

362 Jones Road

Ecological Report Prepared for Scarbro Civil Limited

14 November 2024





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1.0 Introduction

A managed fill operation is proposed for a site at 362 Jones Road, Hunua. The project will include two managed fill areas of 9 ha and 2 ha, respectively, and construction of a haul road from Hunua Road. Fill will be placed over a duration of 5 to 10 years, depending on demand (FTL, 2024). The site has a total area of c. 25 ha and is currently under drystock farming.

The project aims to avoid reclamation of streams and wetlands and thereby minimise ecological impacts.

This report presents the results of investigations to identify and evaluate ecological features within the site and assess the ecological effects of the proposal. The report includes:

- Freshwater features, extent and value (river/streams/wetlands).
- Ecological effects (land and water).

2.0 Methods

2.1 Stream Classification

Watercourses were classified using the definitions and criteria in the Auckland Unitary Plan (AUP) (Appendix 1). There were no artificial watercourses.

Streams and overland flowpaths were identified on Auckland Council Geomaps. Site investigations were undertaken on 14 March 2024.

Metservice records for Manukau show 1.8 mm of rainfall during the week preceding the field survey, and a total of 34.8 mm over the previous two weeks. January and February were both wet, with February having 233 mm of rainfall vs a historical average of 57.1 mm.

2.2 Stream Ecological Valuation

To evaluate stream functions a Stream Ecological Valuation (SEV) assessment was undertaken at Site 1. The stream here comprised a section of open channel within a wetland.

The SEV records instream and riparian features and uses a calculator to assign functional scores in four categories (Hydrological, Biogeochemical, Habitat Provision and Biodiversity) and an overall score for functional integrity compared to a forest stream reference site (Storey *et al*, 2009).

2.3 Wetland Classification and Delineation

The Resource Management Act defines a wetland as:

"Permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions."

The NPS-FM defines a Natural Inland Wetland as a wetland (as defined in the Act) that is not:

- (a) in the coastal marine area; or
- (b) a deliberately constructed wetland, other than a wetland constructed to offset impacts on, or to restore, an existing or former natural inland wetland; or
- (c) a wetland that has developed in or around a deliberately constructed water body, since the construction of the water body; or
- (d) a geothermal wetland; or
- (e) a wetland that:
 - (i) is within an area of pasture used for grazing; and
 - (ii) has vegetation cover comprising more than 50% exotic pasture species (as identified in the National List of Exotic Pasture Species using the Pasture Exclusion Assessment Methodology (see clause 1.8)); unless
 - (iii) the wetland is a location of a habitat of a threatened species identified under clause 3.8 of this National Policy Statement, in which case the exclusion in (e) does not apply.

Exclusions (a) to (d) do not apply to this site. The wetlands are within pasture used for grazing under e (i). Our survey included assessment of the percent cover of pasture species, and the presence of threatened species, specifically addressing e (ii) and (iii).

The Wetland Delineation Protocols (MfE, 2022) and associated guidance documents provide procedures for assessing whether a potential wetland feature meets the definition of Wetland under the RMA or Natural Inland Wetland. The initial steps in the delineation rely on vegetation communities as indicators of wetland conditions, while additional observations of hydrology and soil characteristics are used where wetland species are not conspicuously dominant in community assemblages (Table 1).

Table 1. Wetland delineation criteria. A Pass result indicates the feature is a wetland under the RMA (i.e. has vegetation communities adapted to wet conditions). Wetland species are classified as OBL (Obligate wetland), FAC (Facultative), FACW (Facultative Wetland). All Wetlands are Natural Inland Wetlands unless excluded under criteria in the NPS-FM. The pasture exclusion test is applicable to this site as it is used for grazing.

Wetland as defined in t	he RMA			
Rapid test	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 1).			
Dominance test	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule. If species area all or mostly FAC hydrology indicators must also be present.			
Prevalence Index	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.			
Pasture exclusion test for Natural Inland Wetland				
Pasture cover	Not a Natural Inland Wetland if >50% pasture species.			

Potential wetland areas were identified using the Geomaps hydrology layer, contours and aerial photography. Where distinct vegetation patterns were clearly visible in aerial imagery, vegetation plots were sampled within representative locations (inside and outside potential wetland areas) to record vegetation composition. Plots were also sampled at the boundaries between vegetation communities to identify the transition point between the wetland and dry land. Hydrological indicators such as saturated soil (boggy ground) and seepages at the toe of the valley hillslope that indicate intersection with the water table were also mapped and used to delineate wetland features.

2.4 Wetland Values

The following functions were assessed on a scale of 0-5, where 0 indicates that functions are not present, 1 represents severely degraded function or negligible value and 5 represents high function or value that would be similar to a reference site in the ecological district (Table 2). These functions were selected following a review of attributes in the EIANZ guidelines (Roper-Lindsay *et al*, 2018). A guide for interpretation of scores is presented in Table 3.

Table 2. Assessment criteria for wetland ecological functions.

Ecological Integrity	1 = highly modified feature with limited internal structure (e.g. ecotones) and external influences dominant. 5=Ecosystem with internal structure and limited external influences.
Ecosystem rarity	1=features performing similar functions are common in the landscape; 5= features are rare in the landscape
Biodiversity	1= supports limited range of indigenous flora and fauna compared to reference site. 5=biodiversity similar to reference site.
Threatened species	1=not utilised by threatened species; 5=important habitat that contributed to sustaining populations of At-Risk or threatened species.
Water quality buffering	1=minimal positive influence on ground or surface water receiving environments; 5=has major positive influence on water quality. Factors include scale of feature relative to catchment, slope, nutrient load, interception of surface flows, livestock disturbance.
Hydrological integrity	1= water level range and hydrological function is highly modified from reference condition; 5= Water level range and hydrological function is similar to reference condition.

Table 3. Interpretation of wetland function scores.

Average score	Overall functional integrity
1	Very Low
>1 to 2	Low
>2 to 3	Moderate
>3 to 4	High
>4	Very High

2.5 Terrestrial Vegetation

The site contains limited vegetation other than pasture. All stands of trees and shrubs were identified, mapped and described.

2.6 Terrestrial Fauna

Vegetation and habitats within the site were evaluated with respect to their suitability as refugia and habitat for native terrestrial fauna, including incidental searches for fauna signs or sightings. Trees were inspected for possible bat roosts and bird nests, and we recorded all bird species seen and heard.

3.0 Ecological Values

3.1 Stream Classification

The classification of streams is presented in Figure 1.

Stream 1 was assessed as a Permanent Stream. The bed of Stream 1 was permanently below the water table, and although the watercourse had predominantly wetland functions (Wetland B, described below) there was some open channel, possibly excavated, with stream characteristics. This was located upstream of the culvert and was the location for the SEV assessment.

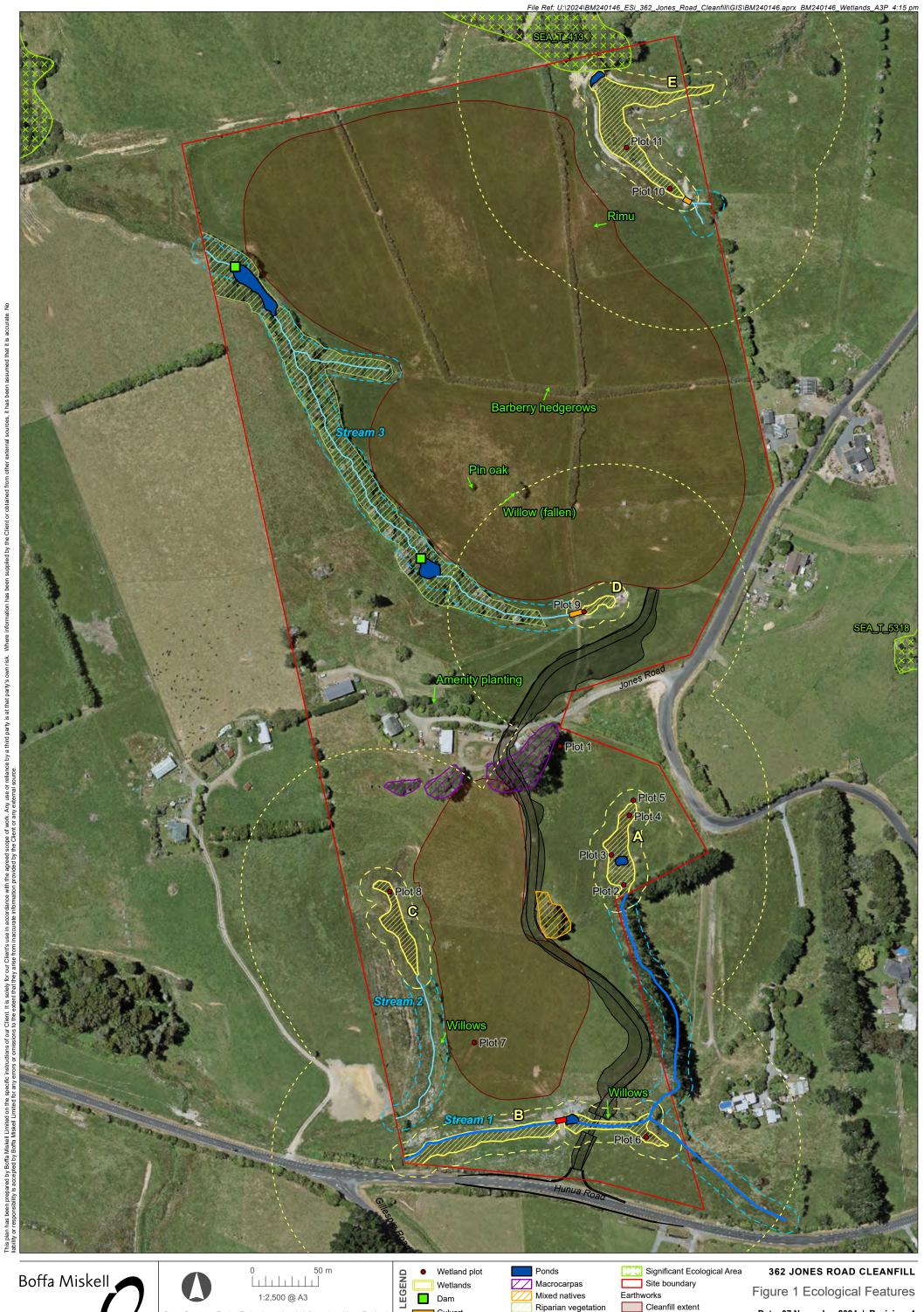
Streams 2 and 3 were assessed as Intermittent Streams. The bed of these streams was intermittently below the water table, with flows in different areas observed to be either very low or absent. Stream 2 was in a relatively steep and narrow gully with a defined channel. Stream 3 was less steep and was mainly dished with poorly defined channel margins. Two ponds were present in the stream, which controlled stream flows in both the ponded areas and downstream reaches.

3.2 Stream Ecological Valuation

An SEV assessment was undertaken in the Permanent Stream at Stream 1 in the area of the proposed bridge crossing (Figure 1). No sampling was undertaken within the Intermittent Streams 2 and 3.

Streams 1 and 2 did not have fences designed to exclude livestock and riparian vegetation was limited (some willow trees are present on the north side of Stream 1). Stream 3 was entirely fenced and had riparian vegetation ranging in width from approximately 15 to 30 m (narrower at the upstream end).

The channel at the Stream 1 SEV site was found to have an average width of 1.29 m, depth of 0.22 m, slow velocity, soft substrate with thick sediment deposition, no effective fencing, and riparian vegetation limited to a narrow margin of mainly rushes (*Juncus* spp.) and willow trees on the northern side (Photo 2). The stream had low banks and a narrow effective floodplain.



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Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors, Auckland Council, Fraser Thomas

Projection: NZGD 2000 New Zealand Transverse Mercator

Culvert Permanent Stream

Riparian vegetation 10m stream setback 10m wetland setback Intermittent Stream 100m wetland setback

Road

Culvert to be removed

Date: 07 November 2024 | Revision: 4 Plan prepared by Boffa Miskell Limited Project Manager: Eddie.Sides@boffamiskell.co.nz | Drawn: HCo | Checked: ESi

The extent of open channel is limited, with wetland characteristics predominant (Wetland B, described below).

The channel here is probably a residual feature in a small gully that has gradually infilled with sediment. It is also possible that it has been excavated or cleared to improve drainage. While

A total of 19 macroinvertebrate taxa were recorded, with only one EPT taxa (a single caddisfly *Triplectides*). The dominant groups were Diptera (62% of sample abundance) and Crustacea (31%). Most fauna were mud-dwelling diptera, ostracods and worms, with some species associated with the marginal plants such as the molluscs and two bug species that prefer open water (waterboatmen and backswimmers). The Macroinvertebrate Community Index score was 63, a low score indicating poor water quality and predominantly tolerant species.

Shortfin eels (*Anguilla australis*) were common. The conservation status of this species in Not Threatened (Dunn *et al*, 2018). No other fish species were recorded.

The overall SEV score was 0.33 out of a maximum possible of 1, a low score reflecting poor habitat functions relative to unmodified reference sites. The value for Hydraulic Functions was 0.48, Biogeochemical Functions 0.27, Habitat provision 0.23 and Biodiversity 0.28 (Table 3). These scores showed low integrity across all categories of functions.

Overall, the stream was found to be highly degraded with very low current values and moderate potential values.

Table 3. SEV function scores at Site 1, 362 Jones Road.

Hydrological	Biogeochemical	Habitat	Biodiversity	Overall score
0.48	0.27	0.23	0.28	0.33

3.3 Wetland Classification and Delineation

Eleven vegetation assessment plots were investigated within and on the periphery of features identified as prospective wetlands in the desktop analysis and site walkover (Table 4; Appendix 2). From this assessment, five wetland features were classified as 'natural inland wetland' and delineated based on NPS-FM protocol. One further feature was assessed but did not qualify as a natural inland wetland (Figure 1).

Table 4. Wetland Plot Results, 362 Jones Road.

Plot	Rapid	Dominance	PI	Pasture %	Dominant Vegetation	Hydric Soils/ Wetland Hydrology	Inland Natural Wetland
	Wetland A						
1	Fail	Fail	3.7	65	Rye Grass (E); White Clover (E)	Fail	No
2	Pass	Pass	2.0	20	Jointed Rush (E)	Pass	Yes
3	Pass	Pass	1.5	22	Soft Rush (E)	Pass	Yes
4	Pass	Pass	2.1	22	Jointed Rush (E)	Pass	Yes
5	Fail	Pass	2.9	55	Yorkshire Fog (E)	Pass	No
	Wetland B						
6	Pass	Pass	2.0	20	Isolepis Prolifera (N)	Pass	Yes
				We	etland C		
7	Fail	Fail	3.2	55	Soft Rush (E); Rye Grass (E)	Pass	No
8	Pass	Pass	1.2	0	Baumea (N)	Pass	Yes
				We	etland D		
9	Pass	Pass	2.2	5	Mercer Grass (E)	Pass	Yes
				We	etland E		
10	Pass	Pass	2.3	20	Mercer Grass (E)	Pass	Yes
11	Pass	Pass	1.5	0	Mercer Grass (E); Baumea (N); Isolepis Prolifera (N)	Pass	Pass
E = E	E = Exotic; N = Native						

3.3.1 Wetland A

Wetland A (963 m^2) is a low-lying, concave area located within the headwaters of an intermittent stream draining to the south of the property (Photo 1).



Photo 1: Wetland A Left: view upstream of feature, Right: Surface water and extensive pugging present.

This feature meets the criteria for a *natural inland wetland*, based on the Rapid test. The dominant vegetation cover within this wetland feature was jointed rush (*Juncus articulatus -* exotic), soft rush (*Juncus effusus -* exotic) and baumea (*Machaerina rubiginosa -* native). Surface water was present and flowing at the toe of the hillslope, forming a shallow pond that discharged to the watercourse. The presence of iron floc in the water indicates that the wetland is groundwater-fed. Extensive cattle damage (pugging) was also evident throughout the feature.

3.3.2 Wetland B

Wetland B (1,458 m²) is located within the low-lying riparian zone of Stream 1 (Photo 2).



Photo 2: Wetland B. Top Left: culvert beneath farm access track. Top Right: Ponding upstream of culvert. Bottom Left: Upstream wetland section. Bottom Right: Downstream Wetland section.

The culvert for the farm crossing in the lower stream reaches appears partially buried so that the access track acts as a bund, resulting in ponding and widening of the wetland feature immediately upstream. The stream channel is poorly defined, with low-lying floodplains overgrown with hydrophilic vegetation. Downstream of the farm crossing, flows are restricted, resulting in sedimentation and expansion of wetland vegetation dominated by *Isolepis prolifera* (native) and wiwi (*Juncus edgariae* – native) across the entire channel. Wetland B meets the criteria of *natural inland wetland*, passing the Rapid test. Surface water and extensive pugging was observed throughout the feature.

3.3.3 Wetland C

Wetland C (699 m²) is located within a flat headwater basin which drains into a gully system before discharging into a defined stream channel (Photo 3). Wetland C was assessed as *natural inland wetland* based on the Rapid test as OBL and FACW species (baumea, *Isolepis prolifera* and soft rush) were dominant. Surface water and extensive pugging was observed within the feature.





Photo 3: Wetland C feature within headwater basin of stream

3.3.4 Wetland D

Wetland D is a small feature (158 m²) located within an overland flow path (OLFP) of Stream 3. The feature was dominated by Mercer grass (*Paspalum distichum* – exotic), a FACW grass which, though not recognised as pasture species for the purposes of the NPS-FW, is indicative of the agricultural landuse (Photo 4). The upper extent of the feature appeared to be truncated due to deposition of disturbed soils/ cleanfill in the upper section. The OLFP also appeared to have been deepened and straightened to increase draining efficiency. Wetland D met the criteria of *natural inland wetland* based on the Rapid test.



Photo 4: Wetland D within OLFP dominated by mercer grass.

3.3.5 Wetland E

Wetland E is a large feature $(2,171 \text{ m}^2)$ located in the low-lying basin in the far north-eastern section of the proposed managed fill footprint. The wetland feature is formed by two tributaries with a pond located at the confluence.



Photo 5: Left: Wetland E vegetation and single rimu on upslope; Right: upper gully, partly drained.

The wetland extends up the gully to the south. In this area a drain has been excavated and this has reduced ground saturation and affected the condition of the wetland. Mercer grass and soft rush dominated vegetation on the outer margins of the wetland, while the centre included patches of baumea, *Isolepis prolifera* and water pepper (*Persicaria hydropiper* – Exotic) (Photo 5). Wetland E was assessed as *natural inland wetland*, based on the Rapid test.

3.3.6 Wetland Values

Overall, the project area encompasses 5,450 m² of inland natural wetland; 40% of which is located within Wetland E. All wetland features were found to be heavily modified and actively grazed, and evidently have a long history of agricultural land use. The condition of these features was poor due to significant pugging from stock, drainage, and poor water (algal blooms were noted in areas of standing water).

Wetlands A and D, and the outer extent of wetlands B, C and E were dominated by exotic wetland vegetation including wet tolerant pasture species and rushes. All wetlands within the site are characterised by modified hydrology, low biodiversity and plant communities poorly representative of indigenous wetland ecosystems. The wetlands nevertheless provide hydrological and water quality treatment functions. Such wetlands are common in the agricultural landscape within the Manukau Ecological District.

Table 5. Wetland Values, 362 Jones Road.

Wetland	Α	В	С	D	E
Ecological Integrity	3	2	2	1	3
Ecosystem rarity	2	1	1	1	2
Biodiversity	2	1	1	1	2
Threatened species	1	1	1	1	1
Water quality buffering	2	3	2	1	3
Hydrological functions	3	2	2	1	3
Total/30	13	10	9	6	14
Average function score	2.17	1.67	1.50	1.00	2.33
% of potential function	43	33	30	20	47
Overall functional value	Moderate	Low	Low	Very Low	Moderate

3.4 Terrestrial Vegetation

Terrestrial vegetation included riparian forest around Stream 3, and two small stands of trees (both fenced; refer Figure 1). These features are described below. Scattered willows were present along Stream 1 and 2, a number of individual trees and barberry hedgerows were interspersed through the pastureland, as shown in Figure 1.

Riparian Vegetation (Stream 3)

The riparian vegetation surrounding Stream 3 comprises willows (*Salix* spp.) and a variety of native trees and shrubs, including houhere (*Hoheria populnea*), tōtara (*Podocarpus totara*), kōwhai (*Sophora microphylla*), karaka (*Corynocarpus laevigatus*), karamu (*Coprosma robusta*), akeake (*Dodonaea viscosa*), kānuka (*Kunzea robusta*), tarata (*Pittosporum eugenioides*), pōnga (*Cyathea dealbata*), and tī kouka (*Cordyline australis*) (Photo 6 and 7). The groundcover was limited due to grazing, but included pasture grasses, buttercup (*Ranunculus repens*),

Juncus spp., kiokio (*Parablechnum novae-zelandiae*), and blackberry (*Rubus fruticosus*). From Google Earth imagery and Retrolens (https://retrolens.co.nz/Map), we determined that this vegetation was planted roughly 20-25 years ago.



Photo 6: Image of the riparian vegetation surrounding Stream 3.



Photo 7: Riparian vegetation surrounding Stream 3.

Macrocarpa stand

Exotic macrocarpa (*Cupressus macrocarpa*) trees and a *Pinus radiata* tree, all around 20-25m tall dominate the stand of trees nearest to the homestead (Photo 8), with a subcanopy of native and exotic shrubs including mapou (*Myrsine australis*) and Chinese privet (*Ligustrum sinense*).

An ~8m tall pūriri (*Vitex lucens*) tree is present on the eastern margin of the stand. The groundcover is largely composed of pasture grass.



Photo 8: Macrocarpa and undergrowth in the first southern vegetation patch.

Native Forest Remnant

A small remnant stand of mature and regenerating native trees (5-12m tall) is present on the margin of the proposed managed fill footprint in the southern quarter of the property. Mature specimens of rewarewa (*Knightia excelsa*), tōtara, kauri (*Agathis australis*), pōhutukawa (*Metrosideros excelsa*) form the canopy, with a subcanopy of karaka, tree privet (*Ligustrum lucidum*) and mapou. Juvenile mapou, totara, karaka and Chinese privet form the understory.





Photo 9 and 10: Native forest remnant.

SEA

Part of a Significant Ecological Area is located in the north-east of the site, at the northern end of Wetland E. This comprises approximately 650 m² of terrestrial vegetation and is identified as SEA_T_413. The SEA continues northwards along the stream corridor. The Schedule 3 of the AUP notes this SEA meets sub-factor 3, assessed as having indigenous diversity values. Aerial photography confirms that the SEA vegetation within the site comprises pine trees.

3.5 Fauna

3.5.1 Native Birds

The forest and scrub habitats present are likely to provide permanent and intermittent habitat for roosting and nesting native birds. Bird Atlas records of native species in the surrounding area (Table 6) include a variety of mostly common species that typically occur in similar habitats. During the site visit grey warbler, spurwing plover, New Zealand fantail and tūī were heard, and pūkeko, swamp harrier, sacred kingfisher and silvereye were sighted. An old nest (possibly of a tui) was found in the riparian vegetation. The site visit was carried out at the end of the breeding season so active nesting was not observed.

Table 6. Native and endemic bird species recorded within a 6km radius of 362 Jones Road, Hunua (Data from OSNZ Atlas of Bird Distribution in NZ, 2024).

Species	Scientific Name	NZ status	Conservation status (Robertson et al., 2021)
Shining cuckoo	Chrysococcyx lucidus	Native	Not Threatened
Kākā	Nestor meridionalis	Endemic	At Risk – Recovering
Grey warbler	Gerygone igata	Endemic	Not Threatened
Ruru	Ninox novaeseelandiae	Native	Not Threatened
Tomtit	Petroica macrocephala	Endemic	Not Threatened
NZ fantail	Rhipidura fuliginosa	Endemic	Not Threatened
Silvereye	Zosterops lateralis	Native	Not Threatened
Kererū	Hemiphaga novaeseelandiae	Endemic	Not Threatened
Tūī	Prosthemadera novaeseelandiae	Endemic	Not Threatened
Harrier hawk	Circus approximans	Native	Not Threatened
Sacred kingfisher	Todiramphus sanctus	Native	Not Threatened
White-faced heron	Egretta novaehollandiae	Native	Not Threatened
Spurwing Plover	Vanellus miles	Native	Not Threatened
Weka	Gallirallus australis	Endemic	Not Threatened
Welcome Swallow	Hirundo neoxena	Native	Not Threatened
Paradise Shelduck	Tadorna variegata	Endemic	Not Threatened
Pūkeko	Porphyrio melanotus	Native	Not Threatened

3.5.2 Bats

Long tailed bats (*Chalinolobus tuberculatus*) are known to be resident in the Hunua Ranges, with numerous detections within a 10km radius of the Project Site. The record closest to 362

Jones Road 5.6 km away, from 2019 (Bat database, Auckland Council). These bats may forage over extensive ranges, often feeding along forest edges and tree lines, and are known to move their roosts frequently.

Mature trees within the site, including large macrocarpa, pine, and both planted and remnant native trees, offer potential roosting habitat for long-tailed bats. The large macrocarpa trees (Photo 3) were observed to have features suitable roosting features for long-tailed bats, specifically small crevices and large areas of loose bark. The threat classification of the long-tailed bat (*Chalinolobus tuberculatus*) is "Threatened – Nationally Critical" (O'Donnell et al., 2023).

3.5.3 Native Lizards

Prospective native lizard habitat features were inspected during the site visit. Native vegetation patches, particularly the riparian vegetation and forest remnant, appeared moderately suitable for both arboreal and ground dwelling lizards. The presence of flakey bark and some diversity of native tree species would provide moderate habitat for arboreal geckos. In the understory the leaf litter offered moderately suitable habitat for ground dwelling skinks. However, the small extent and lack of continuity between patches of native vegetation may limit the viability of these habitats.

Based on a desktop assessment, it is possible that the following species are present within the property (Table 7):

Table 7. Native lizards recorded within a 10km radius of 362 Jones Road, Hunua, across the last 9 years. Data from Auckland Council, accessed in April 2024, and Department of Conservation Bioweb Database, access in April 2024.

Species	Common Name	Threat Classification (National & Regional) Hitchmough <i>et al</i> , 2021.	Habitat Preference	Observation Year
Oligosoma aeneum	Copper skink	At Risk – Declining Regionally Declining	Open scrubland, forest edges – ground dwelling	2015
Naultinus elegans	Elegant gecko	At Risk – Declining Regionally Declining	Forest / scrub – arboreal	2015

3.5.4 Pest Animals

Several rabbits (*Oryctolagus cuniculus*) were observed in the pasture grasses of the site. Rabbits are considered to be ecological and agricultural pests due to their herbivorous grazing, destroying smaller plant species and regenerating native seedlings.

4.0 Proposed Activities

4.1 Stream Crossing

The haul road will cross Stream 1 and Wetland B via a bridge located immediately upstream of the existing culvert. The purpose of the bridge is to avoid encasement of the stream and any wetland reclamation. The bridge will span the stream from abutments on either side, allowing unimpeded flow, hydrological connectivity to the groundwater, and continuity of instream habitat from upstream to downstream. This design will ensure there is no loss of habitat or impairment of fish passage.

The existing 600 mm diameter culvert will be removed, and the natural wetland and stream will be reinstated here. The purpose of removing this structure is to daylight and restore approximately 60 m² of stream and wetland and wetland habitat, achieving a net gain in ecological values. The total works area including bank trimming is approximately 100 m².

The following methodology has been provided by FTL:

Works are to be undertaken during forecast period of fine weather (minimum 2-3 days) in summer season, ideally when no water is flowing in stream:

- (a) Establish erosion and sediment controls, comprising super silt fence across stream channel downgradient of culvert. Provide for portable pump and sand bags to be available on-site for damming stream on upstream side, in event of unexpected rainfall or stream low flows:
- (b) Remove any vegetation from culvert crossing;
- (c) Remove road embankment (soil material) to stockpile. Place suitable materials in Fill facility and dispose of excess or unsuitable spoil off-site to appropriate facility. Contamination testing of fill material in embankment may be required based on visual observations (at discretion of SQEP).
- (d) Remove existing 600 mm diameter culvert and any hardfill bedding material and associated inlet/outlet structures.
- (e) Remove residual stream embankment down to existing stream bed level and undercut by 150mm.
- (f) Trim stream banks to tie in with existing stream profile.
- (g) Place 150mm clean topsoil on restored stream bed and stream batters and cover with biodegradable coir matting or similar, pinned in place.
- (h) Grass stream bed and banks, using water tolerant grass (Outfield 'Rye' grass or similar approved). Supplier Prebble Seeds, 09 273 4682
- (i) Remove erosion/sediment controls and any temporary dams.

Notes:

- Works extent is approx. 100m² with estimated embankment volume of 33m³.
- Estimated works duration is two days, but 3 days allowed to provide some contingency.
- Stream bed disturbance during construction will be limited to the minimum practical area and not more than 5m either side of the old culvert, excluding the length of the culvert itself.
- All construction materials and ancillary materials will be removed from the stream bed following completion of construction.

A plan showing the works is included in Appendix 4.

4.2 Haul Road

Construction of the haul road will require earthworks, including a steep incline. Sediment generation and yield from these works will be managed under an Erosion and Sediment Control Plan complying with Auckland Council guidance GD05 (Auckland Council, 2018). The finished road surface will be stabilised and compacted to a high standard to allow the passage of heavy vehicles.

The stand of macrocarpa and associated trees will be removed to allow an efficient alignment of the haul road.

4.3 Fill Areas

The footprint of the southern fill site is 2 ha, and the northern fill area is 9 ha in extent. These fill areas will have a minimum setback of 10 m from any stream and wetland features. The fill area and setbacks are shown in Figure 1 and Appendix 4.

The fill areas will be managed to control sediment generation. As described in the FTL Engineering Report (FTL, 2024), erosion and sediment control measures will comply with GD05 and are expected to include:

- Staging of fill with maximum of 2ha operational at any time.
- Stabilisation of filled areas (mulching, temporary and permanent seeding).
- · Benching.
- Clean and dirty water diversion.
- Silt fences.
- Sediment retention ponds with chemical flocculation, as required based on bench testing.

4.4 Riparian Management

It is proposed to establish a 10 m wide riparian zone on each side of the stream and wetland features in the south area (Wetland A, B and C and Stream 1 and 2).

These zones will be planted and fenced. These measures will protect the features from livestock damage, reduce sediment and nutrient inputs, increase biodiversity, and enhance ecological functioning by creating more complex communities and interactions between land and water ecosystems.

Stream 3 and its associated riparian margin will be retained and is already fenced. The area will be managed with weed and pest control (possum control) and infill planted with native trees and shrubs.

Wetland D will be planted with native wetland species and a swale established up to Jones Road to improve runoff quality. Where practical, surface flows and subsurface drainage will be directed to this wetland to maintain an intermittently wet wetland hydrology. The fill area will be a minimum distance of 10 m from this feature. Erosion control measures will be important here during construction in order to avoid any direct sediment runoff.

Wetland E will be fenced to protect it from future livestock grazing. The aim will be to reduce pressure from landuse activities. The hydrological functions appear to be relatively intact. The aim here is to maintain wetland functions. This will include fencing of the SEA area that adjoins the wetland. Fencing the SEA within the property will prevent livestock damage and allow the regeneration of native plant species, while the fencing of the adjacent wetland will provide a further buffer zone.

The purpose of this proposed riparian zone management is to enhance ecological values through the project and have a positive effect on streams and wetlands. While we have not identified specific effects on streams and wetlands that require offsetting or compensation, it is important that on-site riparian benefits are available for this purpose, if later required.

5.0 Assessment of Effects

5.1 Streamworks

The haul road crossing of Stream 1 has two components, being the construction of the new bridge, and the removal of the old culvert.

The proposed bridge will cross at a narrow point in the channel and will avoid works within the channel or any permanent reclamation of stream or wetland environments. The bridge will ensure continuity of habitats within the channel and unimpeded fish passage. Effects of the bridge on Stream 1 will be low or negligible.

The removal of the culvert will have temporary effects but long-term benefits by restoring (daylighting) an area of watercourse. The methodology described in Section 4.1 has been developed to minimise construction effects by isolating the works area, minimising the extent and duration of works and managing sediment from earthworks. Construction effects on Stream 1 will be localised and short term, with rapid recolonisation expected by wetland vegetation. The daylighting of the existing culvert will restore a section of wetland and result in a net ecological gain.

5.2 Vegetation Removal

Vegetation removal will be limited to removal of macrocarpa trees, hedgerows and specimen trees. The terrestrial SEA that adjoins Wetland E will be avoided. We understand that the removal of the macrocarpas is a permitted activity (Vance Hodgson, *pers comm*), and that they may be removed prior to haul road construction. As the macrocarpa stand is potentially suitable for bat roosting, we recommend an acoustic monitor check prior to felling to ensure that no long-tailed bats are present. While the presence of bats is unlikely, this would be a good management practice to manage risk on a threatened species. We recognise that this recommendation is not enforceable by consent. The proposed vegetation removal would have low ecological effects, provided that no At-Risk or Threatened species are present.

5.3 Sediment Discharge

Runoff of sediment from earthworks areas during fill construction and operation will be managed by erosion and sediment control practices as listed in Section 4.3. Fraser Thomas Partners note that: "The majority of sediment in runoff from active filling areas is expected to be removed in these sediment retention ponds, with typical removal efficiencies of 95% or higher typically being achieved with flocculation. The treated runoff will be discharged from these ponds in a controlled manner. It will contain some residual solids, the majority of which is likely to be present in dissolved form and hence less likely to precipitate out. Some localised, minor sediment deposition may occur downstream of the pond discharge points".

The existing land is grazed and sediment discharges may be quite high at times of the year, depending on factors such as stock numbers, grass growth and rainfall. During the operation of the fill there will be no sediment discharge from agriculture, a reduction which that will have a positive effect on the overall load entering the streams.

Discharges from Sediment Retention Ponds will occur into Stream 1 (SRP 3), and Stream 3 (SRP1) and a constructed pond at the lower end of Wetland E (SRP2) (Appendix 4). The discharge from SRP2 will enter an existing on-line pond at the wetland outlet and will not pass through the wetland here. Discharges from these treatment devices may result in periodic increases in suspended sediment concentrations during and after rainfall, throughout the period of operation of the fill. As noted above, there may also be localised sediment deposition near discharge points. Both suspended sediment and deposits on the stream bed can have adverse effects on aquatic plants and animals. The aquatic habitats here receive runoff from agriculture and are not considered to be sensitive to the proposed discharges. Any ecological effects are likely to be localised and have only minor effects on ecological functions and values. Effects may include reduction in flora and fauna abundance within areas of sediment deposition but are unlikely to have effects on biodiversity or abundance outside these localised areas.

To manage the effects, it is important that erosion and sediment controls minimise the extent of such depositional areas. In our assessment the proposed controls to GD05 guidelines together with limitations of the exposed earthworks are appropriate and likely to ensure that the level of effects on ecological values in the receiving environmental are low.

5.4 Hydrological Effects

Potential effects may arise from the effects of changes to surface or groundwater flows on streams and wetlands. Groundwater recharge and surface runoff in the earthworks area is likely to be locally affected by the works. Some surface water will be diverted into treatment systems and discharged further downstream than currently (see SRP locations, Appendix 4). The placed fill will be compacted and is likely to have low permeability and low water holding capacity. The additional loading on the surface may also affect water tables, potentially squeezing or deforming it.

Generally, we note that the total amount of water in the catchment of each wetland and stream will be maintained; the fill will be located at a higher elevation than the streams and wetlands, which reduces the likelihood of interactions with the water table; and potential effects on flows will be mitigated by designing drainage to feed into features, where practicable.

The catchment area open at any time will be limited, with a maximum of 2ha going to either of the northern sediment ponds and a maximum of 1.2ha going to the southern sediment ponds. Hence, clean water from the rest of these catchments will be diverted from entering

these ponds and be directed to the current streams/wetlands. This will further mitigate the effect of the cleanfill on streams/wetlands.

Earthworks in the catchment of Wetland A are limited and hydrological effects appear to be unlikely.

Stream 1 and wetland B are at lower elevations than the fill and have a large upstream catchment source of flow that will not be affected by the proposed activities.

Fill will be placed on the eastern side of Wetland C and Stream 2 (Figure 1), but not to the west or north, and the fill is largely elevated above the water table of these features and unlikely to have any hydrological effects.

Wetland D is a small feature at the head of Stream 3, with very low current and potential ecological values. It is close to the northern fill area, which is >10 m to the northern side of the feature and is not obstructing the most direct surface and groundwater flowpaths to the east. The fill here will load and compress the ground under the fill, and there is also likely to be less infiltration and recharge which may affect groundwater levels. The main upslope flowpath is eastward and is likely to provide surface flows and infiltrated flows. Directing surface water flows into this feature will also help maintain the wetland extent and ecological functions. Planting the feature would further enhance biodiversity values. Overall, with appropriate management measures, effects on this small wetland would be low, or potentially a net gain.

Effects on the water table of Stream 3 are unlikely, however, diversion of dirty water for treatment will reduce surface inflows to the middle and upper stream reaches during and after rainfall events. This stream is intermittent and contains some constructed pond features. The duration of non-flowing periods may potentially increase in parts of the stream, but flows are likely to persist during most winter months. These potential effects should be mitigated by diverting clean water flows into the upper reaches of the stream where practicable. Overall, the effects on ecological values are likely to be low.

Wetland E has is at low risk of adverse effects due to its low elevation relative to the fill, groundwater connection and large catchment area unaffected by fill operations.

5.5 National Environmental Standards for Freshwater

In regard to the National Environmental Standards for Freshwater, earthworks and the associated diversion of water is proposed outside of, but within 100 m of Natural Inland Wetlands. This will not result in the complete or partial drainage of any Natural Inland Wetland. No vegetation clearance or earthworks is proposed within a 10 m setback of a Natural Inland Wetland. The diversion and discharge of water within 100m of Natural Inland Wetlands is proposed but engineering analysis has confirmed that there will be no associated changes to water levels or hydrological function of the wetlands.

6.0 Summary and Conclusion

The ecological features with the project area were described and classified. Two Intermittent Streams and one Permanent Stream were identified, and five natural Inland Wetlands. The streams were assessed as having very low ecological values, and the wetlands very low (Wetland D), low (wetland B and C) and moderate ecological values (Wetland A and E).

The proposed activities include fill placement, and haul road construction including a new bridge. The fill areas have been located to avoid reclamation of steam and wetlands. Protection and planting of riparian zones is also proposed in order to generate a positive ecological outcome for the project. This will provide an additional buffer zone to the SEA that will improve the values of the SEA within the property. We recommend that a planting plan is prepared by a suitably qualified and experienced expert.

The proposed bridge will avoid direct effects on stream and wetland habitats and fish passage. The removal of the existing culvert will reinstate an area of wetland and streambed and result in a net gain in ecological values. Surface flows from the active fill areas will be diverted into sediment retention ponds, with treated water discharged into Stream 1, 3 and Wetland E. These ponds will have high sediment removal efficiencies, with treated runoff expected to contain low levels of residual solids, which may result in some localised, minor sediment deposition downstream of the pond discharge points and periodic increases in suspected sediment concentrations. The extent of effects at these locations is likely to be relatively small and adverse effects on stream and wetland ecological values including biodiversity and abundance of plants and animals is likely to be low. Where surface flows are directed into stormwater treatment, flows in Streams 2 and 3 may be reduced. These are Intermittent Streams and hydrological functions will be maintained. Hydrological functions in Wetland E will also be maintained as it has a large catchment uninfluenced by the project. The proposed vegetation removal is limited to hedgerows, rural specimen trees and a stand of macrocarpa trees, and ecological effects are likely to be low; however, we recommend bat checks prior to felling the macrocarpa trees if these are still in place. Adverse effects on the terrestrial SEA that adjoins Wetland E will be avoided.

We conclude that the project will avoid or minimise adverse ecological effects associated with the construction and operation of the managed fill. Furthermore, measures such as stream and wetland daylighting, riparian protection, and weed and pest control are likely to result in net positive ecological outcome.

7.0 References

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Appendix 1: River and Stream Definitions, Auckland Unitary Plan

River or stream

A continually or intermittently flowing body of fresh water, excluding ephemeral streams, and includes a stream or modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal except where it is a modified element of a natural drainage system).

Ephemeral stream

Stream reaches with a bed above the water table at all times, with water only flowing during and shortly after rain events. This category is defined as those stream reaches that do not meet the definition of permanent river or stream or intermittent stream.

Intermittent stream

Stream reaches that cease to flow for periods of the year because the bed is periodically above the water table. This category is defined by those stream reaches that do not meet the definition of permanent river or stream and meet at least three of the following criteria:

- (a) it has natural pools;
- (b) it has a well-defined channel, such that the bed and banks can be distinguished;
- (c) it contains surface water more than 48 hours after a rain event which results in stream flow:
- (d) rooted terrestrial vegetation is not established across the entire cross-sectional width of the channel;
- (e) organic debris resulting from flood can be seen on the floodplain; or
- (f) there is evidence of substrate sorting process, including scour and deposition.

Permanent river or stream

The continually flowing reaches of any river or stream.

Appendix 2: SEV data

Function	Variable (code)	Site 1
	Vchann	0.25
	Vlining	0.90
	Vpipe	1.00
NFR	=	0.47
	Vbank	1.00
	Vrough	0.25
FLE	=	0.25
	Vbarr	0.30
CSM	=	0.30
	Vchanshape	0.90
	Vlining	0.90
CGW	=	0.90
	Hydraulic function mean score	0.48
	Vshade	0.20
WTC	=	0.20
	Vdod	0.60
DOM	=	0.60
	Vripar	0.10
	Vdecid	0.00
OMI	=	0.05
	Vmacro	0.94
	Vretain	0.20
IPR	=	0.20
	Vsurf	0.21
	Vripfilt	0.40
DOP	=	0.31
	Biogeochemical function mean score	0.27
	Vgalspwn	1.00
	Vgalqual	0.25
	Vgobspwn	0.10
FSH	=	0.18
	Vphyshab	0.18
	Vwatqual	0.12
	Vimperv	0.70
HAF	=	0.29
	Habitat provision function mean score	
	Vfish	0.37
FFI	=	0.37
	Vmci	0.26
	Vept	0.17
	Vinvert	0.47
IFI	=	0.30
	Vripcond	0.18
	Vripconn	1.00
RVI	=	0.18
	Biodiversity function mean score	0.28
	Overall mean SEV score (maximum value 1)	0.33

Appendix 3: Vegetation Plot Data

Plot Number		_ 1									
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture	Dominant Species is	Dominant Species is OBL. FACW.	Score (Prevalence)	Points
o-letter code	/a Cover	Dominant (30/20 rule) 1 / N	Species Name	Continue Name	Tilleat Status	Wetland Status	species	Species is OBL, FACW	FAC	Score (Frevalence)	(Prevalence)
lolper	30	у	Lolium perenne	Perennial Rye Grass		FACU	Y			4	120.0
trirep	30	у	Trifolium repens	White Clover		FACU	Y			4	120.0
ranrep rumobt	20 15	У	Ranunculus repens Rumex obtusifolius	Creeping Buttercup Broad-leaved Dock		FAC FAC			Yes	3	60.0 45.0
plalan	5		Plantago lanceolata	Narrow-leaved Plantain		FACU	Y			4	20.0
pididil	,		r lantago lanceolata	Ivanow-leaved Flamain		7 ACO				4	20.0
Number of species: 5	Percent vegetation cover: 100	Number of dominant species: 3									
	and hydrology and hydric soil (1 =										
Primary hydrology indicators				Secondary hydrology indicate	ors						
1A. Surface water		2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture ex	xclusion test:		
1B. Groundwater <30 cm		2H. Sparsely vegetated concave surface		2L. Drainage patterns					65		
1C. Soil saturation <30 cm		2L Salt crust		3E. Dry-season water table				Pasture cover	65		
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	100		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	100		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0.65		
2D. Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is	s pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks							
2F. Surface soil cracks		4A. High water table stunted/stressed plants		Hydric Soil?:		n					
Clarkson 2013						MFE 2021					
Wetland vegetation determinat	ition					Wetland determination	n				
1. Rapid test score:	0%	Wetland if all dominant species across all stra (pass score = 100%)	ta rated OBL and/or FACW	Fail		1. Rapid test score:	0%	Wetland if all dor across all strata FACW (pass sco	rated OBL and/or	Fail	
2a. Dominance Test Score:	33%	Wetland if more than 50% of dominant specie OBL, FACW, or FAC using the 50/20 rule.	s across all strata are rated	Fail		2a. Dominance Test Score:	33%	Wetland if more t		Fail	
2b. FAC dominants	33%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	3.7	Wetland if PI ≤ 3	d be used alongside	Fail	
3. Indicators of hydric soil and wetland hydrology	No	YES (Pass) or NO (Fail)		Fail		3. Dominance + Prev	alence			Fails Both	
4. Prevalence Index Result:	3.7	Wetland if PI ≤ 3.0, but values around 3.0 sho wetland indicators.	uld be used alongside other	Fail		4a. Indicators of wetland hydrology	No	YES (Pass) or N	O (Fail)	Fails Hydrology Test	
Is it a wetland?		<u>It's not wetland vegetati</u>	ion!			4b. Indicators of hydric soil present?	Yes	YES (Pass) or N	O (Fail)	Passes Soil Test	
	l.					Is it a wetland?			Wetland under the		
Plot Number		2						Dominant			
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Species is OBL, FACW	is OBL, FACW,	Score (Prevalence)	Points (Prevalence)
lotped	10		Lotus pedunculatus	Latus		FAC					
junart							Y			3	30.0
impoff	40	у	Juncus articulatus	Jointed Rush		FACW	Y	Yes	Yes	2	80.0
juneff	10	у	Juncus effusus	Jointed Rush Leafless Rush		FACW FACW		Yes	Yes	3 2 2	80.0 20.0
juneff hollan	40 10 10 5	у	Juncus effusus Holcus Ianatus	Jointed Rush Leafless Rush Yorkshire Fog		FACW FACW FAC	Y	Yes	Yes	3 2 2 2 3 3	80.0 20.0 30.0
uneff hollan ranrep isocer	10 10	у	Juncus effusus	Jointed Rush Leafless Rush		FACW FACW		Yes	Yes	3 2 2 2 3 3	80.0 20.0
juneff hollan ranrep isocer Number of species: 6	10 10 5 25 Percent vegetation cover: 100	y Number of dominant species: 2	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Rush Leafless Rush Yorkshire Fog		FACW FACW FAC FAC				3 2 2 3 3 1	80.0 20.0 30.0 15.0
juneff hollan ranrep isocer Number of species: 6	10 10 5 25	y Number of dominant species: 2	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Rush Leafless Rush Yorkshire Fog	tors	FACW FACW FAC FAC				3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
juneff holian ranrep isocer Number of species: 6 OPTIONAL Indicators of wettar Primary hydrology indicators	10 10 5 25 Percent vegetation cover: 100	y Number of dominant species: 2 present, 0 = not present)	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Rush Leafless Rush Yorkshire Fog Creeping Buttercup	tors	FACW FACW FAC FAC		Yes	Yes	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
uneff hollan harrep socer Number of species: 6 DPTIONAL Indicators of wetlar Primary hydrology indicators 1A Surface water	10 10 5 25 Percent vegetation cover: 100	y Number of dominant species: 2 present, 0 = not present) 20. Inundation on aerial imagery	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Rush Leafless Rush Yorkshire Fog Creeping Buttercup Secondary hydrology indicat 2K. Water-stained leaves	tors	FACW FACW FAC FAC		Yes Pasture e	Yes xclusion test:	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
unelf Johan	10 10 5 25 Percent vegetation cover: 100	y Number of dominant species: 2 present, 0 = not present)	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Rush Leafless Rush Yorkshire Fog Creeping Buttercup Secondary hydrology indicat 2K, Water stained leaves 2L. Drainage patterns	tors	FACW FACW FAC FAC		Yes	Yes	3 2 2 3 3 1	80.0 20.0 30.0 15.0
unelf Johan	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydric soil (1 =	y Number of dominant species: 2 present, 0 = not present) 26. Inundation on serial imagery 24. Sparsely regetated concave surface	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Rush Leafless Rush Yorkshire Fog Creeping Buttercup Secondary hydrology indicat 2K, Water-stained leaves 2L. Dralmage patterns 3E. Ory-season water table	tors	FACW FACW FAC FAC		Yes Pasture e Pasture cover	Yes xclusion test:	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
unelf onolian arrep soccer Number of species: 6 OPTIONAL Indicators of wetlar Primary hydrology indicators 1.8 Surface water 1.6. Coll asturation -30 cm 1.7. Water marks	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydric soil (1 =	y Number of dominant species: 2 present, 0 = not present) 10. Inundation on serial imagery 214. Sparsal vegetated concave surface 2.4 Sacrosst	Juncus effusus Holcus lanatus Ranunculus repens	Jointed Risch Leafless Rush Yorkshire Fog Creeping Buttercup Cree	tors	FACW FACW FAC FAC		Yes Pasture e	Yes xclusion test:	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
unelf oblish arrep Socor Number of species: 6 DPTIONAL Indicators of wetlar Zimary Indivology indicators I.A. Surface water B. G. Soll asturation - 30 cm I.A. Water marks B. B. Sediment deposits	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydric soil (1 =	y Number of dominant species: 2 present, 0 = not present) 20. Inundation on serial imagery 216. Sparsed vegetated concave surface 21. Sea crust 23. Aquatic inventebrates 23. Aquatic inventebrates	Juncus effusus Holcus lanatus Ranunculus repens	Junited Rush Leafless Rush Yorkshire Fog Creeping Buttercup Secondary hydrology indicate 28. Water stained leaves 2.0. Oralosop pathers 36. Dry-sesson water stable 37. Saturation in serial imagery 48.4. Comprehension	tors	FACW FACW FAC FAC		Yes Pasture e Pasture cover Vegetation cover	Yes xclusion test:	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
uneff hobian rarrep socor Number of species: 6 OPTIONAL indicators of wetlar Primary hydrology indicators 18. Seroundwater -00 cm (1. Sel saturation -00 cm 22. Water marks 28. Sediment deposits Co. Drift deposits	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydric soil (1 =	y Number of dominant species: 2 present, 0 = not present) 30. Inundation on aerial imagery 31. Separaty vegation concere surface 32. Safe course. 32. Aquatic inventibates	Juncus effusus Holcus lanatus Ranunculus repens	Jurind Ruth Leaflines Ruth Vorkshire Fog Creeping Buttercup Secondary Invertibles Vision Secondary Invertibles Vision Secondary Invertibles Vision Secondary Invertibles Vision Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Investigation Secondary	tors	FACW FACW FAC FAC		Pasture e Pasture cover Vegetation cover	Yes xclusion test: 20 100 0.2	3 2 2 3 3 1	80.0 20.0 30.0 15.0
urelf voible arrep cooper voible Number of species: 6 PPTIONAL Indicators of wells Primary hydrology indicators A Surface water B. Gorundwater 00 cm C. Sol saturation <00 cm A. Water marks B. Sediment deposits C. Orth deposits C. Orth deposits O. Algal materiat	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydric soil (1 =	V Number of dominant species: 2 present, 0 = not present) 30. Inundation on aerial imagery 31. San crust of concerve surface 32. San crust 32. Aquatic inventebrates 32. Aquatic inventebrates 32. Aquatic inventebrates 32. Aquatic present order 33. Consideration of the concerve surface 34. Hydrogen suiffice odour	Juncus effusus Holcus lanatus Ranunculus repens	Junited Rush Leafless Rush Vorkshire Fog Creeging Buttercup Scondary Inytirology, Indicas 28. Water statined leaves 22. United statined leaves 32. Drivange patients 32. Drysacon water table 74. Saturation in aerial imagery 46. Genomyphic poetion 46. Salabow aquitant 46. Salabow aquitant 46. PAG-construction	tors	FACW FACW FAC FAC		Pasture e Pasture cover Vegetation cover	Yes xclusion test: 20 100	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
ureff ordin narrep Ordin narrep Ordin Number of species: 6 Ordin Ordin State Ordin Ordin State Ordin O	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydric soil (1 =	y Number of dominant species: 2 present, 0 = not present) 25. Inundation on aerial imagery 25. Inundation on aerial imagery 25. Sparsely seguitated concave surface 25. Sparsely seguitated concave surface 25. April	Juncus effusus Holcus lanatus Ranunculus repens	Jurind Ruth Leaflines Ruth Vorkshire Fog Creeping Buttercup Secondary Invertibles Vision Secondary Invertibles Vision Secondary Invertibles Vision Secondary Invertibles Vision Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Invertibles Secondary Investigation Secondary	tors	FACW FACW FAC FAC		Pasture e Pasture cover Vegetation cover	Yes xclusion test: 20 100 0.2	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
jurelf horizon	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydrol soil (1=1 1 1	V Number of dominant species: 2 presents 0, en not present) 20. Invariation on serial imagery 30. Invariation on serial imagery 31. San crue 31. San crue 32. A species united concrete surface 33. A species invertebrate 33. A regular invertebrate 34. Rydrogen suffice odour 36. Oxidized rhospite on orosts 3C. Reduced iron in titled soil	Juncus effusus Holcus lanatus Ranunculus repens	Junited Rush Leafless Rush Vorkshire Fog Creeging Buttercup Scondary Inytirology, Indicas 28. Water statined leaves 22. United statined leaves 32. Drivange patients 32. Drysacon water table 74. Saturation in aerial imagery 46. Genomyphic poetion 46. Salabow aquitant 46. Salabow aquitant 46. PAG-construction	COTS	FACW FACW FAC FAC OBL OBL		Pasture e Pasture cover Vegetation cover	Yes xclusion test: 20 100 0.2	3 2 2 3 3 1	80.0 20.0 30.0 15.0
urelf Indian Ind	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydrol soil (1=1 1 1	V Number of dominant species: 2 presents 0, en not present) 20. Invariation on serial imagery 30. Invariation on serial imagery 31. San crue 31. San crue 32. A species united concrete surface 33. A species invertebrate 33. A regular invertebrate 34. Rydrogen suffice odour 36. Oxidized rhospite on orosts 3C. Reduced iron in titled soil	Juncus effusus Holcus lanatus Ranunculus repens	Junited Rush Leafless Rush Vorkshire Fog Creeging Buttercup Scondary Inytirology, Indicas 28. Water statined leaves 22. United statined leaves 32. Drivange patients 32. Drysacon water table 74. Saturation in aerial imagery 46. Genomyphic poetion 46. Salabow aquitant 46. Salabow aquitant 46. PAG-construction	tors.	FACW FACW FAC FAC		Pasture e Pasture cover Vegetation cover This is	xclusion test: 20 100 0.2 not pasture	3 2 2 2 3 3 1	80.0 20.0 30.0 15.0
junelf hobian rarrep home home home home home home home home	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydrol soil (1=1 1 1	V Number of dominant species: 2 presents 0, en not present) 20. Invariation on serial imagery 30. Invariation on serial imagery 31. San crue 31. San crue 32. A species united concrete surface 33. A species invertebrate 33. A regular invertebrate 34. Rydrogen suffice odour 36. Oxidized rhospite on orosts 3C. Reduced iron in titled soil	Jancus effusus Hölcus fanatus Ranunculus reperis Isolepis cernus	Junited Rush Leafless Rush Vorkshire Fog Creeging Buttercup Scondary Inytirology, Indicas 28. Water statined leaves 22. United statined leaves 32. Drivange patients 32. Drysacon water table 74. Saturation in aerial imagery 46. Genomyphic poetion 46. Salabow aquitant 46. Salabow aquitant 46. PAG-construction	lors .	FACW FACW FAC FAC OBL OBL		Pasture e Pasture cover Vegetation cover This is	xclusion test: 20 100 0.2 not pasture	3 2 2 3 3 1	80.0 20.0 30.0 15.0
urself norbian narrep Gooden Number of species: 6 OFF (OVA) Indicators of events Primary hydrology and indicators A Burles water B Gooden of the Control of the Control C Self saturation - 00 cm A Water marks B Geomete deposits C Oth deposits D Again markets F Serface sol cracks D Again markets F Serface sol cracks D Clarkson 2013 Westand Vegetation disterminat	10 10 5 25 Percent vegetation cover: 100 and hydrology and hydrologic (1 = 1) 1 1	y Number of dominant species: 2 present, 0 = not present) 20. Inundation on serial imagery 216. Sparsed vegetated concave surface 21. Search 21. Sparsed vegetated concave surface 21. Agratic inventibrates 21. Agratic inventibrates 31. Reduced inventibrates 310. Ordinate of the concept of the conc	Jancus effusus Holcus Janabus Ranunculus repens Isolepis cernus	Jurinde Rush Leaflines Rush Vorkshire Fog Creeping Buttercup Secondary Invertibles Investigation Secondary Investigation Se	Ors	FACW FACW FAC FAC OBL 1 MFE 2021 Wetland determination	У	Pasture over Pasture cover Vegetation cover This is: Wetland if all doarcross all strata FACW plans sow Wetland if more dominant species	xclusion test: 20 100 0.2 not pasture minant species rated OBL and/or re = 100%	3 1	80.0 20.0 30.0 15.0
urueff horibain harrepo horibain harrepo horibain harrepo horibain harrepo horibain harrepo horibain harrepo h	10 10 5 25 Percent vegetation cover: 100 nd hydrology and hydric soil; (1 = 1 1 1 100%	y Number of dominant species: 2 present, 2 a not present) 20. Invarion on annia imagery 21. Sarealy registed concave surface 21. Sale crust 22. Aquatic inventibables 33. Hydrogen suifiles dodur 34. Rodissid influence onots 50. Reduced son 50. Reduced son 44. High vaster table stunned/stressed plants Wetland if all dominant species across all stre (pass score = 100%) Wetland if more than 50% of dominant species	Jancus effusus Holcus Janabus Ranunculus repens Isolepis cernus	Jurinde Rush Leafless Rush Vorkshire Fog Creeping Buttercup Scorness I bydrology Indicat 25. Water stated leaves 25. Water stated leaves 35. Dryslasped leaves 35. Dryslasped leaves 36. Dryslasped leaves 46. Sonalow pagind	OTS	FACW FACW FAC FAC OBL 1 MFE 2021 Wetland determination 1. Rapid test score: 2a. Dominance Test	Y 100%	Pasture cover Pasture cover Vegetation cover This is: Wetland if all dol across all strata FACW pass soc dominant specie are rated OBL, it is followed to the Community of the Cover of	Yes Xolusion test: 20 100 0.2 mon pasture minant species rated OBL and/or ore = 100% of as across all strata FACW, or FAC using 3.0, but values did be used alongside does used alongside does and alongside does are alongside on the second support of the secon	3 1	80.0 20.0 30.0 15.0
urueff horbitan harrene horbitan harrene horbitan harrene horbitan harrene har	10 10 5 25 Percent vegetation cover: 100 nd hydrology and hydric soil (1= 1 1 1 1 10%	y Number of dominant species: 2 present, 2e not present) 20. Inundation on aerial imagery 215. Sarvel years of concern surface 15. Sarvel 23. Availate inventibrates 24. Availate inventibrates 25. Availate inventibrates 26. Reduced iron in tilled soil 26. Reduced iron in til	Jancus effusus Holcus Janabus Ranunculus repens Isolepis cernus	Jointed Roth Lorinder Roth Vorkshire Fog Creeping Buttercup Creeping Buttercup 2K. Water stained leaves 2K. Water stained leaves 2E. Dryseason water stable 2F. Santration in aerial imagery 4G. Santophile position 4G. Shaloba aguitant 4G.	lors .	FACW FAC FAC FAC OBL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100% 100% 2.00	Pasture over Pasture cover Vegetation cover This is. Wetland if all do across all strate FACW (pass command specified are rated OBL, it who 50/20 ride. Wetland if Pis S arrows of the So/20 ride.	Yes Xolusion test: 20 100 0.2 mon pasture minant species rated OBL and/or ore = 100% of as across all strata FACW, or FAC using 3.0, but values did be used alongside does used alongside does and alongside does are alongside on the second support of the secon	Pass	80.0 20.0 30.0 15.0
urueff horibaln harrerp horibaln harrerp horibaln harrerp horibaln harrerp horibaln harrerp ha	10 10 5 25 Percent vegetation cover: 100 nd hydrology and hydrologic (1= 1 1 1 1 100%	y Number of dominant species: 2 present, 0 = not present) 20. Invalor on enterial imagery 31. Sundon on enterial imagery 32. Invalor on enterial imagery 32. Sanctus 32. Aquatic inventibrates 33. Aquatic inventibrates 33. Aquatic inventibrates 34. Hydrogen suitiles adour 44. High vater trable simmediversed plants 45. Reduced iron 30. Reduced iron in titled soil 46. High vater trable simmediversed plants Wetland if all dominant species across all stre (pass score = 100%) Wetland if more than 50% of dominant specie OBL, FACW, or FAC using the 50/20 rule. Are all or most dominants FAC?	Jancus effusus Holcus Inantus Ramuculus reperis Isolepis cernus Isolepis cernu	Jurinde Rush Leafles Rush Vorkshire Fog Creeping Buttercup Secondary hydrology indicat 24. Water-stained faves 24. Orainage patterns 25. Orainage patterns 26. Shallow subgulard 40. FAC-orainage hummocks injurite Self? Pass Pass No	COTS.	FACW FACW FAC FAC OBL 1 MFE 2021 Wetland determination 1. Rapid teat score: 2a. Dominance Test Score:	100% 100% 2.00	Pasture over Pasture cover Vegetation cover This is. Wetland if all do across all strate FACW (pass command specified are rated OBL, it who 50/20 ride. Wetland if Pis S arrows of the So/20 ride.	Yes xelusion test: 20 100 0.2 not pasture minant species rated ORL and/or rate - 100% of the 100% of the 100% of the 100% of the 100% of FAC using 8.0, but values de tous alongside dicators.	Pass Pass	80.0 20.0 30.0 15.0
juned horbidan carriery of species: 6 POPTIONAL Indicators of evolution for the property of th	10 10 5 25 Percent vegetation cover: 100 and by declopy and by die soil (1= 1 1 1 1 100% 100% Ves	y Number of dominant species: 2 present, 0s not present) 20. Invalidation on aerial imagery 21. Sand rover 22. Sand rover 23. Sand rover 23. Sand rover 24. Regulate liver dender 26. Reduced into 26. Reduced	Jancus effusus Hölcus fanatus Rannuculus reperis Isolepis cernus Isolepis cern	Joined Rush Leafless Rush Yorkshire Fog Creeping Buttercup Creeping Buttercup Secondary Inydrology indicat 28. Water-stained leaves 28. Water-stained leaves 28. Dray-season water stable 37. Saturation in aerial magary 40. Forest heart stable 40. FAC-mountained 40. FAC-mountain	OTS	FACW FACW FAC FAC OBL OBL 1 SEE 2025 Wetland determination 1, Rapid test score: 2a, Dominance Test Score: 3. Dominance + Prev. 4a, Indicators of	100% 100% 2.00	Pasture e Pasture cover Vegetation cover This is. Wetland if all do across all strata FACW pass SW Wetland if more downard special or are downard special or downard sp	Yes Xelusion test: 20 100 0.2 mot pasture minert species rated OBL and/or ore = 100%) than 50% of the across all strata ArcW, or FAC using 8.0, but values do be used alongside dicators. XO (Fall)	Pass Pass Pass Passe Both Passes Hydrology	80.0 20.0 30.0 15.0

Plot Number		3									
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL. FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)
juneff	40	у	Juncus effusus	Leafless Rush		FACW		Yes	Yes	2	80.0
junart	25	y	Juncus articulatus	Jointed Rush		FACW		Yes	Yes	2	50.0
lotped	10		Lotus pedunculatus	Lotus		FAC	Y			3	30.0
plalan	10		Plantago lanceolata	Narrow-leaved Plantain		FACU	Y			4	40.0
pasdil	2		Paspalum dilatatum	Paspalum		FACU	Y			4	8.0
cenuni	5		Centella uniflora	Centella		FACW				2	10.0
cyndac	2		Cynodon dactylon	Bermuda Grass		FACU				4	8.0
pruvul	2		Prunella vulgaris	Selfheal		FACU				4	8.0
belper	2		Bellis perennis	Bellis Daisy		FACU				4	8.0
Number of species: 9	Percent vegetation cover: 98	Number of dominant species: 2									
OPTIONAL Indicators of wetla	and hydrology and hydric soil (1 =	present, 0 = not present)									
Primary hydrology indicators				Secondary hydrology indicat	ors						
1A. Surface water		2G. Inundation on aerial imagery		7 7 37				Pasturo o	xclusion test:		
1B. Groundwater #30 cm		2H. Sparsely vegetated concave surface		2K. Water-stained leaves			-	- asture e.	I		
1C. Soil saturation <30 cm				2L. Drainage patterns	-			Pasture cover	22		
	1	2l. Salt crust		3E. Dry-season water table							
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	98		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	50		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard				0.22	4489796		
2D. Algal mat/crust		3C. Reduced iron		4D FAC-neutral test				This is	not pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks							
2F. Surface soil cracks		4A. High water table stunted/stressed plants		Hydric Soil?:		1					
Clarkson 2013				Tryunc cont.		MFE 2021		•			
Wetland vegetation determina	tion					Wetland determination	on				
1. Rapid test score:	100%	Wetland if all dominant species across all strat (pass score = 100%)	ta rated OBL and/or FACW	Pass		1. Rapid test score:	100%	Wetland if all dor across all strata FACW (pass so	rated OBL and/or	Pass	
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species OBL, FACW, or FAC using the 50/20 rule.	s across all strata are rated	Pass		2a. Dominance Test Score:	100%		than 50% of s across all strata FACW, or FAC using	Pass	
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	2.47	Wetland if PI ≤ 3 around 3.0 shoul other wetland inc	d be used alongside	Pass	
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence			Passes Both	
4. Prevalence Index Result:	2.5	Wetland if PI ≤ 3.0, but values around 3.0 showetland indicators.	uld be used alongside other	Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or N	IO (Fail)	Passes Hydrology Test	
Is it a wetland?		It's wetland vegetation	<u>n!</u>			4b. Indicators of hydric soil present?	Yes	YES (Pass) or N	IO (Fail)	Passes Soil Test	
						Is it a wetland?		It's a W	etland under the R	MA!	

			,								
Plot Number	ceni	tre of wetland						Dominant	Dominant Species		
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Species is OBL. FACW	is OBL, FACW,	Score (Prevalence)	Points (Prevalence)
macrub	40	v	Machaerina rubiginosa	Baumea	Not Threatened	OBL		Yes	Yes	1	40.0
junart	30	ý	Juncus articulatus	Jointed Rush		FACW		Yes	Yes	2	60.0
juneff	10	•	Juncus effusus	Leafless Rush		FACW				2	20.0
hollan	5		Holcus lanatus	Yorkshire Fog		FAC	Y			3	15.0
lotped	5		Lotus pedunculatus	Lotus		FAC	Y			3	15.0
cenuni	2		Centella uniflora	Centella		FACW				2	4.0
blemin	4		Blechnum minus	Swamp Kiokio	Not Threatened	FACW				2	8.0
sphagn	4		Sphagnum species			OBL				1	4.0
Number of species: 8	Percent vegetation cover: 100	Number of dominant species: 2									
OPTIONAL Indicators of wetla	nd hydrology and hydric soil (1 =	present, 0 = not present)									
Primary hydrology indicators				Secondary hydrology indicat	ors						
1A. Surface water	1	2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture ex	clusion test:		
1B. Groundwater <30 cm	1	2H. Sparsely vegetated concave surface		2L. Drainage patterns				Pasture cover	10		
1C. Soil saturation <30 cm		2l. Salt crust		3E. Dry-season water table				Pasture cover	10		
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	100		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	100		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0.1		
2D. Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is r	not pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks							
2F. Surface soil cracks		4A. High water table stunted/stressed plants		Hydric Soil?:		1					
Clarkson 2013				Tryone don't.		MFE 2021					
Wetland vegetation determina	tion					Wetland determination	n .				
1. Rapid test score:	100%	Wetland if all dominant species across all stra (pass score = 100%)	ata rated OBL and/or FACW	Pass		1. Rapid test score:	100%	Wetland if all dor across all strata FACW (pass sco	rated OBL and/or	Pass	
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant specie OBL, FACW, or FAC using the 50/20 rule.	s across all strata are rated	Pass		2a. Dominance Test Score:	100%		than 50% of s across all strata ACW, or FAC using	Pass	
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	1.66	Wetland if PI ≤ 3 around 3.0 should other wetland ind	d be used alongside	Pass	
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence			Passes Both	
4. Prevalence Index Result:	1.7	Wetland if PI ≤ 3.0, but values around 3.0 sho wetland indicators.	ould be used alongside other	Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or N	O (Fail)	Passes Hydrology Test	
Is it a wetland?		<u>It's wetland vegetation</u>	<u>n!</u>			4b. Indicators of hydric soil present?	Yes	YES (Pass) or N	O (Fail)	Passes Soil Test	
						Is it a wetland?		<u>It's a W</u>	etland under the Ri	WA!	

Plot Number		4									
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture	Dominant Species is	Dominant Species is OBL. FACW.	Score (Prevalence)	Points
		Dominant (SW25 Tale) 17 N			Timedi Otatas		species	OBL, FACW	FAC	odore (i revalence)	(Prevalence)
juneff lotped	10 10		Juncus effusus Lotus pedunculatus	Leafless Rush Lotus		FACW FAC				2	20.0 30.0
isopro	20	У	Isolepis prolifera	Three Square	Not Threatened	OBL	,	Yes	Yes	1	20.0
junart	40	у	Juncus articulatus	Jointed Rush		FACW		Yes	Yes	2	80.0
lolper	5		Lolium perenne Ranunculus repens	Perennial Rye Grass Creeping Buttercup		FACU FAC	Y			4 3	20.0 15.0
ranrep blemin	5		Blechnum minus	Swamp Kiokio	Not Threatened	FACW				2	10.0
hollan	5		Holcus lanatus	Yorkshire Fog		FAC	Y			3	15.0
pasdil	5		Paspalum dilatatum	Paspalum		FACU	Y			4	20.0
isocer	5		Isolepis cernua			OBL				1	5.0
Number of species: 10	Percent vegetation cover: 110	Number of dominant species: 2									
OPTIONAL Indicators of wetla		present, 0 = not present)									
Primary hydrology indicators	,,, (p		Secondary hydrology indicat	tors						
1A. Surface water	1	2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture e	xclusion test:		
1B. Groundwater <30 cm		2H. Sparsely vegetated concave surface		2L. Drainage patterns				Pasture cover	25		
1C. Soil saturation <30 cm		2I. Salt crust		3E. Dry-season water table					23		
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	110		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover			
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					7272727		
2D. Algal mat/crust 2E. Iron deposits		3C. Reduced iron 3D. Reduced iron in tilled soil		4D. FAC-neutral test				This is	not pasture		
2F. Surface soil cracks				4E. Frost-heave hummocks		4					
ZF. Surface soil cracks Clarkson 2013		4A. High water table stunted/stressed plants		Hydric Soil?:		MFE 2021	_				
Wetland vegetation determina	ation					Wetland determination	on				
		Wetland if all dominant species across all stra	its rated ORL cod/or EACH					Wetland if all do	minant species		
1. Rapid test score:	100%	(pass score = 100%)	MA TARES ODE BISSOI FACW	Pass		1. Rapid test score:	100%	across all strata	rated OBL and/or	Pass	
				1	1			FACW (pass sco			
								Wetland if more			
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant specie OBL, FACW, or FAC using the 50/20 rule.	s across all strata are rated	Pass		2a. Dominance Test Score:	100%		s across all strata FACW, or FAC using	Pass	
	1	CDL, 7 NOTE, OF LING USING THE SUIZU FUIR.				00016.		the 50/20 rule.	TOTT, OF FAC USING		
								Wetland if PI ≤ 3	O but values		
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence	2.14	around 3.0 shoul	d be used alongside	Pass	
						Index Score:		other wetland inc	dicators.		
3. Indicators of hydric soil and wetland hydrology											
and wetland hydrology	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence			Passes Both	
present?						4a. Indicators of	_	1			
4. Prevalence Index Result:	2.1	Wetland if PI ≤ 3.0, but values around 3.0 sho wetland indicators.	uld be used alongside other	Pass		wetland hydrology	Yes	YES (Pass) or N	IO (Fail)	Passes Hydrology Test	
		wetland indicators.				present?				rest	
Is it a wetland?		It's wetland vegetation	nl			4b. Indicators of	Yes	YES (Pass) or N	IO (Enil)	Passes Soil Test	
is it a wetiand?		it's wedano vegetatio	<u></u>			hydric soil present?	res	TES (Pass) OF N	IO (Fall)	Passes Sui Test	
								•			
						le it a wetland?		It's a M	otland under the B	MAI	
						Is it a wetland?		<u>It's a W</u>	etland under the R	MA!	
						Is it a wetland?		<u>It's a W</u>	etland under the R	<u>MA!</u>	
Plot Number		5				Is it a wetland?		<u>It's a W</u>	etland under the R	MA!	
Plot Number		5					Partura	Dominant	Dominant Species		Points
Plot Number 6-letter code	% Cover	5 Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	is it a wetland? Wetland Status	Pasture species	Dominant	Dominant Species is OBL, FACW,	Score (Prevalence)	Points (Prevalence)
6-letter code		5 Dominant (50/20 rule) Y / N			Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species		(Prevalence)
	10 20	5 Dominant (50/20 rule) Y / N	Species Name Juncus effusus Juncus enticulatus	Common Name Leafless Rush Jointed Rush	Threat Status	Wetland Status FACW FACW	Pasture species	Dominant	Dominant Species is OBL, FACW,		(Prevalence) 20.0 40.0
6-letter code juneff junart hollan	10 20 35		Juncus effusus Juncus articulatus Holcus lanatus	Leafless Rush Jointed Rush Yorkshire Fog	Threat Status	Wetland Status FACW FACW FAC	Pasture species Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC		20.0 40.0 105.0
6-letter code juneff junart hollan ranrep	10 20	у	Juncus effusus Juncus articulatus Holcus Ianatus Ranunculus repens	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup	Threat Status	Wetland Status FACW FACW FAC FAC	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC Yes		20.0 40.0 105.0 30.0
6-letter code juneff junart hollan ranrep pruvul	10 20 35 10 2	y y	Juncus effusus Juncus articulatus Holcus Ianatus Ranunculus repens Prunella vulgaris	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup Selfheal	Threat Status	Wetland Status FACW FACW FAC FAC FAC	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC Yes		20.0 40.0 105.0 30.0 8.0
6-letter code juneff junart hollan ranrep	10 20 35	у	Juncus effusus Juncus articulatus Holcus Ianatus Ranunculus repens	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup	Threat Status	Wetland Status FACW FACW FAC FAC	Pasture species Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC Yes		20.0 40.0 105.0 30.0
6-letter code juneff junart hollan ranrep pruvul pasdil	10 20 35 10 2	y y	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup Selfheal Paspalum	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC Yes		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code juneff junest junest bollan trannep pruvul passdi perhyd Number of species: 7	10 20 35 10 2 20 3 Percent vegetation cover: 100	y y Y Number of dominant species: 3	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup Selfheal Paspalum	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC Yes		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code juneff junest junest bollan trannep pruvul passdi perhyd Number of species: 7	10 20 35 10 2 20 3	y y Y Number of dominant species: 3	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup Selfhaal Paspalum Water Pepper	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC Yes		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Juneif Juneif Juneit Dollan Juneit Ju	10 20 35 10 2 20 3 Percent vegetation cover: 100	Y Y Y Number of dominant species: 3 present, 0 = not present)	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Yorkshire Fog Creeping Buttercup Selfheaf Paspalum Water Pepper	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y	Dominant Species is OBL, FACW Yes	Dominant Species is OBL, FACW, FAC Yes Yes		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Laneff Lanert boilan carrep pruvul pasoli perhyd Definion of species: 7 GPTIONAL indicators of wetn Primary hydrology indicators 18, Surface weta	10 20 35 10 2 20 3 3 Percent vegetation cover: 100	Y Y Number of dominant species: 3 present, 0 = not present) 20. Inundation on aniral inappry	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Yorkshire Foq Creeping Buttercup Selfheal Paspalum Water Pepper	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y	Dominant Species is OBL, FACW Yes	Dominant Species is OBL, FACW, FAC Yes Yes Yes Clusion test:		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code parelf parelf parelf bellen parelf bellen parelf bellen parelf bellen parelf portyd Number of species: 7 OFFIONAL indicators of weth parelf parelf As Surface water 14. Surface water 16. Geondearter-20 cm	10 20 35 10 2 20 3 3 Percent vegetation cover: 100	Y Y Y Number of dominant species: 3 present, 0's not present) 30. hundation on antial imagery 31. Sparsely registed domicroeve surface	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Vorkshire Fog Creeping Buttercup Setthead Paspalum Water Papper Water Papper Secondary hydrology indicate 2K. Water-stained leaves L. Undrage patterns	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y Y	Dominant Species is OBL, FACW Yes	Dominant Species is OBL, FACW, FAC Yes Yes		20.0 40.0 105.0 30.0 8.0 80.0
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6-letter code axelf Arter Arter Arter Code	10 20 35 10 2 20 3 3 Percent vegetation cover: 100	Y Y Number of dominant species: 3 present, 0 = not present) 20. hundston on artial magery 21. Sparsal vegetant deconcer surface 2. Sak crust	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Vorkshire Fog Oreoping Bettercup Selfread Paspallum Water Papper School of March Selfread Paspallum Water Papper School of March Selfread School	Threat Status	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y Y	Dominant Species is OBL, FACW Yes	Dominant Species is OBL, FACW, FAC Yes Yes Yes Clusion test:		20.0 40.0 105.0 30.0 8.0 80.0
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6-letter code a-self Jordan	10 20 35 10 2 20 3 3 Percent vegetation cover: 100	Y Y Number of dominant species: 3 present, 0 = not present) 20. Inundation on aerial inappry 21. Sparsay vegetand concave surface 23. Agrants inventionates 33. Agriculture odour 38. Oxidated mix caphere on roots 38. Oxidated mix caphere on roots 36. Reduced into	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Rush Jointed Rush Vorkshire Fog Creeping Bettercup Selfread Passalum Water Papper Water Papper School of Market Pappe	ors	Wetland Status FACW FACW FAC FAC FAC FAC FACU FACU	Pasture species Y Y	Dominant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover	Dominant Species is OBL, FAGW, FAC Yes Yes Students Stude		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code proff Jarrett Coden Garren Coden Garren Countryd Countryd Countryd Number of species: 7 Ostatoh Mall Indicators of levels Filmany Byter Goyy Indicators 1A. Surface water 1C. Soft sametion of dem 1C. Soft sametion of dem 2D. All professors 2D. Contractors 2D. Contract	10 20 35 10 2 20 35 10 2 20 30 36 Percent vegetation cover: 100 and tryckrology and hydric solit (1=1)	V V V V V V V V V V V V V V V V V V V	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Fush Jointed Rush Jointed Rush Vorkshire Forg Onespecial Subsection Passadum Water Papper Water Papper 25. Water stained laws 25. Water stained laws 25. Union with the subsection of the subsection 26. Subsection on settle Imager 45. Subsection in settle Imager 45. Subsection in settle Imager 45. Subsection in Subsection 45. Subsection subsection 45. Subsection squited	673	Wetland Status FACW FACW FAC FAC FACU FACU FACU FACU FACU FACU F	Pasture species Y Y	Dominant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover	Dominant Species is OBL, FAGW, FAC Yes Yes Students Stude		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code a-self Jordan	10 20 35 10 2 20 35 10 2 20 30 36 Percent vegetation cover: 100 and tryckrology and hydric solit (1=1)	V V V V V V V V V V V V V V V V V V V	Juncus effusus Juncus articulatus Holcus lanatus Ranunculus repens Prunella vulgaris Paspalum dilatatum	Leafless Fush Jointed Rush Jointed Rush Vorkshire Forg Onespecial Subsection Passadum Water Papper Water Papper 25. Water stained laws 25. Water stained laws 25. Union with the subsection of the subsection 26. Subsection on settle Imager 45. Subsection in settle Imager 45. Subsection in settle Imager 45. Subsection in Subsection 45. Subsection subsection 45. Subsection squited	673	Wetland Status FACW FACW FAC FAC FACU FACU FACU FACU FACU FACU F	y Y Y	Deminant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover O This is	Dominant Species is OBL FACW, FAC Yes Yes Yes 100 Chusion test:		20.0 40.0 105.0 30.0 8.0 80.0
6-letter code sandf sandt s	10 20 35 10 2 2 30 35 10 4 2 2 30 3 Percent vegetation cover: 100 and hydrology and hy	Y Y Y Number of dominant species: 3 Present, G = not present Poly	Juncus efficielles Juncus efficielles Hotics Industria Politica Industria Prunella vidjaria Paspalum dialatam Persicaria hydropiper	Leafless Rush Jointed Rush Vorkshire Fog Oreeping Bettercup Selfneal Pesspalum Water Pepper Water Pepper Water Pepper John Selfneal Pesspalum John Selfneal Pesspalum John Selfneal Sel	673	Wetland Status FACW FACW FAC FAC FACI FACU FACU FACU FACU FACU FACU FACU FACU	y Y	Dominant Species is OBL, FACW Yes Pasture exe Pasture cover O This is	Dominant Species is OBL FACW, FAC Yes Yes Yes	Score (Prevalence) 2 2 3 3 4 2	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code proff Jarrett Coden Garren Coden Garren Countryd Countryd Countryd Number of species: 7 Ostatoh Mall Indicators of levels Filmany Byter Goyy Indicators 1A. Surface water 1C. Soft sametion of dem 1C. Soft sametion of dem 2D. All professors 2D. Contractors 2D. Contract	10 20 35 10 2 20 35 10 2 20 30 36 Percent vegetation cover: 100 and tryckrology and hydric solit (1=1)	Y Y Y Number of dominant species: 3 present, 0s not present) 20. Invalidation on arrial imagery 21. Sandy replaced oncave surface 21. Sand roust 22. Aquatic inventibates 33. Hydrogen sutilise odour 30. Oxidized threatpers on roots 55. Reduced from it little soil 44. High water table stunted/sitressed plants	Juncus efficielles Juncus efficielles Hotics Industria Politica Industria Prunella vidjaria Paspalum dialatam Persicaria hydropiper	Leafless Fush Jointed Rush Jointed Rush Vorkshire Forg Onespecial Subsection Passadum Water Papper Water Papper 25. Water stained laws 25. Water stained laws 25. Union with the subsection of the subsection 26. Subsection on settle Imager 45. Subsection in settle Imager 45. Subsection in settle Imager 45. Subsection in Subsection 45. Subsection subsection 45. Subsection squited	673	Wetland Status FACW FACW FAC FAC FACU FACU FACU FACU FACU FACU F	y Y Y	Deminant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover O This is	Dominant Species is OBL FACW, FAC Yes Yes Yes 100 Yes		(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
6-letter code unreff unref unref brotan forere provid geed geed geed Geed Geed Geed Geed Gee	10 20 35 10 2 2 30 35 10 4 2 2 30 3 Percent vegetation cover: 100 and hydrology and hy	Y Y Y Number of dominant species: 3 Present, G = not present Poly	Juncus efficielles Juncus efficielles Hotics Industria Politica Industria Prunella vidjaria Paspalum dialatam Persicaria hydropiper	Leafless Rush Jointed Rush Vorkshire Fog Oreeping Bettercup Selfneal Pesspalum Water Pepper Water Pepper Water Pepper John Selfneal Pesspalum John Selfneal Pesspalum John Selfneal Sel	673	Wetland Status FACW FACW FAC FAC FACI FACU FACU FACU FACU FACU FACU FACU FACU	y Y	Dominant Species is OBL, FACW Yes Pasture exe Pasture cover 0 This is Westard if all domacross all strate af AcW (pass south	Dominant Species is 08L FACW, FAC Yes Yes Yes 100 Clusion test: 55 100 C	Score (Prevalence) 2 2 3 3 4 2	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
6-letter code anelf Viriat	10 20 35 10 20 35 20 3 Percent vegetation cover: 100 nd hydrology and hydric soil (1 =	Y Y Y Number of dominant species: 3 Intestrial_Stricts Stricts Y Number of dominant species: 3 Intestrial_Stricts Stricts Intestrial_Stricts Intestrial_Stricts Intestrial_Stricts Intestrial_Stricts Intertrial_Stricts I	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafless Fush Jointed Rush Jointed Rush Vorksher Forg Possible Forg Software Software Water Popper Water Popper Water Popper 24. Water stated laves 25. Water stated laves 25. Drisings patterns 26. Drissasson water table 27. Saturation in arief Imager 46. Semonths guitard 45. Saturation in arief Imager 45. Possible spatiar 45. Prost-bare hummocks hydre Soft:	673	Wetland Status FACW FACW FAC FAC FACI FACU FACU FACU FACU FACU FACU FACU FACU	y Y 33%	Dominant Species is OBL, FACW Yes Pasture ever Pasture cover Cover This is Wetlant if all dominant species dominant species Wetlant if more to dominant species	Dominant Species is OBL FACW, FAC Yes Yes Yes 100 Clusion test: 55 100 155 pasture 100 pas	Score (Prevalence) 2 2 3 3 4 2 Fail	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
6-letter code sandf sandt s	10 20 35 10 2 2 30 35 10 4 2 2 30 3 Percent vegetation cover: 100 and hydrology and hy	Y Y Y Number of dominant species: 3 Present, G = not present Poly	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafless Rush Jointed Rush Vorkshire Fog Oreeping Bettercup Selfneal Pesspalum Water Pepper Water Pepper Water Pepper John Selfneal Pesspalum John Selfneal Pesspalum John Selfneal Sel	673	Wetland Status FACW FACW FAC FAC FACI FACU FACU FACU FACU FACU FACU FACU FACU	y Y	Dominant Species is OBL, FACW Yes Pasture ex- Pasture cover Vegetation cover Vegetation cover Vegetation for the second of	Dominant Species is OBL FACW, FAC Yes Yes Yes Yes 100 Clusion test: 55 100 105 FACW FAC Yes 100 FAC YE	Score (Prevalence) 2 2 3 3 4 2	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
6-letter code anelf Viriat	10 20 35 10 20 35 20 3 Percent vegetation cover: 100 nd hydrology and hydric soil (1 =	Y Y Y Number of dominant species: 3 Intestrial_Stricts Stricts Y Number of dominant species: 3 Intestrial_Stricts Stricts Intestrial_Stricts Intestrial_Stricts Intestrial_Stricts Intestrial_Stricts Intertrial_Stricts I	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafless Fush Jointed Rush Jointed Rush Vorksher Forg Possible Forg Software Software Water Popper Water Popper Water Popper 24. Water stated laves 25. Water stated laves 25. Drisings patterns 26. Drissasson water table 27. Saturation in arief Imager 46. Semonths guitard 45. Saturation in arief Imager 45. Possible spatiar 45. Prost-bare hummocks hydre Soft:	673	Wetland Status FACW FACW FAC FAC FAC FACU FACU FACU FACU FACU FA	y Y 33%	Dominant Species is OBL, FACW Yes Pasture over Pasture cover Of This is Wetland if all dom across all strate in face to the cover Wetland if more to dominant species are rated OBL, F. face Wetland if more to dominant species are rated OBL, F. face to So20 rise.	Dominant Species is OBL FACW, FAC Yes Yes Yes	Score (Prevalence) 2 2 3 3 4 2 Fail	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
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6-letter code javelf Unstri	10 20 35 10 20 35 20 3 Percent vegetation cover: 100 nd hydrology and hydric soil (1 =	Y Y Y Number of dominant species: 3 Intestrial_Stricts Stricts Y Number of dominant species: 3 Intestrial_Stricts Stricts Intestrial_Stricts Intestrial_Stricts Intestrial_Stricts Intestrial_Stricts Intertrial_Stricts I	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafless Fush Jointed Rush Jointed Rush Vorksher Forg Possible Forg Software Software Water Peopler Water Peopler Water Peopler Water Software John Software School Software Water Software Software Water Software Software Software Water Software S	673	Wetland Status FACW FACW FAC FAC FAC FACU FACU FACU FACU FACU FA	y Y 33%	Dominant Species is OBL, FACW Yes Pasture exe Pasture cover OBL This is Westand if all dom across all strata r FACW (pass source) Westand if more to dominar species are rated OBL, Fac Westand if more to dominar species are rated OBL, Full the 50/20 rule. Wetland if Pis 3.	Dominant Species is OBL FACW, FAC Yes	Score (Prevalence) 2 2 3 3 4 2 Fail	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Junet J	10 20 35 10 2 2 35 10 2 3 Percent vegetation cover: 100 and hydrology and hydric soll (1 =	Y Y Y Number of dominant species: 3 present, 0 = not present 20. Anumbation on aniral inappy 215. Sparsaly vegetated concave surface 21. Aquatis inventionies 32. Aquatis inventionies 34. Hydrogen suities odour 19. Onlinies of hospital odour 19. Reduced from it filted sold 44. High water table summarbareased plants Wetland if all dominant species across all stra (pass score = (00%) Wetland if more than 50% of dominant species OBL FAOW, or FAC using the 50/20 rule.	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafleas Fash Jointed Rush Vorskille Fag Oreigning Sattercap Oreigning Sattercap Respain Plaspain Water Pepper Water Pepper 24. Water stained lawses 24. Water stained lawses 25. Water stained lawses 26. Dealing patterns 27. Sattercap water table 26. Sattercap water table 27. Sattercap to the Company 26. Sattercap to the Company 26. Sattercap to the Company 26. Sattercap water table 26. Factor water table 26. Factor water table 26. Factor water table 27. Factor water table 28. Factor water table 28. Factor water table 29. Factor water table 29. Factor water table 29. Factor water table 20. Factor water table 21. Factor water table 22. Factor water table 23. Factor water table 24. Factor water table 25. Factor water table 26. Factor water table 27. Factor water table 27. Factor water table 27. Factor water table 28. Factor water table 29. Factor water table 29. Factor water table 29. Factor water table 20. Factor water	673	Wetland Status FACW FAC FAC FAC FACU FACU FACU FACU FACU FA	y	Dominant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover Vegetation across all stratar across sal stratar across sal stratar across sal stratar species experienced on the common species are rated OBL, Face rated OB	Dominant Species is OBL FACW, FAC Yes	Score (Prevalence) 2 2 3 3 4 4 2 Fail	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Junet Jun	10 20 35 10 2 2 35 10 2 3 Percent vegetation cover: 100 and hydrology and hydric soll (1 =	Y Y Y Number of dominant species: 3 present, 0 = not present 20. Anumbation on aniral inappy 215. Sparsaly vegetated concave surface 21. Aquatis inventionies 32. Aquatis inventionies 34. Hydrogen suities odour 19. Onlinies of hospital odour 19. Reduced from it filted sold 44. High water table summarbareased plants Wetland if all dominant species across all stra (pass score = (00%) Wetland if more than 50% of dominant species OBL FAOW, or FAC using the 50/20 rule.	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafleas Fash Jointed Rush Vorskille Fag Oreigning Sattercap Oreigning Sattercap Respain Plaspain Water Pepper Water Pepper 24. Water stained lawses 24. Water stained lawses 25. Water stained lawses 26. Dealing patterns 27. Sattercap water table 26. Sattercap water table 27. Sattercap to the Company 26. Sattercap to the Company 26. Sattercap to the Company 26. Sattercap water table 26. Factor water table 26. Factor water table 26. Factor water table 27. Factor water table 28. Factor water table 28. Factor water table 29. Factor water table 29. Factor water table 29. Factor water table 20. Factor water table 21. Factor water table 22. Factor water table 23. Factor water table 24. Factor water table 25. Factor water table 26. Factor water table 27. Factor water table 27. Factor water table 27. Factor water table 28. Factor water table 29. Factor water table 29. Factor water table 29. Factor water table 20. Factor water	673	Wetland Status FACW FAC FAC FAC FACU FACU FACU FACU FACU FA	y y y 33% 67% 2.89	Dominant Species is OBL, FACW Yes Pasture exe Pasture cover OBL This is Westand if all dom across all strata r FACW (pass source) Westand if more to dominar species are rated OBL, Fac Westand if more to dominar species are rated OBL, Full the 50/20 rule. Wetland if Pis 3.	Dominant Species is OBL FACW, FAC Yes	Score (Prevalence) 2 2 3 3 4 4 2 Fail	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Janelf Uract	10 20 35 10 27 20 38 10 20 3 Percent vegetation cover: 100 nd hydrology and hydric soil (1 =	Y Y Number of dominant species: 3 present, 0 = not present) 20. Inundation on antial imagery 21. Sparsal yvegitated concave surface 23. Agruint inventionates 34. Agruint inventionates 34. Netrogen unified odour 38. Oxidiated mix explore on roots 30. Reduced iron in titled soil 44. High water table demindribressed plants (pass score = 1004) Westand if more than 50% of dominant species CSL, FACW, or FAC using the 50/20 rule. Are all or most dominants FAC?	Juncus efficuses Juncus erriculatura Juncus erriculatura Pelosia lineatus Resurculus regeres Pespaium diletatura Persicaria hydropiper ta rated OBL and/or FACW	Leafloss Flush Jointed Flush Jointed Flush Violabile Forg December Cong Software Software Water Pepper Water Pepper John Cong John John Cong John John Cong John John John John John John John John	673	Wetland Status FACW FACW FAC FAC FAC FACU FACU FACW FACW FACW FACW FACW FACW 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	y y y 33% 67% 2.89	Dominant Species is OBL, FACW Yes Pasture exe Pasture cover OBL This is Westand if all dom across all strata r FACW (pass source) Westand if more to dominar species are rated OBL, Fac Westand if more to dominar species are rated OBL, Full the 50/20 rule. Wetland if Pis 3.	Dominant Species is OBL FACW, FAC Yes	Score (Prevalence)	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Janet Jan	10 20 35 10 2 20 35 10 2 30 3 3 Percent vegetation cover: 100 and hydrology and hydric soil: (1 a) 1 1 tion 33% 67%	Y Y Number of dominant species: 3 present, 0 = not present) 20. Inundation on antial inagery 21. Sparsal vegetant deconcere surface 23. Aquatic inventionates 34. Aguits inventionates 34. A legion and the doole 38. Oxidiate of the capture on crosts 30. Reduced two in titled soil 46. High water table demonstrates pacies across all stra (pass score = 1004). Oxidiates of the capture of the control of the contr	Juncus efficielles Juncus efficielles Hotice inculeitus Provincia receptation Prunella vulgaria Paspalum dilatatum Persicaria hydropiper ta rated OBL and/or FACW s across all strata are rated	Leafloss Flush Jointed Flush Jointed Flush Violabile Forg December Cong Software Software Water Pepper Water Pepper John Cong John John Cong John John Cong John John John John John John John John	673	Wetland Status FACW FACW FAC FACI FACU FACU FACU FACU FACU FACU FACU FACU	y	Dominant Species is OBL, FACW Yes Yes Pasture ox Pasture cover Vegetation Cover 0 This is selected in the Cover 1 This is sele	Dominant Species is OBL FACW, FAC Yes Yes Yes Yes 100 Clusion test: 55 100 100 Clusion test: 55 100 Clu	Score (Prevalence) 2 3 3 4 4 2 Fall Pass Passes Both	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code javelf Ursart	10 20 35 10 27 20 38 10 20 3 Percent vegetation cover: 100 nd hydrology and hydric soil (1 =	Y Y Number of dominant species: 3 present, 0 = not present) 20. Inundation on antial imagery 21. Sparsal yvegitated concave surface 23. Agruint inventionates 34. Agruint inventionates 34. Netrogen unified odour 38. Oxidiated mix explore on roots 30. Reduced iron in titled soil 44. High water table demindribressed plants (pass score = 1004) Westand if more than 50% of dominant species CSL, FACW, or FAC using the 50/20 rule. Are all or most dominants FAC?	Juncus efficielles Juncus efficielles Hotice Incustation Province	Leafless Flush Jointed Flush Jointed Flush Violative Forg Postant Forg Software Software Water Forg Water Forg Water Forg John Market John	673	Wetland Status FACW FACW FAC FAC FACU FACU FACU FACU FACU FACU F	y y y 33% 67% 2.89	Dominant Species is OBL, FACW Yes Pasture exe Pasture cover OBL This is Westand if all dom across all strata r FACW (pass source) Westand if more to dominar species are rated OBL, Fac Westand if more to dominar species are rated OBL, Full the 50/20 rule. Wetland if Pis 3.	Dominant Species is OBL FACW, FAC Yes Yes Yes Yes 100 Clusion test: 55 100 100 Clusion test: 55 100 Clu	Score (Prevalence)	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0
6-letter code junet (pred (10 20 35 10 2 20 35 10 2 30 3 3 Percent vegetation cover: 100 and hydrology and hydric soil: (1 a) 1 1 tion 33% 67%	Y Y Y Number of dominant species: 3 Present, 0 = not present) 20. hundation on andal inapery 215. Sparsely vegetated concave surface 31. Seat evest 21. A quastic inventences 21. A quastic inventences 21. A princip inventences 31. Onlinide other consists 31. Onlinide other consists 31. Onlinide other consists 31. Refused ren in filled seat 31. Refused ren in filled seat 32. Refused ren in filled seat 33. Refused ren in filled seat 34. High water table stronted/stressed plants Wetland if more than 50% of dominant species 08. FACW, or FAC using the 50/20 rule. Are all or most dominants FAC? YES (Pass) or NO (Fall) Wetland if PI ≤ 3.0, but values around 3.0 showelland indicators.	Juncus efficusus Juncus erriculatura Juncus erriculatura Pelocus inestes Resurculus regens Resurculus regens Pesspatim diletatura Persicaria hydropiper ta rated OBL and/or FACW sa across all strata are rated	Leafless Flush Jointed Rush Vorskine Fog Onespiral Statescup Perspiral Statescup Respons Water Pepper Water Pepper Secondary hydrology Indicate 28. Water stated leaves 12. Draining patterns 12. States water table 12. Substantial Inagery 14. General Nat 14. Factorial Inagery 14. General Nat 14. Factorial Inagery 15. Substantial Inagery 16. Secondary 16. Sec	673	Wetland Status FACW FACW FAC FACU FACU FACU FACU FACU FACU FACU	y Y Y 33% 67% 2.89	Dominant Species is OBL, FACW Yes Pasture over Pasture cover Vegetation cover Vegetation fall dominant species are raided OBL, FACW Wetterd if self dominant species are raided OBL, Factor of the Social Country of the S	Dominant Species is OBL FACW, FAC Yes Yes Yes 100. The Columbia of the Columbi	Score (Prevalence) 2 2 3 3 4 4 4 2 Fail Pass Passe Both Passes Hydrology Test	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code junet funet f	10 20 35 10 2 20 35 10 2 30 3 3 Percent vegetation cover: 100 and hydrology and hydric soil: (1 a) 1 1 tion 33% 67%	Y Y Y Number of dominant species: 3 Present, 0 = not present) 25. hundration on arrid imagery 29.5 Sparsely vegitated concave surface 34. Sequest loventhrates 34. Regular loventhrates 34. Regular loventhrates 36. Onlides of his cepture on crosts 56. Reduced for no in that soil 56. Reduced from in that soil 56. Reduced from in that soil 67. Reduced from in that soil 68. Reduced from in that soil 68. FACW, or FAC using the 50/20 rule. 69. FACW, or FAC using the 50/20 rule. 69. PACW (PACW) 75. (PACW) 7	Juncus efficusus Juncus erriculatura Juncus erriculatura Pelocus inestes Resurculus regens Resurculus regens Pesspatim diletatura Persicaria hydropiper ta rated OBL and/or FACW sa across all strata are rated	Leafless Flush Jointed Rush Vorskine Fog Onespiral Statescup Perspiral Statescup Respons Water Pepper Water Pepper Secondary hydrology Indicate 28. Water stated leaves 12. Draining patterns 12. States water table 12. Substantial Inagery 14. General Nat 14. Factorial Inagery 14. General Nat 14. Factorial Inagery 15. Substantial Inagery 16. Secondary 16. Sec	673	Wetland Status FACW FAC FAC FAC FAC FACU FACU FACU FACU FAC	y	Dominant Species is OBL, FACW Yes Yes Pasture ox Pasture cover Vegetation Cover 0 This is selected in the Cover 1 This is sele	Dominant Species is OBL FACW, FAC Yes Yes Yes 100. The Columbia of the Columbi	Score (Prevalence) 2 3 3 4 4 2 Fail Pass Passe Hydrology Passes Hydrology	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Lirett L	10 20 35 10 2 20 35 10 2 30 3 3 Percent vegetation cover: 100 and hydrology and hydric soil: (1 a) 1 1 tion 33% 67%	Y Y Y Number of dominant species: 3 Present, 0 = not present) 20. hundation on andal inapery 215. Sparsely vegetated concave surface 31. Seat evest 21. A quastic inventences 21. A quastic inventences 21. A princip inventences 31. Onlinide other consists 31. Onlinide other consists 31. Onlinide other consists 31. Refused ren in filled seat 31. Refused ren in filled seat 32. Refused ren in filled seat 33. Refused ren in filled seat 34. High water table stronted/stressed plants Wetland if more than 50% of dominant species 08. FACW, or FAC using the 50/20 rule. Are all or most dominants FAC? YES (Pass) or NO (Fall) Wetland if PI ≤ 3.0, but values around 3.0 showelland indicators.	Juncus efficusus Juncus erriculatura Juncus erriculatura Pelocus inestes Resurculus regens Resurculus regens Pesspatim diletatura Persicaria hydropiper ta rated OBL and/or FACW sa across all strata are rated	Leafless Flush Jointed Rush Vorskine Fog Onespiral Statescup Statescup Respons Water Pepper Water Pepper Secondary hydrology Indicate 28. Water stated leaves 12. Draining patterns 12. States water table 12. Saterns 13. Draining patterns 14. Secondary layer 14. Secondary layer 15. Saterns 16. Secondary	673	Wetland Status FACW FACW FACW FACU FACU FACU FACU FACU FACU FACU FACU	y Y Y 33% 67% 2.89	Dominant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover Vegetation cover Westard if all dom across all strate FACW (pass soot across all strate FACW (pass soot across all strate fact) Westard if not cover of the fact across all strate fact of the fact across acr	Dominant Species is OBL FACW, FAC Yes Yes Yes 100 Clusion test: 55 100 .555 pasture 100 pa	Score (Prevalence) 2 2 3 3 4 4 4 2 Fail Pass Passe Hydrology Test Passes Soil Test	20.0 40.0 105.0 30.0 8.0 80.0
6-letter code Lineff L	10 20 35 10 2 20 35 10 2 30 3 3 Percent vegetation cover: 100 and hydrology and hydric soil: (1 a) 1 1 tion 33% 67%	Y Y Y Number of dominant species: 3 Present, 0 = not present) 20. hundation on andal inapery 215. Sparsely vegetated concave surface 31. Seat evest 21. A quastic inventences 21. A quastic inventences 21. A princip inventences 31. Onlinide other consists 31. Onlinide other consists 31. Onlinide other consists 31. Refused ren in filled seat 31. Refused ren in filled seat 32. Refused ren in filled seat 33. Refused ren in filled seat 34. High water table stronted/stressed plants Wetland if more than 50% of dominant species 08. FACW, or FAC using the 50/20 rule. Are all or most dominants FAC? YES (Pass) or NO (Fall) Wetland if PI ≤ 3.0, but values around 3.0 showelland indicators.	Juncus efficusus Juncus erriculatura Juncus erriculatura Pelocus inestes Resurculus regens Resurculus regens Pesspatim diletatura Persicaria hydropiper ta rated OBL and/or FACW sa across all strata are rated	Leafless Flush Jointed Rush Vorskine Fog Onespiral Statescup Statescup Respons Water Pepper Water Pepper Secondary hydrology Indicate 28. Water stated leaves 12. Draining patterns 12. States water table 12. Saterns 13. Draining patterns 14. Secondary layer 14. Secondary layer 15. Saterns 16. Secondary	673	Wetland Status FACW FAC FAC FAC FAC FACU FACU FACU FACU FAC	y Y Y 33% 67% 2.89	Dominant Species is OBL, FACW Yes Pasture ex Pasture cover Vegetation cover Vegetation cover Westard if all dom across all strate FACW (pass soot across all strate FACW (pass soot across all strate fact) Westard if not cover of the fact across all strate fact of the fact across acr	Dominant Species is OBL FACW, FAC Yes Yes Yes 100. The Columbia of the Columbi	Score (Prevalence) 2 2 3 3 4 4 4 2 Fail Pass Passe Hydrology Test Passes Soil Test	(Prevalence) 20.0 40.0 105.0 30.0 8.0 80.0

6-letter code		Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture	Species is	Dominant Species is OBL, FACW,		Points
	% Cover								ic OBL EACIN	Score (Prevalence)	
o-letter code	/a Cover	Dominant (30/20 rule) 1 / N	Species Marie	Common Name	Tilleat Status	Wetland Status	species	OBL, FACW	FAC	Score (Frevalence)	(Prevalen
nedg	20	v	Juncus edgariae	Wiwi	Not Threatened	FACW		Yes	Yes	2	40.0
tped	10	<u> </u>	Lotus pedunculatus	Lotus		FAC	Y			3	30.0
opro	35	у	Isolepis prolifera	Three Square	Not Threatened	OBL		Yes	Yes	1	35.0
nrep	5	<u> </u>	Ranunculus repens	Creeping Buttercup		FAC				3	15.0
erhyd	5		Persicaria hydropiper	Water Pepper		FACW				2	10.0
asdil	5		Paspalum dilatatum	Paspalum		FACU	Y			4	20.0
ollan	5		Holcus lanatus	Yorkshire Fog		FAC	Ÿ			3	15.0
nart	15		Juncus articulatus	Jointed Rush		FACW				2	30.0
lumber of species: 8	Percent vegetation cover: 100	Number of dominant species: 2									
PTIONAL Indicators of wetlan	nd hydrology and hydric soil (1 =	present, 0 = not present)									
rimary hydrology indicators				Secondary hydrology indicate	ors						
A. Surface water	1	2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture ex	cclusion test:		
3. Groundwater <30 cm		2H. Sparsely vegetated concave surface		2L. Drainage patterns							
C. Soil saturation <30 cm		2l. Salt crust		3E. Dry-season water table				Pasture cover	20		
A. Water marks		2J. Aquatic invertebrates									
				3F. Saturation in aerial imagery				Vegetation	100		
3. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover			
C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0.2		
). Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is a	not pasture		
. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks							
. Surface soil cracks		4A. High water table stunted/stressed plants		Mudric Soil?		1					
arkson 2013				nyunc sour.		MFF 2021					
etland vegetation determinati	ion					Wetland determination					
etiand vegetation determinati	IOH					wetiand determination	11	har at 120 mm			
Rapid test score:	100%	Wetland if all dominant species across all stra (pass score = 100%)	ta rated OBL and/or FACW	Pass		1. Rapid test score:	100%		rated OBL and/or	Pass	
		(pass score = 100 /s)						FACW (pass sco	re = 100%)		
		1			1			Wetland if more			
a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species	s across all strata are rated	Pass	1	2a. Dominance Test	100%	dominant species	across all strata	Pass	
direct rest desire.	100,0	OBL, FACW, or FAC using the 50/20 rule.		1	1	Score:		are rated OBL, F	ACW, or FAC using	, 455	
		ĺ		1	1			the 50/20 rule.			
		1						Wetland if PI ≤ 3	0. but values		
p. FAC dominants	0%	Are all or most dominants FAC?		No	1	2b. Prevalence	1.95	vvetiand if PI ≤ 3	.0, but values d be used alongside	Pass	
o. TAC dominants	0%	Are as or most dominants PAC?		, NO	1	Index Score:	1.95	around 3.0 should other wetland ind	licators	rass	
		I			-			owier wetland ind	watUIS.		
Indicators of hydric soil nd wetland hydrology	Yes	YES (Pass) or NO (Fail)		Pass							
	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence			Passes Both	
resent?											
Prevalence Index Result:	2.0	Wetland if PI ≤ 3.0, but values around 3.0 sho	uld be used alongside other	Pass		4a. Indicators of wetland hydrology	Yes	YES (Pass) or N	O /E=:0	Passes Hydrology	
Prevalence index Result:	2.0	wetland indicators.		Pass		procent?	168	TES (Pass) OF IN	O (Fall)	Test	
						present:					
it a wetland?		It's wetland vegetation	n!			4b. Indicators of	Yes	YES (Pass) or N	O (Fail)	Passes Soil Test	
it d wettand.			-			hydric soil present?		1 20 (1 000) 01 14	O (i dii)	7 doses don 7est	
						Is it a wetland?		<u>It's a W</u>	etland under the RI	WA!	
						Is it a wetland?		<u>It's a W</u>	etland under the RI	WA!	
						Is it a wetland?		<u>It's a W</u>	etland under the RI	<u>wa!</u>	
Plot Number		7				Is it a wetland?		<u>It's a W</u>	etland under the RI	WA!	
Plot Number		7				Is it a wetland?		It's a W	Dominant Section	<u>WA!</u>	
		7					Pasture	Dominant	Dominant Species		Point
Plot Number 6-letter code	% Cover	7 Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Is it a wetland?	Pasture species	Dominant Species is	Dominant Species is OBL, FACW,	Score (Prevalence)	Point (Prevale
6-letter code		7 Dominant (50/20 rule) Y / N			Threat Status	Wetland Status	Pasture species	Dominant	Dominant Species	Score (Prevalence)	(Prevale
6-letter code	20	7 Dominant (50/20 rule) Y / N	Ranunculus repens	Creeping Buttercup	Threat Status	Wetland Status	species	Dominant Species is	Dominant Species is OBL, FACW,	Score (Prevalence)	(Prevale
6-letter code inrep	20 15	7 Dominant (50/20 rule) Y / N	Ranunculus repens Paspalum dilatatum	Creeping Buttercup Paspalum	Threat Status	Wetland Status FAC FACU	species	Dominant Species is	Dominant Species is OBL, FACW,	Score (Prevalence)	(Prevale 60.0
6-letter code inrep asdil alan	20 15 5	7 Dominant (50/20 rule) Y / N	Ranunculus repens Paspalum dilatatum Plantago lanceolata	Creeping Buttercup Paspalum Narrow-leaved Plantain	Threat Status	Wetland Status FAC FACU FACU	y Y	Dominant Species is	Dominant Species is OBL, FACW,	Score (Prevalence) 3 4 4	60.0 60.0 20.0
6-letter code inrep isdil alan tped	20 15	7 Dominant (59/20 rule) Y / N	Ranunculus repens Paspalum dilatatum Plantago lanceolata Lotus pedunculatus	Creeping Buttercup Paspalum	Threat Status	Wetland Status FAC FACU FACU FAC	species	Dominant Species is	Dominant Species is OBL, FACW,	Score (Prevalence)	60.0 60.0 20.0
6-letter code nrep ssdil slan tped ssax	20 15 5 5 2	7 Dominant (50/20 rule) Y / N	Ranunculus repens Paspalum dilatatum Plantago lanceolata Lotus pedunculatus Leontodon saxatilis	Creeping Buttercup Paspalum Narrow-leaved Plantain Lotus	Threat Status	Wetland Status FAC FACU FACU FACC FAC FAC	y Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence) 3 4 4 3 3	60.0 60.0 20.0 15.0
6-letter code nrep asdi alan pped osax neff	20 15 5 5 2 2	7 Dominant (50/20 rule) Y / N	Ranunculus repens Paspalum dilatatum Plantago lanceolata Lotus pedunculatus Leontodon saxatilis Juncus effusus	Creeping Buttercup Paspalum Narrow-leaved Plantain Lotus Leafless Rush	Threat Status	Wetland Status FAC FACU FACU FAC	y Y Y	Dominant Species is	Dominant Species is OBL, FACW,	Score (Prevalence) 3 4 4 3 3 2	60. 60. 20. 15. 6.0
6-letter code nrep ssdil alan tped osax beff per	20 15 5 5 2 2 25 25	7 Dominant (50/20 rule) Y / N y y	Ranunculus repens Paspalum dilatatum Plantago lanceolata Lotus pedunculatus Leontodon saxatilis Juncus effusus Lolium perenne	Creeping Buttercup Paspalum Narrow-leaved Plantain Lotus Leafless Rush Perennial Rye Grass	Threat Status	Wetland Status FAC FACU FACU FAC FAC FAC FAC FAC FAC FACW	y Y Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence) 3 4 4 3 3 2 4	(Prevale 60. 60. 20. 15. 6.0 50.
6-letter code inrep asdil alan	20 15 5 5 2 2	7 Dominant (50/20 rule) Y / N y y	Ranunculus repens Paspalum dilatatum Plantago lanceolata Lotus pedunculatus Leontodon saxatilis Juncus effusus	Creeping Buttercup Paspalum Narrow-leaved Plantain Lotus Leafless Rush	Threat Status	Wetland Status FAC FACU FACU FAC	y Y Y	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence) 3 4 4 3 3 2	(Prevale 60. 60. 20. 15. 6.0 50.
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6-letter code prep padd padd padd padd padd padd padd pa	20 15 5 6 9 22 25 25 3 3 Percent vegetation cover: 100 id hydrology and hydric soll (1 = 1) 1 1 50% 50% 50%	Y Number of dominant species: 2 present, 0 = not present) 26. hundration on aretia imagery His Sanardy vegation concern surface R. San const 23. A count invention of the surface R. San const 24. A count invention of the surface R. Oxidean of the surface R. Oxidean of the surface R. Reduced from 30. Reduced from it field sold At High vasior sales surfaced plants Wetland if all dominant species across all stra (pass score = 100%) Wetland if all dominant species across all stra (pass across = 100%) Are all or most dominants FAC? YES (Pass) or NO (Fail) Wetland if PI ≤ 3.0, but values around 3.0 showstand indicators.	Ranunculus repens Paspalum dilatatum Plantago Incocelata Lotus peduruculatus Leonodorus assualis Leonodorus assualis Leonodorus Leonodorus Triffolium repens Triffolium repens tata rated OBL and/or FACW s across all strata are rated	Creeping Buttercup Paspalar Natron-leaded Plantain Lotin Lotins Rush Perennial Rys Grass White Clover Secondary hydrology Indicate 27. Water staked leaves 28. Drainage patient 38. Drys season water table 39. Drys season water table 39. Secondary Hydrology Indicate 39. Drys season water table 39. Drys season water table 39. Drys season water table 39. Expression season water table 49. Expression season water ta	Threat Status	Wetland Status FAC FACU FACU FAC FAC FACW FACU FACU FACU FACU FACU FACU FACU FACU	Y	Pasture of Pasture cover This is a state of the Cover This is a state of t	Dominant Species is OBL. FACW, FAC SBL. FACW, or FAC Losing in the SBL. FACW, or FAC Losing Lo. but values d be used alongside licators.	Score (Prevalence) 3 4 4 3 3 2 4 4 4 4 Fail Fail Fails Both Passes Hydrology Test	(Preval 60. 60. 20. 15. 6.0 50.

Plot Number	8 - with	in wetland centre	1								
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)
macrub	50	у	Machaerina rubiginosa	Baumea	Not Threatened	OBL		Yes	Yes	1	50.0
juneff	20	у	Juncus effusus	Leafless Rush		FACW		Yes	Yes	2	40.0
isopro	30	у	Isolepis prolifera	Three Square	Not Threatened	OBL		Yes	Yes	1	30.0
Number of species: 3	Percent vegetation cover: 100	Number of dominant species: 3									
OPTIONAL Indicators of wetla	and hydrology and hydric soil (1 =	present, 0 = not present)									
Primary hydrology indicators				Secondary hydrology indicat	ors						
1A. Surface water	1	2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture e:	xclusion test:		
1B. Groundwater <30 cm	1	2H. Sparsely vegetated concave surface		2L. Drainage patterns				Pasture cover	0		
1C. Soil saturation <30 cm		2l. Salt crust		3E. Dry-season water table				Pasture cover			
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	100		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	100		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0		
2D. Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is a	not pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks							
2F. Surface soil cracks		4A. High water table stunted/stressed plants		Hydric Soil?:		1					
Clarkson 2013						MFE 2021					
Wetland vegetation determina	ation					Wetland determination	on				
1. Rapid test score:	100%	Wetland if all dominant species across all stra (pass score = 100%)	ata rated OBL and/or FACW	Pass		1. Rapid test score:	100%	Wetland if all dor across all strata FACW (pass sco	rated OBL and/or	Pass	
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant specie OBL, FACW, or FAC using the 50/20 rule.	es across all strata are rated	Pass		2a. Dominance Test Score:	100%		than 50% of s across all strata FACW, or FAC using	Pass	
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	1.20	Wetland if PI ≤ 3 around 3.0 shoul other wetland inc	d be used alongside	Pass	
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence	,		Passes Both	
4. Prevalence Index Result:	1.2	Wetland if PI ≤ 3.0, but values around 3.0 showetland indicators.	ould be used alongside other	Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or N	IO (Fail)	Passes Hydrology Test	
Is it a wetland?		It's wetland vegetatio	<u>n!</u>			4b. Indicators of hydric soil present?	Yes	YES (Pass) or N	IO (Fail)	Passes Soil Test	
						Is it a wetland?		lt's a W	etland under the R	MAI	
			-								,
Plot Number		9	1					1			
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence
pasdis	50	у	Paspalum distichum	Mercer Grass		FACW		Yes	Yes	2	100.0
perhyd	20	у	Persicaria hydropiper	Water Pepper	11 - 77	FACW		Yes	Yes	2	40.0
junedg rubfru	15 5		Juncus edgariae Rubus fruticosus	Wiwi Blackberry	Not Threatened	FACW FAC				2 3	30.0 15.0
ruotru rumobt	5		Rumex obtusifolius	Broad-leaved Dock		FAC				3	15.0
pasdil	5		Paspalum dilatatum	Paspalum		FACU	Y			4	20.0
Number of species: 6	Percent vegetation cover: 100	Number of dominant species: 2									
OPTIONAL Indicators of wetla	and hydrology and hydric soil (1 =	present, 0 = not present)									
Primary hydrology indicators				Secondary hydrology indicat	ors						
1A. Surface water		2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture ex	xclusion test:		
1B. Groundwater <30 cm		2H. Sparsely vegetated concave surface		2L. Drainage patterns				Pasture cover	5		
1C. Soil saturation <30 cm	1	2L Salt crust		3E. Dry-season water table				rasture cover	3		
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	100		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	100		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0.05		
2D. Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is i	not pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks							

Pass

Pass

Pass

Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)

Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.

Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.

It's wetland vegetation!

Are all or most dominants FAC?

100%

100%

0%

2.2

100% Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)

Yes YES (Pass) or NO (Fail)

Yes YES (Pass) or NO (Fail)

100%

2.20

Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC usin the 50/20 rule. Wetland if PI ≤ 3.0, but values around 3.0 should be used alongsid other wetland indicators.

It's a Wetland under the RMA!

Pass

Pass

Pass

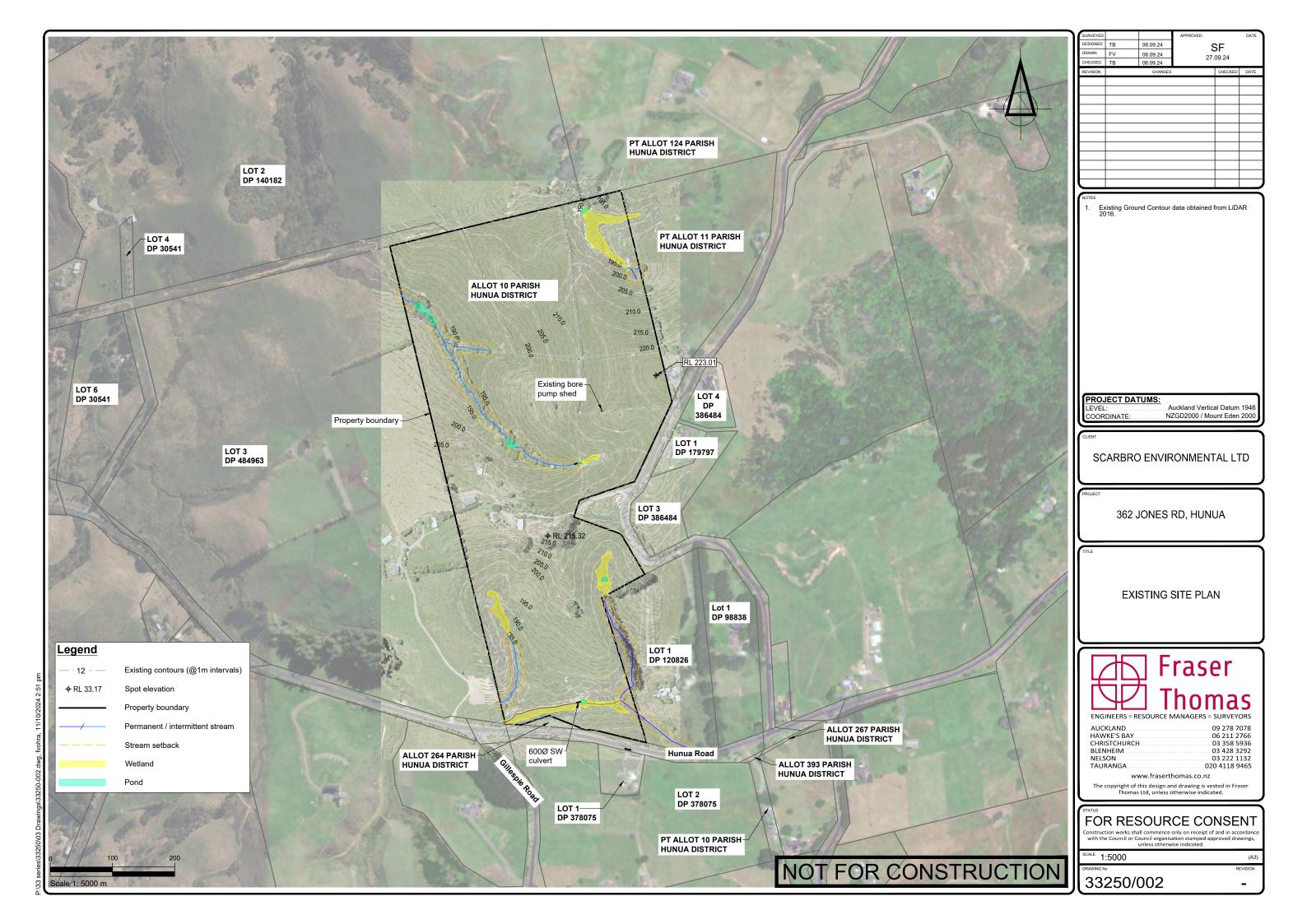
Passes Hydrology Test

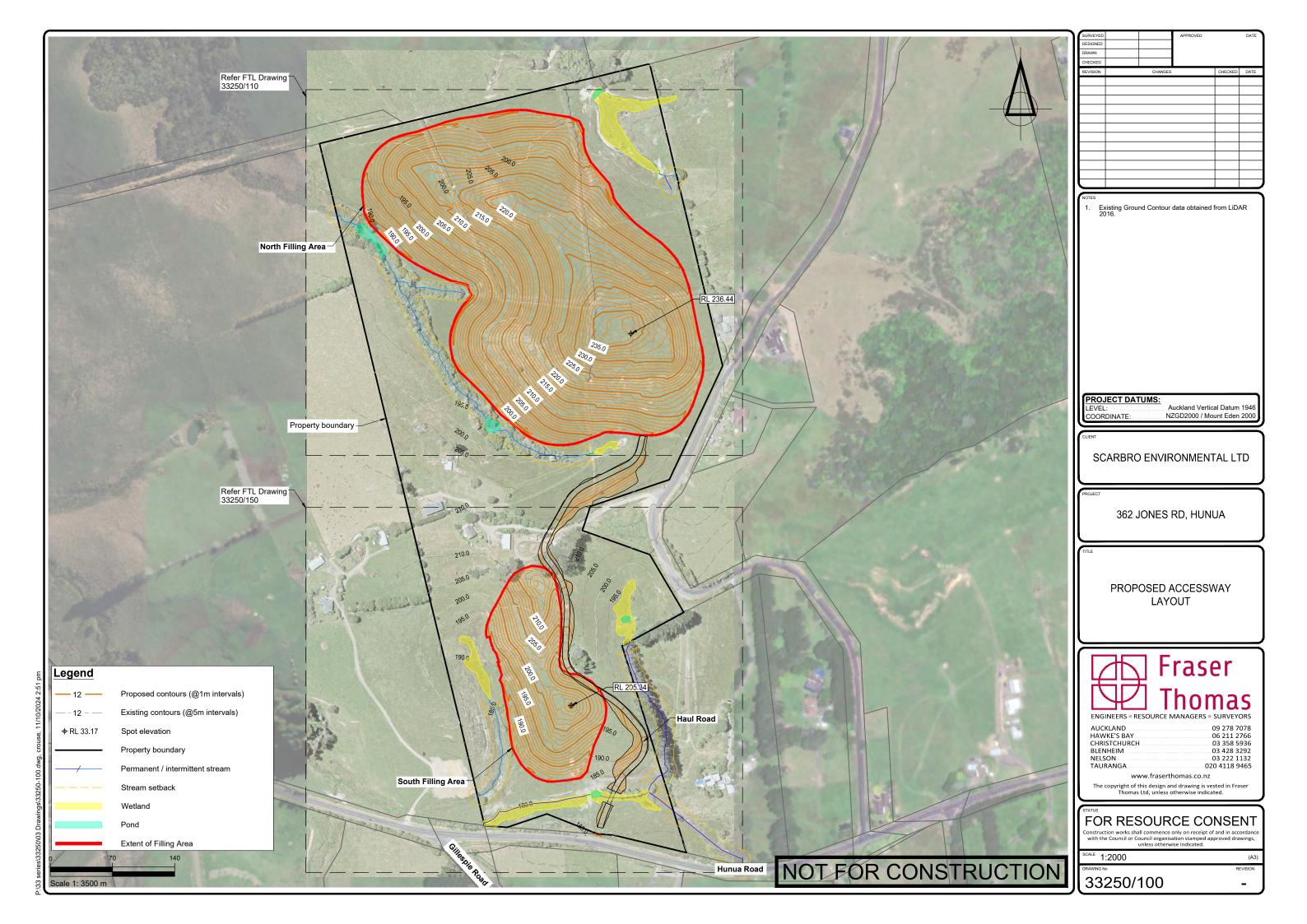
Passes Soil Test

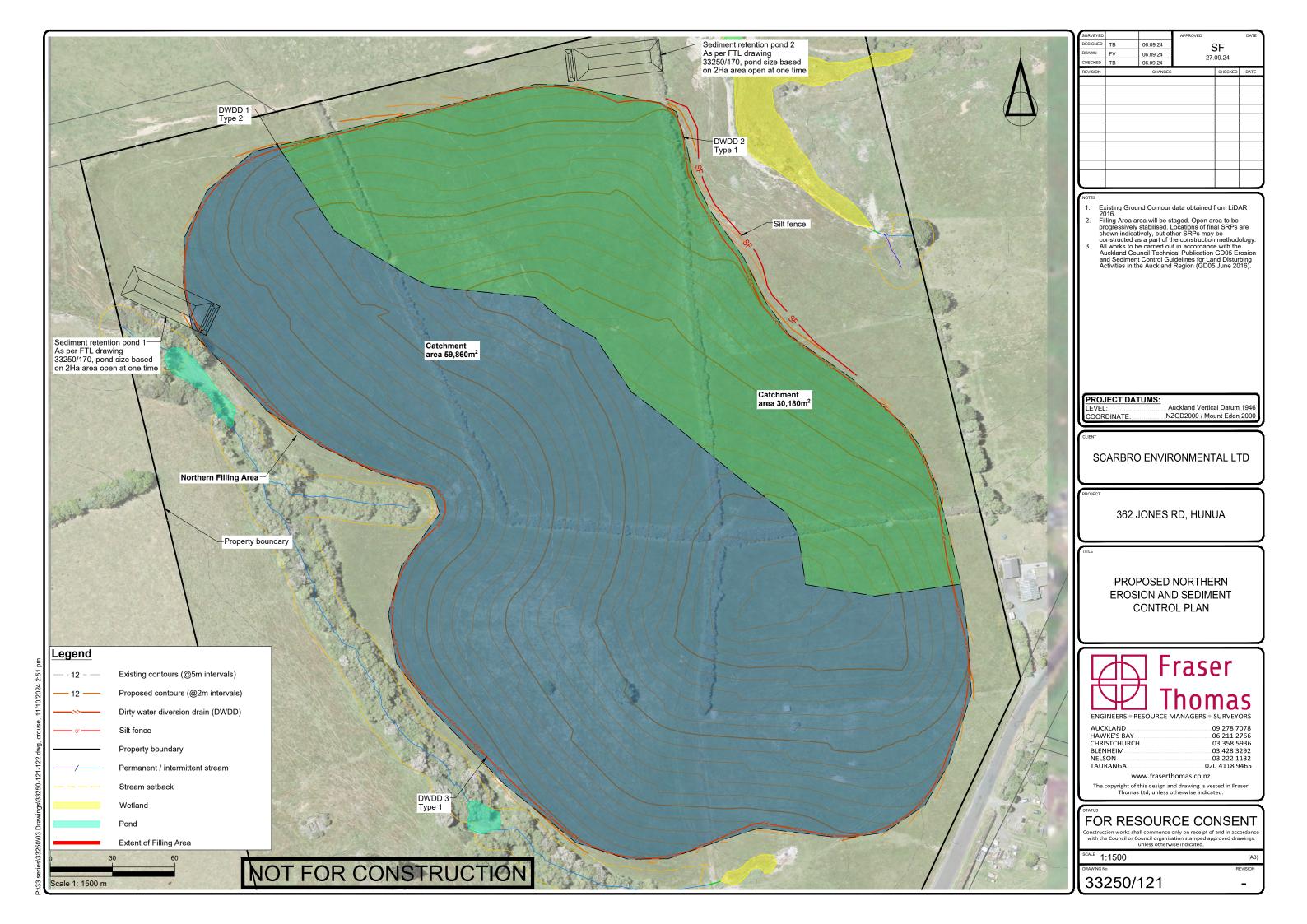
Plot Number		10									
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence
pasdis	40	у	Paspalum distichum	Mercer Grass		FACW		Yes	Yes	2	80.0
juneff	20	у	Juncus effusus	Leafless Rush		FACW		Yes	Yes	2	40.0
ranrep	10		Ranunculus repens	Creeping Buttercup		FAC				3	30.0
lotped	10		Lotus pedunculatus	Lotus		FAC	Y			3	30.0
hollan	5		Holcus lanatus	Yorkshire Fog		FAC	Y			3	15.0
junedg	5		Juncus edgariae	Wiwi	Not Threatened	FACW				2	10.0
pasdil	5		Paspalum dilatatum	Paspalum		FACU	Y			4	20.0
isopro	5		Isolepis prolifera	Three Square	Not Threatened	OBL				1	5.0
Number of species: 8	Percent vegetation cover: 100	Number of dominant species: 2									
	and hydrology and hydric soil (1 =										
Primary hydrology indicators		present, o = not presenty		Secondary hydrology indica	tors						
1A. Surface water	1	2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture ex	clusion test:		
1B. Groundwater <30 cm	1				 		+	- asture ex	l		
	1	2H. Sparsely vegetated concave surface		2L. Drainage patterns			-	Pasture cover	20		
1C. Soil saturation <30 cm		2l. Salt crust		3E. Dry-season water table							
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery				Vegetation	100		
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	100		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0.2		
2D. Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is r	not pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil						77115757	iot pusture		
2F. Surface soil cracks		4A. High water table stunted/stressed plants		4E. Frost-heave hummocks Hydric Soil?:		1					
Clarkson 2013		4A. High water table stuffled/selessed plants		Hydric Soli7:		MFE 2021					
						Wetland determinati	_				
Wetland vegetation determin	ation					wetiand determinati	on				
1. Rapid test score:	100%	Wetland if all dominant species across all stra (pass score = 100%)	ta rated OBL and/or FACW	Pass		1. Rapid test score:	100%	Wetland if all don across all strata FACW (pass sco	rated OBL and/or	Pass	
	100%	Wetland if more than 50% of dominant species OBL, FACW, or FAC using the 50/20 rule.	s across all strata are rated	Pass		2a. Dominance Test Score:	100%		than 50% of across all strata ACW, or FAC using	Pass	
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	2.30	Wetland if PI ≤ 3 around 3.0 should other wetland ind	d be used alongside	Pass	
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence			Passes Both	
4. Prevalence Index Result:	2.3	Wetland if PI ≤ 3.0, but values around 3.0 sho wetland indicators.	uld be used alongside other	Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or N	O (Fail)	Passes Hydrology Test	
Is it a wetland?		It's wetland vegetation	nl			4b. Indicators of hydric soil present?	Yes	YES (Pass) or N	O (Fail)	Passes Soil Test	
						Is it a wetland?		It's a W	etland under the R	MA!	
Plot Number		11									

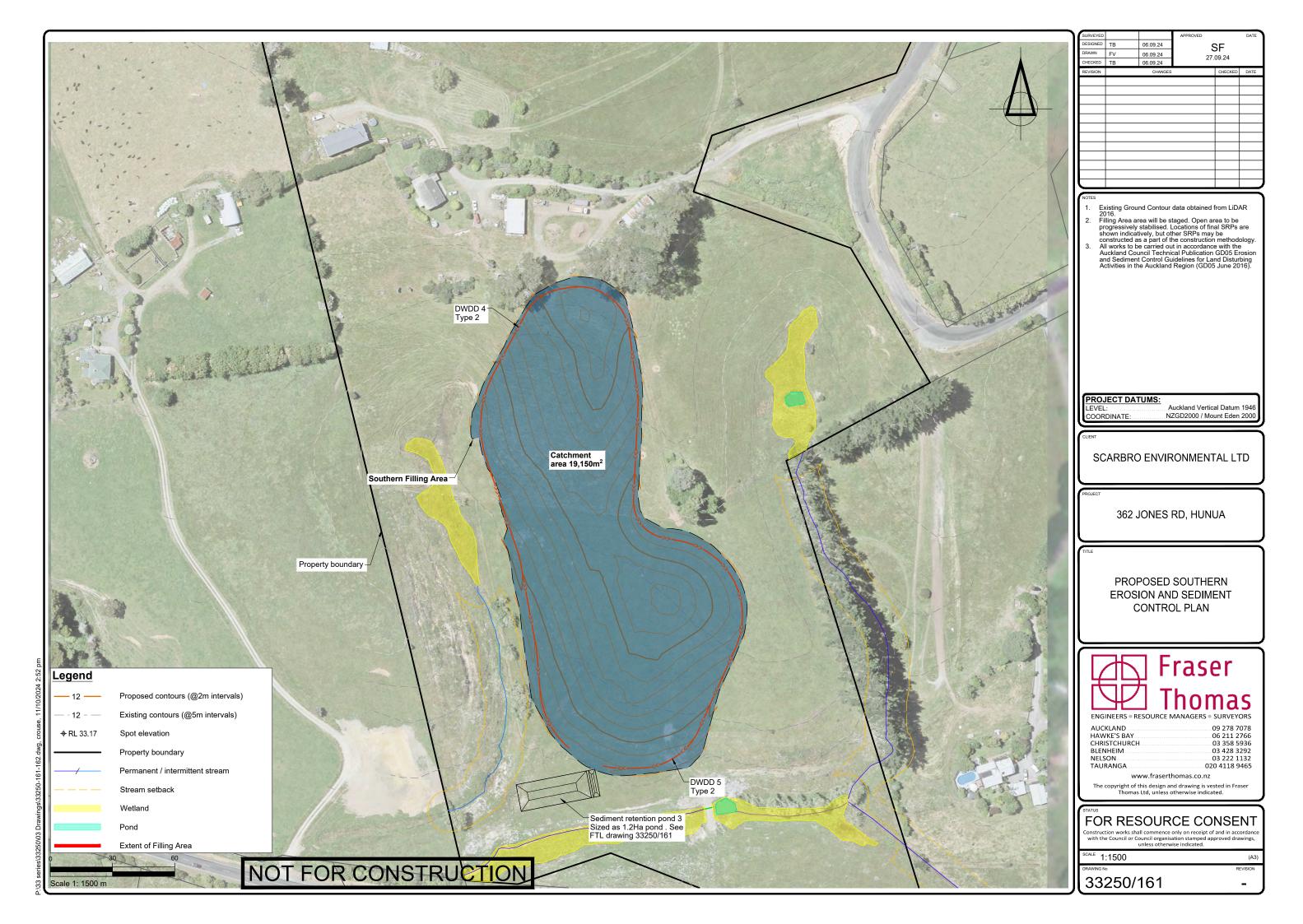
Plot Number		11									
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)
macrub	25	Y	Machaerina rubiginosa	Baumea	Not Threatened	OBL		Yes	Yes	1	25.0
perhyd	15		Persicaria hydropiper	Water Pepper		FACW				2	30.0
pasdis	35	Y	Paspalum distichum	Mercer Grass		FACW		Yes	Yes	2	70.0
isopro	25		Isolepis prolifera	Three Square	Not Threatened	OBL				1	25.0
Number of species: 4	Percent vegetation cover: 100	Number of dominant species: 2									
	nd hydrology and hydric soil (1 =										
Primary hydrology indicators	,,,,,,	p		Secondary hydrology indicate	ors						
1A. Surface water	1	2G. Inundation on aerial imagery		2K. Water-stained leaves				Pasture ex	clusion test:		
1B. Groundwater <30 cm		2H. Sparsely vegetated concave surface		2L. Drainage patterns							
1C. Soil saturation <30 cm		21. Salt crust		3E. Dry-season water table			1	Pasture cover	0		
2A. Water marks		2J. Aquatic invertebrates		3F. Saturation in aerial imagery	l		1	Vegetation			
2B. Sediment deposits		3A. Hydrogen sulfide odour		4B. Geomorphic position				cover	100		
2C. Drift deposits		3B. Oxidised rhizosphere on roots		4C. Shallow aquitard					0		
2D. Algal mat/crust		3C. Reduced iron		4D. FAC-neutral test				This is r	not pasture		
2E. Iron deposits		3D. Reduced iron in tilled soil		4E. Frost-heave hummocks				11110101	ot pusture		
2F. Surface soil cracks		4A. High water table stunted/stressed plants		Hvdric Soil?:		1					
Clarkson 2013		The ringh water table statited at ease o plants		Hydric Soll?:		MFE 2021					
Wetland vegetation determina	tion					Wetland determinati	nn .				
1. Rapid test score:	100%	Wetland if all dominant species across all stra (pass score = 100%)	ta rated OBL and/or FACW	Pass		1. Rapid test score:	100%	Wetland if all don across all strata FACW (pass sco	rated OBL and/or	Pass	
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species OBL, FACW, or FAC using the 50/20 rule.	s across all strata are rated	Pass		2a. Dominance Test Score:	100%	Wetland if more to dominant species are rated OBL, F the 50/20 rule.		Pass	
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	1.50	Wetland if PI ≤ 3 around 3.0 should other wetland ind	d be used alongside	Pass	
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prev	alence			Passes Both	
4. Prevalence Index Result:	1.5	Wetland if PI ≤ 3.0, but values around 3.0 sho wetland indicators.	uld be used alongside other	Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or N	O (Fail)	Passes Hydrology Test	
Is it a wetland?		It's wetland vegetation	<u>ı!</u>			4b. Indicators of hydric soil present?	Yes	YES (Pass) or N	O (Fail)	Passes Soil Test	
						Is it a wetland?		It's a W	etland under the R	MAI	

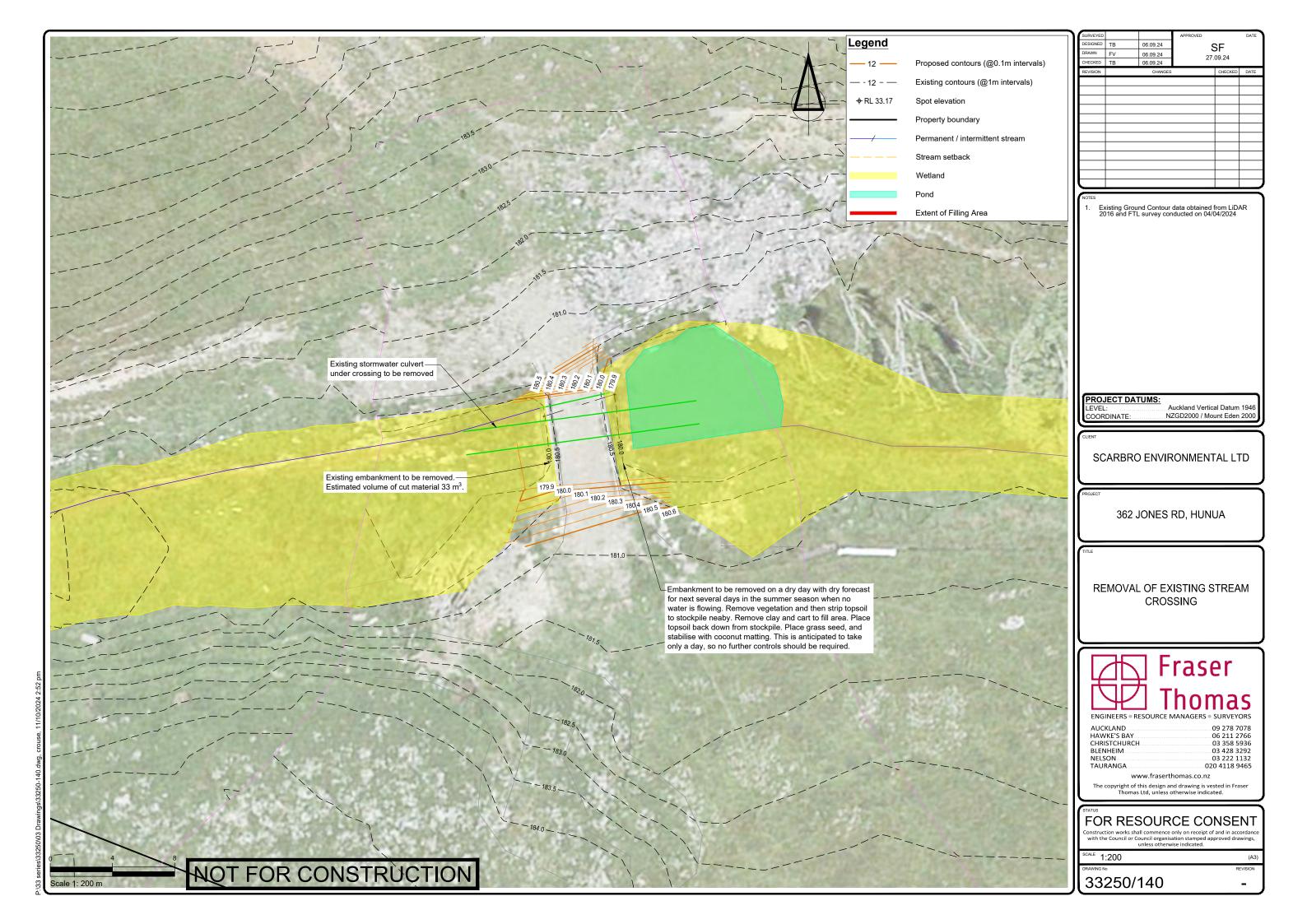
Appendix 4. Engineering Plans prepared by Fraser Thomas Limited

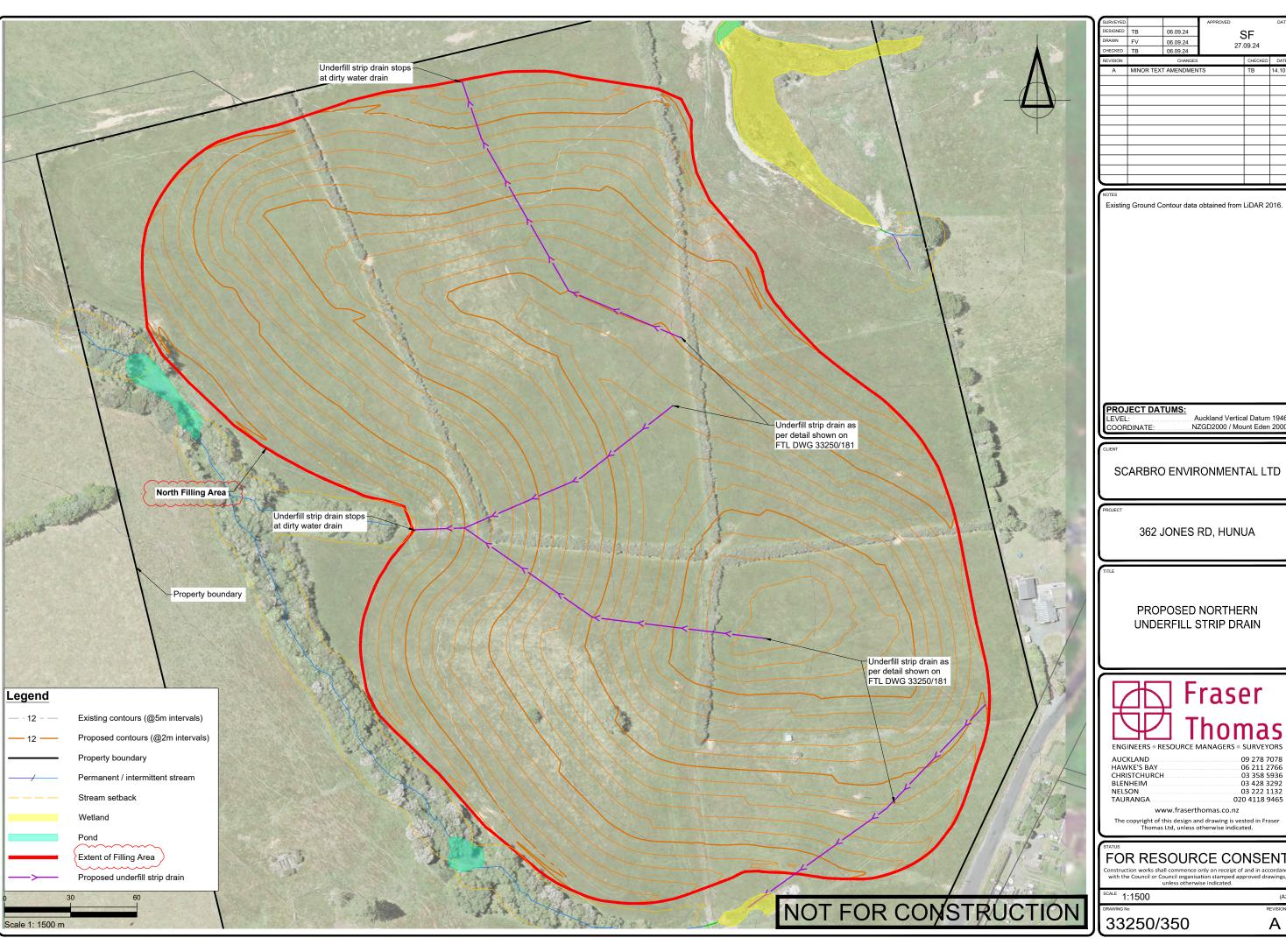


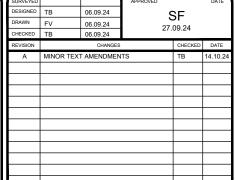












NZGD2000 / Mount Eden 2000

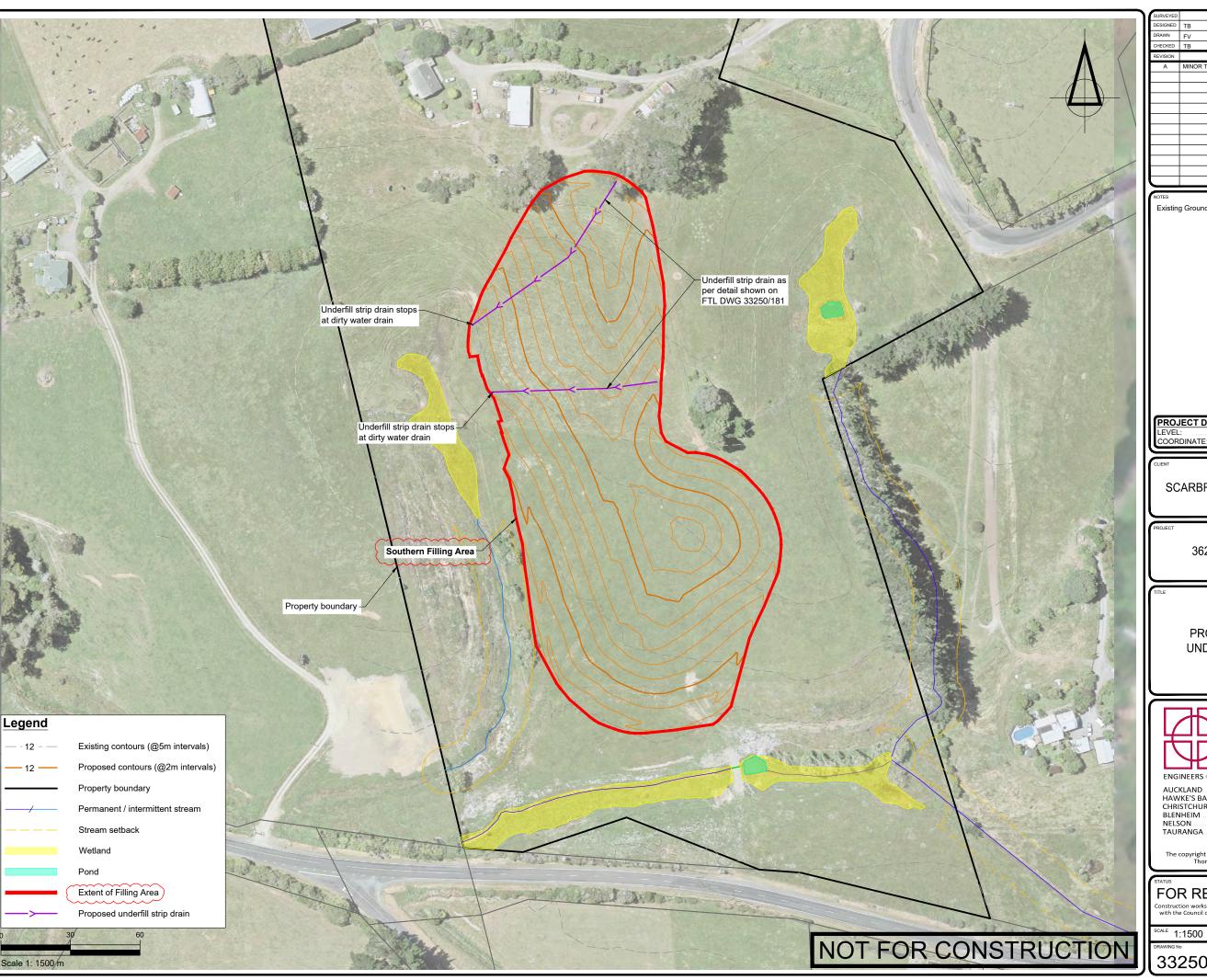
PROPOSED NORTHERN



..09 278 7078

.06 211 2766 .03 358 5936 03 428 3292 03 222 1132 020 4118 9465

FOR RESOURCE CONSENT



SURVEYED			APPROVED		DATE
DESIGNED	TB	06.09.24		SF	
DRAWN	FV	06.09.24		וכ 09.24	
CHECKED	TB	06.09.24	21.	09.24	
REVISION		CHANGES		CHECKED	DATE
Α	MINOR TEXT	T AMENDMEN	TS	TB	14.10.24
			-		

Existing Ground Contour data obtained from LiDAR 2016.

PROJECT DATUMS:

Auckland Vertical Datum 1946 NZGD2000 / Mount Eden 2000

SCARBRO ENVIRONMENTAL LTD

362 JONES RD, HUNUA

PROPOSED SOUTHERN UNDERFILL STRIP DRAIN



HAWKE'S BAY CHRISTCHURCH BLENHEIM NELSON .06 211 2766 .03 358 5936 03 428 3292 03 222 1132 TAURANGA 020 4118 9465

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FOR RESOURCE CONSENT

33250/351

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Whangarei, Auckland, Hamilton, Tauranga, Wellington, Nelson, Christchurch, Dunedin, and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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Tauranga 07 571 5511 Wellington Queenstown Dunedin Hamilton Whangarei Auckland Nelson Christchurch 09 358 2526 09 358 2526 04 385 9315 03 366 8891 07 960 0006 03 548 8551 03 441 1670 03 470 0460