WAKA KOTAHI
NZ TRANSPORT AGENCY

DRURY ACCESS RAMP PROJECT

Appendix L – Ecological Assessment

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Author: Treffery Barnett

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More information

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If you have further queries, call our contact centre on 0800 699 000 or write to us:

NZ Transport Agency
Private Bag 6995
Wellington 6141

This document is available on the NZ Transport Agency's website at http://www.nzta.govt.nz

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Abbreviations

Abbreviation	Term
AEE	Assessment of Environmental Effects
AUP	Auckland Unitary Plan (Operative in Part 2016)
CEMP	Construction Environment Management Plan
CIA	Cultural Impact Assessment
CVA	Cultural Values Assessment
ESCP	Erosion Sediment Control Plan
GD05	Guideline Document 2016/005
NES Contaminated Soil	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011
NES Freshwater	National Environmental Standards for Freshwater 2020
NIMT	North Island Main Trunk
NOR	Notice of Requirement
NUMP	Network Utilities Management Plan
P2DS	SH1 Upgrades Project between Papakura to Drury South
RMA	Resource Management Act 1991
SH1	State Highway 1 Motorway, the Southern Motorway
SH22	State Highway 22, Great South Road
the Project	Proposed Access Ramp at Drury Centre
Waka Kotahi	Waka Kotahi NZ Transport Agency

1 EXECUTIVE SUMMARY

This report comprises an ecological assessment to support the Proposed Access Ramp at Drury Interchange (the Project).

This assessment of effects on freshwater and terrestrial ecology has been undertaken in accordance with the Auckland Unitary Plan – Operative in Part (AUP) and the National Policy Statement for Freshwater Management (NPS-FM) criteria for the classification of streams and natural inland wetlands; and in general accordance with the EIANZ Guidelines for the Assessment of Ecological Effects.

It has been considered that the freshwater and terrestrial ecological effects of the proposed Drury access ramp are very low and can be mitigated to negligible. No streams or natural inland wetlands will be directly impacted by the works and the indirect effects on Hingaia Stream can be managed and mitigated through erosion and sediment control and riparian planting.

This report outlines the measures required to mitigate the effects outlined above, which include the following:

- Erosion and sediment control; and
- Native riparian planting in the cleared works areas in the riparian yard of Hingaia Stream.

With the adoption of the above measures, the potential effects on freshwater and terrestrial ecology of the proposed Drury access ramp are considered to be less than minor.

2 INTRODUCTION

2.1 Project Background Drury Interchange

This Report supports the application lodged by Waka Kotahi NZ Transport Agency (Waka Kotahi) for the construction of a new southbound access ramp at Drury Interchange (The Project).

The proposal is considered in the context of the Papakura to Bombay Project (P2B). P2B is a Waka Kotahi project set to improve the safety and functionality of State Highway 1 (SH1) and provide for long term growth in the south of Auckland. Waka Kotahi has structured P2B in to five stages. The most pertinent of these is Stage 1B1, which pertains to the approved upgrades of Drury Interchange. Stage 1B1 was approved under the COVID-19 Recovery (Fast Track Consenting) Act 2020 ("FTA").

In addition, the proposed site for the Project interfaces the following consented and future developments in the area:

- Future development areas in Drury which are detailed in section 2.1 below;
- Realigned SH1 corridor and SH22 / Great South Road as consented in Stage 1B1 of the Papakura to Drury ("P2D") project by Waka Kotahi;
- Future proofing works along North Island Main Trunk (NIMT) rail corridor by KiwiRail as part of Papakura to Pukekōhe (P2P) rail electrification works; and

2.2 Project Description Drury Centre Access Ramp

The proposal is for the construction of a new southbound access ramp from SH1 to provide direct connection to future development areas in Drury Town Centre. The approximate location of the proposed off-ramp in relation to the surrounding existing and planned environment is referred to in the AEE and shown in Figure 2-1 above.

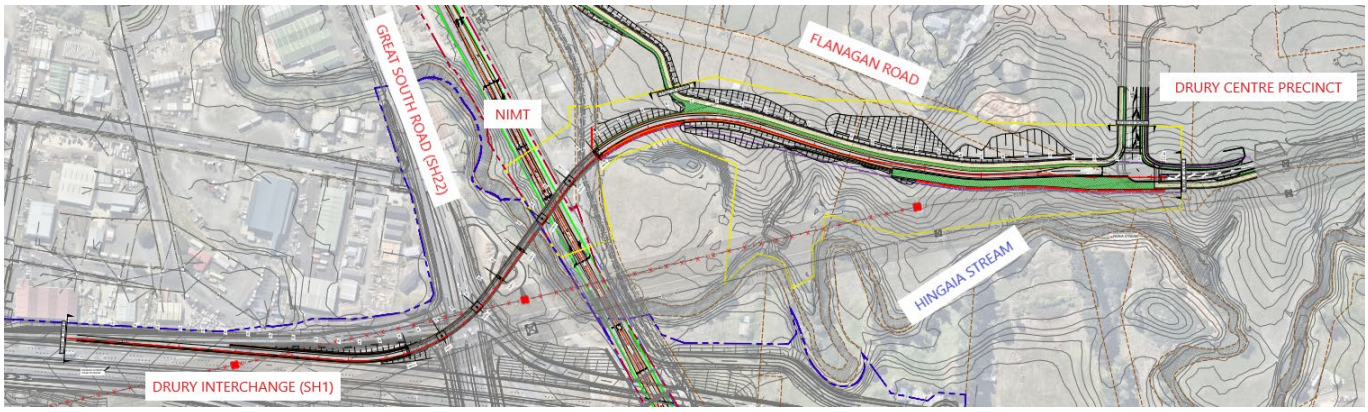

Figure 2-1 Indicative location plan of the proposed Drury Access Ramp

In relation to ecology, the following are proposed for the Project:

- Construction of a 245m long seven span structure bridge from southbound lane of SH1 to an area off Flanagan Road;
- Foundation piling works for bridge support;
- A new proposed roadway on the Kiwi Property Group site; and
- Swale and stormwater outfall to Hingaia Stream on the Kiwi Property Group site.

Further details of the proposed off-ramp are shown on the plans attached as **Appendix B**.

The Project takes place within the existing Flanagan Road (considered as a local road in the AUP) and existing services and utilities, which include: 1200mm diameter underground Waikato watermain parallel to the NIMT corridor; underground sewer and watermain pipes along Flanagan Road; and high voltage overhead lines located directly above the proposed ramp, which is planned to be removed.

2.3 Purpose of this Report

This report on ecology part of a suite of technical reports prepared for the proposed offramp. Its purpose is to inform the AEE for resource consents for:

- NoR for alteration to the existing Designation 6706 for which Waka Kotahi is the Requiring Authority under section 181 of the RMA; and
- Resource consent application for national environmental standard matters under the NES-F; and
- Resource consent application for regional matters under the AUP.

The report will:

- Describe the existing freshwater and terrestrial environment and identify the relevant aquatic habitats within proposed ramp alignment.
- Assess the effects on the identified areas affected by the proposed works.
- Recommend mitigation and management measures to address potential adverse effects.

In assessing the effects related to the freshwater and terrestrial ecology, the main elements associated with the proposed works that are assessed in this report are:

- During the construction phase, the effects of:
- Earthworks and sedimentation on the stream;
- Works within 100m the natural inland wetlands; and
- Temporary loss of riparian yard vegetation.
- During the operational phase, the effects of:
- Improvements within the riparian yard; and
- Diversion of surface water in relation to the functioning of the natural inland wetland.

2.4 Consultation and Engagement with Mana Whenua

Engagement for the Project design and consenting phase in relation to the design with Mana Whenua has occurred through the relevant Mana Whenua forums.

Of particular relevance to the design are the following interactions, which pertain to this assessment:

- March 2022 meeting and site visit to review possible alignment options and agree preferred alignment
- May 2022 meeting to present bridge design alignment, and indicative pier locations
- March 2023 site visit to view alignment and wider development plans
- April 2023 meeting to discuss design and environment assessments prepared for the consent application
- June 2023 site visit to review proposed stormwater outfall locations

Additionally, Mana Whenua have been actively engaged on the P2DS project and associated Drury Interchange upgrade works.

Ongoing engagement is anticipated throughout the detailed design phase. Mana whenua have a particular interest in opportunities for cultural design that can be incorporated into the structure.

2.5 Planning Environment

2.5.1 Designations

The primary designation which covers the majority of the Project corridor is Designation 6706, which is described in **Table 2-1** below. The corresponding planning environment maps are contained in **Appendix J**.

Table 2-1: The Designation in the Project area

Reference No.	Requiring Authority	Designation and Purpose	Location	Conditions
Designation 6706	Waka Kotahi	Motorway purposes between Auckland and Hamilton	SH1, north of Takanini interchange to the south of Quarry Road, Drury	Conditions set Designation 6706 (Operative)

There are a number of designations that overlap the Project corridor, which are described in **Table 2-2** below. The corresponding existing environment maps are contained in **Appendix J**.

Table 2-2: Overlapping designations in the Project area

Reference No.	Requiring Authority	Designation and Purpose	Location
Designation 6302	KiwiRail	NIMT Railway Line	South of the Drury Interchange.
Designation 6566	Watercare Services Ltd	Water supply purposes – pump station and associated structures	Flanagan Road and NIMT

2.5.2 Plan Change 48

Private Plan Change 48 (PC48) was approved by Auckland Council to rezone approximately 95 hectares of land from Future Urban to 35.5 hectares of Business: Metropolitan Centre Zone, approximately 51.8 hectares of Business Mixed Use Zone surrounding the Metropolitan Centre and, 7.4 hectares of Open Space: Informal Recreation Zone at Drury known as PC48 – Drury Centre Precinct. PC48 considered the potential for a future southbound off ramp into Drury Centre Precinct.

2.5.3 Papakura to Drury (P2DS)

The overall works for Stage 1B1 were approved under the FTA on 12th November 2021, which included planning approvals for various upgrades at Drury Interchange, such as the realignment and raising of the interchange towards the east, new bridges over State Highway 22 (SH22), a new off-road Shared Use Path (SUP), additional shoulders and associated stormwater infrastructure. For brevity, the relevant approvals can be summarised as follows:

- Regional and district resource consents granted to Waka Kotahi for the construction and operation of the project. Granted for Stage 1B1 on 12 November 2021 in accordance with the FTA:
  - Land use consents LUC60391712;
  - Groundwater consent WAT60391714;
  - Stream works consent LUS60391713;
  - Coastal works consent CST60391716 and
  - Discharge consents DIS60391717 and DIS60391718.

3 EXISTING ENVIRONMENT

The following is an overview of the existing freshwater and terrestrial ecology in the Project area.

3.1 Methodology

To assess the freshwater and terrestrial ecology of the proposed works site, the following methodologies were used:

- Desktop Assessment:

  The site was initially assessed via desktop review, with emphasis on the potential areas of indigenous vegetation and potential wetlands throughout the Project Area. Riparian zones were identified and aquatic habitats were classified in accordance with the Auckland Unitary Plan – Operative in Part (AUP) and the National Policy Statement for Freshwater Management 2020 (NPS-FM). The desktop assessment noted factors such as changes in vegetation on current and historical images, and review of data such as the Kiwi Property Group Ecological Report (T+T, 2021)[1]; and biodiversity, hydrology and contours on Auckland Councils Geomaps was undertaken.

- Site Assessment:

  The site assessments were undertaken on 8 March and 8 June 2023 by a Senior Bioresearches ecologist to primarily assess the freshwater habitats in the proposed works area (Figure 2-1). During the site assessment, the presence and extent of terrestrial and aquatic habitat features within the proposed ramp alignment were noted and the quality of habitats was visually assessed. The site was assessed for potential wetland areas under the definitions in the NPS-FM. Photographs were taken and notes were made on the extent of the aquatic habitats and their ecological quality, including depth, substrate type, vegetation, riparian cover and habitat-limiting factors. Photographs were taken and specific habitats were marked with a hand-held GPS.

3.2 Site Description

No wetlands were located on the alignment. The Karaka Reserve wetland, within which works are currently occurring was located approximately 50m to the south of the alignment. A second wetland, identified in the Kiwi Property Group ecological report as Wetland 2, is present approximately 50m to the east of the proposed swale from the new road and east of the Hingaia Stream stormwater outfall at the eastern end of the alignment (Figure 3-1).

From the north, the alignment crosses the Hingaia Stream west of the railway and Flanagan Road. The ramp has been specifically designed to avoid direct effects on the stream.

The ramp alignment consisted dominantly of pasture grasses, adventive weeds or impervious surfaces. From Great South Road the ramp alignment runs south-east. It traverses the works area and hard stand for the current works on the Great South Road onramp to State Highway 1, then through approximately 35m of riparian vegetation and stream, before crossing the railway and the hardstand area for the Flanagan Road and Watercare works, then up through grazed pasture to the crest of the central ridge on 108 Flanagan Road (Figure 3-2 to Figure 3-9). Aside from the pest plant dominated riparian vegetation on the banks of the Hingaia Stream, the vegetation on the alignment is either pasture or weedy roadside grasses. The pasture and roadside vegetation are maintained, have very low ecological values and provide minimal habitat for native fauna. The pasture is currently occupied by cattle and the roadside grasses are subject to weed control and maintenance.

[1] T+T (2021). Drury Centre Project. Assessment of Ecological Effects. Report prepared for Kiwi Property Group Limited, November 2021. 42pp.

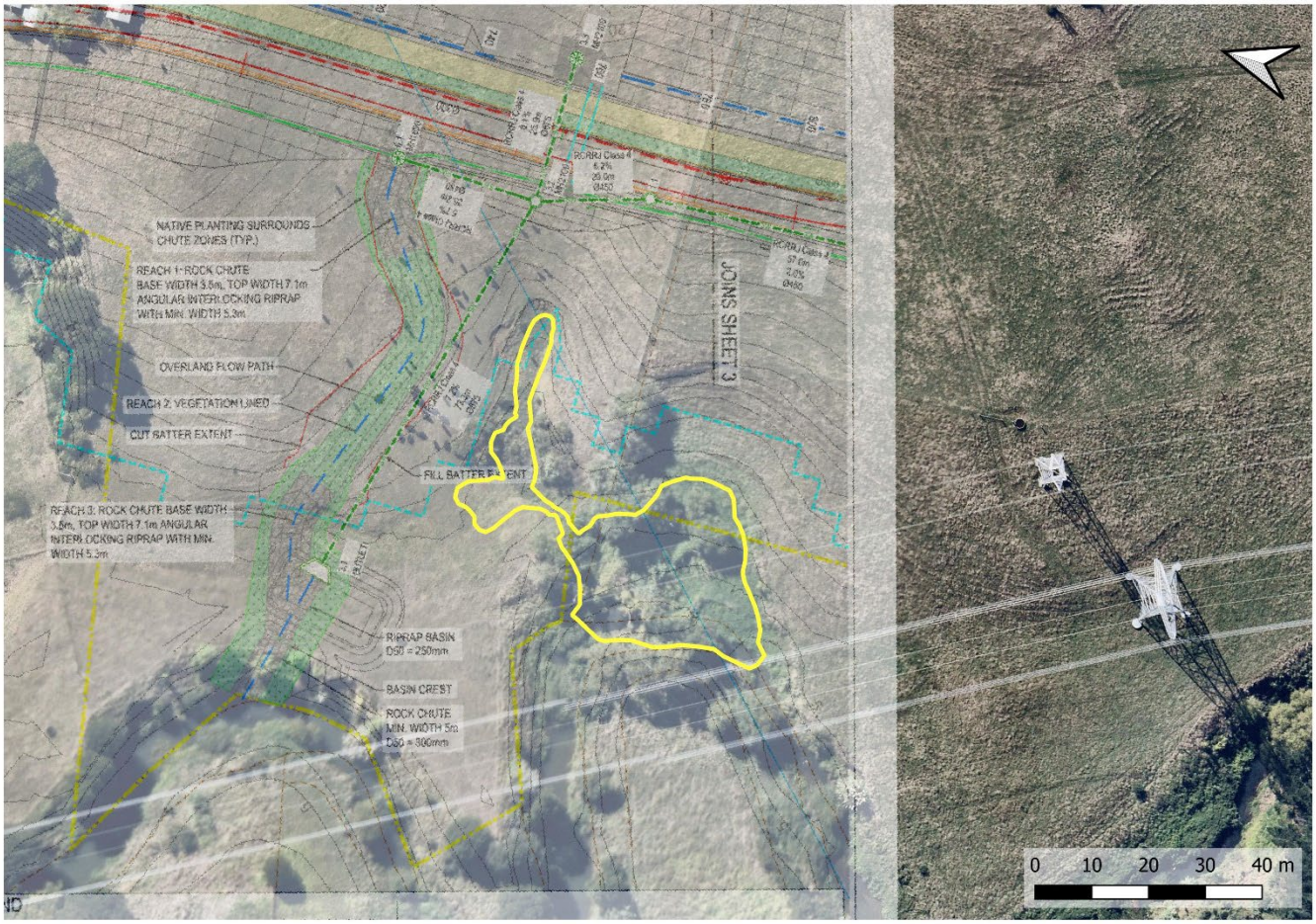

Figure 3-1: Wetland 2 (yellow) and proposed overland flow path with native plantings and stormwater outlet. (Source: Aurecon, Proposed stormwater layout plan Sheet 2, DRG-WD-0102, overlaid on aerial photography).

Figure 3-2: Hard stand area on alignment next to Great South Road

Figure 3-3: Ramp alignment crossing of Hingia Stream, riparian vegetation on left bank in foreground and right bank in background.

Figure 3-4: Riparian vegetation Hingaia Stream at crossing point

Figure 3-5: Incised banks of Hingia Stream at crossing point.

Figure 3-6: Impervious surfaces on alignment between railway and Flanagan Road.

Figure 3-7: Alignment from railway (background) over hardstand (middle) then Flanagan Road.

Figure 3-8: Alignment from hardstand, over Flanagan Road to vegetation on crest of the hill

Figure 3-9: Alignment on 108 Flanagan Road, pasture

The Hingaia Stream was greater than 4m wide, deep, swiftly flowing, with an incised channel. In March 2023, after the severe flood events in January and February 2023, flood debris was present in and over fence lines and on the banks over 4m above the 8 March 2023 water level, and in many places the banks had been scoured of vegetation (Figure 3-4 to Figure 3-5)

The site of the proposed Hingaia Stream crossing was pasture grass, dominated by kikuyu (*Cenchrus clandestinus*) with occasional patches of exotic weed species, crack willow (*Salix fragilis),* woolly nightshade (*Solanum mauritianum*), tree privet (*Ligustrum lucidum*), and rarely ponga (*Cyathea dealbata*) on the top of the bank. On the steeply sloping true left bank (western bank) and low stature weed species, including pampas (*Cortaderia selloana)* and wandering willie (*Tradescantia fluminensis*) dominated to the railway corridor on the steeply sloping true right bank. Either side of the riparian yard were working hard stand areas.

On the Kiwi Property Group site the alignment continued up and along the ridge through well maintained pasture.

No natural inland wetlands were located on the alignment and none were expected considering the steep banks and incised channel of the Hingaia Stream; highly worked and impervious areas either side of the stream; and the location of the alignment on the ridge through maintained pasture within the Kiwi Property Group site. The only wetlands located in the immediately vicinity of the alignment are the wetland at the western end of Karaka Reserve, in the current works area, the edge of which is approximately 50m from the alignment; and the Kiwi Property Group Wetland 2, located at the eastern end of the roadway alignment.

The Karaka Reserve wetland is described in the Stage 1B1 ecological report and the Kiwi Property Group Wetland 2 is described in their ecological report. In summary, the Karaka Reserve wetland is an induced wetland with a mix of terrestrial vegetation (pasture grasses, dock, blackberry, plantain, thistles) and willow weed. The ecological value of was assessed a negligible. Wetland 2 was described as a degraded seepage wetland with low ecological value, and the vegetation present as: *The upper section is unfenced with riparian vegetation consisting of grazed pasture grasses, sporadic gorse and Juncus spp. The lower section of Wetland 2 is located alongside the Hingaia Stream edge and is fenced with Willow (Salix spp.), creeping buttercup (Ranunculus repens), mercer grass (Paspalum distichum), Yorkshire fog (Holcus lanatus) and Gahnia spp. being the dominant species present.* (T+T, 2021).

The Karaka wetland is an intermittent wetland located in a small depression, confined by recent works for access tracks (Watercare and NZTA) and an undersized culvert. The wetland holds water in winter and is dry in summer with the hydrology driven by the shape (depression), rainfall and stormwater overflow from Great South Road and the motorway embankments.

Wetland 2 is a seepage wetland, with the hydrology dominated by groundwater seepage at the toe of the steep embankment, where the wetland originates, and by flood events from the Hingaia Stream. Flow and seepage at the base of the wetland embankments were clearly visible in the June 2023 site visit and flood debris was still visible within the wetland and within the fences surrounding the wetland after the early 2023 rain events. The groundwater assessment for the project (Reference: 506207-0490-REP-NN-0067) concluded:

- The groundwater depths vary across the Project alignment with elevations ranging from 17.9m RL to 3.5m RL. Groundwater is recharged from the Hunua Ranges and Bombay Hills and discharged along tributaries of the Drury-Opaheke catchment and intersecting fault lineaments. Flow is in a north-east direction.
- No cut locations have been identified to intersect near surface groundwater.

4 ASSESSMENT OF EFFECTS

The following sections discuss the positive effects and the potential adverse impacts of the Project works on freshwater and terrestrial ecology.

This assessment of effects has taken into consideration the statutory requirements of the AUP and NPS-FM in this report in respect of the impact on freshwater and terrestrial ecology. With the exception of the modification of the riparian yard, which is assessed under the freshwater effects, no adverse effects on terrestrial habitats were identified that were not fully addressed by the Stage 1B1 consent (e.g. native fauna).

This assessment of effects for the proposed ramp has taken into consideration the assessment of effects undertaken previously as part of Stage 1B1 of the Papakura to Drury project, which included the following:

- The existing ecological values in the Stage 1B1 project area are of negligible to moderate value across terrestrial, estuarine and freshwater ecosystems. With the exception of an SEA, terrestrial ecology values are negligible, being almost entirely planted areas of narrow hedgerows, mowed grass strips or small clusters of exotic trees. Estuarine ecological values are moderate, mainly for connectivity reasons. Freshwater values range from negligible to low.
- Where values are negligible, adverse effects are not greater than 'Very Low' (**Table 0-5**)

The level of effects are assessed against the EcIA guidelines (Roper-Lyndsay et al. 2018) as described in Appendix 1 (**Table 0-1** to **Table 0-5**). These effects are then summarised in the context of the RMA (less than minor, minor).

A new assessment of effects has been carried out for the proposed ramp, in summary:

- There are no direct impacts on streams or natural inland wetlands
- The works for the proposed ramp will result in a minor infringement of the riparian yard of the Hingaia Stream, during construction of the piles for the ramp bridge.

4.1 Assessment of Ecological Effects

The Project will not involve streamworks. The ramp will bridge both the Hingaia Stream and railway with bridge piles proposed either side of the stream and railway.

During construction, the potential for increased erosion and sedimentation from the works into the freshwater environment (Hingaia Stream) can be avoided and/or minimised by utilising strict sediment control procedures, and will be addressed in the Erosion and Sediment Control Plan, working to best practice guidance as required by Auckland Council.

Any adverse effects of vegetation removal in the riparian yards will be short term and will be mitigated through native riparian planting implemented though a landscape planting plan. The planting mix will be in general accordance with the riparian planting mix used in the wider project area and replace the existing bare ground, pasture and weed dominated vegetation with native shrubs and trees, providing ecological benefits to the stream with shading, filtration and woody inputs. The ecological effects are less than minor and the cumulative effects are not significant, and are negligible over and above the existing situation. Once the works are completed and the site stabilised, the native plantings in the riparian yard will provide positive ecological effects to the project area, specifically the Hingaia Stream.

A full assessment of the effects of the wider project on native fauna (lizards, bats, birds) formed part of the Ecological Assessment of the Papakura to Drury South Stage 1B1 project (Ecological Assessment and Technical Appendix D.4 Ecology). The assessment found the terrestrial ecological values to be negligible and the overall effects of vegetation removal to be Low and Very Low on fauna. A Lizard Management Plan (LMP) was recommended to address the requirements of the Wildlife Act 1953 whereby native copper skinks may persist in very low-quality habitats, and the LMP would apply to these works areas to ensure potential adverse effects on lizards are minimised.

Wetland 2 is a seepage wetland, with the hydrology dominated by groundwater seeping through the toe of the embankment near the Hingaia Stream. The diversion of part of the water flowing over the pasture during a rain event

will have a negligible effect on the hydrological regime of the wetland. Both before and after the works associated with the ramp, during a minor rain event most rain water would be absorbed by the pasture; and in a heavy rain event when some sheet flow over pasture could be expected, water would still be flowing to the wetland from the surrounding catchment, plus rain would be falling directly onto the wetland, and potentially water would be entering the wetland from flood flows from the Hingaia Stream. Potential adverse effects of the new overland flow path to the west of Wetland 2 on the hydrology of the wetland are assessed as negligible, conversely the proposed native planting of the area surrounding the flow path will have positive ecological effects by providing a natural buffer on the western side of the wetland.

4.2 Statutory Considerations

The assessment of effects undertaken previously as part of Stage 1B1 includes an overview of the AUP standards, and the NPS-FM and NES-F policies and standards that apply.

With regard to the Project, the following rules apply:

The Project is assessed as meeting the definition of *'infrastructure'* as it is defined in Section 2 of the RMA. As such the Project is subject to the rules in Chapter E26 Infrastructure, these rules are summarised as:

- Rule E26.3.3.1(A77) – Vegetation alteration or removal that does not comply with Standard E26.3.5.1 to E26.3.5.4 is a **Restricted Discretionary Activity**.

The proposed works will result in the removal of approximately 300m^2 of vegetation within the riparian yard[2] of the Hingaia Stream, allowing for the construction of Pier 5 and associated laydown area.

As discussed above, the current vegetation within the riparian yard is comprised dominantly of exotic weed species. Areas cleared within the riparian yard for the works will be replanted with a mix of appropriate native trees, shrubs and grasses, which will provide positive benefits to the Hingaia Stream and have the potential to link to any future riparian restoration works in the area.

With regard to the National Environmental Standards for Freshwater (NES-F) provisions, the Drury access ramp is assessed under Regulation 45 (Discretionary activities).

With regard to Regulation 45:

- Vegetation clearance and earthwork activity is greater than 10m of both the Karaka Reserve wetland and the Kiwi Properties Group Wetland 2;
- The earthworks or land disturbance within 100m of the wetland will not result in drainage of the wetland;
- There is not a direct hydrological connection between the wetland and the proposed Drury access ramp works; and the diversion of water during the construction phase or operation of the ramp and road will not result in a change in the water level range or hydrological functioning of the wetlands; and
- No discharges are proposed from the works areas to the natural inland wetlands.

Therefore, under Regulation 45 of the NES-F, provided that standards for a permitted activity are met, the works are assessed as not triggering the requirement for a consent with regard to proximity to natural inland wetlands.

[2] 'Riparian Yard' – is defined as per Chapter J of the AUP.

5 RECOMMENDATIONS

Based on the consideration of the statutory framework/requirements set out in Section 4.2 of this report and the assessment of potential adverse effects on the environment, the ecological effects are assessed as less than minor.

To ensure the effects are less than minor on the stream, and as the modification of vegetation within the riparian yard are a restricted discretionary activity, the following mitigation and management measures are recommended:

- Replacement planting with native riparian planting of any works areas cleared in the riparian yard.
- Erosion and Sediment Control Plan to ensure sedimentation to the Hingaia Stream is minimised.

APPENDICES

APPENDIX A – Methodology of Assessment of Ecological Effects

This report was prepared in general accordance with the Ecological Impact Assessment Guidelines (EcIAG,), published by Environment Institute of Australia and New Zealand Inc. (EIANZ) (Roper-Lyndsay et al. 2018). The EcIAGs provide a standardised matrix framework that allows ecological effects assessments to be clear and consistent. The EcIAG framework is generally used in impact assessments in New Zealand as good practice.

The EcIAG (Roper-Lyndsay *et al.,* 2018) provides a four-step process for undertaking terrestrial and freshwater assessments as follows:

Step 1: Assess the value of the area, taking into consideration species (Table 0-1) and other attributes of importance for vegetation or habitats (Table 0-2) to assign an overall value (Table 0-3)
Step 2: Determine the magnitude of effect (Table 0-4)
Step 3: Evaluate the severity of ecological effect using a matrix of the above criteria (Table 0-5)
Step 4: Impact Management, using the effects hierarchy of avoid, remedy, mitigate, offset, compensate.

Table 0-1: Factors to be considered in assigning value to species (Roper-Lyndsay *et al.* 2018)

Determining factors	
Nationally threatened species, found in the ZOI either permanently or seasonally	Very High
Species listed as 'At Risk' – declining, found in the ZOI, either permanently or seasonally	High
Species listed as any other category of 'At Risk' found in the ZOI either permanently or seasonally	Moderate
Locally (ED) uncommon or distinctive species	Moderate
Nationally and locally common indigenous species	Low
Exotic species, including pests, species having recreational value	Negligible

Table 0-2: Attributes to be considered when assigning ecological value or importance to a site or area of vegetation / habitat / community (as per Table 4 of Roper-Lyndsay *et al.* 2018).

Matters	Attributes to be considered
Representativeness	*Criteria for representative vegetation and aquatic habitats:* • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified. *Criteria for representative vegetation and aquatic habitats:* • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type

Matters	Attributes to be considered
Rarity/distinctiveness	*Criteria for rare/distinctive vegetation and habitats:* • Naturally uncommon or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National Priority for Protection *Criteria for rare/distinctive species of species assemblages:* • Habitat supporting nationally threatened or At Risk species, or locally uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity and Pattern	• Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations- pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological context	• Site history and local environment conditions which have influenced the development of habitats and communities • The essential characteristics that determine an ecosystems integrity, form, functioning and resilience (from 'intrinsic value' as defined in RMA) • Size, shape and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning - high level, key species identification, habitat as proxy

Table 0-3: Assigning value to areas (Roper-Lyndsay *et al.* 2018)

Value	Description
Very High	Area rates High for three or all of the four assessment matters listed in **Table 0-2** Likely to be nationally important and recognised as such.
High	Area rates High for two of the assessment matters listed **Table 0-2**, Moderate and Low for the remainder, or Area rates High for one of the assessment maters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	Area rates High for one matter listed in **Table 0-2**, Moderate and Low for the remainder, or area rates Moderate for two or more assessment matters Low or Very Low for the remainder Likely to be important at the level of the Ecological District.
Low	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates Very Low for three matters and Moderate, Low or Very Low for remainder.

Table 0-4: Criteria matrix for describing magnitude of effects (Roper-Lyndsay *et al.* 2018)

Magnitude	Description
Very High	Total loss of, or very major alteration, to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element / feature.
High	Major loss or major alteration to key elements/ features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element / feature.
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element / feature.
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances/patterns; AND/OR Having a minor effect on the known population or range of the element / feature.
Negligible	Very slight change from existing baseline condition. Change barely distinguishable, approximating to the “no change” situation; AND/OR Having a negligible effect on the known population or range of the element / feature.

Table 0-5: Criteria matrix for describing level of effects (Roper-Lyndsay *et al.* 2018)

Ecological Value → Magnitude ↓	Very High	High	Moderate	Low	Negligible
Very High	Very High	Very High	High	Moderate	Low
High	Very High	Very High	Moderate	Low	Very Low
Moderate	High	High	Moderate	Low	Very Low
Low	Moderate	Low	Low	Very Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low	Very Low

Drury Access Ramp Project Office

Aurecon Group Limited
Level 3, 110 Carlton Gore Road
Newmarket, Auckland
1023