

To: Marina van Steenberg and Leigh Robcke

From: Hamish Dean

Company: Hauraki District Council

SLR Consulting New Zealand

cc:

Date: 30 August 2024

Project No. 850.016607.00001

RE: Delineation of wetlands at Bradford Street and Ford Road, Waihi

Confidentiality

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1.0 Introduction and Background

Hauraki District Council (DC) has proposed a District Plan Change that will include changes to zoning at two locations at Waihi. Zoning changes are proposed at 69 – 111 Bradford Street, Waihi to enable higher density residential development, and to a site on Ford Road, Waihi to enable light industrial development (Figure 1). Part of the rezoning process includes structure planning to define the form development at the site will take, and to do this any constraints need to be identified. One such ecological constraint is the presence of Natural Inland Wetlands which are subject to regulations in the National Environmental Standards for Freshwater (NES-F). Another consideration for development at these sites is the potential for long-tailed bats (*Chalinolobus tuberculata*) to be present. SLR Consulting was engaged by Hauraki DC to identify and delineate any Natural Inland Wetlands on the site and identify whether long-tailed bats are using the area.

Figure 1: Site locations



2.0 Methodology

2.1 Wetlands

A visit to both sites was undertaken on 17 July 2024 in overcast and light rain conditions. Field work was technically done outside the normal growing season for the Waikato¹ but Waihi has a much more coastal climate than Hamilton and the growing season more accurately begins sometime in July. Significant rain had fallen in Waihi two days prior, and the ground was very wet and temperatures cool. A walk-through of both sites was carried out to identify potential wetland habitat. Any potential wetlands were assessed using the Ministry for the Environment (MfE) wetland delineation protocols² and pasture exclusion methodology³ which comprise a tiered approach to applying a series of tools related to vegetation, hydrology and soils.

Flow charts from the pasture exclusion methodology outlining the approach are included as Figure 2 and Figure 3 below. The methodology includes a rapid test which allows an experienced field ecologist to identify wetlands based on the dominance of obligate and facultative wetland plants alone, without establishing vegetation plots. Where a rapid test is not appropriate, 2 m x 2 m vegetation plots are established in each vegetation type in the potential wetland area and plant cover is estimated.

At Bradford Street, two vegetation plots were established and at Ford Road, just one was required. In general, the rapid test was used to identify and delineate wetlands at these sites.

¹ Ministry for the Environment. 2021. Wetland delineation hydrology tool for Aotearoa New Zealand. Wellington: Ministry for the Environment.

² Ministry for the Environment 2022. Wetland Delineation Protocols. Wellington: Ministry for the Environment.

³ Ministry for the Environment. 2022. Pasture exclusion assessment methodology. Wellington: Ministry for the Environment.



Figure 2: Pasture exclusion test flow chart

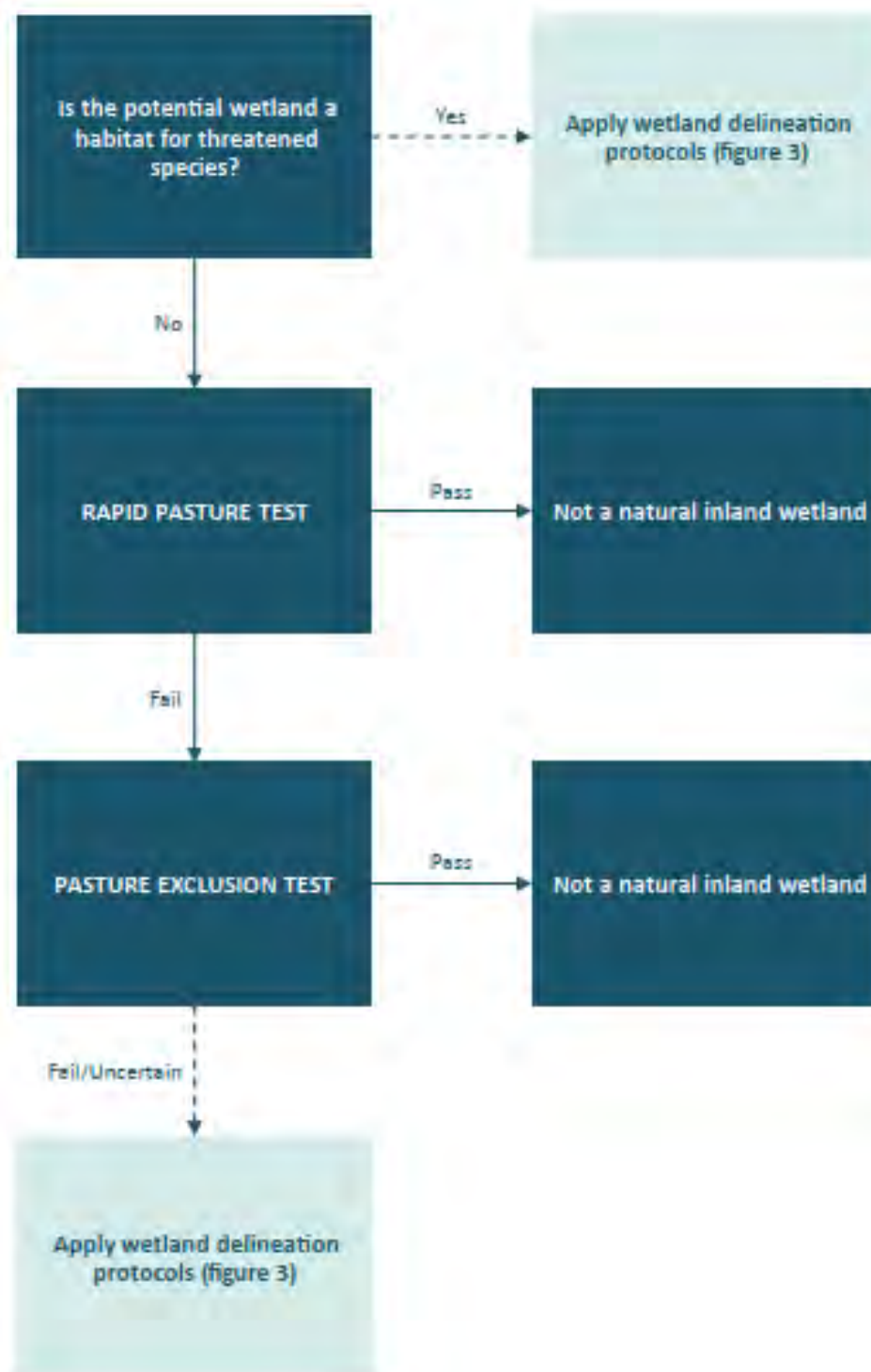
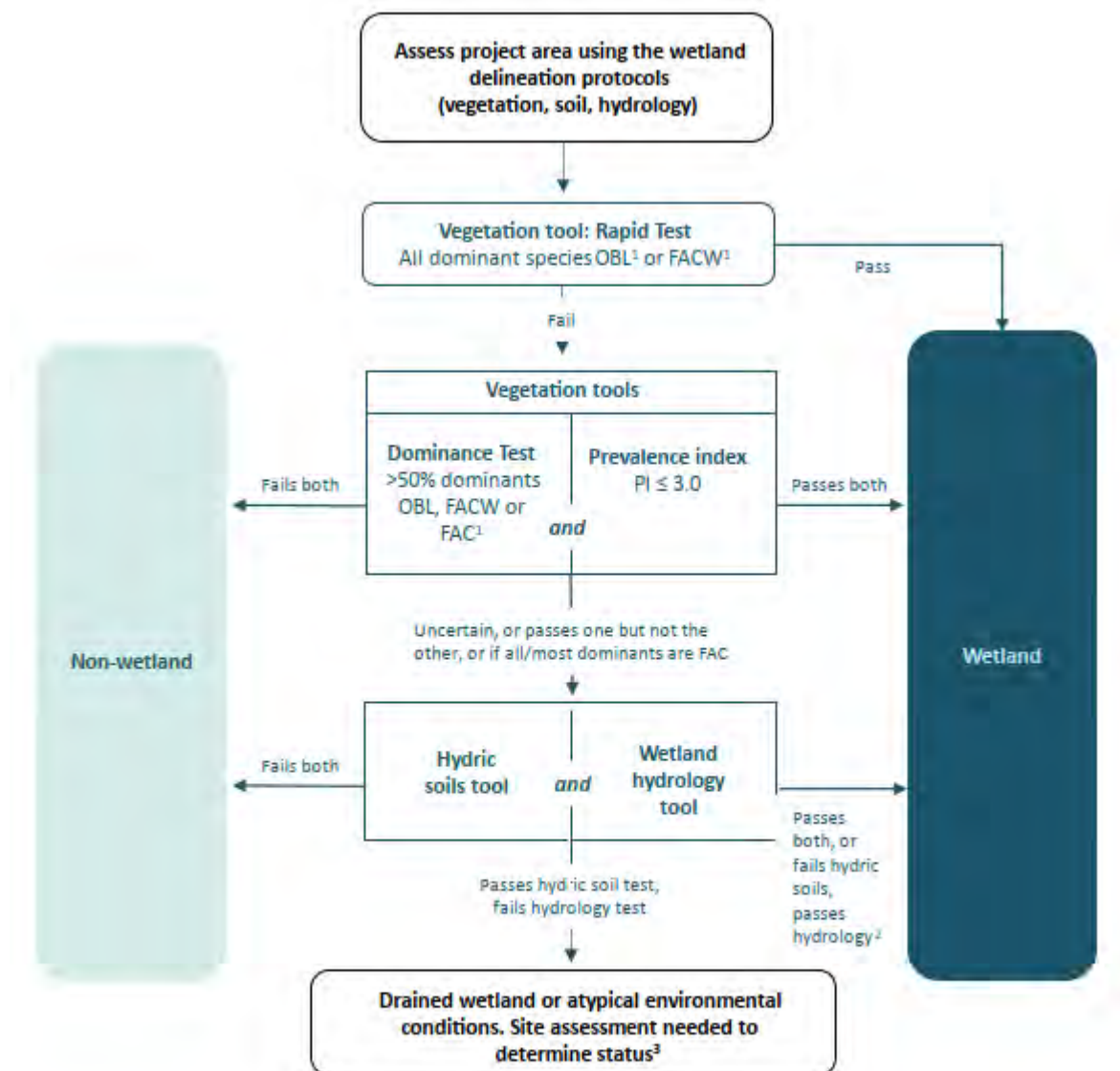


Figure 3: Wetland delineation protocol



Footnotes:

¹ Wetland indicator status abbreviations: FAC = facultative, FACW = facultative wetland, OBL = obligate wetland.

² For example, recent wetland.

³ The US procedures for atypical or problematic situations are recommended.

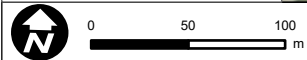
2.2 Bats

Survey for long-tailed bats was conducted using AR4 Automatic Bat Monitors (ABMs) which were deployed at three locations along the Ohinemuri River at the Bradford Street site. These devices record ultrasonic bat calls and were set to record for the period from half an hour before published sunset to half an hour after sunrise each night. ABMs were left in place for five weeks between July 17th and August 22nd 2024. Data was analysed using Bat Search 3.11 software developed by the Department of Conservation.





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Coordinate System:
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Scale: 1:3,900 at A4

Project Number:

Date Drawn: 28-Aug-2024

Drawn by: XX

LEGEND

-  ABMs
- WetlandPlots**
-  Wetland plot
-  Assessed - not wetland
-  Plan change areas

HAURAKI DC PC2 WETLANDS

ABM LOCATIONS AND WETLAND PLOTS



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FIGURE 4

3.0 Results

3.1 Wetlands

Four wetland areas were identified at the Bradford Road site and two were identified at Ford Road. Descriptions of each of these are provided below.

3.1.1 Bradford Street

Wetlands at Bradford Street occur within two gully systems at the northeast and southwest ends of the site. Both systems have natural waterways flowing through them, but both have been heavily modified. At the southwest end of the site two wetlands were identified in a small gully which holds a stream flowing from a small catchment on the northern side of Bradford Street. At the northeast end of the site, a small stream enters the property through a culvert under Bradford Street and flows for around 45 m before entering another 70m long culvert and emerging into the natural channel again. Wetlands occur adjacent to both sections of natural channel. Wetland extents at Bradford Street are shown in Figure 5.

Wetland 1

This is a palustrine swamp located at the back of 111 Bradford Street. It occupies the gully floor where it meets the floodplain of the Ohinemuri River (Figure 5). At the downstream end the vegetation comprises grey willow (*Salix cinerea*) with planted kahikatea (*Dacrydium dacrydioides*) and harakeke (*Phormium tenax*). Naturally growing rautahi (*Carex geminata*) and swamp millet (*Isachne globosa*) are common. The upstream end is dominated by Mercer grass (*Paspalum distichum*) with Yorkshire fog (*Holcus lanatus*) and scattered soft rush (*Juncus effusus* var. *effusus*). This wetland meets the rapid test criteria in the MfE guidelines and can be considered a Natural Inland Wetland.

Photo 1: Wetland 1 looking upstream



WETLANDS AT
BRADFORD STREET

FIGURE 5

LEGEND

WetlandPlots

Category

-  Wetland plot
-  Assessed - not wetland
-  Waterways
-  Wetlands
-  Plan change areas

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0 0.04 0.08
km

Coordinate System:
NZGD 2000 New Zealand Transverse Mercator

NZGD 2000 New Zealand Transverse Mercator
Scale: 1:2,200 at A4

Project Number:

Date Drawn: 28-Aug-2024

Drawn by: XX



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Wetland 2

Wetland 2 is a small area of soft rush with Yorkshire fog, Mercer grass and buttercup (*Ranunculus repens*). The vegetation cover of this area meets the rapid test and can be considered a Natural Inland Wetland.

An area of Yorkshire fog-dominated vegetation adjacent to Wetland 2 was assessed using a wetland plot (Plot 1) and this area met the pasture exclusion test so although it can be considered a wetland, the NES-F regulations do not apply.

Photo 2: Wetland 2



Wetland 3

This is a small modified wetland area comprising an area dominated by *Machaerina rubiginosa*, one or two grey willow, scattered gorse (*Ulex europaeus*) and an area of soft rush rushland with Yorkshire fog. There is also a small patch of taro (*Colocasia esculenta*). Although similar vegetation extends beyond the Natural Inland Wetland area mapped in Figure 5, the pasture exclusion applies because of the prevalence of Yorkshire fog and red fescue (*Festuca rubra*) amongst the soft rush (see Plot 2).



Photo 3: *Machaerina rubiginosa* in Wetland 3



Photo 4: The upstream end of Wetland 3 showing soft rush rushland to the left



Wetland 4

Wetland 4 and 4b are areas of gully floor and stream channel wetland downstream of Wetland 3, in the eastern corner of the site. The vegetation is dominated by floating sweetgrass (*Glyceria declinata*) with patches of soft rush and bergamot mint (*Mentha $\times$ piperita* var. *citrata*) along the stream. These areas meet the definition of a Natural Inland Wetland.



Photo 5: Part of Wetland 4



3.1.2 Ford Road

One wetland area was identified at the Ford Road site in a shallow basin, and another area adjacent to a small channelized stream was investigated. Wetland locations and extent are shown in Figure 6.

Wetland 5

This wetland is located in a small basin at the head of a shallow gully. The gully is drained and review of historical aerial photos show that the drains have been in place since at least 1942. At the time of the visit the area was pooled with water as a result of a considerable amount of rain in the days before the assessment. The vegetation is sparse (<50% total cover) and comprises floating sweetgrass, creeping bent (*Agrostis stolonifera*) and clustered dock (*Rumex conglomeratus*) on the margins of bare mud. A wetland plot was established in this site (Plot 3) which showed that the vegetation passed both the Dominance Test and the Prevalence Index. This site meets the definition of a Natural Inland Wetland but given the significant amount of recent rain and that the survey was carried out at the very beginning of the growing season, this site should be re-assessed later in the year to gain a better understanding of its status. It is highly likely that pasture species will dominate over the majority of the growing season, in which case the pasture exclusion would apply.



Photo 6: Wetland 5 showing pooled water and sparse vegetation



Potential Wetland 6

The riparian margins of the small channelised stream that runs through the southwest corner of the site were investigated. The vegetation comprised reed sweetgrass (*Glyceria maxima*) with scattered creeping bent and Yorkshire fog. Although this vegetation strictly meets the vegetation tests, this area is best considered as a stream and not a Natural Inland Wetland, and appropriate protections applied.



Photo 7: Part of the riparian margins of the channelised stream



WETLANDS AT FORD ROAD

FIGURE 6

LEGEND

WetlandPlots

Category

-  Wetland plot
-  Assessed - not wetland
-  Waterways
-  Wetlands
-  Plan change areas

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0 0.05 0.1
km

Coordinate System:
NZGD 2000 New Zealand Transverse Mercator

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Scale: 1:3,000 at A4

Project Number:

Date Drawn: 29-Aug-2024

Drawn by: XX



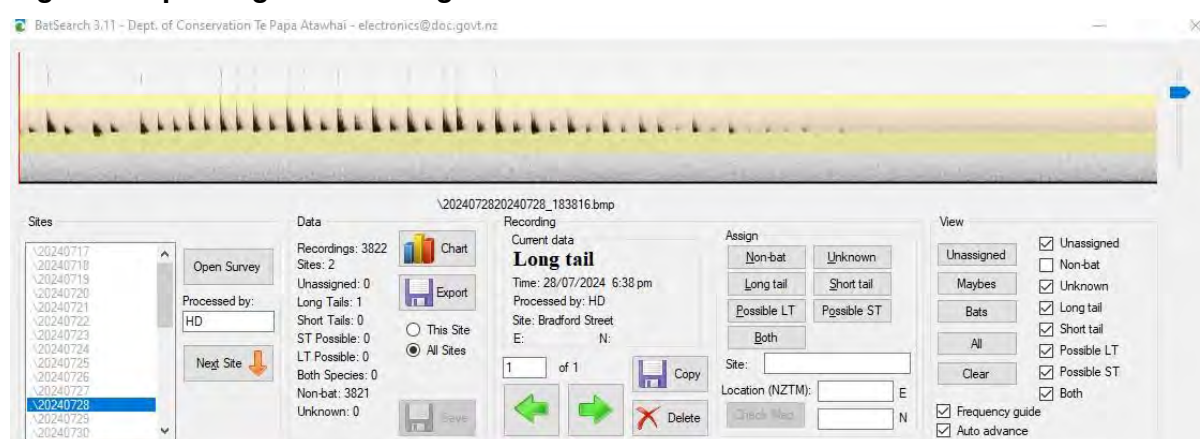
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3.2 Bats

Dusk temperatures over the survey period ranged between 10 and 16 degrees Celsius with one cold snap in the beginning of August when dusk temperatures were only 7 degrees. Twenty-six fine nights were recorded over the survey period. These were not ideal bat monitoring conditions as bat activity is greatly reduced over the winter months and summer monitoring is likely to yield different results.

Only one long-tailed bat pass was recorded during the survey period by ABM 4S5 which was located behind a shed in a totara tree. This bat was recorded just after dusk (6:38 PM) and the spectrogram clearly shows a search phase call (Figure 7).

Figure 7: Spectrogram of a long-tailed bat recorded at the Bradford Street site



4.0 Discussion and Recommendations

The wetlands and associated watercourses identified at both sites will need to be considered in the structure plan process and in subsequent development designs. They do not necessarily preclude development at the sites but may restrict certain activities within 100 m of them and development within the wetland themselves is unlikely to be allowed or appropriate. These sites provide valuable ecosystem services such as water filtration and attenuation and should be incorporated into the design of the urban form.

At Ford Road the larger wetland is situated in a location that would have historically been poorly drained and would likely have been vegetated in swamp forest trees such as kahikatea (*Dacrycarpus dacrydioides*) and pukatea (*Laurelia novae-zelandiae*). If the NES-F provisions allow, managing effects on these low-quality wetlands would be easily achievable, provided some space for wetland restoration can be set aside within the project footprint.

Long-tailed bats are likely to be present in the wider landscape of Waihi in low numbers and limited survey work to the west near Waikino supports this⁴. It is likely that bats utilise the Ohinemuri River as a commuting and hunting corridor, but they may also forage over farmland throughout the area. The presence of bats in the area should not be considered a hindrance to the proposed plan change and future development of the Bradford Street site as bats are known to continue to thrive in built up areas such as Hamilton City. However, considerations such as bat-friendly lighting design, enhancement of the stream corridors,

⁴ DOC Bat Database, 24 August 2023.



and appropriate set-back distances and buffer replanting along the Ohinemuri River should be considered as part of any design.

5.0 Closure

I trust that the information provided in this memo meets your requirements and should you require further support with the project please keep in touch.

Regards,

SLR Consulting New Zealand

Hamish Dean, MSc, CEnvP
Principal Ecologist

Attachments Wetland plot sheets



Handed OK

NEW ZEALAND WETLAND DELINEATION DATA FORM: PASTURE TEST

SECTION A – SITE INFORMATION

Site: Bradford Rd Region: Waikato Sampling point/ID: WPT (Plot 1)
 Owner/address: _____ Date: 17/7/24 Land use: Farm
 Landform: Gully Local relief: Gully Land cover: Pasture
 Is the land drained? YES NO UNKNOWN _____ Investigator(s): HIO Slope: 5°
 GPS (NZTM): _____ Altitude m: 80m Photo Nos: _____

Are climatic/hydrologic conditions on the site typical for this time of year? YES NO (if NO explain in Remarks)
 Are Vegetation Soil or Hydrology significantly disturbed? No Are 'Normal Circumstances' present? YES NO
 Are Vegetation Soil or Hydrology naturally problematic? No Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Pasture exclusion? YES ☒ NO ☐ Hydrophytic vegetation present? YES ☒ NO ☐ Is the sampled area within a wetland? YES ☒ NO ☐
 Hydric soils present? YES ☐ NO ☐
 Wetland hydrology present? YES ☐ NO ☐

SECTION B – VEGETATION

Use scientific names of plants. Absolute Dominant Indicator Pasture
 Tree Stratum (Plot size: _____) % cover Species? Status % cover
 1. _____
 2. _____
 3. _____
 4. _____
 Total tree cover (TT) = _____ 50% _____ 20% _____

Sapling/Shrub Stratum (Plot size: _____)
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 Total sapling/shrub cover (TS) = _____ 50% _____ 20% _____

Herb Stratum (Plot size: _____)
 1. HOL 75 ✓ FAC 75
 2. SKIN 5 ✓ FACW 20
 3. RAN 20 ✓ FAC 20
 4. SKIN 1 ✓ FACW 20
 5. _____
 6. _____
 7. _____
 8. _____
 9. _____
 10. _____
 11. _____
 12. _____
 13. _____
 14. _____
 15. _____
 16. _____
 17. _____
 18. _____

Total herb cover (TH) = 101 50% 50.5 20% 20.2

Total (P) = 45
 Total Vegetation Cover (TVC): TT+TS+TH = 101 50% 50.1 76

Pasture Exclusion Test:
 Pasture cover/Total vegetation cover
 (P/TVC) x100 = _____ %

☐ Rapid Pasture Test
☒ Pasture Exclusion Test is >50%

Dominance Test:
 No. Dominant Spp. OBL/FACW/FAC (A) 1
 Tot. Dominant Spp. across strata (B) 1
 % OBL/FACW/FAC (A/B) 100

Prevalence Index:
 Total % cover of: Multiply by:
 OBL 0 x 1 = 0
 FACW 6 x 2 = 12
 FAC 95 x 3 = 285
 FACU 0 x 4 = 0
 UPL 0 x 5 = 0
 Total 101 (A) 297 (B)

Prevalence Index (B/A) = _____

Hydrophytic vegetation indicators:
☐ Rapid Test
☒ Dominance Test is >50%
☒ Prevalence Index is ≤3.0¹
☐ Morphological adaptations¹ (supporting data in Remarks)
☐ Problematic hydrophytic vegetation¹
 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
 YES ☒ NO ☐ UNCERTAIN ☐

Remarks:
Pasture excl.

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles % ¹	Mottles Size ²	Mottle location ³	Material ⁴	Remarks

¹Use % area charts; ²Use size classes; ³Ped face, pore, within ped along roots, within matrix; ⁴Organic (peaty), humic, mineral soil

Hydric soil indicators:

Organic layers:

- ☐ Organic soil material
- ☐ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:

- ☐ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:

- ☐ Plastic
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:

- ☐ Gley profile OR
- ☐ Mottled profile

Horizon:

- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression Flat Valley Gully Slope

Water table: Depth (cm) _____

High GW Perched Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Restricting layers: Depth (cm) _____

Slow perm argillic

☐ Pugged

Hydric soils present?

YES ☐

NO ☐

UNCERTAIN ☐

NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

Soil °C _____

- | | | |
|--|--|--|
| ☐ Surface water (1A) | ☐ Algal mat/crust (2D) | ☐ Aquatic invertebrates (2J) |
| ☐ Groundwater <30 cm (1B) | ☐ Iron deposits (2E) | ☐ Hydrogen sulphide odour (3A) |
| ☐ Soil saturation <30 cm (1C) | ☐ Surface soil cracks (2F) | ☐ Oxidised rhizosphere on roots (3B) |
| ☐ Water marks (2A) | ☐ Inundation on aerial imagery (2G) | ☐ Reduced iron (3C) |
| ☐ Sediment deposits (2B) | ☐ Sparsely vegetated concave surface (2H) | ☐ Reduced iron in tilled soil (3D) |
| ☐ Drift deposits (2C) | ☐ Salt crust (2I) | ☐ High water table stunted/stressed plants (4A) |

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

- | | |
|--|--|
| ☐ Water-stained leaves (2K) | ☐ Geomorphic position (4B) |
| ☐ Drainage patterns (2L) | ☐ Shallow aquitard (4C) |
| ☐ Dry-season water table (3E) | ☐ FAC-neutral test (4D) |
| ☐ Saturation in aerial imagery (3F) | ☐ Frost-heave hummocks (4E) |

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species _____ (A)
2. No. FACU & UPL dominant species _____ (B)
3. Total _____ (A+B)
4. FAC-neutral (>50%) _____ (A/A+B)*100

Wetland hydrology present?

YES ☐

NO ☐

Sketch of site/vegetation types/sampling points:

Remarks:

NEW ZEALAND WETLAND DELINEATION DATA FORM: PASTURE TEST

SECTION A – SITE INFORMATION

Site: Hawaki Bradford St Region: Waikato Sampling point/ID: WP2 (Plot 2)
 Owner/address: _____ Date: 17/7/24 Land use: Farm
 Landform: Hillside Local relief: Slope Land cover: Pasture
 Is the land drained? YES ☒ NO ☐ UNKNOWN ☐ Investigator(s): HD Slope*: 10°
 GPS (NZTM): _____ Altitude m: 90m Photo Nos: _____

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ YES ☐ NO (if NO explain in Remarks)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? No Are 'Normal Circumstances' present? YES ☐ NO ☐
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? No Explain answers in Remarks if needed

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features etc.

Pasture exclusion? YES ☒ NO ☐ Hydrophytic vegetation present? YES ☒ NO ☐ Is the sampled area within a wetland? YES ☒ NO ☐
 Hydric soils present? YES ☐ NO ☐
 Wetland hydrology present? YES ☐ NO ☐

SECTION B – VEGETATION

Use scientific names of plants. Absolute Dominant Indicator Pasture
 Tree Stratum (Plot size: _____) % cover Species? Status % cover

1. _____
 2. _____
 3. _____
 4. _____
 Total tree cover (TT) = _____ 50% _____ 20%

Sapling/Shrub Stratum (Plot size: _____)

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 Total sapling/shrub cover (TS) = _____ 50% _____ 20%

Herb Stratum (Plot size: _____)

	Absolute % cover	Dominant Species?	Indicator Status	Pasture % cover
1. <u>JUN cl</u>	<u>45</u>	☒	<u>FACW</u>	<u>-</u>
2. <u>RAU</u>	<u>3</u>		<u>FAC</u>	<u>-</u>
3. <u>TRI rep</u>	<u>10</u>		<u>FACU</u>	<u>10</u>
4. <u>FOC lan</u>	<u>35</u>	☒	<u>FAC</u>	<u>35</u>
5. <u>AGR cap</u>	<u>5</u>		<u>FACU</u>	<u>5</u>
6. <u>FES m50</u>	<u>25</u>	☒	<u>FACU</u>	<u>25</u>
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
13. _____				
14. _____				
15. _____				
16. _____				
17. _____				
18. _____				

Total herb cover (TH) = 123 50% 61.5 20% 246
 Total (P) = 75

Total Vegetation Cover (TVC): TT+TS+TH = 11 50% 61.5

Pasture Exclusion Test:
 Pasture cover/Total vegetation cover
 (P/TVC) x100 = _____ %

☐ Rapid Pasture Test
☒ Pasture Exclusion Test is >50%

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) _____
 Tot. Dominant Spp. across strata (B) _____
 % OBL/FACW/FAC (A/B) 67.1

Prevalence Index:

Total % cover of: Multiply by:
 OBL 0 x 1 = 0
 FACW 45 x 2 = 90
 FAC 38 x 3 = 114
 FACU 40 x 4 = 160
 UPL 0 x 5 = 0
 Total 123 (A) 364 (B)

Prevalence Index (B/A) = 2.959

Hydrophytic vegetation indicators:

☐ Rapid Test
☒ Dominance Test is >50%
☒ Prevalence Index is $\leq 3.0^1$
☐ Morphological adaptations¹ (supporting data in Remarks)
☐ Problematic hydrophytic vegetation¹
 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☒ NO ☐ UNCERTAIN ☐

Remarks:

Pasture ex

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles % ¹	Mottles Size ²	Mottle location ³	Material ⁴	Remarks
40cm	3/1	Orange	1	5	Very topsoil		

¹Use % area charts; ²Use size classes; ³Ped face, pore, within ped along roots, within matrix; ⁴Organic (peaty), humic, mineral soil

Hydric soil indicators:

Organic layers:

- ☐ Organic soil material
☐ Litter
☐ Fibric
☐ Mesic
☐ Humic
☒ Peaty topsoil
☐ Peaty subsoil

Concretions:

- ☐ Iron concretions
☐ Manganese concretions
☐ Nodular
Consistence:
☐ Plastic
☐ Sticky
☐ Fluid

Colours: profile form either:

- ☐ Gley profile OR
☒ Mottled profile
Horizon:
☐ Reductomorphic
☐ Redox mottled
☐ Redox segregations
☐ Perch-gley features

Cause of wetness (circle appropriate):

- Location: Depression Flat Valley Gully Slope
 Water table: Depth (cm) 30cm
 High GW Perched Seepage Tidal Lithic
 Pans: Depth (cm) _____
 Pan Humus Fe-pan Densi- Duri- Fragi Ortstein
 Restricting layers: Depth (cm) _____
 Slow perm argillic
☐ Pugged

Hydric soils present?

YES ☐

NO ☒

UNCERTAIN ☒

NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

Soil °C _____

- | | | |
|---|--|--|
| ☐ Surface water (1A) | ☐ Algal mat/crust (2D) | ☐ Aquatic invertebrates (2J) |
| ☒ Groundwater <30 cm (1B) | ☐ Iron deposits (2E) | ☐ Hydrogen sulphide odour (3A) |
| ☐ Soil saturation <30 cm (1C) | ☐ Surface soil cracks (2F) | ☐ Oxidised rhizosphere on roots (3B) |
| ☐ Water marks (2A) | ☐ Inundation on aerial imagery (2G) | ☐ Reduced iron (3C) |
| ☐ Sediment deposits (2B) | ☐ Sparsely vegetated concave surface (2H) | ☐ Reduced iron in tilled soil (3D) |
| ☐ Drift deposits (2C) | ☐ Salt crust (2I) | ☐ High water table stunted/stressed plants (4A) |

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

- | | |
|--|--|
| ☐ Water-stained leaves (2K) | ☐ Geomorphic position (4B) |
| ☐ Drainage patterns (2L) | ☐ Shallow aquitard (4C) |
| ☐ Dry-season water table (3E) | ☐ FAC-neutral test (4D) |
| ☐ Saturation in aerial imagery (3F) | ☐ Frost-heave hummocks (4E) |

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species _____ (A)
 2. No. FACU & UPL dominant species _____ (B)
 3. Total _____ (A+B)
 4. FAC-neutral (>50%) _____ (A/A+B)*100

Wetland hydrology present?

YES ☒

NO ☐

Sketch of site/vegetation types/sampling points:

Remarks:

NEW ZEALAND WETLAND DELINEATION DATA FORM: PASTURE TEST

Ford Rd.

SECTION A – SITE INFORMATION

Site: _____ Region: Waikato Sampling point/ID: WP3 (Plot 3)
 Owner/address: N/A Date: 17/7/26 Land use: Farm
 Landform: Shallow gully Local relief: Basin Land cover: Pasture
 Is the land drained? ☒ YES ☐ NO ☐ UNKNOWN Investigator(s): HO Slope: 45°
 GPS (NZTM): See GIS Altitude m: 100m Photo Nos: _____

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ YES ☐ NO (if NO explain in Remarks)
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are 'Normal Circumstances' present? ☒ YES ☐ NO
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Pasture exclusion? YES ☐ NO ☒ Hydrophytic vegetation present? YES ☒ NO ☐
 Is the sampled area within a wetland? YES ☐ NO ☐
 Hydric soils present? YES ☐ NO ☐
 Wetland hydrology present? YES ☒ NO ☐

SECTION B – VEGETATION

Use scientific names of plants. Absolute Dominant Indicator Pasture
 Tree Stratum (Plot size: _____) % cover Species? Status % cover

1. _____
 2. _____
 3. _____
 4. _____
 Total tree cover (TT) = _____ 50% 20%

Sapling/Shrub Stratum (Plot size: _____)

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 Total sapling/shrub cover (TS) = _____ 50% 20%

Herb Stratum (Plot size: _____)

1. GLY/Ha dec 20 ✓ OBL —
 2. ABR/sto 10 ✓ FACW —
 3. CYP/con 2 ✓ FAC —
 4. Rumex 10 ✓ FAC —
 5. RAU/Ha 5 ✓ FACW —
 6. _____
 7. _____
 8. _____
 9. _____
 10. _____
 11. _____
 12. _____
 13. _____
 14. _____
 15. _____
 16. _____
 17. _____
 18. _____
 Total herb cover (TH) = 47 50% 23.5 20% 9.4

Total Vegetation Cover (TVC): TT+TS+TH = 47 50% 23.5

Pasture Exclusion Test:
 Pasture cover/Total vegetation cover
 (P/TVC) x100 = 0 %

☐ Rapid Pasture Test
☐ Pasture Exclusion Test is >50% No

Dominance Test:
 No. Dominant Spp. OBL/FACW/FAC (A) 3
 Tot. Dominant Spp. across strata (B) 3
 % OBL/FACW/FAC (A/B) 100

Prevalence Index:
 Total % cover of: Multiply by:
 OBL 20 x 1 = 20
 FACW 15 x 2 = 30
 FAC 12 x 3 = 36
 FACU 0 x 4 = 0
 UPL 0 x 5 = 0
 Total 47 (A) 86 (B)
 Prevalence Index (B/A) = 1.83

Hydrophytic vegetation indicators:
☐ Rapid Test
☒ Dominance Test is >50%
☒ Prevalence Index is $\leq 3.0^1$
☐ Morphological adaptations¹ (supporting data in Remarks)
☐ Problematic hydrophytic vegetation¹
 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
 YES ☒ NO ☐ UNCERTAIN ☐

Remarks:
Winter pooling area but passes both veg tests.
Normal circumstances?

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles % ¹	Mottles Size ²	Mottle location ³	Material ⁴	Remarks

¹Use % area charts; ²Use size classes; ³Ped face, pore, within ped along roots, within matrix; ⁴Organic (peaty), humic, mineral soil

Hydric soil indicators:

Organic layers:

- ☐ Organic soil material
☐ Litter
☐ Fibric
☐ Mesic
☐ Humic
☐ Peaty topsoil
☐ Peaty subsoil

Concretions:

- ☐ Iron concretions
☐ Manganese concretions
☐ Nodular

Consistence:

- ☐ Plastic
☐ Sticky
☐ Fluid

Colours: profile form either:

- ☐ Gley profile OR
☐ Mottled profile

Horizon:

- ☐ Reductimorphic
☐ Redox mottled
☐ Redox segregations
☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression Flat Valley Gully Slope

Water table: Depth (cm) _____

High GW Perched Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragl Grtstein

Restricting layers: Depth (cm) _____

Slow perm argillic

☐ Pugged

Hydric soils present?

YES ☐

NO ☐

UNCERTAIN ☐

NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

Soil °C _____

- | | | |
|--|--|--|
| ☒ Surface water (1A) | ☐ Algal mat/crust (2D) | ☐ Aquatic invertebrates (2J) |
| ☐ Groundwater <30 cm (1B) | ☐ Iron deposits (2E) | ☐ Hydrogen sulphide odour (3A) |
| ☐ Soil saturation <30 cm (1C) | ☐ Surface soil cracks (2F) | ☐ Oxidised rhizosphere on roots (3B) |
| ☐ Water marks (2A) | ☐ Inundation on aerial imagery (2G) | ☐ Reduced iron (3C) |
| ☐ Sediment deposits (2B) | ☐ Sparsely vegetated concave surface (2H) | ☐ Reduced iron in tilled soil (3D) |
| ☐ Drift deposits (2C) | ☐ Salt crust (2I) | ☐ High water table stunted/stressed plants (4A) |

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

- | | |
|--|--|
| ☐ Water-stained leaves (2K) | ☐ Geomorphic position (4B) |
| ☐ Drainage patterns (2L) | ☐ Shallow aquitard (4C) |
| ☐ Dry-season water table (3E) | ☐ FAC-neutral test (4D) |
| ☐ Saturation in aerial imagery (3F) | ☐ Frost-heave hummocks (4E) |

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species _____ (A)

2. No. FACU & UPL dominant species _____ (B)

3. Total _____ (A+B)

4. FAC-neutral (>50%) _____ (A/A+B)*100

Wetland hydrology present?

YES ☒

NO ☐

Sketch of site/vegetation types/sampling points:

Remarks: