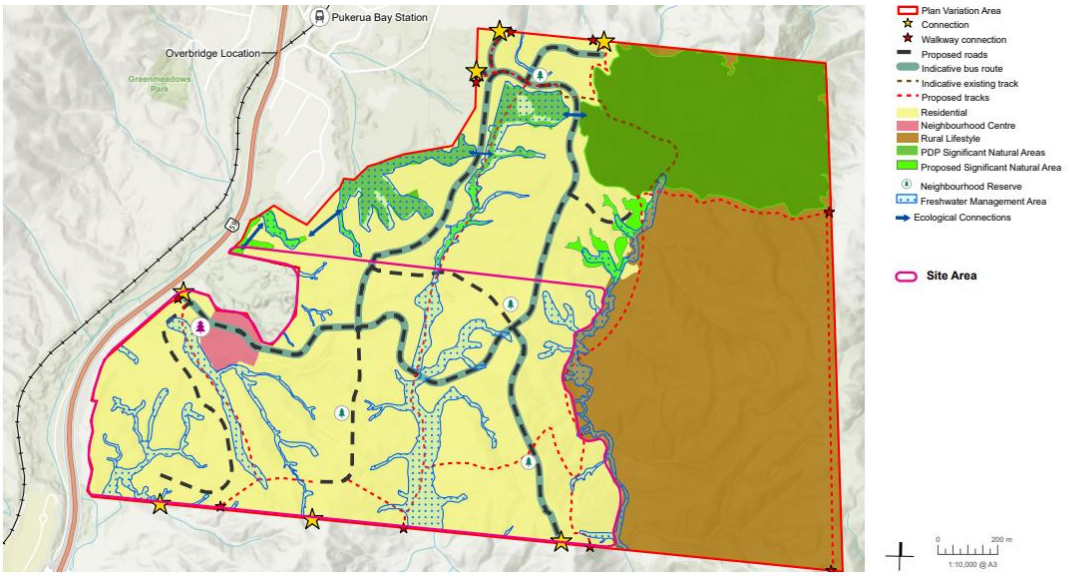

Figure 2: The Mt Welcome site (outlined in red) and the Northern Growth Development Area Structure Plan contained in the Porirua District Plan. Freshwater Management Areas are shown in blue dot pattern (Source: from the Mt Welcome Concept Plan).

[1] Ministry for the Environment (MfE) (2022). Pasture exclusion assessment methodology. Wellington: Ministry for the Environment. Available at: https://environment.govt.nz/publications/pasture-exclusion-assessment- methodology/ . See page 9, Section 3.
[2] See Figure 6 of the Ecological Assessment.

8. For reference, the application, if approved, will result in the loss of 27,220 m^2 (or 2.7220 hectares) of these wetlands as summarised in Table 2 below, and shown in Figure 2.

Table 2: Summary of total wetland on site and wetland loss. Source: Table 1 (PDF page 15) and Table 4 (PDF page 44) of the Ecological Assessment and the Figure in the Ecological Overlay Plan.

	Area (m^2)
Wetland loss due to development of 'retention wetlands'	
Loss due to retention wetlands as identified in the Ecological Assessment	6,900
Wetland loss due to earthworks (reclamation)	
Loss of wetlands reclaimed by earthworks, identified in the Ecological Assessment	15,311
Additional loss of pasture wetlands as identified in the Overall Ecological Areas plan.	5,020
Subtotal	20,320
TOTAL WETLAND LOSS	**27,220**

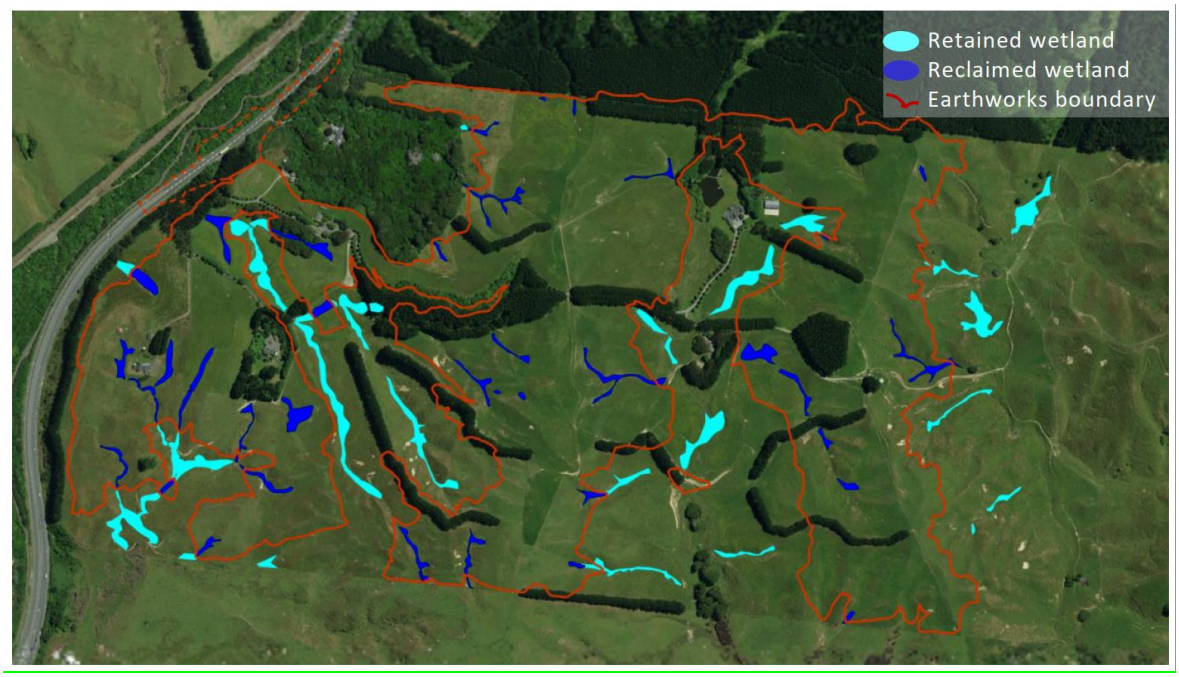

Figure 2: The wetlands proposed to be retained and reclaimed. Source: Figure 10 from the Hydrological Assessment. Note that this does not show the 6,900 m^2 of wetland located under the proposed retention ponds.

9. The Ecology Assessment has assigned value following the Environmental Institute of Australia and New Zealand (EIANZ) guidelines (Roper-Lindsay et al., 2018). Once values are

established, the *level of ecological effect* is determined using a matrix approach that combines the assigned value with the magnitude of the predicted impact.

10. The Ecological Assessment assesses the value of the wetlands are *low* to *negligible* (Section 4.2). Using the same guidelines I have undertaken my own value assessment and consider that the wetlands value is *moderate* to *low*. My assessment is provided in Table 1 in Attachment 1.

11. The Ecological Assessment considers that the *magnitude of effect* on the wetlands *low* as they make up only 1.6% of the area of the combined area of Taupō Swamp and the wetlands on Plimmerton Farm.

12. In contrast, I consider that the wetlands being lost on-site are discrete features that should not be aggregated with downstream wetlands for the purpose of assessing effects. While it is not necessary to assess each of the 62 mapped wetland features individually, a more appropriate approach to assess the magnitude of effect is to consider their loss at the sub-catchment scale and within the broader context of the ecological district (i.e., the Wellington Ecological District). In this context the *magnitude of effect* of the wetland loss is *high*, which is described as in the EIANZ guidelines as "*Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed"*.

13. The overall level of effect is calculated using the Matrix in Table 10 in the EIANZ Guidelines. Table 3 below summarises the differences between my assessment (see Attachment 1) and the Ecological Assessment, which lead me to conclude that the overall level of effect is *moderate* for most wetlands.

Table 3: Value, level of effect, and overall level of effects comparison peer review

	Value	**Magnitude of effect of wetland loss**	**Overall level of effect**	**Comment**
As outlined in the applicants Ecological Assessment	Low - negligible	Low	Very Low	
This peer review	Moderate – Low	High	Moderate – Low	Low overall level of effect is restricted to pasture wetlands in wetland in Muri Catchment.

The necessity of wetland offsetting

14. Having concluded that the overall level of effect of wetland loss is very low, the Ecological Assessment then states that the impacts are less than minor, therefore there is no need to offer any offsetting under the NPS-FM effects management hierarchy, although this has been offered[3].

15. I disagree. In my view at least 15,311 m^2 (or 75%) of the permanent wetland loss has an *overall level of effect* of *moderate*, which, according to the EIANZ guidelines represents an adverse residual effect that requires offsetting if the loss cannot be avoided. The exception is the pasture wetlands and the wetlands in the Muri Catchment, which the overall effects of the loss are *low*.

16. While the wetlands are currently in poor condition due to grazing pressure, the presence of scattered native vegetation demonstrates their potential for natural regeneration. Excluding stock through fencing would facilitate an improvement in wetland function and ecological condition over time. This potential for recovery should be weighed against any proposed loss of wetland extent, which would be permanent.

The use of constructed retention wetlands to remedy wetland and offset loss

17. The development incorporates four retention wetlands[4] that the ecological assessment relies on to remediate the loss of 6,900 m^2 of wetland under the retention wetlands themselves and a further 5,170 m^2 of wetland proposed to be lost to earthworks (i.e., 12,070 m^2, rounded to 12,000 m^2 in the Ecological Assessment) as set out in Table 2 below.

Table 2: A summary of how the wetland loss is proposed to be remediated and offset, as outlined in the Ecological Assessment.

What?	Where?	Area	Comment
Wetland remediation	Retention wetlands	6,900 m^2	This is the proposed replacement of wetlands under the footprint of the retention wetlands.
Wetland offsetting	Retention wetlands	5,170 m^2	This is proposed offsetting of some of the wetlands proposed to be reclaimed through earthworks on the site.
Wetland offsetting	Existing wetlands	10,000 m^2	Discussed in paragraphs 33-40.

[3] Full quote (PDF page 53 of the Ecological Assessment, "However, in adopting a very cautious approach the applicant has offered an offset approach despite the level of loss being sufficiently low as to not being required by the effects management hierarchy in the NPS-FM."
[4] There is one additional smaller constructed wetland that is for attenuation purposes only ("Wetland D") that drains north and is part of the Muri Wetland catchment.

18. Table 3 summarises the size of the retention wetlands and the areas of permanent standing water versus adjacent areas within the 10% AEP flood (i.e. predicted to flood once every 10 years). Figure 3 shows the locations of the retention wetlands.

Table 3: The retention wetlands and the area of permanent water and surrounding area flooded in the 10% AEP: Source: Table 6 of the Stormwater Management Plan.

Retention wetland[5]	**Catchment**	**Permanent water**	**10% AEP flood extent**	**Area within the 10% AEP flood extent only**
Wetland A / central basin / T1W2	Taupō swamp catchment	1,020 m^2	2,140 m^2	1,390 m^2
Wetland B / Northern retention wetland / T3W1	Taupō swamp catchment	1,050 m^2	2,270 m^2	1,220 m^2
Wetland C / North Eastern retention wetland / T3W4	Taupō swamp catchment	880 m^2	1,940 m^2	1,060 m^2
Wetland E / Southwestern retention wetland / K1W4	Kākaho (West) Stream Catchment	1,840 m^2	5,530 m^2	3,690 m^2
TOTALS		**4,790 m^2**	**11,880 m^2**	**7,360 m^2**

[5] Names as listed in the Stormwater Report / Ecological Assessment / Hydrological Report

Figure 1: Figure 9 from the Stormwater Management Plan showing retention wetland locations and naming.

19. The retention wetlands, inclusive of the 10% AEP flood area, are described in the ecological assessment as providing "*an increase in area and quality of the aquatic habitat (12,000m^2)*[6]" This represents a significant over-estimate of the wetland/aquatic habitat available, as described in this section.

20. Firstly, the main bodies of the retention wetlands might be "too wet" i.e. too deep to establish emergent wetland plants[7]. The author of the Ecological Assessment appears to have assumed that "*the proposed stormwater retention wetland can be fully vegetated (in terms of their detention role) and that the lakes are not deeper than 200-300mm normally and have sides that graduate down to that depth*"[8] and that they "*have been developed so as to function as permanent shallow water wetlands which are fully vegetated but can flood at times*"[9] This is contradicted by the cross sections shown in the stormwater plans which show the retention wetlands to have parts that are much deeper.

21. Analysis undertaken by James Blyth of Wetland A indicates that the water levels in a large portion of the wetland will typically fluctuate between 0.5m to 1m deep, with the central portion of the wetlands much deeper as shown in Figure 2 of his memo. Overall, he considers that ~20-30% of the area considered for ecological offsetting in remediation Wetlands A, B and C would have permanent water depths exceeding 0.5m (under low flow/baseflow

[6] Ecological assessment PDF page 70
[7] Emergent wetland plants are aquatic plants that are rooted to the base of a wetland with their stems/foliage extending above the water's surface.
[8] Ecological Assessment, PDF page 58
[9] PDF pg 53

conditions (see his paragraphs 23-30). I agree with his assessment that this deeper area will be a challenging area to establish and maintain cover with wetland plants[10].

22. This is a concern, as although areas of open water are common in wetlands, vegetated areas of wetland are critical as they support many essential physical, chemical, and biological processes. For example, they contribute organic matter and carbon that supports microbial activity and nutrient cycling, while also slowing and dispersing water flows, promoting sediment settlement and improving water quality[11]. Dense emergent wetland vegetation, such as sedges, rushes and raupō also provides food and habitat for wetland wildlife.

23. Large areas of standing open water can be vulnerable to stagnation, higher temperatures and lower dissolved oxygen conditions[12]. They can attract excessive numbers of waterfowl which leads to increased nutrient and bacterial levels. Open water areas are also prone to aquatic pest plant invasion, either spread by the waterfowl, or sometimes deliberately introduced in urban areas. Water quality problems may be exacerbated in dry summers when water levels are predicted to drop below the outlet (with the exceptions of Wetland B) reducing flow through wetland[13].

24. Once an area of open water experiences poor water quality problems (i.e., becomes unhealthy or eutrophic) it can be very difficult to fix[14]. I note that Auckland Council has converted a number of stormwater ponds with large areas of open water to water quality treatment wetlands that are >80% vegetated to improve water quality outcomes, including reduced water temperatures[15]. The potential downstream impacts of the poor water quality that could result from failure to establish sufficient wetland plant cover is discussed by Dr Gareth Taylor in his memo at paragraphs 6-8.

25. The water quality issues in the retention wetlands may not be obvious for some time. For that reason, I do not think it is appropriate that the retention wetlands are vested to Porirua City Council (PCC) or Tiaki Wai after only one year. A minimum of 5 years would be more appropriate.

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[10] Although the wetland plants proposed to be planted here can all grow in water levels over 1m deep it is challenging to establish plants at this depth in constructed wetlands and zones for emergent wetland plants in constructed wetlands are typically only 0.3m to 0.4m deep.
[11] Tanner, C.C.; Depree, C.V.; Sukias, J.P.S.; Wright-Stow, A. E.; Burger, D.F.; Goeller, B.C. (2022).Constructed Wetland Practitioners Guide: Design and Performance Estimates. DairyNZ/NIWA, Hamilton, New Zealand. Available at https://niwa.co.nz/freshwater/freshwater-mitigation-systems/constructed-wetlands/constructed-wetland-guidelines
[12] Maxted, J., McCready, C., Scarsbrook, M. (2005). *Effects of small ponds on stream water quality and macroinvertebrate communities.* New Zealand Journal of Marine and Freshwater Research, 39:1069-1084.
[13] See James Blyth paragraph 24
[14] There are two stable states for standing areas of water. One is cool water cloudy with lots of native aquatic and wetland plant species. The other has warm, turbid water with a build-up of pest aquatic plants or algae and oxygen depleted sludge. Once a waterbody 'flips' between the two states the process is very difficult to reverse, even if the quality of the water entering the water body is good.
[15] Water temperature can be a 'contaminant'. See Young D, Afoa E, Meijer K, Wagenhoff A, Utech C (2013). *Temperature as a contaminant in streams in the Auckland region, stormwater issues and management options*. Prepared by Morphum Environmental Ltd for Auckland Council. Auckland Council technical report, TR2013/044, available at: Temperature as a contaminant in streams in the Auckland region, stormwater issues and management options - Knowledge Auckland

26. Secondly, not all of the area mapped as being within the 10% AEP flood event will be "wet enough" to provide the wetland conditions[16]. The 10% AEP (or 10 year ARI[17]) is an infrequent event that is not a driver of the wetland conditions. About two-thirds of the retention wetland areas by way of area is made up by the10% AEP flood area. A better proxy for wetland conditions outside of the area of permanent standing water would be the annual flood level.

27. Again, looking at Figure 2 in James Blyth's memo, the area which is expected to flood regularly (the Zone of Influence (ZOI) shown in purple) is smaller than the area indicated by the 10% AEP flood given the steep contours. Whilst the area between the Zone of Influence and the 10% AEP flood extent line can successfully be planted with facultative plants (i.e., plants that, under normal conditions are equally likely to be found in wetland and non-wetland areas) it will not provide wetland conditions and will be prone to being invaded by plants that prefer drier conditions such as gorse.

28. Thirdly, although the applicant now indicates that sediment removal from the retention wetlands is not anticipated (documentation in the application as lodged described these retention wetlands as stormwater assets, to be vested in Council requiring ~10 yearly sediment removal) the retention wetlands will nevertheless require some ongoing maintenance including access to outlet structures. The constrained gully settings may also limit practical maintenance access, meaning that any future maintenance requirements could reduce the effective ecological area available for wetland habitat over time.

29. The current designs also do not include any sediment forebays to protect the main body of the wetland from sediment. While these may not ultimately be necessary, they may warrant further consideration particularly given the erodible catchment soils. This is especially the case for the largest retention wetland, Wetland E which is on the main stem of the Kakaho Stream and is downstream of plantation forestry. Sediment forebays, whilst useful, if required would reduce the areas of wetland habitat.

30. In my view, any portions of the retention wetlands that require functional access, infrastructure maintenance, or operational management should not be fully relied upon for wetland remediation or offset calculations.

31. In summary, I consider that the only parts of the retention wetlands could realistically be regarded as providing natural wetland habitat are:

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[16] For reference the hydrology guide states that to provide wetland hydrology, an area must be either (1) inundated for at least seven consecutive days during the growing season in most years (50 per cent probability of recurrence); or (2) saturated at or near the surface (within 30cm) for at least 14 consecutive days during the growing season in most years (50 per cent probability of recurrence, for example, 5 years in 10). In the Wellington Region is 1 August to 13 June the following year. Source: Ministry for the Environment. 2021. *Wetland delineation hydrology tool for Aotearoa New Zealand*. Wellington: Ministry for the Environment..
https://environment.govt.nz/publications/wetland-delineation-hydrology-tool-for-aotearoa-new-zealand/

[17] Average Recurrence Interval

a) Areas of saturated soils within the annual flood level;

b) Areas of shallow permanent water, less than 400 mm deep under normal (baseflow) conditions[18].

c) Areas not subject to stormwater maintenance including access for maintenance.

32. I recommend that the design of the retention wetlands is reviewed in light of concerns about wetland plant establishment and redesigned to maximise wetland plant establishment in permanent water areas (i.e. the depths of the wetlands is reduced) and the amount of wetland habitat for offsetting and remediation is re-calculated.

The wetland offsetting/compensation approach, as it allows for a loss of extent of wetlands

33. In this section I discuss the "offsetting" in the form of ~10,000 m^2 of wetland planting as shown in the Remediation and Offset Plans [19]. This consists of planting in existing wetlands. Planting existing wetlands does not offset the loss of wetland extent.

34. The planting of existing wetlands is 'wetland enhancement', which is a standard mitigation measure commonly associated with this type of development. The conclusion of the Hydrological Assessment is that there will be additional runoff to the majority of the retained wetlands post development and that appropriate planting of these wetlands 'will allow them to cope with any changes in hydrology'[20]. The Hydrological Assessment also recommends baseline monitoring continue until construction and three years post construction to ensure there are no impacts on wetland hydrology from the development.

35. Restoring existing wetlands can offset loss of biodiversity values but does not address loss of extent. Wetland offsetting therefore requires the creation of new wetlands on a minimum 1:1 basis.

36. By way of comparison, in the approved Plimmerton Farm Fast Track decision, the total area of wetland loss (2.08 hectares)[21] is similar to what is proposed but no-net-loss in the value and extent of wetlands has been achieved through the offsetting and mitigation package provided for by that decision. The plans include the creation of a 2.13 ha wetland and the restoration of 2.69 ha of adjacent existing degraded (partly drained and grazed) wetland[22]. This wetland is to be legally protected, not be used for water quality or sediment management, is located in an

[18] Within this there can be smaller areas of deeper water, as long as these areas do not exceed 20% of the permanent standing water in total.
[19] The ecological assessment shows optional areas for wetland planting in Figure 26 and Figure 27 of the ecological assessment. The more detailed ecological overlay shows the extent of planting required to provide 10,000 m^2 (10,150 m^2 by my calculations).
[20] Hydrological Assessment, PDF pg 68. See also J.Blyth at paragraph 36-40.
[21] See Appendix-23_Ecology-Assessment.pdf
[22] This degraded wetland currently delineates as Natural Inland Wetland.

area that has suitable soils and landscape position to enable wetland restoration (i.e. does not require up to 7.8m high earthen bunds) and has to achieve minimum target water levels.

37. It should also be noted that many of the wetlands proposed to be lost are seepage wetlands. These are a wetland type that cannot realistically be recreated or constructed elsewhere. Accordingly, the loss of seepage wetland extent cannot be offset, that is, if approved the application would result in a permanent loss of seepage wetland area[23].

38. In my view, a no-net-loss outcome cannot be achieved unless the wetland 'offset' package replaces the lost wetland extent on at least a 1:1 basis in areas capable of sustaining restored wetland hydrology (i.e. capable of being re-wet). Such an offset is necessary to avoid a net loss in the extent of natural inland wetlands as a result of the project. The requirement to offset the loss of extent applies to all wetlands, including pasture wetlands.

39. If the Panel is minded to grant the application, my recommendation is that adverse effects on wetlands are addressed through requiring the following (as a minimum):

    a) Remediation and/or creation of 27,220 m^2 of wetland (this figure incorporates the loss of pasture wetlands); and

    b) Enhancement of 10,000 m^2 of retained wetland

40. There appear to be options on the site for wetland creation, including on the flat area south of Retention Wetland A (up to, and including the site boundary) and within the lower reaches Kakaho East Catchment. The Applicant would need to assess whether these opportunities provide for a sufficient quantum of wetland creation to achieve the offset.

The lack of response to project staging, and associated delay and risks.

41. The applicant is proposing to undertake the development over a 10 to 15 year period. There is no information provided on the staging of wetland offsetting that could confirm the statement in the Ecological Assessment that any delay between wetland loss and wetland gain will be minimised[24]. This is also a concern of Greater Wellington Regional Council's (GWRC) stream ecology reviewer, Dr Gareth Taylor, in relation to stream loss.

42. It appears that there could be significant time lag between wetland loss and wetland offsetting being realised. As identified by GWRC's hydrology reviewer, James Blyth, the retention wetlands will be built at the start of civil works and cannot be completed until earthworks within their catchment are finished, due to the potential for ongoing sediment deposition and possible unplanned discharges during larger storm events throughout the

[23] While seepage wetland extent would be permanently lost, a revised compensation package could result in a no net loss in seepage wetland values with similar plant communities and fauna, even though the hydrology of seepage wetlands cannot be recreated.
[24] Ecological Assessment PDF page 65.

development period[25]. This creates a potential significant delay in wetland loss and wetland remediation and offsetting.

43. There also appears to be a risk that wetland offsetting will not be completed in the event that not all stages of the development proceed. To illustrate, the Scheme Plan provided shows the largest of the retention wetlands, Wetland E in the Kakaho West Catchment is proposed to be constructed in Stage 20 – the very last stage of the development.

44. One option to address this would be to require that the wetland offsetting is completed during Stage 1 of the development. Alternatively, wetland offsetting, remediation and enhancement works should be clearly set out for each stage.

Eco-Hydrological Management, Offsetting and Monitoring Plan

45. I have discussed concerns regarding staging and uncertainties regarding offsetting and monitoring with Dr Gareth Taylor (steam ecology) and James Blyth (hydrology) and we consider that one possible option to perhaps deal with deficiencies and uncertainties in the application as it is currently stands it to require the preparation and implementation of a holistic Eco-Hydrological Management, Offsetting and Monitoring Plan as a condition of consent.

46. The purpose of the plan would be to provide a coordinated framework for ecological, water quality, and hydrological monitoring, management, and reporting. The plan would include hydrological performance criteria and trigger levels for streams, retained wetlands, and remediation/offset wetlands, together with defined management responses should these triggers be exceeded.

47. For wetlands, the plan would establish environmental performance requirements and minimum offset outcomes (e.g. a minimum area of wetland remediation and/or creation) and set ecological targets for retained, remediation, and offset wetlands. Example targets for offset wetlands could include achieving ≥80% emergent vegetation cover within areas of permanent standing water and the development of hydric soil conditions within five years for areas of wetland that will be seasonally wet.

48. Relevant water quality targets should also be set for the retention wetlands, including the standing water in the wetlands and the wetland outflows as discussed by James Blyth at his paragraph 26.

49. The plan would also identify corrective actions, responsibilities, and timeframes where monitoring indicates that performance criteria or offset targets are not being achieved. Integrating ecological and hydrological monitoring and management within a single plan

[25] See discussion by J. Blyth paragraph 20.

would provide a more efficient and transparent framework for assessing progress and responding adaptively to unforeseen outcomes.

Attachment 1: Values and Effects Assessment

Table 1: Wetland values assessed per catchment following EIANZ guidelines[26]

Wetland catchment	Type	Area (m^2) [27]	Representatives	Rarity and Distinctiveness	Diversity and Pattern	Ecological Context	Ecological Value
Taupō – containing north-west draining sub catchment and south west draining catchment[28]. Taupō North - 22 mapped wetlands. Taupō South - 15 mapped wetlands.	Degraded seeps and valley floor swamps	30,980.97	**Medium – Low. Medium** for wetlands supporting native species such as *Carex secta, Cyperus ustulatus, Isolepis spp.* swamp kiokio (*Blechnum minus*), raupō (*Typha orientalis*) and native wiwi (e.g. *Juncus spp.)*. These are generally located in the north-west draining catchment. Otherwise, **low** for exotic dominated	**High**. No rare species, but wetlands nationally and regionally rare (~3 % remains).	**Low.** Poor species diversity and pattern.	Medium. The wetlands form part of a connected freshwater network that contributes to maintaining water quality and water flows entering the Taupō Swamp Complex. However, grazing has reduced their capacity to remove nutrients and retain sediment (i.e.,	**Medium** (Mid - Upper)

[26] Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. 2018. *Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems*. 2nd edition.

[27] Areas taken from GIS shapefile supplied by the applicant's team 30/06/2025.

[28] I would have preferred to assess these two sub-catchments separately, but the information on wetland loss in the Overall Ecological Areas Plan is presented as a combined catchment.

Wetland catchment	Type	Area (m^2) [27]	Representatives	Rarity and Distinctiveness	Diversity and Pattern	Ecological Context	Ecological Value
			wetlands with only occasional natives.			the potential rating is high if these were fenced)[29].	
	Degraded seeps and valley floor swamps - pasture	1,165.97	**Very low.** Exotic wetlands.	**High**. See above	**Very Low.** Very poor species diversity and pattern	**Medium** see above.	**Low** (Upper)
Kākaho (West) 15 mapped wetlands	Degraded seeps and valley floor swamps	13,617.00	**Low**. Exotic dominated; minor native component	**High**. See above.	**Low.** Poor species diversity and pattern.	Medium. The wetlands form part of a connected freshwater network that contributes to maintaining water quality and water flows entering Pauatahanui Inlet. However, grazing has	**Moderate** (Mid)

[29] Further information on nutrient attenuation in seeps can be found in Rutherford, J.C., Nguyen, M.L., & McDowell, R.W. (2017). *Review of nitrogen attenuation in New Zealand seepage wetlands*. DairyNZ, Hamilton, New Zealand.

Wetland catchment	Type	Area (m^2) [27]	Representatives	Rarity and Distinctiveness	Diversity and Pattern	Ecological Context	Ecological Value
						reduced their capacity to remove nutrients and retain sediment (i.e., the potential rating is high if these were fenced).	
Kākaho (East) 8 mapped wetlands	Degraded swamps	6,663.41	**Low**. Exotic dominated; minor native component.	**High**. See above.	**Low.** Poor species diversity and pattern.	**Low - Medium.** See above	**Moderate** (Mid - Lower)
Muri Catchment (wetland #59 and #60[30])	Degraded seeps	162.61	**Medium**. dominated by a native *Isolepis*.	**High**. See above.	**Low** – poor species diversity and pattern.	**Medium**. Based on contours both wetlands appear to be contiguous with mapped SNA wetland (Muri Road) on property to the north.	**Moderate** (Upper)

[30] No description has been provided of Wetland 60 and this wetland was not viewed during the site visit – this assessment conservatively assumes it is similar to wetland #59

Table 2: Assessment of ecological effects (wetlands) using the EIANZ effects assessment method

Wetland Catchment	Value	Magnitude of Effect[31]	Level of Effect[32]	Comment
Taupō	Moderate	High[33]	Moderate	8,855 m^2 loss of wetland under cut and fill earthworks and bunds for retention wetlands. This represents 36% loss of the non-pasture wetlands.
Taupō (Pasture Wetlands)	Low	High	Low	5,020 m^2 loss of pasture wetland under cut and fill earthworks and bunds for retention wetlands. The represents 38% loss of pasture wetland on the site.
Kākaho (West)	Moderate	High	Moderate	5,150m^2 loss under the wetland bund (Wetland E) representing 38% of the wetland in the catchment on site. The 2,000 m^2 under the retention wetlands is additional to this.
Muri Catchment	Moderate	Low[34]	Low	Low magnitude and level of effect due to the small total area (~160 m^2) and apparent hydrological continuity with the large Muri Wetland.
Kākaho (East)	Moderate	High	Moderate	1,340 m^2 of wetland loss (most of wetland #26), representing ~20% of wetland in catchment on site.

[31] EIANZ matrix Table 8; measured in the context of the Wellington Ecological District
[32] EIANZ matrix Table 10.
[33] High is described as "Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed"
[34] Low is described as: Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns.