Richmond Valley Council

REVIEW OF ENVIRONMENTAL FACTORS FOR THE AINSWORTH ROAD EMBANKMENT AND CULVERT WORKS, MIDDLE CREEK, MONGOGARIE

Review of Environmental Factors (attached)		
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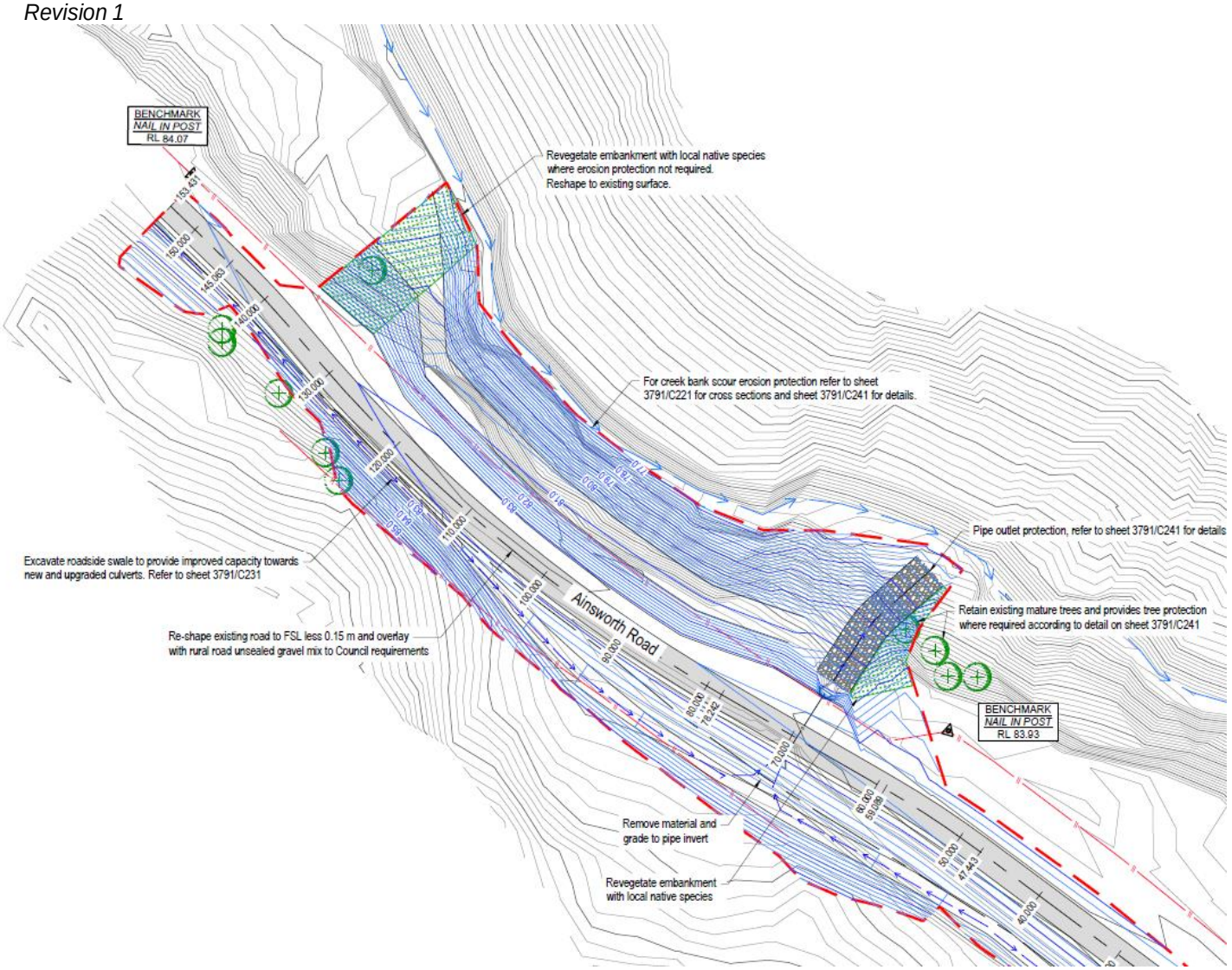
Ainsworth Road Embankment Stabilisation
Ainsworth Road, Mongogarie NSW 2470
Review of Environmental FactorsSeptember 2022

Revision 1



Executive Summary

Proposal:

A tender has been called to engage a suitably qualified and experienced organisation to conduct designed flood repairs on Ainsworth Road, Mongogarie including placement of boulders along toe of river bank, scour protection to stabilise a road embankment, replace culverts, reshape swales and reconstruct, reshape and re-sheet unsealed road with a 50mm overlay using Council approved flood blend as per the design drawing. The site is located approximately 7km along Ainsworth Road from the intersection of Mongogarie Road NSW, 2470.

Need for the proposal:

Ainsworth Road is an unsealed rural road, with approximate AADT 28 vehicles per day, 9.1% heavy vehicles- usually cattle trucks on sale days. The road from CH4000 runs alongside Middle Creek. The trafficable road width varies from 3.2m to 4.2m wide. This site was impacted by a flood event, and Middle Creek has scoured and undermined the road by approximately 3m x 800m long. A 600 diameter Reinforced Concrete Pipe Culvert has segmented and slipped down the embankment causing further damage to the road shoulder. Council is keen to see the embankment works underway as a priority for the safety of road users.

Statutory and planning framework:

All relevant statutory planning instruments have been examined in relation to the proposed road construction. Development consent is not required from Richmond Valley Council due to the implementation of *State Environmental Planning Policy (Transport & Infrastructure)* 2021.

Clause 2.109 (1) of Transport & Infrastructure SEPP states that:

"Development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land. However, such development may be carried out without consent on land reserved under the National Parks and Wildlife Act 1974 only if the development:

(a) is authorised by or under the National Parks and Wildlife Act 1974, or

(b} is, or is the subject of, an existing interest within the meaning of section 39 of that Act, or

(c) is on land to which that Act applies over which an easement has been granted and is not contrary to the terms or nature of the easement.,,

The proposal is an activity for the purposes of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is subject to a Review of Environmental Factors (REF).

Community and Stakeholder Consultation:

The REF will be advertised as required including for review by DPI Fisheries as a Fisheries Permit will be required for this project. All residents affected by the proposed works have been consulted and communication will continue throughout the duration of works onsite.

Environmental Impacts:

Potential impacts from the proposal are identified in this REF. These impacts can be mitigated against and proposed safeguards and mitigation measures for each of these potential impacts are given.

Justification and Conclusion:

The proposal outlined herein will repair and stabilise the Ainsworth Road embankment slip in accordance with the relevant Australian Standards. The implementation of the mitigation measures of this REF will ensure that the proposal is unlikely to have any significant environmental impacts.

Table of Contents

Executive Summary 2

1 Introduction 6

1.1 Proposal Identification 6

1.2 Location 6

1.3 Purpose of the Report 7

2 Need and Options Considered 7

2.1 Strategic Need for the Proposal 7

2.2 Proposal Objectives 8

2.4 Preferred option 8

3 Description of the proposal 9

3.1 The proposal 9

3.2 Existing infrastructure 9

3.3 Design parameters 9

3.3.1 Design criteria 9

3.3.2 Engineering constraints 10

3.4 Construction Activities 10

3.4.1 Work methodology 11

Plant and equipment 11

3.4.2 Earthworks 11

Source and quantity of materials 12

Traffic management and access 12

3.4.6 Working Hours 12

3.5 Ancillary facilities 13

3.6 Public utility adjustment 13

3.7 Property acquisition 13

4 Statutory and planning framework 13

4.1 State Environmental Planning Policies (SEPP's) 13

State Environmental Planning Policy (Infrastructure) 2007 13

4.2 Local Environmental Plans 14

Richmond Valley Local Environmental Plan 2012 14

4.3 Commonwealth legislation 15

Environment Protection and Biodiversity Conservation Act 1999 15

4.4 Fisheries Management Act 1994 15

4.5 Confirmation of statutory position 16

5 Stakeholder and community consultation 16

5.1 Consultation strategy- 16

5.2 Aboriginal community involvement 16

5.3 ISEPP consultation 17

5.4 Government agency and stakeholder involvement 17

5.5 Ongoing or future consultation 17

6 Environmental Assessment 17
6.1 Ecology and Biodiversity 17
6.1.1Existing environment 17
6.1.2Potential impacts 19
Safeguards and management measures: 19
6.2 Traffic and Access 20
6.2.1Existing environment 20
6.2.2Criteria 20
6.2.3Potential impacts 20
6.2.4Safeguards and management measures: 20
6.3 Topography, Geology and Soils 20
6.3.1Existing environment 20
6.3.2Criteria 20
6.3.3Potential impacts 21
6.3.4Safeguards and management measures; 21
6.4 Water Quality 21
6.4.1Existing environment 21
6.4.2Criteria 22
6.4.3Potential impacts 22
6.4.4Safeguards and management measures: 22
6.5 Air Quality 23
6.5.1Existing environment 23
6.5.2Criteria 23
6.5.3Potential impacts 23
6.5.4Safeguards and management measures 23
6.6 Noise and Vibration 24
6.6.1Existing environment 24
6.6.2Criteria 24
6.6.3Potential impacts 24
6.6.4Safeguards and management measures 24
6.7 Landscape/Visual 24
6.7.1Existing environment 24
6.7.2Criteria 24
6.7.3Potential impacts 25
6.7.4Safeguards and management measures 25
6.8 Aboriginal Heritage 25
6.8.1Existing environment 25
6.8.2Criteria 25
6.8.3Potential impacts 25
6.8.4Safeguards and management measures 25
6.9 Non - Aboriginal Heritage 25

6.9.1 Existing environment 25
6.9.2 Criteria 25
6.9.3 Potential impacts 25
Safeguards and management measures 25
6.10 Socio-economic 26
6.10.2 Criteria 26
6.10.3 Potential impacts 26
6.10.4 Safeguards and management measures 26
6.11 Waste 26
Existing environment 26
Criteria 26
Potential impacts 26
Safeguards and management measures 26
6.12 Climate Change 27
Existing environment 27
Criteria 27
Potential impacts 27
Safeguards and management measures 27
6.13 Cumulative Impacts 27
6.14 Summary of beneficial effects 27
6.15 Summary of adverse effects 28
7 Environmental management 28
7.1 Environmental management plans (or system) 28
7.2 Licensing and approvals 28
8 Conclusion 28
8.1 Justification 28
8.2 Ecologically sustainable development 28
8.2.1 Precautionary principle 28
8.2.2 Intergenerational equity 28
8.2.3 Conservation of biological diversity and ecological integrity 29
8.2.4 Improved valuation, pricing and incentive mechanisms 29
8.3 Conclusion 29

Attachments:

Attachment A – Issued For Construction Plans
Attachment B - Geotechnical Report
Attachment C - EPBC Act (Department of Environment and Energy) Protected Matter Report
Attachment D - Aboriginal Heritage Information Management System (AHIMS) Search
Attachment E - Environmental Management Plan
Attachment F - Proposed Methodology
Attachment G - Dial Before You Dig
Attachment H – Bionet Database Searches
Attachment **I** - Threatened Species Potential Occurrence
Attachment **J** - Five Part Test of Significance
Attachment K - Seven Part Test of Significance (FM Act)

1 Introduction

1.1 Proposal Identification

Richmond Valley Council (RVC) proposes to conduct designed flood repairs on Ainsworth Road, Mongogarie including earthworks and boulders along the toe of the riverbank and scour protection works to stabilise a road embankment. The work will also involve replacing two pipe culverts and headwalls as well as reshaping swales and reconstruct, reshape and resheet unsealed road with a 50mm overlay using Council approved flood blend as per the design drawing. The site is located approximately 7km along Ainsworth Road from the Mongogarie Road Intersection.

RVC's requirements for the new structure have been identified in consultation with TfNSW as the following:

- Replace 375 dia. RCP at CH16 with 600 dia. Class3 RRJ RCP with precast headwalls. Shape south swale from pipe outlet to energy dissipator
- Replace 600 dia. RCP at CH70 with 750 dia. Class3 RRJ RCP with precast headwalls. Install scour protection to pipe outlet
- Provide protection around existing mature trees as per sheet, revegetate embankment.
- Excavate roadside swale on southern side to improve capacity
- Reshape Existing Road to FSL less 0.15m and 50mm overlay with Council approved flood blend.

The project is expected to take up to four months to complete (depending on weather conditions). Works are expected to start in Late October 2022 subject to receiving permit from DPI Fisheries.

1.2 Location

The subject site is located on Council road reserve and is accessed via Mongogarie road.

All proposed works are within the road reserve and within the banks of the river on Crown Land (no works on the river bed itself). The works will follow the alignment of the original embankment and is being completed under the Infrastructure SEPP Division 17 Roads and Traffic, Subdivision 1 Road infrastructure facilities, Clause 94 1, Clause 94 2(c) Clause 94 2(d) which allows development for the purpose of a road or alterations or additions to an existing road to be undertaken by or on behalf of a public authority without consent on any land (see Site Location Image below):

Map 1. Site Location

1.3 Purpose of the Report

This REF has been prepared by the contractor MCS Civil in consultation with Richmond Valley Council (RVC).

For the purposes of these works, RVC is the proponent and the determining authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The purpose of the REF is to describe the project and to document the likely impacts of the proposal on the environment and to detail protective measures to be implemented. The description of the proposed works and associated environmental impacts have been undertaken in context of Clause 228 of the Environmental Planning and Assessment Regulation 2000, the Threatened Species Conservation Act 1995 (TSC Act), the Fisheries Management Act 1994 (FM Act), and the Australian Government's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Attachment C). In doing so, the REF helps to fulfil the requirements of Section 111 of the EP&A Act, that RVC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for approval to be sought under Part 4 of the EP&A Act.
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in Section SA of the EP&A Act and therefore the requirement for a Species Impact Statement.
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Environment and Energy for a decision by the commonwealth minister for the Environment on whether assessment and approval is required under the EPBC Act.

2 Need and Options Considered

2.1 Strategic Need for the Proposal

This site was impacted by a flood event, and Middle Creek has scoured and undermined the road by approximately 3m x 800m long. A 600 diameter Reinforced Concrete Culvert has segmented and slipped down the embankment.

Geotechnical investigation of the embankment has been undertaken and used to inform the design.

2.2 Proposal Objectives

The objective of the proposal is to conduct designed flood repairs on Ainsworth Road including earthworks and scour protection to stabilise a road embankment, replace culverts, reshape swales and reconstruct, reshape and resheet unsealed road with a 50mm overlay using Council approved flood blend as per the design drawing.

Richmond Valley Council has sought appropriately qualified and experienced tenderers to conduct the works.

The Engineering Plans are provided in Attachment A.

Description of the proposal

2.3 The proposal

Ainsworth Road is an unsealed rural road, with approximate AADT 28 vehicles per day, 9.1% heavy vehicles- usually cattle trucks on sale days. The road from CH4000 runs alongside Middle Creek. The trafficable road width varies from 3.2m to 4.2m wide. This site was impacted by a flood event, and Middle Creek has scoured and undermined the road by approximately 3m x 800m long. A 600 diameter Reinforced Concrete Pipe Culvert has segmented and slipped down the embankment. Geotechnical investigation of the embankment has been undertaken and used to inform the design.

A detailed work methodology for the proposed works is provided below in Section 3.4.

The road will remain open for the duration of works with delineation provided where works are deviated from current alignment & to provide separation between travel path & work area. Consultation with affected residents and primary producers has been ongoing during planning stages and notification will be provided once a work start date is set. A

site compound will be required and most likely located near the works area.

2.4 Design parameters

2.4.1 Design criteria

The proposed works have been designed in consideration of the following criteria:

Element	Key Design Criteria	Reference
AADT	28 vehicles per day	*N/A*
Design Speed	60 km/hr	*N/A*
Minimum Length	800m	*N/A*
Alignment	Alignment as shown on design drawings.	*N/A*
Access	Access to be provided for 12.5 m rigid truckand 12.2 m single axle trailer	*N/A*
Design Lanes	Single lane 3.0m	*N/A*
Carriageway width	as shown on design drawings.	AS5100.1:2017 Clause 13.4
Lane Width	3000mm	AS5100.1:2017 Clause 13.4
Shoulder width	as shown on design drawings.	AS5100.1 Clause 13.5
Longitudinal grade	Level (as shown on design drawings)	*NIA*
Crossfall	As shown on design drawings	NJA
Design vehicle	SM1600 design loading preferred. Council would adopt an alternative design with T44 design loading.	AS5100.2 Clause 7 Aust roads bridge design code Section 2 (1992)
Traffic Barriers Performance Level	Castellated 150mm kerb	AS 5100.1:2017 Section 14 Road Traffic Barriers and Appendix A {or Standard}
Materials	Various	N/A

2.4.2 Engineering constraints

Engineering constraints upon the proposed works include:

- Nature of high erodible banks compounded by flood damage sustained in AGRN960- March 2021 Flood.
- Provision of appropriate sediment controls working within a key fish habitat environment.

2.5 Construction Activities

All Construction activities will be undertaken by MSC Civil and done in accordance with their Environmental Management Plan and Proposed Methodology for the repairs on Ainsworth Road.

These documents are provided as Attachment E and Attachment F

2.5.1 Work methodology

The replacement works include (but not limited to):

- Replace 375 dia. RCP at CH16 with 600 dia. Class3 RRJ RCP with precast headwalls. Shape south swale from pipe outlet to energy dissipator
- Replace 600 dia. RCP at CH70 with 750 dia. Class3 RRJ RCP with precast headwalls. Install scour protection to pipe outlet
- Install scour protection to scour area between CH76- CH127
- Provide protection around existing mature trees, revegetate embankment. Excavate roadside swale on southern side to improve capacity,
- Reshape Existing Road to FSL less 0.15m and 50mm overlay with Council approved flood blend.
- Routine Grading on Ainsworth Road past this site has not been undertaken past CH4000 since the flood damage occurred. Rural grading with a 50mm overlay, 3% crown on the 3.9m wide road should be undertaken upon

completion of works from the end of extent of works to end of the road at CH9023.

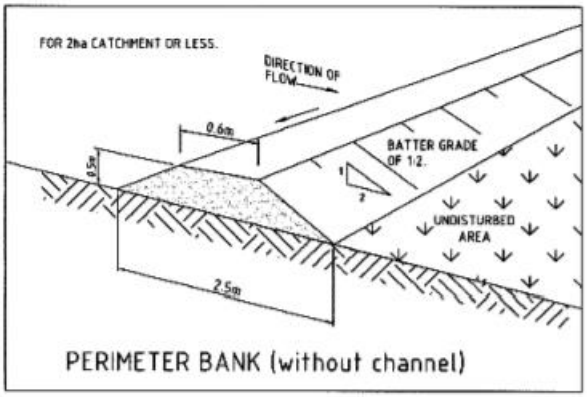
2.5.2 Plant and equipment

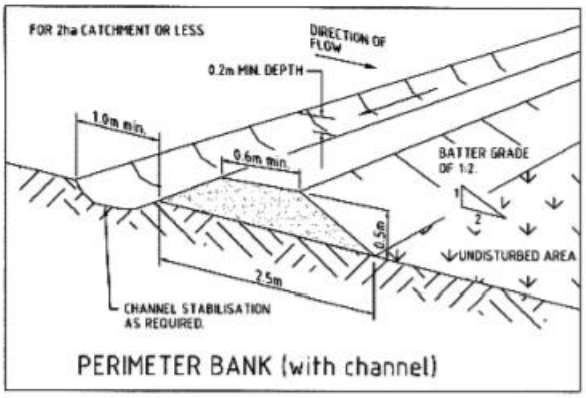
A variety of plant and equipment will be required for the proposed activity including, but not limited to:

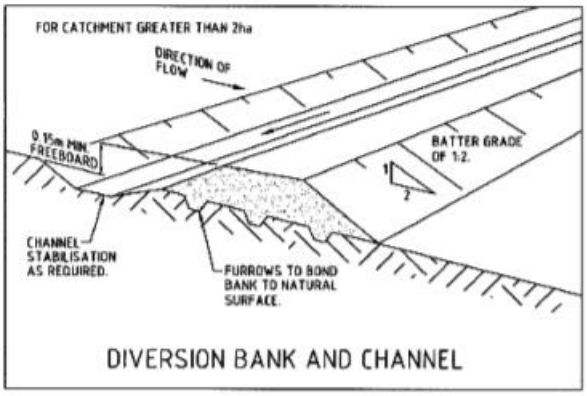
- Air compressor/s
- Diesel & petrol generator/s
- Toilet
- Site office
- Skid steer loaders
- Excavators 13 to 30 ton
- Backhoes
- Tip Trucks
- Handheld power tools
- Crane

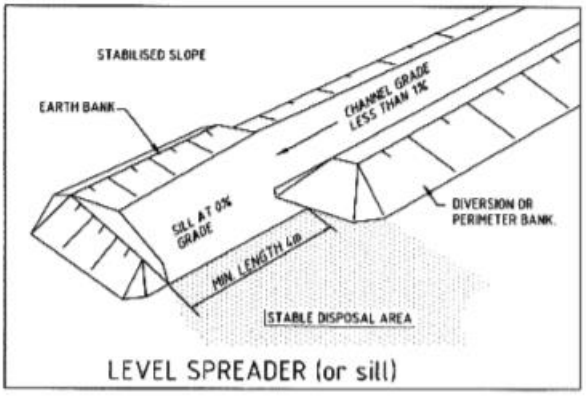
2.5.3 Earthworks

Earthworks are required during construction activities and the majority of works are located outside the highbank of the flood channel. Sediment and Erosion Control will be implemented in accordance with the "Blue Book" (Managing Urban Stormwater: Soils and Construction [4th Edition, Landcom, 2004]). All erosion and sediment control features will be inspected regularly, in particular after each rainfall event to ensure that they are structurally and functionally sound.









2.5.4 Source and quantity of materials

Materials involved in the construction will be ordered from suitable suppliers and be clean fill and brought into the storage areas and/or the work site by delivery vehicles as required.

2.5.5 Traffic management and access

The subject site is the Ainsworth Road. Access is off Mongogarie Road and is only accessed by familiar users who have been advised of the construction. Delineation of the site is sufficient to manage an AADT of 10 vehicles per day.

2.5.6 Working Hours

Construction activities would be undertaken in accordance with Environmental Planning and Assessment (COV/D-19 Development- Infrastructure Construction Work Days No. 2) Order 2020.

The Order applies to any approved public infrastructure project and permits weekend and public holiday works; however, construction sites must take all feasible and reasonable measures to minimise noise and noisy works like rock breaking, rock hammering, sheet piling or similar activities are not permitted on weekends and public holidays. If the contractor proposes to utilise the above order and conduct works outside of the normal construction hours below, it is still expected that they should notify surrounding residents of Sunday or Public Holiday works.

Normal Construction hours: Monday-Friday: 7am to 6pm. Saturday: 8am to 1pm. Sunday and Public Holidays: no work.

2.6 Ancillary facilities

A site compound will be located as determined by the contractor, within the existing road reserve, closed during construction to the north or south of the concrete pipe culvert. Equipment and facilities to be located within the site compound will be minimal and consist of a small site office and shipping container. The site compound installed as part of the project infrastructure will be kept in tidy condition. Any hazardous material like fuel and oils will be stored and kept under lock with appropriate material datasheets in accordance with regulations applicable to each substance and prescriptive SWMS for all activities relating to project works will be completed.

2.7 Public utility adjustment

The proposal does not require the adjustment or relocation of any public utilities. All public and private infrastructure in the area affected by the proposed works such as roads, driveways, fences, services will be maintained, protected and or re-instated as required.

A Dial Before You Dig search is attached as Attachment G.

2.8 Property acquisition

No property acquisition is required.

3 Statutory and planning framework

3.1 State Environmental Planning Policies (SEPP's)

3.1.1 State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&ISEPP)

State Environmental Planning Policy (Transport and Infrastructure) 2021 aims to facilitate the effective delivery of infrastructure across the State.

Clause 2.109 of T&ISEPP permits development on any land for the purpose of a road or road infrastructure to be carried out by or on behalf of a public authority without consent.

As the proposal is for the construction of a road and is to be carried out by RVC, within the existing road reserve it can be assessed under Part 5 of the Environmental Planning and Assessment Act 1979. Development consent from council is not required.

The T&ISEPP Infrastructure sections below are applicable:

Division 17 Roads and Traffic

(3) In this section and section 2.112, a reference to development for the purpose of road infrastructure facilities includes a reference to development for any of the following purposes if the development is in connection with a road or road infrastructure facilities.

(a) construction works whether or not in a heritage conservation areas), including:

(i) temporary buildings or facilities for the management of construction, if they are in or adjacent to a road corridor, and;

(ii) creation of embankments, and

(iii) extraction of extractive materials and stockpiling of those materials if –

(A) The extraction and stockpiling are ancillary to road construction, or

(B) The materials are used solely for road construction and the extraction and stockpiling take place in or adjacent to a road corridor, and

(iv) temporary crushing or concrete batching plants, if they are used solely for road construction and are on or adjacent to a road corridor

(v) temporary roads that are used solely during road construction

(b) emergency works or routine maintenance works;

(c) alterations or additions to an existing road (such as widening, narrowing, duplication or reconstruction of lanes, changing the alignment or strengthening of the road),

(d) environmental management works, if the works are in or adjacent to a road corridor.

The proposal is not located on land reserved under the National Parks and Wildlife Act 1974 and does not affect land or development regulated by State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental

Planning Policy No. 26 - Littoral Rainforests or State Environmental Planning Policy (Major Development) 2005. The subject site is not within area defined as Koala Habitat (SEPP44). The subject site is within area mapped as indicative flood prone.

Figure 2: Ainsworth Road Location

3.2 Local Environmental Plans

3.2.1 Richmond Valley Local Environmental Plan 2012

The proposal is located within the Richmond Valley Council Local Government Area (LGA) and is governed by the Richmond Valley Local Environmental Plan (RVLEP) 2012.

The proposed work site falls within the RU1 - Primary Production zone. Due to the provisions of the ISEPP, consent in accordance with the RVLEP 2012 is not required. The area is not mapped as having Acid Sulphate Soil

3.3 Commonwealth Legislation

3.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) a referral is required to the Australian Government for proposed actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land.

These are considered in Attachment C and Chapter 6 of the REF.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment.

An EPBC Act (Department of Environment and Energy) Protected Matter Report is provided in Attachment C. The proposed works are unlikely to impact upon any item listed in this report. Riverbank erosion has been identified and it is proposed to replant the riverbank area as part of site restoration.

3.4 Fisheries Management Act 1994

Fisheries NSW Mapping shows that the Myrtle Creek area is mapped as Key Fish Habitat- Northern Rivers with a fair freshwater fish community rating and threatened species listing for Purple Spotted Gudgeon and preliminary discussions with Fisheries have ascertained that a Fisheries Permit (Application Parts 2 & 4 of the Fisheries Management Act 1994- Other Works) is required. Fisheries have reviewed the design and provided feedback about the placement of culverts, proposed rock armoury and revegetation plan.

Figure 4: *Key Fish Habitat and Threatened Species Mapping Source: RVC GIS*

3.5 Asset Owner Approvals

Richmond Valley Council is the asset owner of the road and stormwater infrastructure assets identified within the project description. Council has engaged the services of MCS Civil to carry out restoration works subject to approval of REF and DPI fisheries permit requirements. This includes all works associated with stabilising the riverbank embankment, replacing the pipe culverts and re-instating the road surface to ensure the safety of road users.

3.6 Confirmation of statutory position

All relevant statutory planning instruments have been examined above and the proposal does not require approval under Part 4 of the EP&A Act.

Therefore, assessment and determination in accordance with Part 5 of the Act is appropriate for the proposal.

4 Stakeholder and community consultation

4.1 Consultation strategy

A consultation strategy is not required for the Proposal.

4.2 Aboriginal community involvement

A basic AHIMS search has been undertaken and is included in Attachment D. This search advised that no Aboriginal Sites or Aboriginal Places are recorded/declared in the location of the works.

4.3 T&ISEPP consultation

Part 2.2, Division 1 of the T&ISEPP contains provisions for public authorities including the consultation with local councils and other public authorities prior to certain types of works being undertaken. Given the nature of the proposal and the fact it is being undertaken by RVC, consultation under T&ISEPP is not triggered.

4.4 Government agency and stakeholder involvement

As RVC is the local roads authority, no government agency involvement is required aside from Transport for NSW Disaster Recovery Team as funding body for the proposed works. Residents in the area will be advised of the construction works. This will be carried out by door knocking and providing a letter with contact details for Council Project Manager and Site Construction Supervisor. It is anticipated that approximately four property owners may be impacted by the works.

4.5 Ongoing or future consultation

The residents and Essential Energy that live nearby will be notified by RVC regarding the works prior to the commencement.

5 Environmental Assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guideline Is an EIS required? (DUAP 1999) as required under clause 228(1)(b) of the Environmental Planning and Assessment Regulation 2000. Site specific safeguards are provided to ameliorate the identified potential impacts.

5.1 Ecology and Biodiversity

5.1.1 Desktop Review

5.1.1.1 BioNet Search

Searches were undertaken of the DPIE BioNet Atlas of NSW Wildlife on 30 August 2022 to identify threatened

species within 10 km of the site (refer to Attachment H). Records of one threatened flora species, habitat for 15 threatened ecological communities (TECs) (two of which are listed under the EPBC Act) and eight threatened fauna species listed under the BC Act (including four species also listed in the EPBC Act) occur within the search area.

5.1.1.2 EPBC Protected Matters Search

The Protected Matters Search Tool (PMST; refer to Attachment C) identified 70 threatened species (49 fauna and 21 flora) and four threatened ecological communities listed under the EPBC Act as being likely to occur or may occur within 10 km of the site. A total of 46 migratory species listed under the EPBC Act were identified within the search area.

5.1.1.3 Area of Outstanding Biodiversity Values

The site does not occur within an Area of Outstanding Biodiversity Value.

5.1.1.4 Wildlife Corridors

The site occurs within the Richmond Range Bungawalbyn regional mapped wildlife corridor as per Scotts (2003). Within a local context, the site provides good connectivity to the south and north, linking with forested vegetation across the broader landscape.

5.1.1.5 Biodiversity Values Map

The site occurs within land mapped as Biodiversity Value (Riparian Zone, refer to **Figure 4.1**) as per the Office of Environment and Heritage Biodiversity Value and Threshold Tool; accessed 31/08/2022. However, as this assessment is being undertaken as a Part 5 assessment of the EP&A Act this does not apply

Figure 4.1 The site (in blue) and the areas of Biodiversity Value marked in purple (source: OEH, 2022)

5.1.1.5 DPI Fisheries NSW Spatial Data Portal

Review of the DPI Fisheries NSW Spatial Data Portal maps Middle Creek at the site as Key Fish Habitat. Additionally, Purple Spotted Gudgeon Habitat is mapped approximately 3 km downstream of the site.

5.1.2 The Existing Environment

The site was assessed on the 31 August 2022, by GeoLINK ecologist Sam Smith. The site assessment utilised the following methodology:

- Vegetation assessment and mapping including identifying vegetation communities to plant community type (PCT).
- Targeted surveys for threatened flora (as identified in database searches).
- Identification of TECs
- Opportunistic survey off all fauna based on visual and aural observations.
- Identification and survey (by GPS) of any hollow-bearing trees, bird nest or other fauna habitat features.
- Targeted searches for Koala scats using the Spot Assessment Technique (SAT), as per Phillips & Callaghan (2011) with one SAT plot undertaken and opportunistic searches for Koala scats beneath mature trees.

5.1.2.1 Vegetation

One native vegetation community occurs at the site. Native vegetation is described at **Table 4.1** and aligned with plant community types (PCTs) in the BioNet Vegetation Classification system. The vegetation at the site is does not align with any TECs. Refer to **Plate 4.1** and **Plate 4.2** for photos of the PCT that occurs at the site.

Table 4.1 Plant Community Types

Plant Community Type	Comments
PCT 3427: Northern Hinterland Hills Bloodwood-Red Gum Grassy Forest The vegetation comprises of open forest dominated by Pink Bloodwood (*Corybia intermedia*) and Broad-leaved Apple (*Angophora subvelutina*), with occasional Forest Oak (*Allocasuarina torulosa*), Forest Red Gum (*Eucalyptus tereticornis*) and scattered Broad-leaved Paperbark (*Melaleuca quinquenervia*). The midstorey consists of Red Ash (*Alphitonia excelsa*), Green Wattle (*Acacia irrorata subsp. irrorata*), Curracabah (*Acacia concurrens*) and occasional Banskia (*Banksia integrifolia*). The midstorey is also features Lantana (*Lantana camara**) incursions at the edges. Groundcover on the is dominated by Kikuyu Grass (*Cenchrus clandestinus*),* Broad-leaved Paspalum (*Paspalum mandiocanum**) and Blue Billygoat Weed (*Ageratum houstonianum**) but does feature pockets of Blady Grass (*Imperata cylindrica*).	The vegetation along the south side adjacent Ainsworth Road is in moderate condition, with some weed incursions and impacts from cattle. The north side is in poor condition, from past clearing, flood damage, cattle, and extensive weed incursions.
*Denotes exotic species	

Plate 4.1 Example of PCT 3427 that occurs at the site

Plate 4.2 View of Lantana infestation within PCT 3427 at the site

5.1.2.2 Threatened Flora

No threatened flora were observed at the site.

Based on the desktop assessment and the habitat at the site, no threatened flora species are considered likely to occur at the site (refer to potential occurrence assessment in Attachment I).

5.1.2.3 Threatened Ecological Communities

No TECs occur at the site.

5.1.2.4 Waterways

Middle Creek runs adjacent the northern portion of site along Ainsworth Road. It features disturbance to the bank from previous flooding, past land clearing of its riparian zone and damage caused by cattle that graze through the area.

The remaining riparian vegetation consists of Forest Oak (*A. torulosa*) with exotic shrubs and ground cover species (refer to **Plate 4.3**).

Plate 4.3 View facing west of Middle Creek and riparian vegetation at the site

5.1.2.5 Priority Weeds

Two priority weed species listed in the Biosecurity Act 2015, Fireweed (*Senecio madagascariensis**) and Lantana (*Lantana camara**) occur at the site. Biosecurity measures for both these species are limited to “Must not be imported into State or sold”.

*Denotes exotic species

5.1.2.6 Fauna Habitat Values

The site provides habitat for a range of fauna species which would utilise similar areas of eucalypt forest and waterways in the locality. Habitat values at the site are summarised below:

- Dry sclerophyll forest on the site provides potential foraging (fruit, nectar, pollen, insect) resources for locally occurring avifauna, amphibians, reptiles, arboreal mammals, microbats and flying-foxes.
- Fallen timber and rocks occur throughout the site may provide habitat for reptiles and ground dwelling mammals.
- Middle Creek provides habitat for freshwater fish, amphibians and invertebrate as well as foraging resources for avifauna within the locality.
- During the site inspection a range of common fauna species were observed including Grey Fantail (*Rhipidura albiscapa*), Eastern Whipbird (*Psophodes olivaceus*), Torresian Crow (*Corvus orru*) and Eastern Dwarf Tree Frog (*Litoria fallax*).

5.1.2.7 Threatened Fauna

No threatened fauna species were confirmed at the site during the site inspection.

No Koala scats were detected while undergoing SAT surveys during the site inspection.

One migratory species listed in the EPBC Act, Rainbow Bee-eater (*Merops ornatus*) was observed at the site. While no nesting burrows were observed at the site, areas within the locality where exposed areas of sandy soil occur may provide nesting burrow habitat for the Rainbow Bee-eater. Safeguards for this species are address in **Section 5.1.4**.

Based on the desktop analysis and the habitat at the site, several threatened species have the potential to occur at the site (refer to Attachment I) and are summarised below in **Table 4.2**. Five-part tests of significance were prepared in accordance with Section 7.3 of the BC Act and seven-part test of significance in accordance with Section 22IJ of the FM Act for Southern Purple Spotted Gudgeon (refer to Attachment J and Attachment K).

Due to the scope of the proposal, the works are unlikely to result in significant impacts to any of the subject species. On this basis, it would be highly unlikely that an adverse effect on the life cycle of the subject species would occur such that a viable local population of the species is likely to be placed at risk of extinction.

Table 4.2 Threatened BC Act and FM Act listed fauna with a moderate likelihood of occurrence

Scientific Name	Common Name	BC Act	Likelihood of Occurrence
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	**Moderate:** Potential foraging habitat occurs at the site (Forest Oak trees).
Daphoenositta chrysoptera	Varied Sittella	V	**Moderate**: Potential foraging habitat occurs at the site. BioNet records in the locality
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V	
Phascolarctos cinereus	Koala	E	**Moderate**: Potential foraging habitat occurs at the site. Local BioNet records
Pteropus poliocephalus	Grey-headed Flying Fox	V	**Moderate**: Potential foraging habitat in the form of flower myrtaceous trees at the site. Camps located in the broader region outside site (as per the Flying-fox Camp Viewer, DAWE 2015)
Mogurnda adspersa	Southern Purple Spotted Gudgeon	E (FM Act)	**Moderate**: Potential foraging habitat occurs at the site (Middle Creek). DPI Fisheries Spatial Data Portal indicates habitat downstream of the site.
V = Vulnerable; E = Endangered			

5.1.3 Potential impacts

The proposal would have the following impacts on biodiversity:

- Loss of native vegetation including a maximum area of 0.21 ha of PCT 3427 for the proposed activity (this area is likely less due to the volume of exotic vegetation that is intermixed with native vegetation species).
- Disturbance and removal of other microhabitat features such as fallen logs and rocks.
- Potential disturbance to Middle Creek and the downstream environment from sedimentation.
- Potential for the spread or introduction of weed propagules.
- Potential for injury or mortality to fauna during clearing works.
- Short-term disturbance to fauna during construction.
- As Ainsworth Road is located in an isolated area, disturbance to fauna during ongoing operation will not be increased and would be remain as minor.

5.1.4 Safeguards and management measures:

1) The work area will be clearly delineated to minimise the extent of vegetation removal by trimming and/ or trampling.
2) Appropriate erosion and sediment control measures will be installed and maintained in accordance with the "Blue Book" (Managing Urban Stormwater: Soils and Construction [4th Edition, Landcom, 2004]).
3) Tree felling will be conducted by a suitably qualified professional who will perform fauna checks prior to felling and comply with RVC standard procedures.
4) Removal of native vegetation should be avoided where possible.
5) All Personnel shall be informed of the importance of flora and fauna management. Demarcation using approved flagging and boundary markers shall be used to protect areas containing significant flora and fauna habitat where there is a risk of damage, including waterways.
6) A pre-clearing survey by an ecologist shall be completed prior to removal of vegetation to ensure there is no fauna present or fauna habitat features that may have been established.
7) In the event a Koala is detected on the site, clearing would be suspended within 50 m of the animal until it voluntarily leaves (as confirmed by an ecologist).
8) A pre-clearing survey prior to clearing along the Middle Creek bank and riparian area to check for Rainbow Bee-eater nesting burrows that may have been establish prior to works beginning.
9) If Rainbow Bee-eater nest burrows are discovered during works, work in that area would be suspended and advice sought from an ecologist.
10) Ground disturbance will be done in a systematic manner to allow any potential fauna to escape.
11) Progressive rehabilitation of disturbed areas will be undertaken (in particularly the riparian zone of Middle Creek).
12) Implementation of staged erosion and sediment controls including haybales, bunding, silt curtains or hydrocarbon boom.
13) All erosion and sediment control features would be inspected regularly, in particular after each rainfall event to ensure that they are structurally and functionally sound.
14) No side-track is required which reduces waterway impact and risk of runoff or sediment entering the waterway.
15) Silt barriers will be provided during tree removal to ensure sediment that may be disturbed doesn't enter the waterway.
16) Give consideration to management of surface water runoff through sediment or evaporation ponds.
17) Measures will be introduced during construction to ensure the potential for the introduction of weed propagules to the site is minimised (e.g. vehicle washdown prior to being used at the site).

5.2 Traffic and Access

5.2.1 Existing environment

The subject site is an unformed, unmaintained Ainsworth Road, utilised by local residents, primary producers and essential services only. A TMP is not required, however the Contractor shall ensure that site delineation of hazards, signage and barricades are erected, replaced and maintained whilst under control of the site in a way that ensures safety of the general public. Spotters and warning signage may be required during movement of heavy vehicles on to site.

All signs, barriers, lights and other devices used on site for the purposes of this clause shall conform to the requirements of the current RTA "Traffic Control at Work Sites Manual" version 5.0 2018. The Contractor is to ensure that the safety of the general public is maintained at all times.

5.2.2 Criteria

The target for the proposal is to minimise impacts on vehicular and pedestrian traffic over the life of the project. In addition, no recorded traffic incidents or accidents as a consequence of project works would be a project objective. This is achieved by implementing the relevant safeguards and management measures listed below and outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.2.3 Potential impacts

Potential impacts of the proposal are managed by implementing the relevant safeguards and management measures listed below and outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.2.4 Safeguards and management measures:

1) A TCP is to be prepared in accordance with relevant guidelines to control public vehicles within the works area.
2) Traffic management shall be in accordance with the RTA's "Traffic control at Work Sites" and "AS1742.3 Manual of Uniform Traffic Control Devices Part 3: Traffic control devices for works on roads".
3) Residents along the Crown Road should be notified of the works and delineation measures.

5.3 Topography, Geology and Soils

5.3.1 Existing environment

A search of the RVC GIS shows the area is not known to compromise contaminated soils.

A search of the NSW Department of Primary Industries Cattle Dip Site Locator (http://www.dpi.nsw.gov.au/agricultu re/livestock/health/specific/cattle/ticks/cattle-dip-site-locator) did not identify any cattle dip sites in the immediate locality of the works site.

The Geotechnical Report is provided in Attachment B.

5.3.2 Criteria

Under Section 120 of the Protection of the Environment Operations Act 1997 (POEO Act) it is an offence to pollute or cause or permit pollution of waterways. Water pollution under the POEO Act includes introducing sediment or placing such material where it is likely to be washed or blown into waterways, stormwater systems or groundwater. It is also an offence, under Section 142 of the POEO Act, to pollute the land. Further, it is an offence to wilfully or negligently cause any substance to leak, spill or otherwise escape in a manner that is likely to harm the environment (S.116). The criterion would be achieved by implementing relevant safeguards and management measures outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.3.3 Potential impacts

Proposed works would not significantly alter topography or expose potential or actual contaminated soils. Furthermore, the works in this location are within the road reserve.

Potential impacts could occur due to erosion of exposed soils and consequent sedimentation of the flood channel. Pollution of the land due to inadequate storage or use of chemicals or any other pollutants is also possible, however can be mitigated by Safe Guard measures outlined in Clause 6.3.4 below.

5.3.4 Safeguards and management measures;

1) Wastes generated during construction will be stored and disposed of at approved waste facilities.
2) All Sediment and Erosion Control will be implemented in accordance with the "Blue Book" (Managing Urban Stormwater: Soils and Construction [4th Edition, Landcom, 2004]). All erosion and sediment control features would be inspected regularly, in particular after each rainfall event to ensure that they are structurally and functionally sound. All erosion and sediment control will be staged for base slab and wing wall construction and will include methods such as hay bales.
3) Any hazardous material like fuel and oils will be stored and kept under lock with appropriate material datasheets MSDS or SDS in accordance with regulations applicable to each substance, and prescriptive SWMS, for all activities relating to project works will be completed. Appropriate PPE will be used.

5.4 Water Quality

5.4.1 Existing environment

The works are located within Ainsworth road adjacent to middle creek. A new batter stabilization of rock boulders will be completed compliant with current standards and drainage upgraded comprising of concrete RCPs, wing walls and scouring protection complying relevant standards will reduce risk of erosion and soil infiltration into the waterway in the long term.

5.4.2 Criteria

It is an offence under Section 120 of the POEO Act to pollute or cause or permit pollution of waterways. Water pollution under the POEO Act includes introducing any contaminant or placing such material where it is likely to be washed or blown into waterways, stormwater systems or groundwater. The criterion would be achieved by implementing relevant safeguards and management measures outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.4.3 Potential impacts

The proposal poses a potential risk to water quality if contaminants enter local waterways. Potential contaminants include construction materials, general titter, sediment, oil, fuel and other lubricants from machinery. There is a risk of bank erosion and sedimentation of the waterway during works,

5.4.4 Safeguards and management measures:

1) Fuels and chemicals will be stored in appropriately bunded areas.
2) Any re-fuelling shall occur within an appropriately bunded area greater than 20 meters from the flood channel bank.
3) All plant will be kept in good working order.
4) Temporary compound and stockpile areas will be protected with appropriate erosion and sediment controls outlined in the concept drawing Figure l.
5) Works would not be undertaken during periods of heavy rainfall.
6) Works would be completed promptly to minimise the exposure period of the disturbed area.
7) A spill containment kit will be kept on-site at all times.
8) Design considerations have sought to locate base slab
9) Sediment and Erosion Control will be implemented in accordance with the "Blue Book" (Managing Urban Stormwater: Soils and Construction [4th Edition, Landcom, 2004)).
10) All erosion and sediment control will be staged for base slab and wing wall construction. Use of haybales, silt curtains, bunding or hydrocarbon boom will be ascertained on site during construction by the contractor.
11) Implement erosion and sediment controls by way of floating sediment control if heavy rain fills the creek.
12) All erosion and sediment control features would be inspected regularly, in particular after each rainfall event to ensure that they are structurally and functionally sound.
13) Put controls in place to ensure construction materials shall not be placed in drainage lines
14) No side track is required which reduces waterway impact and risk of runoff or sediment entering the waterway.
15) During the demolition of the existing bridge abutments the EMP states geofabric will be used under the bridge to contain/catch any loose timber preventing it from entering the flood channel.
16) Give consideration to management of surface water runoff through sediment or evaporation ponds.
17) Ensure strict protocols are implemented to prevent and manage leaks or spills or hydrocarbons.
18) All Personnel shall be informed of the importance of flora and fauna management and need for demarcation using approved flagging and boundary to protect areas containing significant flora and fauna habitat where there is a risk of damage if identified during the works.

5.5 Air Quality

5.5.1 Existing environment

No specific analysis of the air quality of the locality has been undertaken but due to its rural location and the predominant land use it is likely to be good, with some dust from the gravel road likely during times of dry conditions. During construction, some short-term localised impacts on air quality could be expected. These impacts are likely to be caused by emissions and generation of dust during the operation of plant and equipment. Providing that the appropriate safeguards are implemented, it is not expected that there would be any significant adverse impact on air quality during construction.

5.5.2 Criteria

Sections 124 to 126 of the POEO Act require businesses to maintain and operate equipment and deal with materials in a proper and efficient manner at all times to prevent the emission of impurities of any kind into the air.

The most suitable performance criterion for air quality is to minimise air borne pollution at the site during works. This is achieved by implementing the relevant safeguards and management measures listed below and outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.5.3 Potential impacts

There is a risk of the release of various airborne contaminants during project works such as dust, vehicle and other machinery emissions etc. Construction vehicle and dust emissions would be the main source of air pollutants. There would be increases in the local incidence of dust due to use of heavy plant and machinery. These adverse impacts would be short term and localised and controlled according to best management practices, and EPA compliance levels.

There may be some potential to discern some odour from products such as adhesives and the like during their application. However, this is not expected to be extensive or of long duration.

Any odour from construction equipment and activities is not expected to have an adverse environmental impact. Dust emissions would be minimised by adoption of appropriate dust suppression techniques. This would include but not necessarily be limited to, spraying of water on dust affected areas during dry windy weather.

5.5.4 Safeguards and management measures

1) Vehicles and all fuel-powered machinery and equipment would be maintained in order to meet the requirements of the Protection of the Environment Operations Act 1997.
2) Plant will be kept in good working order and operate within approved working times.
3) Debris and wastes would be cleaned from the construction area as soon as practical to ensure light-weight material is not disseminated by wind gusts.
4) No burning of timber or other wastes would occur onsite.
5) If winds are high and works are creating high levels of dust that are likely to create a safety hazard to traffic or personnel, works would be modified or ceased until Dust Control Measures such as dampening of the work site would be employed where appropriate.
6) Watering of the road will occur to suppress dust and aid in compaction where required.

5.6 Noise and Vibration

5.6.1 Existing environment

The existing road environment is that of an unsealed rural road providing access to rural properties including rural dwellings, farm paddocks, cropping sites and tea tree plantations.

Noise data on the site is not available, however, it is expected the area would sustain a moderate level of noise given the rural nature of the road, and noise generated by farm and plantation machinery and operations. An estimate of the background noise levels at the site is 75 to 89 dB(A) based on average street traffic at 40 km/h, 7 m away and heavy truck at 40 km/h, 7m away (RTA Environmental Noise Management Manual 2001).

Noise from machinery is not expected to be significantly greater than normal noise levels from a vehicle (e.g. truck). Therefore, it is not considered that construction noise will exceed the background noise level as detailed above. Based on the noise levels described above, the following noise criteria from the EPA Environmental Noise Control Manual (1999) is applicable to the proposal - Background plus lOdB (A) for a cumulative period of noise exposure between four weeks and 26 weeks.

The works will be undertaken during normal daytime hours. During this period, activities that may generate noise would be undertaken and thus are unlikely to breach the above criteria. Therefore, this short-term construction noise is unlikely to impact upon health concerns of residents in the wider area.

5.6.2 Criteria

The most suitable performance for noise and vibration is to minimise excessive noise for surrounding residents by working within approved work hours. The criterion would be achieved by implementing relevant safeguards and management measures outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.6.3 Potential impacts

Construction Noise Levels may exceed acceptable noise levels in the locality and vibration may displace fauna temporarily, however sufficient habitat is available in adjoining sites for this to have minimal impact.

5.6.4 Safeguards and management measures

The Site Supervisor will be required to minimise noise outputs through the use of the best practice and high-quality plant and equipment and compliance with EPA requirements.

5.7 Landscape/Visual

5.7.1 Existing environment

The visual amenity of the area is characterised as a rural landscape dominated with grazing paddocks, cropping, farm plantations and rural properties. The bridge is located approximately 11.9km from

Summerland Way and is generally orientated in a north-west to south-east direction. The proposed works will not affect the long-term visual appearance of the locality as the proposal seeks to replace a damaged structure which maintains the existing alignment.

5.7.2 2 Criteria

The target for the proposal is no long-term effect on the existing visual landscape.

5.7.3 Potential impacts

Proposed works would temporarily alter the nature of the existing vista (through the erection of the site compound and exposed soil etc.) but it is unlikely to significantly negatively impact upon it.

5.7.4 4 Safeguards and management measures

All working areas are to be maintained and kept free of rubbish and cleaned up at the end of each working day.

5.8 Aboriginal Heritage

5.8.1 Existing environment

A basic Aboriginal Heritage Information Management System (AHIMS) search has been undertaken. Results of this search indicated that there are no sites recorded within or near the site of the proposed bridge replacement works (refer Attachment D). Should any items or places of significance be located, RVC will cease work and the relevant Council staff heritage officer will inform and liaise with the Local Aboriginal Land Council (LALC).

5.8.2 Criteria

The most suitable criteria are for no items of Aboriginal Heritage to be impacted upon during the proposed works. This would be achieved by the implementation of the safeguards and management measures below and outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.8.3 Potential impacts

Damage to Aboriginal heritage items could result from the proposed works if any such items are uncovered. However, the basic AHIMS search indicated that the likelihood of an Aboriginal heritage item being present at the site is low. Safeguards and management measures are provided to ensure that if any items of Aboriginal heritage are uncovered during the works are not significantly affected.

5.8.4 Safeguards and management measures

In the event that any Aboriginal items of significance are located during the works, all work would cease in the vicinity of the artefact and the Councils Heritage Officer and Office of Environment and Heritage would be contacted immediately.

5.9 Non - Aboriginal Heritage

5.9.1 Existing environment

RVC GIS Heritage development planning layer was consulted in relation to heritage sites and items. Results of this search indicated that there are no sites were recorded within or near the site of the proposed bridge replacement works.

5.9.2 Criteria

The most suitable criteria is for no items of Non - Aboriginal Heritage to be impacted upon during the proposed works. The criterion would be achieved by implementing relevant safeguards and management measures outlined in Section 4- Risk and Identification Assessment of MCS Construction Environment Management Plan.

5.9.3 Potential impacts

The Proposal is not expected to impact upon items of Non - Aboriginal Heritage as none were identified within or near the subject site.

5.9.4 Safeguards and management measures

In the event that heritage items are located during the works all works will cease immediately and Council's Heritage Adviser or Heritage Council shall be contacted.

5.10 Socio-economic

5.10.1 Existing environment

The predominant land use in the area is rural and dominated by grazing paddocks, cropping, farm plantations and rural properties. The site is located approximately 7km from Mongogarie Road. The Ainsworth Road is on an important thoroughfare used to access forestry, cropping and farmland.

5.10.2 Criteria

The most suitable criteria is that socio-economic value of the area is maintained and/or enhanced. The nature of the proposal is such that the socio-economic values will be maintained.

5.10.3 Potential impacts

- Potential minor and short-term changes in air quality;
- Potential short-term increase in noise;
- Improvements in resilience of concrete box culvert infrastructure and road approaches;
- Improvements in flood channel operation with improved concrete box culvert infrastructure and scouring protection;
- Improvement in productivity via removal of current 30km detour required due to the damaged bridge.

5.10.4 Safeguards and management measures

Road traffic user access and safety during works are to be managed in accordance with an approved Traffic Management Plan, notification and communication.

Noise impacts would be managed through the implementation of the range of mitigation measures described in Section 6.6.4.

5.11 Waste

5.11.1 Existing environment

The main type of waste currently located in the area include roadside litter and debris from passing vehicles. Overall, the site is relatively clean.

5.11.2 Criteria

The most suitable performance criteria are that any wastes generated as a result of the Proposal is minimized and recycled where possible.

5.11.3 Potential impacts

Potential wastes generated from the Proposal include:

- Excess construction material;
- Dust and paint fragments from demolition work; and
- Garbage.

5.11.4 Safeguards and management measures

1) Unnecessary resource consumption would be avoided as a priority through appropriate management and planning.
2) Site generated waste will be collected and removed from the site to an approved waste disposal facility daily.
3) Recycled material will be used where possible.
4) If any contaminated waste is identified it will be removed to an approved EPA facility for the purpose of disposal of contaminated waste. All necessary permits for removal, transportation and disposal of contaminated waste will be obtained prior to any works being undertaken.
5) Compliance with the Protection of the Environmental Operations Act 1996:
    a) To ensure proper storage, handling and disposal of hazardous material
    b) To minimize the impact of waste disposal on the local and regional environment and prevent pollution of the air, land and water.
    c) To collect, segregate, transport, treat and dispose of wastes in an environmentally acceptable manner in accordance with the relevant legislation; and
    d) To ensure that the transport, handling and storage of hazardous materials are in accordance with the Dangerous Goods Safety Act 2004, the Dangerous Goods Safety Regulations 2007 and associated applicable codes, guidelines and Australian Standards and the Client's Standard Specification.

5.12 Climate Change

5.12.1 Existing environment

The closest weather station to the Proposal site is located at Casino. The climate of the region is characterised by warm to hot (Average Mean Temperatures: 18 - 31 •q summers and mild winters (Average Mean Temperatures: 7 - 22 ·q. The annual average rainfall is 1100mm, with the wettest months from December to March (http:www.bom.gov.au/).

5.12.2 Criteria

The target for the proposal with respect to climate change is no discernible input to the progress of climate change from the project.

5.12.3 Potential impacts

The proposal has little likelihood of significantly contributing to or altering the course of the currently accepted progress of global climate change.

5.12.4 Safeguards and management measures

Reduction in the use of vehicles and other greenhouse gas emitting machinery, rationalization of the use of all resources for the project and effective management of waste generated.

5.13 Cumulative Impacts

Under Clause 228 of the EP&A Regulation 2000, any cumulative environmental effect with other existing or likely future activities must be taken into account when assessing the impact of an activity for the purposes of Part 5 of the EP&A Act 1979.

The Proposal is expected to add to a number of cumulative impacts including resource consumption and generation of greenhouse gas emissions (e.g. through operation of vehicles and equipment, extraction processes to obtain material, etc.). However, the extensive mitigation measures stated within Section 6 and the choice of methodology for completion of the Proposal aim to minimize the extent to which the proposal contributes to cumulative adverse

environmental impacts.

5.14 Summary of beneficial effects

- The Proposal meets the ongoing commitment by Richmond Valley Council to provide an adequate level of road infrastructure;
- The rectification of the damaged carriageway & drainage infrastructure along Ainsworth Road to current engineering standards will improve road safety for road users and safe guard against potential flood impacts;
- The new structure will contribute to positive socio-economic outcomes for the area and increase Ainsworths Road maintenance and flood immunity perspectives

5.15 Summary of adverse effects

- Short term increases in noise levels;
- Increased potential for short-term pollution of the environment through dust, airborne particles, littering and waste production.

6 Environmental management

6.1 Environmental management plans (or system)

All works shall be delivered in accordance with a Construction Environmental Management Plan (CEMP). An CEMP has been developed, reviewed and approved prior to any works/activities commencing and should include an Erosion and Sedimentation Control Plan. The CEMP shall incorporate any agency/Council requirements, all relevant Conditions of Approval and safeguards detailed in the REF. These must be implemented and complied with throughout all stages of the project. The CEMP shall be submitted to the relevant RVC Council officer for review and approval prior to construction works.

All construction staff and site personnel must be made aware of their environmental responsibilities and safeguard measures from the REF, Council Specifications and CEMP to minimise environmental impacts.

6.2 Licensing and approvals

The proposal does not require any specific licenses or other approvals.

7 Conclusion

7.1 Justification

The proposal is justified as it seeks to repair and stabilise the Ainsworth Road embankments. The proposal can be undertaken without any significant adverse environmental impacts and will provide a positive socio-economic impact to the community.

7.2 Ecologically sustainable development

7.2.1 Precautionary principle

A range of options were evaluated for the repair of Ainsworth Road embankment. The evaluation of options and the assessment of the preferred option have concentrated on avoiding irreversible impacts on the environment wherever possible.

Conservative, worst-case scenarios have been addressed in this REF to ensure a precautionary approach has been taken in the environmental assessment. The environmental impacts of the proposal would be minimal due to the extensive mitigation measures identified in Sections 6 and 7.

7.2.2 Intergenerational equity

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 defines inter-generational equity as "the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations".

The Proposal would not significantly impact upon threatened species and EEC's, therefore the local biodiversity values will not be adversely impacted upon. The proposal would provide long term improvements in road safety and safeguards against flooding impacts. The economic and social disruption resulting during the Proposal would be temporary in nature.

The Proposal will result in protecting the longevity of the road asset. Issues that have potential long-term implications, such as consumption of resources, waste disposal, impacts of visual amenity and water quality have been avoided and minimised as much as possible through development and design of the proposal and the application of best practice management measures.

7.2.3 Conservation of biological diversity and ecological integrity

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 states that that "conservation of biological diversity and ecological integrity should be a fundamental consideration".

The proposal has been developed with regard to the potential impacts on the ecology of the local area and has sought to avoid and minimise biodiversity impacts as much as possible. Safeguards and management measures outlined in this REF have been designed specifically to ensure any adverse impacts associated with the construction of the proposal are minimised and incorporate best practice principles.

7.2.4 Improved valuation, pricing and incentive mechanisms

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 lists the following principles for improved valuation, pricing and incentive mechanisms that were considered as part of this REF:

"(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems."

Environmental and social factors were a key consideration in establishing the need for the project and preferred option selection and the value placed on these factors is evident in the environmental assessment included in this REF. Functional and economic considerations were also important in option selection and during the development of the proposal and although dollar value cost remained a key consideration, all design decisions and proposed safeguards were based on an appropriate balance of environmental, social, functional and cost criteria.

7.3 Conclusion

The proposed repair of the Ainsworth Road is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some minor impacts on air quality, noise and vibration and traffic and access, and vegetation as removal of trees are required to ensure structural integrity of the culvert approaches.

Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal will improve the resiliency of the road asset by repair flood damage by installing rock boulders and scour protection along the road embankment, replacing culverts reshaping swales and reconstructing, reshaping and re-sheeting the unsealed road. So, on balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for approval to be sought for the proposal under Part 4 of the EP&A Act. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the Threatened Species Conservation Act 1995 and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance.

It has been identified that the Middle Creek area is a Key Fish Habitat and that a Fisheries Permit (Application Parts 2 & 4 of the Fisheries Management Act 1994- Other Works) is required. Plans have been put in place via the design and rock armoury and planting, as well as through the EMP to limit the impact of the works on the local waterways. Fisheries have reviewed the design and provided positive feedback about the culvert position, proposed rock armoury and revegetation plan. This REF will be used to support the Fisheries Permit Application.

References

Department of Agriculture, Water and Environment (Cth) (2020). National Flying-fox Monitoring Viewer. [Accessed 1/09/2022].

Phillips S. & Callaghan J. (2011). *The Spot Assessment Technique: A tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus*. BioLINK Ecological Consultants, Uki, NSW.

Scotts, D. (2003). *Key Habitats and Corridors for Forest Fauna. Occasional Paper 32.* NSW NPWS.

Attachment Listing:

- Attachment A: For Construction Plans
- Attachment B: Geotechnical Report
- Attachment C: EPBC Act (Department of Environment and Energy) Protected Matter Report
- Attachment D: Aboriginal Heritage Information Management System (AHIMS) Search
- Attachment E: Environmental Management Plan
- Attachment F: Proposed Methodology
- Attachment G: Dial Before You Dig (DBYD) Dig and Site Enquiry
- Attachment H: Bionet Database Searches
- Attachment I: Threatened Species Potential Occurrence
- Attachment J: Five Part Test of Significance
- Attachment K: Seven Part Test of Significance (FM Act)

Attachment A

For Construction Plans

RICHMOND VALLEY COUNCIL
Ainsworth Road Embankment Stabilisation
Ainsworth Road, Mongogarie NSW 2470

Locality Plan

Drawing Schedule

Dwg No.	Title	Revision
3791/C201	Cover Sheet, Locality Plan and Drawing Schedule	C
3791/C202	Existing Site Layout	C
3791/C210	General Arrangement Plan	C
3791/C220	Longitudinal Section Ainsworth Road	C
3791/C221	Cross Sections - Ainsworth Road Sheet 1 of 3	C
3791/C222	Cross Sections - Ainsworth Road Sheet 2 of 3	C
3791/C223	Cross Sections - Ainsworth Road Sheet 3 of 3	C
3791/C224	Cross Sections - Swales	C
3791/C230	Stormwater Layout and Typical Swale Cross Sections	C
3791/C231	Stormwater Longitudinal Sections and Trenching Detail	C
3791/C240	General Notes	C
3791/C241	Typical Details	C
3791/C250	Erosion and Sediment Control Plan Layout	C
3791/C251	Erosion and Sediment Control Plan Details and Notes	C

FOR CONSTRUCTION

Rev.	Description	Date	Des.	App.	Chk.
C	Redesign at Council request	2/09/2022	JLC	BWH	BWH
B	Edits to the plan set	1/09/2021	JLC	BWH	BWH
A	Updated to gabion retaining	14/07/2021	JLC	BWH	BWH

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Project Title

Ainsworth Rd Embankment Stabilisation

Client

Richmond Valley Council

Designed	JLC	Drawn	JLC	Checked	BWH
Approved	BWH	Date	11/02/2021		
XREFs					
Scale	metres	Not To Scale			

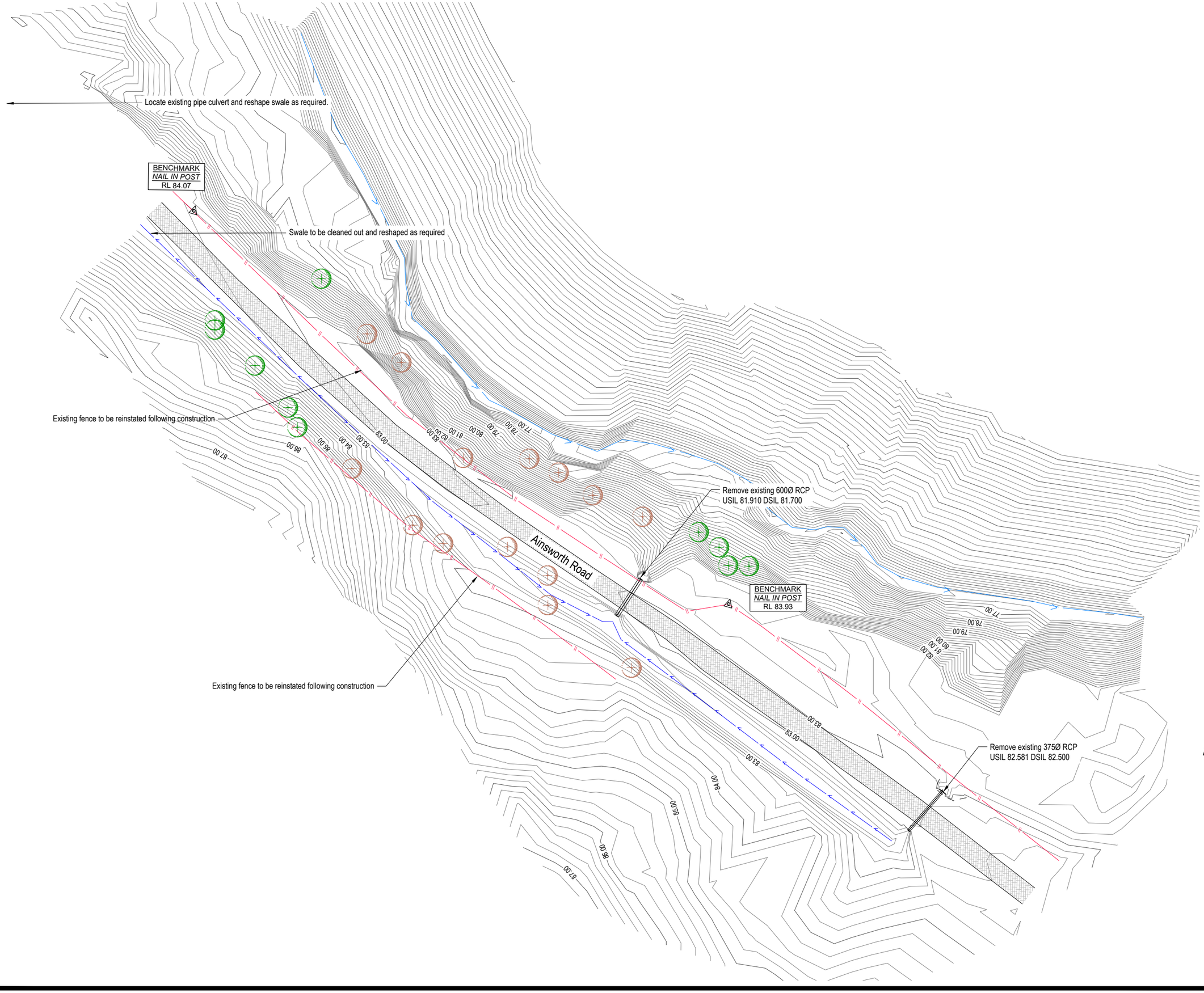
Drawing Title

Cover Sheet, Locality Plan and Drawing Schedule

3791-1044

Drawing Number 3791/C201

Revision C



LEGEND

- Gravel road
- Fence
- Creek
- Swale
- Tree
- Tree to be removed
- Survey mark

Existing contours are at 0.2m intervals

Notes:

1. Existing contours on the northern side of the creek line are approximate only.

FOR CONSTRUCTION

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Approved	BWH	Date 11/02/2021	
XREFs			

Scale

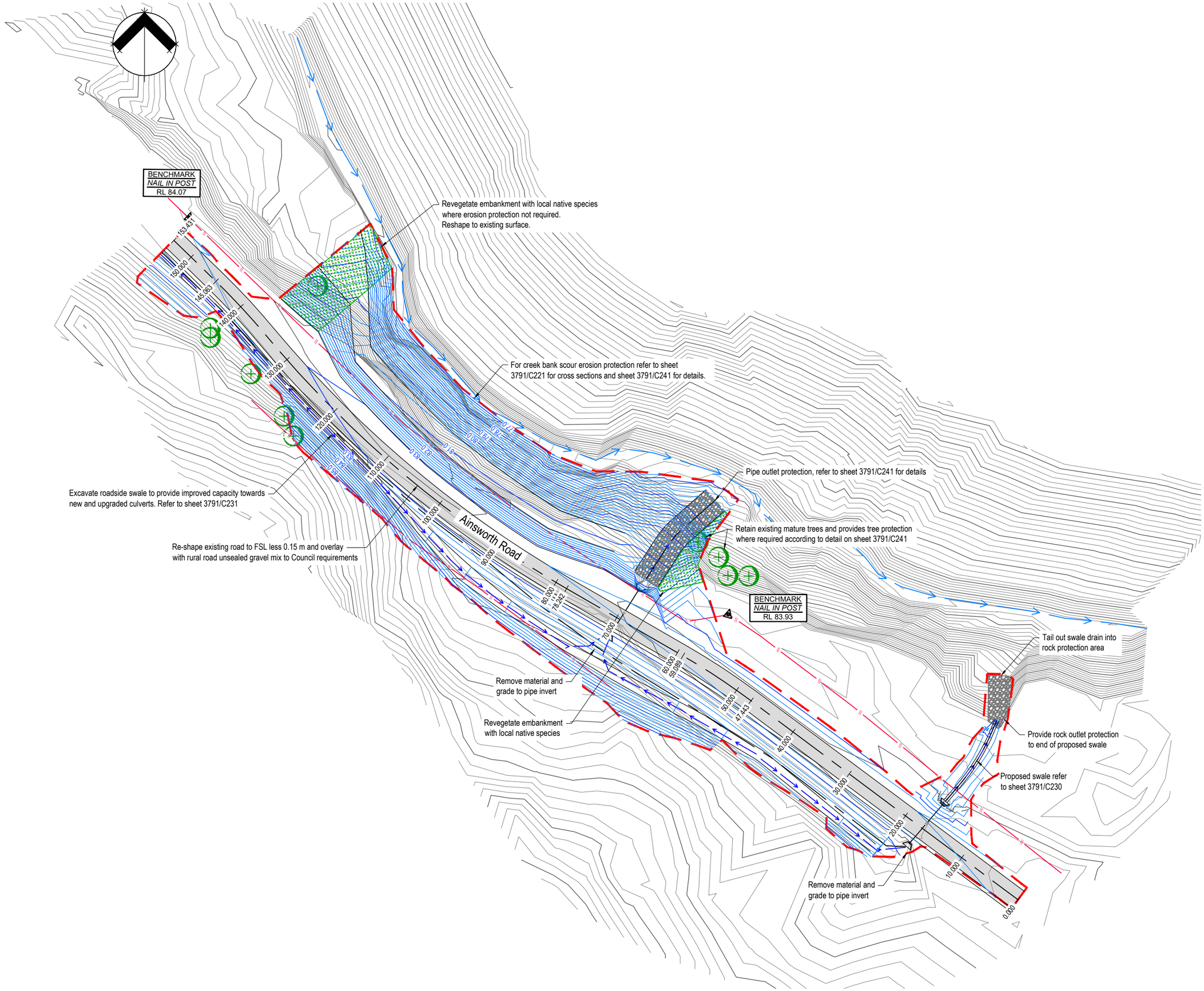
metres 0 2.5 5 7.5 10 12.5

Drawing Title

Existing Site Layout

3791-1045

Drawing Number 3791/C202 *Revision* C



LEGEND (Existing)

- Fence
- Creek
- Tree
- Survey mark

LEGEND (Proposed)

- Road
- Rock embankment protection
- Revegetation areas
- Extent of works
- Stormwater pipe (D)
- Swale

Existing and design contours are at 0.2m intervals

Notes:

1. Existing contours on the northern side of the creek line are approximate only.

FOR CONSTRUCTION

Rev.	Description	Date	Des.	App.	Chk.
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Approved	BWH	Date 11/02/2021	
XREFs			

Scale

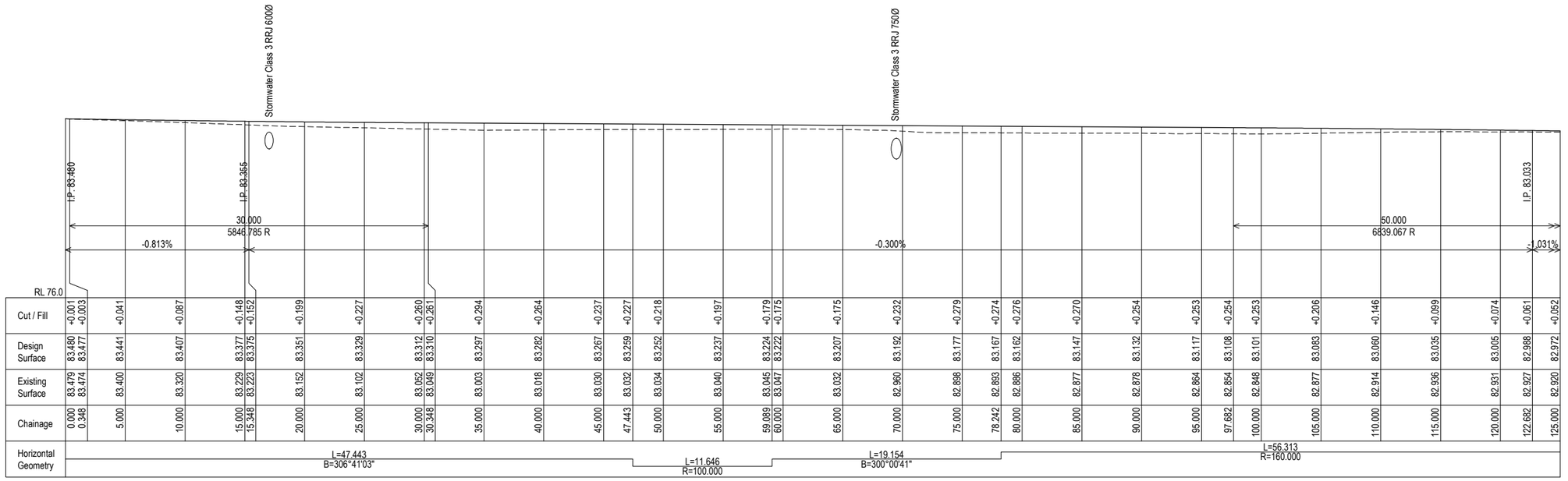
metres 0 2.5 5 7.5 10 12.5

Drawing Title

General Arrangement Plan

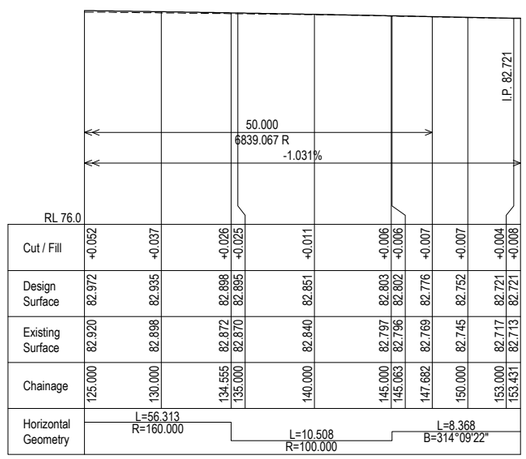
Drawing Number 3791/C210

Revision C



Longitudinal Section Ch 0.000 to Ch 125.000

Horizontal Scale A Vertical Scale B



Longitudinal Section Ch 125.000 to Ch 153.431

Horizontal Scale A Vertical Scale B

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Richmond Valley Council

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Approved	BWH	Date	11/02/2021		
XREFs					

Scale

A metres 0 2 4 6 8 10

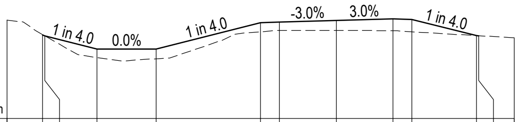
B 0 1 2 3 4 5

Drawing Title

Longitudinal Section
Ainsworth Road

3791-1047

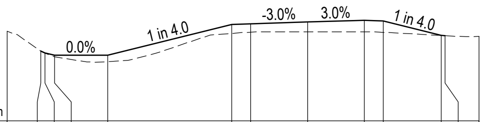
Drawing Number 3791/C220 *Revision* C



RL80.7m

Cut / Fill		-0.011	0.000	0.227	0.258	0.237	0.220	0.264	0.317	0.327	0.000	0.000	
DESIGN		82.898	82.877	82.531	82.531	83.222	83.237	83.282	83.327	83.312	82.883	82.880	
EXISTING	83.291	82.909	82.877	82.304	82.273	82.985	83.017	83.018	83.009	82.985	82.883	82.880	82.828
OFFSET	-8.710	-7.766	-7.710	-6.326	-4.761	-2.000	-1.500	0.000	1.500	2.000	3.713	3.773	4.713

Ch 40.000 m
Ainsworth Road



RL80.7m

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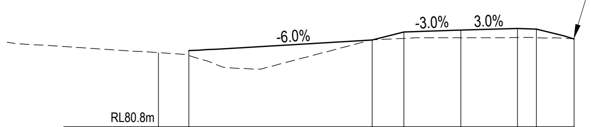
DESIGN		82.545	82.494	82.431	82.431	83.252	83.267	83.312	83.357	83.342	82.957	82.952	
EXISTING	83.066	82.544	82.494	82.391	82.264	83.012	83.043	83.052	83.054	83.040	82.957	82.952	82.934
OFFSET	-7.941	-7.051	-6.941	-6.688	-5.281	-2.000	-1.500	0.000	1.500	2.000	3.537	3.638	4.537

Ch 30.000 m
Ainsworth Road

Refer to SW pipe longitudinal section on sheet 3791/C231



RL80.8m

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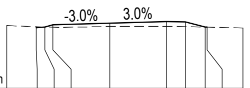
EXISTING	82.756	82.679	83.096	83.135	83.152	83.155	83.149	83.127
OFFSET	-8.000	-7.196	-2.340	-1.500	0.000	1.500	2.000	3.000

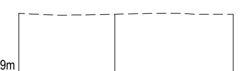
Ch 20.000 m
Ainsworth Road



RL81.7m

Cut / Fill		-0.022	0.000	0.060	0.087	0.128	0.119	0.000	0.000	
DESIGN		83.292	83.307	83.362	83.407	83.452	83.437	83.305	83.304	
EXISTING	83.344	83.313	83.307	83.302	83.320	83.324	83.318	83.305	83.304	83.281
OFFSET	-2.718	-1.948	-1.718	-1.500	0.000	1.500	2.000	2.527	2.581	3.527

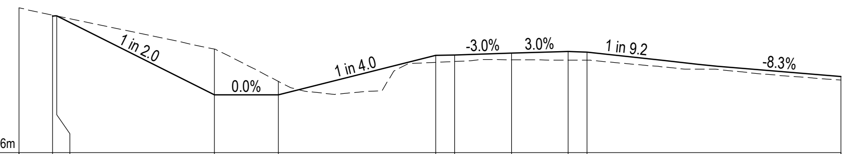
Ch 10.000 m
Ainsworth Road



RL81.9m

Cut / Fill			
DESIGN			
EXISTING	83.501	83.479	83.474
OFFSET	-2.539	0.000	3.137

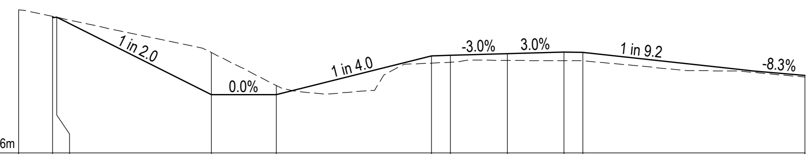
Ch 0.000 m
Ainsworth Road



RL80.6m

Cut / Fill		-0.025	0.000	-1.211	-0.357	0.183	0.175	0.175	0.227	0.214	0.095
DESIGN		84.202	84.205	82.120	82.120	83.162	83.177	83.222	83.267	83.252	82.606
EXISTING	84.416	84.227	84.205	83.332	82.477	82.979	83.002	83.047	83.040	83.037	82.511
OFFSET	-13.034	-12.142	-12.034	-7.865	-6.165	-2.000	-1.500	0.000	1.500	2.000	8.723

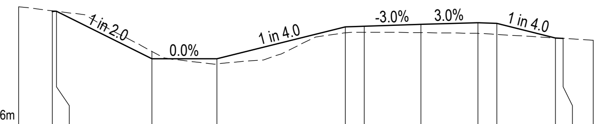
Ch 60.000 m
Ainsworth Road



RL80.6m

Cut / Fill		-0.030	0.000	-1.115	-0.242	0.191	0.183	0.179	0.233	0.221	0.043
DESIGN		84.178	84.185	82.137	82.137	83.164	83.179	83.224	83.269	83.254	82.651
EXISTING	84.382	84.208	84.185	83.252	82.380	82.974	82.997	83.045	83.036	83.034	82.609
OFFSET	-12.921	-12.028	-11.921	-7.826	-6.108	-2.000	-1.500	0.000	1.500	2.000	7.879

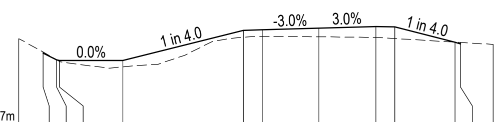
Ch 59.089 m
Ainsworth Road



RL80.6m

Cut / Fill		-0.017	0.000	-0.194	0.137	0.164	0.161	0.218	0.281	0.295	0.000	-0.001	
DESIGN		83.599	83.602	82.343	82.343	83.192	83.207	83.252	83.297	83.282	82.894	82.881	
EXISTING	83.724	83.616	83.602	82.537	82.205	83.028	83.046	83.034	83.016	82.986	82.894	82.882	82.835
OFFSET	-10.633	-9.750	-9.633	-7.116	-5.394	-2.000	-1.500	0.000	1.500	2.000	3.549	3.755	4.549

Ch 50.000 m
Ainsworth Road



RL80.7m

Cut / Fill		-0.027	0.000	0.022	0.170	0.181	0.176	0.227	0.290	0.305	0.000	-0.036	
DESIGN		82.596	82.421	82.404	82.404	83.199	83.214	83.259	83.304	83.289	82.889	82.845	
EXISTING	82.980	82.623	82.421	82.381	82.234	83.019	83.038	83.032	83.014	82.984	82.889	82.881	82.830
OFFSET	-7.933	-7.289	-6.933	-6.864	-5.183	-2.000	-1.500	0.000	1.500	2.000	3.599	3.740	4.599

Ch 47.443 m
Ainsworth Road

FOR CONSTRUCTION

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XREFs					

Scale

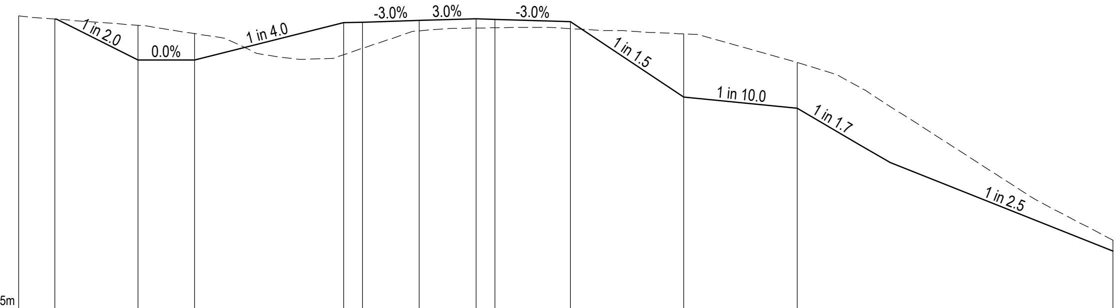
metres 0 1 2 3 4 5

Drawing Title

Cross Sections - Ainsworth Road
Sheet 1 of 3

3791-1047

Drawing Number 3791/C221 *Revision* C



RL75.5m

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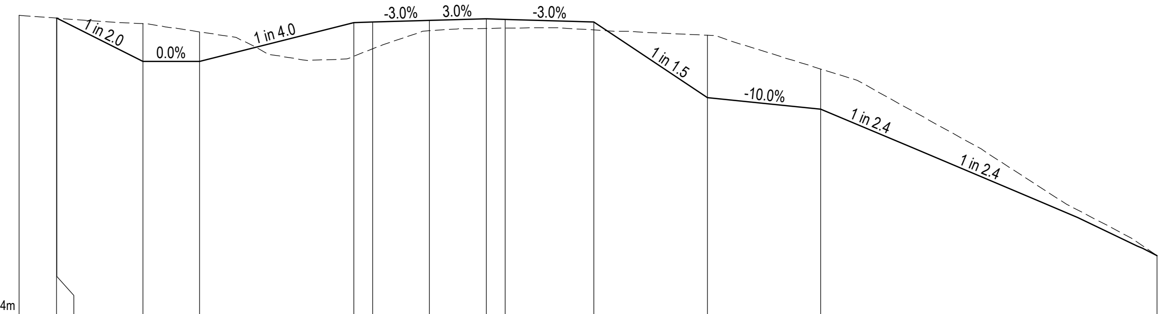
DESIGN		83.193	82.115	82.115	83.102	83.117	83.162	83.207	83.192	83.132	81.132	80.832	77.052
EXISTING	83.279	83.198	83.035	82.813	82.255	82.423	82.886	82.959	82.967	82.945	82.804	82.046	77.342
OFFSET	-10.605	-9.650	-7.446	-5.946	-2.000	-1.500	0.000	1.500	2.000	4.000	7.000	10.000	18.358

Ch 80.000 m
Ainsworth Road



RL75.4m

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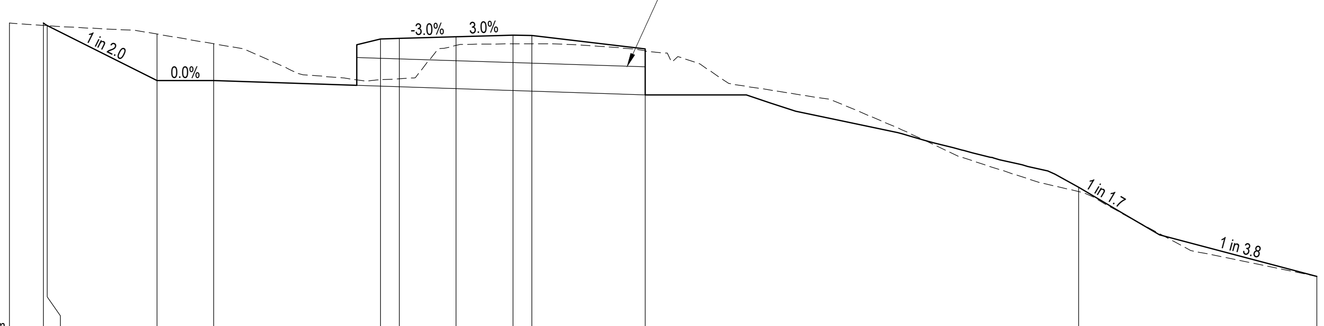
DESIGN		83.226	83.226	82.087	82.087	83.107	83.122	83.167	83.212	83.197	83.126	81.126	80.826	76.956
EXISTING	83.302	83.226	83.226	83.082	82.865	82.219	82.419	82.893	82.955	82.962	82.914	82.775	81.884	76.956
OFFSET	-10.860	-9.862	-9.860	-7.581	-6.081	-2.000	-1.500	0.000	1.500	2.000	4.352	7.352	10.352	19.246

Ch 78.242 m
Ainsworth Road

750Ø SW pipe refer to sheet 3791/C231 for details



RL75.3m

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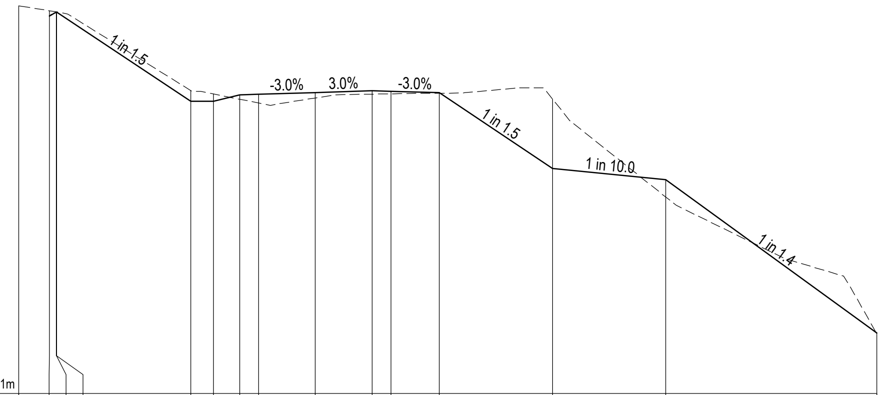
DESIGN		83.554	83.484	82.029	82.029	83.132	83.147	83.192	83.237	83.222	83.132	79.200	76.842
EXISTING	83.553	83.491	83.484	83.260	83.004	82.049	82.075	82.960	83.004	83.004	82.816	79.089	76.843
OFFSET	-11.818	-10.915	-10.818	-7.908	-6.408	-2.000	-1.500	0.000	1.500	2.000	5.000	16.463	22.765

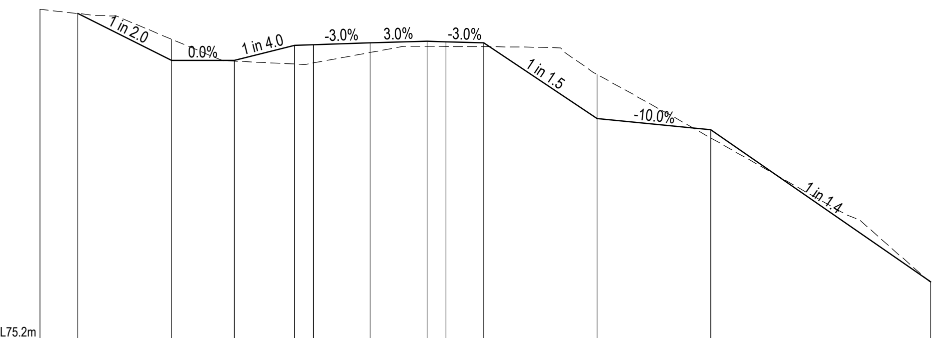
Ch 70.000 m
Ainsworth Road



RL75.1m

Cut / Fill		-0.140	-0.013	0.000	-0.289	-0.195	0.120	0.234	0.146	0.090	0.066	0.010	-1.838	0.459	0.006
DESIGN		85.083	85.181	85.193	82.825	82.825	83.000	83.015	83.060	83.105	83.090	83.052	81.052	80.752	76.695
EXISTING	85.352	85.223	85.194	85.193	83.114	83.020	82.881	82.781	82.914	83.016	83.025	83.042	82.890	80.293	76.688
OFFSET	-7.851	-7.040	-6.856	-6.851	-3.300	-2.700	-2.000	-1.500	0.000	1.500	2.000	3.278	6.278	9.278	14.865

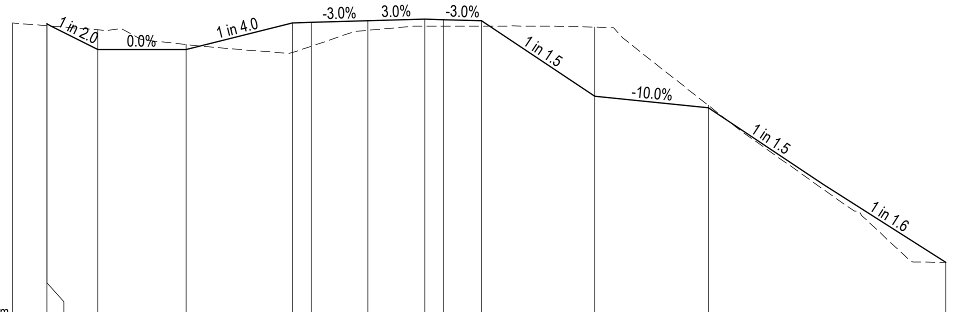
Ch 110.000 m
Ainsworth Road



RL75.2m

Cut / Fill		0.000	-0.558	0.022	0.498	0.485	0.253	0.136	0.124	0.099	-1.166	0.214	0.000
DESIGN		83.883	82.642	82.642	83.041	83.056	83.101	83.146	83.131	83.101	81.101	80.801	76.772
EXISTING	83.992	83.883	83.199	82.620	82.543	82.571	82.848	83.010	83.007	83.002	82.267	80.587	76.771
OFFSET	-8.735	-7.735	-5.253	-3.597	-2.000	-1.500	0.000	1.500	2.000	3.000	6.000	9.000	14.816

Ch 100.000 m
Ainsworth Road



RL75.2m

Cut / Fill		0.057	0.050	-0.527	-0.137	0.780	0.630	0.253	0.191	0.174	0.141	-1.831	-0.064	-0.002
DESIGN		83.058	83.050	82.367	82.367	83.072	83.087	83.132	83.177	83.162	83.132	81.132	80.832	76.739
EXISTING	83.072	83.001	83.000	82.894	82.504	82.292	82.456	82.878	82.986	82.987	82.991	82.962	80.895	76.741
OFFSET	-9.402	-8.499	-8.491	-7.150	-4.817	-2.000	-1.500	0.000	1.500	2.000	3.000	6.000	9.000	15.285

Ch 90.000 m
Ainsworth Road

FOR CONSTRUCTION

Rev.	Description	Date	Des.	App.	Chk.
C	Redesign at Council request	2/09/2022	JLC	BWH	BWH
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Project Title

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Client

Richmond Valley Council

Designed	JLC	Drawn	JLC	Checked	BWH
Approved	BWH	Date	11/02/2021		
XREFs					

Scale

metres 0 1 2 3 4 5

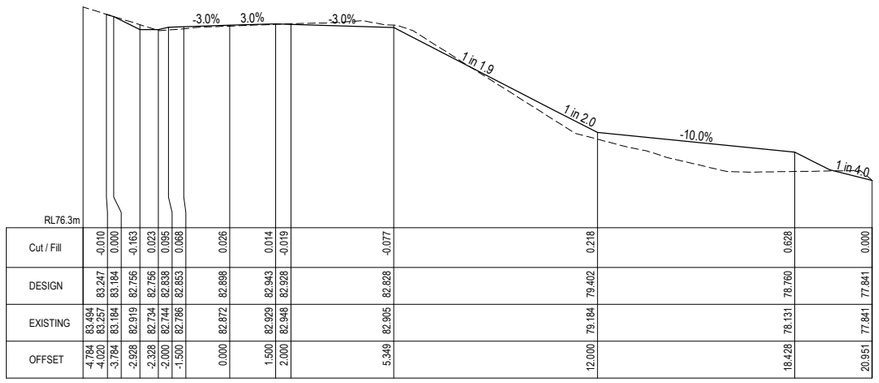
Drawing Title

Cross Sections - Ainsworth Road
Sheet 2 of 3

3791-1047

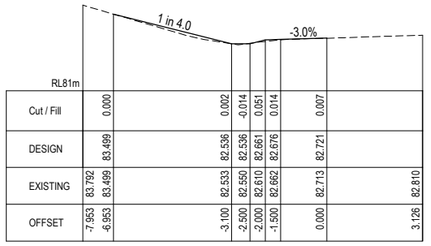
Drawing Number 3791/C222

Revision C



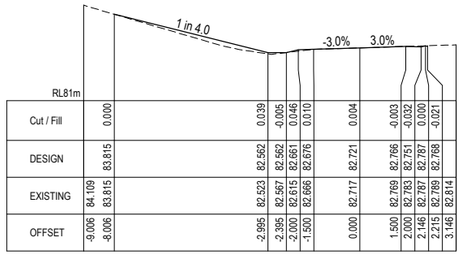
RL76.3m																					
Cut / Fill	-0.010	0.000	-0.163	0.023	0.095	0.068	0.026	0.014	-0.019	-0.077	0.218	0.628	0.000								
DESIGN	83.247	83.164	82.756	82.756	82.838	82.853	82.898	82.943	82.928	82.828	79.402	78.760	77.841								
EXISTING	83.494	83.257	83.164	82.919	82.734	82.744	82.786	82.872	82.929	82.948	82.905	79.184	78.131	77.841							
OFFSET	-4.784	-4.020	-3.784	-2.928	-2.328	-2.000	-1.500	0.000	1.500	2.000	5.349	12.000	18.428	20.951							

Ch 134.555 m
Ainsworth Road



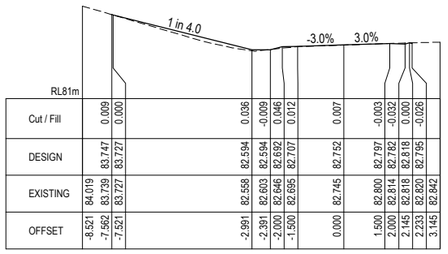
RL81m									
Cut / Fill	0.000	0.002	-0.014	0.051	0.014	0.007			
DESIGN	83.499	82.536	82.536	82.661	82.676	82.721			
EXISTING	83.792	83.499	82.533	82.560	82.610	82.662	82.713	82.810	
OFFSET	-7.953	-6.953	-3.100	-2.500	-2.000	-1.500	0.000	3.126	

Ch 153.431 m
Ainsworth Road



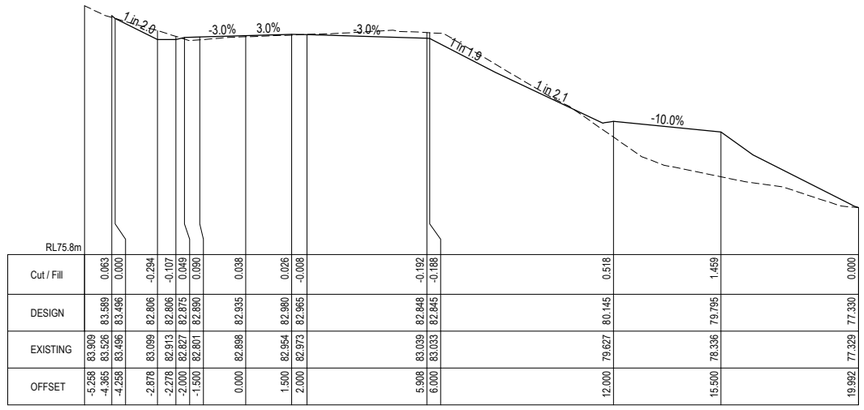
RL81m									
Cut / Fill	0.000	0.039	-0.005	0.046	0.010	0.004	-0.003	-0.032	0.000	-0.021
DESIGN	83.815	82.562	82.562	82.661	82.676	82.721	82.766	82.751	82.787	82.768
EXISTING	84.109	83.815	82.523	82.567	82.615	82.666	82.717	82.769	82.783	82.787	82.789	82.814
OFFSET	-9.006	-8.006	-2.995	-2.395	-2.000	-1.500	0.000	1.500	2.000	2.146	2.215	3.146

Ch 153.000 m
Ainsworth Road



RL81m									
Cut / Fill	0.009	0.000	0.036	-0.009	0.046	0.012	0.007	-0.003	-0.032	0.000	-0.026
DESIGN	83.747	83.727	82.594	82.594	82.692	82.707	82.752	82.797	82.782	82.818	82.795
EXISTING	84.019	83.739	83.727	82.588	82.603	82.646	82.695	82.745	82.800	82.814	82.818	82.820	82.842
OFFSET	-8.521	-7.562	-7.521	-2.991	-2.391	-2.000	-1.500	0.000	1.500	2.145	2.233	2.820	3.145

Ch 150.000 m
Ainsworth Road

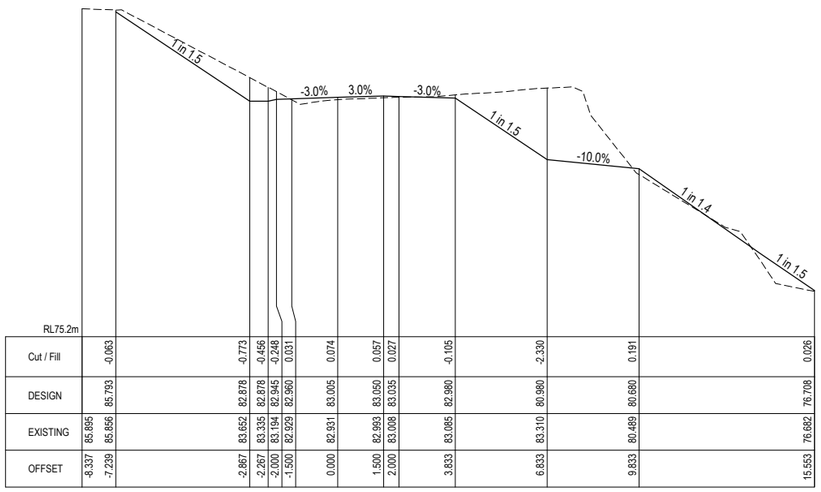


RL75.8m																					
Cut / Fill	0.063	0.000	-0.294	-0.107	0.049	0.090	0.038	0.026	-0.008	-0.192	-0.188	0.518	1.459	0.000							
DESIGN	83.589	83.496	82.806	82.806	82.875	82.890	82.935	82.980	82.965	82.848	82.845	80.145	79.795	77.330							
EXISTING	83.909	83.526	83.496	83.099	82.813	82.827	82.901	82.898	82.954	82.973	83.039	83.033	78.336	77.329	77.330						
OFFSET	-5.258	-4.365	-4.258	-2.878	-2.278	-2.000	-1.500	0.000	1.500	2.000	5.908	6.000	15.500	19.992							

Ch 130.000 m
Ainsworth Road

RL81.1m									
Cut / Fill	-0.014	0.000	0.030	-0.009	0.049	0.016	0.006	-0.003	-0.030	0.000	-0.021
DESIGN	82.840	82.778	82.647	82.647	82.742	82.757	82.802	82.847	82.832	82.865	82.845
EXISTING	83.089	82.854	82.729	82.692	82.628	82.776	82.840	82.895	82.906	82.909	82.910	82.932
OFFSET	-4.120	-3.366	-3.120	-2.964	-2.364	-2.000	-1.500	0.000	1.500	2.000	2.113	2.144	3.113

Ch 145.063 m
Ainsworth Road



RL75.2m																					
Cut / Fill	-0.063		-0.773	-0.456	-0.248	0.031	0.074	0.057	0.027	-0.105	-2.330	0.191	0.026								
DESIGN	85.793		82.878	82.878	82.945	82.960	83.005	83.050	83.035	82.980	80.980	80.680	76.708								
EXISTING	85.895	85.856	83.652	83.335	83.194	82.929	82.931	82.993	83.008	83.085	83.310	80.489	76.682								
OFFSET	-8.337	-7.239	-2.867	-2.267	-2.000	-1.500	0.000	1.500	2.000	3.833	6.833	9.833	15.553								

Ch 120.000 m
Ainsworth Road

FOR CONSTRUCTION

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Project Title

Ainsworth Rd Embankment Stabilisation

Client

Richmond Valley Council

Designed	JLC	Drawn	JLC	Checked	BWH
Approved	BWH	Date	11/02/2021		

XREFs

Scale

metres 0 1 2 3 4 5

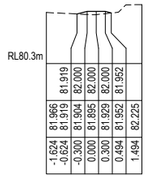
Drawing Title

Cross Sections - Ainsworth Road
Sheet 3 of 3

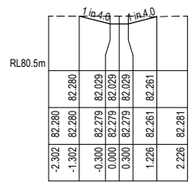
3791-1047

Drawing Number *Revision*

3791/C223 C

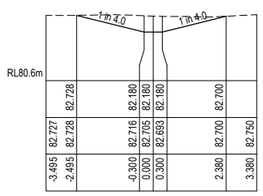


Ch 13.756 m

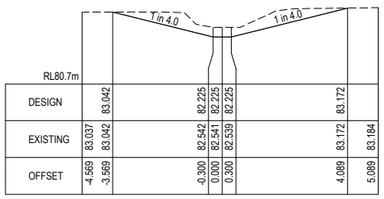


Ch 11.978 m

Ch 10.000 m

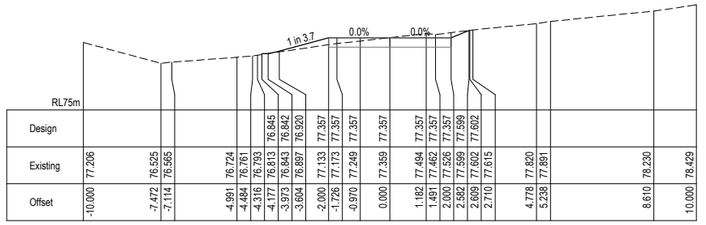


Ch 2.779 m

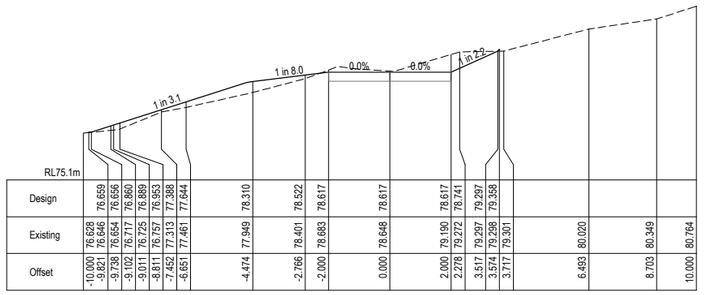


Ch 0.000 m

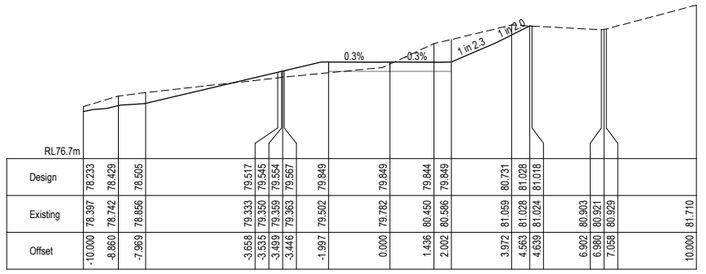
Swale South Pipe 0.000 to Ch 13.756



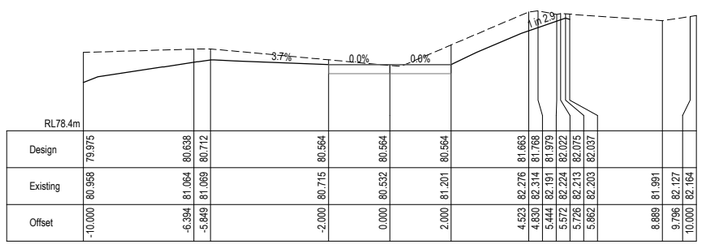
Ch 15.000 m



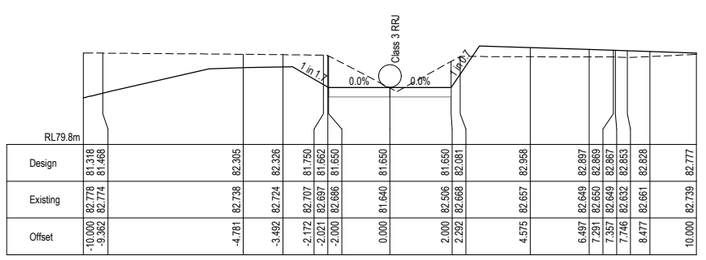
Ch 10.000 m



Ch 7.500 m



Ch 5.000 m



Ch 0.000 m

Swale North Pipe 0.000 to Ch 15.000

FOR CONSTRUCTION

Rev.	Description	Date	Des.	App.	Chk.
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A	Updated to gabion retaining	14/07/2021	JLC	BWH	BWH

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Project Title

Ainsworth Rd Embankment Stabilisation

Client

Richmond Valley Council

Designed	JLC	Drawn	JLC	Checked	BWH
Approved	BWH	Date	11/02/2021		

XREFs

Scale

metres 0 1 2 3 4 5

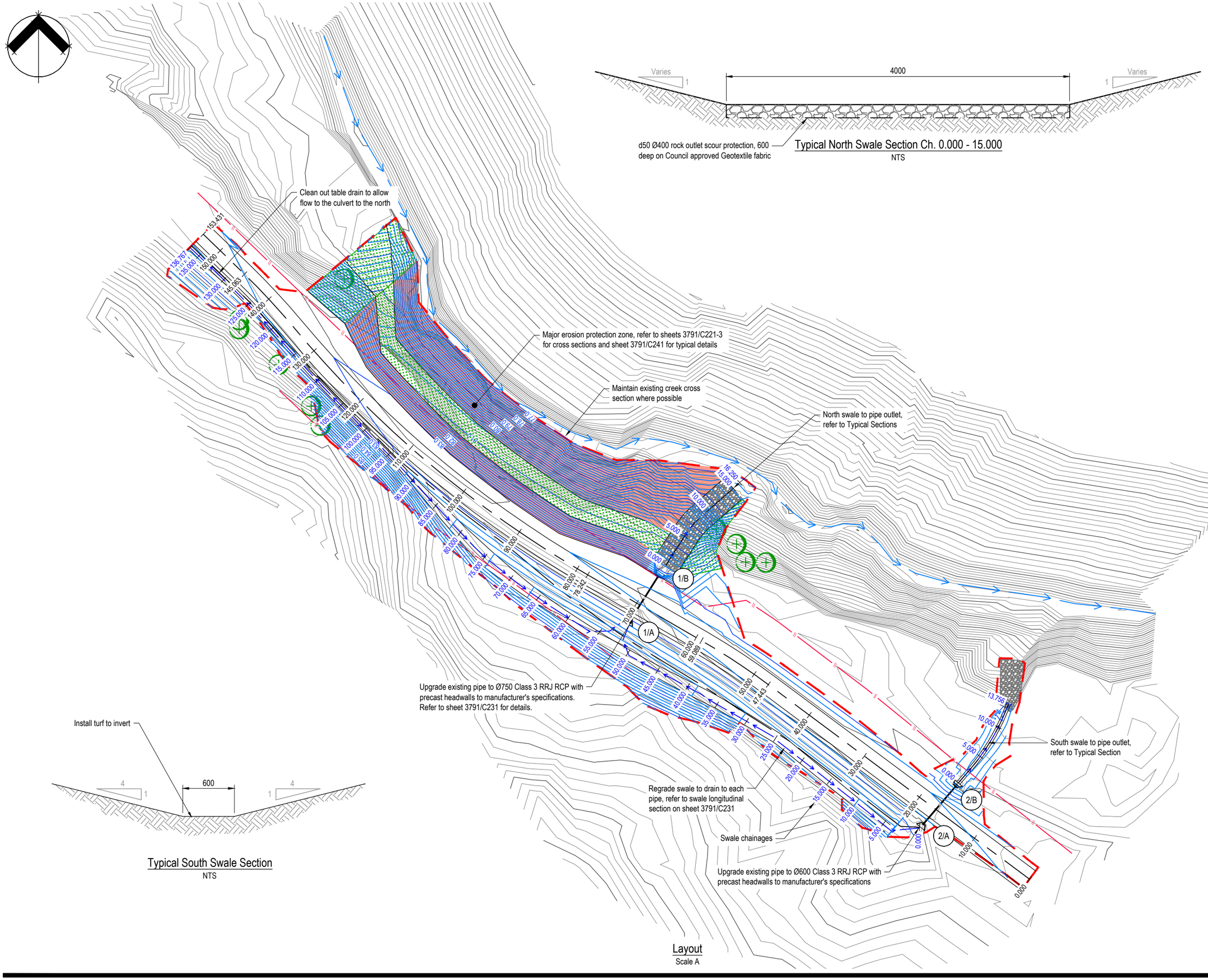
Drawing Title

Cross Sections - Swales

Drawing Number 3791/C224

Revision C

3791-1047



Layout
Scale A

Typical North Swale Section Ch. 0.000 - 15.000
NTS

Typical South Swale Section
NTS

LEGEND

- Fence
- Creek
- Tree

LEGEND (Proposed)

- Road
- Rock embankment protection
- Revegetation areas
- Rock protection with pocket planting revegetation
- Extent of works
- Stormwater pipe
- Swale

Existing and design contours are at 0.2m intervals

Notes:
1. Existing contours on the northern side of the creek line are approximate only.

FOR CONSTRUCTION

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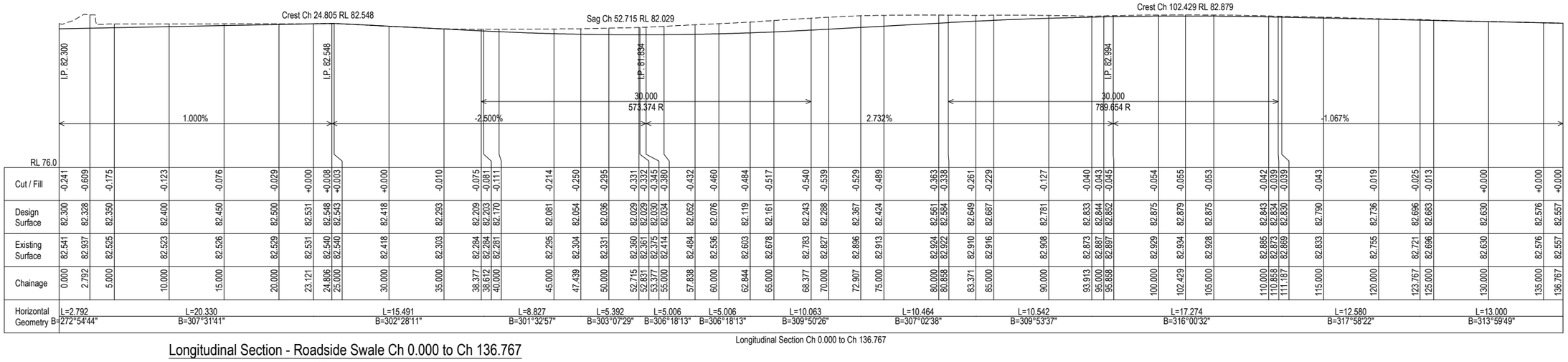
XREFs					
Scale					

metres 0 2.5 5 7.5 10 12.5

Drawing Title
Stormwater Layout and Typical Swale Cross Sections

3791-1048

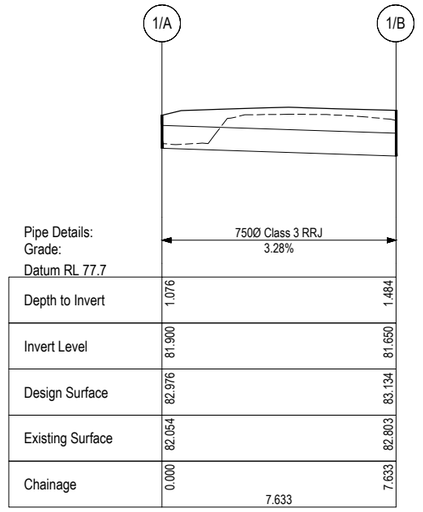
Drawing Number 3791/C230 *Revision* C



Longitudinal Section Ch 0.000 to Ch 136.767

Longitudinal Section - Roadside Swale Ch 0.000 to Ch 136.767

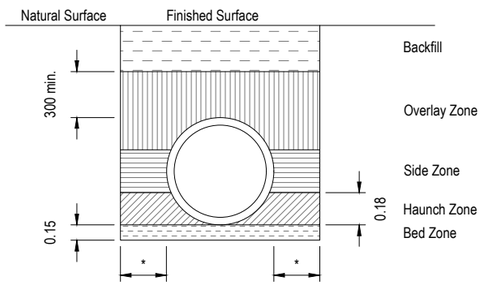
Horizontal Scale A Vertical Scale B



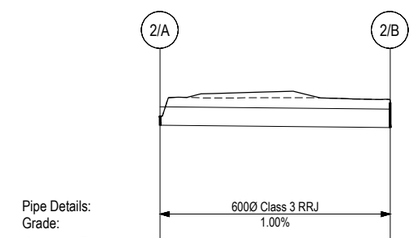
North Pipe Ch 0.000 to Ch 8.540

Scale B

Note: Use HS3 pipe support within road reserves and H2 support in all other areas unless noted otherwise.

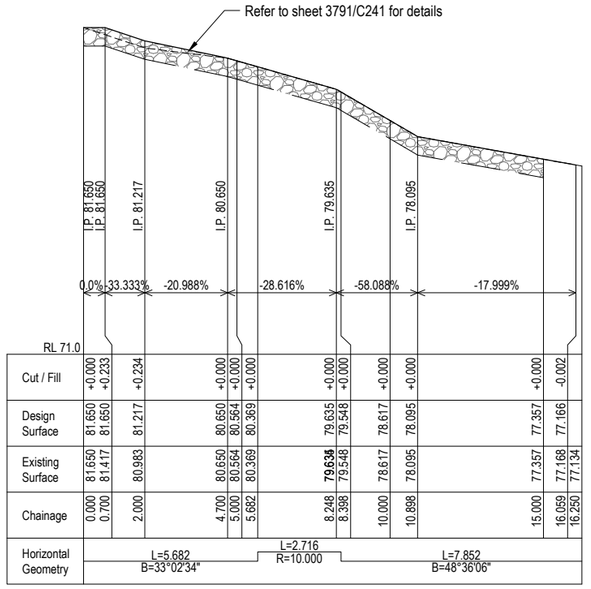


* denotes 0.2D or 0.3m (whichever is greater)
D = External diameter of pipe



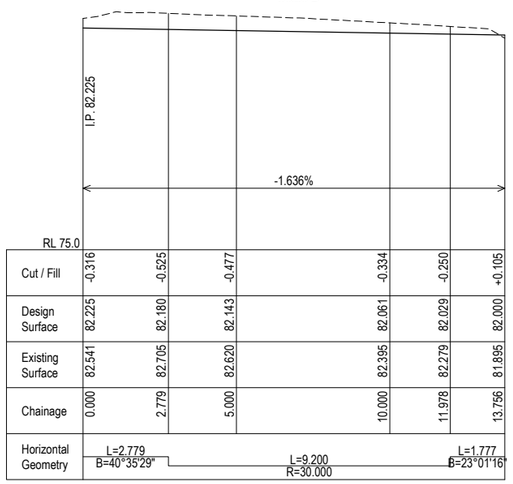
South Pipe Ch 0.000 to Ch 7.505

Scale B



North Swale Ch 0.000 to Ch 16.250

Scale B



South Swale Ch 0.000 to Ch 13.756

Scale B

FOR CONSTRUCTION

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Project Title

Ainsworth Rd Embankment Stabilisation

Client

Richmond Valley Council

Designed	JLC	Drawn JLC	Checked BWH
Approved	BWH	Date 11/02/2021	
XREFs			

Scale

A metres 0 2 4 6 8 10

B 0 1 2 3 4 5

Drawing Title

Stormwater Longitudinal Sections and Trenching Detail

3791-1048

Drawing Number 3791/C231

Revision C

General Notes

1. All erosion and sediment controls are to be in accordance with the *Soils and Construction Volume 1 - Managing Urban Stormwater 4th Ed.* (the 'Blue Book').
2. These notes and accompanying plans are to be read in conjunction with any relevant engineering plans, and any other written instructions issued in relation to development on site.
3. All sub contractors are to be informed of their responsibilities in relation to erosion and sedimentation.
4. Accidentally disturbed areas would be stabilised and/or re-vegetated or secured with geofabric as soon as practical after the damage has occurred;
5. Work are to cease if any pollution problems are suspected or detected.
6. A spill containment kit, including equipment to address both terrestrial and aquatic spills, would be available at all times. Staff would be trained in the effective deployment of the spill containment kit.
7. Safety issues must be considered at all times; incorporate traffic control devices to the satisfaction of the superintendent.

Timing of Works

1. Works are to be carried out wherever possible during the cooler months, when rainfall events occur less frequently.
2. The weather is to be monitored during the proposed period of works. Works would be scheduled outside of forecasted significant rain events and postponed during unforeseen rain events.
3. Pavement formations and any excavation works are to be scheduled outside of average high rainfall periods.
4. Works would cease and all sediment control measures checked and repaired or re-installed (if required) if heavy rainfall was forecast.
5. Sediment control features would be checked as soon as practical (within 24 hours) after significant rainfall events.

Construction Staging

Works are to be undertaken in the following order. One stage must be complete prior to the next stage being commenced.

1. Site Establishment

Prior to the commencement of *any* works on site, the following erosion and sediment control works must be carried out:

- Construct a suitably stabilised site access comprising Alternative 1 or 2 from the details sheet, minimum 15 m in total length excluding grid, and a maximum of 3 m wide. The access is to be flanked with barrier fencing to ensure it is not bypassed during construction.
- Install clearly visible barrier fencing to contain construction works and delineate no-go zones.
- Construct the temporary and permanent clean water diversion drains and stabilise.
- As required for the stage construct a Sediment Basin and dirty water diversion drains that discharge to the Sediment Basin
- Establish stockpile areas for spoil material
- If bio-retention basin is to be constructed within the stage works, construct bio-retention basin retaining walls and outlet structure excluding filtration media and internal drainage pipework.

2. Site Preparation:

- Commencement of civil works may only begin when all erosion and sediment controls are correctly installed.
- Preparation works may then proceed, including approved clearing of vegetation, stripping of topsoil, and stockpiling materials.
- Stockpiles are to be constructed in accordance with *The Blue Book* and these notes.

3. Civil Works:

- As much as possible, works are to be carried out in stages to minimise disturbed areas exposed to erosion.
- Stabilise disturbed land as soon as practicable e.g. with grass seeding.
- Works shall include pavement preparation and construction, lot regrading, laying of pipes for services etc.
- Ongoing maintenance of all erosion and sediment controls shall extend for the duration of construction works.
- Ensure stormwater runoff from all disturbed construction areas drains to the sediment basin.
- As drainage inlet structures are constructed, they are to be protected with appropriate sediment control, including pit filter bags and filter bags placed to prohibit first flush bypassing.

4. Site Decommission:

- On completion of works, completed areas are to be decommissioned. Only once the site is suitably stabilised and rehabilitated may the erosion and sediment controls be removed.
- The sediment basins are to remain operational on site for as long as practicable. The basins must not be decommissioned until a minimum of 70% of the site has permanent soil coverage.
- Ensure stormwater drainage structures, are free of sediment and debris.
- Sediment and barrier fencing is to remain in place until a suitably qualified person deems the erosion and sedimentation risk is low enough to warrant its removal.
- All erosion and sediment controls are to be maintained in accordance with these notes for the full duration of their installation. Failure to do so may result in pollution of the receiving environment.
- ***For the purpose of these plans, stabilised shall be defined as 70% permanent soil coverage over all upstream disturbed land.***

Water Quality

To ensure the receiving sensitive environment is not adversely affected by the proposed works, the following measure shall be put in place:

1. No cleaning of tools or equipment would occur within any drainage line or creek.
2. All equipment would be maintained in good working order and operated according to manufacturer's specifications;
3. An incident management and emergency response procedure would be prepared detailing procedures to be followed in the event of a spill or release of waste.
4. Vehicles, machinery and equipment would be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulations.
5. Vehicles and equipment would be switched off when not operating.
6. No materials are to be placed within areas of potentially high velocity flow.

Waste

1. No waste materials will be used in a manner that would pose a risk to public safety and that waste generated from the proposed works will be recycled where possible.
2. Any contaminated waste generated by the proposed works will be disposed of in accordance with the EPA approved methods of waste disposal.
3. All materials, including waste and hazardous materials are to only be stored in approved containers. Regular clearing of waste from the site is to be scheduled.
4. The quantity of plant and material kept on site is to be limited to only those immediately required. All plant and materials are to be removed from the site when practical, as soon as construction is complete. Unnecessary storage of fuels, lubricants or other compounds on-site would be avoided and required fuels and other liquids would be stored in small quantities.

Site Inspection and Maintenance

1. A self-auditing checklist program will be established by the contractor prior to the commencement of any construction works.The checks will be performed at least weekly, as well as immediately before site closure and immediately after any rainfall even greater than 5 mm in any one 24-hour period.
2. A suitably qualified person will oversee the installation and maintenance of all soil and water management works.
3. Waste receptacles will be cleared at least weekly, and more frequently if required.
4. Areas recently stabilised with grass species will be watered regularly until an effective cover has been established. Re-seed if vegetation growth is inadequate.
5. All erosion and sedimentation controls are to be kept in good working order at all times, and repaired/replaced as required.
6. Sediment build-up behind sediment fences, within drainage lines and within sediment basins shall be removed and spread on site in locations where further erosion and or sedimentation is unlikely to occur.
7. Where practical, foot and vehicular traffic will be kept away from all recently stabilised areas.

Stockpiles

1. Place stockpiles a min. of 2 m (preferably 5 m) from existing vegetation, concentrated water flow and roads etc.
2. Construct on the contour as low, flat, elongated mounds, less than 2 m high (if possible)
3. Earth banks shall be constructed on the upslope side, and sediment fences installed within 2 m downslope.

Check Dams

1. Check dams may be used within diversion drains to control velocity. Sediment collection is a secondary purpose.
2. Catchment area will be limited to 4 ha.

Sediment Fences

1. Shall not to be located in areas of concentrated flow.
2. Are to be installed along the contour with a max. catchment area 0.6 ha per 100 m length of fence.
3. Woven fabrics are to be used.
4. Where fences need to be located across the contour the layout shall conform to 'typical layout across grade'.
5. Fences are required 2 m min. from toe of cut or fill batters, where not practical, one fence can be at the toe with a second fence 1 m min. away. Fence should not be located parallel with toe if concentration of flow will occur behind the fence.
6. Wherever possible, construct the sediment fence from a continuous roll. To join fabric, either: a) attached each end to individuation stakes, hold the stakes together, rotate the stakes 180°, then drive the two stakes into the ground or b) overlap the fabric to the next support post.
7. Both ends of the fence should be turned up the slope a minimum of 1.5 m to minimise the risk of flow bypassing around the ends of the fence.
8. Returns are to be spaced at 20 m (max.) if fence is located along the contour, otherwise 5 to 10 m depending on the upstream slope.
9. At least 300 mm of fabric must be buried in either a 200 mm deep trench or under a continuous 100 mm high layer of sand or aggregate (not soil).
10. Sediment fences are to be braced for long-term stability. Spill-through weirs are to be incorporated at intervals of 20 - 30 m with rock rubble scour protection on the down stream side to control overflow.
11. Barrier and sediment fencing are to be located no more than 5 m (2 m desirable) from construction activities, to ensure disturbed land is minimised.
12. Captured sediment is to be removed and spread on site in locations where further erosion and or sedimentation is unlikely to occur.

Variations in Construction Process

As per *The Blue Book*, a revised Soil and Water Management Plan might be required where:

- Changes occur in slope gradients and drainage paths, with their exact form frequently unpredictable before works start;
- Works continue over an extended period, with revisions being required at the beginning of the second year of operations and further revisions at two-yearly intervals after that. Any revised plans should reflect reasonable new standards applying to them; or
- The desired outcome (e.g. protection of receiving environments) is clearly not being achieved. This plan is only part of the strategy, with other aspects being appropriate implementation, monitoring and corrective action.

Stormwater Drainage

1. All stormwater drainage construction shall be in accordance NRLG Specifications C221.
2. Drainage pipe 375 diameter and larger shall be precast reinforced concrete supplied and manufactured by an approved pipe manufacturer. Unless otherwise noted on the drawings or specified by the Superintendent concrete pipes shall be a minimum of Class 2.
3. Existing services (e.g. water and comms) are to be adjusted locally to allow for culvert extensions.

Drainage Structures

4. Unless otherwise noted and detailed on the design drawings drainage structures such as gully pits, MHs, headwalls and junction pits shall be supplied and constructed by an approved concrete manufacturer specialising in drainage components.
5. Should the contractor undertake to construct pits insitu, that have not been detailed, before undertaking any construction the contractor shall submit to the Superintendent engineering drawings endorsed by a suitably qualified engineer detailing the proposed construction details.

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Project Title

Ainsworth Rd Embankment Stabilisation

Client

Richmond Valley Council

Designed	JLC	Drawn	JLC	Checked	BWH
Approved	BWH	Date	11/02/2021		
XREFs					

Scale

metres Not To Scale

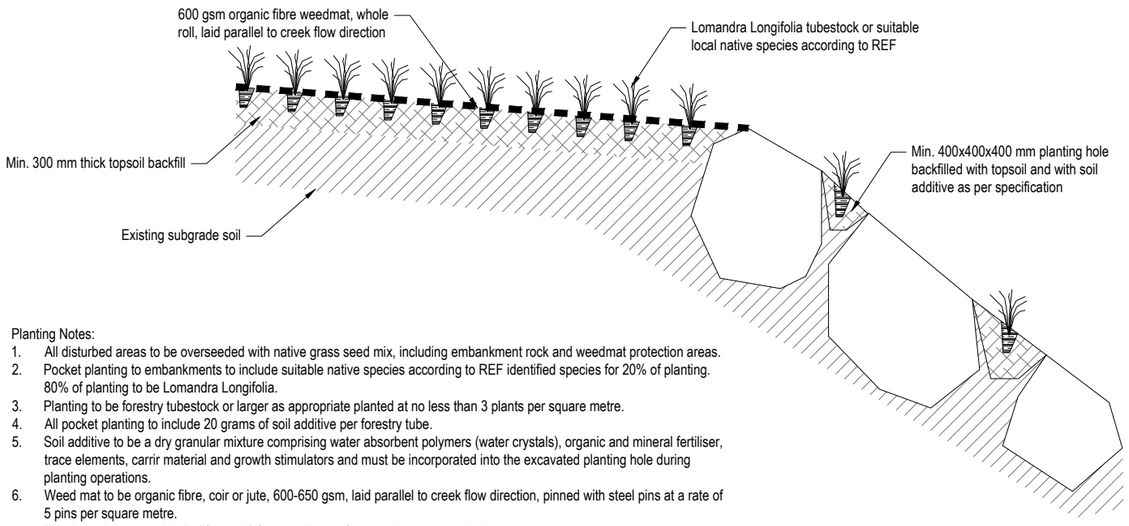
Drawing Title

General Notes

3791-1049

Drawing Number *Revision*

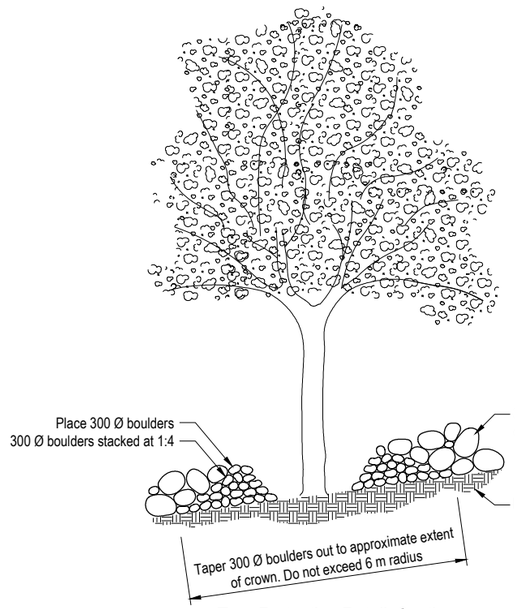
3791/C240 C



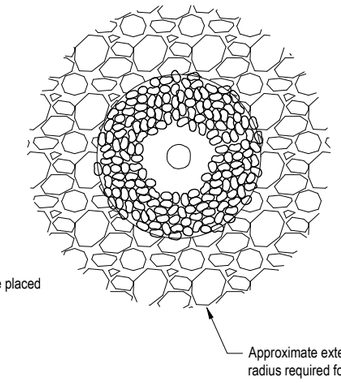
Planting Notes:

1. All disturbed areas to be overseeded with native grass seed mix, including embankment rock and weedmat protection areas.
2. Pocket planting to embankments to include suitable native species according to REF identified species for 20% of planting. 80% of planting to be Lomandra Longifolia.
3. Planting to be forestry tubestock or larger as appropriate planted at no less than 3 plants per square metre.
4. All pocket planting to include 20 grams of soil additive per forestry tube.
5. Soil additive to be a dry granular mixture comprising water absorbent polymers (water crystals), organic and mineral fertiliser, trace elements, carrir material and growth stimulators and must be incorporated into the excavated planting hole during planting operations.
6. Weed mat to be organic fibre, coir or jute, 600-650 gsm, laid parallel to creek flow direction, pinned with steel pins at a rate of 5 pins per square metre.
7. Planting to be watered daily (if no rain) for a minimum of two weeks post completion.

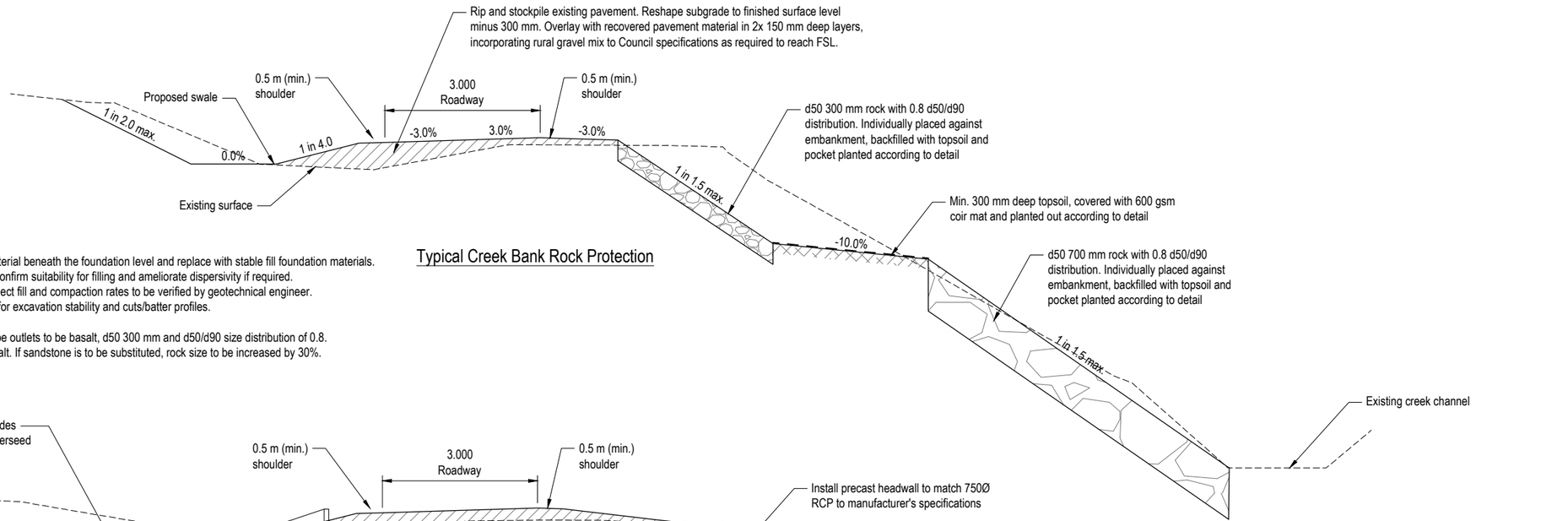
Typical Pocket Planting and Weed Mat Detail
N.T.S.



Tree Protection Detail: Section
N.T.S.



Tree Protection Detail: Plan
N.T.S.



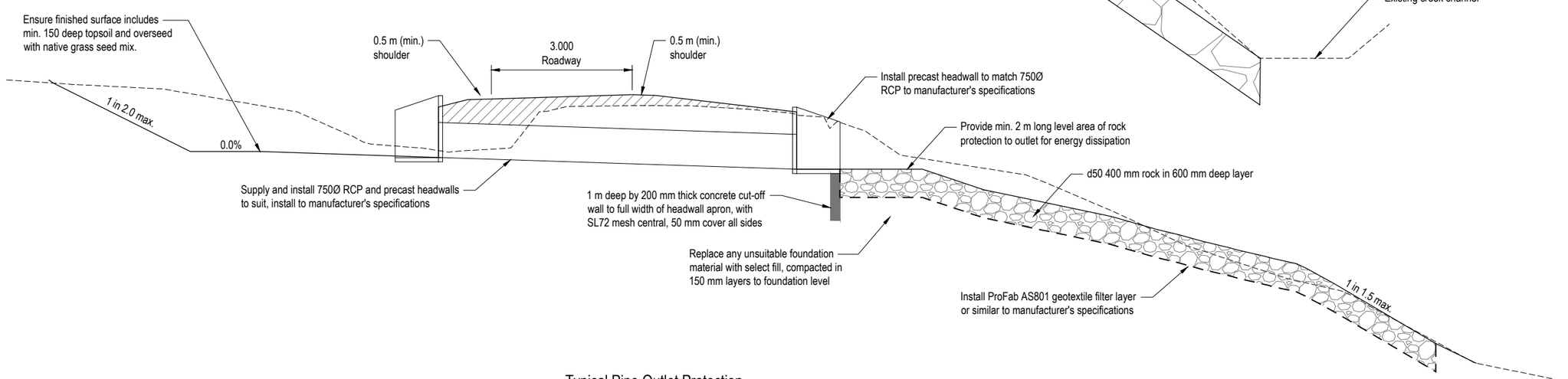
General Structures Notes:

1. Remove any unsuitable material beneath the foundation level and replace with stable fill foundation materials. test excavated material to confirm suitability for filling and ameliorate dispersivity if required.
2. All foundation materials, select fill and compaction rates to be verified by geotechnical engineer.
3. Refer to geotchnical report for excavation stability and cuts/batter profiles.

Rock Infill

1. Rock scour protection at pipe outlets to be basalt, d50 300 mm and d50/d90 size distribution of 0.8.
2. All rock assumed to be basalt. If sandstone is to be substituted, rock size to be increased by 30%.

Typical Creek Bank Rock Protection



Typical Pipe Outlet Protection

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Scale

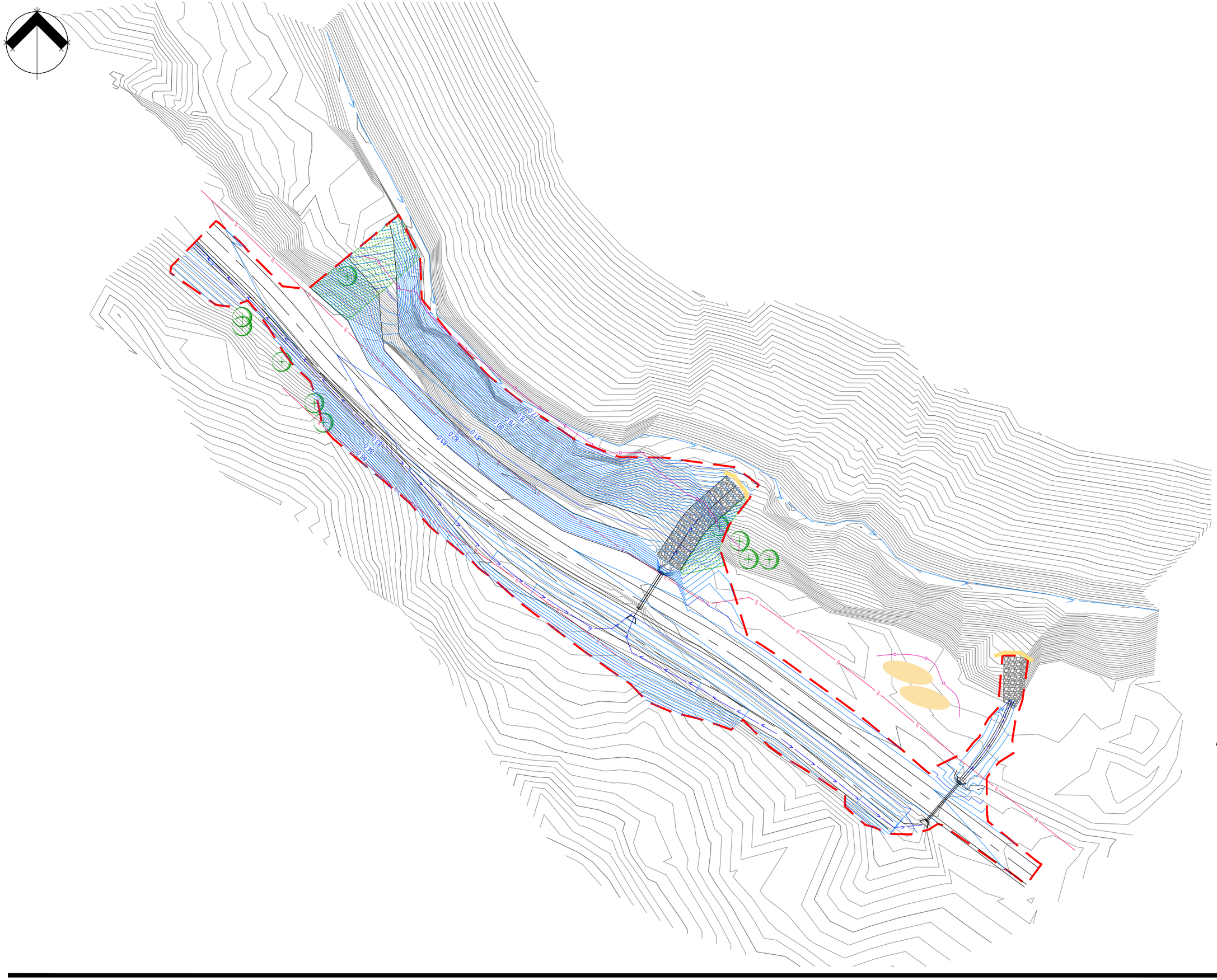
metres 0 0.5 1.0 1.5 2.0 2.5

Drawing Title

Typical Details

3791-1049

Drawing Number 3791/C241 *Revision* C



LEGEND

- Stockpiles (SD4-1)
- Sediment fence
- Coir Log

Existing and design contours are at 0.2m intervals

Notes:

1. Existing contours on the northern side of the creek line are approximate only.
2. Remove any noticeable ponding areas throughout the existing water course to lessen the impact of sediment build up.
3. Depending on the final location of access to complete the works, temporary waterway crossings may be required.

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XREFs					
Scale					

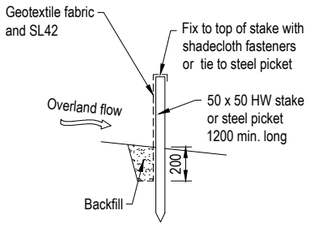
metres 0 2 4 6 8 10

Drawing Title

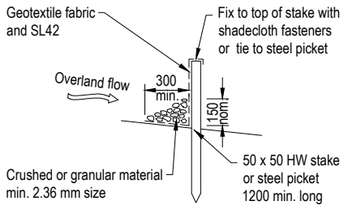
Erosion and Sediment Control Plan Layout

3791-1050

Drawing Number 3791/C250 *Revision* C



Alternative 1 Typical Section



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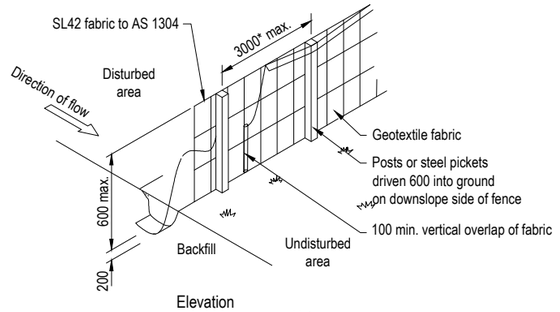
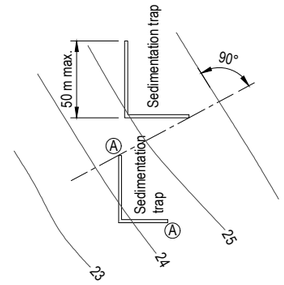


Elevation

Notes:

SL42 fabric may be omitted if post spacing is less than 2000 max

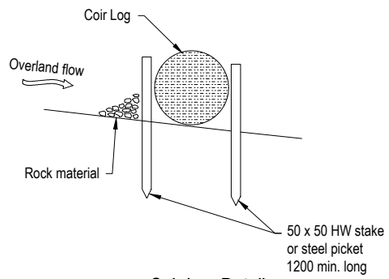
Returns are to be spaced at 20 m (max.) if fence is located along the contour, otherwise 5 to 10 m depending on the upstream slope



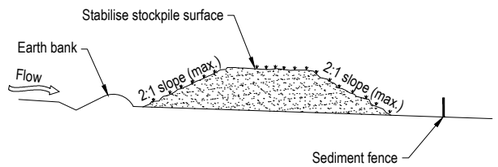
Typical Layout Across Grade
Points 'A' at same elevation

Sediment Fence

Details are not to scale



Coir Log Detail



Typical Stockpile Elevation

General Erosion and Sediment Notes

1. All erosion and sediment controls are to be in accordance with the *Soils and Construction Volume 1 - Managing Urban Stormwater 4th Ed.* (the 'Blue Book').
2. These notes and accompanying plans are to be read in conjunction with any relevant engineering plans, and any other written instructions issued in relation to development on site.
3. All sub contractors are to be informed of their responsibilities in relation to erosion and sedimentation.
4. Accidentally disturbed areas would be stabilised and/or re-vegetated or secured with geofabric as soon as practical after the damage has occurred;
5. Work are to cease if any pollution problems are suspected or detected.
6. A spill containment kit, including equipment to address both terrestrial and aquatic spills, would be available at all times. Staff would be trained in the effective deployment of the spill containment kit.
7. Safety issues must be considered at all times; incorporate traffic control devices to the satisfaction of the superintendent.
8. Wind erosion on the site shall be managed by limiting traffic on disturbed areas, utilising water trucks, covering stockpiles with anchored geofabric, and providing dust covers on trucks and dumpers. If wind speed exceeds 10m/s, increase watering or cease dust generating activities until dust controls are operating effectively. Other measures may be employed as outlined in the Landcom manual.
9. Works are to be carried out wherever possible during the cooler months, when rainfall events occur less frequently.
10. The weather is to be monitored during the proposed period of works. Works would be scheduled outside of forecasted significant rain events and postponed during unforeseen rain events.
11. Pavement formations and any excavation works are to be scheduled outside of average high rainfall periods.
12. Works would cease and all sediment control measures checked and repaired or re-installed (if required) if heavy rainfall was forecast.
13. Sediment control features would be checked as soon as practical (within 24 hours) after significant rainfall events.

Water Quality

To ensure the receiving sensitive environment is not adversely affected by the proposed works, the following measure shall be put in place:

1. No cleaning of tools or equipment would occur within any drainage line or creek.
2. All equipment would be maintained in good working order and operated according to manufacturer's specifications;
3. An incident management and emergency response procedure would be prepared detailing procedures to be followed in the event of a spill or release of waste.
4. Vehicles, machinery and equipment would be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulations.
5. Vehicles and equipment would be switched off when not operating.
6. No materials are to be placed within areas of potentially high velocity flow.

Stockpiles

1. Place stockpiles a min. of 2 m (preferably 5 m) from existing vegetation, concentrated water flow and roads etc.
2. Construct on the contour as low, flat, elongated mounds, less than 2 m high (if possible)
3. Earth banks shall be constructed on the upslope side, and sediment fences installed within 2 m downslope.

Sediment Fences

1. Shall not to be located in areas of concentrated flow.
2. Are to be installed along the contour with a max. catchment area 0.6 ha per 100 m length of fence.
3. Woven fabrics are to be used.
4. Where fences need to be located across the contour the layout shall conform to 'typical layout across grade'.
5. Fences are required 2 m min. from toe of cut or fill batters, where not practical, one fence can be at the toe with a second fence 1 m min. away. Fence should not be located parallel with toe if concentration of flow will occur behind the fence.
6. Wherever possible, construct the sediment fence from a continuous roll. To join fabric, either: a) attached each end to individuation stakes, hold the stakes together, rotate the stakes 180°, then drive the two stakes into the ground or b) overlap the fabric to the next support post.
7. Both ends of the fence should be turned up the slope a minimum of 1.5 m to minimise the risk of flow bypassing around the ends of the fence.
8. Returns are to be spaced at 20 m (max.) if fence is located along the contour, otherwise 5 to 10 m depending on the upstream slope.
9. At least 300 mm of fabric must be buried in either a 200 mm deep trench or under a continuous 100 mm high layer of sand or aggregate (not soil).
10. Sediment fences are to be braced for long-term stability. Spill-through weirs are to be incorporated at intervals of 20 - 30 m with rock rubble scour protection on the down stream side to control overflow.
11. Barrier and sediment fencing are to be located no more than 5 m (2 m desirable) from construction activities, to ensure disturbed land is minimised.
12. Captured sediment is to be removed and spread on site in locations where further erosion and or sedimentation is unlikely to occur.

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Scale					

metres Not To Scale

Drawing Title

Erosion and Sediment Control Plan
Details and Notes

3791-1050

Drawing Number *Revision*

3791/C251 C

Attachment B

Geotechnical Report

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Geotechnical Investigation

Flood Damaged Pavement and Culvert
Ainsworth Road, Mongogarie

Prepared for
GeoLink

Project 105018.00
January 2021

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

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Site address	Ainsworth Road, Mongogarie		
Report prepared for	GeoLink		
File name	105018.00.R.001.Rev0.Ainsworth		

Document status and review

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Revision 0	John Niland	Michael Gawn	29 January 2021

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Bradley Herd, GeoLink

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author	John Niland	29 January 2021
Reviewer	pp	29 January 2021

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Douglas Partners
Geotechnics / Environment / Groundwater

Table of Contents

Page

1. Introduction 1
2. Site Description 1
3. Regional Geology 4
4. Field Work 4
   - 4.1 Field Work Methods 4
   - 4.2 Field Work Results 4
5. Comments 5
   - 5.1 Remedial Options 5
   - 5.2 Excavations and Batters 6
   - 5.3 Creek Bank Erosion Protection 7
   - 5.4 Retaining Walls 7
     - 5.4.1 Retaining Wall Options 7
     - 5.4.2 Retaining Wall Design Parameters 8
   - 5.5 Rock Boulders 8
6. References 8
7. Limitations 9

Appendix A: About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Borehole Logs
Results of Dynamic Penetrometer Tests

Appendix B: Drawing 1 - Test Location Plan

Report on Geotechnical Investigation
Flood Damaged Pavement and Culvert
Ainsworth Road, Mongogarie

1. Introduction

This report presents the results of a geotechnical investigation undertaken for a flood damaged pavement and culvert at Ainsworth Road, Mongogarie. The investigation was commissioned in an email dated 9 November 2020 by Bradley Herd of GeoLink and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal CFH200158 dated 4 November 2020.

It is understood that a rain event in early 2020 resulted in damage at Ainsworth Road. The damage typically comprises scour erosion at the downstream end of a pipe culvert and creek bank, partial clogging and displacement of the pipe culvert. It is understood that overland flow overwhelmed the existing pipe culvert and stormwater flowed across Ainsworth Road exacerbating erosion of the creek bank adjacent to Ainsworth Road.

Remedial options being considered by Richmond Valley Council include stabilisation of the creek bank (eg gabion baskets, sheet piles, vegetation) and road realignment away from the creek.

The aim of the investigation was to assist in the design of repair options and provide information on the following:

- Subsurface conditions;
- Retaining wall design parameters;
- Allowable bearing pressure for retaining wall footings; and
- Excavatability and suggested batter slopes for hillside cuttings.

The investigation included the drilling of four boreholes as well as engineering analysis and reporting. The details of the field work are presented in this report, together with information on the items listed above.

2. Site Description

The site is located at Ainsworth Road, Mongogarie which is a low volume, rural road with unsealed gravel pavement (refer Figure 1). There is a tree covered hillside to the south of Ainsworth Road and Middle Creek is situated to the north.

The creek bed was dry at the time of the field work and is approximately 5 m below Ainsworth Road. The creek banks are typically sloped at about 35°. The creek bank contains thick vegetation. Silt and sand was exposed in parts of the creek bank as well as in areas of erosion (refer Figure 2) at the time of inspection.

The majority of the erosion occurred at the downstream end of a damaged pipe culvert and the upper portion of the creek bank adjacent to Ainsworth Road for a length of about 20 m to 30 m.

The downstream segment of a 0.6 m diameter existing concrete pipe culvert has been damaged (Figure 3). The hillside is situated on the upstream side of the culvert and Middle Creek is situated on the downstream side of the culvert.

Figure 1: Ainsworth Road. Middle Creek on right hand side of fence

Figure 2: Creek bank erosion adjacent to Ainsworth Road

Figure 3: Damaged pipe culvert (downstream outlet)

3. Regional Geology

Reference to the NSW Geology Statewide data (GSNSW, 2019) indicates that the hillside is underlain by residual soil and weathered rocks of the Kangaroo Creek Sandstone Beds which typically comprise quartz sandstones and minor conglomerate. The mapping indicates that Ainsworth Road and Middle Creek are underlain by channel and flood plain alluvium typically comprising gravel, sand, silt and clay.

4. Field Work

4.1 Field Work Methods

The field work was undertaken on 18 and 19 November 2020 and comprised the drilling of four boreholes (Bores A1 to A4) together with dynamic penetrometer tests (DPTs A3 and A4).

Bores A1 and A2 were drilled using a truck mounted drill rig using a spiral flight auger. Bore A1 was terminated at 7.45 m at the target depth of investigation. Bore A2 was terminated at 4.05 m depth due to refusal in weathered sandstone.

Bores A3 and A4 were drilled using a 100 mm diameter hand auger. Bores A3 and A4 were terminated at the target depths of 1.55 m and 1.50 m respectively. DPTs A3 and A4 were terminated at the target depth of 1.80 m.

A geotechnician from DP drilled Bores A3 and A4 and collected samples for subsequent identification purposes.

The bores were backfilled with auger cuttings at the completion of drilling.

The test locations were set out from existing site features. The coordinates of the test locations were recorded with a hand-held GPS which has a typical accuracy of about ± 5 m. The approximate locations of the tests are indicated on Drawing 1 in Appendix B.

4.2 Field Work Results

The subsurface conditions encountered in the bores are presented in detail in the borehole logs (Bores A1 to A4) in Appendix A. These should be read in conjunction with the accompanying notes attached (Sampling Methods, Soil Descriptions and Symbols and Abbreviations), which explain the descriptive terms and classification methods used in the logs. The results of the dynamic penetrometer tests are shown graphically on the logs and are also tabulated on a separate results sheet in Appendix A.

The subsurface conditions encountered in the bores are summarised in Table 1.

Table 1: Summary of Subsurface Conditions

Bore	A1	A2	A3	A4
Stratum	Depth Range (m)			
Fill - Gravelly Sand: Pale brown	0.0 – 0.3	0.0 – 0.35	-	-
Sandy Silt / Silty Sand / Sand / Clayey Sand: Very stiff and loose to medium dense	0.3 – 2.1	0.35 – 1.3	-	0.0 – 0.65
Silty Clay / Clay / Sandy Clay: Typically stiff to hard	2.1 – 7.45	1.3 – 2.5	0.0 – 1.5	0.65 – 1.5
Sandstone: Extremely weathered.	-	2.5 – 4.05	-	-

The auger cuttings obtained while drilling Bore A3 are shown in Figure 4.

Figure 4: Bore A3 auger cuttings

Groundwater was not observed in the bores during the time they remained open. It should be noted that groundwater levels are affected by factors such as climatic conditions and soil permeability and will vary with time.

5. Comments

5.1 Remedial Options

Remedial options being considered by Richmond Valley Council include stabilisation of the creek bank (eg gabion baskets, sheet piles, vegetation) and road realignment away from the creek (which would require excavation of the adjacent hill).

It appears that the damage has occurred principally through erosion/scour of the creek bank material during high water / flooding events.

Remedial options should address the potential of the site soils to erode. This could include armouring of the creek bank in the impacted area with sound, durable rock boulders

An alternative method for protection may be the construction of a retaining wall within the impacted area.

It is understood that re-alignment of the road is also being considered. It should be noted, however, that depending on the alignment and local topography of the creek and surrounding areas, this may result in more concentrated flows in the creek which may increase the risk of creek erosion.

It is recommended that appropriate drainage (including suitably size pipes/culvert) be installed to prevent overland flow across the surface of Ainsworth Road regardless of the remedial measure adopted.

5.2 Excavations and Batters

If realignment of the road is being considered, it is anticipated that some excavation of the existing hill will be required.

Bore A3 was located at the existing hillside and typically encountered stiff to very stiff sandy clay and clay. The clay and sandy clay material be readily removed using a conventional mini or larger sized excavator.

Given the location and topography at the site, it is anticipated that surface runoff and groundwater seepage, especially following inclement weather, would be likely periodically. Dewatering methods, if required, should be assessed by the contractor at the time of construction.

It should be noted that the prolonged presence of ponded water within the excavation may potentially destabilise the excavation or soften the base of the excavation.

The following geotechnical matters should be considered in design and construction for temporary batters on the site:

- Short term stability of the soil profile. The soils are generally stiff to very consistency. The soil would be expected to stand unsupported in the short term for excavations of up to 2 m, subject to appropriate battering. However, there would be the possibility of localised dry friable lumps dislodging. This may be exacerbated by prolonged exposure and adverse weather. The risk could be reduced by ensuring a short exposure period;
- Temporary batter slopes in the stiff clay should be battered no steeper than 0.75H:1V in the short term for cuts up to 2 m height. Loose material/blocks encountered during bulk excavations should be removed prior to entering excavations. The ground surface should be shaped to direct any seepage and surface runoff away from the slope and batter. Temporary drains should be installed at the crest of the excavation as well as the toe of each slope to direct water away from the excavation. Flatter batters may be required if excessive groundwater seepage or fissured clay is encountered; and
- Permanent cut and fill batter slopes in stiff or stronger clay material up to 2 m high should be battered at 1.5H:1V or flatter and revegetated to prevent erosion. Flatter slopes should be adopted if access is required for maintenance purposes.

5.3 Creek Bank Erosion Protection

Protection against erosion could be provided by the provision of rock/boulders armouring to the existing creek banks.

The boulders should be placed at the base of the creek and extend to above the design flood levels.

Further analysis would be required to comment on the appropriate sizing of the boulders and would require provision of the design water velocity during a flood event. For preliminary design, however, the rock material should have the following characteristics:

- Specific gravity of at least 2.6 (igneous) or 2.4 (sedimentary);
- Saturated unconfined compressive strength of at least 50 MPa (igneous) or 25 MPa (sedimentary);
- No significant quantities of deleterious minerals such as analcime or expansive clay materials;
- Minimum dimension of 0.3 m and a maximum of 0.9 m (subject to further assessment).

The rock armouring should be placed in interlocking layers.

5.4 Retaining Walls

5.4.1 Retaining Wall Options

Retaining walls may be required for support of either a permanent excavation within the upslope hillside cutting or as part of protection measures for the creek bank below Ainsworth Road.

5.4.1.1 Gabion Basket Footings

A gabion, gravity style wall may be appropriate at the site. Further assessment would be required if this option is to be considered further following civil design of the remedial measures (i.e. wall location, height, founding levels).

Gabion baskets founded in loose to medium dense sand or stiff or stronger clay should be proportioned for a maximum allowable bearing pressure of 100 kPa. Appropriate erosion protection should be provided at the base of the gabion baskets. The gabion baskets should preferably be founded below the creek bed design scour level.

5.4.1.2 Sheet Piles

Sheet pile walls could also be used at the site. The piles should have sufficient embedment depth to resist erosion at the toe. Appropriate erosion protection should also be provided on the vertical edges at the extent of the wall. An anchored sheet pile wall would provide a greater level of robustness and resilience to potential for damage from future flooding events.

5.4.2 Retaining Wall Design Parameters

For permanent retaining walls, where the wall will be free to deflect, design may be based on "active" (K_a) earth pressure coefficients, assuming a triangular earth pressure distribution. This would comprise any non-propped or laterally unrestrained walls (e.g. cantilever type walls).

The suggested long term (permanent) design soil parameters are shown in Table 2 below. Any additional surcharge loads, including those imposed by adjacent structures and inclined slopes, during or after construction, should be accounted for in design.

Table 2: Geotechnical Parameters for Retaining Structures (unfactored)

Parameter	Symbol	Clay (stiff or stronger)	Silt / Sand (loose to medium dense)
Bulk Density	γ	18 kN/m^3	18 kN/m^3
Angle of Friction	ϕ'	25°	30°
Active Earth Pressure Coefficient	K_a	0.4	0.33
At Rest Earth Pressure Coefficient	K_o	0.6	0.50
Passive Earth Pressure Coefficient	K_p	2.5	3.0

Backfill placed in and behind the wall should be free-draining (20 mm single size aggregate or coarser) and connected to a rear wall drainage system. A slotted drainage pipe should be placed at the base of the backfill which should all be encapsulated in a geotextile fabric. Alternatively, the retaining wall should be designed for full hydrostatic pressure. Any walls which are to be constructed in areas which may be periodically inundated during flood events should be designed for full hydrostatic forces.

A clay lining, a dish drain or impermeable surface should be formed at the top of the wall backfill to prevent stormwater overland flow surcharging the retaining wall.

Cantilever walls should not be used to support any adjacent structural items (eg road pavement). Where walls are not free to more, they should be designed for the at rest (K_o) earth pressure coefficients outlined above, together with any surcharge, such as sloping ground surface and surface / structural loadings.

5.5 Rock Boulders

It is likely that the placement of rock boulders would provide resistance to erosion as well as structural support to the creek bank. The boulders should be placed at an appropriate angle.

6. References

GSNSW. (2019). *NSW Seamless Geology.* Geological Survey NSW Web Map Service.

7. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at Ainsworth Road, Mongogarie with reference to DP's proposal CFH200158 dated 4 November 2020 and acceptance received from Bradley Herd dated 9 November 2020. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of GeoLink for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Borehole Logs
Results of Dynamic Penetrometer Tests

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

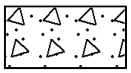
Symbols & Abbreviations

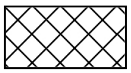
Graphic Symbols for Soil and Rock

General

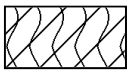

Asphalt

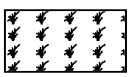

Road base

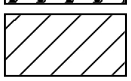

Concrete


Filling

Soils


Topsoil

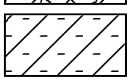

Peat


Clay


Silty clay

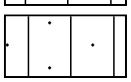

Sandy clay

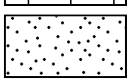

Gravelly clay

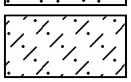

Shaly clay

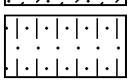

Silt


Clayey silt


Sandy silt

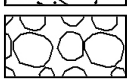

Sand


Clayey sand


Silty sand


Gravel

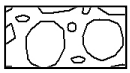

Sandy gravel


Cobbles, boulders

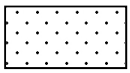

Talus

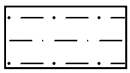
Sedimentary Rocks

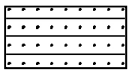

Boulder conglomerate

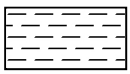

Conglomerate


Conglomeratic sandstone

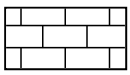

Sandstone


Siltstone

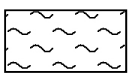

Laminite

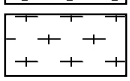

Mudstone, claystone, shale

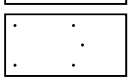

Coal


Limestone

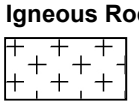
Metamorphic Rocks

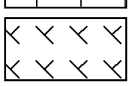

Slate, phyllite, schist

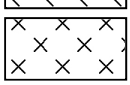

Gneiss

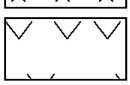

Quartzite

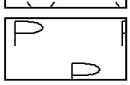
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: GeoLINK
PROJECT: Flood Damaged Pavement and Culvert
LOCATION: Ainsworth Road, Mongogarie

SURFACE LEVEL: 82.9 AHD
EASTING: 488171
NORTHING: 6802470
DIP/AZIMUTH: 90°/--

BORE No: A1
PROJECT No: 105018.00
DATE: 18/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 0mm)
	0.3	FILL: Brown, gravelly sand, with silt, dry, (sand portion: fine), (gravel portion: up to 20mm subangular), trace rootlets		A	0.05				
		Sandy SILT SM: Dark brown, trace clay, w<PL, (sand portion: fine), very stiff		A	0.5				
	1	From 1.0m, grey mottled brown		S	1.0		6,8,13 N = 21		
					1.45				
	2.1	Silty CLAY CI: Dark grey mottled brown, with fine to medium grained sand, w<PL, trace carbonaceous material, very stiff		S	2.5		pp >400 4,8,19 N = 27		
	3				2.95				
	3.5	CLAY CI: Dark grey mottled brown, with silt, trace fine sand, carbonaceous material, w<PL to w~PL, very stiff		S	4.0		pp >400 4,9,11 N = 20		
	4				4.45				
	5								
	6								
	7				7.0				
	7.1	Sandy CLAY SC: Pale grey mottled pale brown, trace silt, trace sandstone gravel up to 30mm, wet, very stiff, residual		S			pp = 250 5,6,10 N = 16		
	7.45	Bore discontinued at 7.45m, limit of investigation			7.45				
	8								
	9								

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Uncased

TYPE OF BORING: SFA to 7.45m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. Handheld GPS; coordinates approximate. RL interpolated from plan supplied by client.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: GeoLINK
PROJECT: Flood Damaged Pavement and Culvert
LOCATION: Ainsworth Road, Mongogarie

SURFACE LEVEL: 82.8 AHD
EASTING: 488197
NORTHING: 6802453
DIP/AZIMUTH: 90°/--

BORE No: A2
PROJECT No: 105018.00
DATE: 18/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 0mm)
	0.35	FILL: Pale brown, gravelly sand, trace clay, dry, (sand portion: fine), (gravel portion: up to 30mm subangular), trace rootlets, grassed surface.		A	0.05				
		Silty SAND SM: Fine grained, brown, trace organics, dry, medium dense		A	0.5				
	1.3			S	1.0		pp = 400 4,7,7 N = 14		
		Silty CLAY CI: Dark grey mottled browm, with fine sand, w<PL, stiff			1.45				
	1.8	Sandy CLAY: Pale grey mottled pale brown and red brown, trace silt, gravel, w<PL, (gravel portion: up to 15mm subangular), (sand portion: fine to medium grained), hard, residual							
	2.5	SANDSTONE: Red brown and pale brown, extremely weathered material		S	2.5		pp = 400 8,25/140,- refusal		
					2.79				
				D	3.6				
					3.75				
				S			18,25/150,- refusal		
	4.05	Bore discontinued at 4.05m, refusal			4.05				

RIG: DT100 **DRILLER:** Hickman **LOGGED:** Cudmore **CASING:** Uncased

TYPE OF BORING: SFA to 4.05m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. Handheld GPS; coordinates approximate. RL interpolated from plan supplied by client.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: GeoLINK
PROJECT: Flood Damaged Pavement and Culvert
LOCATION: Ainsworth Road, Mongogarie

SURFACE LEVEL: 83.2 AHD
EASTING: 488174
NORTHING: 6802454
DIP/AZIMUTH: 90°/--

BORE No: A3
PROJECT No: 105018.00
DATE: 19/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.5	Sandy CLAY CI: Medium plasticity, brown, trace silt, w<PL, stiff, trace rootlets, residual		A	0.2				
	1	CLAY CH: High plasticity, orange brown, with sand, w<PL, very stiff, residual		A	0.6				
				A	1.0				
				A	1.2				
	1.55			A	1.5				
		Bore discontinued at 1.55m, limit of investigation							

RIG: Hand tools **DRILLER:** Roberts **LOGGED:** Ussher **CASING:** Uncased

TYPE OF BORING: 100mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. Handheld GPS; coordinates approximate. RL interpolated from plan supplied by client.

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: GeoLINK
PROJECT: Flood Damaged Pavement and Culvert
LOCATION: Ainsworth Road, Mongogarie

SURFACE LEVEL: 80 AHD
EASTING: 488187
NORTHING: 6802471
DIP/AZIMUTH: 90°/--

BORE No: A4
PROJECT No: 105018.00
DATE: 19/11/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.1	SAND SP: Medium grained, pale brown, trace rootlets, w<PL, loose, alluvial		A	0.05				
				A	0.3				
		Clayey SAND SC: Medium grained, brown, trace gravel, w<PL, medium dense, alluvial		A	0.6				
	0.65	From 0.55 trace wood pieces							
	1	Sandy CLAY CI: Intermediate plasticity, grey mottled brown, w~PL, stiff, alluvial		A	1.0				
				A	1.4				
	1.5	Bore discontinued at 1.5m, limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: Hand tools **DRILLER:** Roberts **LOGGED:** Ussher **CASING:** Uncased

TYPE OF BORING: 100mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates are in MGA94 Zone 56. Handheld GPS; coordinates approximate. RL interpolated from plan supplied by client.

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
18 Lawson Crescent
Coffs Harbour NSW 2450
Phone: (02) 6650 3200

Results of Dynamic Penetrometer Tests

Dynamic Cone Penetrometer - DCP

Client GeoLink **Project No.** 105018.00

Project Flood Damaged Pavement and Culvert **Date** 19/11/20

Location Ainsworth Road - Mongogarie **Page No.** 1 of 1

Test Location	A3	A4								
Depth (m)	**Penetration Resistance** Blows/150 mm									
0.00 - 0.15	6	8								
0.15 - 0.30	8	9								
0.30 - 0.45	19	10								
0.45 - 0.60	21	13								
0.60 - 0.75	12	12								
0.75 - 0.90	10	9								
0.90 - 1.05	10	13								
1.05 - 1.20	9	17								
1.20 - 1.35	12	12								
1.35 - 1.50	19	7								
1.50 - 1.65	22	5								
1.65 - 1.80	23	3								
1.80 - 1.95										
1.95 - 2.10										
2.10 - 2.25										
2.25 - 2.40										
2.40 - 2.55										
2.55 - 2.70										
2.70 - 2.85										
2.85 - 3.00										
3.00 - 3.15										
3.15 - 3.30										
3.30 - 3.45										
3.45 - 3.60										

Test Method AS 1289.6.3.2, Cone Penetrometer (●) **Tested By** JR

AS 1289.6.3.3, Sand Penetrometer ( ) **Checked By** RU

Remarks Ref = Refusal, 24/110 indicates 24 blows for 110 mm penetration

Appendix B

Drawing 1 - Test Location Plan

Legend

Approximate Borehole Locations

Drawing adapted from Google Earth imagery dated 04/04/2020 and drawing by Byron Bay Surveying Pty Ltd, titled "Plan of Detail Survey", DWG No. CAS008AR.DWG, Rev0, dated 07-12-2020

0 10 20 30 40 50 m

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Geotechnics | Environment | Groundwater

CLIENT:	GeoLink		
OFFICE:	Coffs Harbour	DRAWN BY:	Ussher
SCALE:	1:500 @ A3	DATE:	18-12-2020

TITLE: **Test Location Plan**

Flood Damaged Pavement and Culvert

Ainsworth Road - Mongogarie

N

PROJECT No:	105018.00
DRAWING No:	1
REVISION:	0

Attachment C

EPBC Act Protected Matters Report

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-Feb-2022

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	34
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cyclopsitta diophthalma coxeni		
Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Falco hypoleucos		
Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster		
Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
FROG		
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat may occur within area
INSECT		
Argynnis hyperbius inconstans		
Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
MAMMAL		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Angophora robur		
Sandstone Rough-barked Apple [56088]	Vulnerable	Species or species habitat may occur within area
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Cryptocarya foetida		
Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Eucalyptus glaucina		
Slaty Red Gum [5670]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus tetrapleura		
Square-fruited Ironbark [7490]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat likely to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Symposiachrus trivirgatus as Monarcha trivirgatus		
Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State
North East NSW RFA	New South Wales

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
330 kV Transmission Line, 205km in Length	2010/5326	Controlled Action	Completed
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed

Bioregional Assessments

SubRegion	BioRegion	Website
Clarence-Moreton	Clarence-Moreton	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

Attachment D

Aboriginal Heritage Information Management System report (AHIMS)

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Ainsworth Road

Client Service ID : 671988

Richmond Valley Council

Date: 31 March 2022

Locked Bag 10
Casino New South Wales 2470

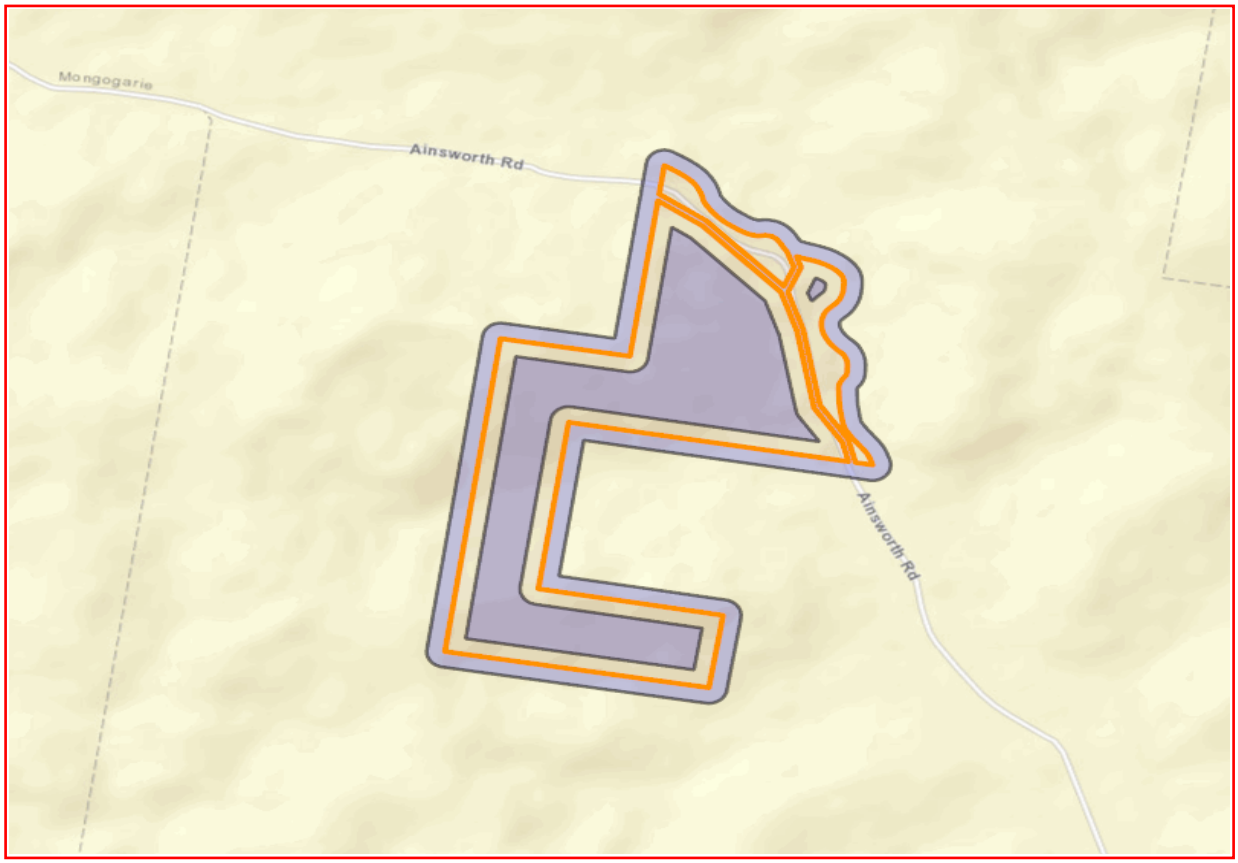
Attention: Lani Hancock

Email: lani.hancock@richmondvalley.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 95, DP:DP755618, Section : - with a Buffer of 50 meters, conducted by Lani Hancock on 31 March 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

UNEXPECTED FINDS CONTINGENCY PLAN

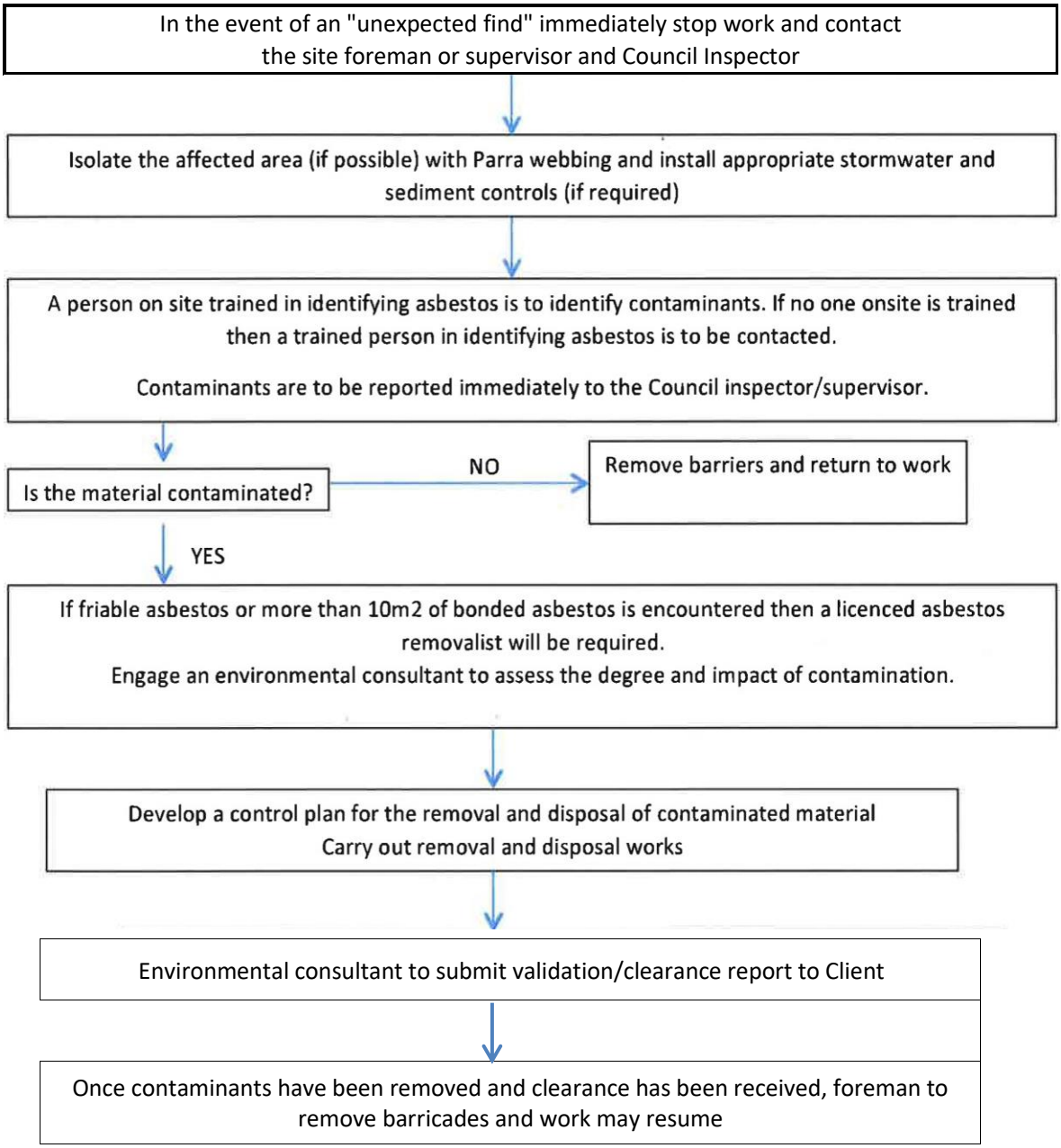
Where earthworks are required there is potential to expose unexpected forms of contamination within the surface and subsurface. In such instances, action is required to mitigate potential contaminated soil/material encountered during excavation or construction activities.

Unexpected finds include:

- Suspected Bonded (roofing, Asbestos pipes, asbestos weatherboard) or Friable asbestos contamination both buried or on the surface
- Unexpected building debris buried

If you encounter unexpected finds stop work immediately or as soon as it is safe to do so in the affected area; move upwind and away from the area and immediately notify the site foreman and/or supervisor.

Should you encounter an unexpected find, please follow the flowchart protocol below:



Attachment E

Environmental Management Plan

MCS Civil (NSW) Pty Ltd

Construction Environmental Management Plan

Ainsworth Road Embankment Stabilisation Project

Project No: 22003

This document has been developed by:

Colm Lawton Project Manager

MCS Civil (NSW) Pty Ltd

Table of Contents

1. Introduction 4

1.1 Purpose and Scope 4

1.2 Project Overview 4

1.3 Site Overview 5

2. Environmental Policy 6

2.1 Environmental Policy 6

2.2 Objectives and Targets 6

2.2.1 Project Objectives 6

2.2.2 Element-Specific Objectives and Targets 6

3. Legislative and Other Requirements 6

3.1 Legislative Requirements 7

3.2 Licences, Permits and Approvals 8

4. Risk Identification and Assessment 8

4.1 On-Going Risk Assessment 10

4.2 Working Hours 10

4.2.1 Standard Hours 10

5. Sensitive Areas 11

6. Environmental Management Sub-Plans 11

6.1 Heritage Management 11

6.2 Work Method Statements 11

7. Roles and Responsibilities 12

8. Environmental Incidents, Non-Conformance and Complaints 13

8.1 Environmental Incidents 13

8.1.1 Preparedness 14

8.1.2 Notification 14

8.2 Non-Conformance Reports (NCRs) 14

9. Monitoring and Inspections 15
9.1 Environmental Monitoring 15
9.2 Site Inspections 15
10. Communication 16
10.1 Community Communications 16
10.2 Complaints 16
10.2.1 Telephone Contact Line 16
10.2.2 Complaints Management 16
10.3 Internal Communication 17
10.3.1 Meetings 17
10.4 External Communication 17
10.4.1 Regulatory Authorities 17
10.4.2 Media 17
11. Training and Awareness 18
11.1 Site Induction 18
12. Emergency Plan and Response 18
13. CEMP Review 19
14. Contacts 20
15. Cultural Heritage Management Plan 21

MCS Civil (NSW) Pty Ltd

1. Introduction

1.1 Purpose and Scope

MCS CIVIL (NSW) Pty Limited (MCS) has developed this Construction Environmental Management Plan (CEMP) to provide a framework for management of all environmental aspects associated with the Embankment Stabilisation works at Ainsworth Road, Mongogarie NSW 2470

The primary purpose of the CEMP is to describe the management systems and procedures which will be adhered to in achieving project environmental objectives and goals. The CEMP is the overarching project reference for environmental management throughout the construction phase. It describes how MCS proposes to manage and control environmental aspects and potential impacts of the project, through both project-wide and element-specific approaches. The CEMP prescribes all applicable procedures, processes and practices to be undertaken by MCS and subcontractors in order to manage environmental risks, effectively minimise impacts on the surrounding environment, and ensure compliance with regulatory and other obligations throughout project delivery.

The CEMP, its Sub-Plans and procedures will be applicable to all project works, employees and subcontractors during construction of this project.

The Construction Environmental Management Plan (including all Sub Plans) is consistent with:

- AS/14001:2004; and
- Environmental documents prepared for the Project

The CEMP is designed to be a flexible document providing continual feedback and improvement throughout its life. If a non-conformance is detected in the CEMP and/or the associated sub plans, if project implementation methodologies change, or if safeguard methodologies improve, the CEMP will be modified so that it remains continually effective in managing environmental impacts from the project.

1.2 Project Overview

MCS has been engaged by Richmond Valley Council to undertake Embankment Stabilisation and Culvert works as part of a Flood Works Package with the project located at Ainsworth Road, Mongogarie NSW 2470.

The work required to be carried out by MCS under the contract includes the following elements:

- Site clearing and construction area establishment.
- Site Clearance, Earthworks for the Installation of Base Boulders
- Excavation and removal/ stockpiling of materials
- Removal of existing culvert

- Installation of FC base and placement of new culvert
- Scour protection and Erosion control
- Excavate and re-shape bank, remove loose materials
- Placement of Boulders (base foundation)
- Site clean-up and reinstatement.

Figure 1 : Location Map

1.3 Site Overview

The site is located on Ainsworth Rd an unsealed, off Mongogarie road which is a remote road providing access for local landowners residents and transport companies.

Due to the remoteness of the structure locations and current load restrictions, we do not envisage a large amount traffic disruption during site activities.

It is not expected to encounter contaminated soil during the works.

MCS Civil (NSW) Pty Ltd

2. Environmental Policy

2.1 Environmental Policy

MCS will ensure that the requirements of this policy are communicated and implemented by all relevant personnel involved with the Project. This policy may be updated as required throughout the project. MCS environmental policy complies with ISO 14001:2004.

2.2 Objectives and Targets

2.2.1 Project Objectives

In broad terms, the environmental objectives to which MCS adhere are to:

- Comply with all environmental legislation applicable to project works;
- Meet or exceed all statutory obligations applicable to project works;
- Meet or exceed all licence, permit and approval requirements;
- Promote respect for cultural and community values;
- Foster a positive culture towards environmental management to contribute to overall environmental performance;
- Maintain and integrate formal environmental management systems (including ISO 14001 conformance) into project works;
- Encourage ethical practices which reflect commitment to Duty of Care by all project personnel, subcontractors and suppliers; and
- Promote and record efficient use of resources.

2.2.2 Element-Specific Objectives and Targets

Objectives and Targets specific to each environmental element are described in each Environmental Management Sub-Plans.

3. Legislative and Other Requirements

The key legislative and other requirements which apply to or may affect project works arise from the following sources:

- Key Legislation: Section 3.1 indicates key pieces of environmental legislation which apply to project works. Legislation specific to certain environmental elements are also identified within Environmental Management Sub-Plans.
- Licences, Permits and Approvals: Section 3.2 lists all licences, permits and approvals which apply to project works.
- Other Requirements: Section 3.3 lists all other requirements including Environmental Planning Policies, standards, specifications, codes of practice and other documents pertaining to environmental management requirements during construction.

3.1 Legislative Requirements

The following pieces of environmental legislation apply directly to project works. Legislation specific to certain environmental elements are also identified within Environmental Management Sub-Plans.

Table 3.1 Project Environmental Legislative Requirements

Legislation	Requirement
Environmental Protection and Biodiversity Conservation Act 1999	Under the EPBC Act, any action that has, or is likely to have, a significant impact on a Matter of National Environmental Significance (MNES) may progress only with the approval of the Commonwealth Minister for the Environment. The REF for the Project has concluded that the proposal is not likely to significantly impact on a Matter of National Environmental Significance
Protection of the Environment Operations Act 1997	MCS has a duty to undertake works in accordance with the POEO (thereby minimising the potential for pollution of the surrounding environment) and to immediately inform EPA of pollution incidents causing environmental harm defined under part 5.7 of the Act.
Environmental Planning and Assessment Act 1979 (and Regulation 2000)	The proposed activity requires assessment under Part 5 of the EP&A Act. Section 111 of the EP&A Act requires that the determining authority examine and take into account to the fullest extent possible, all matters affecting, or likely to affect the environment by reason of the activity.
Heritage Act 1977	No identified Heritage items, sites or artefacts have been identified for the Project area in the REF. If unexpected non-indigenous heritage items are discovered, works will be stopped in that area and in accordance with section 146(a) of the Act the Heritage Council shall be notified
Water Management Act 2000	The Principal is exempt from the need to obtain 'Controlled Activity' Approvals under this Act. The proposed works do not constitute a 'Controlled Activity', approval under Section 91(E) is not required.

Legislation	Requirement
Contaminated Land Management Act 1997	Whilst no contaminated land has been identified for the Project, MCS is required to identify, report and manage any identified land contamination in accordance with the CLM Act. This will be done as per our Contaminated Land Management Sub-Plan.
National Parks and Wildlife Act 1974	No identified Aboriginal items, sites or artefacts have been identified for the Project area. If unexpected Aboriginal heritage items are discovered, works will be stopped in that area and RVC shall be notified
Noxious Weeds Act 1993	MCS is required to control the spread of noxious weed off site and to report findings of certain weed types.
Waste Avoidance and Resource Recovery Act	MCS will address the objectives of this Act via the Project Waste Management Plan.
Rural Fires Act 1997	MCS will ensure steps are taken to prevent occurrence of bushfires on and minimise danger of spread of bushfire on or from, Project lands. See MCS Safety Management Plan.
Road and Rail Transport (Dangerous Goods) Act 1997	MCS will ensure dangerous goods are transported in a safe manner and in compliance with relevant regulations. Drivers and vehicles will be appropriately licensed.
TfNSW Code of Practice Minor Works in NSW Waterways	MCS will address the objectives of this Code of Practice
Blue Book: Managing Urban Stormwater: Soils and Construction, (Landcom, 2004)	MCS will address the objectives of the Blue Book and implement a sediment control plan accordingly

3.2 Licences, Permits and Approvals

Environmental licences, permits and approvals pertaining to the works are listed in the project's Licences, Permits and Approvals Register.

4. Risk Identification and Assessment

Activity (aspect)	Potential Environmental Impact	Control Measures
Initial clearing / grubbing	Dust generation impacting on health and amenity of community, flora and fauna	Minimal clearing of the construction area. Workers to report location of endangered Flora and Fauna species if

Activity (aspect)	Potential Environmental Impact	Control Measures
	Clearing of flora and fauna habitat, impacts on listed threatened species and communities Erosion and sedimentation due to exposed soils	not already delineated from the work zone. No Clearing has been identified as required
Site excavation	Damage to flora and fauna habitat, impacts on listed threatened species and communities Exposure of contaminated soils during drilling Exposure of Acid Sulphate Soils during excavations Exhaust emissions from operating machinery Noise generation	Workers to monitor and notify project engineer of any contamination present in the spoil Workers to report location of endangered Flora and Fauna species if not already delineated from the work zone Keep all plant in good working order Operate plant within approved working hours
Refuelling plant onsite	Ground contamination due fuel spills Fire hazard	Ensure Spill Kits are located with plant at all times. Employees to be trained in the use of spill kits. Approved method of transportation and dispensing Grounded Hose to pump Nozzle to be placed in tank filler prior to climbing on machine or passed up by assistant Employees to be aware of SDS prior to refuelling Refuel in safe area away from waterways, drains, gutters, etc
Plant breakdown – Burst Hydraulic hose/seals on rams leaking oil	Ground contamination due to Hydraulic spills	Regular plant check-ups and servicing Turn of engine immediately if hydraulic leak is caused by a burst hose. Ensure Spill Kits are located with plant at all times. Employees to be trained in the use of spill kits. Employees to be aware of SDS prior to undertaking work.
Concrete works associated with culvert	Concrete contaminating farmland and water ways	Ensure a washout pit is established at site compound Cleanout of washout pits once work is competed at location Set up plastic bund under concrete pump to trap any spills during pouring works

Activity (aspect)	Potential Environmental Impact	Control Measures
Placing of Gabion boxes and mattresses including placement of boulders	No negative environmental impact	Environmental controls still to be established
Construction Waste - Poor management of ordering and disposing of construction materials.	Increase level of construction waste sent to landfills	Appropriate collection, recycling and disposal of construction waste products Correct ordering of concrete volume to reduce the amount of waste sent off site for dumping.
Portable toilet septic tank sludge disposal	Uncontrolled and illegal disposal of septic tank sludge	Keep records of the movement/management of waste and provide EPA documentation

4.1 On-Going Risk Assessment

Environmental risk assessment will be on-going throughout project delivery. Emphasis will be placed on any changes to construction methodology, changes in materials used, and works within or adjacent to sensitive receiving environments. The Environmental Representative will be responsible for management of risk identification and assessment in consultation with the project team. Forums for facilitation of risk identification include:

- Project Meetings
- Toolbox Meetings
- Informal site discussions
- Regular site inspections
- Work Method Statements
- Job Hazard Analyses

4.2 Working Hours

4.2.1 Standard Hours

In accordance with MCS's Environmental Operating Requirements, the approved working hours is:

a. Dayshift - Restricted to between 7am to 5pm; Monday to Saturday
b. Not to take place on Public Holidays.
c. Shift Cycles – 13 days on, 1 day off minimum.

MCS Civil (NSW) Pty Ltd

5. Sensitive Areas

A Creek adjacent to Ainsworth road is a known key fish habitat. Erosion and sediment controls will be fish friendly.

Temporary crossings will:

- Be 'fish friendly' with a lower section of the temporary crossing provided to act as an emergency spillway.
- Be used for the shortest time required to complete their designed operational function.
- Use material that will not result in fine sediment material entering the waterway.
- Where rock crossings are used, the rock will be of suitable size to prevent / reduce the likelihood of the material being washed away in a storm or flood event, with large sized rock on the lower side of crossings where water velocity increases.

6. Environmental Management Sub-Plans

6.1 Heritage Management

The Principal has not identified any items of Aboriginal or non-Aboriginal heritage in the Project impact area and has determined that the Project would be unlikely to result in direct and/or indirect impacts on Aboriginal or non-Aboriginal heritage.

During the construction of the Project, should archaeological material be unexpectedly uncovered during construction, all works would cease within the vicinity of the material/find and the Principal would be notified immediately.

All site personnel would be made aware of the procedure of the Australian Cultural Heritage Management (ACHM) as part of the Project induction. Procedure attached to this document.

6.2 Work Method Statements

A series of WMS will be prepared to address the combined safety and environmental impacts of construction activities.

Monitoring, inspecting and auditing against compliance with the WMS will be undertaken by MCS management personnel, as part of the Project Engineer weekly inspection, to ensure that all controls are being followed and that any non-conformances are recorded, and action taken.

MCS Civil (NSW) Pty Ltd

7. Roles and Responsibilities

Key responsibilities according to roles on the Project are outlined below. This is not considered an exhaustive list. More detailed descriptions of individual responsibilities will be included in activity-specific WMS.

Title	Description of Role
Project Manager	Review and approval of all Project Environmental Management Plans, including the CEMP and minor revisions. Provision of adequate environmental training to all staff, subcontractors and visitors to the site. Reporting of all observed environmental inadequacies to the relevant staff member for appropriate remedial action. Operate as the representative contact point with EPA (including as 24-hour contact person) and other relevant Government bodies. Monitor register of environmental complaints and any subsequent remedial action. Ensure all requirements requested by the Client are acted upon by all personnel and sub-contractors. Monitor construction activities against the conditions of approval to evaluate compliance with the EMS.
Project/Site Engineer	Ensure training/induction of personnel is carried out and that staff operate in an environmentally responsible manner. Report on environmental incidents, liaise with the Client on corrective actions and verify environmental measures as requested by the Client. Maintenance of the project environmental management plans including preparing the CEMP and minor revisions. Produce WMS which address environmental requirements Conduct regular checks of the site to ensure environmental controls such as sediment controls and dust suppression are functioning effectively Manage subcontractors to ensure that any work performed by these external parties meets with the requirements of this CEMP, including identifying and documenting the environmental risks of the proposed works Operate as 24-hour contact person for EPA Report any non-compliance with the CEMP.
Supervisor	Monitor daily work routines so that environmental protection requirements are communicated to all personnel and contractors under his control. Assist in verification of environmental measures as requested by the Environmental Site Representative. Rectify work as directed by Project Engineer to comply with environmental requirements Report on environmental incidents Ensure the implementation of the CEMP on a day-to-day basis. Monitor construction activities against the conditions of approval to evaluate compliance with the EMS, including a minimum weekly site inspection. Escort environmental auditors and brief them on site related issues.
Subcontractors	Ensure work instructions reflect the requirements of this CEMP Ensure all requirements of the CEMP relevant to their work activities are implemented Nominate a representative to liaise with MCS Project Engineer

Title	Description of Role
	Comply with relevant legislation Ensure all required records/documentation are maintained and submitted to MCS Ensure training/induction of personnel is carried out and that staff operate in an environmentally responsible manner. Undertake and report on all monitoring and inspections completed. Report all environmental incidents and near misses.
All Staff	Attend environmental site inductions and training relevant to their activities Consult with Environment Staff prior to the commencement of all activities to ensure environmental and planning requirements are documented, conveyed to relevant staff and implemented. Implement control measures identified in the CEMP Report all environmental incidents and near misses.

8. Environmental Incidents, Non-Conformance and Complaints

8.1 Environmental Incidents

An environmental incident may, amongst other things, include a fuel or hazardous material spillage, a major leak, failure of a pollution control device such as a bund or basin, fire (e.g., loss of ground cover vegetation) or damage to protected vegetation or animals in the Project corridor.

Environmental Incidents will be investigated and reported upon in accordance with MCS Incident and Accident Management Policy . Any Environmental Incidents will be immediately reported to the Project Engineer or Project Manager, who will report the incident to the Client as per project requirements.

In the event of serious or material environmental harm MCS will notify the relevant regulatory authorities as per State / Territory requirements as outlined in the Incident and Accident Management Policy Where necessary, MCS will also notify the respective property owners or occupiers within 24 hours of the incident occurring.

An incident will be reported if any of the following scenarios occur or have the potential to occur:

- Serious Environmental Harm;
- Material Environmental Harm;
- Prosecution by a Regulatory Authority;
- Environmental Approval condition breach; or
- Environmental monitoring parameter breach.

Incidents will be reported both verbally and in writing. Details of any environmental incident will be investigated and entered into the MCS's Incident and Accident Register. Additionally, this information will be forwarded to the Client. Verbal notification will be provided immediately (no longer than two hours), and written notification will be forwarded as per project requirements. All Incidents and Accidents shall be recorded in the MCS's Incident and Accident Register.

8.1.1 Preparedness

The key to effective prevention of incidents is risk assessment, procedure development, monitoring and training. During construction activities, MCS's inspections and preventive actions will include:

- Activity specific and daily risk assessments
- Daily inspections of active work sites
- Issue and quick close-out of non-compliance notices
- Environmental audits of work sites, subcontractors and compliance issues.

Environmental and safety information on hazardous substances (e.g., SDS) will be available for all MCS personnel and subcontractors.

8.1.2 Notification

A person conducting a business or undertaking must notify the principal contractor immediately of a notifiable incident as defined by legislation i.e., an incident that has or is likely to cause environmental harm.

The person giving notice by telephone (and if required by the regulator) must give a written notice of the incident to the relevant regulator within 48 hours of that requirement being made.

The Project Manager will appoint a senior member of staff (Project Manager or Project Engineer) to liaise with interested parties (regulatory authorities) in the event of a notifiable incident.

Media contact will need to be managed by Richmond Valley Council.

Emergency Contact / Organisation	Contact Details	Email
EPA NSW	131 555	info@epa.nsw.gov.au

8.2 Non-Conformance Reports (NCRs)

Non-conformance with any environmental project requirement will be managed and reported upon in accordance with the MCS Incident and Accident Management Policy. In the event of any non-conformance with any regulatory or other requirement as set out in CEMP and corrective action/s shall be raised.

MCS Civil (NSW) Pty Ltd

9. Monitoring and Inspections

9.1 Environmental Monitoring

The Environmental Monitoring program will be the responsibility of the Project Engineer/Site Manager (or Project Manager's nominee), and will include:

- Sufficient training of personnel;
- Arranging specialist consultants when required;
- Coordination of monitoring equipment and materials;
- Coordination of sample collection, documentation and delivery;
- Ensuring frequency and methodology is in accordance with all Licences, Permits, Approvals, Australian Standards and any other industry standards;
- Data management and representation of results; and
- Reporting Non-conformances and implementing corrective actions.

9.2 Site Inspections

Environmental site inspections will be undertaken by various project personnel to assess the adequacy and effectiveness of environmental controls. These inspections will address the following as a minimum:

1. High risk activities and processes;
2. Work in environmentally sensitive areas; and
3. Site preparation for adverse weather conditions.

Responsibilities for environmental inspections on the project are summarised below:

- Site supervisory staff (Foremen) will conduct daily inspections of areas under their supervision, including assessment of environmental controls and issues. Daily inspections will be documented in Daily Diaries.
- Site supervisory staff will conduct weekly inspections by completing Weekly Environmental Checklists. Environmental issues arising will be immediately addressed for rectification.
- Any MCS staff member or subcontractor may raise an environmental issue through their supervisor.

10.Communication

10.1 Community Communications

In partnership with the Client, MCS acknowledges that the nature of the project will require clear protocols and procedures to ensure minimal impacts on the landowners and the Client's public repute.

MCS will ensure that all relevant stakeholder communication is undertaken in accordance with Richmond Valley Council's Construction SQE Manual.

10.2 Complaints

10.2.1 Telephone Contact Line

There will be placed signage with the Principal's contact details at every site location prior to commencement of construction.

10.2.2 Complaints Management

A complaints register will be maintained by the Project Engineer with the following records for all complaints and enquiries:

- Date and time of complaint
- The method by which the complaint was made (telephone, letter, meeting, etc.)
- Name, address, contact telephone number of complainant (if no such details were provided, a note to that effect)
- Nature of complaint
- Action taken in response including follow up of contact with the complainant
- Any monitoring to confirm that the complaint has been satisfactorily resolved
- If no action was taken, the reasons why no action was taken

This process enables the management of the receipt and response to issues and reports.

All project staff will be advised of the procedures to be followed on receipt of a complaint during the project induction.

MCS will notify the Client within 48 hours upon receipt of a complaint and provide details of the complaint.

Initial response to all telephone and email complaints received by MCS from the public will be within 4 hours of the representation being received. When a complaint cannot be resolved within four hours, a follow-up verbal response on what action is proposed will be made to the complainant/enquirer within four hours.

10.3 Internal Communication

Regular project management and coordination meetings will be held to monitor progress, discuss issues and plan upcoming construction activities. Environmental management will be a mandatory agenda item at such meetings. All project communication shall be conducted as per MCS HSE Communication Management Policy

.

10.3.1 Meetings

Meetings where environmental issues are identified and discussed will include:

- Daily Prestart Meetings – a forum where all construction personnel have the opportunity to raise concerns, where specific environmental works can be discussed and delegated, and where general environmental issues can be relayed to the workforce. Items are to be recorded on the MCS Prestart Talk and Site Attendance Record form.
- Weekly / Fortnightly Toolbox Meetings – environmental issues may be discussed as required. Specific Toolbox Meetings may be held following an environmental incident to ensure team is aware of issue and preventative measures are communicated.

Minutes of all formal meetings will be recorded and distributed to relevant personnel.

10.4 External Communication

10.4.1 Regulatory Authorities

Communication with a range of Regulatory Authorities shall be undertaken if required. This communication shall be through the Project Manager.

10.4.2 Media

All contact with the media shall be through the Client. Under no circumstances are project staff to engage with the media.

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11. Training and Awareness

11.1 Site Induction

Communication of CEMP requirements and individual environmental responsibility will commence with the compulsory site induction. The site induction will ensure all project personnel, subcontractors, consultants and visitors become familiar with the environmental management obligations and requirements of the project. The project site induction will outline the following:

- Purpose and objectives of the CEMP
- General Environmental Duty / Duty to Notify
- Site emergency / incident reporting requirements
- Sensitive or protected environmental areas on and surrounding site
- Project environmental risks and mitigation measures

Requirements of the CEMP will be revisited on occasion through site Toolbox meetings. Timing and content of such meetings will be aligned with the Project works programme.

12. Emergency Plan and Response

Emergency Planning and Response will be implemented in accordance with MCS Emergency Response Management Policy and have been developed for emergency situations which may impact upon the environment.

A Site Emergency Plan has been developed for the following potential incidents/emergencies:

Incident / Emergency	Potential Impact	Contingency Response Measures
Major Oil or Fuel Spill	Contamination of waterways; intertidal and marine environments. Contamination of soil. Prosecution.	All work to stop immediately in vicinity. Spill Response (hydrocarbons) kits and equipment deployed. Use all available resources to contain and clean up spill. Contact additional consultants or subcontractors if required. Notify relevant authorities. Implement incident reporting procedures.
Major Chemical Spill	Contamination of waterways; intertidal and marine environments. Contamination of soil.	All work to stop immediately in vicinity. Spill Response (chemical) kits and equipment deployed. Use all available resources to contain and clean up spill.

Incident / Emergency	Potential Impact	Contingency Response Measures
	Prosecution.	Contact additional consultants or subcontractors if required. Notify relevant authorities. Implement incident reporting procedures.
Major Sediment Discharge	Contamination of waterways; intertidal and marine environments. Risk to aquatic fauna. Prosecution.	All work to stop immediately in vicinity. Reinstate controls if required. Install new controls if required. Apply flocculants if required. Commence clean-up activities. Contact additional consultants or subcontractors if required. Notify relevant authorities. Implement incident reporting procedures.

13. CEMP Review

The CEMP, its operation and implementation, and any elements of the overarching Environmental Management System will be periodically reviewed during project delivery.

Formal review of the CEMP may not be required due to the short duration of the Project. Triggers for review may include:

- Corrective or Preventative Actions are raised through the reporting process requiring amendments to the CEMP;
- Changes to relative legislative or regulatory requirements;
- Significant changes to any constituent of project construction;
- Request by the Client or any regulatory authority;
- Significant changes to the environment;
- Changes to Best Practice Environmental Management; or
- Identification of new environmental risks.

The Environmental Representative (or Project Manager's nominee) will be responsible for review and amendment of the CEMP. If updated at any stage of the project, a revised copy will be submitted to all relevant stakeholders.

14. Contacts

Internal Contacts Position	Name	Phone
Construction Manager	Roy Hendy	0429 050 392
Project Manager	Matthew Hume	0448 944 919
External Contacts	**Name**	**Phone**
Emergency Services	Police, Fire, Ambulance	000
Casino Police Station		02 6662 0099
Casino Hospital		02 6660 0500
Poisons Information Centre		13 11 26
EPA NSW		13 15 55
Essential Energy		13 20 80
Telstra		13 22 03
DBYD		1100
Richmond Valley Council	Lani Hancock	0418 205 344

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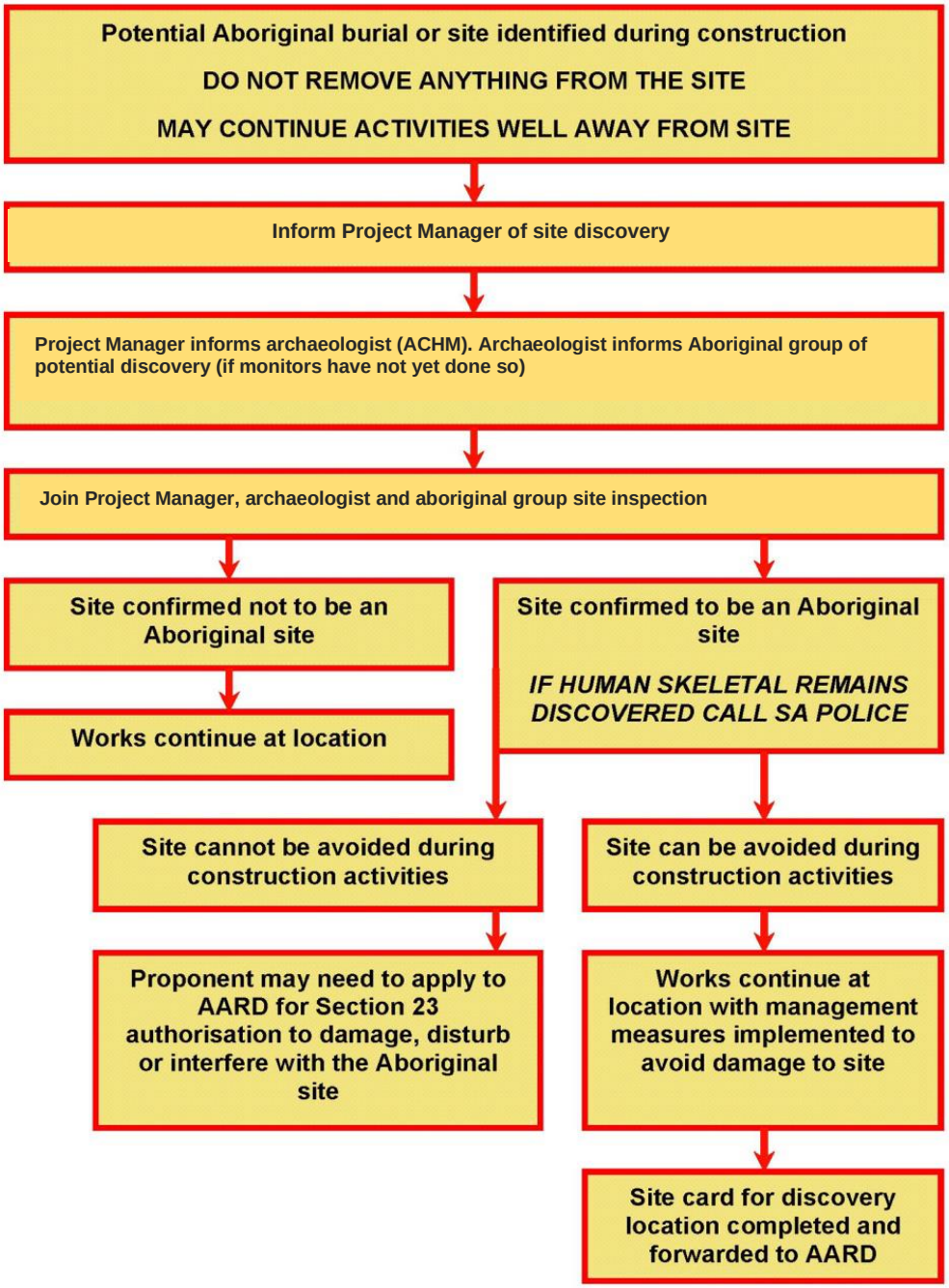
15. Cultural Heritage Management Plan



Attachment F

Proposed Methodology

MCS Civil (NSW) Pty Ltd

Civil - Rail -Plant - Labour

Contract:

Embankment Stabilisation Works at Ainsworth Road, Mongogarie NSW 2470

Project Methodology and Works Plan

MCS Civil (NSW) Pty Ltd

Civil - Rail -Plant - Labour

WORK METHODOLOGY – EMBANKMENT STABILISATION/ CULVERT WORKS AT AINSWORTH ROAD, MONGOGARIE NSW 2470

1 General

The Method Statement is an outline of the proposed MCS Civil (NSW) Pty Ltd ("MCS") project methodologies, construction techniques and procedures for the Embankment Stabilisation Works on Ainsworth Road, Mongogarie.

The Richmond Valley Council area lies in the beautiful Northern Rivers region of NSW and extends from the coastline at Evans Head to the foothills of the Great Dividing Range to the west, interspersed with State forests, national parks and nature reserves.

Ainsworth Road is an unsealed rural road located in Mongogarie.
The Ainsworth Road Embankment stabilisation project is part of the Flood repairs package of the Richmond Valley Council.

The Work Methodology describes a basic outline of equipment and processes required to complete the works but will be expand in more detail prior to construction being undertaken. Protection to stabilise a road embankment with rock boulders and scour protection, replace culverts and reshape swales, and reconstruct, reshape and re-sheet unsealed road with a 50mm overlay using Council approved flood blend as per the design drawings. This method statement is intended to work in conjunction with the following documents during delivery of works to ensure quality, safety & efficiency:

- Construction program
- Lot configurations (site specific)
- Service Investigation Methodology - location and marking of utility services and mains
- Inspection & Testing Plans (ITPs)

2 Site Set Up

MCS will establish environmental control to the designated laydown yard on the southwest side of the site. This area will primarily be used for the storage of equipment and materials, MCS Civil (NSW) do not anticipate large amounts of spoil will need to be stored in this area as there is only minor filling required on the project. If spoil needs to be removed from site it shall be done direct from excavation offsite to avoid double handling.

Daily Prestarts will occur at the Laydown yard to ensure unwanted or unneeded vehicles and plant do not congest the work site. Prestart's will be documented and signed by all onsite staff at the beginning of each shift and stored at the site office.

3 Construction Methods

Construction of the proposed bridge would involve the following:

- Traffic controls full road closure provided by RVC. MCS Civil will install concrete barrier to prevent unwanted traffic entering the site
- Laydown areas including amenities, temporary fencing and signage
- Maintain a clean water flow path through the works for creek flows in the form of a overflow pipe located on the northern side of the old bridge
- Establishment of environmental controls (sandbag dam on up stream, sediment fencing and exclusion zones).
- Vegetation trimming or removal where required
- Site clearing and construction area establishment
- Earthworks for the installation of base boulders
- Excavation and removal/ stockpiling of materials
- Removal of existing culvert
- Installation of FC base and placement of new culvert
- Scour protection and Erosion control
- Excavate and re-shape bank, remove loose materials
- Placement of Boulders (base foundation)
- Site clean-up and reinstatement, rehabilitation, and revegetation activities.
- Removal of site offices, amenities, and MCS traffic controls

The below resources have been priced in and allocated for these works to ensure the works are delivered to a high standard to council:

Item	Type & Size	Number on Site	Supplier	Work Activity
Crane	100t	1	MCS	boulder Installation
Excavator	13 ton & 22ton	2	MCS	Excavation and backfill works
Grab attachments		1	MCS	
Possi Track	PT 95 Kubota	1	MCS	Back fill and trimming pavement
Site Dumper	10-ton swivel tip	1	MCS	Excavation and backfill works

Item	Type & Size	Number on Site	Supplier	Work Activity
Tippers	Various (truck and dog and bogie)	multiple	Material supplier	Addition of selected products & removal of spoil
Crane truck	10 wheeler	1	MCS	Delivery of materials
Semi-Trucks	Quad axle and tri axle	multiple	MCS	Plant, material and precast deliveries
Concrete Truck	TBC			
Geotechnical Testing	Test equipment, light utility vehicles	As required	Specialist supplier	Compaction testing and quality control testing
Sample Testing	TBC			
Boom Pump	TBC			

4 Preparation

Prior to start of Construction works MCS have a number of tasks that are undertaken and then communicated to Council. These include:

- DBYD reports submitted and reviewed by MCS where necessary
- Service Locations conducted at each Bridge location and results sent to Council for their reference
- Traffic Control Plans drawn up and submitted to Council for approval.
- MCS Management Plans completed and submitted to Council:
    - Contract and Client share drive
    - Construction Environmental Management Plan
    - Project Management Plan
    - WHS Management Plan
    - Quality Management Plan
    - SWMS
    - ITPs

5 Demolition

The two culverts will be removed and replaced with new ones.

6 Construction Process

MCS has well defined construction procedures with Quality Procedures for the Embankment stabilisation works and road surface transition activities as well as ITPs for broader process control at work sites. Our ISO certified company Integrated Management System (Safety, Quality and Environment) is available for viewing at the request of Council.

Specifically, MCS measure Foundation depth and bearing using our internally developed Quality Sheets. Road surface shape and engineered methodology to install rock boulders are to be adhered. Compacted material densities are measured by our sub-contract geotechnical company. Lot controls and conformance issues are managed in accordance with our project specific Project Management Plans and internal quality procedures.

More broadly, our pavement construction process as experienced by the client is as listed below:

6.1 Prepare Site - ensure all existing services are clearly marked and displayed on site.
6.2 Install all siltation control measures and conduct a HSEQ Plan for the site.
6.3 Sample material at Pile locations and visual inspection of a senior Geotech during works.
6.4 Send material to a specialised lab to verify inspection of the holes meet design requirements.
6.5 Supervisor to mark-up site boundaries and set out the works.
6.6 Service locating to be undertaken and depths check back to design depth to ensure services do not impede the pavement layer. If a service is at a level of the design layer, then it is to be either lowered as a variation proceeding approval from council or lifted over at the point of the service.
6.7 Saw cut existing pavement where necessary for lead in repair transitions.
6.8 Install Sediment and Environmental controls.
6.9 Remove and replace existing culvert.
6.10 Install base boulders
6.11 Install scour protection
6.12 On Site Meeting held on site between council and MCS to ensure all expectations were met and there are no issues with the final product before hand over back to council.

7 Compaction and Trimming

Compaction shall be completed after concrete foundations are laid (if required by the client). This shall be carried out using an appropriate roller that can achieve relatively uniform compaction of the depth of the backfill and embankment layers.

The Foreman is responsible for supervising the installation of boulders and scour protection.

All trimming required shall involve cutting to waste and all material cut to waste shall be disposed of at an approved location. Trimming will take place to meet a tolerance of -10mm + 10mm as per specification.

8 Culvert and Embankment Construction

8.1 Pot holing and Services

DBYD show limited services within the area.

Minor saw cutting will be required along the Road at a line determined by survey to allow for the jointing of the proposed asphalt into the existing asphalt. Saw cutting will also be required locally at the culverts during demolition.

8.2 Construction Process

MCS has well defined construction procedures with Quality Procedures for the installation of large rock boulders including reconstruction of the scoped culverts and road surface transition activities as well as ITPs for broader process control at work sites. Our ISO certified company Integrated Management System (Quality, Safety and Environment) is available for viewing at the request of Council.

Specifically, MCS measure Foundation depth using our internally developed Quality Sheets. Lot controls and conformance issues are managed in accordance with our project specific Project Management Plans and internal quality procedures.

More broadly, our construction process as experienced by the client is as listed below:

8.3 Culvert reconstruction:

8.4 Compaction and Trimming

Compaction shall be completed after rock boulders are complete. This shall be carried out using an appropriate roller that is capable of achieving relatively uniform compaction of the depth of the backfill.

The Foreman will instruct the roller operators to ensure a consistent rolling pattern and that the full width of each run receives equivalent compactive effort. The Foreman is responsible for the decision to move the rollers off a section of pavement once the target compaction is met.

All trimming required shall involve cutting to waste and all material cut to waste shall be disposed of at an approved location. Trimming will take place to meet a tolerance of -10mm + 10mm as per specification.

8.5 Culvert Construction

- A blinding layer of 25mpa concrete shall be placed on subgrade in preparation for base slabs.
- Formwork will be formed on site with conventional timber methods. Construction will occur in two parts allowing for steel reinforcement instal once Abutment face work has been installed. Form work will be secured using push pull props anchored to the blinding layer for vertical structures.
- Concrete S40 shall be discharged via boom pump and placed in multiple vibrated layers.

- Testing shall be conducted as per standard and expectation would be to achieve 32mpa within 7 days.
- Form work shall be striped prior to placement of scour protection.

8.6 Installation of Boulders,

- Project Manager or site engineer will meet with the MCS Crew in the week prior to the rock boulders being placed to develop a lift plan and select an appropriate location for the lift to take place.
- Crane shall be set up as per lift plan and a lift study conducted.
- Materials will arrive via Semi trailers and be lift form trailers to a lay down area close to final distention.

8.7 Survey and Depth Control

A dedicated surveyor equipped with mm control total station will be on site when deemed necessary and the following represents the areas they will be involved in:

- Initial set out and recovery of the sites.
- Setting out.

8.8 Testing

Any testing required on site is to be conducted by a NATA accredited laboratory nominated by MCS and approved by the Client.

8.9 Waste

Waste shall be disposed of at a council approved tip site.

9 Survey and Depth Control

A dedicated surveyor equipped with mm control total station will be on site when deemed necessary and the following represents the areas they will be involved in:

- Initial set out and recovery of the sites.
- Determining road levels prior to wearing course to quantify regulation course and any shape improvement necessary
- To determine the finished surface level relative to design levels from existing levels to new structure levels.

10 Testing

Any testing required on site is to be conducted by a NATA accredited laboratory nominated by MCS and approved by the Client. Any removal of material will be taken to a Council approved stockpile.

11 Curing

Not applicable

Document controls

Business Name	**MCS Civil (NSW) Pty Ltd (MCS)**					
Client	**Richmond Valley Council**					
Project Title	**Contract** **Road Embankment Stabilisation Works, Ainsworth Rd. Mongogarie NSW 2470**					
Document title	**Project Methodology and Works Plan**					
Document / Project No.	**MCS**	**Issue**	**1.0**	**Date**		
Prepared by	**Colm Lawton**					
Authorising manager						
	Colm Lawton					
	(Name)		**(Signature)**		**(Date)**	

Attachment G

Dial Before You Dig

Job No 31435757

Phone: 1100
www.1100.com.au

Caller Details

Contact:	Jonathan Reyes	**Caller Id:**	3180828	**Phone:**	0477 994 886
Company:	MCS Civil				
Address:	260 Captain Cook Drive Kurnell NSW 2231	**Email:**	jonathan@mcsaus.com.au		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

User Reference: Embankment stabilisation project

Working on Behalf of: Utility Richmond Valley

Enquiry Date:	**Start Date:**	**End Date:**
21/02/2022	22/02/2022	28/02/2022

Address:
545 Ainsworth Road
Mongogarie NSW 2470

Job Purpose:	**Onsite Activities:**
Excavation	Manual Excavation, Mechanical Excavation
Location of Workplace:	**Location in Road:**
Road Reserve	Road

- Check that the location of the dig site is correct. If not you must submit a new enquiry.
- Should the scope of works change, or plan validity dates expire, you must submit a new enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:

this is for an embankment stabilisation project (covered by Richmond Valley Council Flood control package)

Your Responsibilities and Duty of Care

- The lodgement of an enquiry does not authorise the project to commence. You must obtain all necessary information from any and all likely impacted asset owners prior to excavation.
- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.1100.com.au**
- **For more information on safe excavation practices, visit www.1100.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days.
Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Dial Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash # require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
208378641	Essential Energy	13 23 91	NOTIFIED
208378639	Richmond Valley	(02) 6660 0300	NOTIFIED
208378640	Telstra NSW North	1800 653 935	NOTIFIED

END OF UTILITIES LIST

CABLE/PIPE LOCATION

No assets were found in the search area

COMPANY NAME:	MCS Civil
ATTENTION:	Jonathan Reyes
SEARCH LOCATION:	545 Ainsworth Road Mongogarie NSW 2470
SEQUENCE NO:	208378641
DATE:	Monday, 21 February 2022

Provision of Plans:
Please find enclosed plans depicting approximate locations of **Essential Energy** assets in the search location***. The excavator must not assume that there may not be assets owned by other network operators in the search location.***

Underground assets searched for	Underground assets found
Essential Energy Electrical	☐
Essential Energy Water & Sewerage	☐

Plans are updated from time to time to record changes to underground assets and may be updated by Essential Energy without notice. In the event that excavation does not commence within 28 days of receipt of a plan, a new plan should be obtained.

The excavator must retain the plans on site for the duration of the works.

The excavator shall report all damage made to Essential Energy assets immediately. Note that damage includes gouges, dents, holes and gas escapes.

IN CASE OF EMERGENCY OR TO REPORT DAMAGE:
PHONE 13 20 80

DISCLAIMER

Please be aware that plans may **not** reflect alterations to surface levels or the position of roads, buildings, fences etc. **Cable and pipe locations are approximate** and the plans are **not** suitable for scaling purposes. *Essential Energy does not retain plans for privately-owned underground electrical or water & sewerage assets located on private property.* ***Privately-owned underground electrical assets located on private property are the responsibility of the owner.***

The plans have been prepared for Essential Energy's sole use and benefit. **Essential Energy cannot and does not warrant the accuracy or completeness of the plans**. Essential Energy supplies them at no cost with the object of reducing the serious risk of unintentional damage being caused to its cables and pipes. **Essential Energy does not accept any responsibility for any omissions, inaccuracies or errors in the plans, or any reliance place on the material. Any reliance placed on any plan provided in response to your request is at your own risk.**

www.essentialenergy.com.au
ABN 37 428 185 226
PO Box 5730 Port Macquarie NSW 2444
Telephone: 13 23 91 Facsimile: 1800 354 636

Essential Energy retains all intellectual and industrial property rights which exists or may exist in or with respect to the plan(s). The material provided is not to be copies or distributed beyond you.

You release Essential Energy from and against all claims, demands, actions and proceedings arising out of or in any way related to the use of the provided material.

Location of Assets on Site:
The plans indicate only that cables and pipes may exist in the general vicinity – they do not pinpoint the exact location of the cables and pipes.

If it is found that the location of cables or pipes on the plans can be improved, please notify Essential Energy on 13 23 91 (or fax 1800 354 636).

All individuals have a duty of care they must observe when working in the vicinity of underground cables and pipes. It is the **excavator's responsibility to visually expose the underground cables and pipes manually**, **ie. by using hand-held tools and non-destructive pot-holing techniques prior to any mechanical excavation.** The excavator will be held responsible for all damage caused to the Essential Energy network or cables and pipes, and for the costs associated with the repair of any such damage. The excavator will also be held responsible for all damage caused to any persons.

When digging in the vicinity of underground assets, persons should observe the requirements of the applicable Codes of Practice published by the NSW Work Cover Authority or Safe Work Australia, and any amendments from time to time by the Authorities, including although not limited to:

- Excavation Work
- Managing Electrical Risks in the workplace
- How to manage and control asbestos in the workplace

(Please refer to https://www.workcover.nsw.gov.au/law-and-policy/legislation-and-codes/codes-of-practice).

When digging in the vicinity of **electrical assets** persons should observe the requirements of the **Electricity Supply Act 1995.**
Persons excavating near live underground electrical reticulation and/or earthing cables **must exercise extreme caution at all times and adhere to the requirements of Essential Energy's Electrical Safety Rules.** (These are available on our website: http://www.essentialenergy.com.au/content/safety-community and include

- **Work near Essential Energy's Underground Assets:**
  http://www.essentialenergy.com.au/asset/cms/pdf/contestableWorks/CEOP8041.pdf , and
- **Asbestos Fact Sheet**:
  http://www.essentialenergy.com.au/asset/cms/pdf/safety/AsbestosFactSheet.pdf

In some situations these procedures call for work to be performed by authorised staff.
Should there be any doubt as to the exact location of any underground electrical assets, and the potential for conflict with live underground cables caused by excavation at your work site, you should contact **13 23 91** to arrange for an on-site visit by an Essential Energy representative**.** No construction or mechanical excavation work is to commence prior to this on-site visit and approval being obtained.

When digging in the vicinity of **water or sewer assets** persons should observe the requirements of the **Water Management Act 2000.**
Should there be any doubt as to the exact location of any underground water and sewer assets, and the potential for conflict with underground water and sewer pipes caused by excavation at your work site, you should contact **13 23 91** to arrange for an on-site visit**.** No construction or excavation work is to commence prior to this on-site visit and approval being obtained.

Prior Notification:
Please note that for excavation depths greater than 250mm near power poles and stays you should allow for **advance notice** in your construction program to permit Essential Energy time to allocate the necessary field resources to carry out the inspection at the site a **minimum of fourteen (14) working days prior to work commencing**. This service may incur a fee and this can be negotiated with the local Area Coordinator at the time of making the appointment. Failure to give reasonable notice to the local Area Coordinator may result in disruption to Essential Energy's planned works program in the district and could incur an extra charge over and above the normal rate for this service.

For further information please call 13 23 91.

www.essentialenergy.com.au
ABN 37 428 185 226
PO Box 5730 Port Macquarie NSW 2444
Telephone: 13 23 91 Facsimile: 1800 354 636

ELECTRICITY SAFETY WHILE EXCAVATING

When working near underground electrical infrastructure

NSW legislation requires people who are planning to do excavation work to obtain copies of underground electricity cable plans through Dial Before you Dig (Phone 1100) and to make sure that the plans are no more than 30 days old when excavation commences.

The aim of the legislation is to ensure that when workers dig or drive items near underground electricity cables, ducting, and pipes, they will establish the exact location of the cables and thus avoid coming into contact with them or damaging them. These items carry vital services such as electricity, water, gas and communications, and establishing their location before digging will help ensure worker safety and prevent damage to the network which may cause disruption of essential services to local communities.

Excavate safely and protect underground assets

Dial Before You Dig (DBYD) is the first step to excavating safely. You should use DBYD when you will be undertaking (but not restricted to) the following:

- Any excavation using machinery digging deeper than 150mm. This includes but is not restricted to back hoes, excavators, borers & kanger hammers (ploughing or ripping activities)
- Any excavation using hand tools deeper than 300mm which includes shovels, spades and crow bars
- Any vertical or horizontal boring.

Note: The above examples are general and may not cover all situations in the regulations where a DBYD would be required e.g. driving metal posts in the ground.

Regardless of the size of your project you should lodge an enquiry with DBYD before commencing work. This applies to small tasks like backyard landscaping, driving items into the ground as well as heavy work such as directional boring or directional drilling. DBYD strive to respond to enquiries within two business days.

Dial Before You Dig

- Phone 1100
- Web www.1100.com.au
- Download the DBYD iPhone app

DIAL BEFORE YOU DIG
www.1100.com.au
The Essential First Step

When a DBYD has been obtained, contact Essential Energy on **13 23 91** to identify any underground pipes and/or cables in the vicinity of excavation works to be carried out. Allow at least **two weeks or 10 working days advance notice** in your construction program to permit Essential Energy time to allocate the necessary field resources to carry out an onsite inspection if required. This service may incur a fee & should be stated at the time of making the appointment.

In the event the excavation does not commence within 28 days of receipt of a plan, a new plan should be obtained. The excavator **must** retain the plans on site for the duration of the excavation works.

Your responsibility

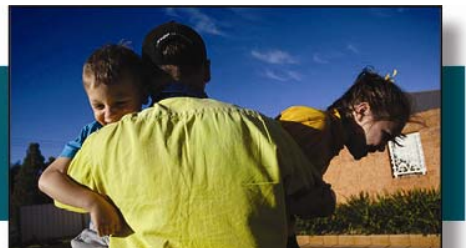
All individuals have a duty of care they must observe when working in the vicinity of underground cables, ducts and pipes. Be aware of the requirement set out in the latest WorkCover Codes of Practice 'Work near Underground Assets Guideline' and 'Work near Overhead Powerlines' which can be viewed at **www.workcover.nsw.gov.au** or you can purchase a copy of the Code of Practice by contacting WorkCover on 1300 799 003.

You should also be familiar with Essential Energy's operational procedures 'Work near Essential Energy's underground assets' CEOP8041 and 'Construction work near electricity network' CEOP1116, which can be found at essentialenergy.com.au/construction

- Employers: If you're an employer or employing someone to excavate, complete construction or drive items into the ground even at home you have a legal obligation to ensure their safety
- Excavators: It is the excavator's responsibility to visually expose the underground pipes and cables manually before any construction begins.

Note – when excavating involving high pressure water or compressed air to break up the ground, which is then removed by a powerful vacuum unit to expose critical utilities after they have been electronically located to confirm identity, size, number of services and depth, checks should be carried out to ensure the pressure is acceptable for all cables and other assets which may be found prior to commencing pot holing by this method. Warning: CONSAC cables shouldn't be potholed by this method and must be de-energised before any work carried out near them. It's recommended to only use air/vacuum equipment to pot hole that operates at or less than 13,790Kpa (2000psi).

Be safe, because they need you



No Go Zone for powered excavation

Extract from WorkCover "**Work near Underground Assets**"

TABLE 1: Types of assets and limits of underground approach

Assets	Clearances	No Go Zone for Powered Excavation	Controls	Typical Depths
Low voltage electricity cables – voltages less than or equal to 1000V (1kV)	Close proximity with the use of hand tools	300 mm	Must contact asset owner for specific conditions	450 – 750 mm
Electricity conductors from 11,000V (11kV) up to 33,000V (33 kV)	Close proximity with the use of hand tools	600 mm	Must contact asset owner for specific conditions	900 mm
Underground sub-transmission cables 33,000V up to 132,000V (132 kV)	Must contact asset owner	Must contact asset owner	Must be carried out under the supervision of the asset owner	900 mm
High Voltage Electricity cables – voltages from 1000V (1kV) up to (33 kV)	Close proximity with the use of hand tools	Must contact asset owner	Must contact asset owner for specific conditions	600 – 1000 mm
Extra High Voltage Electricity Transmission cables – voltages above (132 kV) and 330,000V (330 kV)	Must contact asset owner	Must contact asset owner	Work must be carried out under the supervision of the asset owner	800 – 1200 mm

How to expose cables or pipes

Location plans provide an indication of the presence of underground assets only; they do not pinpoint the exact location. This is why manual exposure is required, which can be done by potholing. Underground assets must first be exposed by pot-holing with non-conductive tools to identify their location. Excavation with hand tools shall be carried out carefully up to, but not closer than, the minimum distances specified in Table 1. Several potholes may need to be dug manually to determine and satisfy yourself of the exact locations of cables or pipes to avoid any mishaps. Manual pot-holing needs to be undertaken with extreme care, common sense and while employing techniques least likely to damage cables. For example, orientate shovel blades and trowels parallel to the cable rather than digging across the cable. Look out for sand, plastic strips or specially marked bricks when excavating, which signal the presence of underground cables.

Only once all underground assets have been located, marked and protected against damage can the excavation proceed with caution.

No Go Zone for powered excavation

Directional boring is powered excavation and contact with the asset owner must be made before excavation takes place. For directional boring across the line of an asset a minimum clearance of **300 mm** from the asset shall be maintained. When boring across the line of an underground asset, the location of the asset/s shall be positively proven by hand digging (pot-holing) or by another approved method and a safety observer appointed.

Note: Where the risk assessment identifies a potential risk of making contact with either underground assets, safety observer/s would be required. The safety observer's responsibility is to ensure that approach distances from underground and overhead assets are maintained.

For boring under electricity cables, the only true way of knowing where the directional drill is, is to "see" it. It is necessary to excavate a slit trench at right angles to the approaching drill and 500mm deeper than the asset being protected and beside the cables to confirm the depth of the cables and ensure the drill is not within the minimum approach distance of the cable (specified in Table 1).

For directional boring parallel to the asset and at the level of the asset, a clearance of **500 mm** shall be maintained from the edge of the nearest asset and pot holed at 10m intervals to ensure clearances are maintained with a safety observer appointed.

The four Ps of safe excavation

1. **Plan** – Plan your job. Use the Dial Before You Dig service before your job is due to begin to help keep your project safe. Contact Essential Energy on 13 23 91 to identify any underground pipes and/or cables in the vicinity
2. **Pothole** – Potholing (digging by hand) is a method to assist in establishing the exact location of all underground infrastructure. Only use air/vacuum equipment to pot hole that operates at or less than 13,790Kpa (2000psi)
3. **Protect - Protecting and supporting exposed infrastructure is the** excavator's responsibility. Always erect safety barriers in areas at risk to protect underground networks
4. **Proceed** – But ONLY when you have planned, potholed and put the protective measures in place.

Digging safely

You cannot be too careful when it comes to safe excavation. Avoiding underground ducting pipe and cable damage is as simple as having the right tools, the right skills and the right information.

- Study the plans you receive from asset owners thoroughly
- Check to see if they relate to the area you requested and make sure you understand them. If you are unclear about what the symbols mean or how to proceed, contact the relevant network owner
- Check the work area for other forms of electrical equipment, including street lights, ground substations, phone boxes or traffic lights – all good indicators that underground cables will be present
- Remember underground cables can also be present even if overhead powerlines have been identified
- Never assume the depth or alignment of pipes and cables. Installed networks assets may not have been installed in a straight line
- Always observe any instructions stated on the plans provided by the asset owner
- Remember, plans and maps identifying the location of underground cables and depths can alter after road upgrades or developments and underground assets may be as little as a few millimetres below the surface
- Other service lines (for example gas mains (pipes) and communication cables) can also be present. Shared trenches are frequently used on underground runs to premises
- New electrical cables are sometimes laid using existing old conduits
- Various methods of protecting underground cables may be utilised (for example electrical bricks, conduits, concrete or flat PVC barriers) or may be direct buried or installed by under-boring methods which may have no visual disturbance of the ground
- Ensure overhead & electrical structures aren't undermined during excavation.

Earth cables

Earth cables are an important part of all electrical installations and have two main purposes:

- To safeguard against the possibility of danger to life
- To maintain the good working order of the electrical network.

They can have potentially dangerous electrical current flowing through them. Usually they have a green and yellow covering but could be a bare cable buried directly in the ground.

Even if the map provided does not show underground cables, earth cables may be present. These earth cables are usually associated with electrical equipment located on the pole such as transformers, switching equipment, permanent earthing points or Padmount / kiosk subs.

It's recommended that if any excavation is to take place within **10m** of a power pole with a cable running down it into the ground, contact is made with Essential Energy on **13 23 91** to have the earthing system located. While an effort is made to install the earthing under the powerline and guy if installed, sometimes circumstances may require a variation to this, so done assume where they are installed. The distance and configuration that the earthing cable is installed varies due to the soil conditions and system type (e.g. Single wire earth return (SWER)).

Additional earthing electrodes stakes may be installed to ensure the required earthing reading is obtained.

WARNING:SWER installations

- Contacting SWER earthing can be deadly
- Voltage is present on SWER transformer earthing systems either at 12.7 kV or 19.1kV
- NO excavation is allowed within 10 metres of a SWER transformer pole.

Excavating around electrical poles

Anyone intending to excavate around any electrical item risks serious injury or death as a result of contact with underground cables or the earthing system.

Assets around poles

For excavation depths greater than 250mm near power poles and stays you must arrange for an Essential Energy representative to attend the worksite 2 weeks prior to work commencing. Call Essential Energy on 13 23 91. More information is available in Essential Energy's operational procedure, 'Work near Essential Energy's underground assets: CEOP8041' which can be found at essentialenergy.com.au/construction

Unless otherwise agreed, underground assets and other obstructions around poles are to be kept a minimum distance of 300mm from the periphery of the pole, to allow inspections by the asset owner employees.

No excavation within 10 metres of a SWER transformer pole is to occur without the approval of the local electricity asset owner. It should be noted that the NSW Service and Installation Rules require a sketch of the underground service/consumers mains to be marked inside the switchboard.

The risks are higher for those earthing systems of the SWER constructions as the earthing is utilised as the return path.

Be safe, because they need you

Typically any electrical item installed on a pole will have an earth wire running down the pole into the ground, which includes:

- Transformers in urban and rural situations
- Isolation, protection and regulation items.

Transformers located on the ground (padmount and kiosk), besides having underground electrical cables, will have an earthing system installed around them.

Damaged earthing

If an earth cable has been damaged, maintain a clearance of eight (8) meters and contact Essential Energy on 13 23 91. **DONT ATTEMPT** to re-join the cable - this will place you at serious risk.

Operating near underground cables and earths

- Underground cables should never be moved or relocated unless under the express authority of the organisation or person responsible for the powerlines
- The excavator shall report all damage made to Essential Energy assets immediately. Damage includes: gouges, dents, holes and gas escapes
- Never undermine poles, cables, earthing cable, pad-mount and kiosk substations.

Above: Poles with become unstable if undermined

Make sure it can't go wrong

You should ensure that people at work, their equipment (tools and plant) or materials do not come within close proximity to underground powerlines unless:

- A written risk assessment has been completed and a safe system of work implemented
- The relevant safety precautions and worker training requirements, including WorkCover Codes of Practice and Essential Energy's requirements, have been implemented and complied with.

If working in close proximity to underground cables is unavoidable and the risk assessment has been completed, the following should be considered to control the risks and ensure work safety:

- Have the power switched off by Essential Energy
- Consider all conductors as live unless it is positively known they have been de-energised
- Where appropriate, provide ground markings to identify location and warn workers of the presence of underground power and other assets.

Emergency situations

In the event that contact with an underground powerline occurs or cables are exposed or damaged, remembering the following points could help save a life:

- If the situation is at all life threatening, immediately contact the Emergency Services on 000 (triple zero)
- Call Essential Energy's 24-hour supply interruptions line – **13 20 80** to switch off the power if required or report damage or exposure cables / conduits

- If any other underground assets are damaged you should contact the affected asset owners immediately
- Treat underground cables as alive, even if they appear to be dead
- Keep everyone at least eight metres away from the incident site, the person or any machinery making contact with underground cable

- Don't panic or touch the person receiving the electric shock – this could place you at risk
- Untrained, unequipped persons should not attempt to rescue a person receiving an electric shock. All too often secondary deaths occur when others go to the aid of earlier victims
- Remain on/inside the machinery until the supply is disconnected
- If possible, break contact between the machinery and underground cable.

For more information

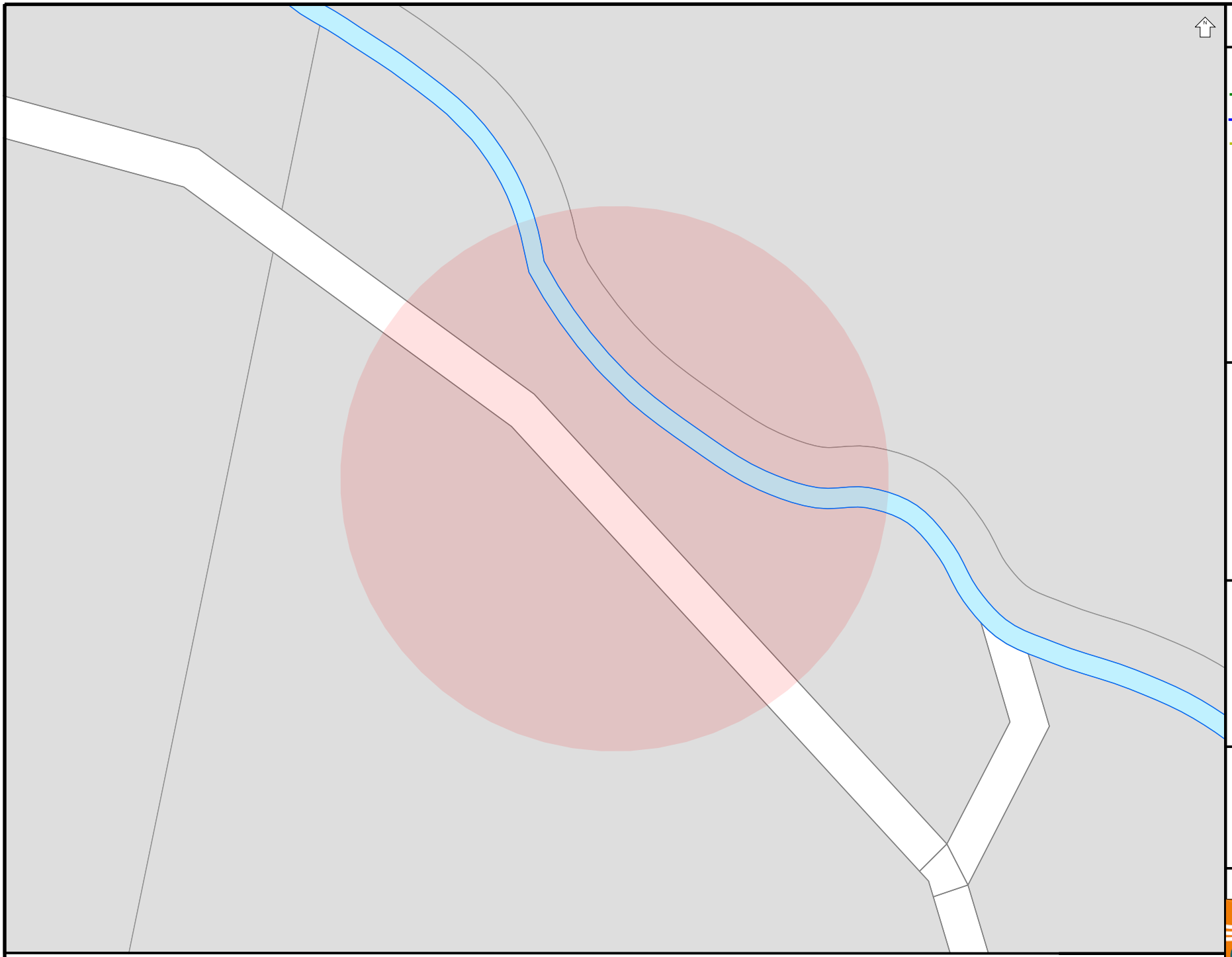
Essential Energy's Public Safety team is available to facilitate Electrical Awareness sessions and discuss any questions relating to electrical safety. For more information on electrical safety please call

- Essential Energy General Enquiries 13 23 91
- Essential Energy Supply Interruptions 13 20 80
- WorkCover NSW 13 10 50
- Dial Before You Dig www.1100.com.au 1100
- Follow us
- or visit essentialenergy.com.au/safety

Safety first: Before you dig or drive items into the ground

1. Contact DBYD
2. DO NOT attempt to excavate with in 10m of any power pole or electrical item
3. Contact Essential Energy on 13 23 91 for assistance to locate cables and earthing
4. Locate asset: Pot-hole
5. Proceed only if you have satisfied yourself it is safe.

Be safe, because they need you



Overhead wires not shown
LOOK UP & LIVE!

LEGEND

- LV Underground Cable
- HV Underground Cable
- Underground Pipe
- Underground Earth or Wires
- Ground Substation
- Pole
- Cubicle
- Pit
- Area of Interest

Critical Assets

Contact Essential Energy on 13 23 91

- Zone Substation
- Underground Cable
- Underground Fibre

Proposed Works

- Area of proposed works

Proposed assets are shown as orange symbols

THE INFORMATION ON THIS MAP MAY NOT BE ACCURATE. If details are incorrect, please notify Essential Energy on 13 23 91 (or fax 1800 354 636)

ISSUE DATE: 21/02/2022

You must resubmit your request if you have not started work within 4 weeks of the 'Issue Date' above

A4 | SCALE: 1:2470

Job Number: 31435757 Sequence number: 208378641 Job location: 545 Ainsworth Road, Mongogarie Map Centre: 152° 52' 43.1", -28° 54' 20.9"

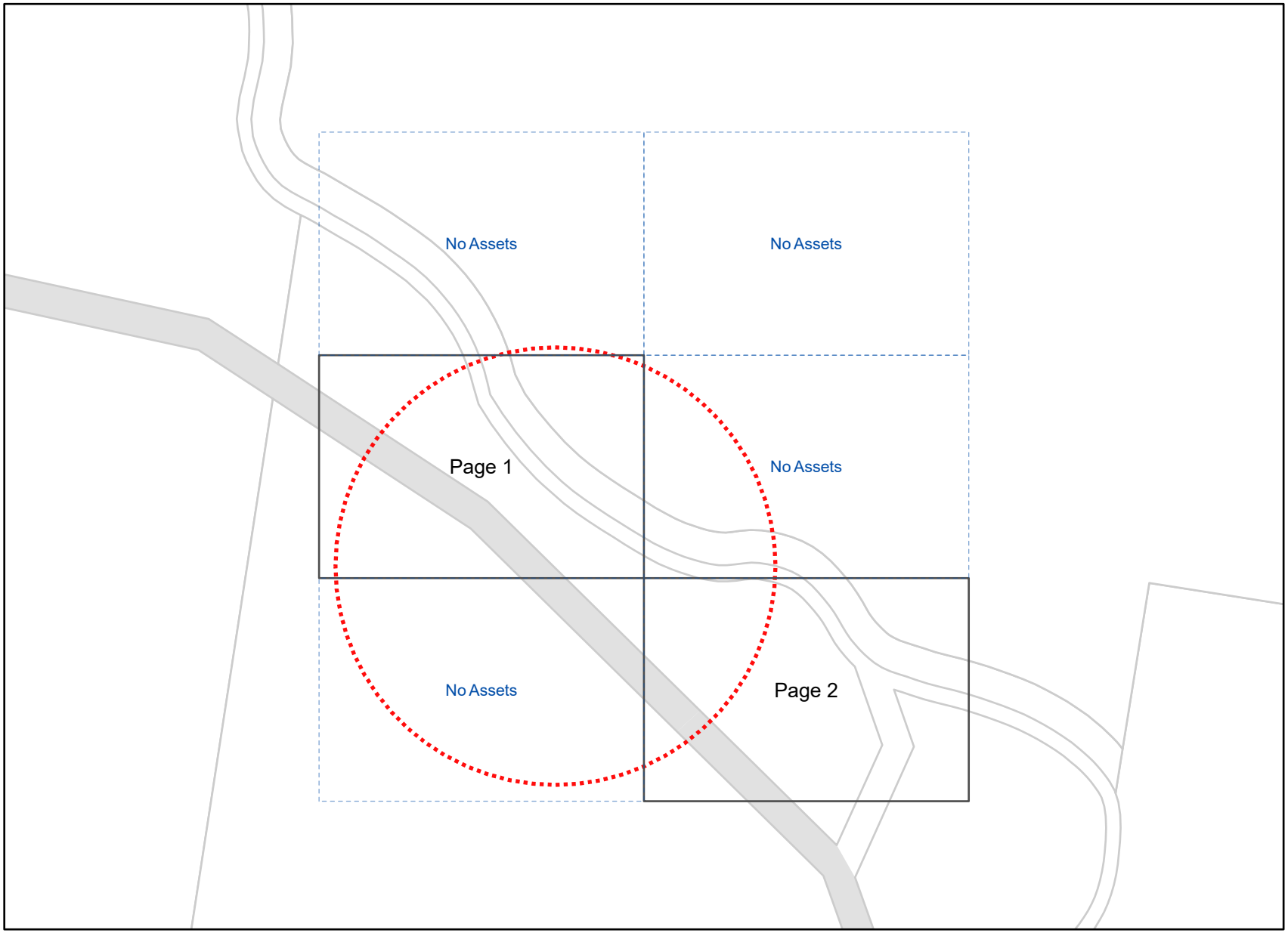
essential energy

Richmond Valley Council

Job # 31435757
Seq # 208378639

Provided by Richmond Valley Council

DIAL BEFORE YOU DIG www.1100.com.au



Legend

- DBYD Enquiry
- Detailed map page
- No dig site assets

Disclaimer: The Plan is provided in response to a Dial Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of Richmond Valley Council infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

In an emergency contact Richmond Valley Council on (02) 6660 0300

Index Sheet

Plans generated by SmarterWX™ Automate

0 37.5 75 150 m

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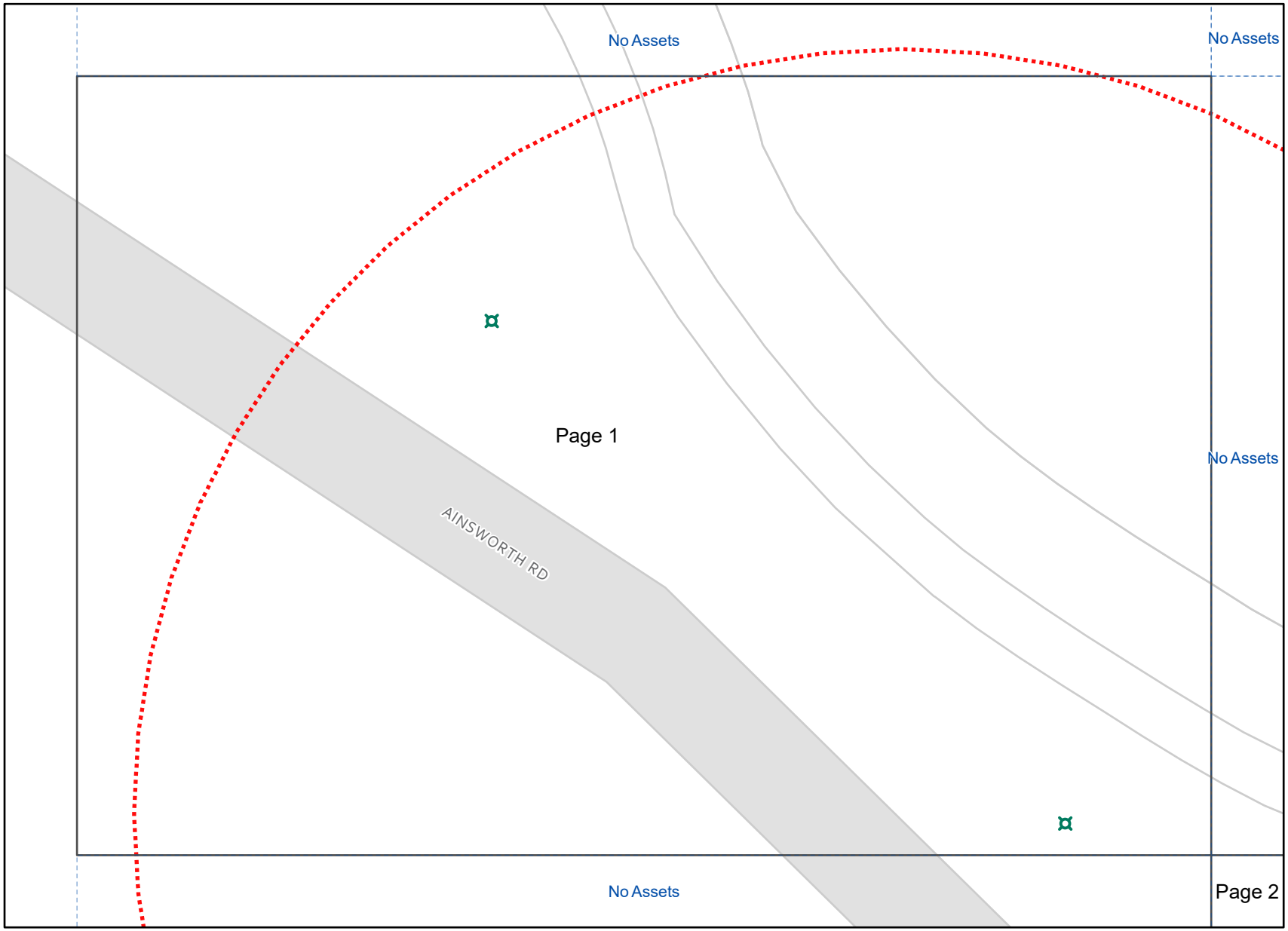
Scale 1:3,500

Richmond Valley Council

Job # 31435757
Seq # 208378639
Provided by Richmond Valley Council

DIAL BEFORE YOU DIG www.1100.com.au



Legend

- DBYD Enquiry
- Minor Culvert

Disclaimer: The Plan is provided in response to a Dial Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of Richmond Valley Council infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

In an emergency contact Richmond Valley Council on (02) 6660 0300

21/02/22 (valid for 30 days)

Plans generated by SmarterWX™ Automate

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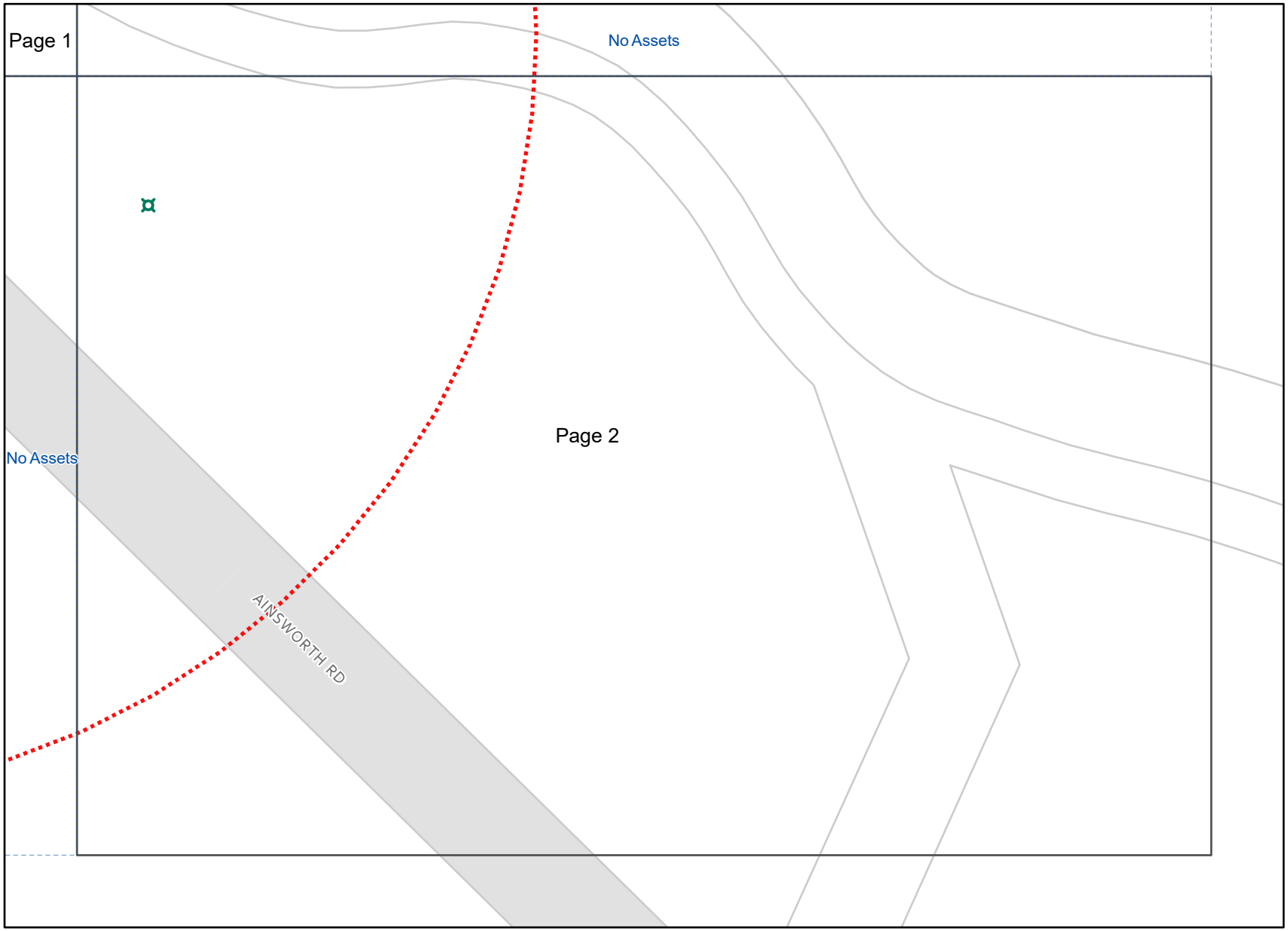
Scale 1:1,000

Richmond Valley Council

Job # 31435757
Seq # 208378639
Provided by Richmond Valley Council

DIAL BEFORE YOU DIG www.1100.com.au



Legend

- DBYD Enquiry
- Minor Culvert

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In an emergency contact Richmond Valley Council on (02) 6660 0300

21/02/22 (valid for 30 days)

Plans generated by SmarterWX™ Automate

0 10 20 40 m

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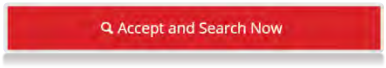
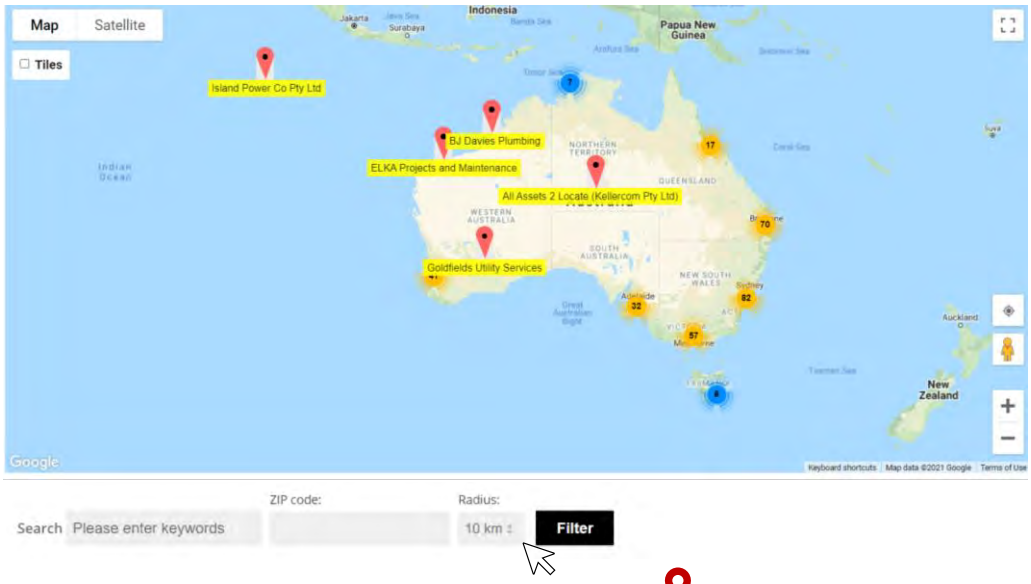
Scale 1:1,000

Certified Locating Organisations (CLO)

Find the closest CLO to your worksite on: https://dbydlocator.com/certified-locating-organisation/

Read the disclaimer and click: 

A national map and an A-Z list of Certified Locating Organisations is displayed.



Use the map to zoom to your work area and choose the closest Locator indicated.

OR search by entering the **postcode** of your work area.

1. **Enter the post/zip code**
2. **Choose your search radius**
3. **Click filter** (If there is no result, you may have to increase the search radius)
4. **Click on the closest for CLO details or view the results displayed below the map**

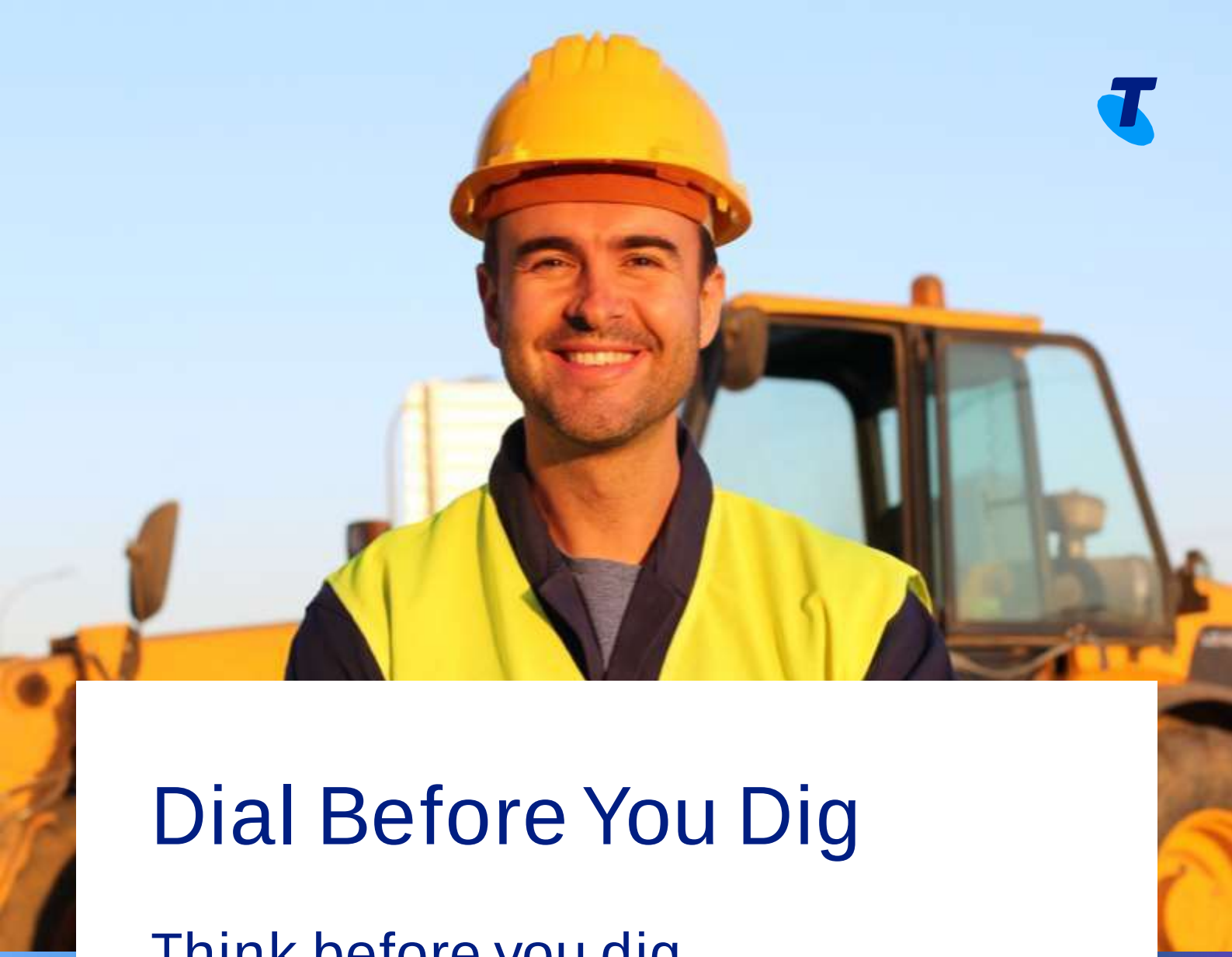
Locator skills have been tested, and the Organisation has calibrated location and safety equipment.

Telstra is aware of each Certified Locating Organisation and their employee locators.

Only a DBYD Certified Locator registered with a Certified Locating Organisation is authorised to access Telstra network for locating purposes.

Each Certified Locator working for a CLO is issued with a photo ID Card, authorising them to access Telstra pits and manholes for the purpose of cable and plant locations.

Please ask to see your Locators' CLO ID Card.



Dial Before You Dig

Think before you dig

This document has been sent to you because you requested plans of the Telstra network through Dial Before You Dig.

If you are working or excavating near telecommunications cables, or there is a chance cables are located near your site, you are responsible to avoid causing damage to the Telstra network.

Please read this document carefully. Taking your time now and following the steps below can help you avoid damaging our network, interrupting services, and potentially incurring civil and criminal penalties.

Our network is complex and working near it requires expert knowledge. Do not attempt these activities if you are not qualified to do so.

Your checklist

1. Plan

Plan your work with the latest plans of our network.

Plans provided through the DBYD process are indicative only*.

This means the actual location of our asset may differ substantially from that shown on the plans.

Refer to steps 2 and 3 to determine actual location prior to proceeding with construction.

2. Prepare

Engage a DBYD Certified Locating Organisation (CLO) via dbydlocator.com to identify, validate and protect Telstra assets before you commence work.

3. Pothole

Validate underground assets by potholing by hand or using non-destructive vacuum extraction methods.

Electronic detection alone (step 2) is not deemed to validate underground assets and must not be used for construction purposes.

If you cannot validate the Telstra network, you must not proceed with construction.

4. Protect

Protect our network by maintaining the following distances from our assets:

- 1.0m Mechanical Excavators, Farm ploughing, Tree Removal
- 500mm Vibrating Plate or Wacker Packer Compactor
- 600mm Heavy Vehicle Traffic (over 3 tonnes) not to be driven across Telstra ducts or plant
- 1.0m Jackhammers/Pneumatic Breakers
- 2.0m Boring Equipment (in-line, horizontal and vertical)

5. Proceed

You can proceed with your work only once you have completed all the appropriate preparation, potholing and protection.

Useful information

Report any damage immediately

https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment

13 22 03

If you receive a message asking for an account or phone number say "I Don't have one"
Then say "Report Damage" then press 1 to speak to an operator.

Relocating assets

If your project requires the relocation of a Telstra asset, please contact the Telstra Network Integrity Group:

1800 810 443 (AEST business hours only)

NetworkIntegrity@team.telstra.com

Never try to move or alter our network infrastructure without authorisation. By law, only authorised people can work on our assets or enter a facility owned or operated by us. Any interference, including unauthorised entry or tampering, may result in legal action.

Further information

Plan enquiries

1800 653 935 (AEST business hours only)

Telstra.Plans@team.telstra.com

Information on how to find cables and request asset relocations:

https://www.telstra.com.au/consumer-advice/digging-construction

Asset Plan Readers

PDF Adobe Acrobat Reader DC Install for all versions
DWF Download Design Review | DWF Viewer | Autodesk

Disclaimer and legal details

*Telstra advises that the accuracy of the information provided by Telstra conforms to Quality Level D as defined in AS5488-2013.

It is a criminal offence under the Criminal Code Act 1995 (Cth) to tamper or interfere with telecommunications infrastructure.

Telstra will also take action to recover costs and damages from persons who damage assets or interfere with the operation of Telstra's networks.

By receiving this information including the indicative plans that are provided as part of this information package you confirm that you understand and accept the risks of working near Telstra's network and the importance of taking all of the necessary steps to confirm the presence, alignments and various depths of Telstra's network. This in addition to, and not in replacement of, any duties and obligations you have under applicable law.

When working in the vicinity of a telecommunications plant you have a "Duty of Care" that must be observed. Please read and understand all the information and disclaimers provided below.

The Telstra network is complex and requires expert knowledge to interpret information, to identify and locate components, to pothole underground assets for validation and to safely work around assets without causing damage. If you are not an expert and/or qualified in these areas, then you must not attempt these activities. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers. The 5 P's to prevent damage to Telstra assets are listed above. Construction activities and/or any activities that potentially may impact on Telstra's assets must not commence without first undertaking these steps. Construction activities can include anything that involves breaking ground, potentially affecting Telstra assets.

If you are designing a project, it is recommended that you also undertake these steps to validate underground assets prior to committing to your design.

This Notice has been provided as a guide only and may not provide you with all the information that is required for you to determine what assets are on or near your site of interest. You will also need to collate and understand all of the information received from other Utilities and understand that some Utilities are not a part of the DBYD program and make your own enquiries as appropriate. It is the responsibility of the entities undertaking the works to protect Telstra's network during excavation / construction works.

Telstra owns and retains the copyright in all plans and details provided in conjunction with the applicant's request. The applicant is authorised to use the plans and details only for the purpose indicated in the applicant's request. The applicant must not use the plans or details for any other purpose.

Telstra plans or other details are provided only for the use of the applicant, its servants, agents, or Certified Locating Organisation. The applicant must not give the plans or details to any parties other than these and must not generate profit from commercialising the plans or details.

Telstra, its servants or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Telstra against any claim or demand for any such loss or damage.

Please ensure Telstra plans and information provided always remains on-site throughout the inspection, location, and construction phase of any works.

Telstra plans are valid for 60 days after issue and must be replaced if required after the 60 days.

Data Extraction Fees

In some instances, a data extraction fee may be applicable for the supply of Telstra information. Typically, a data extraction fee may apply to large projects, planning and design requests or requests to be supplied in non-standard formats. For further details contact Telstra Planned Services.

Telstra does not accept any liability or responsibility for the performance of or advice given by a Certified Locating Organisation. Certification is an initiative taken by Telstra towards the establishment and maintenance of competency standards. However, performance and the advice given will always depend on the nature of the individual engagement.

Neither the Certified Locating Organisation nor any of its employees are an employee or agent for Telstra. Telstra is not liable for any damage or loss caused by the Certified Locating Organisation or its employees.

Once all work is completed, the excavation should be reinstated with the same type of excavated material unless specified by Telstra

The information contained within this pamphlet must be used in conjunction with other material supplied as part of this request for information to adequately control the risk of potential asset damage.

When using excavators and other machinery, also check the location of overhead power lines.

Workers and equipment must maintain safety exclusion zones around power lines

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 - Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the assets are protected during construction works. The exact position of Telstra assets can only be validated by physically exposing them. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

Privacy Note

Your information has been provided to Telstra by DBYD to enable Telstra to respond to your DBYD request. Telstra keeps your information in accordance with its privacy statement. You can obtain a copy at www.telstra.com.au/privacy or by calling us at 1800 039 059 (business hours only).

LEGEND

IT'S HOW WE CONNECT

For more info contact a Certified Locating Organisation or Telstra Plan Services 1800 653 935

Exchange
(Major Cable Present)

Footway Access Chamber
(can vary from 1-lid to 12-lid)

or

Pillar / Cabinet
(above ground / free standing)

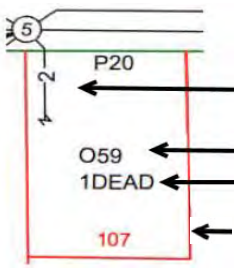
Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V Electricity

OC — Other Carrier Telecommunications Cable/Asset

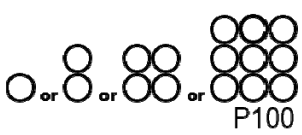
Dist — Distribution cables in Main Cable ducts

MC — Main Cable ducts on a Distribution plan

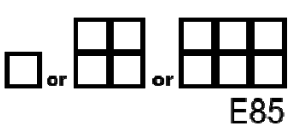
Blocked or damaged duct.



2 pair lead-in to property from pit in street 1
pair working (pair ID 059)
1 pair dead (i.e. spare, not connected)
Internal Property Boundary



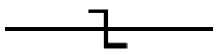
Single to multiple round conduit
Configurations 1,2,4,9 respectively
(attached text denotes conduit type and size)



Multiple square conduit
Configurations 2, 4, 6 respectively
(attached text denotes conduit type and size)

Cable Jointing Pit
(number indicating Pit Type)

Elevated Joint
(above ground joint on buried cable)

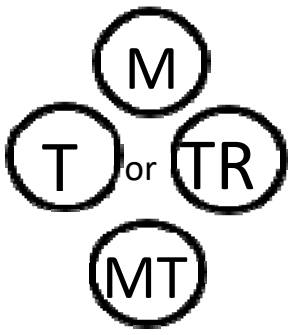


Telstra Plant in shared Utility trench

Aerial Cable

Aerial Cable
(attached to joint Use Pole eg. Power)

Direct Buried Cable



Marker Post Installed

Buried Transponder

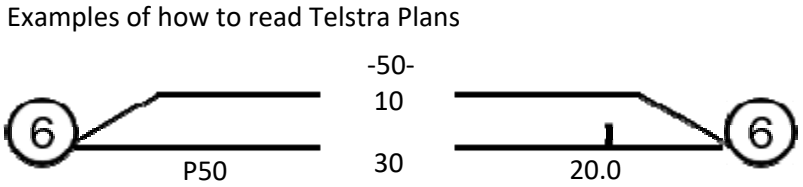
Marker Post, Transponder

Optical Fibre cable direct buried

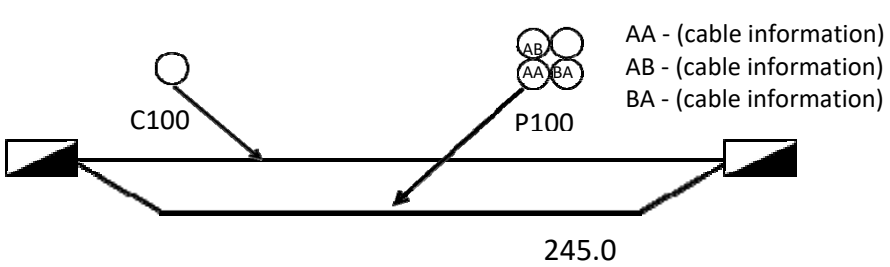
Some examples of conduit type and size:

A - Asbestos cement, P - PVC / Plastic, C - Concrete,
GI - Galanised iron, E - Earthenware
Conduit sizes *nominally* range from 20mm to 100mm
P50 50mm PVC conduit
P100 100mm PVC conduit
A100 100mm asbestos cement conduit

Some Examples of how to read Telstra Plans



One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits. approximately 20.0m apart, with a direct buried 30-pair cable along the same route

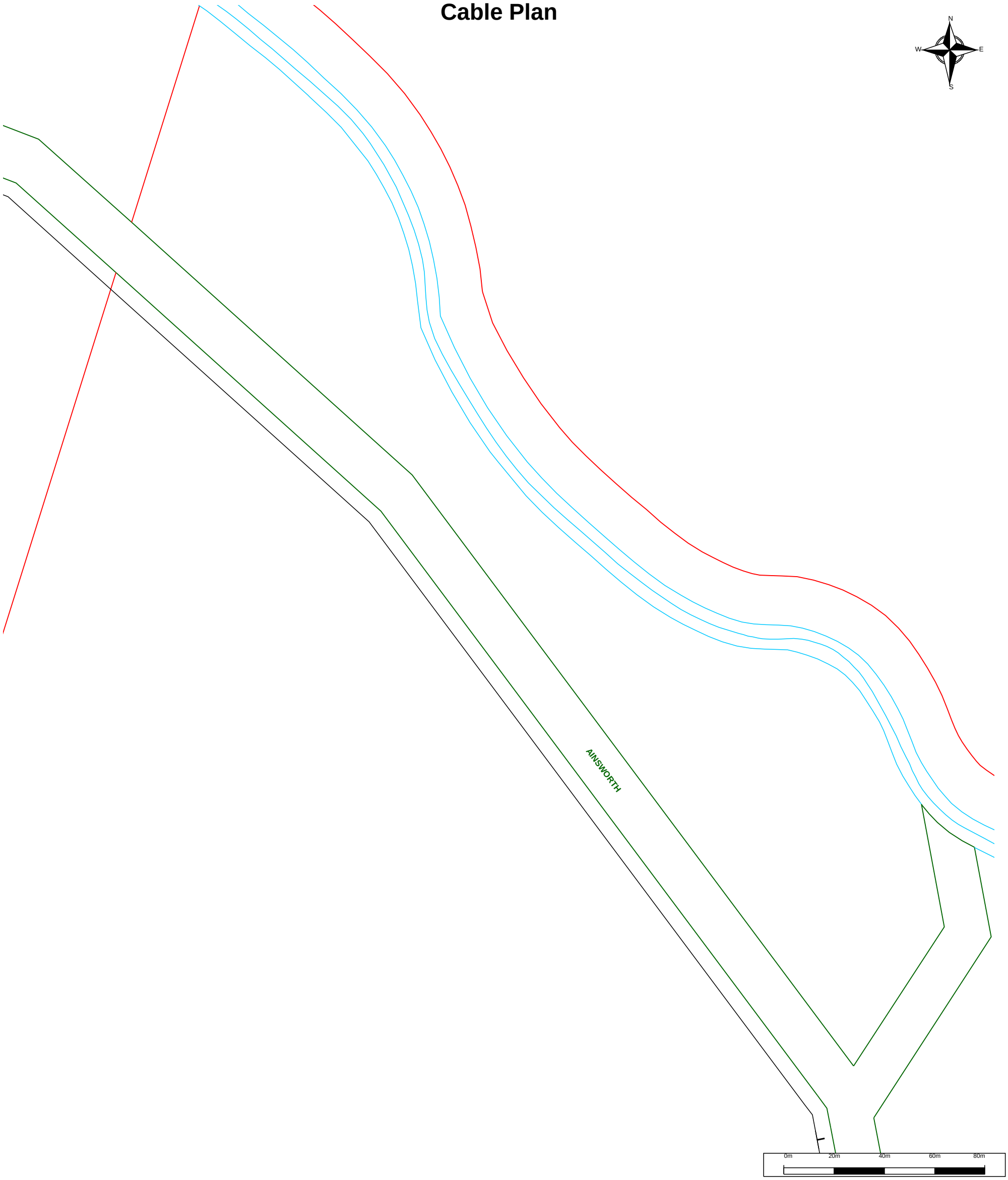


AA - (cable information)
AB - (cable information)
BA - (cable information)

Two separate conduit runs between two footway access chambers (manholes) approximately 245m apart A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along

TELSTRA CORPORATION ACN 051 775 556

Cable Plan



Telstra For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com For urgent onsite contact only - ph 1800 653 935 (bus hrs)	Sequence Number: 208378640
TELSTRA CORPORATION LIMITED A.C.N. 051 775 556	Please read Duty of Care prior to any excavating
Generated On 21/02/2022 14:27:20	

WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.

Attachment H

Bio-net Database Search

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Communities in selected area [North: -28.86 West: 152.83 East: 152.93 South: -28.96] returned 0 records for 15 entities.
Report generated on 30/08/2022 2:11 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Community				*Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion*		Coastal Cypress Pine Forest in the New South Wales North Coast Bioregion	E3		K	
Community				*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community*		Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community		E	K	
Community				*Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Grey Box—Grey Gum Wet Sclerophyll Forest in the NSW North Coast Bioregion*		Grey Box—Grey Gum Wet Sclerophyll Forest in the NSW North Coast Bioregion	E3		K	
Community				*Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*		Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3		K	
Community				*Lowland Rainforest of Subtropical Australia*		Lowland Rainforest of Subtropical Australia		CE	K	
Community				*Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion*		Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E3		K	

Community	*Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions*	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	E3	P	
Community	*Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion*	Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E3	K	
Community	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	K	
Community	*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	K	
Community	*Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions*	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	K	
Community	*White Gum Moist Forest in the NSW North Coast Bioregion*	White Gum Moist Forest in the NSW North Coast Bioregion	E3	K	

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Animals in selected area [North: -28.86 West: 152.83 East: 152.93 South: -28.96] returned a total of 38 records of 8 species.
Report generated on 30/08/2022 2:10 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	1	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		21	
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*		Comb-crested Jacana	V,P		5	
Animalia	Aves	Pomatostomidae	8388	*Pomatostomus temporalis temporalis*		Grey-crowned Babbler (eastern subspecies)	V,P		3	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	1	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	E1,P	E	4	
Animalia	Mammalia	Macropodidae	1215	*Petrogale penicillata*		Brush-tailed Rock-wallaby	E1,P	V	1	

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Plants in selected area [North: -28.86 West: 152.83 East: 152.93 South: -28.96] returned a total of 2 records of 1 species.
Report generated on 30/08/2022 2:11 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Polygalaceae	5260	*Polygala linariifolia*		Native Milkwort	E1		2	

Attachment I

Threatened Species Potential Occurrence

Potential of Occurrence Assessment

A potential of occurrence assessment was completed to assess the likelihood of occurrence of each threatened species or population identified within the subject site. All threatened biodiversity identified in background research were considered. The assessment is based on the habitat profile for the species and other habitat information in the Threatened Species Profile Database (Environment Energy and Science Group). The assessment also takes into consideration the dates and locations of nearby records and information about species populations in the locality.

Threatened Flora Potential Occurrence Assessment

For this proposed activity, the likelihood of occurrence of threatened flora species was determined based on the criteria shown in **Table B.1.**

Table B.1 Potential of occurrence criteria for threatened species and populations of flora

Potential of Occurrence	Criteria
Known	The species was observed in the subject site either during the current survey or during another survey less than one year prior.
High	A species has a high likelihood of occurrence if: the subject site contains or forms part of a large area of high-quality suitable habitat that has not been subject to recent disturbance (e.g. fire), the species is known to form a persistent soil seedbank and the species has been recorded recently (within 10 years) in the locality the species is a cryptic flowering species that has been recorded recently (within 10 years) in the locality and has a large area of high-quality potential habitat within the construction footprint that was not seasonally targeted by surveys.
Moderate	A species has a moderate likelihood of occurrence if: the species: has a large area of high-quality suitable habitat in the subject site that has not been subject to recent disturbance (e.g. fire) the species is known to form a persistent soil seedbank, but the species has not been recorded recently (within 10 years) in the locality the species: has a small area of high-quality suitable habitat or a large area of marginal habitat in the subject site That has not been subject to recent disturbance (e.g. fire) the species is known to form a persistent soil seedbank the species has been recorded recently (within 10 years) in the locality the species is a cryptic flowering species, with a small area of high-quality potential habitat or a large area of marginal habitat within the proposal footprint, that was not seasonally targeted by surveys.
Low	A species has a low likelihood of occurrence if: it is not a cryptic species, nor a species known to have a persistent soil seedbank species and was not detected despite targeted searches the species is a cryptic flowering species, with a small area of high-quality potential habitat or a large area of marginal habitat within the proposal footprint, that was not seasonally targeted by surveys as the species has not been recorded within 50 years in the locality.
None	Suitable habitat is absent from the subject site.

Table B.2 Threatened Flora Potential Occurrence Assessment

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE/EES Threatened Species Profiles websites)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
Acacia ruppii	Rupp's Wattle	E	E	Banyabba Coaldale area north-west of Grafton between 50-150 m AHD. Dry open forest and shrubland in sandstone areas, often near creeks and on roadsides.	Low	Poor quality habitat occurs at the site. No BioNet records.
Arthraxon hispidus	Hairy Jointgrass	V	V	Moist shady places in or on the edges of rainforest and wet eucalypt forest, often near creeks or swamps.	Low	Poor quality habitat occurs at the site. No BioNet records.
Bosistoa transversa	Yellow Satinheart	V	V	Lowland subtropical rainforest up to 300 m in altitude, from Maryborough in Queensland to Nightcap Range (north of Lismore) in NSW.	None	Suitable habitat is absent from the site. No BioNet records within the locality.
Clematis fawcettii	Northern Clematis	V	V	Drier rainforest, usually near streams.	Low	Poor quality habitat occurs at the site. No BioNet records.
Cryptostylis hunteriana	Leafless Tongue-orchid	V	V	Does not have well defined habitat and is known from a range of communities, including swamp-heath and woodland.	Low	Poor quality habitat occurs at the site. No BioNet records.
Dichanthium setosum	Bluegrass	V	V	In NSW, occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	Low	Poor quality habitat occurs at the site. No BioNet records.
Eucalyptus glaucina	Slaty Red Gum	V	V	Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. Grows in grassy woodland and dry eucalypt forest. Grows on deep, moderately fertile and well-watered soils.	Low	While potential habitat occurs within the greater locality, species was not recorded at the site. No BioNet records.

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE/EES Threatened Species Profiles websites)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
Hibbertia marginata	Bordered Guinea Flower	V	V	Grassy or shrubby dry open eucalypt forest at low altitudes on sandstone, only found between Casino and Grafton.	Low	Poor quality habitat occurs at the site. No BioNet records.
Macadamia integrifolia	Macadamia Nut	-	V	While specimens have been collected from the North Coast of NSW (e.g. Lismore, Gross 1995), this species is not known to occur naturally in NSW (Harden 1991). The Macadamia Nut grows in remnant rainforest.	None	Suitable habitat is absent from the site. No BioNet records within the locality.
Macadamia tetraphylla	Rough-shelled Bush Nut	V	V	Subtropical rainforest usually near the coast.	None	Suitable habitat is absent from the site. No BioNet records within the locality.
Myrsine richmondensis	Ripple-leaf Muttonwood	E	E	Subtropical and dry rainforest and swamp forest on creek flats and slopes on basalt derived soil.	Low	Poor quality habitat occurs at the site. No BioNet records.
Olax angulata	Square-stemmed Olax	V	V	Low-lying coastal heaths and heathy woodlands on sandy soils near swamps, often in association with Wallum Banksia (*Banksia aemula*).	Low	Poor quality habitat occurs at the site. No BioNet records.
Owenia cepiodora	Onion Cedar	V	V	Subtropical and dry rainforest. In NSW, from Bangalow to the Macpherson Range.	None	Suitable habitat is absent from the site. No BioNet records within the locality.
Paspalidium grandispiculatum	-	V	V	Restricted to poor sandy soils on sandstone. It has been found in open forest of Turpentine (*Syncarpia glomulifera*) on undulating topography as well as in drier forest types on ridges.	Low	Poor quality habitat occurs at the site. No BioNet records.
Persicaria elatior	Tall Knot-weed	V	V	Damp or swampy situations and sometimes with *Melaleuca linarifiolia*.	Low	Poor quality habitat occurs at the site. No BioNet records.

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE/EES Threatened Species Profiles websites)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
Plectranthus nitidus	Nightcap Plectrathus	E	E	Rocky cliff faces and boulders, creek banks in shelter of adjacent rainforest.	None	Suitable habitat is absent from the site. No BioNet records within the locality.
Polygala linariifolia	Native Milkwort	E	-	Sandy soils in dry eucalypt forest or woodland with sparse understorey.	Low	Poor quality habitat occurs at the site.
Rhodamnia rubescens	Scrub Turpentine	CE	-	Subtropical rainforests, warm temperate rainforests, littoral rainforests, and wet sclerophyll forests. It may also occur as a pioneer in adjacent areas of dry sclerophyll and grassy woodland associations.	Low	Poor quality habitat occurs at the site. No BioNet records.
Rhodomyrtus psidioides	Native Guava	CE	-	Rainforest and its margins with sclerophyll vegetation, often near creeks and drainage lines. Pioneer species in disturbed environments such as regrowth and rainforest margins.	Low	Poor quality habitat occurs at the site. No BioNet records.
Sophora fraseri	Brush Sophora	V	V	Moist situations near rainforest.	Low	Poor quality habitat occurs at the site. No BioNet records.
Thesium australe	Austral Toadflax	V	V	Grassland or grassy eucalypt woodland where *Themeda australis* is predominant, on grassy headlands.	None	Suitable habitat is absent from the site. No BioNet records within the locality.
Tylophora woollsii		E	E	Moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins.	Low	Poor quality habitat occurs at the site. No BioNet records.

V = Vulnerable; E = Endangered; CE = Critically Endangered

Threatened Fauna Potential Occurrence Assessment

For this proposed activity, the likelihood of occurrence of threatened and migratory fauna species and populations was determined based on the criteria shown in **Table B.3.**

Table B.3 Potential of occurrence criteria for threatened species and populations of fauna

Potential of occurrence	Criteria
Known	The species was observed in the subject site either during the current survey or during another survey less than one year prior.
High	A species has a high likelihood of occurrence if: the subject site contains or forms part of a large area of high-quality suitable habitat important habitat elements (i.e. for breeding or important life cycle periods such as winter foraging periods) are abundant within the subject site the species has been recorded recently in similar habitat in the locality the subject site is likely to support resident populations or to contain habitat that is visited by the species during regular seasonal movements or migration.
Moderate	A species has a moderate likelihood of occurrence if: the subject site contains or forms part of a small area of high-quality suitable habitat the subject site contains or forms part of a large area of marginal habitat important habitat elements (i.e. for breeding or important life cycle periods such as winter foraging periods) are sparse or absent within the subject site the subject site is unlikely to support resident populations or to contain habitat that is visited by the species during regular seasonal movements or migration but is likely to be used occasionally during seasonal movements and/or dispersal.
Low	A species has a low likelihood of occurrence if: potentially suitable habitat exists but the species has not been recorded recently (previous 10 years) in the locality despite intensive survey (i.e. the species is considered to be locally extinct) the species is considered to be a rare vagrant, likely only to visit the subject site very rarely; e.g. during juvenile dispersal or exceptional climatic conditions (e.g. extreme drought conditions in typical habitat of inland birds).
None	Suitable habitat is absent from the subject site.

Table B.4 Threatened Fauna Potential Occurrence Assessment*

***Migratory/pelagic marine species identified in the search results are not assessed as no habitat occurs at the site**

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE Threatened Species Profiles)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
AMPHIBIA						
Mixophyes balbus	Stuttering Frog	E	V	Cool rainforest, moist eucalypt forest and occasionally along creeks in dry eucalypt forest. Typically, at elevations between 200 and 1420m above sea level in their northern range.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Mixophyes fleayi	Fleay's Barred Frog	E	E	Rainforest and wet eucalypt forest of the escarpment and foothills, close to gravely streams.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Mixophyes iteratus	Giant Barred Frog	E	E	Deep, damp leaf litter in rainforests, moist eucalypt forest and near dry eucalypt forest.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
AVIFAUNA						
Anthochaera phrygia	Regent Honeyeater	CE	CE	Dry open forest and woodland with an abundance of nectar-producing eucalypts, particularly box-ironbark woodland, swamp mahogany forests, and riverine sheoak woodlands.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Botaurus poiciloptilus	Australasian Bittern	E	E	Permanent freshwater wetlands with tall dense vegetation, particularly bullrushes and spikerushes.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Calidris ferruginea	Curlew Sandpiper	E	CE	Tidal mudflats, sandy ocean shores and occasionally inland freshwater or salt-lakes.	None	No suitable habitat occurs at the site. No BioNet records within the locality.

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE Threatened Species Profiles)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods.	**Moderate**	**Potential foraging habitat occurs at the site (Forest Oak).**
Cyclopsitta diophthalma coxeni	Coxen's Fig-parrot	CE	E	Drier rainforests and adjacent wet eucalypt forest, wetter lowland also wetter lowland rainforests.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Daphoenositta chrysoptera	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	**Moderate**	**Potential foraging habitat occurs at the site. BioNet records in the locality.**
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	Low	Poor quality foraging habitat occurs at the site.
Erythrotriorchis radiatus	Red Goshawk	CE	V	Open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water. Typically found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Population in NSW is naturally small (probably only one pair) and lies at extreme of the natural range of the species in Australia.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Falco hypoleucos	Grey Falcon	E	V	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE Threatened Species Profiles)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
Grantiella picta	Painted Honeyeater	V	V	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Hirundapus caudacutus	White-throated Needletail	-	V	Most often recorded aerial foraging above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy. Breeding does not occur in Australia.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Irediparra gallinacea	Comb-crested Jacana	V	-	Among vegetation floating on slow-moving rivers and permanent lagoons, swamps, lakes and dams.	Low	Poor quality foraging habitat occurs at the site.
Lathamus discolor	Swift Parrot	E	CE	On mainland Australia foraging occurs where eucalypts are flowering profusely or where abundant lerp infestations occur. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis* and Yellow Box *E. melliodora*.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Numenius madagascariensis	Eastern Curlew	-	CE	Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats and sometimes saltmarsh of sheltered coasts.	None	No suitable habitat occurs at the site. No BioNet records within the locality.
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V	-	Open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs.	**Moderate**	**Potential foraging habitat occurs at the site. BioNet records in the locality.**

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE Threatened Species Profiles)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
Rostratula australis	Australian Painted Snipe	E	E	Well-vegetated shallows and margins of wetlands, dams, sewage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub, and open timber.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Turnix melanogaster	Black-breasted Button-quail	CE	V	Drier rainforests and vine scrubs, often in association with Hoop Pine and a deep moist leaf litter layer. During drought it may move to adjacent wetter rainforests.	None	No suitable habitat occurs at the site. No BioNet records within the locality.
FISH						
Maccullochella ikei	Eastern Freshwater Cod	E (FM Act)	E	Permanent clear rocky streams with instream cover and deep pools. Native to only the Clarence and Richmond Rivers in northern New South Wales.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Mogurnda adspersa	Southern Purple Spotted Gudgeon	E (FM Act)	-	The species can be found in a variety of habitats such as rivers, creeks, streams and billabongs with slow-flowing or still waters. Cover in the form of aquatic vegetation, overhanging vegetation from river banks, leaf litter, rocks or snags are important for the species.	**Moderate**	**Potential foraging habitat occurs at the site. DPI Fisheries Spatial Data Portal indicates habitat downstream of the site.**
INSECTA						
Argynnis hyperbius	Australian Fritillary	E	CE	Open swampy coastal habitat where the caterpillar's food plant, Arrowhead Violet (*Viola betonicifolia*) occurs.	None	No suitable habitat occurs at the site. No BioNet records within the locality.
Phyllodes imperialis southern subspecies	Pink Underwing Moth	E	E	Undisturbed subtropical rainforest below 600 m. Breeding habitat is restricted to areas where the caterpillar's food plant, a native rainforest vine, *Carronia multisepalea*, grows in a collapsed shrub-like form.	None	No suitable habitat occurs at the site. No BioNet records within the locality.

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE Threatened Species Profiles)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
MAMMALIA						
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Near cave entrances and crevices in cliffs.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	Low	Poor quality foraging habitat occurs at the site.
Petauroides volans	Greater Glider	-	E	Ranges and coastal plains of eastern Australia, where it inhabits a variety of eucalypt forests and woodlands.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	V	V	Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Dens in tree hollows of large trees, often in family groups. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Petrogale penicillata	Brush-tailed Rock Wallaby	E	V	North-facing cliffs and dry eucalypt forest and woodland, inhabiting rock crevices, caves, overhangs during the day, and foraging in grassy areas nearby at night.	Low	Poor quality foraging habitat occurs at the site.
Phascolarctos cinereus	Koala	E	E	Appropriate food trees in forests and woodlands, and treed urban areas.	**Moderate**	**Potential foraging habitat occurs at the site. BioNet records in the locality.**
Potorous tridactylus	Long-nosed Potoroo	V	V	Cool temperate rainforest, moist and dry forests, and wet heathland, inhabiting dense layers of grass, ferns, vines and shrubs.	Low	Poor quality foraging habitat occurs at the

Scientific Name	Common Name	Status		Habitat Requirement (EPBC Act SPRAT and/ or DPIE Threatened Species Profiles)	Potential of Occurrence	Outcome - Assessment of Significance (AoS)?
		BC Act	*EPBC Act*			
						site. No BioNet records within the locality.
Pseudomys novaehollandiae	New Holland Mouse	-	V	Occurs in open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes.	None	No suitable habitat occurs at the site. No BioNet records within the locality.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	**Moderate**	**Potential foraging habitat occurs at the site. Camps located in the broader region outside site.**
REPTILIA						
Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	V	E	Rainforest and occasionally moist eucalypt forest, on loamy or sandy soils.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.
Delma torquata	Collared Delma	-	V	Usually inhabits eucalypt dominated woodland and open forest where it is associated with suitable micro-habitats i.e. exposed rocky outcrops.	Low	Poor quality foraging habitat occurs at the site. No BioNet records within the locality.

V = Vulnerable; E = Endangered; CE = Critically Endangered

Attachment J

Five Part Test of Significance

BC Act Five Part Tests for Threatened Species

The study area habitat values and extent of local population per species/species group are detailed below. To minimise repetition, the responses to the five-part tests are structured as follows:

Part (a), (c), (d) and (e) are answered per species or as a collective group of species depending on the nature of impacts.

Part (b) deals specifically with threatened ecological communities, and hence is not relevant to the subject threatened species assessment.

a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

FAUNA

Birds

- Glossy Black-Cockatoo
- Varied Sittella
- Grey-crowned Babbler

Mammals

- Koala
- Grey-headed Flying-fox

<u>Fauna</u>

Glossy Black Cockatoo

Glossy Black-Cockatoo inhabit coastal woodland, dry open forests, open inland woodland or along timbered watercourses where *Casuarina* and *Allocasuarina* species commonly occur. In Northern NSW their key food trees belong to the genus *Allocasuarina* and include Forest Oak (*A. torulosa*) and Black Oak (*A. littoralis*). This species is dependent on large hollow bearing Eucalypts for breeding where nests are located within large hollows where single egg is laid between March and May. The female predominantly feeds the chick however and both parents have been observed to feed the young.

Threatening processes for this species include:

- Habitat loss via clearing of woodland areas containing *Allocasuarina* (food) trees or large eucalyptus (hollow bearing) trees.
- Habitat fragmentation of food resources in relation to nesting trees sites.
- Changing patterns of bushfires in eastern Australia. *Casuarina* and *Allocasuarina* trees are very fire sensitive and are easily killed in an intense fire. Large dead trees where the birds nest may also be destroyed by fire.
- Threats from other animals such as feral cats and possums, which raid bird nests.
- Competition with Galah and feral honeybees for hollow resources.
- Climate change and reduction in resources due to drought.
- Illegal bird smuggling and egg collection.
- Habitat infestation by weeds.

Potential Impacts from the Proposal

The proposal would result in the removal of up to 0.21 ha of native vegetation in the form of PCT 3427. The subject vegetation comprises a relatively minor amount of potential foraging habitat for the

Glossy Black Cockatoo. Forest Oak (*A. torulosa*) (a primary food tree for the Glossy Black Cockatoo) with a greater amount of Forest Oak outside the side. The site does not support important breeding habitat for the species due to the lack of large hollow bearing trees which these birds rely on for breeding and nesting (hollow bearing trees do occur on the site, however they are unsuitable for this species). Glossy Black Cockatoo may also disperse across the site and opportunistically forage on occasions when moving between key forest habitat areas and nesting sites more broadly within the surrounding forest.

On this basis it would be highly unlikely that an adverse effect on the life cycle of the Glossy Black Cockatoo would occur such that a viable local population of the species is likely to be placed at risk of extinction.

Varied Sitella

The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.

Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.

Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

Threatening processes for this species include:

- Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement.
- The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches
- Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection.
- Infestation of habitat by invasive weeds.
- Inappropriate fire regimes.
- Climate change impacts including reduction in resources due to drought.
- Overgrazing by stock impacting on leaf litter and shrub layer.

Potential Impacts from the Proposal

The proposal may result in the loss of up to 0.21 ha of native vegetation in the form of PCT 3427. The subject vegetation comprises a small area of potential foraging habitat for the Varied Sittella in a local context. Given the occurrence of extensive areas of woodland and forest in the locality the proposal represents a minor reduction of foraging resources which may be utilised by the Varied Sittella.

On this basis, it would be highly unlikely that an adverse effect on the life cycle of the Varied Sittella would occur such that a viable local population of the species is likely to be placed at risk of extinction.

Grey-crowned Babbler

Grey-crowned Babblers (GCB) inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Other habitat includes woodlands on fertile soils in

coastal regions. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas.

Babblers live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to 15 birds. All members of the family group remain close to each other when foraging. They build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year-round, and old nests are often dismantled to build new ones.

Breeding occurs between July and February. Usually, two to three eggs are laid and incubated by the female. During incubation, the adult male and several helpers in the group may feed the female as she sits on the nest. Young birds are fed by all other members of the group. Territories range from one to 50 hectares (usually around 10 hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting.

Babblers feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses.

Threatening processes for this species include:

- Loss, degradation and fragmentation of woodland habitat on high fertility soils
- Excessive total grazing pressure and loss of coarse woody debris is resulting in degradation and loss of important habitat components
- Infestation of habitat by invasive weeds including exotic perennial grasses
- Inappropriate fire regimes - excessive fires lead to loss of tree and shrub regeneration and absence of fire may lead to the grass sward being too dense and therefore unsuitable for foraging by babblers
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners
- Climate change impacts including reduction in resources due to drought
- Nest predation by species such as ravens and butcherbirds may be an issue in some regions where populations are small and fragmented.

Potential Impacts from the Proposal

The proposal may result in the loss of up to 0.21 ha of native vegetation in the form of PCT 3427. The subject vegetation comprises a small area of potential foraging habitat for the Grey-crowned Babbler in a local context. Given the occurrence of extensive areas of woodland and forest within the locality, the proposal represents a minor reduction of foraging habitat which may be utilised by the Grey-crowned Babbler.

On this basis, it would be highly unlikely that an adverse effect on the life cycle of the Grey-crowned Babbler would occur such that a viable local population of the species is likely to be placed at risk of extinction.

Koala

The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW, it mainly occurs on the central and north coasts, with populations on the western side of the Great Dividing Range. Habitat consists of eucalypt woodlands and forests, in which the Koala feeds on more than 70 eucalypt species and 30 non-eucalypt species. Preferred browse species differ across regions. Koalas are inactive for most of the day and do most of their feeding and moving during the night. Although predominantly arboreal, Koalas will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging

from less than 2 ha to several hundred hectares in size. Generally solitary, the Koala has complex social hierarchies based on a dominant male with a territory that overlaps that of several females, with sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.

In Clarence Valley LGA, preferred food trees include Forest Red Gum (*Eucalyptus tereticornis*), Swamp Mahogany (*E. robusta*), Tallowwood (*E. microcorys*) and Small-fruited Grey Gum (*E. propinqua*), with several other species recognised as secondary feed trees.

Threatening processes for this species include:

- Loss, modification and fragmentation of habitat.
- Predation by feral and domestic dogs.
- Intense fires that scorch or kill the tree canopy.
- Road-kills.
- Human-induced climate change, especially drought.

Potential Impacts from the Proposal

The proposal may result in the loss of up to 0.21 ha of native vegetation in the form of PCT 3427. The subject vegetation comprises a small area of low-quality foraging habitat for the Koala in a local context. Given the occurrence of extensive areas of woodland and forest within the locality (in particular further east where greater number of Koala food trees are present) the proposal represents a minor reduction of foraging habitat which may be utilised by the Koala.

On this basis, it would be highly unlikely that an adverse effect on the life cycle of the Koala would occur such that a viable local population of the species is likely to be placed at risk of extinction.

Grey-headed Flying-fox

Grey-headed Flying-foxes (GHFF) have a distribution that typically extends approximately 200 km from the coast of Eastern Australia, from Rockhampton in Queensland to Adelaide in South Australia. Foraging areas include subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. GHFF feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines, as well as from cultivated gardens and orchards. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. GHFF may travel up to 50 km from the camp to forage; commuting distances are more often <20 km.

Threatening processes for this species include:

- Clearing of woodlands for agriculture
- Loss of roosting and foraging sites
- Electrocution on powerlines, entanglement in netting and on barbed-wire
- Heat stress
- Conflict with humans
- Incomplete knowledge of abundance and distribution across the species' range.

Potential Impacts from the Proposal

The proposal may result in the loss of up to 0.21 ha of native vegetation in the form of PCT 3427. The subject vegetation comprises a small area of potential foraging habitat for GHFF in a local context. Given the occurrence of extensive areas of woodland and forest within the locality, the proposal

represents a minor reduction of foraging habitat which may be utilised by the GHFF. No potential roosting habitat would be affected.

On this basis, it would be highly unlikely that an adverse effect on the life cycle of the GHFF would occur such that a viable local population of the species is likely to be placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

i. ***is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
ii. ***is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,***

No threatened ecological communities occur, no further assessment required.

c) in relation to the habitat of a threatened species or ecological community:

i. ***the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and***

Fauna: The proposal may result in loss of up to 0.21 ha of native vegetation in the form of PCT 3427. The subject vegetation comprises a small area of potential foraging habitat for the subject species in a local context. Given the occurrence of extensive areas of woodland and forest within the locality, the proposal represents a minor reduction of foraging habitat which may be utilised by the subject species.

ii ***whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and***

The vegetation at the site features some disturbance as a result of historic land clearing in the locality for Ainsworth Road and cattle grazing. The proposal would not increase this fragmentation or isolate any areas of habitat for the subject flora and fauna species to any significant degree.

iii ***the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,***

The habitat to be removed comprises open forest and understory vegetation adjacent to disturbed/ cleared areas, which contains no specific habitat values which do not occur more widely in the locality that are not being impacted.

No barriers to dispersal for the subject species would be created due to the proposal. Habitat to be removed is unlikely to be of any significant importance to the subject species.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No areas of outstanding biodiversity value have been declared in Richmond Valley LGA.

e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

A key threatening process (KTP) is a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species or ecological communities. The current list of KTP under the BC Act, and whether the proposal is recognised as a KTP is shown in **Table C.1**.

Table C.1 Key Threatening Processes

Key Threatening Process (as per Schedule 4 of the BC Act)	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
	Likely	*Possible*	*Unlikely*
Aggressive exclusion of birds by noisy miners (*Manorina melanocephala*)			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bushrock removal			✓
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)			✓
Competition and habitat degradation by feral goats (*Capra hircus*)			✓
Competition from feral honeybees (*Apis mellifera*)			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest eucalypt dieback associated with over-abundant psyllids and bell miners			✓
Habitat degradation and loss by Feral Horses, *Equus caballus*			✓
Herbivory and environmental degradation caused by feral deer			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Importation of red imported fire ants (*Solenopsis invicta*)			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the large earth bumblebee (*Bombus terrestris*)			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)			✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)			✓
Invasion, establishment and spread of Lantana (*Lantana camara*)			✓
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)			✓
Invasion of native plant communities by *Chrysanthemoides monilifera*			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes*) into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation by feral dogs (*Canis lupus familiaris*)			✓
Predation by the European Red Fox (*Vulpes vulpes*)			✓
Predation by the feral cat (*Felis catus*)			✓
Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)			✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)			✓
Removal of dead wood and dead trees		✓	

The proposal is characteristic of several KTPs as follows:

Clearing of Native Vegetation: Refers to the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. The proposal would require minor clearing - (0.21 ha) of PCT 3427, of which has historic disturbance and the majority within a road reserve.

Removal of Deadwood and Dead Trees: Refers to the removal of forest and woodland waste left after timber harvesting, collecting fallen timber for firewood, burning on site, mulching on site, the removal of fallen branches and litter as general tidying up, and the removal of standing dead trees. It is possible some dead wood may be removed as part of the proposal.

Contributions to any relevant KTPs are minor in a local context.

The degree that the proposal would contribute to any threatening process is not considered likely to place the local population of any of the subject species at significant risk of extinction.

Conclusion

It is considered unlikely that the local population of any of the subject species would be placed at significant risk of extinction as a result of the proposal.

Attachment K

Seven Part Test of Significance – Fisheries Management Act

FM Act Seven Part Test of Significance

Part of Middle Creek is mapped as potential habitat for the threatened fish species, the Southern Purple Spotted Gudgeon (*Mogurnda adspersa*) in the FM Act.

Due to the potential for impacts on threatened fish habitat, a seven part test of significance under the FM Act has been completed as follows:

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Southern Purple Spotted Gudgeon

The Southern Purple Spotted Gudgeon (*Mogurnda adspersa*) occurs in inland drainages of the Murray-Darling basin as well as coastal drainages of northern NSW and Queensland. Southern Purple Spotted Gudgeon (SPSG) are found in a variety of lotic and lentic habitats including small coastal streams, rainforest streams, large rivers and in dune lake and stream systems. There are also reports of the SPSG being found in estuaries. SPSG are classified as a pool dwelling species, occurring in slow-flowing weedy areas and slow moving or still waters in rivers, creeks and billabongs (Pusey 2004). Miles (2013) suggests that ideal SPSG habitat comprises “stagnant” pools or backwaters, <61 m long and 16 m wide, depth <600 mm, one to 60 per cent riparian cover, 40-60 per cent riparian shading, >21 per cent macrophyte cover, mud or rocky bottom, dissolved oxygen between 6-12 mg/L-1, conductivity 101-300 µm, pH 6-8.99 and 30-150 cm Secchi depth.

SPSG may occur across a range of mesohabitat conditions ranging from small, shallow riffles with moderately fast current velocities to long, moderately deep pools with no obvious flow (Pusey 2004). Substrates may range from complete dominance by mud and sand to those dominated by rock or bedrock. On average, SPSG typically occur in streams less than 10 m in width, about 40 cm deep and with a moderate current velocity (Pusey 2004). PSG feed mainly on insect larvae, but also consume worms, tadpoles, small fish and some plant matter. Female SPSG may lay several batches of eggs per season (30-1300 per batch). The eggs are deposited in clusters on solid objects such as rocks, wood or broad-leaved plants. The male guards and fans the eggs until hatching (three to eight days). The spawning period in northern NSW is not known with any certainty.

Threats to SPSG include:

- Predation by introduced fish such as gambusia and redfin perch.
- Habitat degradation, particularly the loss of aquatic plants.
- Fluctuations in water levels as a result of river regulation, leading to negative impacts on reproduction and recruitment.

Potential impacts of the Activity

Potential impacts from the proposal may include indirect impacts to water quality as part of the excavation on the banks of Middle Creek and the associated clearing of riparian zone for the road works of Ainsworth Road and riverbank stabilisation. This may result in erosion or sedimentation runoff from disturbed areas. With mitigations in place, the minor nature of the works is unlikely to impact SPSG habitat.

On this basis the proposal is not considered likely to adversely affect the life cycle of SPSG such that a viable local population of the species is likely to be placed at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

No threatened populations occur at the site; no further consideration is required.

c) In the case of an endangered ecological community, or critically endangered ecological community whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

No endangered ecological communities occur; no consideration under this part of the assessment is required.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed,

The minor earthworks of on the bank of Middle Creek as part of the proposal hve the potential to indirectly impact the aquatic habitat of SPSG via potential water quality impacts. The risks of these potential impacts will be managed through the implementation of safeguards (outline in the REF) and is considered unlikely to have significant impacts on the potential habitat of the SPSG.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The proposal would be not requiring any significant blockage of fish passage associated with road construction or erosion and sedimentation controls. It would be expected that the majority of the creek environment would be available for fish movement during the duration of the works.

(iii) the importance of the habitat to be removed, modified fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Better quality SPSG habitat occurs within the locality which will be retained. No fragmentation, isolation or direct impacts to SPSG habitat is likely to occur as a result of the works. The Activity is unlikely to result in a reduction in the habitat values of the subject section of the creek during the construction period. Post construction, the habitat values should largely be retained, as revegetation of native species flora will occur, as part of riverbank stabilisation.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No areas of critical habitat have been declared for the subject species.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threatened abatement plan.

Recovery plans under the FM Act have not been prepared for SPSG. A Priorities Action Statements (PAS) has been prepared for SPSG. The Proposal will involve some revegetation to the riparian zone of Middle Creek at the site which is consistent with the habitat rehabilitation of the PAS recovery actions.

g) whether the action proposed constitutes or is part of a threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

An assessment of the Activity with regards to potential contribution towards or operation of key threatening processes (KTPs) listed under Schedule 6 of the FM Act is provided in **Table F.1**.

Table F.1 Assessment of Key Threatening Process (FM Act)

1. Listed Key Threatening Process (FM Act)	*2. Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
	Likely	*Possible*	*Unlikely*
Current shark meshing program in NSW waters			✓
Hook and line fishing in areas important for the survival of threatened fish species			✓
Human-caused climate change			✓
Instream structures and other mechanisms that alter natural flow			✓
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW			✓
The introduction of fish to fresh waters within a river catchment outside their natural range			✓
The removal of large woody debris from NSW rivers and streams			✓
The degradation of native riparian vegetation along NSW water courses	✓		

The degradation of native riparian vegetation along NSW water course: The riparian vegetation along Middle Creek at the site is highly disturbed. With regeneration of native flora species, the degree that the proposal would contribute to this KTP is not expected to place the local populations of the subject species at significant risk of extinction

Conclusion

It is considered unlikely that the local population of Southern Purple Spotted Gudgeon would be placed at significant risk of extinction as a result of the proposal.