Te Kaunihera o Te Hiku o te Ika
Far North District Council

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Schedule 4). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Consent representative to discuss this application prior to lodgement? ◯ **Yes** ✔ **No**

2. Type of Consent being applied for

(more than one circle can be ticked):

- ✔ **Land Use**
- ◯ **Fast Track Land Use***
- ◯ **Subdivision**
- ◯ **Consent under National Environmental Standard** (e.g. Assessing and Managing Contaminants in Soil)
- ◯ **Discharge**
- ◯ **Change of Consent Notice (s.221(3))**
- ◯ **Extension of time (s.125)**
- ◯ **Other (please specify)** _____

The fast track is for simple land use consents and is restricted to consents with a controlled activity status.

3. Would you like to opt out of the Fast Track Process?

◯ **Yes** ✔ **No**

4. Consultation

Have you consulted with Iwi/Hapū? ✔ **Yes** ◯ **No**

If yes, which groups have you consulted with?	Ngati Hau have been advised of works.
Who else have you consulted with?	Landowner has given written approval.

For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council ***tehonosupport@fndc.govt.nz***

5. Applicant Details

Name/s: New Zealand Transport Agency Waka Kotahi - Stephanie Kane

Email: [redacted]

Phone number: Work [redacted] Home

Postal address:
(or alternative method of service under section 352 of the act)

[redacted]

Postcode 1143

6. Address for Correspondence

Name and address for service and correspondence (if using an Agent write their details here)

Name/s: WSP New Zealand - Kaya Tobin

Email: [redacted]

Phone number: Work [redacted] Home

Postal address:
(or alternative method of service under section 352 of the act)

[redacted]

Postcode 0110

**** All correspondence will be sent by email in the first instance. Please advise us if you would prefer an alternative means of communication.***

7. Details of Property Owner/s and Occupier/s

Name and Address of the Owner/Occupiers of the land to which this application relates (where there are multiple owners or occupiers please list on a separate sheet if required)

Name/s: Charles Richard Barnes, Derek Richard Barnes, Helen Denise Barnes,

Property Address/ Location: [redacted]ed

Postcode 0182

8. Application Site Details

Location and/or property street address of the proposed activity:

Name/s:

Site Address/ Location: [redacted]

Postcode 0182

Legal Description: [redacted] **Val Number:**

Certificate of title:

Please remember to attach a copy of your Certificate of Title to the application, along with relevant consent notices and/or easements and encumbrances (search copy must be less than 6 months old)

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? ◯ **Yes** ✔ **No**

Is there a dog on the property? ◯ **Yes** ✔ **No**

Please provide details of any other entry restrictions that Council staff should be aware of, e.g. health and safety, caretaker's details. This is important to avoid a wasted trip and having to re-arrange a second visit.

9. Description of the Proposal:

Please enter a brief description of the proposal here. Please refer to Chapter 4 of the District Plan, and Guidance Notes, for further details of information requirements.

If this is an application for a Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s), with reasons for requesting them.

10. Would you like to request Public Notification?

◯ **Yes** ✔ **No**

11. Other Consent required/being applied for under different legislation

(more than one circle can be ticked):

- ◯ **Building Consent** Enter BC ref # here (if known)
- ◯ **Regional Council Consent (ref # if known)** Ref # here (if known)
- ◯ **National Environmental Standard consent** Consent here (if known)
- ◯ **Other (please specify)** Specify 'other' here

12. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health:

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following:

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL) ◯ **Yes** ✔ **No** ◯ **Don't know**

Is the proposed activity an activity covered by the NES? Please tick if any of the following apply to your proposal, as the NESCS may apply as a result. ◯ **Yes** ✔ **No** ◯ **Don't know**

- ◯ **Subdividing land**
- ◯ **Changing the use of a piece of land**
- ◯ **Disturbing, removing or sampling soil**
- ◯ **Removing or replacing a fuel storage system**

13. Assessment of Environmental Effects:

Every application for resource consent must be accompanied by an Assessment of Environmental Effects (AEE). This is a requirement of Schedule 4 of the Resource Management Act 1991 and an application can be rejected if an adequate AEE is not provided. The information in an AEE must be specified in sufficient detail to satisfy the purpose for which it is required. Your AEE may include additional information such as Written Approvals from adjoining property owners, or affected parties.

Your AEE is attached to this application ✔ **Yes**

13. Draft Conditions:

Do you wish to see the draft conditions prior to the release of the resource consent decision? ● **Yes** ◯ **No**

If yes, do you agree to extend the processing timeframe pursuant to Section 37 of the Resource Management Act by 5 working days? ✔ **Yes** ◯ **No**

14. Billing Details:

This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

Name/s: (please write in full) New Zealand Transport Agency Waka Kotahi - Stephanie Kane

Email: [redacted]

Phone number: Work [redacted] Home

Postal address:
(or alternative method of service under section 352 of the act)

[redacted]

Postcode 1143

Fees Information
An instalment fee for processing this application is payable at the time of lodgement and must accompany your application in order for it to be lodged. Please note that if the instalment fee is insufficient to cover the actual and reasonable costs of work undertaken to process the application you will be required to pay any additional costs. Invoiced amounts are payable by the 20th of the month following invoice date. You may also be required to make additional payments if your application requires notification.

Declaration concerning Payment of Fees
I/we understand that the Council may charge me/us for all costs actually and reasonably incurred in processing this application. Subject to my/our rights under Sections 357B and 358 of the RMA, to object to any costs, I/we undertake to pay all and future processing costs incurred by the Council. Without limiting the Far North District Council's legal rights if any steps (including the use of debt collection agencies) are necessary to recover unpaid processing costs I/we agree to pay all costs of recovering those processing costs. If this application is made on behalf of a trust (private or family), a society (incorporated or unincorporated) or a company in signing this application I/we are binding the trust, society or company to pay all the above costs and guaranteeing to pay all the above costs in my/our personal capacity.

Name: (please write in full) Stephanie Kane

Signature:
(signature of bill payer) [redacted]

Date 25-Sep-2025

MANDATORY

15. Important Information:

Note to applicant
You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.
You may apply for 2 or more resource consents that are needed for the same activity on the same form.
You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application
Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement. A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

Privacy Information:
Once this application is lodged with the Council it becomes public information. Please advise Council if there is sensitive information in the proposal. The information you have provided on this form is required so that your application for consent pursuant to the Resource Management Act 1991 can be processed under that Act. The information will be stored on a public register and held by the Far North District Council. The details of your application may also be made available to the public on the Council's website, www.fndc.govt.nz. These details are collected to inform the general public and community groups about all consents which have been issued through the Far North District Council.

15. Important information continued...

Declaration

The information I have supplied with this application is true and complete to the best of my knowledge.

Name: (please write in full) Kaya Tobin

Signature: [redacted] Date 24-Sep-2025

A signature is not required if the application is made by electronic means

Checklist (please tick if information is provided)

- ☐ Payment (cheques payable to Far North District Council)
- ☐ A current Certificate of Title (Search Copy not more than 6 months old)
- ☑ Details of your consultation with Iwi and hapū
- ☐ Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- ☑ Applicant / Agent / Property Owner / Bill Payer details provided
- ☐ Location of property and description of proposal
- ☑ Assessment of Environmental Effects
- ☑ Written Approvals / correspondence from consulted parties
- ☑ Reports from technical experts (if required)
- ☐ Copies of other relevant consents associated with this application
- ☐ Location and Site plans (land use) AND/OR
- ☐ Location and Scheme Plan (subdivision)
- ☐ Elevations / Floor plans
- ☐ Topographical / contour plans

Please refer to Chapter 4 of the District Plan for details of the information that must be provided with an application. Please also refer to the RC Checklist available on the Council's website. This contains more helpful hints as to what information needs to be shown on plans.

ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

NZ Transport Agency Waka Kotahi (NZTA)
State Highway 1 subsidence remediation works (Akerama Curves)

KAYA TOBIN, WSP NEW ZEALAND

23 SEPTEMBER 2025

RESOURCE CONSENT APPLICATION

NZ TRANSPORT AGENCY WAKA KOTAHI

CONTENTS

APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991 (RMA)

To: Far North District Council
PO Box 752
Kaikohe, 0440.

From: NZ Transport Agency Waka Kotahi
Private Bag 106602,
Auckland 1143
New Zealand.

NZ Transport Agency Waka Kotahi applies for the following type of resource consent:

Activity	Applicable Rule	Duration
Earthworks over 5,000 m^3 and over 1.5 m in height.	Rule 12.3.6.1.1	5 years

The activity to which the application relates is as follows:

- "Excavation and/or filling" as a Restricted Discretionary Activity, pursuant Rule 12.3.6.1.2 of the Operative Far North District Plan (August 2009).

The site at which the activity is to occur is as follows:

The work site is located on SH1 approximately 20 km southeast of Kawakawa and 34 km northwest of Whangārei in the Far North district as indicated in **Error! Reference source not found.**. This site is located on farmland adjacent to SH1 between RP 01N-0215-B/15.813 and 01N-0215-B/15.813.

The full name and address of the owner and occupier of the site are as follows:

Legal description	Address	Owner Name
Section 75 Block VI Hukerenui SD	No address	Charles Richard Barnes, Derek Richard Barnes, Helen Denise Barnes, Karen Joanne Barnes, MP Trustees 2014 Limited

Other resource consents:

No other consents are required.

Supporting information:

Attached in the Assessment of Effects on the Environment (AEE) is an assessment of the proposed activity's effects on the environment that—

- Includes the information required by clause 6 of Schedule 4 of the Resource Management Act 1991; and
- Addresses the matters specified in clause 7 of Schedule 4 of the Resource Management Act 1991; and

- Includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

Attached in the AEE is an assessment of the proposed activity against the matters set out in Part 2 of the Resource Management Act 1991.

Attached in the AEE is an assessment of the proposed activity against any relevant provisions of a document referred to in section 104(1)(b) of the Resource Management Act 1991, including the information required by clause 2(2) of Schedule 4 of that Act.

Signed by: 

Name: Jonathan Wyeth
Position: Senior Project Manager - Complex, Transport Services
Organisation: NZ Transport Agency Waka Kotahi

Address for Service:

NZ Transport Agency Waka Kotahi
Email: consents@nzta.govt.nz
C/- WSP New Zealand Limited (Whangarei)
Mansfield Terrace Service Lane
125A Bank Street
PO Box 553
Whangārei 0140.

Attention: Stefan Roets
T: +64 9 302 3147
M: +64 27 244 6664
E-mail: Stefan.Roets@wsp.com

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QUALITY REVIEW AND APPROVAL RECORD

Item	Name	Date
Prepared by:	Kaya Tobin, Graduate Planner, WSP New Zealand	04/09/2025
Reviewed by:	Stefan Roets, Senior Planner, WSP New Zealand	04/09/2025
Approved by:	Stephanie Kane Principal Planner, Environmental Planning, NZ Transport Agency Waka Kotahi	22/09/2025

ACRONYMS, TERMS AND ABBREVIATIONS

Acronym/Term	Description
AEE	Assessment of Effects on the Environment
ADP	Accidental Discovery Protocol
CMP	Construction Management Plan
ESCP	Erosion and Sediment Control Plan
Far North District Council	FNDC
Operative Far North District Plan	OFNDP
ORWSP	Regional Water and Soil Plan for Northland
Proposed Far North District Plan	PFNDP
GD05	2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region"
HAIL	Hazardous Activities and Industries List
HNZPT	Heritage New Zealand Pouhere Taonga
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
LTMA	Land Transport Management Act 2003
NES-F	National Environmental Standards for Freshwater 2020 (NES-F)
NES-Soil	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NPS-FM	National Policy Statement for Freshwater Management 2020
NPS-HPL	National Policy Statement for Highly Productive Land 2022 – amended August 2024
NRC	Northland Regional Council
NZTA	NZ Transport Agency Waka Kotahi
Project	State Highway 1 subsidence remediation works (Akerama Curves)
PRPN	Proposed Regional Plan for Northland – February 2024
RMA	Resource Management Act 1991
SH1	State Highway 1
WAA	Wildlife Act Authorization
WSP	WSP New Zealand Ltd

1 INTRODUCTION

1.1 Purpose of this report

This Assessment of Environmental Effects (**AEE**) report has been prepared on behalf of New Zealand Transport Agency Waka Kotahi (NZTA) by WSP New Zealand Ltd (**WSP**) to support the resource consent application for the Akerama Curves Subsidence Remediation Works Project (hereafter referred to as "**the project**").

The works relate to a section of land located directly adjacent to State Highway 1 (**SH1**) in Akerama, Northland.

The primary objective of the proposed works is to remediate the buttressed embankments in close proximity to SH1 that have subsided.

A description of the activities to be authorised is provided in Section 3 of this report.

This AEE report has been prepared in support of the Application, in accordance with Section 88 of the Resource Management Act 1991 (RMA).

1.2 NZ Transport Agency Waka Kotahi

NZTA is a Crown entity with its functions, powers and responsibilities set out in the Land Transport Management Act 2003 (**LTMA**) and the Government Roading Powers Act 1989. The primary objective of NZTA under Section 94 of the LTMA is to contribute to an effective, efficient, and safe land transport system in the public interest.

An integrated approach to transport planning, funding and delivery is taken by NZTA. This includes investment in public transport, walking and cycling, local roads and the construction and operation of state highways.

Section 96(1)(a) of the LTMA requires that NZTA exhibits a sense of social and environmental responsibility when undertaking its work. This statutory requirement is reflected in a raft of strategic and policy documents. One of the core position statements is that NZTA will responsibly manage the land transport system's interaction with people, places, and the environment.

NZTA is also a network utility operator approved as a requiring authority under Section 167 of the RMA.

The legal name for NZTA is the New Zealand Transport Agency Waka Kotahi. The abbreviated name NZTA is used throughout this AEE.

1.3 Background

SH1 was realigned at SH01N-RS0215-B Akerama Bends in 2018 and has experienced some localised subsidence post-construction. The adjacent landowner has made NZTA aware the subsidence is impacting their property at two locations.

The subsidence at the location to which this application relates includes an overslip in a cut batter at approximately RP15.930. Following the realignment of the road the overslip began to slump. This overslip has recently been buttressed close to the road to prevent it from affecting live traffic. While this has removed the immediate risk to the road, the overslip headscarp appears to be regressing towards the neighbouring property.

WSP prepared an options assessment report to identify measures to stabilise situation.

NZTA opted for a "cut and fill" approach that will involve excavating (cutting) soil from the slope and using it to fill the lower sections. A permanent clean water diversion bund will also be constructed adjacent to the road to direct water away from SH1.

1.4 Resource Consents Sought

Following an assessment of the proposal under the RMA and the Operative Far North District Plan (OFNDP), resource consent is sought pursuant to the following rule:

- Earthworks that exceeds 5,000 m³ in any 12 month period and which also involves a continuous cut or filled face exceeding an average of 1.5 m in height over the length of the face pursuant to Rule 12.3.6.1.1 of the OFNDP.

The proposed works are therefore a Restricted Discretionary Activity under the OFNDP.

1.5 Appended Information

The following information is appended to this AEE:

Appendix A	Remediation Works Design Drawing
Appendix B	*Consultation and Support Information*
	B.1: Landowner Agreements / Approvals

2 GENERAL DESCRIPTION OF THE SITE

2.1 Location

The work site is located on SH1 approximately 20 km southeast of Kawakawa and 34 km northwest of Whangārei in the Far North District. This site is located on farmland adjacent to SH1.The location of the proposed work is shown in **Error! Reference source not found.** below.

Figure 1 - General site location

2.2 Landowners and Occupiers

The proposed works are located on private land adjacent to SH1 (outside of the road reserve), as shown in Figure 2.

Table 1 and **Error! Reference source not found.** below indicate the land parcel that is directly affected by the works.

Table 1: Land parcels affected by the works

Legal Description	Record of Title	Owner	Status
Section 75 Block VI Hukerenui SD	NA5A/849	Charles Richard Barnes, Derek Richard Barnes, Helen Denise Barnes, Karen Joanne Barnes, MP Trustees 2014 Limited	Privately owned. NZTA has agreed temporary occupation to this property with the landowner.

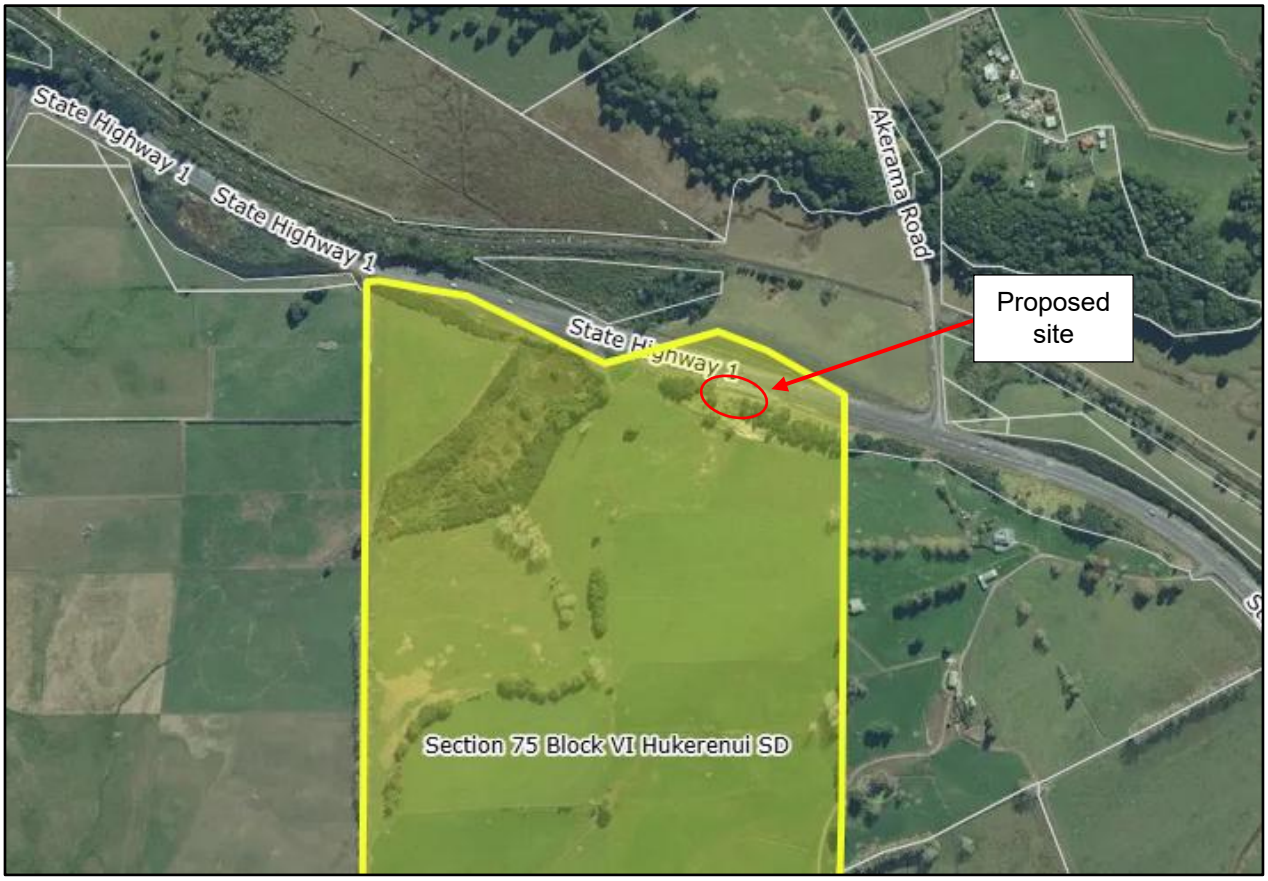


Figure 2 - Property parcel details (source: https://app.grip.co.nz/)

2.3 Surrounding Area

The Akerama Curves site is located on SH1 (1N-0215-B/15.813 to 1N-0215-B/16.109) between Kawakawa and Whangārei in the Far North District. SH1 is a vital connection road for communities in the Far North with the rest of the country.

Error! Reference source not found. below provides an aerial image of the subject site, and shows the extent of the proposed works along the road corridor.

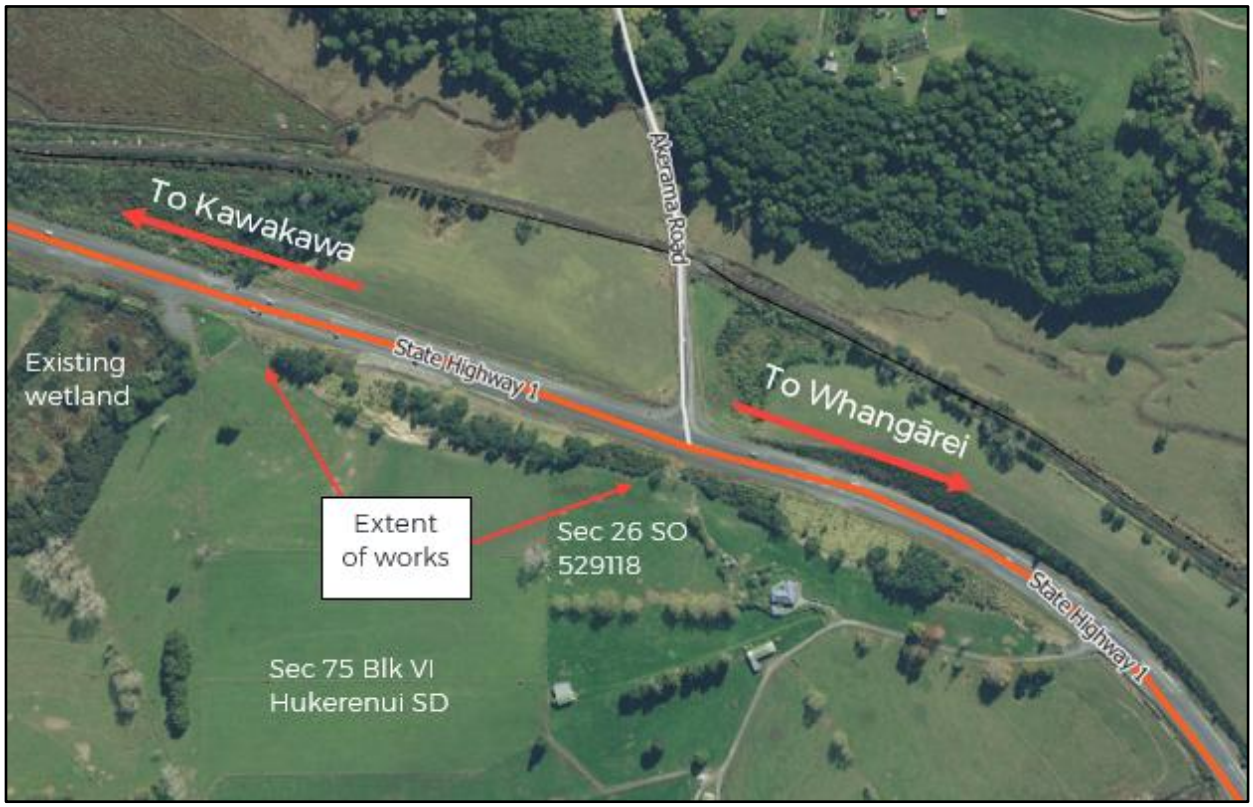


Figure 3 - Akerama Curves works site extent (Aerial photo source: https://fndc.maps.arcgis.com)

A railway corridor runs adjacent to SH1 on the opposite side of the road. The site is within the Rural Production Zone as indicated in Figure 4 below.

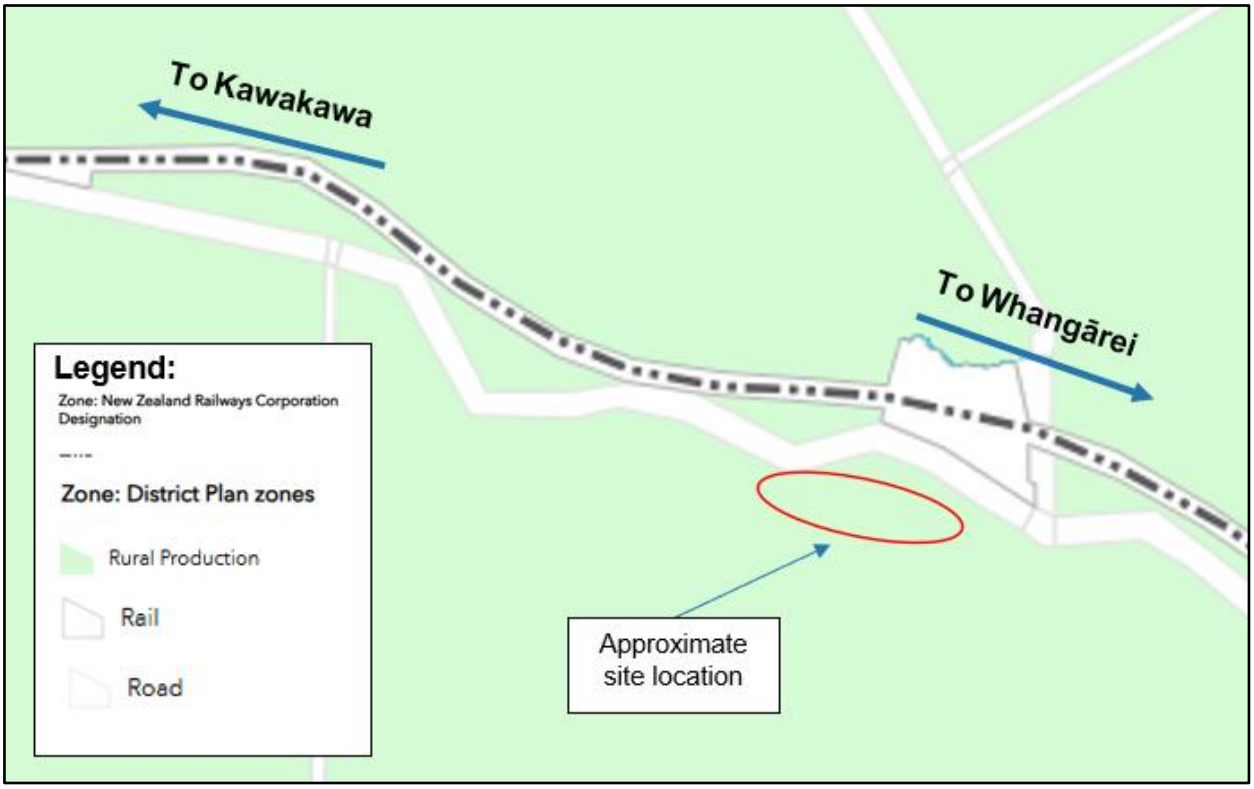


Figure 4 - Akerama Curves FNDP zones (Source:https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=6effb35003d84813b34071798e29634d)

The land adjacent to the subject site is farmland, predominately grass pasture. The area is relatively flat with a wetland located approximately 85 m to the northwest of the site. The proposed works does not extend into the adjacent wetland.

There are a few archaeological sites to the west and north of the site. Three Māori hut sites have been identified to the west, the closest being 694 m from the proposed site. There are also two European sites in Towai, to the north, with the closest site being 2.1 km away. This site was previously disturbed when the road was realigned in 2018. It is thus highly unlikely that any undiscovered artifacts will be found as part of the proposed works. An Accidental Discovery Protocol will be applied.

No culturally significant sites are recorded in the vicinity of the work site according to the NRC or FNDC GIS maps.

The wetland in proximity to the site is mapped as flood susceptible land by NRC, the proposed works do not extend into this overlay.

2.4 Environmental Values

2.4.1 Terrestrial Ecological Values

A field assessment was undertaken on 20th of August 2025 to assess the ecological values of the project site.

The habitat surrounding Akerama Curves did not appear to provide suitable ground cover for skink species, however, the site potentially contains suitable habitat for arboreal geckos. No suitable bat habitat was identified at the site. As noted, a wetland was identified approximately 85 m from the proposed works area.

Birds identified at the site are outlined in Table 2 below. These are mostly non-threatened species with two at risk species identified. These are the New Zealand Pipit and the Red Billed Gull. Red Billed Gulls are unlikely to occur this far inland. Pipits nest within long grass such as kikuyu which is present within the project site, however, they are more likely to be nesting in the surrounding farmland rather than within the site. The site is likely to provide habitat for common native and introduced bird species.

Table 2 - Bird species observed in proximity to Akerama Curves

Scientific Name	Common Name	Threat Classification	Likelihood of presence on-site
Larus novaehollandiae scopulinus	Red Billed Gull	At Risk - Declining	Unlikely
Anthus novaeseelandiae novaeseelandiae	New Zealand Pipit	At Risk - Declining	Likely
Porphyrio melanotus melanotus	Pukeko	Not Threatened	Confirmed
Hemiphaga novaeseelandiae	Kereru	Not Threatened	Likely
Larus dominicanus dominicanus	Southern Black Backed Gull	Not Threatened	Unlikely
Rhipidura fuliginosa placabilis	North Island Fantail	Not Threatened	Confirmed
Tadorna variegata	Paradise Shelduck	Not Threatened	Likely
Chrysococcyx lucidus	Shining Bronze-Cuckoo	Not Threatened	Possible
Vanellus miles novaehollandiae	Masked Lapwing	Not Threatened	Likely
Gerygone igata	Grey Gerygone	Not Threatened	Confirmed
Egretta novaehollandiae	White-faced Heron	Not Threatened	Possible
Todiramphus sanctus vagans	Kingfisher	Not Threatened	Confirmed

Prosthemadera novaeseelandiae	Tui	Not Threatened	Likely
Himantopus himantopus leucocephalus	Pied Stilt	Not Threatened	Likely
Petroica macrocephala toitoi	Tomtit	Not Threatened	Unlikely
Cygnus atratus	Black swan	Not Threatened	Unlikely
Zosterops lateralis lateralis	Silvereye	Not Threatened	Possible
Circus approximans	Swamp Harrier	Not Threatened	Confirmed
Hirundo neoxena neoxena	Welcome Swallow	Not Threatened	Likely

Both indigenous and non-indigenous vegetation were found within the project footprint – refer to Table 3 below. The indigenous vegetation has been replanted since the original SH1 remediation work in 2018.

Table 3 - Vegetation recorded at the site

Scientific Name	Common Name	Threat Classification
Cordyline australis	Cabbage Tree	Not Threatened
Podocarpus totara var. totara	Totara	Not Threatened
Melicytus ramiflorus	Mahoe	Not Threatened
Coprosma robusta	Karamu	Not Threatened
Dacrycarpus dacrydioides	Kahikatea	Not Threatened
Leptospermum scoparium var. scoparium	Manuka	Not Threatened
Pittosporum tenuifolium	Black Matipo	Not Threatened
Hydrocotyle novaeseelandiae var. novaezeelandiae	New Zealand Pennywort	Not Threatened
Phormium tenax	Flax	Not Threatened
Dianella haematica	Swamp Dianella	Not Threatened
Paesia scaberula	Pig Fern	Not Threatened
Histiopteris incisa	Water Fern	Not Threatened
Acacia mearnsii	Black Wattle	Exotic
Ranunculus repens	Buttercup	Exotic
Ligustrum sinense	Chinese Privet	Exotic

2.5 Cultural Values

The PRPN overlays and the Far North District Council's GIS maps indicate that there are no Nohoaka sites or Wāhi tūpuna (sites of significance to iwi) in the immediate area. Additionally, the project site is not subject to customary rights or marine title.

The project site is within the rohe of Ngāti Hau. .

3 DESCRIPTION OF PROJECT / PROPOSED ACTIVITY

3.1 Description of the Project / Proposed Activity

NZTA proposes to remediate the site using a cut-and-fill method to excavate soil from the slope and use it to fill the lower sections. The proposed works are illustrated in Figure 6 below.

The main objectives of the works are to remediate the subsidence and overslip adjacent to SH1. The overslip has been buttressed to reduce the risk to live traffic, but appears to be continuing to slip, encroaching onto the adjacent property.

The planned work, as shown in Figure 6, involves the installation of a bund, subsoil drainage, as well as cut and fill to stabilise the slope at the slip site. The main activities involved in this are earthworks and vegetation clearance.

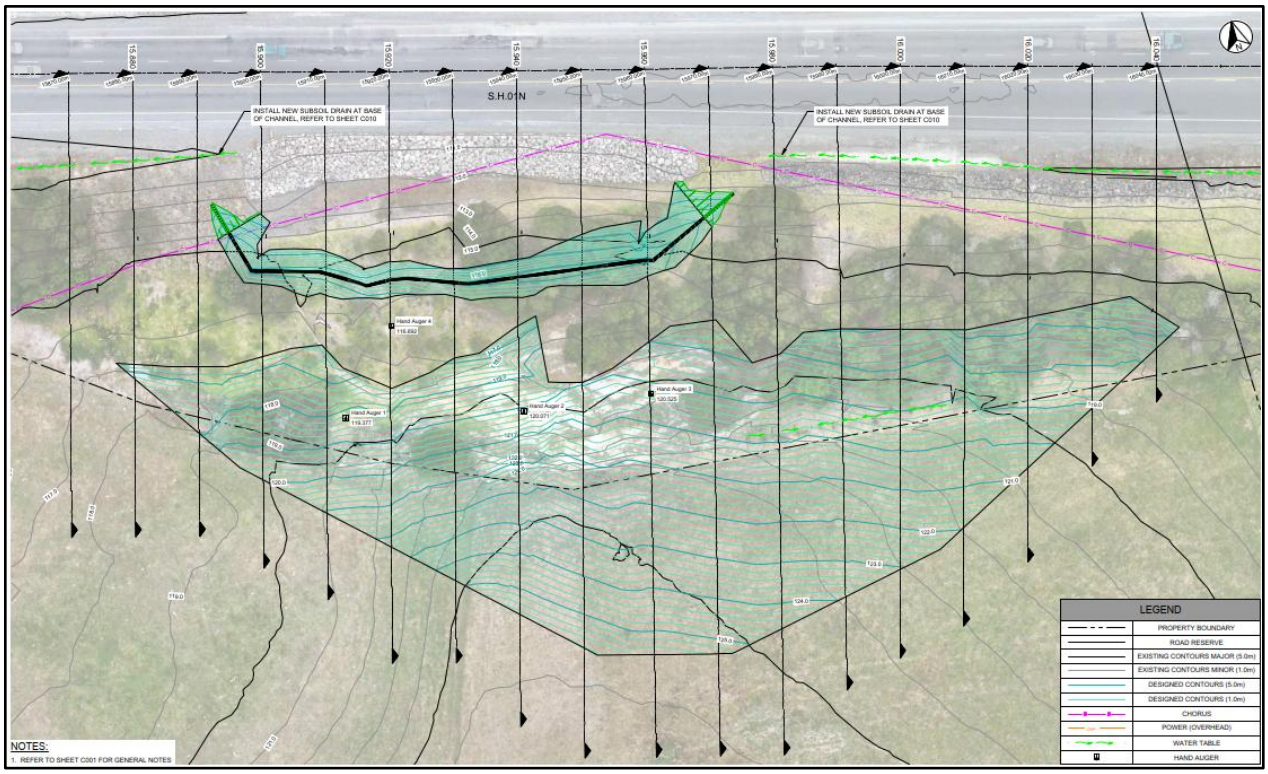


Figure 5 - Proposed remediation works

3.2 Options Assessment

An options assessment was undertaken on the 25 March 2025 to assess the subsidence on the site and the long-term risk of the overslip to live traffic.

Four options were considered, namely:

- Do minimum.
- Retaining wall along the boundary.
- Retaining wall closer to the road and some minor fill.
- Cut and fill the current material.

The outcome of this assessment was a recommendation to undertake drainage works at the spoil site and cut to fill at the cut face slip site. The proposed work was identified as the preferred option as it was seen to be the best balance to achieve the desired outcomes, while being cost effective and environmentally friendly.

3.3 Indicative Construction Methodology

The works duration should not be longer than one month.

These works will include:

- Vegetation clearance within the designated construction area.
- Cut and fill of the batter to remove the risk of slips along the road and farmland boundary. This will involve cutting from the slope and using it to fill in the lower sections
- Subsoil drainage to reduce the buildup of porewater pressure.
- Creation of a clean water diversion bund.
- Hydroseeding to reinstate the slopes of decommissioned cut and fill section as well as the bund.

The construction methodology aims to mitigate effects on the environment as far as reasonably practicable.

An updated Construction Management Plan (**CMP**) which will include an Erosion and Sediment Control Plan (**ESCP**) will be prepared by the contractor prior to the commencement of the works.

The ESCP will be prepared in accordance with "2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region" (known as **GD05**) which will be followed by the contractor at all stages of the project to ensure any disturbed sediment from the proposed work will not inadvertently enter the Waiomio Stream.

Additionally, an Accidental Discovery Protocol (**ADP**) that has been developed by NZTA will also be followed at all stages in case an archaeological site, kōiwi / human remains, or taonga (Māori artefacts) are accidentally discovered during the work.

Earthworks are planned to take place during the summer dry period.

Works associated with the exercise of this consent shall only be carried out during normal working hours.

The information provided in this section is indicative and is intended to provide sufficient detail to assess the potential effects of construction on the environment and to identify measures to avoid, remedy or mitigate any adverse effects, where appropriate.

The final construction methodology may be influenced by:

- Final consent conditions
- Final detailed design
- Construction duration and target completion date
- Type of delivery contract; and
- Technological advances and innovation in construction methods.

4 STATUTORY CONTEXT

4.1 Overview

The purpose of this section is to set out the statutory framework against which the work must be assessed, including identifying the statutory authorisations sought under the RMA. For the sake of completeness and transparency, this statutory assessment considers the following relevant RMA statutory documents that relate to both Regional and District matters:

- Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (**NES-CS**);
- National Policy Statement for Highly Productive Land 2022 – amended August 2024 (**NPS-HPL**)
- Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (**NES-F**);
- Proposed Regional Plan for Northland (February 2024) (**PRPN**).
- Operative Far North District Plan (**OFNDP**)
- Proposed Far North District Plan (**PFNDP**)

4.2 Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES-CS)

The NES-CS should be considered due to the earthworks component of this proposal. The NRC Selected Land-Use Register does not identify the subject site as being an area currently or formerly used for purposes listed in the Ministry for the Environment's Hazardous Activities and Industries List (**HAIL**). As the subject site has already been previously disturbed as part of the 2018 works, it is not expected to contain contaminants that could be found within historic roads such as coal tar or lead-based materials. Therefore, it is unlikely that any HAIL activities have ever taken place on the site.

The NES-CS is therefore not applicable.

4.3 National Policy Statement for Highly Productive Land 2022 – amended August 2024 (NPS-HPL)

Consideration should be given to the NPS-HPL as the proposed works include earthworks on rural land. The site is categorised as LUC4, which is not considered highly productive land.

The NPS-HPL is therefore not applicable.

4.4 Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F)

The Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F) regulates activities that pose risks to the health of freshwater and freshwater ecosystems. The regulations came into force on 3 September 2020.

The site is within 100 m of a natural inland wetland, therefore the NES-F regulations are applicable.

An assessment of the regulations in the NES-F has concluded that the works will comply with the relevant conditions and are therefore permitted.

4.5 Proposed Regional Plan for Northland – February 2024 (PRPN)

The proposed works are assessed as being a Permitted Activity under the PRPN. The proposed earthworks will be staged to keep the area of exposed earth below 5,000 m² at any given time.

Rule	Conditions	Work Status
Rule C.8.3.1 **Earthworks**	Earthworks will be required for the remediation works. Under the PRPN, Rule C.8.3.1 permits earthwork thresholds depending on the location described in Table 15. The proposed earthworks will be more than 10 m from the wetland and the stream flowing through the wetland. The subject site is classed as "other areas" in Table 15 and therefore, the plan permits 5,000 m2 of exposed earth at any time.	The earthworks to construct the bund will be undertaken first and then sealed. The topsoil for the larger earthworks will be stripped and temporarily stockpiled and the area sealed. Finally, the last cut to fill will be undertaken.

4.6 Operative Far North District Plan (OFNDP)

While SH1 was re-aligned in 2018, the updated property boundaries and SH1 designation are yet to be legalised. Therefore, the site is not within the SH/NZTA designation and is within Section 75 Block VI Hukerenui SD.

4.6.1 Zoning and Overlays

The works are located within the Rural Production Zone under the Far North District Plan where the proposed works will be undertaken within private land.

4.6.2 Rules Assessment

The relevant rules are outlined below.

Chapter 12.1 - Landscapes and natural features

Rule	Conditions	Work Status
Rule 12.2.6.1.1 **Indigenous vegetation clearance permitted throughout the district**	Notwithstanding any rule in the Plan to the contrary but subject to Rules 12.5.6.1.1, 12.5.6.1.3 and 12.5.6.2.2 in the Heritage section of this Plan, indigenous vegetation clearance is permitted throughout the District where the clearance is for any of the following purposes: […] (d) the maintenance of existing roads, and private accessways and walkways including for the purposes of visibility and road safety; or […]	Some indigenous vegetation clearance will be required in order to maintain the existing road (SH1).
Comment: *Under Rule 12.2.6.1.1 of the OFNDP, indigenous vegetation clearance is **permitted** throughout the District where the removal is for the purpose of the maintenance of existing roads.*		

Chapter 12.3 - Soils and minerals

Rule	Conditions	Work Status
Rule 12.3.6.1.1 **[Permitted]** **Excavation and/or filling, excluding mining and quarrying, in the rural production zone or Kauri Cliffs zone**	Excavation and/or filling, excluding mining and quarrying, on any site in the Rural Production Zone or Kauri Cliffs Zone is permitted, provided that: (a) it does not exceed 5,000 m³ in any 12 month period per site; and (b) it does not involve a continuous cut or filled face exceeding an average of 1.5 m in height over the length of the face i.e. the maximum permitted average cut and fill height may be 3 m.	The proposed works will exceed 5,000 m^3 in 12 months and the average height of the cut will be 7 m in height.
Comment: *The proposed works will exceed 5,000 m^3 (approx.5,363.95 m^3) in 12 months and the average height of the cut will be 7 m in height. Therefore, resource consent is required for earthworks within the Rural Production Zone as a* ***Restricted Discretionary Activity*** *pursuant to Rule 12.3.6.2. of the OFNDP.*		

Chapter 8.6 - Rural Production Zone

Rule	Conditions	Work Status
8.6.5.1.7(b) **Noise**	**Construction Noise:** Construction noise shall meet the limits recommended in, and shall be measured and assessed in accordance with, NZS 6803P:1984 "*The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*".	Noise will occur during the works.
Comment: *These construction limits have been updated to NZS 6803:1999 Acoustics – Construction noise. It is expected that the noise produced during construction can meet the NZS 6803:1999 Acoustics – Construction noise standards, thus this is a* ***permitted activity.***		

4.6.3 Activity Status Summary

The proposal for the slip remediation and drainage works along SH1, with specific reference to earthworks do not meet the permitted standards for Rule 12.3.6.1.1.

The activity therefore requires consent as a ***Restricted Discretionary Activity***.

The measures proposed, such as erosion and sediment control and ecological derisking, will adequately mitigate any potential adverse effects on the environment.

4.7 Proposed Far North District Plan (PFNDP)

While SH1 was re-aligned in 2018, the updated property boundaries and SH1 designation are yet to be legalised. Therefore, the site is not within the SH/NZTA designation and is within Section 75 Block VI Hukerenui SD.

The Far North Proposed District Plan (PDP) is currently in the hearings stage, with public submissions and further submissions already completed. The Council received over 580 submissions and is now working

through hearings and preparing recommendations. A variation to the plan was notified in late 2024, focusing on minor corrections and zoning updates. Due to the plan's complexity, the Council has been granted an extension and must notify its decisions by 27 May 2026. Some rules already have immediate legal effect, but most of the plan won't apply until it becomes operative, which may be delayed further by appeals. Notably, the proposed Significant Natural Areas (SNAs) were removed from the plan, pending further changes to national policy requirements.

Rule	Conditions	Work Status
Rule IB-R1 **Indigenous vegetation pruning, trimming and clearance and any associated land disturbance for specified activities within and outside a Significant Natural Area**	13. It is for the operation, repair and maintenance of the following activities where they have been lawfully established: i. fences; ii. infrastructure; iii. buildings; iv. driveways and access; v. walking tracks; vi. cycling tracks; or vii. farming tracks.	Some indigenous vegetation clearance will be required in order to ensure resilience of SH1.
Comment: *Under Rule IB-R1 of the PFNDP, indigenous vegetation clearance is **permitted** throughout the District where the removal is for the purpose of the repair and maintenance of infrastructure which includes roads.*		

Rule	Conditions	Work Status
Rule EW-R12 **Earthworks and the discovery of suspected sensitive material**	The earthworks must comply with standard EW-S3 - Accidental Discovery Protocol.	Earthworks required for slope works and bund creation.
Rule EW-R13 **Earthworks and erosion and sediment control**	Earthworks must comply with standard EW-S5 Erosion and sediment control. Earthworks 1. must for their duration be controlled in accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005); and 2. shall be implemented to prevent silt or sediment from entering water bodies, coastal marine area,	Earthworks required for slope works and bund creation.

Rule	Conditions	Work Status
	any stormwater system, overland flow paths, or roads.	
Comment: *The proposed works will ensure the Accidental Discovery Protocol standards outlined in EW-S3 are followed.* *Earthworks will be completed in accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005); and mitigation measures will be in place to prevent silt or sediment from entering water bodies, any stormwater system, overland flow paths, or roads.* *Therefore, the proposed earthworks are **permitted** under the PFNDP.*		

4.8 Other Statutory Approvals

4.8.1 Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA)

There are no known archaeological sites in the immediate vicinity of the subject site and therefore, there has not been any consultation with Heritage New Zealand Pouhere Taonga (**HNZPT**). It is therefore recommended that the proposed works be undertaken in accordance with NZTA's P45 ADP.

4.8.2 Wildlife Act 1953

The Wildlife Act requires a Wildlife Act Authorization (**WAA**) for activities involving the killing, handling, or disturbing of protected wildlife. It is considered highly unlikely that any protected wildlife will be encountered during construction activities, and subsequently a WAA is not required the for taking or killing of wildlife as outlined in Section 53 of the Wildlife Act.

5 CONSULTATION

5.1 Overview

NZTA is engaging with the owner of the directly affected land and has provided information to hapū members regarding the works.

Due to the short-term and temporary nature of the works (expected to take less than one month) and the minor effects of the associated works (assessed in **Section 7** below), there have been no other identified affected persons resulting from the proposed works.

5.2 Landowner

The section of the road this site is located on is still subject to the ongoing road legislation process, under the Public Works Act 1981. As a result, the landowner has been in regular consultation with NZTA more broadly. It was the affected landowner (Section 75 Block VI Hukerenui SD 674818) who notified NZTA of subsidence impacting their property at two locations. No additional private land will be encroached onto as part of the works. However, private land will need to be temporarily occupied by contractors in order to complete the works. The extent of this temporary occupation is shown in the detailed design drawings in Appendix A.

The proposed works will have a positive effect on the landowner as they will mitigate drainage and subsidence issues that the landowner has been experiencing. There will be a less than minor temporary impact to the landowner through the use of their land as access during works. Cut and fill will occur for the creation of the bund and associated drainage system, but no permanent infrastructure will be installed on private land.

5.3 Iwi / Hapū

NZTA has established processes for consulting with iwi and hapū and will engage further with mana whenua through existing mechanisms and as required through the resource consent process.

6 ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

6.1 Overview

This assessment of environmental effects is provided in relation to the proposed earthworks.

Section 88 of the RMA requires that an applicant assess any actual or potential effects that the proposed activities may have on the environment, and the ways in which any adverse effects may be avoided, remedied or mitigated.

FNDC is restricting the exercise of its discretion to:

(i) the effects of the **area and volume of soils and other materials to be excavated**; and

(ii) the effects of **height and slope of the cut or filled faces**; and

(iii) the **time of the year when the earthworks will be carried out and the duration of the activity**; and

(iv) the degree to which the **activity may cause or exacerbate erosion and/or other natural hazards on the site or in the vicinity of the site**, particularly lakes, rivers, wetlands and the coastline; and

(v) the **extent to which the activity may adversely impact on visual and amenity values**; and

(vi) the extent to which the activity may **adversely affect cultural and spiritual values**; and

(vii) the extent to which the activity may **adversely affect areas of significant indigenous vegetation or significant habitats of indigenous fauna** and

(viii) the **number, trip pattern and type of vehicles associated with the activity**; and

(ix) the **location adequacy and safety of vehicular access and egress**; and

(x) the means by which any adverse **environmental effects of the activity will be avoided, remedied or mitigated**.

These actual and potential effects on the environment of allowing the activity, have been identified and assessed below.

6.2 Positive Effects

SH1 is regionally and nationally significant infrastructure that connects Northland, including the Far North, Whangārei, and Kaipara Districts, to the Auckland Region and the rest of New Zealand. It is vital for the social and economic well-being of both local communities and the region as a whole. Therefore, maintaining the road and its supporting infrastructure to a high standard is essential.

The proposed works are aimed to improve drainage and mitigate the risk of slipping and subsidence of the Akerama Curves section of SH1.

Positive effects of the works include improved road safety, reduced ongoing maintenance costs and safeguarding of economy activity along this transport corridor. In addition, the remediation works will prevention of encroachment of slips, reduce slumping and improve drainage on the adjacent farmland.

Overall, repairs to the State Highway network are fundamental to ensure that communities are resilient and remain connected in extreme weather events.

6.3 Area and volume of excavated material

At approximately 6,054 m³, the expected earthworks volume is only slightly larger than what is permitted in this zone under the OFNDP. The permitted baseline under Rule 12.3.6.1.1 of the OFNDP is 5,000 m³ the proposed works exceed this by 1,054 m³.

The excavated earth will be used to fill in certain areas within the worksite to create a gradual slope and more stable embankment.

The earthworks will be staged in order to keep the area of exposed earth at a given time below 5,000 m².

The area and volume of earthworks and effects deriving from it is considered to be **less than minor**.

6.4 Height and slope of cut or filled face

The height of the cut / fill face is approximately 4.5 m to 4.9 m, as can be seen from the cross section in Figure 7.

This height is over a distance of 26 m and has a gradual slope at around 12°.

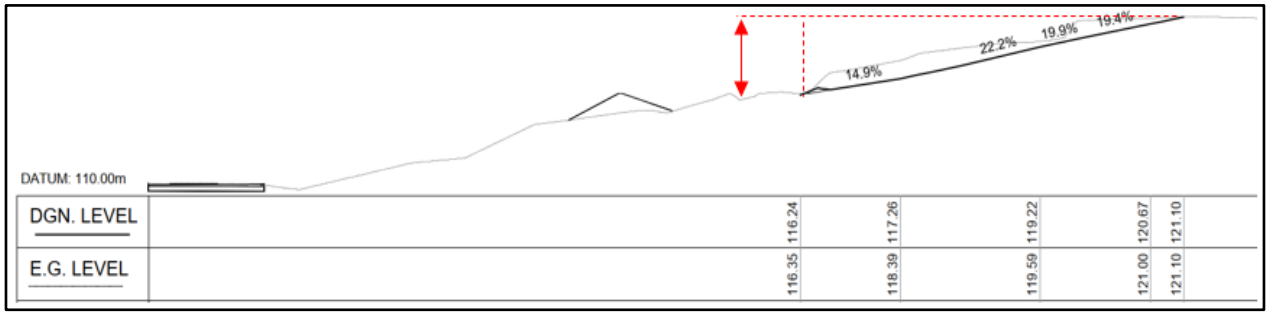


Figure 7 - Cut/Fill Face

Any effects from the height of the cut face are therefore considered **less than minor**.

6.5 Timing and duration

The proposed works are scheduled to take place during the drier summer period. The works are temporary and expected to be completed within a one-month time period. During this period, short-term effects will be actively managed through appropriate mitigation measures. Once construction is complete and the affected areas are reinstated and revegetated, these effects will cease. Due to their temporary nature and the implementation of effective management practices, any actual or potential adverse environmental effects associated with the works are considered to be **less than minor**.

6.6 Erosion and/or other natural hazards

The proposed works will occur over summer months to reduce the impacts of sedimentation runoff to nearby environments. A silt fence will be used for sediment control during earthworks.

The works will be carried out under the supervision of an experienced roading engineer, who will ensure contractors follow best practice standards appropriate to the site conditions. This includes implementing effective erosion and sediment control measures and avoiding excavation during unfavourable weather. These mitigation strategies are designed to prevent any adverse effects from earthworks on surrounding land or waterways.

The works will create a more gradual embankment which is less volatile and has lower risk of becoming unstable.

Overall, adverse effects relating to erosion and sediment from stormwater runoff and natural hazards will be **less than minor**.

6.7 Visual and amenity values

The embankment was modified in the past with the realignment of SH1 and therefore doesn't hold any value in terms of visual and aesthetic values.

During the proposed work the visual amenity and landscape values will be impacted by the earthworks undertaken on the site. The exposed earth and presence of machinery will be temporary in nature. Machinery should be on site for no longer than one month, thus this effect is very limited.

The cut and fill location will take some time for vegetation to grow back, during the time it takes for vegetation regrown it will look visually different for those who are familiar with the landscape. This bare soil will be reseeded with grass, which will help the proposed work site blend into the surrounding pastoral

rural environment. The extensions to the bund will occur in the same location as the existing bund, thus the alternation to the landscape will be very limited and not incongruous with the existing landform.

These works will prevent future slips from occurring and will avoid any visual scars to the landscape that may occur if remediation works were not undertaken.

Earthworks at the site and the use of vehicles on unsealed surfaces in the adjacent farmland will create dust. The potential effects of dust include irritation to eyes and dust deposits on nearby surfaces. These proposed works will occur over a one-month time period.

While the works are being completed, industry standard dust suppression measures will be used to mitigate any nuisance dust effects. These measures likely include a water truck being used on haul roads. To prevent ongoing dust nuisance the batter will be reseeded after the earthworks are completed.

The construction works are limited to accepted operational hours and will comply with the guidelines and recommendations of NZS 6803: 1999 “Acoustics - Construction Noise”.

There are no residences close to the work site. Works will only occur during normal working hours of eight-hour shifts on weekdays.

Overall, the effects on visual and amenity values are considered to be **less than minor**.

6.8 Cultural effects on Tāngata Whenua

There are no mapped cultural features in the immediate vicinity of the site. This includes the absence of Nohoaka sites, Wāhi tūpuna (Sites of Significance to Iwi) areas, or any Māori heritage values. Additionally, the project site is not subject to customary rights or marine title. The site is not recognised within a Statutory Acknowledgment Area.

The adjacent wetland will not be impacted by the works, ensuring that its values and Te Mana o te Wai are upheld. NZTA’s ADP will be followed at all times during the works in the event that archaeological or cultural materials are uncovered during the work.

Effects on Tāngata Whenua and cultural values, including those associated with adjacent fresh waterbodies, are considered to be acceptable.

6.9 Ecological Effects

The proposed works may result in actual and potential adverse ecological effects, including loss of vegetation and habitat for fauna as well as wildlife disturbance. Full assessment of ecological values and potential effects by can be found in the Ecological Impact Assessment in Appendix C.

6.9.1 Effects on flora

Vegetation clearance will occur as part of the works. This vegetation consists of an exotic canopy and common native species within the understory. These plants are not naturally occurring due to being recently planted and are not representative of the surrounding landscape. Effects on vegetation have been assessed by ecologists as very low.

The overall effects in relation to vegetation clearance are therefore considered to be **less than minor**.

6.9.2 Effects on fauna

The ecological assessment determined that the project site (and its receiving environments) provides moderate value habitat for birds and herpetofauna. These species may be disturbed during the vegetation clearance and earthworks. It is expected that noise will be the main disturbance to birds in the area. Derisking of the site to ensure no specifies are present should occur by an ecologist prior to the works commencing.

Provided the mitigation measures outlined in Section 7.1.2 are implemented and ecologists have derisked the area, then the effects on fauna will be **less than minor**.

6.9.3 Effects on wetland

One wetland was identified within 100m of the impact area and is considered to be of high ecological value. However, no works will occur within the wetland boundaries; works will be occurring approximately 85 m away from the existing wetland. The proposed works are not likely to alter hydrology of the wetland system either directly or through any alteration to contributing surface water or groundwater systems.

Due to the adjacent wetland not being impacted by the proposed work, the potential adverse effects are expected to be **less than minor**.

6.10 Construction Traffic

The design has been developed to ensure all works are undertaken from the adjacent landowner's property working towards the road, reducing the risk of construction traffic impacting live traffic on SH1. Construction traffic will utilise existing farm access tracks. Imported hardfill will be used to support the maintenance of the existing farm track, which will have a positive impact on the landowner as they will be left with improved farm access tracks following the completion of the works.

The avoidance of SH1 and utilisation of existing farm tracks for construction traffic means potential effects of construction traffic will be **less than minor**.

6.11 Overall Conclusion of Effects

Overall, based on the assessment outlined above, it is considered that the actual and potential adverse effects of the proposed work on the wider environment are ***less than minor***.

The management procedures described in section 7 of this AEE report will be implemented on the site during construction (such as cleaning machinery, erosion and sediment control, ecology derisking, etc.) to ensure effects are adequately mitigated.

Any adverse effects arising from the proposed works will be mitigated and temporary in nature. Potential adverse effects on any person and the environment are considered to be no more than minor. The proposed consent will generate positive effects by reducing the risk of overslips and subsidence impacting SH1 as well as mitigating subsidence and slips on adjacent farmland.

Overall, any actual or potential adverse effects of the proposal on the environment can be avoided, remedied, or mitigated such that they will be no more than minor.

The benefits of the proposed work to the wider local community and economy are significant, given the proposed project will improve the resilience of SH1 by maintaining the infrastructure and protecting it in the face of increased frequency of extreme weather events.

7 MANAGEMENT OF EFFECTS ON THE ENVIRONMENT

7.1 Mitigation Measures

The following mitigation measures will be implemented in order to minimise potential effects on the environment.

7.1.1 Erosion and sediment

- Good practice management and erosion and sediment control measures equivalent to those set out in the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005) will be implemented for the duration of the activity.
- The works are to be under the supervision of an experienced MSQA engineer, who will convey the requirements for best practice in this type of situation to the contractors. The experienced MSQA engineer will supervise to ensure appropriate erosion and sediment control is used during the course of the works.
- Work during unfavourable weather conditions will be avoided as far as practically possible to minimise sediment deposit to receiving environments.
- A silt fence will be used during the earthworks.
- On completion of an activity, all disturbed areas and access tracks will be stabilised and restored.

7.1.2 Ecology

- Any woody shrubs and trees must be checked by a suitably qualified ecologist for presence of active nests. Trees should only be cut following approval from an ecologist.
- Cut rank grass at least 48 hours prior to earthworks and rake the cut grass to areas outside the impact area.
- If lizards are observed during earthworks, cease work immediately and consult a herpetologist.
- Woody vegetation should be cut and left on-site for 24 - 48 hours to give native lizards the opportunity to evacuate the area prior to removal from the site.

7.1.3 Cultural Heritage and Archaeology

- NZTA's ADP will be implemented during project works in the event of any discovery of potential archaeological or cultural material.

8 NOTIFICATION

Sections 95A to 95E of the RMA establish a step-by-step process to determine whether an application for resource consent should be publicly or limited notified. The applicable components of these steps are summarised below.

Considering the assessment steps above in sections 95A and 95B, it is reflected that for the proposed work public or limited notification is not mandatory, especially as the effects on the environment will be less than minor.

Section 95A - Public Notification Analysis:

A consent authority must follow the steps set out in this section, in the order given, to determine whether to publicly notify an application for a resource consent.

Step 1: Mandatory Public Notification in certain circumstances:	YES	NO
Has the applicant requested public notification? [s95A(2)(b)]		X
Is public notification required under s95C?		X
The application is made jointly with an application to exchange recreation reserve land under section 15AA of the Reserves Act 1977.		X
Step 2: Public Notification **precluded** in certain circumstances:	YES	NO
Does a rule or NES preclude public notification of the application? [s95B(2)]		X
A controlled activity; and/or		X
Restricted-discretionary or discretionary activities for: • A subdivision of land • A residential activity [s95A(6)] • A boundary activity [87AAB]		 X X X
Step 3: Public Notification **required** in certain circumstances:	YES	NO
Does a rule or NES require public notification of the application? [s95B(2)]		X
Are adverse effects on the environment more than minor? [s95A(2)(a)]		X
Step 4: Public notification **required in special circumstances**:	YES	NO
Do special circumstances apply that warrant public notification? [s95A(4)]		X

Summary:
Public Notification is not considered essential for the following reasons:

- the applicant (NZTA) has not requested public notification (section 95A(3)(a));
- the application does not include a proposal to exchange reserve land (section 95A(3)(c));
- notification of the application is not required by a rule or national environmental standard (sections 95A(5)(a) and 95A(8)(a));
- the application will not have adverse effects on the environment that are more than minor (section 95A(8)(b)); and
- there are no special circumstances that would warrant public notification (section 95A (9).

Section 95B – Limited Notification Analysis:

The consent authority must follow the steps outlined under Section 95B, in order, to determine whether to publicly notify or limited notify an application for resource consent.

Step 1: Certain affected groups and affected persons **must be notified**:	YES	NO
Are there any affected protected customary rights groups? [s95F]		X
Is the activity on, adjacent to or likely to affect a statutory acknowledgement area? And; would you consider the person(s) for whom the statutory acknowledgement is made to be affected? [s95E(2)(c)]		X
Step 2: Limited Notification **precluded** in certain circumstances:	YES	NO
Does a rule or NES preclude limited notification of the application? [s95B(2)]		X
Is the land use consent a controlled activity?		X
Step 3: Certain other affected persons **must be notified**:	YES	NO
Are adverse effects on any person minor or more than minor?		X
Step 4: Limited notification **required in special circumstances**:	YES	NO
Do special circumstances apply? [s95A(4)]		X

Summary:

Limited Notification is not considered essential for the following reasons:

- there are no affected protected customary rights groups (Section 95B(2)(a));
- the activity will not affect a statutory acknowledgement (Section 95B(3)(a));
- limited notification is not precluded by a rule or national environmental standard (section 95B(6)(a)); and
- The landowner on whose property the works are taking place has given their written approval and is therefore not an affected person in terms of section 95.E(3)(a).
- No other persons are considered to be adversely affected (sections 95D and 95E).

The applicant requests that this application proceed on a non-notified basis.

9 STATUTORY ASSESSMENT

Section 104 of the RMA sets out matters that the consent authority shall have concern while considering an application for resource consent. Before making a decision on a ***Restricted Discretionary Activity*** pursuant to Section 104C, the Council must consider the proposal in terms of Section 104 of the RMA.

Section 104(1) outlines the following matters, which are relevant to the Council's consideration of the application:

> *"When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to–*
>
> *(a) Any actual and potential effects on the environment of allowing the activity; and*
>
> *(ab) Any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
>
> *(b) any relevant provisions of—*
>
> *(i) a national environmental standard:*
> *(ii) other regulations:*
> *(iii) a national policy statement:*
> *(iv) a New Zealand coastal policy statement:*
> *(v) a regional policy statement or proposed regional policy statement:*
> *(vi) a plan or proposed plan; and*
>
> *(c) Any other matters the consent authority considers relevant*

Section 104(2) states that:

> *"When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect."*

Council's decision in terms of a ***Restricted Discretionary Activity*** must be made in terms of Section 104C of the RMA. **Section 104C** states that:

> *" (1) When considering an application for a resource consent for a restricted discretionary activity, a consent authority must consider only those matters over which—*
>
> *(a) a discretion is restricted in national environmental standards or other regulations:*
>
> *(b) it has restricted the exercise of its discretion in its plan or proposed plan.*
>
> *(2) The consent authority may grant or refuse the application.*
>
> *(3) However, if it grants the application, the consent authority may impose conditions under section 108 only for those matters over which—*
>
> *(a) a discretion is restricted in national environmental standards or other regulations:*
>
> *(b) it has restricted the exercise of its discretion in its plan or proposed plan. "*

The works are considered to be an important long-term solution for the SH1 shoulder stability. As per the assessment of effects on the environment in section 6 above, the works are considered to generate ***less than minor adverse effects*** on the environment.

This report has been prepared within the statutory framework provided by the following applicable legislation and plans.

- National Policy Statement for Indigenous Biodiversity (NPS-IB)

- Regional Policy Statement for Northland (RPSN)
- Proposed Regional Plan for Northland, February 2024
- Part 2 of the RMA

9.1 National Policy Statement for Indigenous Biodiversity 2023 (NPS-IB)

The NPS-IB was gazetted on 7 July 2023 and took effect on 4 August 2023, it was amended in October 2024 by the Resource Management (Freshwater and Other Matters) Amendment Act 2024. The NPS-IB is applicable to indigenous biodiversity in the terrestrial environment, and relevant to the proposed works due to the proposed clearance of vegetation, some of which is indigenous.

The sole objective of the NPS-IB is to maintain indigenous biodiversity across Aotearoa New Zealand so that there is at least no overall loss of indigenous biodiversity, and to achieve this by (amongst other matters) protecting (and restoring) indigenous biodiversity as necessary to achieve the overall maintenance of indigenous biodiversity, whilst providing for the social, economic and cultural wellbeing of people and communities now and in the future.

Under the NPS-IB, any significant adverse effects on indigenous biodiversity of new use or development inside a significant natural area (**SNA**) must be avoided, or managed by applying the effects management hierarchy where it cannot be avoided. All other adverse effects of any activities that may adversely affect indigenous biodiversity within an SNA must be managed to give effect to the objective and policies of the NPS-IB.

Comment:

The site is not classified as a SNA. This section of SH1 is the main connector road for Far North communities to the rest of Aotearoa. The resilience work is essential to ensure SH1 remains open and provides continued access now and in the future.

Overall, the proposed works and mitigation measures are considered to give effect to the NPS-IB.

9.2 Regional Policy Statement for Northland (RPSN)

The purpose of the Regional Policy Statement for Northland (RPSN) is to provide a broad direction and framework for managing the region's natural and physical resources. The RPSN covers the management of natural and physical resources in the Northland Region, from Kaiwaka in the south to Cape Reinga in the north, and out to the 12 nautical mile (22.2 km) limit.

The relevant RPSN objectives and policies are provided below:

Objective 3.13 Natural Hazard Risk

"The risks and impacts of natural hazard events (including the influence of climate change) on people, communities, property, natural systems, infrastructure and our regional economy are minimised".

Objective 3.4 Indigenous Ecosystems and Biodiversity

"Safeguard Northland's ecological integrity by:

(a) Protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna;

(b) Maintaining the extent and diversity of indigenous ecosystems and habitats in the region; and

(c) Where practicable, enhancing indigenous ecosystems and habitats,

particularly where this contributes to the reduction in the overall threat status of regionally and nationally threatened species."

Objective 3.7 Regionally significant infrastructure

"Recognise and promote the benefits of regionally significant infrastructure, (a physical resource), which through its use of natural and physical resources can significantly enhance Northland's economic, cultural, environmental and social wellbeing".

Policy 4.4 Maintaining and enhancing indigenous ecosystems and species

"…(3) Outside the coastal environment and where clause (1) does not apply, avoid, remedy or mitigate adverse effects of subdivision, use and development so they are not significant on any of the following:

(a) Areas of predominantly indigenous vegetation;

(b) Habitats of indigenous species that are important for recreational, commercial, traditional or cultural purposes;

(c) Indigenous ecosystems and habitats that are particularly vulnerable to modification, including wetlands, dunelands, northern wet heathlands, headwater streams, floodplains and margins of freshwater bodies, spawning and nursery areas.

Policy 5.3 Regionally Significant Infrastructure

"The regional and district councils shall recognise the activities identified in Appendix 3 of this document as being regionally significant infrastructure.

Comment:
The works will help to ensure the safe operation of SH1 in extreme weather events, through improved drainage and water diversion. The works will mitigate the risk of subsidence and slips to the road and the adjacent farmland.

The effect of the proposal on indigenous biodiversity is considered less than minor. The earthworks to stabilise the slope and create a bund may create temporary sedimentation and/or dust effects. However, the remediation also prevents any future slips from having adverse effects on the environment.

SH1 is identified as regionally significant infrastructure in Appendix 3 of the RPSN where 'roads' are recognised. The proposed remediation works are needed to ensure no slips impact live traffic and safeguard the infrastructure for future generations. Improved resilience of this main route will have a positive impact on the community in terms of social, cultural, and economic wellbeing as it will ensure a long-term secure route.

Overall, the proposed works are aligned with the objectives and policies of the NRPS as the as the project prevents future effects of slips on the environment, whilst also safeguarding regionally significant infrastructure and minimising adverse effects on the environment and natural values.

9.3 Proposed Regional Plan for Northland (PRPN)

The Proposed Regional Plan specifies the controls on natural and physical resource use. The following objectives and policies are considered relevant to the proposal:

Objective F.1.5 Enabling Economic Well-being

The use and development of Northland's natural and physical resources is efficient and effective and managed in a way that will improve the economic, social, and cultural well-being of Northland and its communities.

Objective F.1.6 Regionally Significant Infrastructure

Recognise the national, regional, and local benefits of Regionally Significant Infrastructure and renewable energy generation and enable their effective development, operation, maintenance, repair, upgrading and removal.

Policy D.2.2 Social, cultural, and economic benefits of activities

Regard must be had to the social, cultural, and economic benefits of a proposed activity, recognising significant benefits to local communities, Māori and the region including local employment and enhancing Māori development, particularly in areas of Northland where alternative opportunities are limited.

Policy D.2.3 Climate change and development
Particular regard must be had to the potential effects of climate change on a proposed development requiring consent under this Plan, taking into account the scale, type and design-life of the development proposed and with reference to the latest national guidance and best available climate change projections.

Policy D.2.8 Maintenance, repair and upgrading of Regionally Significant Infrastructure
Enable the maintenance and upgrading of established Regionally Significant Infrastructure wherever it is located by allowing adverse effects, where: 1) the adverse effects whilst the maintenance or upgrading is being undertaken are not significant or they are temporary or transitory, and 2) the adverse effects after the conclusion of the maintenance or upgrading are the same, or similar, to those arising from the Regionally Significant Infrastructure before the activity was undertaken

Policy D.2.11 Protection of Regionally Significant Infrastructure
When considering new use and development activities that could adversely affect the ongoing operation, maintenance, upgrade, or development of Regionally Significant Infrastructure; ensure that the Regionally Significant Infrastructure is not compromised.

Policy D.4.27 Land preparation, earthworks, and vegetation clearance
When assessing an application for a resource consent for an earthworks, vegetation clearance or land preparation activity and any associated discharge of a contaminant, ensure that the activity:

1) *will be done in accordance with established good management practices, and*
2) *avoids significant adverse effects, and avoids, remedies, or mitigates other adverse effects on:*
   a) *drinking water supplies, and*
   b) *areas of high recreational use, and*
   c) *aquatic ecosystem health, indigenous biodiversity in water bodies and coastal water and receiving environments that are sensitive to sediment or phosphorus accumulation.*

Comment:
The proposed works will improve the resilience of SH1 (Regionally Significant Infrastructure), the key interregional route contributing to the social, cultural and economic benefit of Northlanders. The frequency of extreme weather events is predicted to increase due to climate change and these works will help to maintain and safeguard the infrastructure. The proposed works will not have significant adverse effects, with most adverse effects being temporary in nature and less than minor in scale.

Overall, it is considered that the proposed works are aligned with the objectives and policies of the PNRP.

9.4 Operative Far North District Plan

The Operative Far North District Plan specifies the controls on natural and physical resource use, zoning and built form. The following objectives and policies are considered relevant to the proposal:

Objective 2.7.3

To recognise and provide for the protection of waahi tapu and other ancestral sites and the mauri (life force) of natural and physical resources.

Policy 8.6.4.1

That the Rural Production Zone enables farming and rural production activities, as well as a wide range of activities, subject to the need to ensure that any adverse effects on the environment, including any reverse

sensitivity effects, resulting from these activities are avoided, remedied or mitigated and are not to the detriment of rural productivity.

Policy 15.1.3.5

To promote safe and efficient movement and circulation of vehicular, cycle and pedestrian traffic, including for those with disabilities.

Comment:

The proposed works will not disturb any waahi tapu or ancestral sites. The mauri of the nearby wetland will not be impacted by this proposal. This proposal will have a positive effect on rural productivity due to SH1 being a vital connecting road for rural communities across Northland with the rest of Aotearoa. The proposed works will ensure the safe and efficient movement of vehicles along SH1 and contribute to a resilient traffic network into the future.

9.5 Proposed Far North District Plan

The Proposed Far North District Plan is partially operative and is in the process of going through hearings currently. This plan gives insight into future direction for the District and thus should be considered. The following objectives and policies are considered relevant to this proposal:

Objective SD-SP-O3

Encourage opportunities for fulfilment of the community's cultural, social, environmental, and economic wellbeing.

Objective SD-EP-O4

People, businesses and places are connected digitally and through integrated transport networks.

Objective TRAN-O1

The State Highways, transport networks and cycleways of strategic significance are recognised and managed as regionally significant infrastructure to support the economic, cultural, environmental and social wellbeing of current and future generations.

Policy TRAN-P1

Recognise the transport network as regionally significant infrastructure by having particular regard to the significant social, economic, and cultural benefits of transport projects when determining resource consent applications or making recommendations on notices of requirement.

Objective RPROZ-O2

The Rural Production zone is used for primary production activities, ancillary activities that support primary production and other compatible activities that have a functional need to be in a rural environment.

Comment:

SH1 is recognised as regionally significant infrastructure. The proposal will ensure that the Far North's cultural, social, environmental and economic wellbeing is enhanced by connecting Northland communities, businesses and places. Overall, the proposed works align with the aforementioned objectives and policies and assist with making a resilient transport network for the Far North.

9.6 Other Matters

There are no other matters or national policy statements relevant to the works.

9.7 Part 2 RMA Assessment

The RMA is the overarching legislation that manages the use of natural and physical resources within New Zealand.

The overriding purpose of the RMA is “to promote the sustainable management of natural and physical resources” (Section 5). The broader principles (Sections 6 to 8) are to inform the process to achieving that purpose. When considering an application for a resource consent and any submissions received, the consent authority, must be subject to Part 2, have regard to those matters listed under Section 104 of the RMA.

With regards to the application of the ‘subject to Part 2’ under Section 104, case law findings have directed that decision makers / Commissioners need now only have recourse to Part 2 of the RMA if it is determined that one of three exceptions apply:

1. If any part or the whole of the relevant plan(s) are invalid;
2. If the relevant plan(s) did not provide complete coverage of the Part 2 matters;
3. If there is uncertainty of the meaning of provisions as they affect Part 2

In essence what this means is that decision makers only need to ‘go back to’ Part 2 of the RMA if the relevant planning documents have not fully addressed the Part 2 matters. If a Regional or District Plan has not fully addressed the Part 2 matters, then decision makers can ‘go up the tree’ to the RPS and then any relevant NPS in relation to any Part 2 matters.

Plans, which have to “give effect” to the higher order statutory planning documents (RPS and NPSs), should have appropriately addressed Part 2 of the RMA.

None of the three exceptions listed above apply, and the Part 2 matters have adequately been addressed through the NPS-IB, RPSN, PRPN and higher order planning documents. Based on the assessment of the proposal being consistent with the aforementioned provisions, the proposal is considered to be consistent with Part 2 of the RMA.

10 CONCLUSION

The proposed works help to protect and safeguard an important part of the nationally and regionally significant SH1 transport network, which provides for the transportation of people and goods.

Based on the preceding sections of this AEE report, it is concluded that the proposed works will have ***less than minor*** adverse effects.

The affected private landowner has given their written approval and is therefore not an affected person in terms of section 95.E(3)(a). No other parties are considered to be affected.

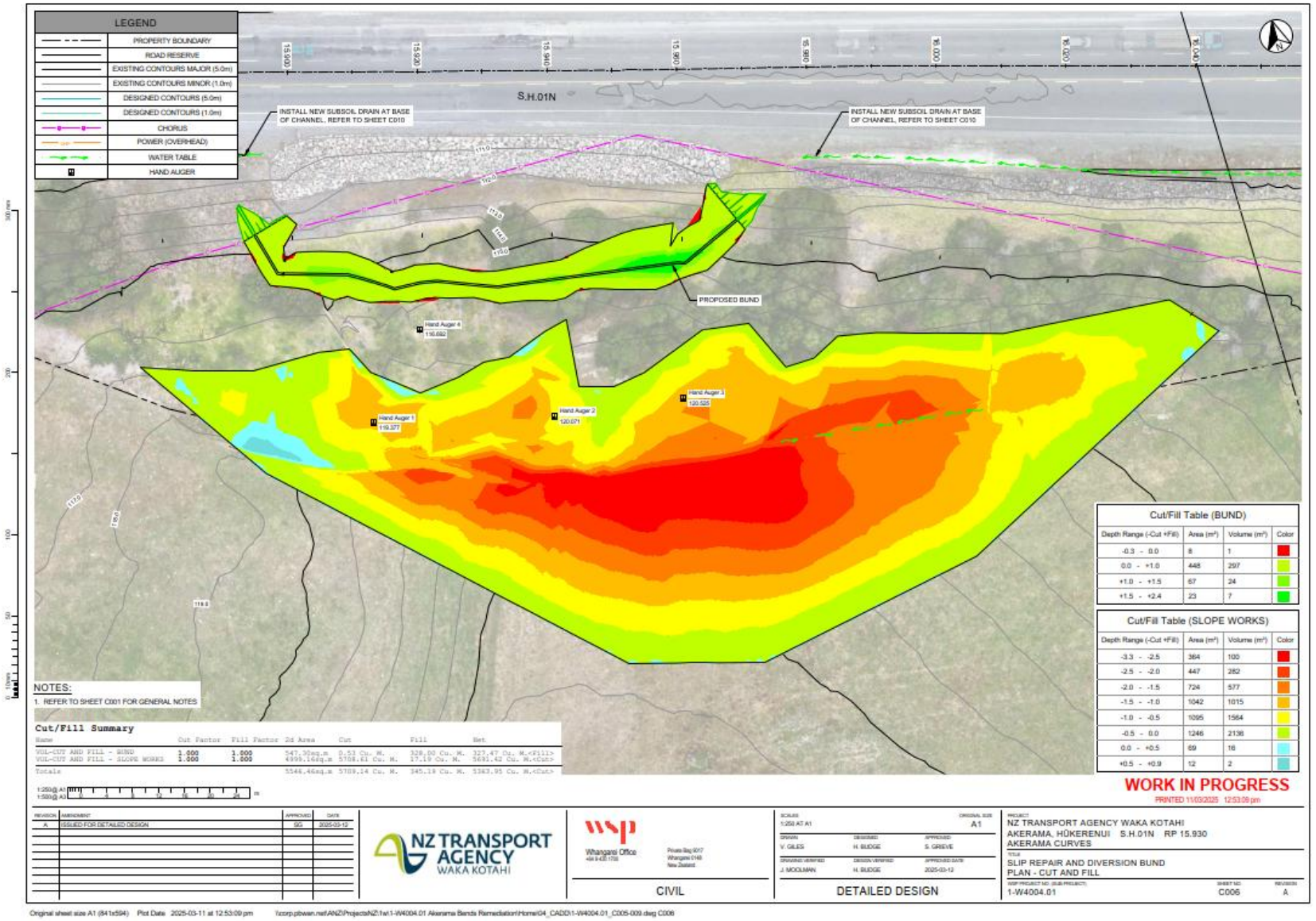
NZTA has established processes for consulting with iwi and hapū and will engage with mana whenua as required through the resource consent process.

This application has been assessed under the relevant provisions of the RMA and the proposal achieves the purpose of the RMA while avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Evaluation of the effects of the works against the relevant matters of Section 104 of the RMA and against the relevant objectives and policies of the applicable statutory documents demonstrates that the proposal is not contrary to the key provisions.

The works are therefore appropriate in the statutory context, and consent can be granted under the RMA.

APPENDIX A – Slip Remediation Design Drawing



APPENDIX B - Consultation and Support Information

Appendix B.1 – Written approval

FORM 8A
AFFECTED PERSON'S WRITTEN APPROVAL
(Section 95E(3)(a)/95F(c) of the Resource Management Act 1991)

TO: Northland Regional Council

Full name of person giving written approval: Charles Richard Barnes, Derek Richard Barnes, Helen Denise Barnes, Karen Joanne Barnes, MP Trustees 2014 Limited

I am the owner / occupier *(delete one)* **of the property located at:** Section 75 Block VI Hukerenui SD
(Give address of property)

I have authority to sign on behalf of all the other **owners / occupiers** *(select one)* of the above property.

Note: If you are signing on behalf of a trust or company, please provide additional written evidence that you have signing authority.

This is written approval to the following activity that is subject of a resource consent application:

Applicant's Name: New Zealand Transport Agency Waka Kotahi

Application Number: *(if known)*

Description of Proposal: Akerama Curves subsidence remediation works along SH1 a"cut and fill" approach will used involving excavating (cutting) soil from the slope and using it to fill the lower sections. A clean water diversion bund will also be constructed adjacent to the road to direct water away from SH1.

Location: Akerama Curves - Section 75 Block VI Hukerenui SD

I have read the full application for resource consent, the Assessment of Environmental Effects (AEE), and any site plans as follows:

Document name and date: AEE not drafted

Plan number(s) and date(s): SH01N Akerama Bends Landslip Earthworks Design Report
24 March 2025

In signing this written approval, I understand that the Northland Regional Council must decide that I am no longer an affected person, and the Northland Regional Council must not have regard to any adverse effects on me.

I understand that I may withdraw my written approval by giving written notice to the Northland Regional Council before the hearing, if there is one, or, if there is not, before the application is determined.

DRBarnes — 22 SEPT 2025

Signature* of person giving written approval *(or person authorised to sign on behalf of person giving written approval)*

Date

Address for service of person giving written approval: 452 CROWNEST ROAD

Telephone: 0274339097

Fax/Email: thebarness@xtra.co.nz

Contact person: *(name and designation, if applicable)* DEREK BARNES trustee.

** A signature is not required if you give your written approval by electronic means.*

APPENDIX C – Ecological Impact Assessment

New Zealand Transport Agency Waka Kotahi

Akerama Curves Remediation

Ecological Impact Assessment

19 August 2025

1-W4004.02

Akerama Curves Remediation

Ecological Impact Assessment

New Zealand Transport Agency Waka Kotahi

WSP
Whangarei
Mansfield Terrace Service Lane
125A Bank Street
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	NAME	ROLE	DATE
Prepared by:	Hanna Webb Jordan Stewart	Graduate Ecologist Ecologist	25/08/2025
Reviewed by:	Wayne Teal	Senior Ecologist	26/08/2025
Approved by:	Huge Budge	Team Leader Geotechnical Engineer/Project Manager	

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Akerama Curves is a section of State Highway 1 (SH1) located in Hukerenui, which was realigned in 2018. Since this realignment, the neighbouring slope of the section of SH1 has undergone localised subsidence and slumping and requires further remediation. This is the main connector road for Far North communities and the rest of Aotearoa.

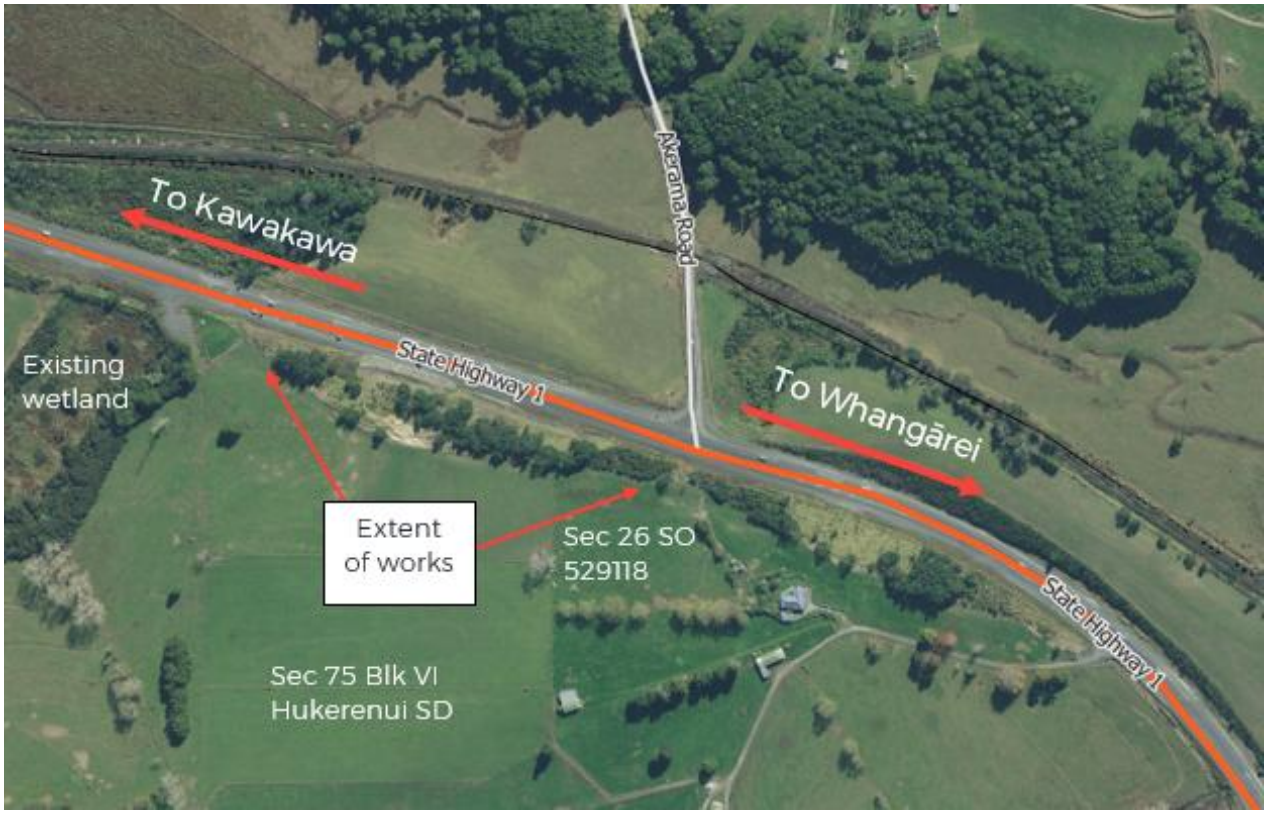

Figure 1: Location of the section of State Highway 1 requiring remediation works.

WSP was engaged to undertake an Ecological Impact Assessment (EcIA) to support the Resource Consent application for the remediation works of Akerama Curves.

1.2 SCOPE

This report provides an ecological impact assessment (EcIA) of the Project covering the following:

- A description of ecological characteristics and values of the vegetation, habitat and species of flora and fauna that may be affected by the Project.
- An assessment of the impact of construction and operation effects associated with the ecological values identified.
- Details of measures recommended to avoid, remedy, mitigate, offset or compensate adverse effects, if required.

This assessment was informed by a desktop review of existing information, using publicly available information, alongside relevant information gathered by WSP ecologists during a site visit.

1.3 SITE LOCATION & ECOLOGICAL DISTRICT

The Project site is located approximately 20 km southeast of Kawakawa and 34 km northwest of Whangarei in the Northland Region (Figure 2). Akerama Curves fall within the Eastern Northland Ecological Region and are situated within the Whangarei Ecological District. Most forests in this district are a result of secondary regeneration with few remaining old growth stands (Manning, 2001).

Figure 2: Site location in relation to Whangarei.

1.4 SITE DESCRIPTION

The land adjacent to the Project site is farmland, predominantly grass pasture. This location is relatively flat with a wetland to the northwest of the site. The existing wetland inhabits Black Mudfish (*Neochanna diversus*), which were relocated to this area as part of the previous road realignments (W. Teal, pers.com 2025). No works are proposed in the adjacent wetland.

Figure 3: Impact area of the immediate Project site at Akerama Curves.

1.5 PROPOSED WORKS

The proposed works are aimed to improve the drainage and mitigate the risk of slipping and subsidence of the Akerama Curves section of SH1. The works are temporary and expected to be completed within a one-month time period. During this period, a range of short-term effects may occur and will be actively managed through appropriate mitigation measures.

1.5.1 PROJECT DESIGN

New Zealand Transport Agency Waka Kotahi (NZTA) proposes to remediate the site using a cut-and-fill method to excavate soil from the slope and use it to fill the lower sections. This will occur in the land adjacent to the to the road corridor.

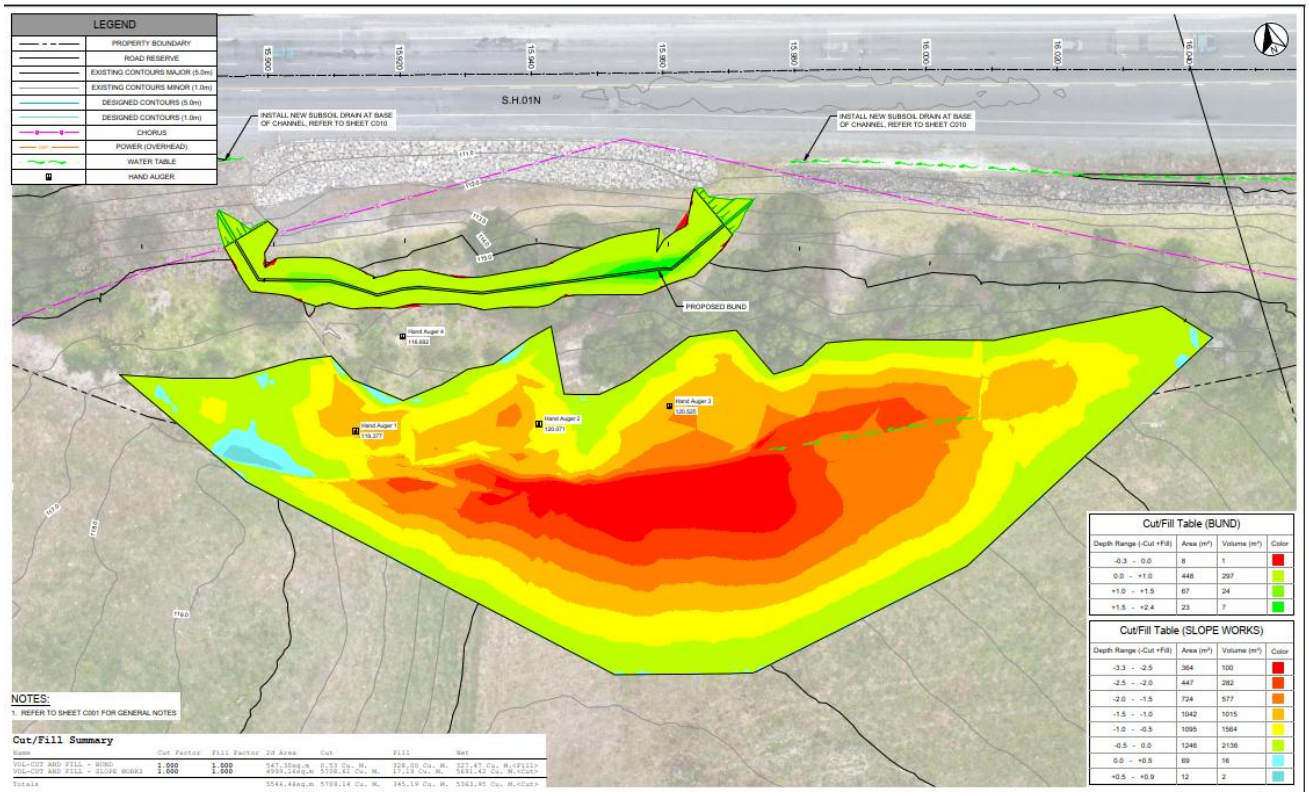

Figure 4: Construction drawings and proposed remediation works of Akerama Curves.

1.5.2 ESTIMATED ZONE OF INFLUENCE

All vegetation within the immediate proposed Project site (Figure 3) is expected to be cleared to achieve the proposed road realignment. The Zone of Influence (ZOI) (Figure 5) encompasses a wider area than the immediate Project site, as some Project activities are expected to have effects beyond the immediate boundaries of the work site, such as noise and runoff (Roper-Lindsay et al., 2018). Noise from construction activities can be detrimental to avifauna within 50 m. Figure 5 displays a ZOI to this 50 m buffer.

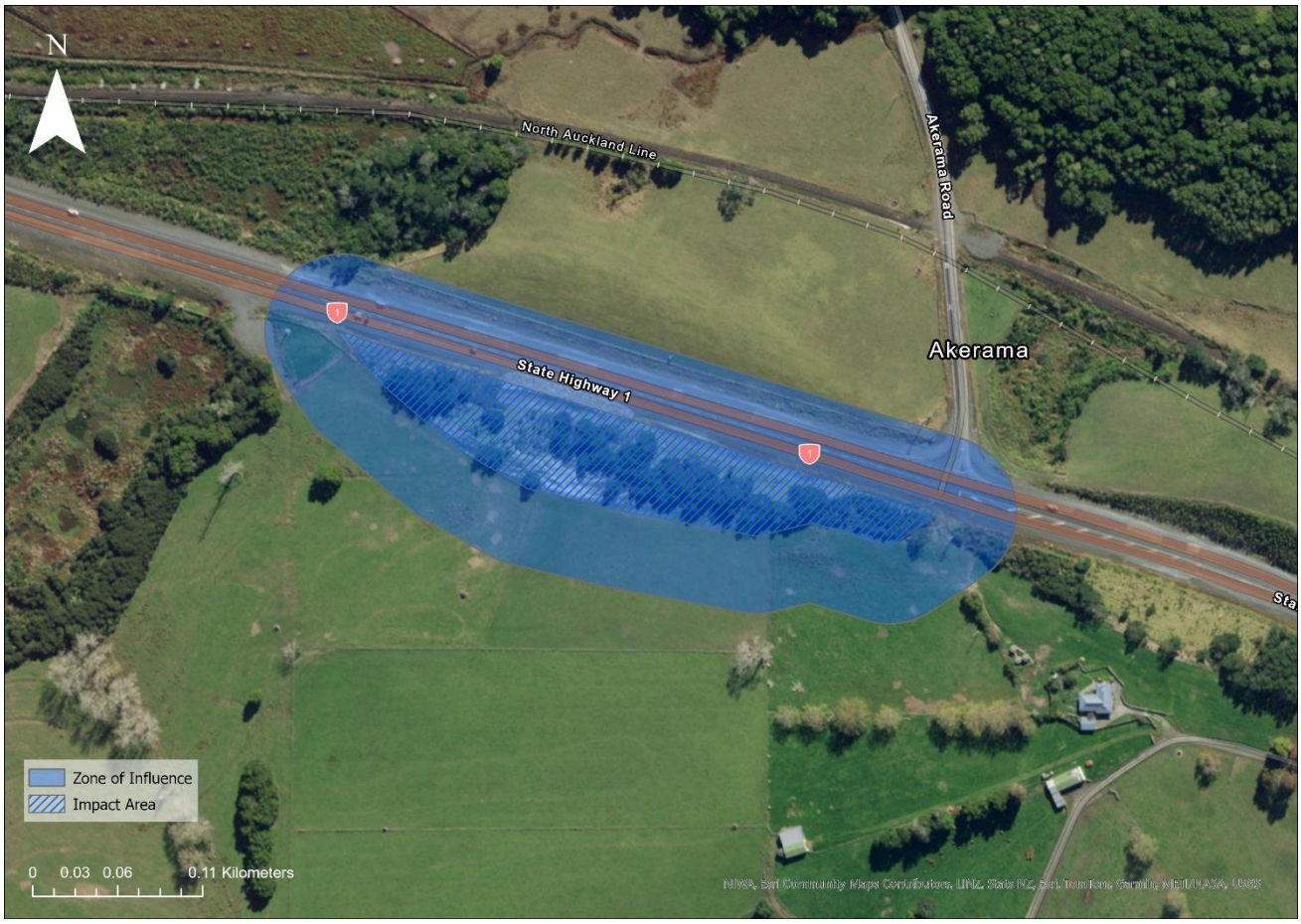

Figure 5: The anticipated zone of influence surrounding the Project site.

2 ECOLOGICAL ASSESSMENT METHODOLOGY

The overall approach used to undertake the ecological impact assessment involved application of the "Guidelines for undertaking Ecological Impact Assessments (EcIA) published by the Environment Institute of Australia and New Zealand (EIANZ)" using data and ecological information gathered by two primary methods:

- A desktop review of existing data and ecological information.
- A site visit was undertaken by ecologists Hanna Webb and Jordan Stewart on the 20th of August 2025.

2.1 DESKTOP ASSESSMENT

The desktop assessment involved a review of relevant literature and databases. Information sources reviewed as part of this assessment included:

- Ministry for the Environment (MFE) Prediction of Pre-human Wetlands (Ministry for the Environment, 2017).
- MFE Current Wetlands (Ministry for the Environment, 2013).
- The eBird NZ bird atlas (eBird, n.d.).
- The Department of Conservation (DOC) Bat Bioweb database.
- The DOC Herpetofauna Bioweb database.

2.2 FIELD SURVEY

A field assessment was undertaken on 20th of August 2025 to assess the ecological values of the Project site. The following assessments were undertaken:

- Vegetation types and plant species were recorded during a site walkover. All bird species observed or heard were also recorded.
- Risk assessment of trees for features that could support bat roosts, in-line with DOC best practice.
- Lizard habitat suitability.
- The site was assessed against the wetland delineation protocols (Ministry for the Environment, 2022) to determine if any wetlands were present within the project footprint and its 100m buffer.

2.3 EIANZ GUIDELINES – ASSESSMENT OF EFFECTS METHODOLOGY

2.3.1 EIANZ GUIDELINES

Guidelines for undertaking Ecological Impact Assessments (EcIA) published by the Environment Institute of Australia and New Zealand (EIANZ) were used to assess the ecological impacts of the Project (Roper-Lindsay et al., 2018). These guidelines assist in assessing values and effects in a consistent and transparent way. However, sound professional judgement is still required when applying this framework.

The approach involves assigning values for vegetation, habitats or species using the criteria in *Table 1* and then assigning a magnitude of effects rating using the criteria in *Table 2*. An overall level of effects is then determined by combining the value of an ecological feature or attribute (*Table 1*) with the rating for the magnitude of effect (*Table 2*) using the matrix in

Table 3.

2.3.2 ECOLOGICAL VAUES ASSESSMENT

The first step of the EcIA guidelines approach requires ecological values to be assigned on a scale of 'Low', 'Moderate', 'High', or 'Very High' to each ecological feature (*Table 1*).

Environmental values were ascribed using the above policies and the four key 'matters' to consider from the EIANZ guidelines and the above policies.

The EIANZ guidelines provide guidance on four key matters for consideration when assigning ecological value or importance to a site or area of vegetation/habitat/community. These are:

- Representativeness.
- Rarity/distinctiveness.
- Diversity and pattern.
- Ecological context.

More information on these matters and how they are applied to assign value to ecological features can be found within Table 4 of the EIANZ guidelines. Scoring for sites or areas combining values for the four matters can be found within Table 6 of the EIANZ guidelines (Roper-Lindsay et al., 2018). The application of the four key matters to consider is discussed in more detail in the relevant sections below.

The value of vegetation or habitat at the species level used conservation status as a starting point for determining value; the presence of those species classified as 'At Risk' or 'Threatened' conveying a higher value than those classified as 'Not Threatened'.

In determining the value of vegetation/habitat (based on threat classification of species), the likelihood of species being present and the importance of the habitat to the species based on habitat quality has also been considered. Note that in assigning value based on species, a site may support a high value species on occasion but may have low value for a species based on habitat quality and the degree to which the species relies on it in the context of the wider habitat resource it uses.

Table 1: Assignment of values to vegetation, habitats, and species (adapted from EIANZ, 2018).

Value	Species Value Requirements	Vegetation/Habitat Value Requirements
Very High	Nationally 'Threatened' species occur or expected to occur regularly within the Project footprint on a permanent or seasonal basis.	Area rates High for 3 or all four assessment matters (as above). Likely to be nationally important and recognised as such.
High	Nationally 'At Risk-Declining' species occur or expected to occur on a permanent or seasonal basis.	Area rates High for 2 of the assessment matters (as above). Moderate and Low for the remainder, or Area rates High for 1 of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	No Nationally 'Threatened' or 'At Risk-Declining' species occur, but other categories of 'At-Risk' or locally uncommon or rare species, or keystone species (that are considered important for ecological integrity and function) present on a permanent or seasonal basis.	Habitat provides locally important ecosystem services (e.g., erosion and sediment control, and landscape connectivity). Area rates High for one matter (as above), Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder. Likely to be important at the level of the Ecological District.

Value	Species Value Requirements	Vegetation/Habitat Value Requirements
Low	No species present that are Nationally 'Threatened', 'At Risk', locally uncommon or rare, or considered keystone species.	Nationally or locally common habitat that does not provide locally important ecosystem services. Area rates Low or very Low for majority of assessment matters (as above) and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Exotic species, including pests, and species with recreational values occur or are expected to occur within the project area either permanently or seasonally.	Limited ecological values other than as a local habitat. Area rates Very Low for 3 matters (as above) and Moderate, Low or Very Low for remainder.

2.3.3 MAGNITUDE OF EFFECTS ASSESSMENT

In determining a rating for the magnitude of effects on each ecological value consideration was given to the scale of habitat loss relative to the size of the available resource, duration of the effect, likely effect at population level with respect to individual species and degree to which the proposal was likely to impact on the sustainability of the ecosystem and associated species. The magnitude of the effects is described as 'Negligible', 'Low', 'Moderate', High', or 'Very High' (*Table 2*). In assessing the magnitude of effects, standard best practice in terms of minimising effects and post construction restoration have been assumed to be part of the Project.

Table 2: Criteria for describing the magnitude of effects (EIANZ, 2018).

Magnitude	Description
Very high	Total loss of, or very major alteration to, key elements/features of the existing baseline conditions, such that the post-works character, composition and/or attributes will be fundamentally change 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-works 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 key elements/features of the existing baseline conditions such that the post-works 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 existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-works circumstances or patterns; AND/OR having a minor effect on the known population or range of the element/feature.
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR having negligible effect on the known population.

2.3.4 LEVEL OF EFFECTS ASSESSMENT

The last step in the effects assessment process is to determine the overall level of effect using the EIANZ matrix (

Table 3).

The level of effect or risk posed on ecological values ranges from Very High to Very low level. Moderate level effects, or greater, typically require measures to avoid, remedy or mitigate effects, while Low to Very low effects levels are not normally of concern, although care may be required to minimise effects through design, construction, and operation.

Table 3: Criteria for describing the overall level of effects (EIANZ, 2018).

Magnitude	Ecological Value				
	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
Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

3 ASSESSMENT OF ECOLOGICAL VALUES

3.1 FRESHWATER HABITAT

An unnamed tributary of Ngaruawahine stream runs through the wetland adjacent to the proposed Project site. This stream is approximately 80 m away from the immediate impact area. The New Zealand Freshwater Fish Database (NZFFD, 2024[1]) and the Discover DNA database (Wilderlab, 2024[2]) displayed no 'Threatened' or 'At-Risk' species present within the unnamed tributary. However, the existing wetland inhabits Black Mudfish which were relocated to this area as part of the previous road realignments No works will be undertaken within this area.

3.2 VEGETATION

The vegetation of the surrounding landscape that will be directly affected by the proposed works was observed as primarily common native species that had been re planted following the original realignment works. This area was surveyed during the site visit to confirm the current species composition. The land adjacent to the Project site is farmland, predominantly grass pasture. All species observed on-site are recorded in Table 4. Common native species with no higher threat status are considered to have a **Low** ecological value.

Table 4: Vegetation recorded at the Project site.

Scientific Name	Common Name	Threat Classification
Cordyline australis	Cabbage Tree	Not Threatened
Podocarpus totara var. totara	Totara	Not Threatened
Melicytus ramiflorus	Mahoe	Not Threatened
Coprosma robusta	Karamu	Not Threatened
Dacrycarpus dacrydioides	Kahikatea	Not Threatened
Leptospermum scoparium var. scoparium	Manuka	Not Threatened
Pittosporum tenuifolium	Black Matipo	Not Threatened
Hydrocotyle novaeseelandiae var. novaezeelandiae	New Zealand Pennywort	Not Threatened
Phormium tenax	Flax	Not Threatened
Dianella haematica	Swamp Dianella	Not Threatened
Paesia scaberula	Pig Fern	Not Threatened
Histiopteris incisa	Water Fern	Not Threatened
Acacia mearnsii	Black Wattle	Exotic
Ranunculus repens	Buttercup	Exotic
Ligustrum sinense	Chinese Privet	Exotic

[1] NIWA :: NZFFDMS

[2] Explore — wilderlab

3.3 WETLANDS

One wetland was identified within 100 m of the proposed works area; formal delineations were not undertaken as works will not occur within this area. A high-level description of this system is provided below.

3.3.1 EXISTING WETLAND

The existing wetland is located approximately 80 m northwest of the Project site and is dominated by several common native species. This wetland consists of a mosaic of several habitats including a dense margin of manuka (*Leptospermum scoparium*) that transitions to flax (*Phormium tenax*) and other wetland species within its interior. There are also several pools of standing water which appear to be linked to the known stream flowing through the centre of the wetland. Grey warblers (*Gerygone igata*) and fantail (*Rhipidura fuliginosa*) were observed foraging within the wetland. All species are common and Not Threatened or exotic, but wetlands are a threatened ecosystem type, so the value of the environment will be assessed using the four matters from the EcIA guidelines. The following scores for the four matters are expanded upon in Table 5, finding that two matters scored as 'High' and two scored as 'Moderate' leading to an overall ecological value of **High**.

The dominant flora species at this wetland are presented in Table 4 and photos of this site can be seen in Figure 6.

Table 4: Dominant plant species observed at the nearby wetland.

Scientific Name	Common Name	Threat Classification
Cordyline australis	Cabbage Tree	Not Threatened
Phormium tenax	Flax	Not Threatened
Leptospermum scoparium var. scoparium	Manuka	Not Threatened
Dacrycarpus dacrydioides	Kahikatea	Not Threatened
Nasturtium officinale	Water Cress	Exotic
Ranunculus repens	Buttercup	Exotic

Figure 6: Existing wetland.

Table 5: Summary of the four matters. See original table for summary of attributes considered within each matter.

Matter	Value	Reason
Representativeness	High	• Native species are dominant. • Representative of a diverse inland freshwater wetland.
Rarity/distinctiveness	High	• Induced scarcity. • Distinctive compared to the surrounding landscape. • National and regional priority for protection of these.
Diversity and Pattern	Moderate	• Moderate native species diversity. • Evident mosaic of habitats (high heterogeneity). • Small size prevents more complex patterns from forming.
Ecological Context	Moderate	• Small size with minimal buffer (immediate farmland and highway). • Remnant of much larger wetland environment.

3.4 BIRDS

A search of the eBird database within the New Zealand Bird Atlas indicated 19 different native species of bird within the area[3]. These species, their threat status (Robertson *et.al.* 2021) and their likelihood of presence on-

[3] Grid reference M62

site are provided in Table 6 below. Bird species that were observed during the site visit have been recorded as 'confirmed' in Table 6.

Two At Risk – Declining species, the New Zealand Pipit (*Anthus novaeseelandiae novaeseelandiae*) and the Red Billed Gull (*Larus novaehollandiae scopulinus*) were identified as being previously observed on-site on the eBird database (eBird, n.d.).

Red Billed Gulls are unlikely to occur this far inland, but Pipits nest within long grass such as kikuyu which is present within the ZOI.

The Project site is likely to provide habitat for common native and introduced bird species. The New Zealand Pipit is likely to be nesting within the Zone of Influence on the surrounding farmlands and not within the immediate impact area. Therefore, the Project site has been assessed as having **Moderate** ecological value for birds.

Table 6: Bird species observed in proximity to Akerama Curves.

Scientific Name	Common Name	Threat Classification	Likelihood of presence on-site
Larus novaehollandiae scopulinus	Red Billed Gull	At Risk - Declining	Unlikely
Anthus novaeseelandiae novaeseelandiae	New Zealand Pipit	At Risk - Declining	Likely
Porphyrio melanotus melanotus	Pukeko	Not Threatened	Confirmed
Hemiphaga novaeseelandiae	Kereru	Not Threatened	Likely
Larus dominicanus dominicanus	Southern Black Backed Gull	Not Threatened	Unlikely
Rhipidura fuliginosa placabilis	North Island Fantail	Not Threatened	Confirmed
Tadorna variegata	Paradise Shelduck	Not Threatened	Likely
Chrysococcyx lucidus	Shining Bronze-Cuckoo	Not Threatened	Possible
Vanellus miles novaehollandiae	Masked Lapwing	Not Threatened	Likely
Gerygone igata	Grey Gerygone	Not Threatened	Confirmed
Egretta novaehollandiae	White-faced Heron	Not Threatened	Possible
Todiramphus sanctus vagans	Kingfisher	Not Threatened	Confirmed
Prosthemadera novaeseelandiae	Tui	Not Threatened	Likely
Himantopus himantopus leucocephalus	Pied Stilt	Not Threatened	Likely
Petroica macrocephala toitoi	Tomtit	Not Threatened	Unlikely
Cygnus atratus	Black swan	Not Threatened	Unlikely
Zosterops lateralis lateralis	Silvereye	Not Threatened	Possible

Circus approximans	Swamp Harrier	Not Threatened	Confirmed
Hirundo neoxena neoxena	Welcome Swallow	Not Threatened	Likely

3.5 BATS

The Department of Conservation's Bat BioWeb database returned several monitoring records for bats within 25 km of the Project Site. The long-tailed bat (*Chalinolobus tuberculatus*) has been recorded approximately 21 km southeast of the Project site. There are no records within the site itself.

The long-tailed bat has a threat classification of 'Threatened - Nationally Critical' and are absolutely protected under the Wildlife Act (1953). The species roosts in cavities and damaged branches of mature native and exotic trees typically above >15cm diameter at breast height (DBH) in size.

Whilst on-site a thorough risk assessment of all trees within the proposed works alignment was conducted to assess the potential for bat roost features. No suitable roost features were found and so the trees are deemed to be low risk for roosting bats.

Whilst the species value of bats is **Very High**, the value of the habitat at the site for roosting bats has been assessed as **Low**.

3.6 HERPETOFAUNA

The Department of Conservation's Herpetofauna BioWeb database indicates the presence of seven native herpetofauna species in the wider landscape surrounding the Project site, six of which are an At-Risk Declining species. No records exist within the impact area itself.

The habitat surrounding Akerama Curves did not appear to provide suitable ground cover for skink species, however, the site potentially contains suitable habitat for arboreal geckos. Therefore, the ecological value for lizards at the Project site has been conservatively assessed as **Moderate**.

Table 7: Herpetofauna records from the DOC Herpetofauna BioWeb database near the Akerama Curves Project Site.

Scientific Name	Common Name	Threat Classification	Nearest Record
Mokopirirakau granulatus	Forest Gecko	At Risk - Declining	12.4 km southwest
Oligosoma aeneum	Copper Skink	At Risk - Declining	8.6 km southwest
Oligosoma ornatum	Ornate Skink	At Risk - Declining	12.1 km south
Oligosoma smithi	Shore Skink	At Risk - Declining	18.8 km northeast
Naultinus elegans	Auckland Green Gecko	At Risk - Declining	10.9 km southeast
Naultinus grayii	Northland Green Gecko	At Risk - Declining	21.2 km north
Dactylocnemis pacificus	Pacific Gecko	Not Threatened	14.4 km northeast

4 ASSESSMENT OF ECOLOGICAL EFFECT

4.1 VEGETATION

This vegetation consists of an exotic canopy and common native species within the understory. These plants are not naturally occurring due to being recently planted and are not representative of the surrounding landscape. Accordingly, clearance of this vegetation will have at most a minor effect on the wider populations of these species, leading to a magnitude of effect of Low and an overall level of effect of **Very Low**.

As part of an Erosion and Sediment Control plan (ESC) all areas of bare soil should be progressively stabilised to prevent additional erosion and runoff. This could be achieved by re planting similar species, or hydroseeded with a native seed selection. The use of biodegradable geotextile fabrics can also be utilised or a combination of these approaches.

A summary of the values, pre-mitigated magnitude of effects, proposed mitigation and post-mitigated level of effects are provided in Table 8.

Table 8: Vegetation impact assessment summary.

Ecological Feature	Value	Magnitude of effect	Pre-mitigated overall level of effect	Mitigation recommendation	Post-mitigated magnitude of effect
Vegetation	Low	Low	Very Low	Development of an ESCP	Very Low

4.2 WETLANDS

One wetland was identified within 100m of the impact area and is of **High** ecological value. No works will occur within the wetland boundaries; works will be occurring within 80 m of the existing wetland.

The proposed works are not likely to alter hydrology of these wetland systems as they will be avoided and no significant earthworks above or below these systems are proposed.

A summary of wetland values, pre-mitigated magnitude of effects, proposed mitigation and post-mitigated level of effects are provided in 9.

Table 9: Wetland impact assessment summary.

Ecological Feature	Value	Magnitude of effect	Pre-mitigated overall level of effect	Mitigation recommendation	Post-mitigated magnitude of effect
Wetland	High	Negligible	Very Low	The wetland will not be affected by the proposal. Care should be taken to avoid all known wetland areas.	Negligible

If the mitigation recommendations are undertaken the post mitigated magnitude of effect will be **Negligible**. Should works need to be undertaken within this system, further assessment will be required.

4.3 BIRDS

The New Zealand Pipit and the Red Billed Gull are not anticipated to occur within the immediate Project site and are likely only to be affected by noise. This is only anticipated to have at most, a minor effect on the wider population of this species, leading to a magnitude of Low and an overall level of effect of **Low**. However, if Pipits or Red Billed Gulls are observed within the Project site, work should temporarily halt until the birds have left the site.

The project area is likely to provide habitat for other common native and introduced bird species not observed during the survey. It is possible that wider area supports At Risk or Threatened bird species on occasion however, it is unlikely that the project site provides significant habitat for any of these species. It seems like you want a concise summary of the key points from your report. While I can't directly access or summarize the document, I can help you create a high-level overview based on the main points you provide. Could you share some of the key findings or conclusions from the report? This will help me generate an effective summary for you. 😊It seems like you want a concise summary of the key points from your report. While I can't directly access or summarize the document, I can help you create a high-level overview based on the main points you provide. Could you share some of the key findings or conclusions from the report? This will help me generate an effective summary for you. 😊

Based on this the pre-mitigated magnitude of effect is considered to be **Low**. If tree removal is timed to avoid native bird nesting and fledgling seasons (September to April) the impact will be further reduced. A summary of bird habitat values, pre-mitigated magnitude of effects, proposed mitigation and post-mitigated level of effects are provided in Table 10.

Note that most indigenous birds are absolutely protected from killing and injury under the Wildlife Act 1953.

Table 10: Bird impact assessment summary.

Value	Magnitude of effect	Pre-mitigated overall level of effect	Mitigation recommendation	Post-mitigated overall magnitude of effect	Residual level of effect
Moderate	Low (based on the likelihood of only common non threatened species utilising this habitat).	Low	Any woody shrubs and trees must be checked by a suitably qualified ecologist for presence of active nests. These trees can only be cut following approval from the ecologist.	Low	Low

4.4 BATS

Whilst the species value of bats is **Very High** due to their threat status the value of habitat was assessed as **Low** due to an absence of suitable roost trees.

The unnamed tributary of Ngaruawahine stream might provide value for bats as a foraging and commuting habitat, however, due to the scale of the works and the already disturbed nature of the vegetation in proximity

to the Akerama Curves remediation works, it is not considered that works will affect the ecological value that the stream and its riparian margin may provide for bats.

A summary of bat habitat values, pre-mitigated magnitude of effects, proposed mitigation and post-mitigated level of effects are provided in Table 11.

Table 11: Bat impact assessment summary.

Ecological Feature	Value	Magnitude of effect	Pre-mitigation overall level of effect	Mitigation recommendation	Post-mitigated magnitude of effect	Residual level of effect
Bat habitat	Low	Negligible	Very Low	Not applicable as the trees that may be removed have been assessed as Low risk for roosting bats.	Very Low	Very Low

4.5 HERPETOFAUNA

Records from the BioWeb Herpetofauna Database show historic records for native lizards and geckos within 9 kms of the Project site. Due to the presence of At-Risk species within the wider landscape the value for lizards has been conservatively assessed to be **Moderate**.

Robust passive management is recommended for the removal of any area of vegetation to further reduce any adverse effects for lizards that may be present within the impact area. Passive management controls are outlined below in section 5.5.

Native lizards are absolutely protected from killing and injury under the Wildlife Act 1953, if a lizard is observed during the construction work, work should cease immediately, and a qualified herpetologist should be consulted.

A summary of lizard habitat values, pre mitigated magnitude of effects, proposed mitigation and post-mitigated level of effects are provided in Table 12.

Table 12: Lizard habitat impact assessment summary.

Value	Magnitude of effect	Pre-mitigated level of effect	Mitigation recommendation	Post-mitigated magnitude of effect	Residual level of effect
Moderate	Low (based on the likelihood of only common non threatened species utilising this habitat).	Low	Cut rank grass at least 48 hours prior to earthworks. Rake the cut grass to areas outside the impact area. If lizards are observed during earthworks, cease work immediately and consult a herpetologist. Woody vegetation should be cut and left on-site for 24 - 48 hours to give native	Low	Low

			lizards the opportunity to evacuate the area prior to removal from the site.		

5 RECOMMENDATIONS

A summary of the recommended measures proposed to minimise the effects of the Project are given below. These measures address disturbance to wildlife during the construction period, likely effects of earthworks activities, mitigation for the mobilisation of sediment, and measures to minimise the risk of mortality of birds, bats and herpetofauna.

5.1 GENERAL

- Any areas of exposed earth (as a result of construction) will be revegetated to minimise sediment loss as soon as is practicable.

5.2 VEGETATION

- As part of an Erosion and Sediment Control plan (ESC) with Construction Environmental Management Plan (CEMP) all areas of bare soil should through the course of project be stabilised to prevent additional erosion and runoff.
- If any native regenerating forest must be cleared, manual planting or hydroseeding with a native species mix is recommended to reduce the overall level of effect to an acceptable level.

5.3 WETLANDS

- Ensure all flow paths that occur from the works are directed away from the wetland.
- Follow an ESC.

5.4 BIRD MANAGEMENT

- A pre-start nest survey should be conducted at the Project Site to confirm that no nests are present within the zone of impact.
- A Bird Management Plan will inform the best approaches for these checks.

5.5 LIZARD MANAGEMENT

Passive lizard management protocols should be implemented, prior to earthworks and vegetation clearance within the Project footprint. This includes:

- Cutting any rank grass within the working areas to a height of 100-150 mm at least 48 hours prior to earthworks. Rake the cut grass to areas outside the impact area. This will remove lizard habitat within the area and encourage lizards to move outside of the impact area where cover objects remain.
- Woody vegetation should be cut and left on-site for 24 - 48 hours to give native lizards the opportunity to evacuate the area prior to removal from the site.
- If lizards are observed during construction works should cease immediately and a qualified herpetologist should be consulted.

6 CONCLUSIONS

This Ecological Impact Assessment has determined that the Project site (and its receiving environments) provides Moderate value habitat for birds and herpetofauna. The existing wetland that was identified within 100 m of the proposed works area has been given an ecological value of High. Due to no works being conducted within the wetland, the overall level of effects was assessed as Very Low. The remaining ecological values for the site have been assessed as Low.

Measures to mitigate any residual effects have been recommended. Assuming these are undertaken the overall level of effect is expected to be Low – Very Low. Should any additional areas be affected by the proposed works further assessment will be required.

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NZTA - Waka Kotahi

SH01N AKERAMA BENDS LANDSLIP
EARTHWORKS DESIGN REPORT

24 MARCH 2025

PUBLIC

SH01N AKERAMA BENDS LANDSLIP H
EARTHWORKS DESIGN REPORT

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REV	DATE	DETAILS
01	24/03/2025	For Release

	NAME	DATE	SIGNATURE
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Reviewed by:	Shaun Grieve	24/03/2025	
Approved by:	Shaun Grieve	24/03/2025	

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1 INTRODUCTION

1.1 BACKGROUND

State Highway 1 was realigned as part of a capital works project along SH01N-RS0215-B-14.86 to RS0233-0.31, this project was colloquially known as Akerama Bends. The physical works began in the summer of 2015 and was completed approximately March 2018.

Following the completion of work, there has been some localised subsidence and overslips. The adjacent landowner has made NZTA aware the subsidence is impacting their property at two locations. Waka Kotahi has engaged WSP to investigate and design a remediation.

An options report has been developed and shall be understood by the reader of this report. The options report can be found in Appendix A.

Following the options reporting the design selected by NZTA was to undertake a 1V:5H cut at approximately the half height of the existing batter. This aims to remove the risk of slips along the boundary. Additional to this a planning assessment has been undertaken as part of the design and is to be issued as a separate document.

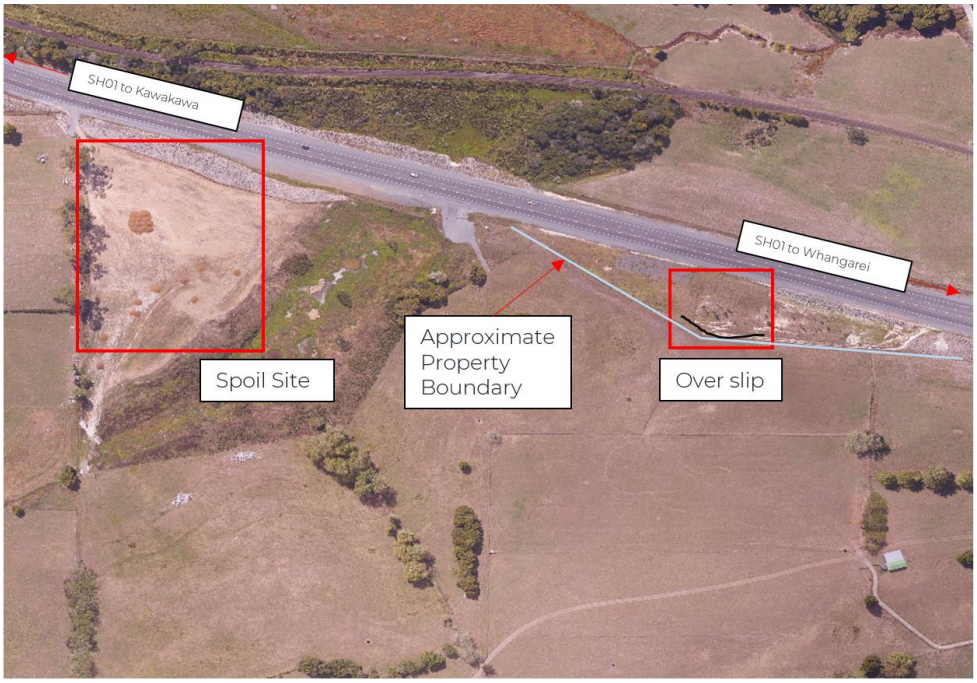


Figure 1: Overview of the site

1.2 EXISTING SITE

The surrounding area is pastural with areas of saturated ground from ground water seepage. The surrounding slopes show instabilities with minor slumps observable, the terrain can be seen to be generally hummocky.

At the location of the overslip, the new alignment of the road was constructed by cutting through a high point in the topography. The cut slopes were initially cut to approximately 3H:1V.

Immediately following the construction movement was observed in the southern cut face, initial responses included planting along the slope to aid in stability.

The location of the site indicate its underlain by Northland Allochthon. The geological unit of Northland Allochthon, relies on terrain evaluation as the preferred method of understanding of mechanisms of failure. Due to the difficulties in determining meaningful effective stress strength (c', φ') properties in sheared mudstone materials, cut batter design will often rely initially on terrain evaluation. This involves assessing natural slope inclinations for identified soil and rock units—that is, determining which slope inclinations are stable and which are not for given material types. In addition, it will highlight areas where localized steepening or flattening of cut slope batters may be required. It may also identify areas where additional geotechnical testing may help resolve design difficulties. Slope stability calculations are not reliable and should only be used to support the terrain evaluation. Trial cuts are typically recommended for verification.

2 GEOTECHNICAL INTERPRETATION

2.1 INVESTIGATIONS

On 6th and 7th of January, targeted geotechnical investigations were undertaken to inform the remedial measures recommended at the subject site. The Investigations comprised the following:

- 4no. Hand auger's to a maximum depth of 5m
- 4no. Scala's to a maximum depth of 5.75m

The intrusive investigations were undertaken by WSP Limited. The data and locations are displayed in Appendix B and Appendix D.

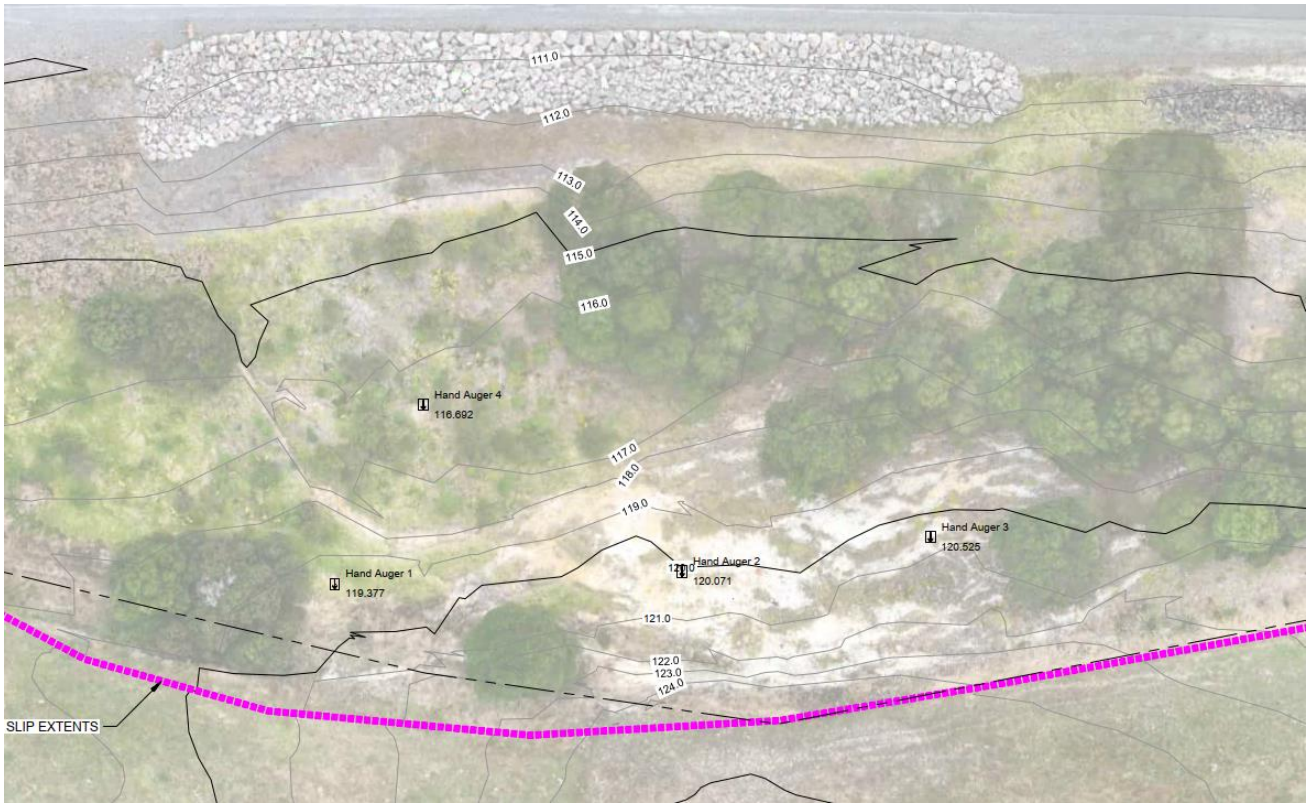


Figure 2: Hand auger and Slip location

2.2 GROUND CONDITIONS

A summary of the ground condition interpretations of the Hand augers are shown in Table 1 below. Please note due to the investigation method soil samples are not retrieved while undertaking Scalas therefore depth of soils are judgement based approximations.

2.2.1 COLLUVIUM/RESIDUAL SOIL

Residual soils and colluvium was encountered from ground level to depths of 1.9m BGL. The soils generally consisted of Silty clay to Clayey silt. The soils were generally stiff to very stiff with undrained shear strength ranging from 55kPa to 149kPa.

2.2.2 COMPLETELY TO HIGHLY DEGRADED MANGAKAHIA COMPLEX

Completely to Highly degraded rock of the Mangakahia Complex was encountered in all holes. The completely to highly degraded rock, was disturbed during the drilling process, due to this the rock structure was not able to be accurately described. The completely weathered material generally broke down to dark grey and bluish grey Clay with some to trace silt. The material was generally very stiff to hard with undrained shear strengths ranging from 120kPa to 227+kPa.

2.2.3 MODERATELY DEGRADED MANGAKAHIA COMPLEX

Moderately degraded rock of the Mangakahia Complex was inferred in all Scalas. The Moderately degraded rock was interpreted from depths of 4.5m to 5.8m BGL.

Table 1: Summary of Depth of geological units

Lithology	**Top (m bgl)**	**Bottom (m bgl)**	**Total Thickness (m)**
Colluvium/residual soil	0	0.7-1.8	0.7-1.8
Completely to highly degraded Mangakahia Complex	0.7-1.8	4.5-5.6	3.8-4.0
Moderately degraded Mangakahia Complex	4.5-5.6	Not encountered	

2.3 GEOTECHNICAL DESIGN PARAMETERS

The design soil parameters are based on the field testing results, back analysis and experience with similar ground conditions within Northland. The soil parameters for the corresponding soil units are presented in Table 1.

Table 2: Soil Properties assumed for design

Soil Unit	Description	Unit Weight (kN/m³)	Angle of Internal Friction (°)	Drained Cohesion (kPa)	Undrained Cohesion (kPa)
1	Residual Soil/Colluvium	19	11	3	50
2	Highly Degraded Mangakahia	19	22	8	200
3	Moderately Degraded Mangakahia	20	32	10	300

3 GEOTECHNICAL DESIGN

3.1 DESIGN STANDARD

The design of a cut slope has been completed in accordance with the following standards:

- Highway Structures Design Guide
- The New Zealand Transport Agency's Bridge Manual SP/M/022

3.2 TRAFFIC LOADING

At the location of the landslip, the traffic conditions are:

- AADT – 2208
- 8.967% heavy
- ONRC Primary Collector

As the slip is an overslip and traffic loading has not impacted the performance of the slope, therefore the design traffic loads have not been included in the global stability.

3.3 SEISMIC DESIGN

The peak Ground Acceleration (PGA) has been assessed based on Section 6 of the NZTA Bridge Manual, sub soil category "Class C - Shallow Soil Sites", and NZTA bridge manual Section 5 "earthquake resistant design of structures". Table 2 provides a summary of the derived PGA for the serviceability limit state (SLS) and ultimate limit state (ULS).

$$PGA = C_{0,1000}\frac{R_u}{1.3}fg$$

Where:

$C_{0,1000}$ = 1000-year return period PGA coefficient for a subsoil Class A or B rock site or Class C shallow soil site derived from figure 6.1(a), or for subsoil Class D deep or soft soil site or Class E very soft soil site from figure 6.1(b). Alternatively, for the locations listed, PGA coefficients may be taken from table 6A.1 contained in addendum 6A.

R_u = Return period factor derived from table 3.5 of NZS 1170.5 Structural design actions part 5 Earthquake actions – New Zealand (1) corresponding to the design return period determined from tables 2.2 or 2.3, as appropriate.

f = The site subsoil class factor; 1.33 as Class C (shallow soil) was assumed.

Table 3 : PGA cases used in design

PGA Case	Structural Design Life	$C_{0,1000}$	R_u	Annual Probability of Exceedance	Peak Ground Acceleration	w_d	A_{topo}	k_h

ULS	100 years or more	0.13	1.8	1/2500	0.31	0.5	1	0.16
SLS	100 years or more	0.13	0.25	1/50	0.03	1	1	0.03

3.4 GLOBAL STABILITY

The global stability of the site was assessed in GeoStudio module Slope/W. A cross section of the site was used to assess the site pre-landslip and back-analyse the soil properties shown in Table 1. The critical factors of safety from these models are shown in Table 3 below, a detailed outlook on the models are attached as Appendix C.

The factors of safety in line with the Bridge Manual (2022) Section 6.6.3 (Strength Reduction Factor/s and Factors of Safety for Earth Retaining Systems) were used to determine if the calculated factors were acceptable:

- For static conditions, the minimum FOS shall be 1.5
- For seismic conditions, the minimum FOS shall be 1.25 (flooding included)

Drained soil conditions were considered for static conditions. Undrained soils were used in the seismic case.

Table 4: Factors of Safety from Slope/W

Model	Case	Calculated Factor of Safety	Required Factor of Safety
Pre-slip	High Groundwater	0.98	1.25
Current Slope	Low Groundwater	1.07	1.5
	High Groundwater	1.03	1.25
	Seismic (ULS)	4.35	1.25
1:5 Cut Mid Slope	Low Groundwater	1.08*	1.5
	High Groundwater	1.03*	1.25
	Seismic (ULS)	5.89	1.25

*Slips that are < Require FOS are all 15m away from the road and 45m away from the boundary therefore do not pose a risk to either.

4 COST ESTIMATION

4.1 GENERAL

The Cost estimates have been developed based on the information contained within this document and the detailed design drawings titled *NZ Transport Agency Waka Kotahi Akerama, Hukerenui S.H.01N RP 15.930, Akerama Curves: Detailed Design* Job Ref: *1-W4004.01* Dated *March 2025.*

Section 5 outlines the presumed allowances and their corresponding costs as they relate to the provided information to date. The cost presented are primarily indicative and provide an estimated overview of the financial aspects at a high level. It may undergo further refinement as the project progresses and more information becomes available. For detailed breakdown of the estimated costs please see Appendix E.

4.2 ASSUMPTIONS

4.2.1 GENERAL

In addition, the following general assumptions were considered:

- No provision for planting
- Access to the site is through the neighbouring land owners property
- No allowances made for unforeseen contamination that may arise during construction
- Cost estimates are indicative and based on detailed designs
- Assumed no archaeological or cultural heritage constraints affecting excavation
- Estimated costs are based on current material prices, with no escalation factored in
- Assumed that site access will remain unrestricted throughout the duration of the project
- Assumed that all construction activities occur within normal working hours (8-hour shifts, days a week), and no night shifts or overtime is expected
- Assumed a max. two (2) hours returned trip from project site to quarry source

4.2.2 ENVIRONMENTAL COMPLIANCE

- Provision allocated for an environmental advisor to prepare required documentation and permits.
- Allowed for the implementation of dust suppression measures, during dry conditions.
- Allowed sediment controls using silt fence during earthworks.
- No provision for reforestation or habitat restoration required
- Assumes no environmental remediation is necessary
- No allowance for any cultural or archaeological resources encountered during earthworks

- No provision allocated in the construction schedules for nesting/mating seasons period of local wildlife

4.2.3 EARTHWORKS

- Site clearance allows removal of all existing structures, vegetation, debris, and obstructions within the designated construction area as per the project plans.
- Allowed maximum 1 day for site clearance, using 3 no. general labour, 1 no. of 15T- 20T excavator and 1 no. of 6W 10T tipper truck.
- All cleared materials to disposed of in accordance with local regulations and environmental guidelines
- Minimal vegetation clearing required. No large trees or significant root systems impacting construction.
- No allowance made for Type R1/R2 rock excavation.
- Allowed slopes, exceeding a specified gradient, graded to a stable angle to prevent slippage.
- All earthworks delivered during specified working hours to minimize noise impacts.
- No allowance for temporary works to access roads construction to facilitate equipment movement and material transport.
- Allowed cutting/ trimming and disposed off-site, along the water channel.
- Allowed imported hardfill for the maintenance of farm access track.
- Allowed topsoil on-site to reinstate the reshaped slope.

4.2.4 GROUND IMPROVEMENTS

Not Applicable

4.2.5 DRAINAGE

Not Applicable

4.2.6 PAVEMENT AND SURFACING

Not Applicable

4.2.7 BRIDGES

Not Applicable

4.2.8 RETAINING WALLS

Not Applicable

4.2.9 TRAFFIC SERVICES

Not Applicable

4.2.10 UTILITY SERVICES

Not Applicable

4.2.11 LANDSCAPING

- Allowance for hydroseeding to reinstate the slopes of decommissioned section and bund.
- No allowance for planting.

4.2.12 TRAFFIC MANAGEMENT

Not Applicable

4.2.13 PRELIMANARY AND GENERAL

- It is assumed that the procurement model is traditional and will be delivered using the NZS3910:2023 Conditions of Contract.

4.3 CONTINGENCIES

We have allowed a contingency of 20% and funding risk contingency of 30% from the Project Base Estimate.

5 SAFETY IN DESIGN

An internal safety by design assessment has been undertaken, this identifies some of the potential safety risks for the site and outlines measures that can be taken to reduce the risks.

- The site is currently unstable and has active slips. The slips appear to be related to water therefore it is recommended that works are undertaken during summer months.
- Due to the active slips it is also recommended to work from a top down approach.
- While the site is outside of the 10m setback from the wetland it still has restrictions on the amount of allowable exposed earth. The exposed earth shall not exceed 5000m^2.
- While this is a NZTA project and a portion of the works are within the road reserve to reduce the risk of traffic the design has been undertaken so as the works are undertaken from the neighbouring land owners property working towards the road. This will also remove the need for traffic management.
- Erosion Protection: Following the work the design has incorporated reseeding the batter to prevent surface erosion, there is also an opportunity for planting of the batter.

6 CONCLUSION

This report outlined the design process for the remediation of the slip along the neighbouring property at subject site. The slips arose from the original cut batters being cut too steep. Following analysis a 5H:1V slope was deemed to be a safe and stable slope. The design outlines the cut batter starting at approximately half the height of the existing batter and cutting back into the neighbouring property. Following these works the slope is to be seeded to reduce erosion.

7 LIMITATIONS

This report ('Report') has been prepared by WSP New Zealand Limited ('WSP') exclusively for Waka Kotahi ('Client') in relation to SH12 Kauri Bushmans Retained Soil Slope Design ('Purpose') and in accordance with the NOC contract ('Agreement'). The findings in this Report are based on and are subject to the assumptions specified in the Report. WSP accepts no liability whatsoever for any use or reliance on this Report, in whole or in part, for any purpose other than the Purpose or for any use or reliance on this Report by any third party.

APPENDIX A

OPTIONS REPORT

15 October 2024

Jon Wyeth
NZ Transport Agency Waka Kotahi
82 Bank Street
Whangārei 0110

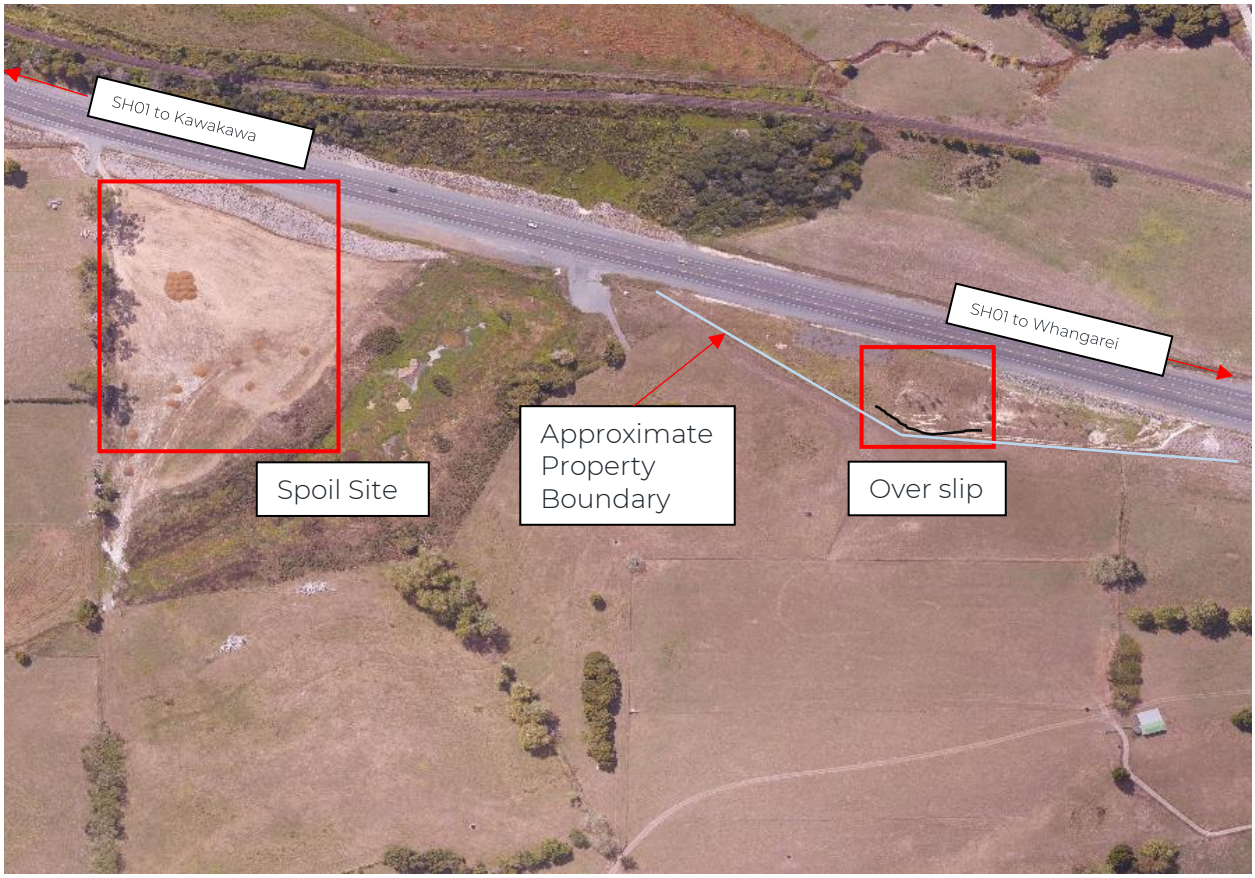
Akerama Bends Remediation

1-W4004.01

1 Introduction

State Highway 1 was realigned at SH01N-RS0215-B Akerama Bends in 2018 and has experienced some localised subsidence post construction. The adjacent landowner has made NZTA aware the subsidence is impacting their property at two locations. This report investigates the cause of subsidence and considers options to remediate. The two sites are:

- Slumping and drainage issues at a spoil site on Section 75 Block VI Hukerenui.
- Overslip in a cut batter at approximately RP15.930



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The slumping at the spoil site has caused some minor terracing in the paddock. The drainage issues appear to be at the entrance to the paddock, it appears that this has made it difficult for the property owner to use the land.

Following the realignment of the road the overslip began to slump. This overslip has recently been buttressed close to the road to prevent it from affecting live traffic. While this has removed the immediate risk to the road the overslip headscarp appears to be regressing towards the neighbouring property

The remediation strategies presented in this report will consider and outline factors such as technical feasibility, cost-effectiveness, environmental impact, long-term risk and constructability.

2 Background Information

2.1 General

The surrounding area is pastural with areas of wet ground from ground water. The surrounding slopes show instabilities with minor slumps observable, the terrain can be seen to be generally hummocky.

2.2 Terrain Evaluation

Using 2018 LIDAR data, the site topography has been mapped. The 3D image of the topography is shown in Figure 1 below. From the image, we can see that when the road was cut, the slope was cut to approximately 3H:1V, which is steeper than the surrounding slopes, which run at approximately 8H:1V.

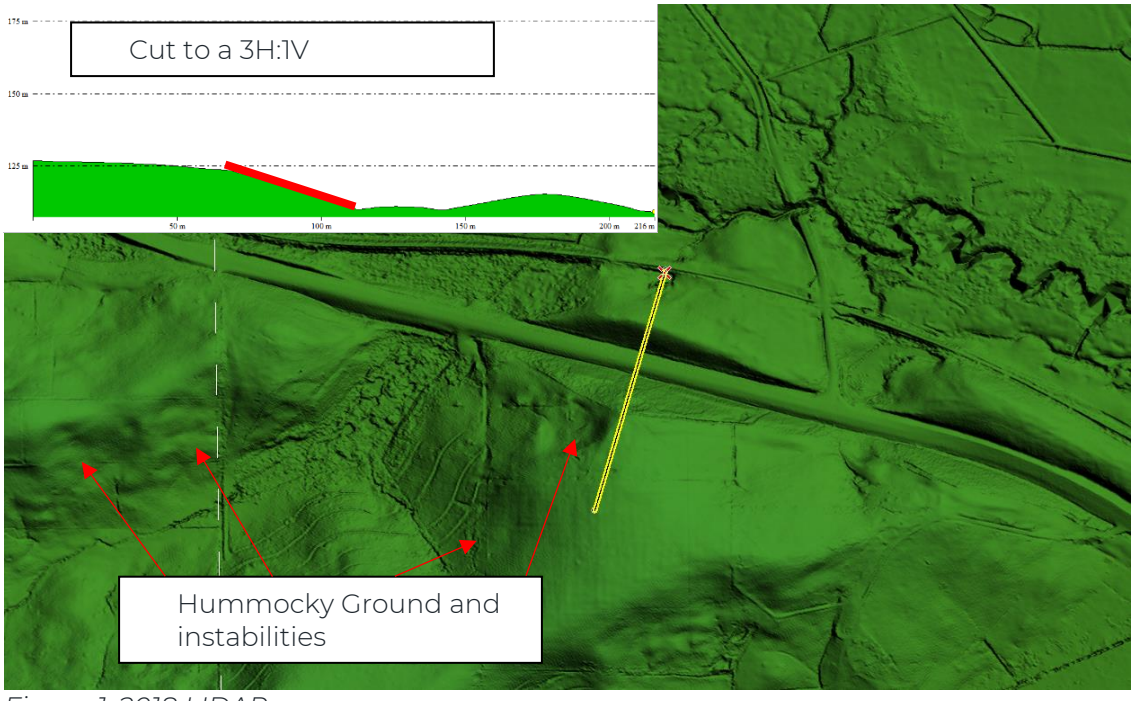


Figure 1: 2018 LIDAR

2.3 Site Geology

Available published geological resources indicate that the site is underlain by undifferentiated Mangakahia Complex, part of the Northland Allochthon, with nearby units of Holocene river deposits (Figure 2).

The Mangakahia Complex was emplaced through tectonic movements, resulting in a sheared structure. This shearing typically causes stability issues with cut faces.

Holocene River Deposits are young in geological terms. The unit is characterized as unconsolidated to poorly consolidated, with organic matter commonly present within the stratigraphy. This indicates that the material is conducive to settlement.

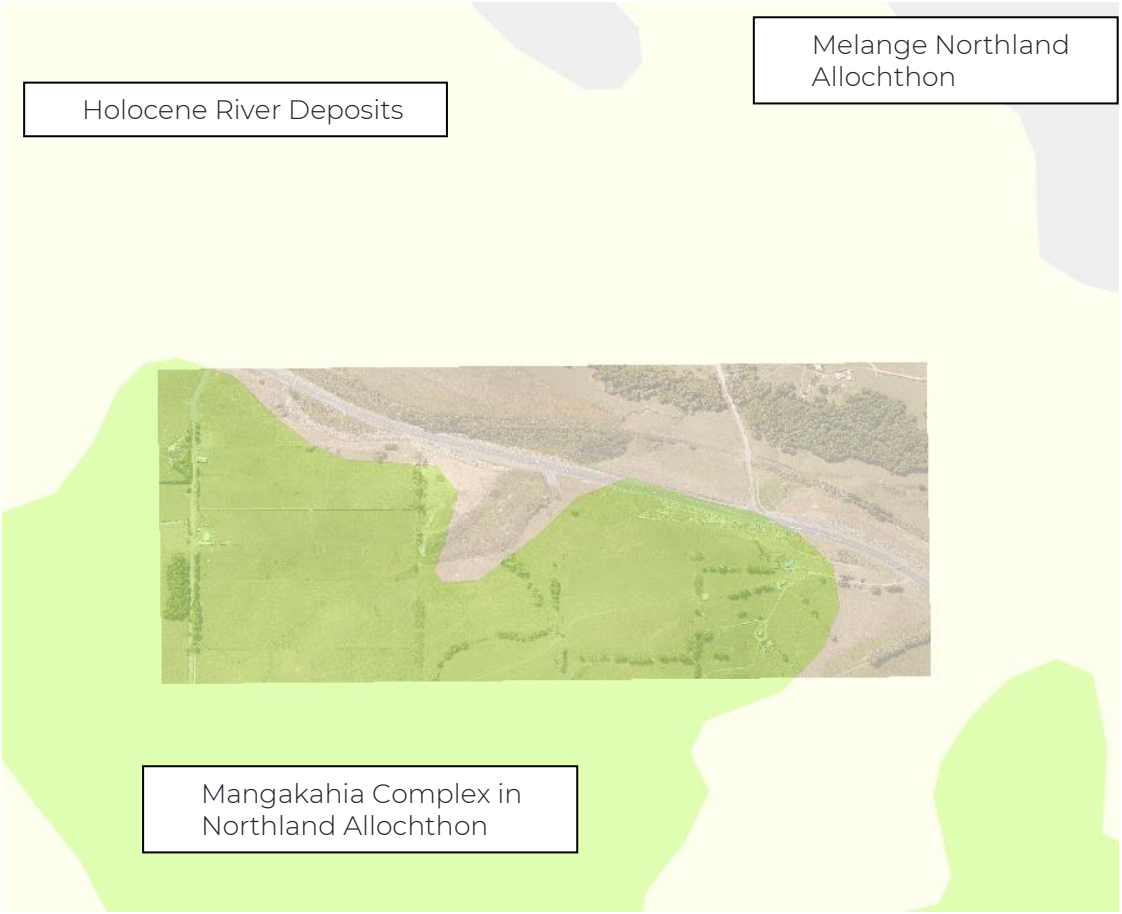


Figure 2: Underlying Geology

2.4 Aerial Imagery

The spoil site, established to place cut material from the road realignment works, is now experiencing slumping and drainage issues. It is unknown what agreement the contractor and landowner had when the spoil site was being used.

The overslip site is a portion of the land cut during the road's realignment. This slip is immediately below the landowner's proposed property boundary.

A review of the aerial photographs has been undertaken, images and key features are shown below.

Spoil Site

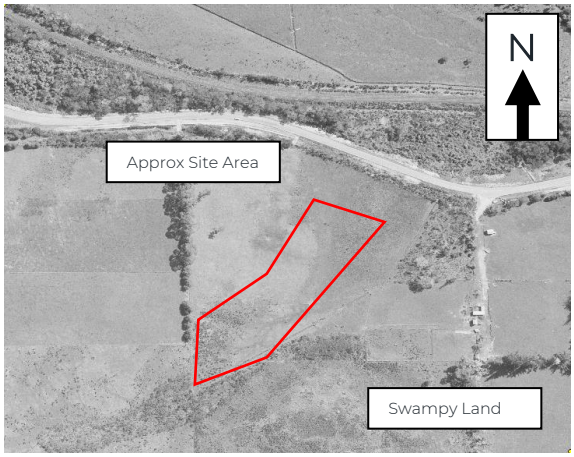


Figure 3: Retrolens (1961)

Figure 4: Retrolens (1971)

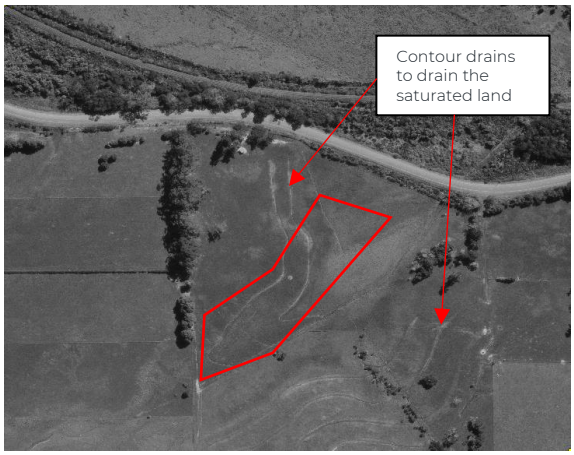


Figure 5: Retrolens (1985)

Figure 6: LINZ (2004)

Figure 7: LINZ (2016)

Figure 8: LINZ (2018)

- The oldest aerial image (1961) shows that the spoil site was predominantly a low lying area with signs of being wet. The site was unchanged in the 1971 image.
- By 1985 some contour drains appear to have been dug in the area, this was likely undertaken to reduce the surface water saturation.
- The contour drains seem to have been present in 2004, with their outlets leading to the formation of a pond.
- Construction is known to have begun circa 2015. Imagery from 2016 shows the site as a dump site.
- By 2018, the realignment appeared to have been near completion. Some material still appears to be in stockpiles on the site.

Over slip in a cut batter

Figure 9: Retrolens (1961)

Figure 10: LINZ (2006)

Figure 11: LINZ (2016)

Figure 12: LINZ (2018)

- The oldest aerial image (1961) shows that the site was a pastoral area with the original road alignment seen.

- The site was relatively unchanged until 2006 where some broken earth can be seen. We are unable to discern if this is a geological feature or man made.
- In 2016 earthworks had began for the realignment of the road, while it is difficult to conclude the actual depth of excavation and materials encountered from the colour of the ground in the image it appears the batter face was predominantly in residual soils with the carriageway encountering a highly to moderately degraded northland allochthon.
- The 2018 imagery shows the present day alignment with the overslips in the batter face.

3 Site Walkover

5th August 2024 a site walkover was undertaken. At the over slip site the cut batter is failing, with the headscarp appearing to have effects on the neighbouring boundary. The cut batter is composed of Mangakahia residual soils. Nearby slopes appear to be very shallow, indicating that the natural slope is gentler than the cut angle, additionally nearby slopes appeared to have subsidence indicating the land forms are marginally stable. Some works have been undertaken along the roadside, including the placement of rocks as a passive fix. However, these works are unlikely to prevent the ongoing movement in the short term, meaning the slip will likely continue to impact the neighbouring property before the passive fix can stabilize the slope over the long term.

At the spoil site some minor settlement may have occurred post-construction, but it is difficult to quantify as settlement monitoring was not implemented as part of the works. The settlement does not seem to have affected the use of the paddock with similar topographic features observable in nearby paddocks. A wet area was observed at the entrance of the paddock, in a location corresponding to where a pond was noted in historic imagery.

4 Options

4.1 Spoil Site

At the spoil site only minor issues were noted. We do not believe that any works for the slumping is necessary but some minor drainage works may be considered.

Option 1 – Do nothing

It appears that the affects of slumping will not have catastrophic impact and is likely due to the underlying geology which is known to settle and slump over time. The drainage issues that were noted on the walkover were also present prior to the works. By doing nothing the effects will still be present.

Option 2 – Improve the drainage

Placing a subsoil drain along the western fence line and a culvert that will aid in the flow of water from this area to the wetland will improve the drainage.

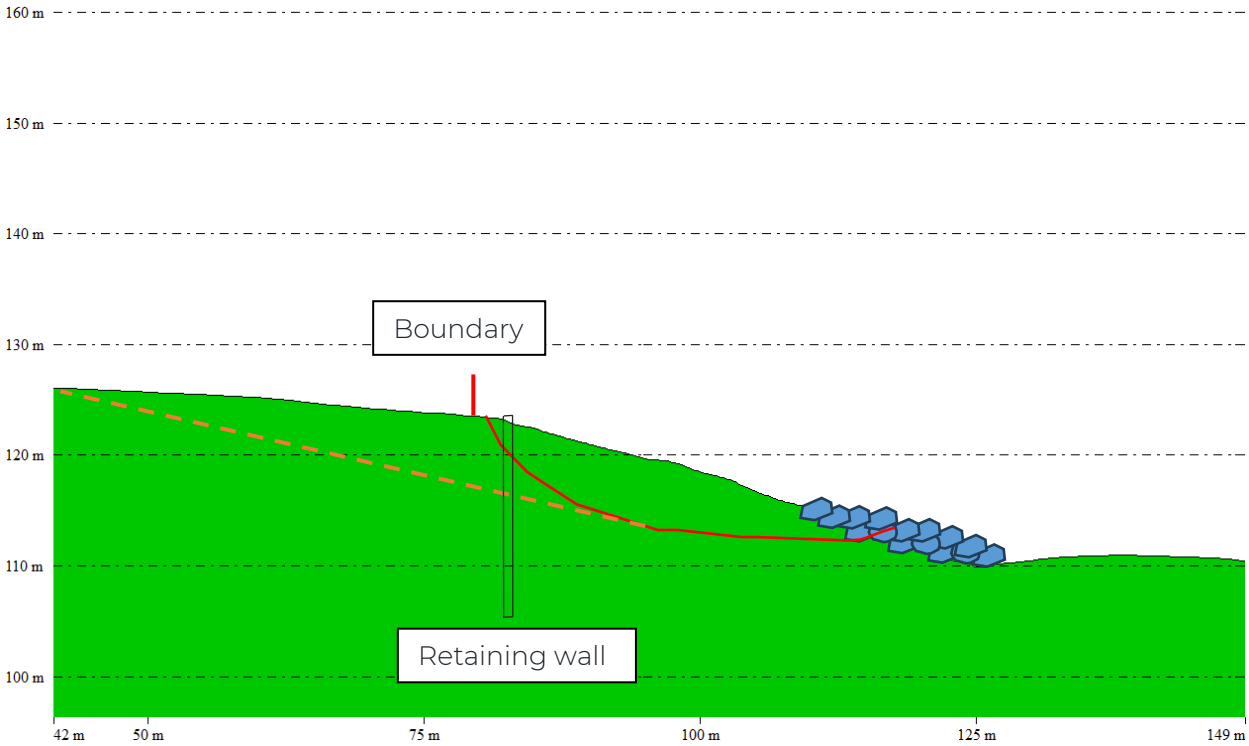
4.2 Cut Face

Option 1 – Do minimum

A "do minimum" approach for the cut face slip involves routine monitoring of the site to observe any significant changes in stability over time. This option would not entail any immediate structural interventions. Instead, periodic inspections would be scheduled to assess the condition of the cut face and the surrounding area, ensuring that any potential risks are identified early. Vegetative cover could be encouraged to stabilize the soil, and any minor erosion can be addressed with very localized repairs as necessary. This approach aims to maintain the status quo while keeping the cut face under close observation. The slip will likely continue to regress into private property.

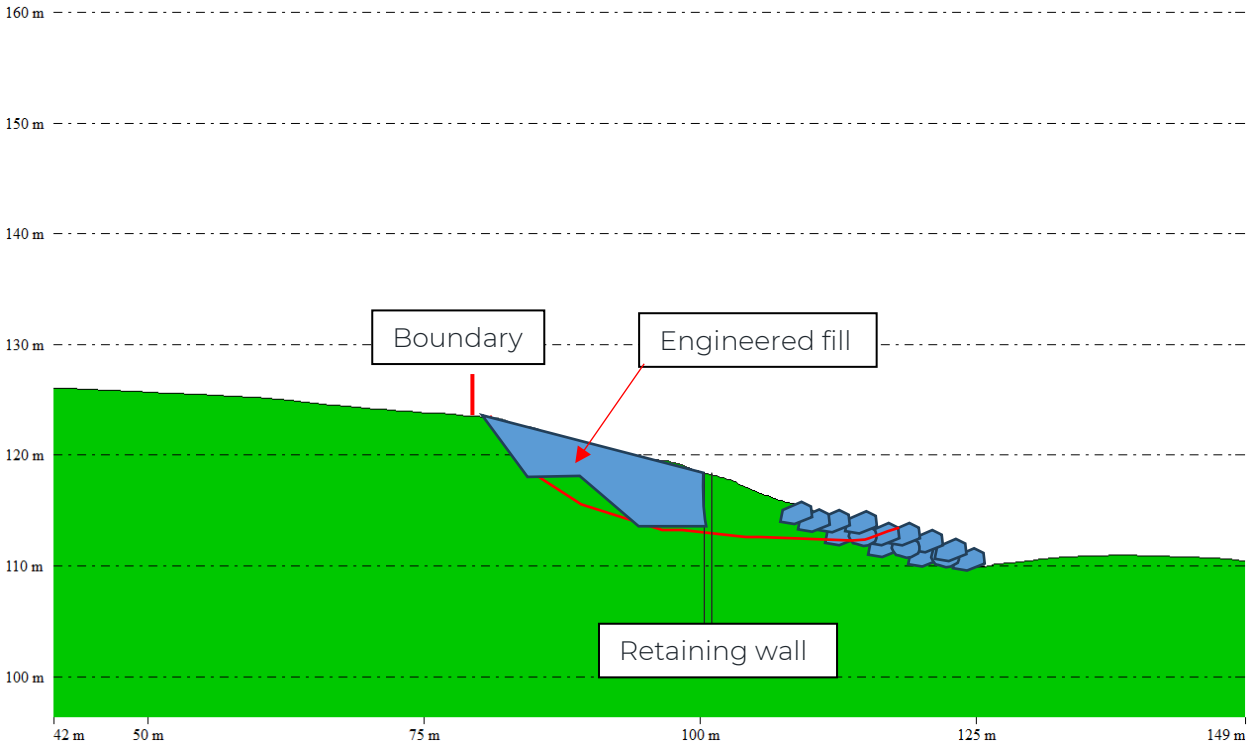
Option 2 – Retaining wall along boundary

Constructing a retaining wall along the boundary is a more proactive approach to addressing the cut face slip. This option involves the installation of a structurally engineered retaining wall that would support the slope and prevent further instability. This method would provide a long-term solution that enhances the stability of the cut face. It is a more costly and time-consuming option compared to the minimum intervention approach but offers a definitive resolution to the stability issues.



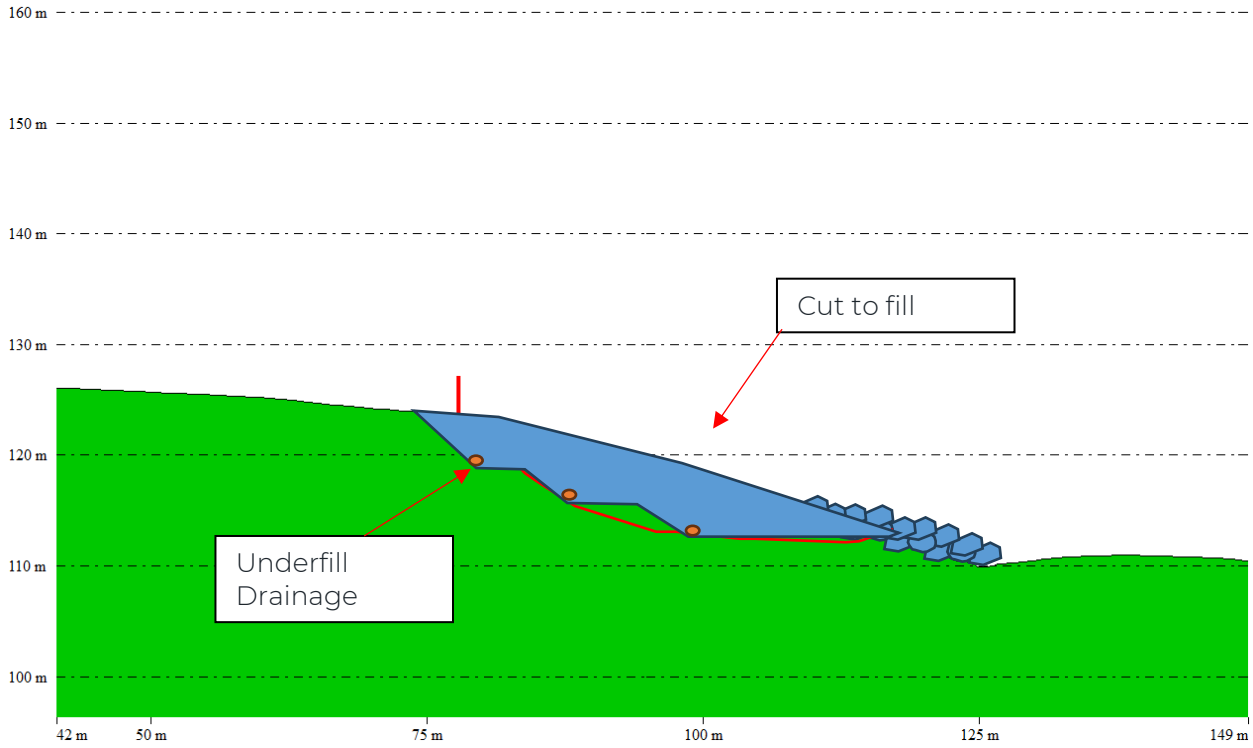
Option 3 – Retaining wall closer to the road and some minor fill

Constructing a retaining wall closer to the road, along with some minor fill, presents a balanced approach to addressing the cut face slip. Placing the retaining wall near the road is likely to reduce the overall structure size needed, making it a more efficient solution. However, due to the mixed method employed—combining the retaining wall with minor fill—this approach will necessitate the use of different types of construction equipment and machinery.



Option 4 – Cut and fill the current material

The "cut and fill" approach involves excavating (cutting) soil from the slope and using it to fill the lower sections. This method aims to create a more stable and uniform gradient, thereby reducing the risks associated with uneven terrain and potential slumping. The cut and fill technique balances the earthworks by minimizing the need to import or export materials, making it a cost-effective and environmentally friendly option. This option aims to cut and replace the soils as a means of intercepting the existing slip boundary. By regrading the slope, this method provides enhanced stability and improved drainage, which can help mitigate issues of soil erosion and water accumulation. This method should also include subsoil/underfill drainage works to reduce build up of porewater pressures



5 Recommendations

Our recommended options are to undertake the drainage works at the spoil site and cut to fill at the slip site. These options are seen to be the best balance of achieving the desired outcome. An overview of the options are shown in Appendix A.

Written By

Hugh Budge 14/10/2024

Reviewed By

Shaun Grieve 14/10/2024

Appendix A

Options Table

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Table 1: Options for Spoil Site

Spoil Site		
Option	1.Do Nothing	2. Drainage Works
Cost	$0	$15,000
Benefits	Cheapest option	Likely a desired outcome
Risks and disadvantages	Does not address the instability issues	Has a higher cost. Will require works in private property Due to the soils and ground water excavations may have poor temporary stability, which will require temporary works from the contractor.

Table 2: Options for the Slip in the cut face

Cut Face over slip				
Option	1. Do minimum	2. Retaining wall at boundary	3. Retaining wall near road	4. Cut to fill on site
Cost	$5,000	$500,000	$500,000	$350,000
Benefits	Cheapest option	Will solve the issue in the long term. Work can likely be undertaken without the need of traffic management	Will solve the issue in the long term. Due to the geometry will likely be a simpler wall	Will solve the long term issue.
Risks and disadvantages	Does not address the instability issues May not resolve the legalisation of the boundaries.	Has a higher cost. Will require works in private property Due to the soils and ground water, excavations may have poor temporary stability, this may require additional temporary works. No geotechnical investigations have been undertaken; scope of works may be subject to change. Will require detailed design	No geotechnical investigations have been undertaken; scope of works may be subject to change. Will require detailed design Will require multiple types of plant to compact fill.	Temporary slopes as part of the cut works will pose a stability risk – may require temporary slope stability. The suitability of the material to use as fill needs to be well understood hence investigations required. Works need to be undertaken during favourable weather conditions.

APPENDIX B

HAND AUGER INVESTIGATION

Auger Scala No. HA1

Project:	Akerama Bends	*Coordinates:*	345973 E 952991 N
Client:	NZTA Waka Kotahi	*Ref. Grid:*	Mount Eden 2000
Project No.:	1-W4004.01	*R.L.:*	119.377 m
Location:	Akerama Slip SH01N-0215-B/15.694	*Datum:*	NZ Vertical Datum 2016

GEOLOGY	DEPTH (m)	DESCRIPTION	GRAPHIC LOG	WATER LEVEL	R.L. (m)	DEPTH (m)	SOIL TESTS: SCALA PENETROMETER (Blows per 50mm)	SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES
	0	TOPSOIL.								
Colluvium?		Silty CLAY; brown with mottled orange. Stiff, moist, high plasticity.						107/16		
		CLAY with some silt; light grey with mottled orange. Stiff, moist, high plasticity.						110/32		
	1	Silty CLAY; light grey with mottled orange. Stiff, moist, high plasticity. Woody fragments present.				1		120/19		
		CLAY with trace silt; orange with mottled light grey. Stiff, moist, high plasticity. (Moisture higher than previous).			118			81/24		
		CLAY with trace silt; light grey with trace orange. Stiff, moist, high plasticity. (Moisture back to previous).						129/32		
Mangakahia Complex	2	CLAY trace silt; Dark grey with mottled grey and trace dark orange. Very stiff, moist, high plasticity.				2		129/29		
		CLAY trace silt; Dark grey with trace light grey. Very stiff, moist, high plasticity.						142/32		
	3	CLAY trace silt; Dark grey with trace grey. Very stiff, moist, high plasticity.			116	3		168/36		
								152/32		
								226+		
	4					4		226+		
								226+		
	5	END OF AUGER AT 5m - Target Depth Reached			114	5		210/49		
	6					6				
	7				112	7				

Notes:
All Shear vane readings have been corrected.

Date Tested: 6/01/2025
Tested by: HB
Checked by:

Test Methods:
Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988
Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001

Logged in accordance with NZ Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.

Scale 1:40 @ A4

Auger Scala No. HA2

Project:	Akerama Bends	*Coordinates:*	346000 E 952984 N
Client:	NZTA Waka Kotahi	*Ref. Grid:*	Mount Eden 2000
Project No.:	1-W4004.01	*R.L.:*	120.071 m
Location:	Akerama Slip SH01N-0215-B/15.694	*Datum:*	NZ Vertical Datum 2016

GEOLOGY	DEPTH (m)	DESCRIPTION
Colluvium?	0	SILT with some clay; light grey. Stiff, dry, low plasticity.
		Silty CLAY; light browning grey with mottled orange. Stiff, moist, high plasticity.
		CLAY with some silt; dark grey with mottled orange. Stiff, moist, high plasticity.
Mangakahia Complex		CLAY with some silt; dark grey with mottled grey. Stiff, moist, high plasticity.
	1	
		CLAY with some silt; dark grey with mottled grey. Very stiff, moist, high plasticity.
	2	
	3	
	4	END OF AUGER AT 4m - Equipment Failure
	5	
	6	
	7	

GRAPHIC LOG | WATER LEVEL | R.L. (m) | DEPTH (m)

SOIL TESTS

SCALA PENETROMETER (Blows per 50mm)

0 2 4 6 8 10 12 14 16 18 20

R.L. (m)	DEPTH (m)
120	0
	1
118	2
	3
116	4
	5
114	6
	7

SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES
74/19		
81/6		
136/26		
116/36		
227+		
227+		
205/61		
227+		
227+		
UTP		
UTP		
UTP		
UTP		

AUGER SCALA 8M 2 PHOTO AKERAMA CURVES HAND AUGERS.GPJ WSP-OPUS2018_TEM.GDT 8/1/25

Notes:
All Shear vane readings have been corrected.

Date Tested: 6/01/2025
Tested by: HB
Checked by:

Test Methods:
Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988
Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001

Logged in accordance with NZ Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.

Scale 1:40 @ A4

Auger Scala No. HA3

Project:	Akerama Bends	*Coordinates:*	346020 E 952981 N
Client:	NZTA Waka Kotahi	*Ref. Grid:*	Mount Eden 2000
Project No.:	1-W4004.01	*R.L.:*	120.525 m
Location:	Akerama Slip SH01N-0215-B/15.694	*Datum:*	NZ Vertical Datum 2016

GEOLOGY	DEPTH (m)	DESCRIPTION
Colluvium?	0	Topsoil.
		Silty CLAY; light grey with some orange. Firm, dry, high plasticity. Friable.
		Silty CLAY; orange with mottled brownish grey. Stiff, moist, high plasticity.
		Silty CLAY; greenish grey. Stiff, moist, high plasticity.
Mangakahia Complex	1	Silty CLAY; Dark grey. Stiff, moist, high plasticity.
		Silty CLAY to CLAY with some silt; Dark grey. Very stiff, moist, high plasticity.
	2	
	3	
	4	END OF AUGER AT 3.65m - Equipment Failure
	5	
	6	
	7	

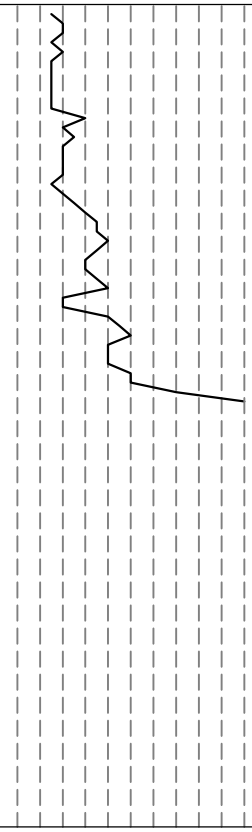
GRAPHIC LOG | WATER LEVEL | R.L. (m) | DEPTH (m)

SOIL TESTS

SCALA PENETROMETER (Blows per 50mm)

0 2 4 6 8 10 12 14 16 18 20

SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES
55/13		
81/16		
40/19		
94/19		
165/49		
191/40		
227+		
193/55		
170/65		
227+		
UTP		
UTP		



AUGER SCALA 8M 2 PHOTO AKERAMA CURVES HAND AUGERS.GPJ WSP-OPUS2018_TEM.GDT 8/1/25

Notes:
All Shear vane readings have been corrected.

Date Tested: 6/01/2025
Tested by: HB
Checked by:

Test Methods:
Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988
Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001

Logged in accordance with NZ Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.

Scale 1:40 @ A4

Auger Scala No. HA4

Project:	Akerama Bends	*Coordinates:*	345984 E 953002 N
Client:	NZTA Waka Kotahi	*Ref. Grid:*	Mount Eden 2000
Project No.:	1-W4004.01	*R.L.:*	116.692 m
Location:	Akerama Slip SH01N-0215-B/15.694	*Datum:*	NZ Vertical Datum 2016

GEOLOGY	DEPTH (m)	DESCRIPTION
Colluvium?	0	Topsoil.
		Silty CLAY; brownish light grey with mottled orange. Stiff, moist, high plasticity.
	1	CLAY with some silt; grey with trace orange. Stiff, moist, high plasticity.
Mangakahia Complex		CLAY with some silt; dark grey mottled bluish grey. Very stiff, moist, high plasticity.
	2	
		CLAY with some silt trace fine gravels (highly weathered mudstone fragements); dark grey mottled bluish grey. Very stiff, moist, high plasticity.
	3	
	4	Scala Rod showed moisture at 4.1m, as material was not wet at this depth it is expected a confined aquifer was punctured during scala between 4.25m and 5.5m
		END OF AUGER AT 4.5m - Equipment Failure
	5	
	6	
	7	

GRAPHIC LOG | WATER LEVEL | R.L. (m) | DEPTH (m)

SOIL TESTS

SCALA PENETROMETER (Blows per 50mm)

0 2 4 6 8 10 12 14 16 18 20

R.L. (m)	DEPTH (m)
116	1
114	2
112	3
110	4
	5
	6
	7

SHEAR STRENGTH (kPa)	OTHER TESTS	SAMPLES
73/16		
121/23		
149/29		
136/23		
181/52		
142/39		
188/40		
170/45		
178/36		
227+		
214/37		
201/42		
181/65		

Notes:
All Shear vane readings have been corrected.

Date Tested: 7/01/2025
Tested by: HB
Checked by:

Test Methods:
Determination of the Penetration Resistance of a Soil, NZS 4402 Test 6.5.2:1988
Guideline for Hand Held Shear Vane Test, NZ Geotechnical Soc., 2001

Logged in accordance with NZ Geotechnical Society Guidelines (2005). See attached key sheet for explanation of symbols.

Scale 1:40 @ A4

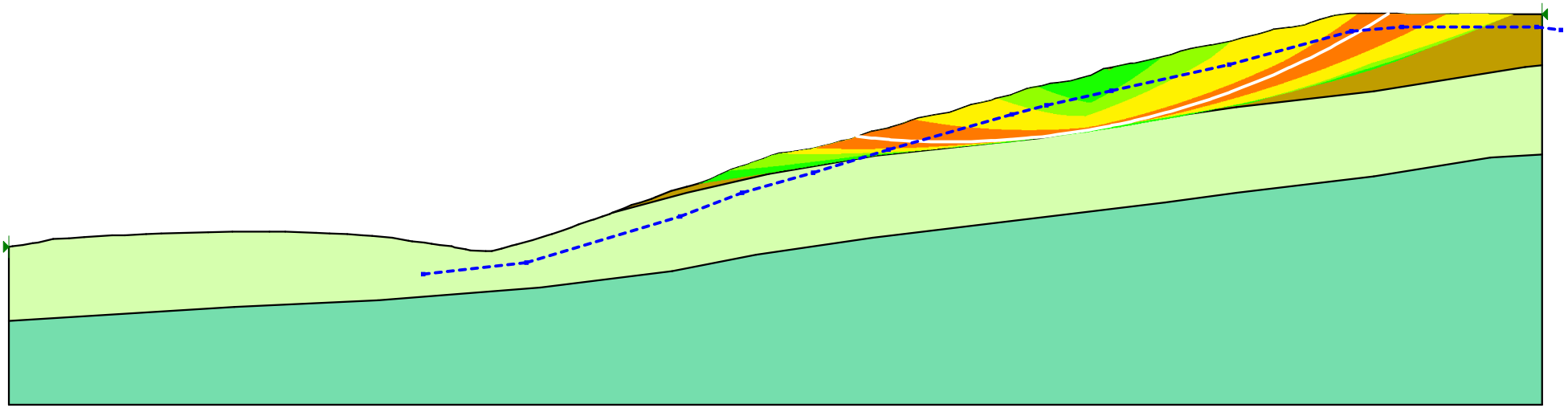
APPENDIX C

SLOPE/W GLOBAL STABILITY ANALYSIS

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	HD Mangakahia Complex	Mohr-Coulomb	19	8	22	1
	MD Mangakahia Complex	Mohr-Coulomb	20	10	32	1
	Residual Soil/Colluvium	Mohr-Coulomb	19	3	11	1

Factor of Safety

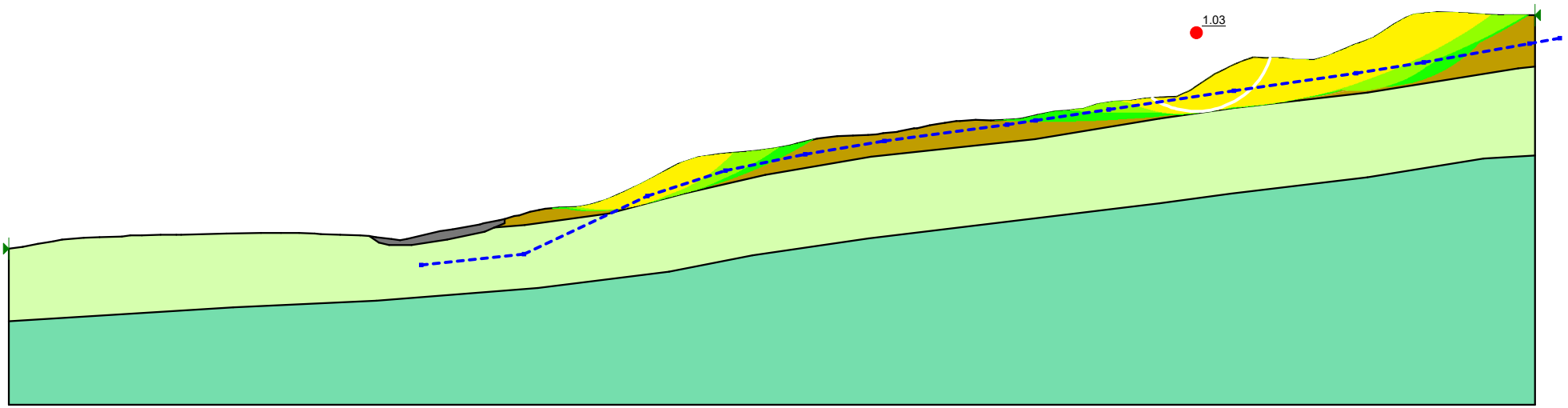
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	HGW Back Analysis	PGA	g	Proj No.	2-9B000.00
Modelled By:	Budge, Hugh	Checked By: V. Houssidas	FOS 0.98	Date:	10/03/2025
				Scale	1:317

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	HD Mangakahia Complex	Mohr-Coulomb	19	8	22	1
	MD Mangakahia Complex	Mohr-Coulomb	20	10	32	1
	Residual Soil/Colluvium	Mohr-Coulomb	19	3	11	1
	Stone Stabilisation	Mohr-Coulomb	28	0	35	1

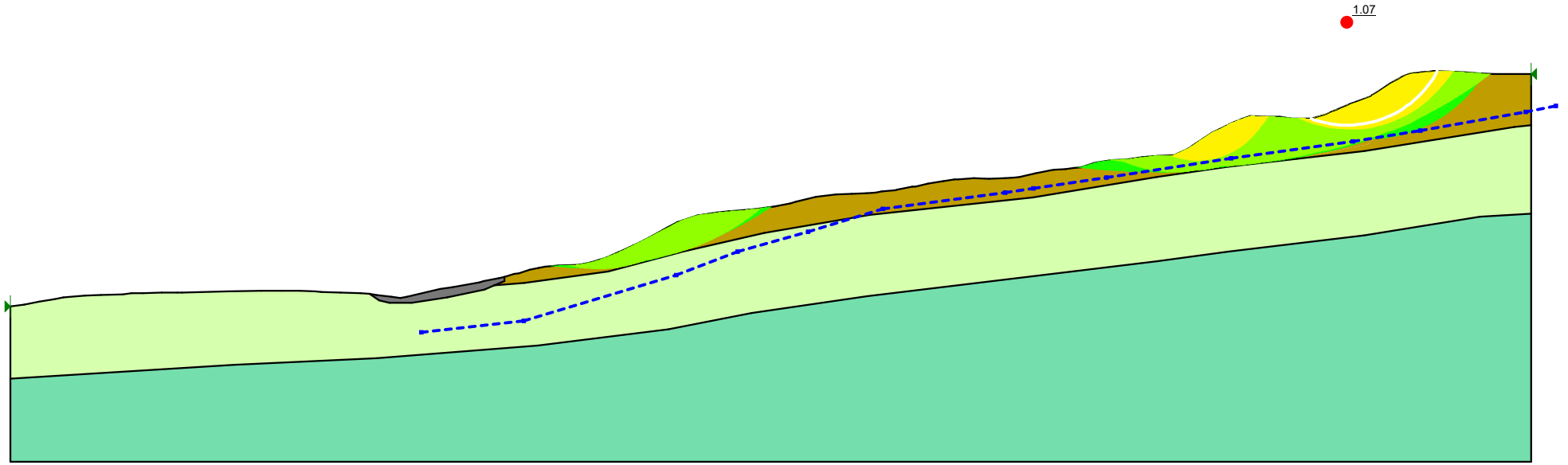
Factor of Safety
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	HGW Existing	PGA	g	Proj No.	2-9B000.00
Modelled By: Budge, Hugh	Checked By: V. Houssidas	FOS	1.03	Date:	10/03/2025
				Scale	1:317

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	HD Mangakahia Complex	Mohr-Coulomb	19	8	22	1
	MD Mangakahia Complex	Mohr-Coulomb	20	10	32	1
	Residual Soil/Colluvium	Mohr-Coulomb	19	3	11	1
	Stone Stabilisation	Mohr-Coulomb	28	0	35	1

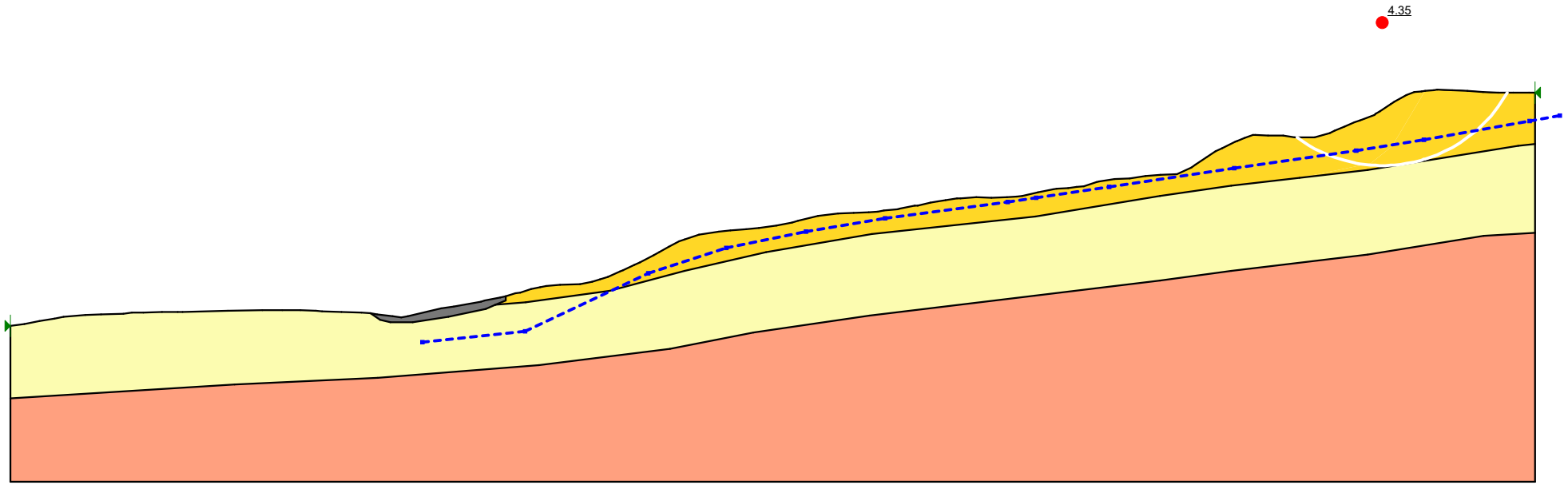
Factor of Safety
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	LGW Existing	PGA	g	Proj No.	2-9B000.00
Modelled By: Budge, Hugh	Checked By: V. Houssidas	FOS	1.07	Date:	10/03/2025
				Scale	1:317

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Total Cohesion (kPa)	Piezometric Surface
	(UD) HD Mangakahia Complex	Undrained (Phi=0)	19			200	1
	(UD) MD Mangakahia Complex	Undrained (Phi=0)	20			300	1
	(UD) Residual Soil/Colluvium	Undrained (Phi=0)	19			50	1
	Stone Stabilisation	Mohr-Coulomb	28	0	35		1

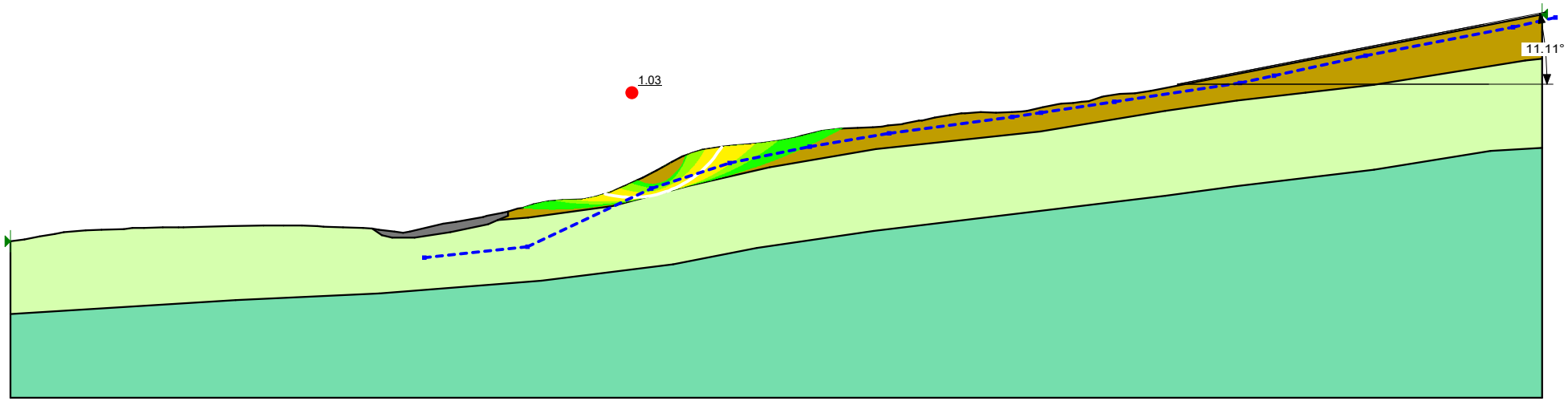
Factor of Safety
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	Seismic Existing	PGA	0.16g	Proj No.	2-9B000.00
Modelled By: Budge, Hugh	Checked By: V. Houssidas	FOS	4.35	Date:	10/03/2025
				Scale	1:317

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	HD Mangakahia Complex	Mohr-Coulomb	19	8	22	1
	MD Mangakahia Complex	Mohr-Coulomb	20	10	32	1
	Residual Soil/Colluvium	Mohr-Coulomb	19	3	11	1
	Stone Stabilisation	Mohr-Coulomb	28	0	35	1

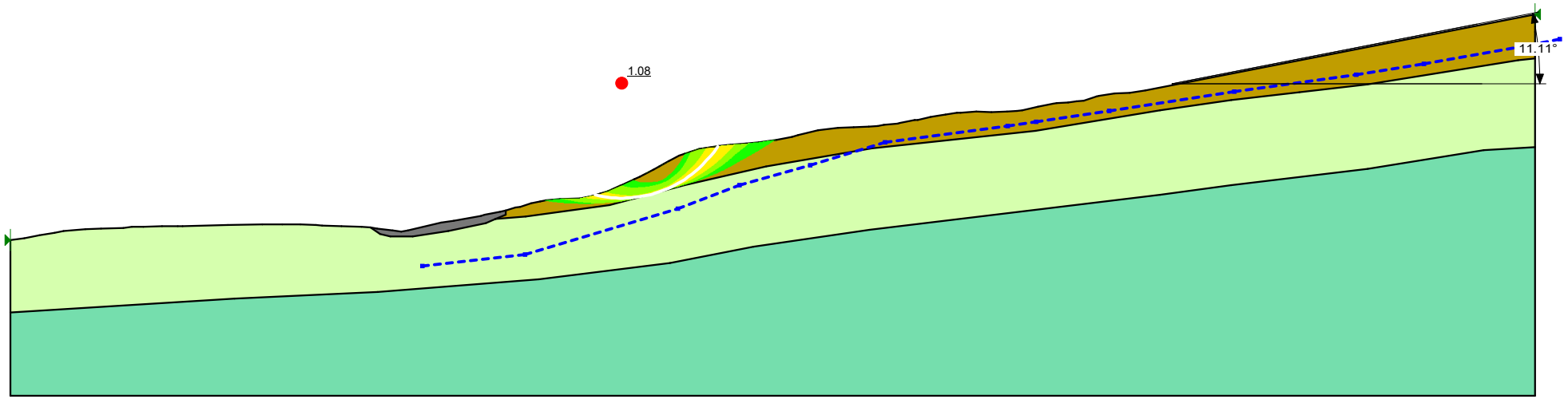
Factor of Safety
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	HGW Option 1	PGA	g	Proj No.	2-9B000.00
Modelled By: Budge, Hugh	Checked By: V. Houssidas	FOS	1.03	Date:	10/03/2025
				Scale	1:317

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Surface
	HD Mangakahia Complex	Mohr-Coulomb	19	8	22	1
	MD Mangakahia Complex	Mohr-Coulomb	20	10	32	1
	Residual Soil/Colluvium	Mohr-Coulomb	19	3	11	1
	Stone Stabilisation	Mohr-Coulomb	28	0	35	1

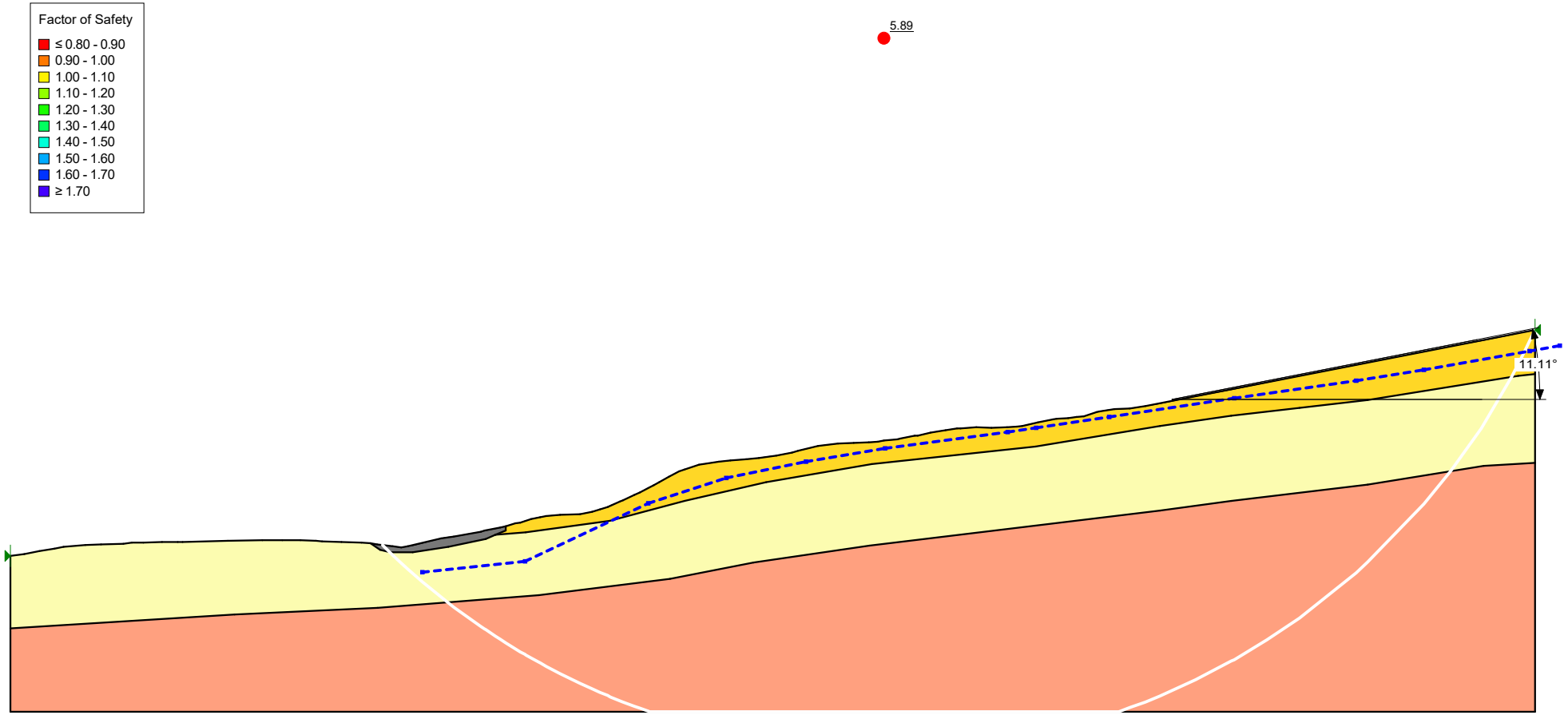
Factor of Safety
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	LGW Option 1	PGA	g	Proj No.	2-9B000.00
Modelled By: Budge, Hugh	Checked By: V. Houssidas	FOS	1.08	Date:	10/03/2025
				Scale	1:317

Color	Name	Slope Stability Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Total Cohesion (kPa)	Piezometric Surface
	(UD) HD Mangakahia Complex	Undrained (Phi=0)	19			200	1
	(UD) MD Mangakahia Complex	Undrained (Phi=0)	20			300	1
	(UD) Residual Soil/Colluvium	Undrained (Phi=0)	19			50	1
	Stone Stabilisation	Mohr-Coulomb	28	0	35		1

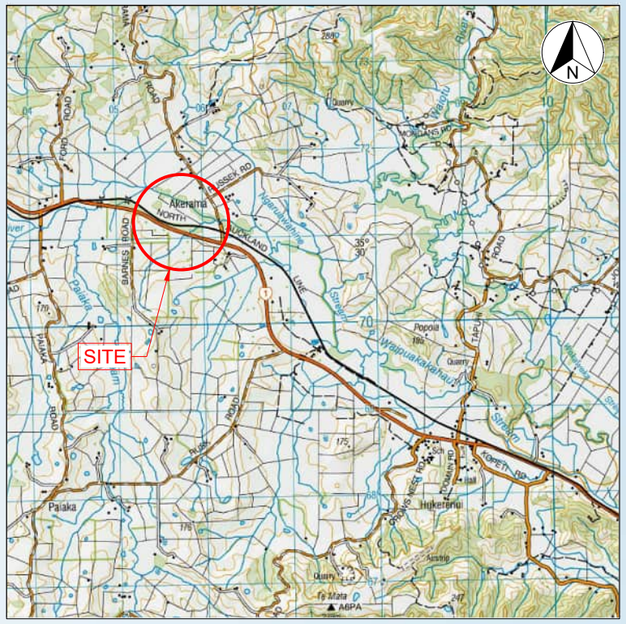
Factor of Safety
- ≤ 0.80 - 0.90
- 0.90 - 1.00
- 1.00 - 1.10
- 1.10 - 1.20
- 1.20 - 1.30
- 1.30 - 1.40
- 1.40 - 1.50
- 1.50 - 1.60
- 1.60 - 1.70
- ≥ 1.70



Project:	**Akerama Bends**	Model	SLOPE/W	Method	Morgenstern-Price
Analysis:	Seismic Option 1	PGA	0.16g	Proj No.	2-9B000.00
Modelled By: Budge, Hugh	Checked By: V. Houssidas	FOS	5.89	Date:	10/03/2025
				Scale	1:317

APPENDIX D

DRAWINGS



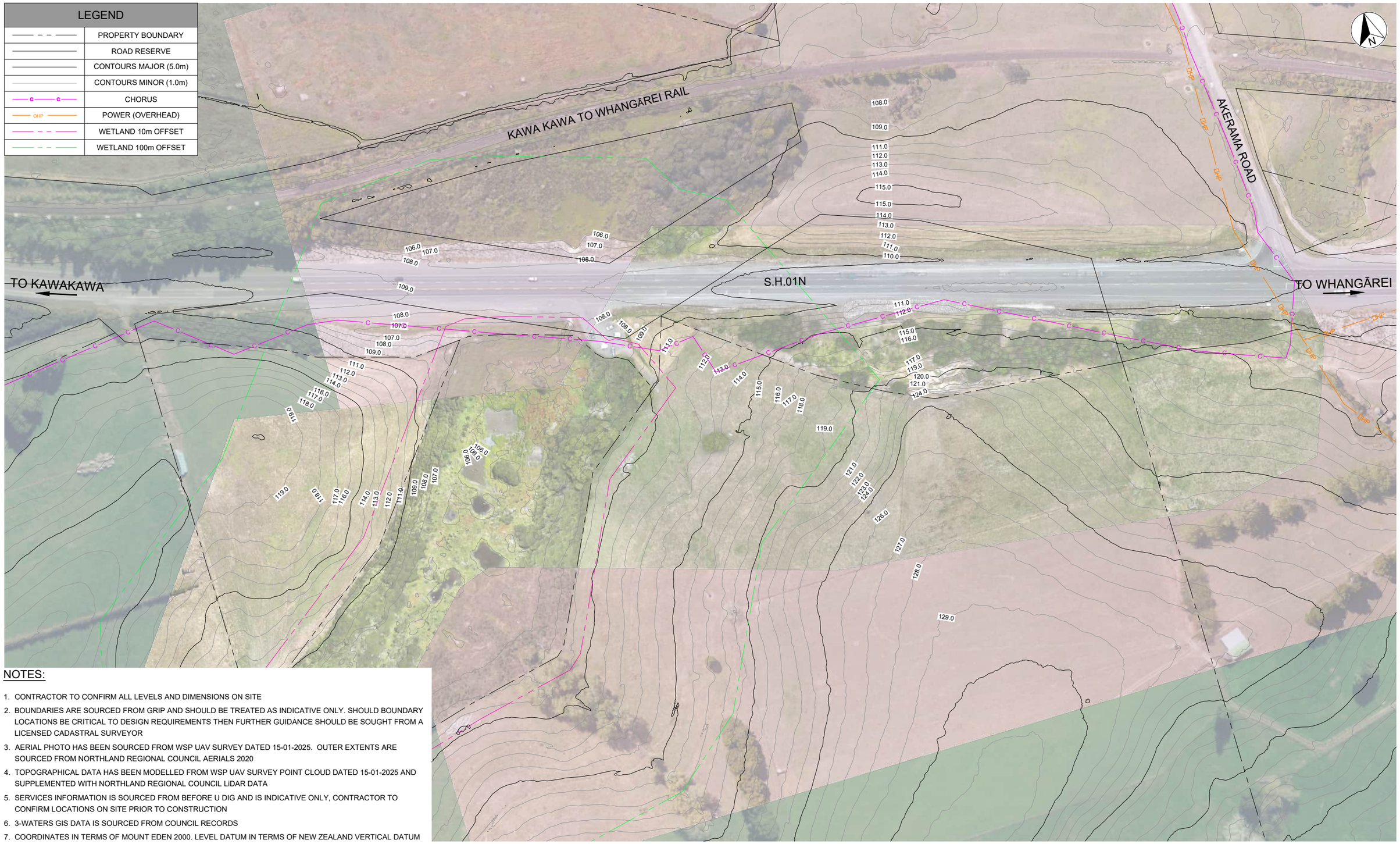
DRAWING INDEX		
SHEET No.	SHEET TITLE	REV. No.
C000	COVER SHEET AND INDEX	A
C001	PLAN - EXISTING CONTOURS AND SERVICES	A
SLIP REPAIR AND DIVERSION BUND		
C002	PLAN - SURVEY	A
C003	PLAN - GEOTECHNICAL	A
C005	PLAN - DESIGN	A
C006	PLAN - CUT AND FILL	A
C010	TYPICAL SECTION	A
C040	CROSS SECTIONS CH 15870.00 - 15920.00	A
C041	CROSS SECTIONS CH 15930.00 - 15980.00	A
C042	CROSS SECTIONS CH 15990.00 - 16010.00	A
C050	LAND REQUIREMENT PLAN	A
PADDOCK RESHAPING AND FARMER ACCESS		
C020	PLAN - DESIGN	A

NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HUKERENUI S.H.01N RP 15.930
AKERAMA CURVES

CIVIL
DETAILED DESIGN

Project No: 1-W4004.01
Date: MARCH 2025

LEGEND	
	PROPERTY BOUNDARY
	ROAD RESERVE
	CONTOURS MAJOR (5.0m)
	CONTOURS MINOR (1.0m)
C C	CHORUS
OHP	POWER (OVERHEAD)
	WETLAND 10m OFFSET
	WETLAND 100m OFFSET



NOTES:

1. CONTRACTOR TO CONFIRM ALL LEVELS AND DIMENSIONS ON SITE
2. BOUNDARIES ARE SOURCED FROM GRIP AND SHOULD BE TREATED AS INDICATIVE ONLY. SHOULD BOUNDARY LOCATIONS BE CRITICAL TO DESIGN REQUIREMENTS THEN FURTHER GUIDANCE SHOULD BE SOUGHT FROM A LICENSED CADASTRAL SURVEYOR
3. AERIAL PHOTO HAS BEEN SOURCED FROM WSP UAV SURVEY DATED 15-01-2025. OUTER EXTENTS ARE SOURCED FROM NORTHLAND REGIONAL COUNCIL AERIALS 2020
4. TOPOGRAPHICAL DATA HAS BEEN MODELLED FROM WSP UAV SURVEY POINT CLOUD DATED 15-01-2025 AND SUPPLEMENTED WITH NORTHLAND REGIONAL COUNCIL LiDAR DATA
5. SERVICES INFORMATION IS SOURCED FROM BEFORE U DIG AND IS INDICATIVE ONLY, CONTRACTOR TO CONFIRM LOCATIONS ON SITE PRIOR TO CONSTRUCTION
6. 3-WATERS GIS DATA IS SOURCED FROM COUNCIL RECORDS
7. COORDINATES IN TERMS OF MOUNT EDEN 2000. LEVEL DATUM IN TERMS OF NEW ZEALAND VERTICAL DATUM

1:1000 @ A1
1:2000 @ A3
0 10 20 30 40 50 60 70 80 90 100 m

300 mm 200 100 50 0 10 mm

WORK IN PROGRESS

PRINTED 11/03/2025 12:51:54 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

wsp
Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: 1:1000 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	H. BUDGE	S. GRIEVE
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
PLAN
EXISTING CONTOURS AND SERVICES

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C001
REVISION: A

Original sheet size A1 (841x594) Plot Date 2025-03-11 at 12:51:54 pm \\corp.pbwan.net\ANZ\ProjectsNZ\1w\1-W4004.01 Akerama Bends Remediation\Home\04_CADD\1-W4004.01_C000-004.dwg C001

LEGEND	
	PROPERTY BOUNDARY
	ROAD RESERVE
	CONTOURS MAJOR (5.0m)
	CONTOURS MINOR (1.0m)
PIN 1	SURVEY CONTROL
	EDGE OF SEAL
	FENCELINE
	WATER TABLE
	APPROX EXTENT OF SLIP SCARP

SURVEY DETAILS	
SURVEY/DRONE PILOT	G. RUSSELL/T. KEEN
VERIFIED	S. SPRAGUE
SURVEY DATE	16/12/2024
EQUIPMENT USED	TRIMBLE R10 / MAVIC 3E DRONE
	DJI PHANTOM 4 DRONE
CLIENT	NZ TRANSPORT AGENCY - WAKA KOTAHI
DATUM NOTE	
HORIZONTAL DATUM	MOUNT EDEN 2000
VERTICAL DATUM	NEW ZEALAND VERTICAL DATUM 2016
HORIZONTAL ORIGIN	DB 56 SO 47229 (A1HT) SOURCED LINZ GDB DECEMBER 2024
VERTICAL ORIGIN	
BOUNDARIES HAVE BEEN SOURCED FROM LINZ DATA SERVICE AND ARE CLASSIFIED AS LINZ ORDER 7 - SURVEY ACCURATE CADASTRE	

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:500 @ A1
1:1000 @ A3
0 5 10 15 20 25 30 35 40 45 50 m

WORK IN PROGRESS

PRINTED 11/03/2025 12:52:04 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

wsp
Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: 1:500 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	H. BUDGE	S. GRIEVE
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
PLAN - SURVEY

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C002
REVISION: A

LEGEND	
	PROPERTY BOUNDARY
	ROAD RESERVE
	CONTOURS MAJOR (5.0m)
	CONTOURS MINOR (1.0m)
	HAND AUGER
	APPROX EXTENT OF SLIP SCARP

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

WORK IN PROGRESS

PRINTED 11/03/2025 12:52:12 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	H. BUDGE	S. GRIEVE

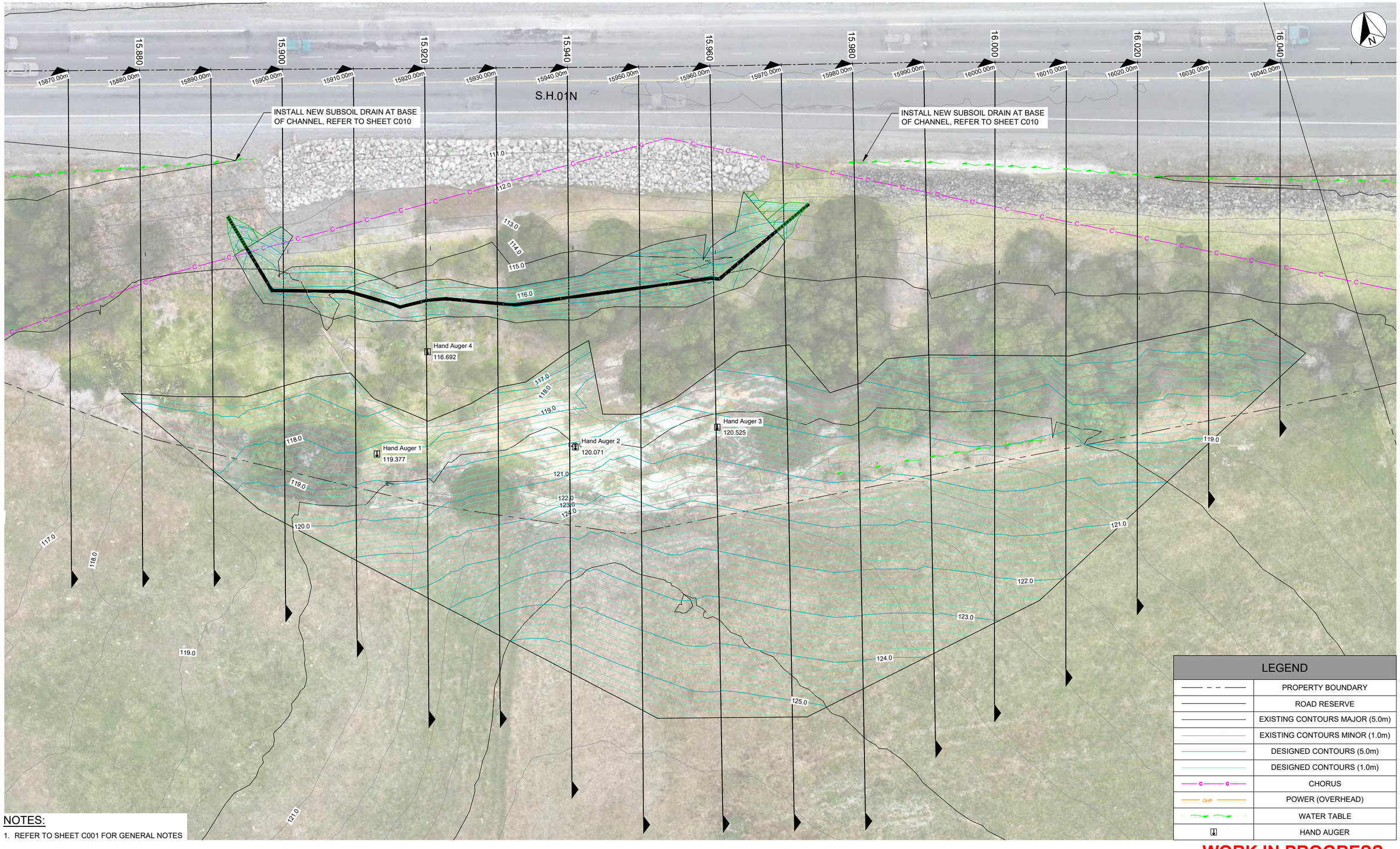
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
PLAN - GEOTECHNICAL

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
1-W4004.01	C003	A



LEGEND

	PROPERTY BOUNDARY
	ROAD RESERVE
	EXISTING CONTOURS MAJOR (5.0m)
	EXISTING CONTOURS MINOR (1.0m)
	DESIGNED CONTOURS (5.0m)
	DESIGNED CONTOURS (1.0m)
C C	CHORUS
OHP	POWER (OVERHEAD)
	WATER TABLE
	HAND AUGER

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

WORK IN PROGRESS

PRINTED 11/03/2025 12:52:46 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	H. BUDGE	S. GRIEVE

DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

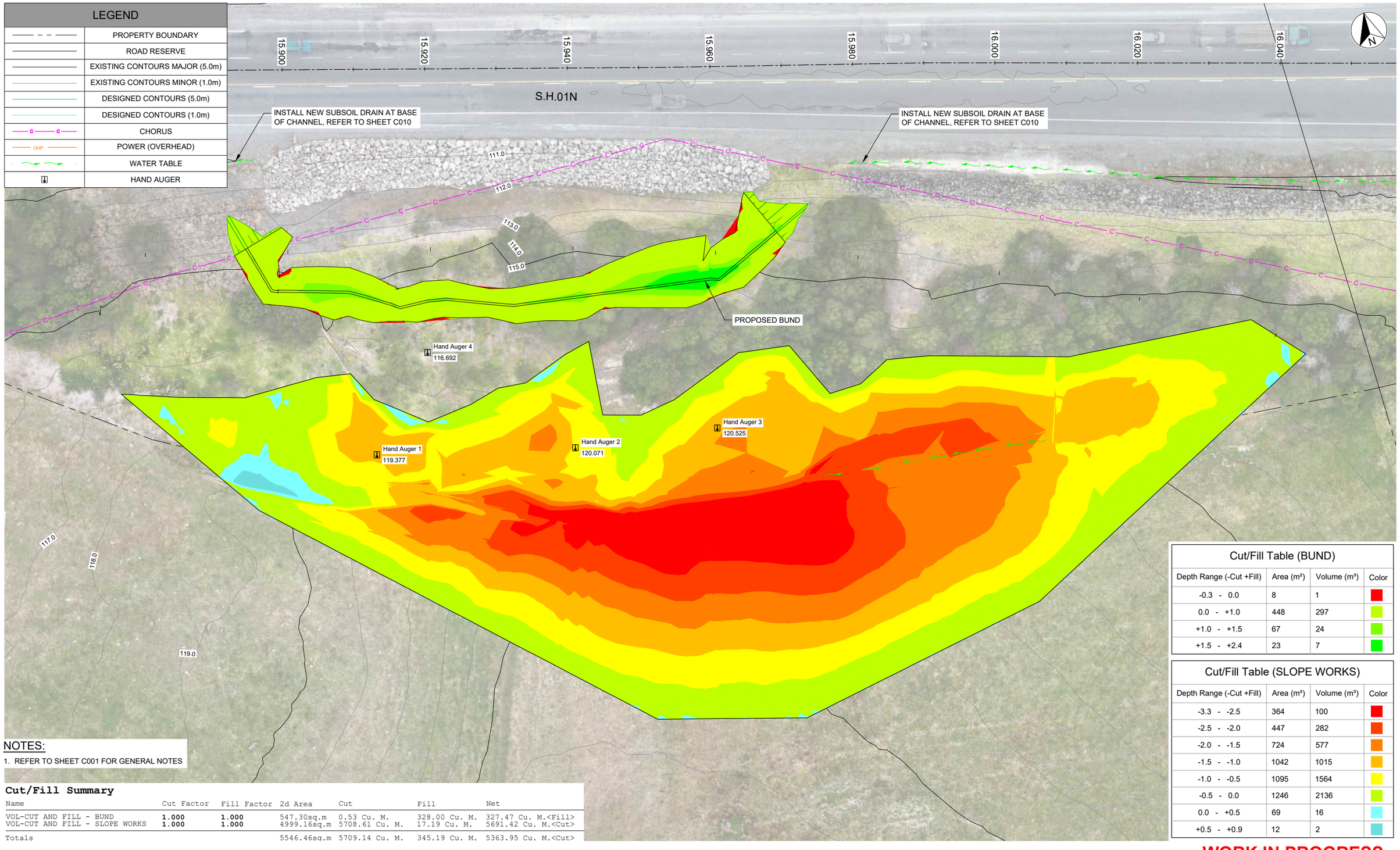
DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
PLAN - DESIGN

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C005
REVISION: A

LEGEND	
	PROPERTY BOUNDARY
	ROAD RESERVE
	EXISTING CONTOURS MAJOR (5.0m)
	EXISTING CONTOURS MINOR (1.0m)
	DESIGNED CONTOURS (5.0m)
	DESIGNED CONTOURS (1.0m)
C C	CHORUS
OHP	POWER (OVERHEAD)
	WATER TABLE
	HAND AUGER



300 mm
200
100
50
0 10 mm

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
VOL-CUT AND FILL - BUND	1.000	1.000	547.30sq.m	0.53 Cu. M.	328.00 Cu. M.	327.47 Cu. M.<Fill>
VOL-CUT AND FILL - SLOPE WORKS	1.000	1.000	4999.16sq.m	5708.61 Cu. M.	17.19 Cu. M.	5691.42 Cu. M.<Cut>
Totals			5546.46sq.m	5709.14 Cu. M.	345.19 Cu. M.	5363.95 Cu. M.<Cut>

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

Cut/Fill Table (BUND)

Depth Range (-Cut +Fill)	Area (m²)	Volume (m³)	Color
-0.3 - 0.0	8	1	
0.0 - +1.0	448	297	
+1.0 - +1.5	67	24	
+1.5 - +2.4	23	7	

Cut/Fill Table (SLOPE WORKS)

Depth Range (-Cut +Fill)	Area (m²)	Volume (m³)	Color
-3.3 - -2.5	364	100	
-2.5 - -2.0	447	282	
-2.0 - -1.5	724	577	
-1.5 - -1.0	1042	1015	
-1.0 - -0.5	1095	1564	
-0.5 - 0.0	1246	2136	
0.0 - +0.5	69	16	
+0.5 - +0.9	12	2	

WORK IN PROGRESS

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REVISION	AMENDMENT	APPROVED	DATE
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NZ TRANSPORT AGENCY WAKA KOTAHI

Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	H. BUDGE	S. GRIEVE

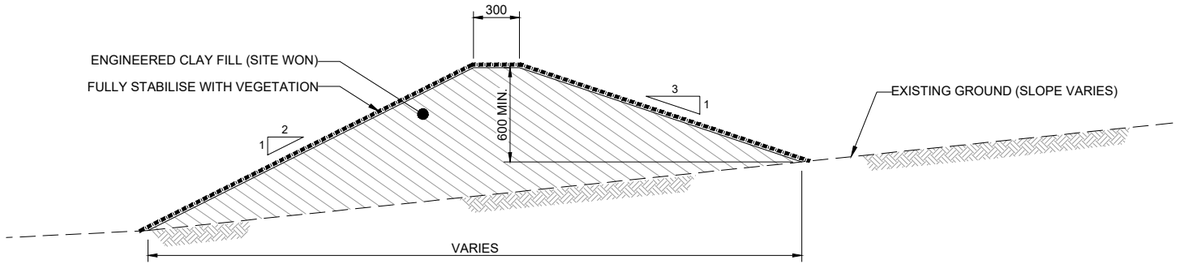
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

DETAILED DESIGN

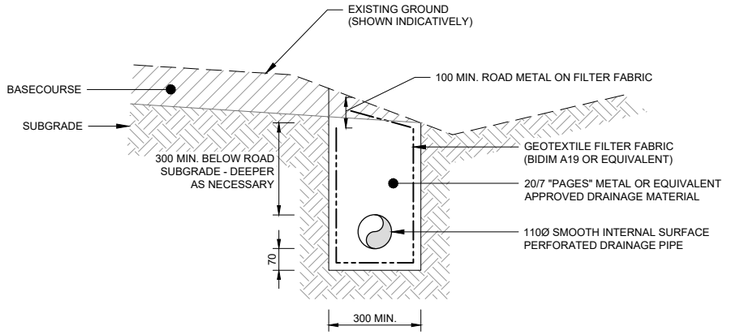
PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
PLAN - CUT AND FILL

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C006
REVISION: A



A - DETAIL - CLEAN WATER DIVERSION BUND
SCALE: 1:20



B - RURAL SUBSOIL DRAINAGE
SCALE: 1:10

TYPICAL SECTION
SCALE: 1:100

0 10 mm 50 100 200 300 mm

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES.

SUBSOIL NOTES:

1. CONSTRUCT SUBSOIL DRAIN AFTER STABILISATION OF SUBGRADE.
2. FOR SCOUR PROTECTION, REFER TO WDC EES SECTION 1.2 14.3
3. SUBSOIL DRAINS IN CLAYS TO BE PAP 7 OR BMF (BLUE METAL FINES).

1:100@ A1, 1:200@ A3: 0 1 2 3 4 5 6 7 8 9 10 m
1:20@ A1, 1:40@ A3: 0 200 400 600 800 1000 1200 1400 1600 1800 2000 mm
1:10@ A1, 1:20@ A3: 0 100 200 300 400 500 600 700 800 900 1000 mm

WORK IN PROGRESS
PRINTED 11/03/2025 12:53:15 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

wsp
Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: AS SHOWN
ORIGINAL SIZE: A1
DRAWN: V. GILES
DESIGNED: V. GILES
APPROVED: S. GRIEVE
DRAWING VERIFIED: J. MOOLMAN
DESIGN VERIFIED: H. BUDGE
APPROVED DATE: 2025-03-12

DETAILED DESIGN

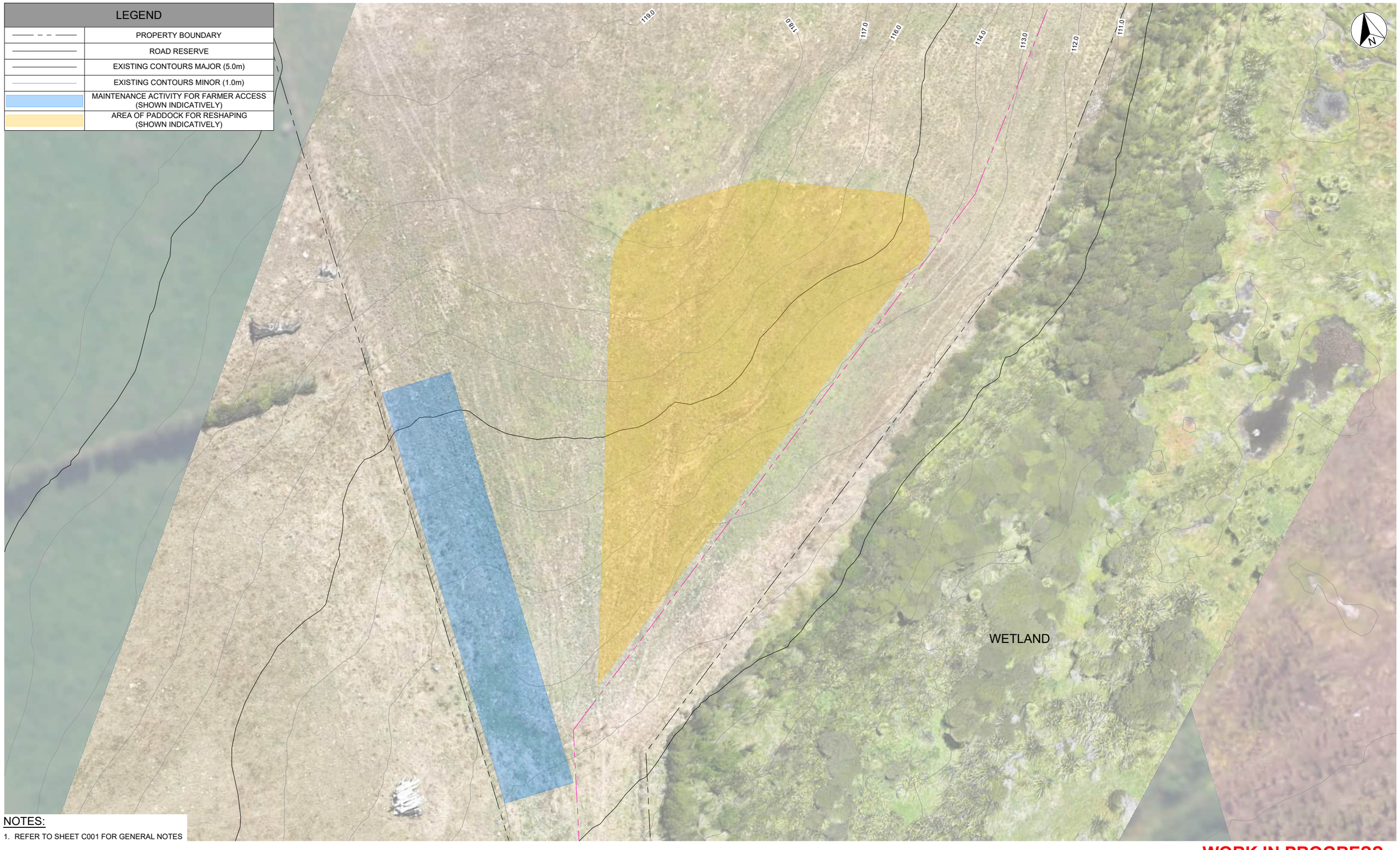
PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
TYPICAL SECTION

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C010
REVISION: A

LEGEND

	PROPERTY BOUNDARY
	ROAD RESERVE
	EXISTING CONTOURS MAJOR (5.0m)
	EXISTING CONTOURS MINOR (1.0m)
	MAINTENANCE ACTIVITY FOR FARMER ACCESS (SHOWN INDICATIVELY)
	AREA OF PADDOCK FOR RESHAPING (SHOWN INDICATIVELY)



NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

300 mm
200
100
50
0 10 mm

WORK IN PROGRESS

PRINTED 11/03/2025 12:53:37 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

wsp
Whangarei Office
+64 9 430 1700
Private Bag 9017
Whangarei 0148
New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	H. BUDGE	S. GRIEVE

DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

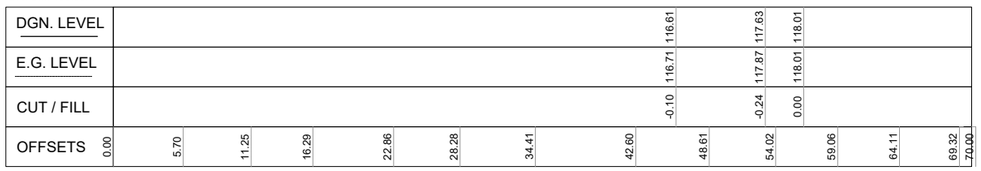
DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
PADDOCK RESHAPING AND FARMER ACCESS PLAN - DESIGN

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
1-W4004.01	C020	A

Original sheet size A1 (841x594) Plot Date 2025-03-11 at 12:53:37 pm \\corp.pbwan.net\ANZ\ProjectsNZ\1w\1-W4004.01 Akerama Bends Remediation\Home\04_CADD\1-W4004.01_C020.dwg C020



SCALE: 1:250

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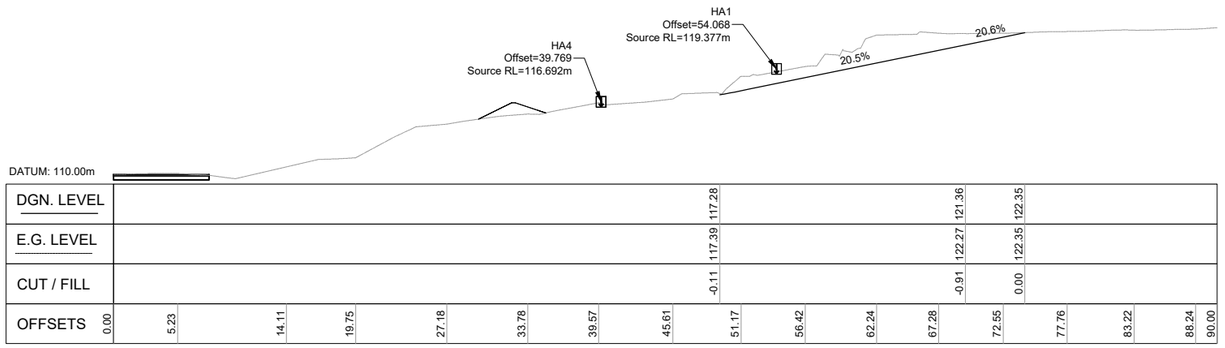
EX-CL



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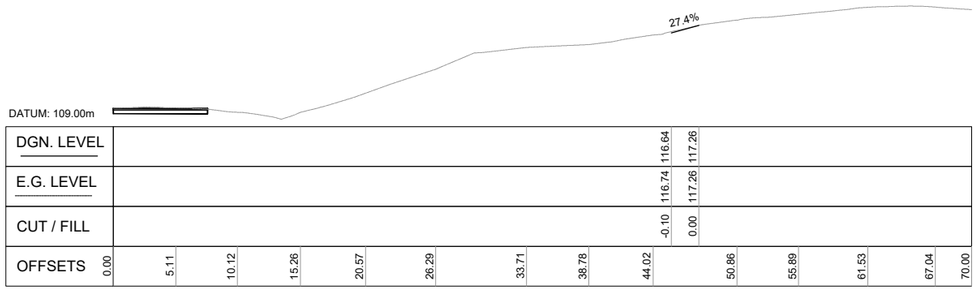
EX-CL



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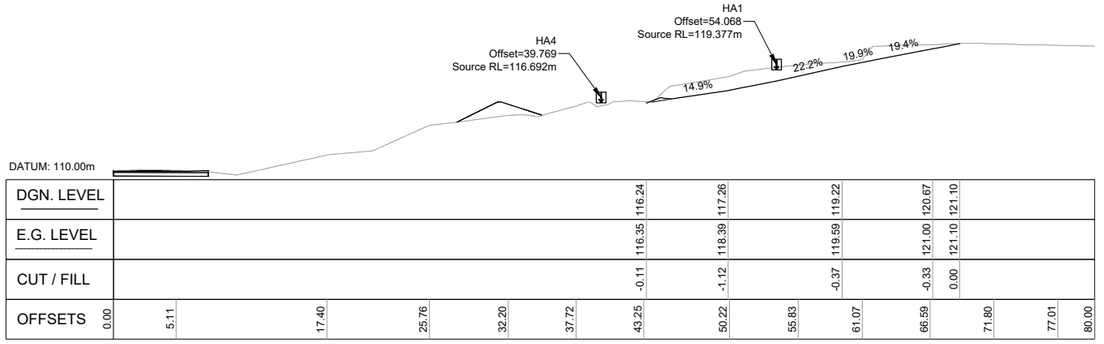

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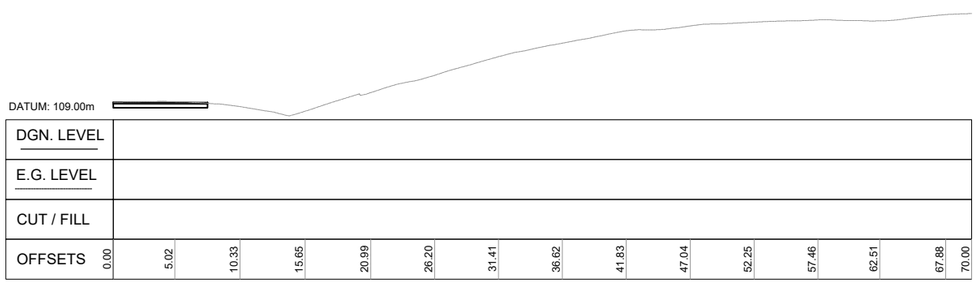

SCALE: 1:250

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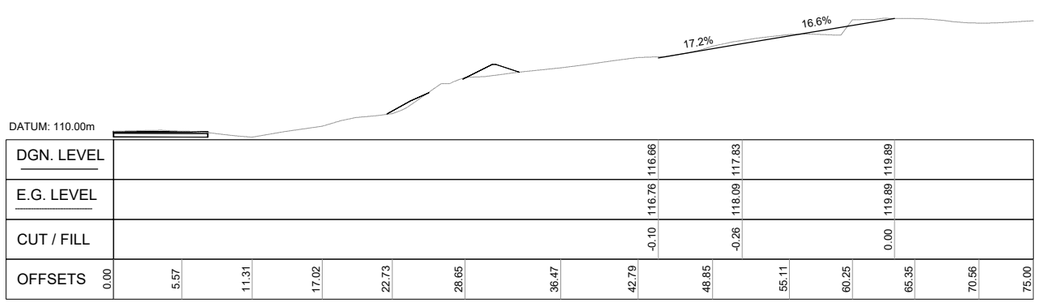
EX-CL



SCALE: 1:250

CHAINAGE: 15900.00m
EX-CL

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

WORK IN PROGRESS

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REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

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New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	V. GILES	S. GRIEVE
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

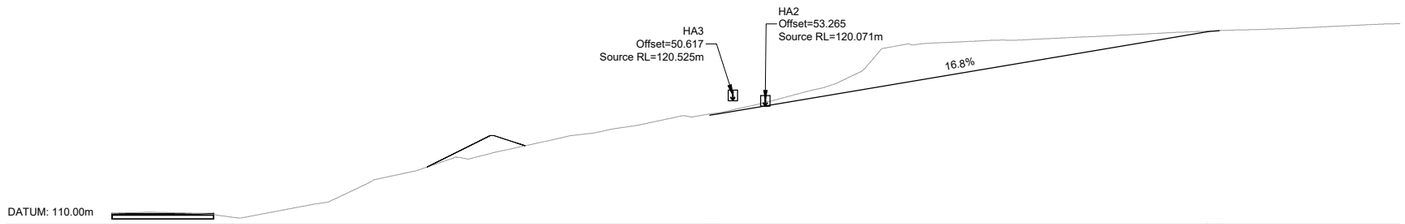
DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
CROSS SECTIONS - CH 15870.00 - 15920.00

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C040
REVISION: A

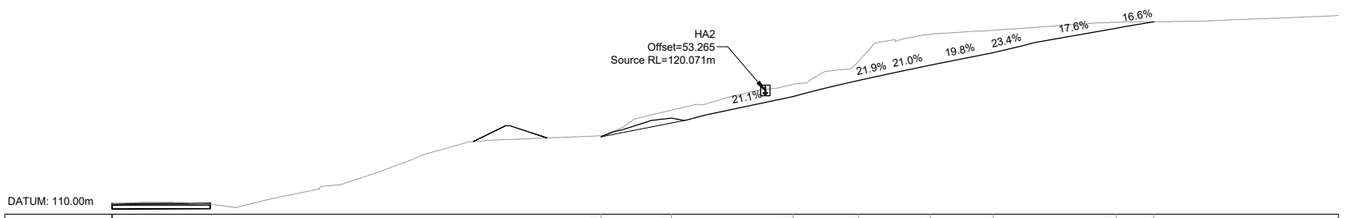
Original sheet size A1 (841x594) Plot Date 2025-03-11 at 12:54:01 pm \\corp.pbwan.net\ANZ\ProjectsNZ\1w\1-W4004.01 Akerama Bends Remediation\Home\04_CADD\1-W4004.01_C040-049.dwg C040



DGN. LEVEL								118.92										125.73	125.82			
E.G. LEVEL								119.02										125.76	125.82			
CUT / FILL								-0.10										-0.03	0.00			
OFFSETS	0.00	5.51	16.49	24.55	31.37	37.39	42.74	48.66	53.74	59.07	65.02	70.50	75.63	80.92	86.03	91.34	96.55	101.76	105.00			

SCALE: 1:250

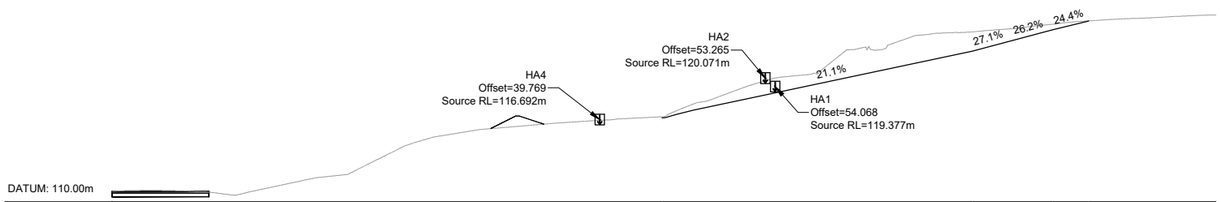
CHAINAGE: 15950.00m
EX-CL



DGN. LEVEL							116.31	117.84		119.59	120.91	122.16	123.17			125.15	125.69					
E.G. LEVEL							116.41	118.48		120.58	122.47	124.67	125.00			125.65	125.68					
CUT / FILL							-0.10	-0.64		-0.99	-1.56	-2.51	-1.83			-0.50	0.00					
OFFSETS	0.00	5.65	12.67	18.64	24.44	31.23	37.54	42.57	47.61	52.89	58.13	63.14	68.22	73.23	78.64	83.85	89.06	94.27	99.48	100.00		

SCALE: 1:250

CHAINAGE: 15940.00m
EX-CL



DGN. LEVEL								116.83								122.28		124.01	124.73			
E.G. LEVEL								116.93								123.85		124.47	124.75			
CUT / FILL								-0.10								-1.57		-0.46	-0.01			
OFFSETS	0.00	5.05	11.12	16.57	23.85	29.97	36.20	41.21	46.41	51.50	57.05	62.21	67.55	72.75	78.23	83.23	88.86	90.00				

SCALE: 1:250

CHAINAGE: 15930.00m
EX-CL

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

WORK IN PROGRESS

PRINTED 11/03/2025 12:54:05 pm

REVISION	AMENDMENT	APPROVED	DATE
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NZ TRANSPORT AGENCY WAKA KOTAHI

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New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

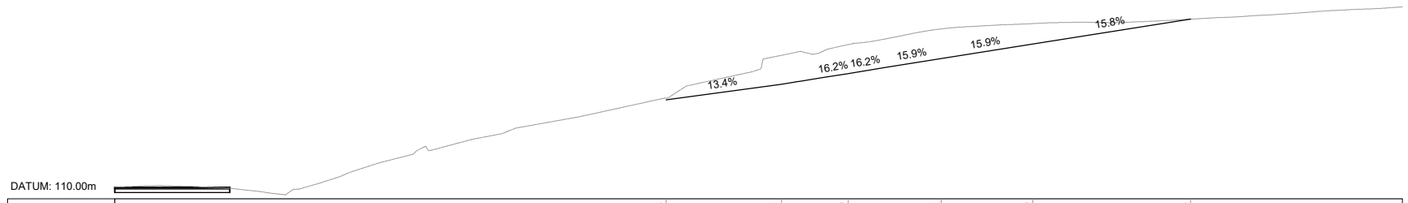
DRAWN	DESIGNED	APPROVED
V. GILES	V. GILES	S. GRIEVE
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
CROSS SECTIONS - CH 15930.00 - 15980.00

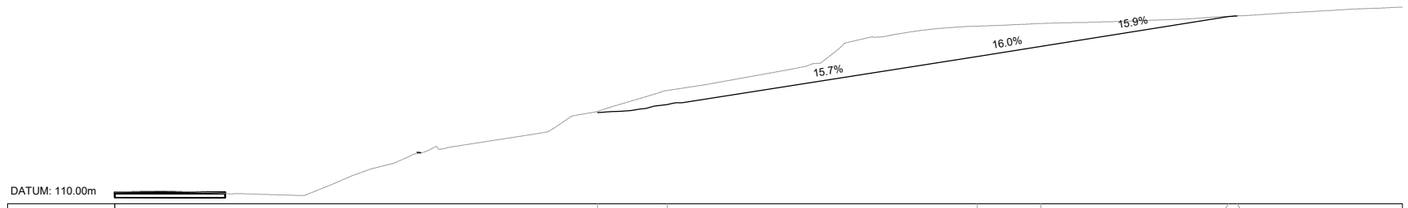
WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
1-W4004.01	C041	A



DGN. LEVEL								118.06		119.32	120.20		121.42	122.60			124.63					
E.G. LEVEL								118.20		121.69	122.56		123.84	124.27			124.63					
CUT / FILL								-0.14		-2.36	-2.36		-2.42	-1.67			0.00					
OFFSETS	0.00	5.31	10.66	16.69	24.34	31.55	37.88	44.79	51.97	57.05	62.06	67.74	73.23	78.28	83.62	88.81	94.01	99.20	104.23	105.00		

SCALE: 1:250

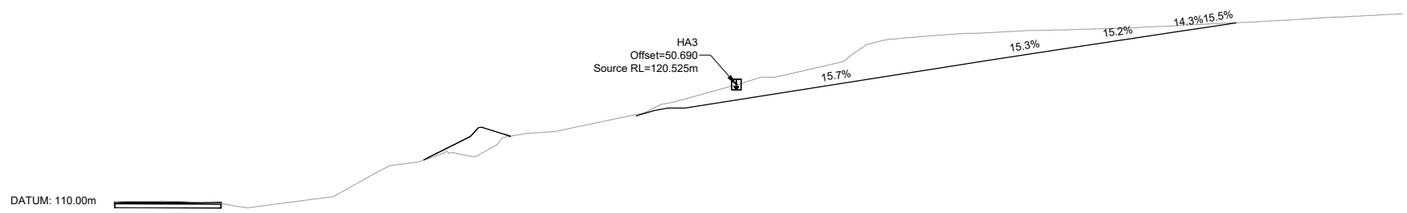
CHAINAGE: 15980.00m
EX-CL



DGN. LEVEL							117.43	118.08				122.00	122.83			125.26	125.31					
E.G. LEVEL							117.51	119.23				124.48	124.69			125.27	125.31					
CUT / FILL							-0.09	-1.15				-2.47	-1.86			-0.01	0.00					
OFFSETS	0.00	5.27	15.14	20.97	26.23	34.25	39.37	44.40	55.05	61.82	66.99	72.67	78.12	83.21	88.51	93.62	98.90	104.09	105.00			

SCALE: 1:250

CHAINAGE: 15970.00m
EX-CL



DGN. LEVEL								118.00				122.53	123.42			124.85	125.57					
E.G. LEVEL								118.10				124.78	124.99			125.34	125.59					
CUT / FILL								-0.10				-2.25	-1.57			-0.50	-0.02					
OFFSETS	0.00	5.10	10.89	17.82	24.82	31.17	43.20	50.37	56.27	61.32	66.39	71.58	76.78	81.97	87.17	92.19	97.55	102.69	105.00			

SCALE: 1:250

CHAINAGE: 15960.00m
EX-CL

NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:250@ A1
1:500@ A3
0 4 8 12 16 20 24 m

WORK IN PROGRESS

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REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

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New Zealand

CIVIL

SCALES: 1:250 AT A1
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
V. GILES	V. GILES	S. GRIEVE

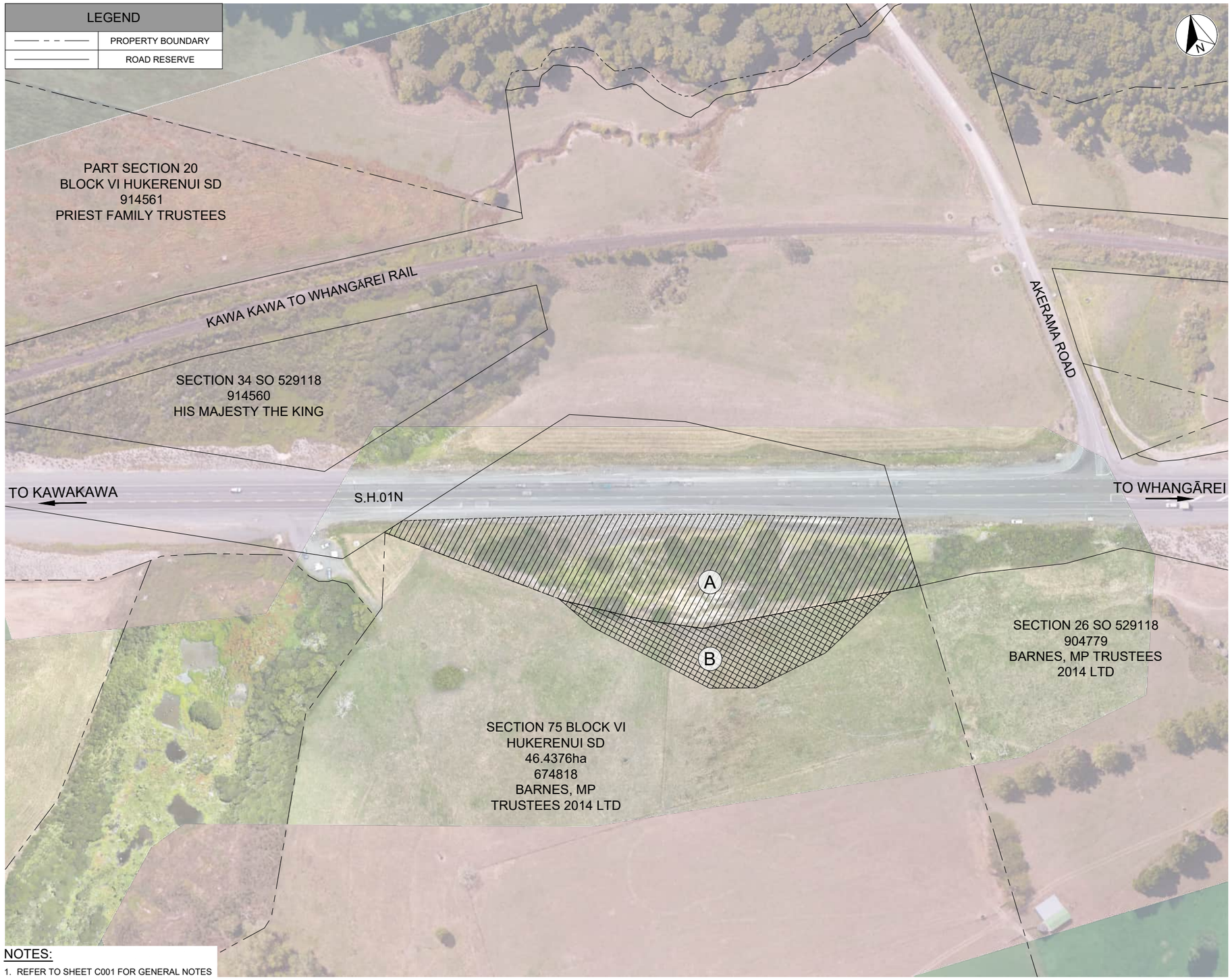
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
J. MOOLMAN	H. BUDGE	2025-03-12

DETAILED DESIGN

PROJECT
NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE
SLIP REPAIR AND DIVERSION BUND
CROSS SECTIONS - CH 15990.00 - 16010.00

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01
SHEET NO.: C042
REVISION: A



NOTES:

1. REFER TO SHEET C001 FOR GENERAL NOTES

1:1000 @ A1
1:2000 @ A3
0 10 20 30 40 50 60 70 80 90 100 m

LAND REGISTRATION DISTRICT : NORTH AUCKLAND

LOCAL AUTHORITY : WHANGĀREI DISTRICT COUNCIL

SCHEDULES

LAND REQUIRED FOR TEMPORARY OCCUPATION

SHOWN	DESCRIPTION	AREA
A	SECTION 75 BLOCK VI HUKERENUI SD 674818 BARNES, MP TRUSTEES 2014 LTD (SECTION 31 SO 529118)	9712m²
B	SECTION 75 BLOCK VI HUKERENUI SD 674818 BARNES, MP TRUSTEES 2014 LTD	3147m²
TOTAL AREA		12859m²

NOTE THAT SECTION 75 BLOCK VI HUKERENUI SD IS SUBJECT TO ONGOING ROAD LEGALISATION PROCESS (SECTION 31 SO 529118)

WORK IN PROGRESS

PRINTED 11/03/2025 12:54:29 pm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR DETAILED DESIGN	SG	2025-03-12

NZ TRANSPORT AGENCY WAKA KOTAHI

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Whangarei 0148
New Zealand

CIVIL

SCALES: 1:1000 AT A1 — ORIGINAL SIZE: A1

DRAWN	SURVEYED	APPROVED
K. MEIN	S. SPRAGUE	S. GRIEVE
DRAWING VERIFIED	SURVEY VERIFIED	APPROVED DATE
J. BOOM	S. SPRAGUE / R. BRILL	2025-03-12

DETAILED DESIGN

PROJECT: NZ TRANSPORT AGENCY WAKA KOTAHI
AKERAMA, HŪKERENUI S.H.01N RP 15.930
AKERAMA CURVES

TITLE: SLIP REPAIR AND DIVERSION BUND
LAND REQUIREMENT PLAN

WSP PROJECT NO. (SUB-PROJECT): 1-W4004.01 — SHEET NO.: C050 — REVISION: A

APPENDIX E

COST ESTIMATION