Our Ref: 137-001-002L
Your Ref: OPW/21/0001

8 February 2022

Chief Executive Officer
Mareeba Shire Council
PO Box 154,
MAREEBA QLD 4880

LOT 200 SP323217, EMERALD END ROAD MAREEBA
DEVELOPMENT APPLICATION FOR OPERATIONAL WORKS
COUNTRY ROAD ESTATE – STAGE 3 (11 ALLOTMENT RURAL RESEIDENTIAL SUBDIVISION)

Please find attached the operational works submission for the above mentioned subdivision in electronic format.

Per Council's invoice the Operational Works fee payable is $3,108.00 being for the base fee and per lot fee (11 lots). This invoice has been provided to the applicant for payment.

If you require any further clarification or additional information please do not hesitate to contact the undersigned.

Yours faithfully

John Martin
Director

Enc: DA Form 1 – Development Application Details
Design Report
Engineering Drawings
Statement of Compliance

ERSCON Consulting Engineers
PO Box 7890 Cairns QLD 4870 | PO Box 26 Buderim QLD 4556
ABN 95 167 45 474

ERSCON
CONSULTING ENGINEERS

BENCHMARK
SURVEY & DESIGN

Country Road Estate

Stage 3
Operational Works Design Report

February 2022

www.erscon.com.au

Prepared by:

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DOCUMENT ISSUE RECORD

Revision Code	Date Revised	Revision Details	Author	Checked	Approved
1	08/02/22	OPERATIONAL WORKS ISSUE	MT	JDM	JDM

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1 SUMMARY

1.1 DEVELOPMENT APPLICATION DETAILS

Proposed development:	Construction of 11 new rural residential allotments in Country Road Estate Subdivision. Works include site clearing, bulk earthworks, roadworks, water, and stormwater connections.
Type of approval sought:	Operational Works
Site address:	Country Road Mareeba, QLD 4880
Real property description:	Lot 200 on SP32317 & Lot 100 on SP320505
Site area:	74,000m²
Assessment manager:	Mareeba Shire Council
Owner details:	Conmat No 2 Pty Ltd
Applicant details:	Conmat No 2 Pty Ltd C/- Benchmark Survey & Design

1.2 PLANNING INSTRUMENT DETAILS

Planning scheme:	Mareeba Shire Council Planning Scheme 2016
Zone:	Rural Residential A – ZM016a
Local plan:	Nil
Level of assessment:	Code Assessment
Applicable codes:	Bushfire Overlay Code Flood Hazard Overlay

1.3 REFERRAL AGENCIES

Referral agency and role

2 SITE DETAILS

2.1 SITE DESCRIPTION

The site is located adjacent existing rural residential subdivision land to the North-east of the Mareeba township.

Table 1: Site description

Site characteristic	Description
Existing land use	The existing land consists of nearby rural residential allotments and generally sparse vegetation.
Existing structures	There is no significant existing infrastructure on the site.
Frontage and access	Extensions to Country Road and a new road “Road A” will provide frontage and access to all allotments.
Topography and views	Levels vary across the site from approximately RL412m AHD in the west to RL402m AHD in the east.
Existing vegetation	There is sparse existing vegetation present.
Existing waterways	Site stormwater discharges to an existing major drainage channel to the North/East of the site.

Figure 1: Aerial View of Site Identification
Source: DA Mapping System

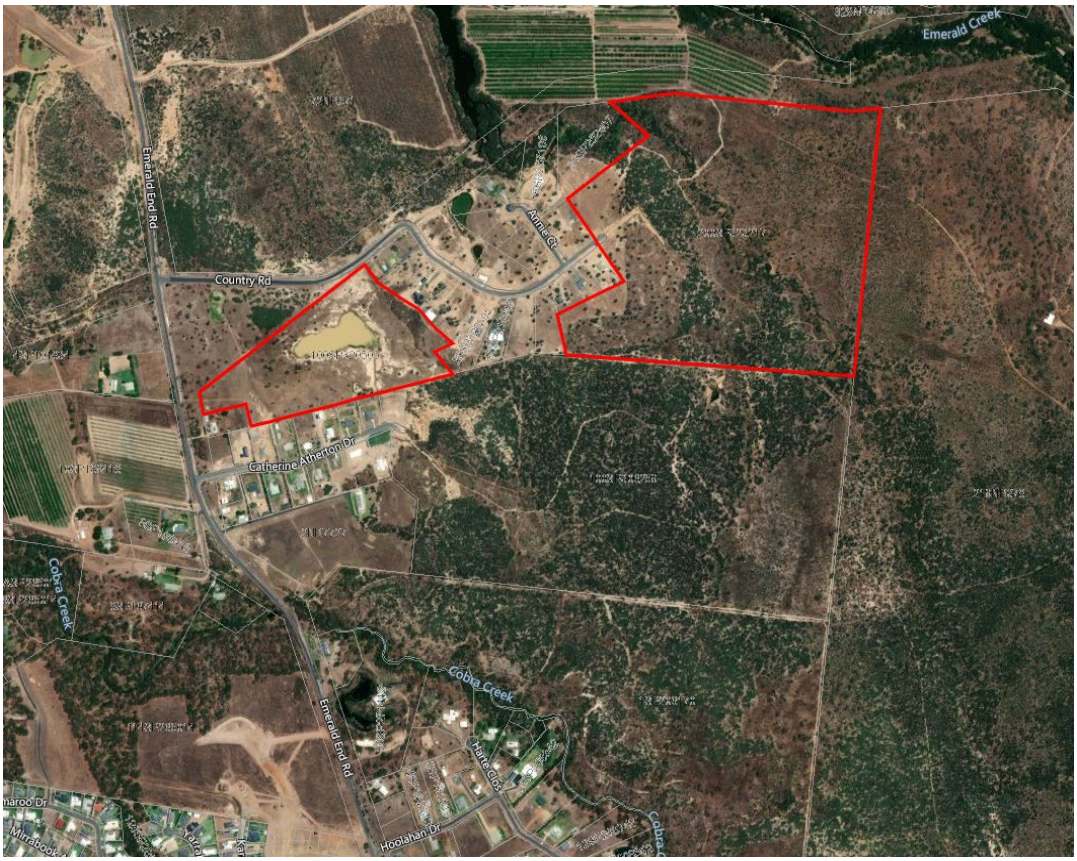


Figure 2: Satellite View of Site Identification
Source: DA Mapping System

2.2 SURROUNDING LAND USES

Table 2: Surrounding land uses

	Surrounding land uses
North	Existing development/drainage
South	Future development/cleared land
East	Existing development/drainage
West	Existing vegetated area

3 PROPOSED DEVELOPMENT DETAILS

The purpose of this application is the development of 11 new allotments, including all municipal services (excluding sewer) and access road. This stage is a continuation on from previous stages, and is designed in accordance with Council's conditions, and relevant specifications and standards.

Table 3: Summary of development aspects

Building or operational work	
Operational work	Construction of 11 new rural residential allotments including roadwork, bulk earthworks, road works, water, and stormwater connections.
Value of proposed work	Approx. $247,000.00

4 DEVELPOPMENT APPLICATION FORM 1

DA Form 1 – Development application details

Approved form (version 1.3 effective 28 September 2020) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) **and** parts 4 to 6 of *DA Form 2 – Building work details*.

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008.* For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: *All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	Conmat No. 2 Pty Ltd C/O Benchmark Survey & Design
Contact name *(only applicable for companies)*	Wayne Storey
Postal address *(P.O. Box or street address)*	PO BOX 1285
Suburb	Innisfail
State	QLD
Postcode	4860
Country	Australia
Contact number	0447 616 747
Email address *(non-mandatory)*	highdodd@westnet.com.au
Mobile number *(non-mandatory)*	
Fax number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	

2) Owner's consent
2.1) Is written consent of the owner required for this development application?
☐ Yes – the written consent of the owner(s) is attached to this development application ☒ No – proceed to 3)

Queensland Government

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

***Note**: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see DA Forms Guide: Relevant plans.*

3.1) Street address and lot on plan

☒ Street address **AND** lot on plan (*all lots must be listed*), ***or***

☐ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
		200	Emerald End Road	Mareeba
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4880	200	SP323217	Mareeba
b)	Unit No.	Street No.	Street Name and Type	Suburb
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application

☒ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

☐ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer:

☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:

Name of port authority for the lot:

☐ In a tidal area

Name of local government for the tidal area *(if applicable)*:

Name of port authority for tidal area *(if applicable)*:

☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*

Name of airport:

☐ Listed on the Environmental Management Register (EMR) under the *Environmental Protection Act 1994*	
EMR site identification:	
☐ Listed on the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*	
CLR site identification:	

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see DA Forms Guide.

☐ Yes – All easement locations, types and dimensions are included in plans submitted with this development application

☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☒ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☒ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☒ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

Construction of 11 lot rural residential subdivision including roads, stormwater and water reticulation

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms guide: Relevant plans.*

☒ Relevant plans of the proposed development are attached to the development application

6.2) Provide details about the second development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☐ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*

☐ Relevant plans of the proposed development are attached to the development application

6.3) Additional aspects of development

☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application

☒ Not required

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	☐ Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	☐ Yes – complete division 2
Operational work	☒ Yes – complete division 3
Building work	☐ Yes – complete *DA Form 2 – Building work details*

Division 1 – Material change of use

***Note**: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.*

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition *(include each definition in a new row)*	Number of dwelling units *(if applicable)*	Gross floor area (m^2) *(if applicable)*

8.2) Does the proposed use involve the use of existing buildings on the premises?
☐ Yes
☐ No

Division 2 – Reconfiguring a lot

***Note**: This division is only required to be completed if any part of the development application involves reconfiguring a lot.*

9.1) What is the total number of existing lots making up the premises?	
9.2) What is the nature of the lot reconfiguration? *(tick all applicable boxes)*	
☐ Subdivision *(complete 10))*	☐ Dividing land into parts by agreement *(complete 11))*
☐ Boundary realignment *(complete 12))*	☐ Creating or changing an easement giving access to a lot from a constructed road *(complete 13))*

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				

10.2) Will the subdivision be staged?	
☐ Yes – provide additional details below ☐ No	
How many stages will the works include?	
What stage(s) will this development application apply to?	

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m^2)	Lot on plan description	Area (m^2)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? *(attach schedule if there are more than two easements)*				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? *(e.g. pedestrian access)*	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

***Note**: This division is only required to be completed if any part of the development application involves operational work.*

14.1) What is the nature of the operational work?		
☒ Road work	☒ Stormwater	☒ Water infrastructure
☐ Drainage work	☒ Earthworks	☐ Sewage infrastructure
☐ Landscaping	☐ Signage	☐ Clearing vegetation
☐ Other – please specify:		
14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*		
☒ Yes – specify number of new lots:	11	
☐ No		
14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*		
$247,000		

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application
Mareeba Shire Council
16) Has the local government agreed to apply a superseded planning scheme for this development application?
☒ Yes – a copy of the decision notice is attached to this development application
☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
☐ No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements?
***Note**: A development application will require referral if prescribed by the* Planning Regulation 2017.

☒ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6

Matters requiring referral to the **Chief Executive of the *Planning Act 2016*:**

☐ Clearing native vegetation
☐ Contaminated land *(unexploded ordnance)*
☐ Environmentally relevant activities (ERA) *(only if the ERA has not been devolved to a local government)*
☐ Fisheries – aquaculture
☐ Fisheries – declared fish habitat area
☐ Fisheries – marine plants
☐ Fisheries – waterway barrier works
☐ Hazardous chemical facilities
☐ Heritage places – Queensland heritage place *(on or near a Queensland heritage place)*
☐ Infrastructure-related referrals – designated premises
☐ Infrastructure-related referrals – state transport infrastructure
☐ Infrastructure-related referrals – State transport corridor and future State transport corridor
☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels
☐ Infrastructure-related referrals – near a state-controlled road intersection
☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas
☐ Koala habitat in SEQ region – key resource areas
☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor
☐ Ports – Brisbane core port land – environmentally relevant activity (ERA)
☐ Ports – Brisbane core port land – tidal works or work in a coastal management district
☐ Ports – Brisbane core port land – hazardous chemical facility
☐ Ports – Brisbane core port land – taking or interfering with water
☐ Ports – Brisbane core port land – referable dams
☐ Ports – Brisbane core port land – fisheries
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*
☐ SEQ development area
☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation
☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use
☐ Tidal works or works in a coastal management district
☐ Reconfiguring a lot in a coastal management district or for a canal
☐ Erosion prone area in a coastal management district
☐ Urban design
☐ Water-related development – taking or interfering with water
☐ Water-related development – removing quarry material *(from a watercourse or lake)*
☐ Water-related development – referable dams
☐ Water-related development –levees *(category 3 levees only)*
☐ Wetland protection area

Matters requiring referral to the **local government:**

☐ Airport land
☐ Environmentally relevant activities (ERA) (*only if the ERA has been devolved to local government)*

☐ Heritage places – Local heritage places

Matters requiring referral to the **Chief Executive of the distribution entity or transmission entity:**
☐ Infrastructure-related referrals – Electricity infrastructure

Matters requiring referral to:
- The **Chief Executive of the holder of the licence**, if not an individual
- The **holder of the licence**, if the holder of the licence is an individual

☐ Infrastructure-related referrals – Oil and gas infrastructure

Matters requiring referral to the **Brisbane City Council:**
☐ Ports – Brisbane core port land

Matters requiring referral to the **Minister responsible for administering the *Transport Infrastructure Act 1994*:**
☐ Ports – Brisbane core port land *(where inconsistent with the Brisbane port LUP for transport reasons)*
☐ Ports – Strategic port land

Matters requiring referral to the **relevant port operator**, if applicant is not port operator**:**
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*

Matters requiring referral to the **Chief Executive of the relevant port authority:**
☐ Ports – Land within limits of another port *(below high-water mark)*

Matters requiring referral to the **Gold Coast Waterways Authority:**
☐ Tidal works or work in a coastal management district *(in Gold Coast waters)*

Matters requiring referral to the **Queensland Fire and Emergency Service:**
☐ Tidal works or work in a coastal management district *(involving a marina (more than six vessel berths))*

18) Has any referral agency provided a referral response for this development application?

☒ Yes – referral response(s) received and listed below are attached to this development application
☐ No

Referral requirement	Referral agency	Date of referral response
Concurrence	Department of Transport & Main Roads	4th March 2011
Concurrence & Advice	Department of Environment and Resource management	11th May 2011

Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application *(if applicable).*

These works will not interfere with a wetland or waterway so should not require referral and the state-controlled intersection upgrade has been previously completed so this should not require referral. As such the application indicates that there should be no requirement for referral.

PART 6 – INFORMATION REQUEST

19) Information request under Part 3 of the DA Rules

☒ I agree to receive an information request if determined necessary for this development application
☐ I do not agree to accept an information request for this development application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties*
- *Part 3 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules.*

Further advice about information requests is contained in the DA Forms Guide.

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? *(e.g. a preliminary approval)*

☒ Yes – provide details below or include details in a schedule to this development application
☐ No

List of approval/development application references	Reference number	Date	Assessment manager
☒ Approval ☐ Development application	REC/08/0096	28 March 2012 (As amended 20 June 2018)	Tablelands Regional Council (Now Mareeba Shire Council)
☐ Approval ☐ Development application			

21) Has the portable long service leave levy been paid? *(only applicable to development applications involving building work or operational work)*

☐ Yes – a copy of the receipted QLeave form is attached to this development application
☒ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid
☐ Not applicable *(e.g. building and construction work is less than $150,000 excluding GST)*

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

☐ Yes – show cause or enforcement notice is attached
☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below
☒ No

***Note**: Application for an environmental authority can be found by searching "ESR/2015/1791" as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.*

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

☐ Yes – *Form 69: Notification of a facility exceeding 10% of schedule 15 threshold* is attached to this development application
☒ No

***Note**: See www.business.qld.gov.au for further information about hazardous chemical notifications.*

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

***Note**: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.*

2. See https://www.qld.gov.au/environment/land/vegetation/applying for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

***Note**: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.*

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

***Note**: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.des.qld.gov.au for further information.*

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the *Water Act 2000***?

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

***Note**: Contact the Department of Natural Resources, Mines and Energy at www.dnrme.qld.gov.au for further information.*

DA templates are available from https://planning.dsdmip.qld.gov.au/. If the development application involves:

- *Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1*
- *Taking or interfering with water in a watercourse, lake or spring: complete DA Form1 Template 2*
- *Taking overland flow water: complete DA Form 1 Template 3.*

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from https://planning.dsdmip.qld.gov.au/. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☐ Yes – an associated *resource* allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☒ No

***Note**: See guidance materials at www.daf.qld.gov.au for further information.*

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development
☒ No

***Note**: Contact the Department of Natural Resources, Mines and Energy at www.dnrme.qld.gov.au and www.business.qld.gov.au for further information.*

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development
☒ No

***Note**: Contact the Department of Environment and Science at www.des.qld.gov.au for further information.*

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the Water Supply Act)?

☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the Water Supply Act is attached to this development application
☒ No

***Note**: See guidance materials at www.dnrme.qld.gov.au for further information.*

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

☐ Yes – the following is included with this development application:
- ☐ Evidence the proposal meets the code for assessable development that is prescribed tidal work *(only required if application involves prescribed tidal work)*
- ☐ A certificate of title

☒ No

***Note**: See guidance materials at www.des.qld.gov.au for further information.*

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

☐ Yes – details of the heritage place are provided in the table below
☒ No

***Note**: See guidance materials at www.des.qld.gov.au for information requirements regarding development of Queensland heritage places.*

Name of the heritage place:		Place ID:	

Brothels

23.14) Does this development application involve a **material change of use for a brothel**?

☐ Yes – this development application demonstrates how the proposal meets the code for a development application for a brothel under Schedule 3 of the *Prostitution Regulation 2014*
☒ No

Decision under section 62 of the *Transport Infrastructure Act 1994*

23.15) Does this development application involve new or changed access to a state-controlled road?

☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)
☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.16) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

***Note**: See guidance materials at www.planning.dsdmip.qld.gov.au for further information.*

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist	
I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17 ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
If building work is associated with the proposed development, Parts 4 to 6 of *DA Form 2 – Building work details* have been completed and attached to this development application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is with the development application ***Note**: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning Report Template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued (*see 21*)	☒ Yes ☐ Not applicable

25) Applicant declaration

☒ By making this development application, I declare that all information in this development application is true and correct

☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001*

***Note**: It is unlawful to intentionally provide false or misleading information.*

Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website.

Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where:

- such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or
- required by other legislation (including the *Right to Information Act 2009*); or
- otherwise required by law.

This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: | Reference number(s):

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			

5 SUBDIVISION CONDITIONS

5.1 ENGINEERING CONDITION CONFIRMATION

Each of the conditions noted in the Negotiated *Decision Notice – Application for reconfiguring a lot – (Subdivision creating a further 64 lots in five (5) stages) – Lot 4 on RP739487 – Situated at 200 Emerald End Road, Mareeba* dated 28 March 2012 (Amended on 20 June 2018) attached in **Appendix A**, have been addressed as follows:

Condition 1

The proposed development works are in accordance with this condition.

Condition 2 – Timing of Effect

Condition acknowledged.

Condition 3 - General

Condition acknowledged and design has been undertaken in accordance with the requirements of this condition and its sub-conditions where relevant to this stage.

Condition 4 – Infrastructure Services and Standards

Condition acknowledged and design has been undertaken in accordance with the requirements of this condition and its sub-conditions where relevant to this stage.

Electrical, Telecommunications and Lighting submission will be provided under a separate operational works application.

6 STORMWATER DRAINAGE

6.1 DESIGN METHOD

The stormwater design has been carried out using the Rational Method, in accordance with the Queensland Urban Drainage Manual (QUDM). Rainfall values from FNQROC Development Manual D4 (03/17) have been utilised. The majority of the hydrological and hydraulic computations undertaken during the development of the stormwater drainage system have been performed utilising the stormwater design module of Version 12 of 12d Model.

In accordance with the QUDM recommendations, the major system design has been calculated based on a 100-year recurrence interval, using a combination of underground and overland flow. Minor flows in rural residential streets are carried entirely by the underground pipe system, which is designed based on a 5-year recurrence interval, in accordance with the requirements of the FNQROC. Road crossings have been designed to a 10-year recurrence interval for rural areas in accordance with FNQROC.

Runoff has been calculated using IFD Chart 15 of the FNQROC Development Manual. Runoff Coefficients have been determined in accordance with QUDM.

Gully pit capacities have been estimated using FNQROC Section D4 Appendix B “Kerb Inlet Capacity Charts”. Roadway flow widths have been calculated using Manning’s equation for both major and minor flows.

As a rural residential subdivision, pits have been spaced at intervals to ensure road flows do not exceed the reserve, typical of the adjacent development.

6.2 MINOR DRAINAGE

6.2.1 Hydrological Design Philosophy

The minor drainage system consists of a combination of grass open drains and underground drainage infrastructure consisting of pits and pipes.

The major drainage system involves overland flow on both the street surfaces, open drains and underground system. The major drainage system has a capacity of Q100, as required by QUDM.

6.2.2 Hydrological Analysis

12d Model requires various data to be input by the operator in order for it to perform hydrological computations as detailed below.

Coefficients of Runoff have been determined in accordance with Section 5.04 of QUDM assuming an Urban Residential Development Category. Rainfall intensities have been obtained from IFD Chart 15 from FNQROC Section D4 Appendix A.

Times of Concentration have been determined in accordance with Section 5.05 of QUDM, specifically the Recommended Standard Inlet Times detailed in Table 5.05.1. Larger

catchment Tc has been calculated on an average slope calculation using the Bransby-Williams' equation in accordance with QUDM.

The Hydrological Analysis undertaken including pit flow, catchment, bypass and flow widths for the pit layout are shown in the calculation tables contained in **Appendix C**. Stormwater longitudinal sections showing pipe grades and a graphical representation of the Hydraulic Grade Line are referred to in **Appendix C**.

6.2.3 Hydraulic Analysis

Results of the Hydraulic Analysis of the stormwater drainage system including pit and pipe head losses and pipe discharge are detailed in the calculation tables contained in **Appendix C.**

Pipe sizes and invert levels have been determined through the utilisation of 12d Model with the stipulation of a minimum pipe cover of 600mm. The K values utilised by 12d Model in the determination of pit head losses are based on the QUDM K value charts.

6.3 MAJOR DRAINAGE

6.3.1 Overland Flow

In accordance with the requirements of QUDM, the major drainage system, which incorporates overland flow along the street network and open drains, has been designed for a recurrence interval of 100 years. A portion of the total runoff will be carried by the minor drainage system in the underground pipes and the remainder of the run-off is conveyed by the streets and park drains to the lawful point of discharge.

Depth by velocity calculations for half the road flow have been undertaken and all pits produce satisfactory results with regard to pedestrian safety (dv < 0.6m2/s).

6.3.2 Flood Immunity

In accordance with the requirements of the development approval, allotments have a minimum of 2,000 square metres being 300mm above the Q100 level. No filling is proposed below the Q100 level.

Flood investigations previously undertaken for Council include a large portion of the development area. These investigations show the development to not be subject to inundation at 1%AEP (Q100) event. Further site investigations of debris levels directly after the significant rainfall event during March 2018, which resulted in major peak flooding of the Barron River, showed a debris/water level of RL401.200. This has been mapped on drawings 137-001-SK02 and is provided in **Appendix A**. This area of inundation shows that the requirement of 2,000 square meters of allotment area being 300mm above flooding level is still achievable.

6.4 STORMWATER OUTLETS

Stormwater outlets have been designed to be located in easements as required by the development approval where located in private property. Outlets have been designed to have outlet scour protection and energy dissipation through rock outlet pads.

Existing flow paths have been maintained as much as practicable to minimise re-directed or increased stormwater flows. Existing dams and billabongs have been utilised to capture flow as per the natural site conditions. This approach has been used to further mitigate re-directed/increased flows.

Upstream flows have been calculated for the existing channels and crossroad drainage culvers to ensure the existing drains have capacity for these flows and minimise the risk of disturbance to property.

Rear of allotment cut off drains have been designed to direct existing overland flows adjacent Stage 8 into the existing open drain system.

6.5 WATER QUALITY

The design addresses the "State Planning Policy 4/10 Healthy Waterways" as below:

Part A – Urban Stormwater Management

Protecting Water Quality	
Performance Outcome P01 The development is compatible with the land use constraints of the site for achieving stormwater design objectives.	**Acceptable outcome A01.1** The nature, design and stormwater management of the development is in accordance with design objectives stated in Chapter 4 (section 4.9) of the State Planning Policy Guideline for Healthy Waters (the guideline) **And** Prepare a site stormwater quality management plan (SQMP) that: a. Is consistent with any local area stormwater management planning; and b. Provides for achievable stormwater quality treatment measures reflecting land use constraints, such as soil type, landscape features (including landform), nutrient hazardous areas, acid sulfate soil, and rainfall erosivity.
Outcome achieved – Stormwater design has been undertaken to incorporate as much of the existing flow paths and dams as practical. All stormwater outlets are directed towards or directly into existing stormwater drainage paths/gullies. Stormwater flows exiting pipe networks have been designed with outlet scour and energy dissipation to reduce velocities to minimise impacts to existing ground. Previous development has shown that outlet drains have naturally re-vegetated to provide additional protection.	

Performance Outcome P02 The entry of contaminants into, and transport of contaminants, in stormwater is avoided and minimised.	**Acceptable outcome A02.1** Any development application incorporates: • Stormwater management measures to achieve relevant design objectives outlined in Chapter 4 of the guideline • Management of nutrients of concern and acid sulfate soils. **And** Prepare a site stormwater quality management plan (SQMP) that: a. Accounts for development type, construction phase, local landscape, climatic conditions and design objectives in accordance with the guideline; and b. Is consistent with the Queensland Acid Sulfate Soil Technical Manual.
Outcome achieved – The site is not expected to be subject to Acid Sulfate Soils. Should Acid Sulfate Soils be encountered, appropriate measures will be undertaken in accordance with Queensland Acid Sulfate Soil Technical Manual. An appropriate Erosion and Sediment Control (ESC) plan will be implemented during and post construction as part of the SQMP.	
Performance Outcome P03 Construction activities for the development avoid or minimise adverse impacts on stormwater quality.	**Acceptable outcome A03.1** Any development application for the development is accompanied by an erosion and sediment control plan (ESCP) prepared in accordance with the guideline that demonstrates release of sediment laden stormwater is avoided for the nominated design storm, and minimised when the nominated design storm is exceeded by addressing design objectives in the guideline, Chapter 4, for: • Drainage control; • Erosion control; • Sediment control; and • Water quality outcomes. Addressing the design objectives may include enhancing the achievement of some objectives if achievement of other objectives is impractical. **And**

	Acceptable outcome A03.2 Erosion and sediment control practices including any proprietary erosion and sediment control products are designed, installed, constructed, operated, monitored and maintained, and any other erosion and sediment control practices are carried out, in accordance with local conditions and appropriate recommendations from a suitable qualified person. Or The ESCP demonstrates how stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to Acceptable Outcome A03.1
Outcome achieved - An appropriate Erosion and Sediment Control (ESC) plan will be implemented during and post construction as part of the SQMP. The ESC is designed for the application of best practices to erosion and sediment control during and post construction. Stormwater flows exiting pipe networks have been designed with outlet scour and energy dissipation to reduce velocities to minimise impacts to existing ground.	
Protection of Natural flows	
Performance Outcome P04 Construction and operation activities for the development avoid or minimise changes to waterway hydrology from adverse impacts of altered stormwater quality and flow.	**Acceptable outcome A04.1** Development incorporates stormwater flow control measures to achieve at least the design objectives set out in Chapter 4 of the guideline. Both the construction and operational phases for the development comply with advice and the design objectives in Chapter 4 of the guideline including management of frequent flows, peak flows and construction phase hydrological impacts.
Outcome achieved – Stormwater flows have been designed to be directed to existing stormwater flow paths, with post-development catchments remaining similar to pre-development. Stormwater outlets have been designed with energy dissipation to reduce velocities of flows out letting from piped networks. The existing flow regime to existing dams is generally unchanged.	

Part C – Non-tidal artificial waterways ('the waterway')

<table>
<tr><th colspan="2">Protecting Water Quality in existing natural waterways</th></tr>
<tr><td>Performance Outcome P01

The waterway is not designed only for stormwater flow management or stormwater quality management.</td><td>Acceptable outcome A01.1

The waterway is designed and managed for any of the following end use purposes:
Amenity including aesthetics, landscaping, and recreation;
Flood management;
Stormwater harvesting as part of an integrated water cycle management plan;
Aquatic habitat.
And

The end use purpose is designed and operated in a way that protects water environmental values.</td></tr>
<tr><td colspan="2">Outcome achieved – The waterway end use purposes have not changed from the pre-development case. Flows that were directed towards the existing dams in the pre-development case are still current post-development. Flows to the larger gullies also remain generally the same. No new dams are proposed as part of the development, and no flows to existing flow paths are proposed to be significantly altered.</td></tr>
<tr><td>Performance Outcome P02

The waterway is located in a way that is compatible with the land use constraints of the site for protecting water environmental values in existing natural waterways.</td><td>Acceptable outcome A02.1

Where relevant:<ol type="a">
Environmental values in downstream waterways are protected;
Any groundwater recharge areas are not affected;
The location of the waterway incorporates low lying areas of a catchment connected to an existing waterway;
Any existing areas of ponded water are included.
And

Acceptable outcome A02.2

Waterways are located:</td></tr>
</table>

	a. Outside natural wetlands and any associated buffer areas; and b. To avoid disturbing soils or sediments and c. To avoid altering the natural hydrologic regime in acid sulfate soil and nutrient hazardous areas.
Outcome achieved – The catchments and flow directions on site remain generally the same between pre and post development. No additional dams are proposed, with the existing gullies being maintained toward existing dams and piped flows out letting to these. The larger gullies are also maintained with piped networks out letting toward these.	
Performance Outcome P03 The waterway is located in a way that is compatible with existing tidal waterways.	**Acceptable outcome A03.1** Where the waterway is located adjacent to, or connected to, a tidal waterway by means of a weir, lock, pumping system or similar: a. There is sufficient flushing or a tidal range of >0.3m; or b. Any tidal flow alteration does not adversely impact on the tidal waterway; or c. There is no introduction of salt water into freshwater environments.
Outcome achieved – Not adjacent tidal waterways.	
Performance Outcome P04 The construction phase for the waterway is compatible with protecting water environmental values in existing natural waterways.	**Acceptable outcome A04.1** Erosion and sediment control measures are incorporated during construction to achieve design objectives set out in Chapter 4 of the guideline.
Outcome achieved – Erosion and sediment control has been designed in accordance with best practices. The construction contractor will also be responsible for preparing an erosion and sediment control plan in reference to the civil design ESC to ensure appropriate controls are in place during and after construction.	
Performance Outcome P05 Stormwater overflows from the waterway provide for the achievement of water quality objectives in existing natural waterways	**Acceptable outcome A05.1** Stormwater run-off that may enter the non-tidal waterway is pre-treated in accordance with the guideline design objectives, water quality objectives of local waterways, and any relevant local area stormwater management plan.

Outcome achieved – Stormwater has been designed to be captured and conveyed to the existing stormwater flow paths as per previous stages of the development. Run-off quality is enhanced by large areas of natural grass and vegetation to prevent sediment runoff.	
Designing, managing and operating the non-tidal artificial waterway	
Performance Outcome P06 The waterway is designed, managed and operated by suitably qualified persons.	**Acceptable outcome A06.1** To help achieve water quality objectives in and downstream of the waterway, the waterway is designed, constructed and managed under the responsibility of a suitably qualified registered professional engineer, Queensland with specific experience in establishing and managing artificial waterways.
Outcome achieved – No additional artificial waterways are to be constructed as part of the works. Flows to existing artificial waterways and drainage paths have been designed under the responsibility of an RPEQ.	
Performance Outcome P07 The waterway Is managed and operated in ways that demonstrate achievement of water quality objectives in natural waterways.	**Acceptable outcome A07.1** Monitoring and maintenance programs adaptively manage water quality in the waterway to achieve relevant water quality objectives downstream of the waterway. **And** **Acceptable outcome A07.2** Aquatic weeds are managed in ways that achieve a low percentage of coverage of the water surface area (less than 10%). Pests and vectors (such as mosquitoes) are managed such as by avoiding stagnant water areas, providing for native fish predators, and if necessary, other best practices for monitoring and treating pests. **And** **Acceptable outcome A07.3** The waterway is managed and operated by a responsible entity under agreement for the life of the waterway. The responsibility entity is to implement a deed of agreement for the management and operation of the waterway that: a. Identifies the waterway; b. States a period of responsibility for the

	entity for the management and operation of the waterway; c. States a process for any transfer of responsibility for the waterway; d. States required actions under the agreement for monitoring of the water quality of the water and receiving waters; e. States required actions under the agreement for maintaining the waterway to achieve the outcomes of this policy and any relevant approval conditions of the development; and f. Identifies funding sources for the above including bonds, headworks charges or levies.
Outcome achieved – No additional artificial waterways are to be constructed as part of the works. Existing flow paths remain in place post development and no significant catchment changes are proposed.	

7 POTABLE WATER RETICULATION

7.1 DESIGN METHOD

All reticulation mains have been designed in accordance with the FNQROC Development Manual for 500 litres/person/day as follows:

- Single Family Dwelling (>1500 m²) = 3.7 EP/Connection
- Average Day Consumption (AD) = 1,850 L/day
- Mean Day Maximum Month (MDMM) = 1.5 x AD = 2,775 L/day
- Maximum Day = 2.25 x AD = 4,163 L/day
- Maximum Hour = 1/12 MD = 347 L/hour
  = 0.0964 L/s

The following design criterion was assessed:

- Pressure in system to remain above 22m and below 60m during Maximum Hour Demand.
- Pressure in system to remain above 12m during firefighting flows of 15 L/s.

7.2 GENERAL WATER LAYOUT

7.2.1 Alignment

Water mains have been designed on an alignment of 2.0m from the RP boundary as per the Mareeba Shire requirement in Table D6.2 of the FNQROC Development Manual.

7.2.2 Cover

The minimum cover for mains located on the footpath is 600mm and 800mm for a road crossing, whilst complying with a maximum of 1200mm.

The minimum separation between the water main and other services is as follows:

Minimum Clearance for Water Mains ≤ 200mm

Service	Horizontal Clearance (mm)	Vertical Clearance (mm)
Ergon	500	225
Telstra	300	150
Stormwater	300	150
Sewer	1000	500
Water Crossing	300	150

*Based on WSA 03 Table 4.1

7.2.3 Fittings

Road crossings shall be DICL with a minimum diameter of 100mm.

Rider Mains

Properties located on the opposite side of the road to the water main are serviced by a DN63mm MDPE pipe to serve a maximum of 15 allotments.

Hydrants

Fire hydrants shall be located opposite RP boundaries at a maximum spacing of 80m and shall be located on mains 100mm dia. Or greater only.

Valves

Valves are installed throughout the system to provide minimum disturbance during maintenance. The maximum number of houses inconvenienced is no greater than 15.

7.3 DESIGN

The local existing network has been modelled with an interim and ultimate design development outcome assessed. An analysis of the design network showed that Maximum Hour Demand was achieved for all allotments when connected to the existing local network, however the required Fire Fighting Demand was unable to be achieved for all allotments. With the addition of a loop main between proposed Road C, and Proposed Road B, Fire Fighting Demand is achieved to all allotments. As a result of this, it was decided to prepare an interim network design which serviced the maximum number of allotments as possible without the loop main, and an ultimate design with the loop main to service all allotments.

The interim design will allow for service of all Stage 8 allotments, and the service of allotments 26-30, 72-74 & 55 in Stage 3.

The water main reticulation layout is detailed in the Operational Works drawings. Water Reticulation EPANET calculations are provided in **Appendix D.**

7.3.1 Maximum Hour Demand

The local water network has been modelled with the proposed network and demands added. The network shows that the network complies with pressures between the minimum 22m and maximum 60m pressure requirements at maximum hour demand, in both the interim & ultimate development cases.

7.3.2 Fire Fighting Demand

The assessment undertaken as part of the design works shows that the network is able to operate at the minimum required pressure head of 12m at 15L/s flow, in both the interim & ultimate development cases. With future network upgrades planned for the water reticulation network in the area, this will only further improve the serviceability beyond the minimum as these are undertaken.

8 SEWERAGE RETICULATION

The proposed rural residential lots are to be serviced by on-site effluent disposal systems that are to be approved on a lot by lot basis at the time of construction.

9 ROAD PAVEMENT DESIGN

9.1 DESIGN METHOD

All roadway pavements have been designed in accordance with the FNQROC Development Manual section D3 – Road Pavements.

9.1.1 Design Life

A Design Life of 20 years has been adopted for all streets and roads.

9.1.2 Subgrade

California Bearing Ratio (CBR) testing has not been completed as part of the design. The CBR testing is to be evaluated prior to construction by in situ CBR, and 4-day soaked CBR by a NATA registered materials testing authority using the procedures described by the Department of Main Roads and Standards Association of Australia.

A value of 7% has been adopted for design purposes.

9.1.3 Flexible Pavement Design

In accordance with Table D3.1 of the FNQROC Development Manual the minimum allowable traffic loading for each pavement type has been reviewed and in each case the allowable traffic exceeds the minimum allowable.

The road classification is “Low Density Rural Road” which allows for a sealed carriageway, kerb and channel, and verge. The road reserve width is nominally 20.0m. Table D3.2 of the FNQROC Development Manual requires a minimum pavement thickness of 200mm and a minimum surfacing of 30mm AC.

A copy of the pavement design standard drawings is contained within **Appendix B**.

10 ELECTRICAL, COMMUNCATIONS, AND GAS RETICULATION

Ergon Energy and Telstra have been approached to supply conditions and conduit drawings by the electrical consultant.

There is no provision for gas in this subdivision.

11 SOIL AND WATER MANAGEMENT

A Soil and Water Management Strategy (SWMS) has been produced that identifies policies and development conditions relevant to the site and recommend measures required to satisfy those requirements. In accordance with the FNQROC Section D5. The strategy consists of:

- A Concept Report that identifies the constraints of the site and recommends measures to address those constraints; and
- Soil and Water Management Plan (SWMP) providing measures that can be adopted to address those constraints.

The following documents have been referenced in preparing this SWMP:

- ERSCON Pty Ltd construction drawings;
- FNQROC Development Manual;
- IEAust Soil Erosion and Sediment Control Guidelines;
- NSW DLWC – Construction and Sediment Control (Course Notes);
- Queensland Urban Drainage Manual; and
- Australian and New Zealand Guidelines for Freshwater and Marine Water Quality.

11.1 EROSION AND SEDMENT CONTROL STANDARDS

11.1.1 Duty of Care

In accordance with the Environmental Protection Act, 1994 (the Act), all Queenslanders have a legal duty to take all reasonable and practicable measures to minimise or prevent environmental harm.

In accordance with the Integrated Planning Act, 1997, it is a requirement to comply with Council's Planning Scheme and conditions issued in Development Permits.

This SWMP considers environmental harm caused by sediment-laden runoff from the subject site entering stormwater drains and/or waterways.

11.2 CONCEPT REPORT

11.2.1 Site Conditions

The subject site is currently generally covered in sparse vegetation. The site grades from the west toward the east where an existing drainage flow path exists.

11.2.2 Control Measures

Erosion and sediment control measures are to be designed and constructed in accordance with Cairns Regional Council Development Manual – Part 2. Specific requirements are provided on drawing CRE17-018-C18 in **Appendix B**.

11.2.3 Water Quality Strategy

In accordance with the requirements of the Queensland Urban Drainage Manual, management of water quality involves:

- Identifying and enhancing environmental values;
- Establishing objectives to achieve the required level of protection;
- Establishing water quality management strategies;
- Monitoring and surveillance programs;
- Research.

11.2.4 Water Quality Monitoring

The soil and water management strategy requires water sampling 50m downstream of the point where stormwater drainage discharges. Sampling is required only after significant rainfall i.e. 10mm.

11.3 EROSION AND SEDIMENT CONTROL PLAN

Erosion and sediment control measures are to be designed and constructed in accordance with the FNQROC Development Manual, as detailed in the Soil and Water Management Strategy, and CRE17-018-C18 “Soil and Water Management Strategy”.

The Contractor shall take all reasonable precautions to minimise erosion and prevent sediment-laden runoff from leaving the site. This goal will be monitored to ensure minimal erosion on site and no visible siltation of waterways by implementing effective erosion and sediment control.

The purpose of this SWMP is to ensure the Contractor meets the following objectives:

- Comply with all relevant legislation;
- Ensure erosion and sedimentation is controlled in an appropriate and cost-effective manner;
- Maintain and if possible, enhance the existing environment;
- Reinforce and improve environmental awareness within the workforce and the general community.

11.3.1 Environmental Responsibilities of Key Staff

Inspection Officer

The Inspection Officer is to be nominated by the Contractor.

Project Manager (PM)

The Project Manager will be responsible for:

- Coordinating the response to any major environmental incident and reporting serious or material harm to the Inspection Officer, Council, EPA and/or other agencies as appropriate;
- Monitoring, review and continuous improvement of the SWMP;
- Assess the need and if required ensure the proper completion of all internal and sub-contractor audits;
- Ensuring compliance of construction activities with the EP Act and other relevant legislation, codes and specifications;
- Liaison with all external authorities and stakeholders;
- Investigating and addressing complaints in the shortest possible time frame;
- Ensuring appropriate document control is maintained and;
- Supporting and providing advice to the project team.

Contractor Environmental Representative (CER):

The Contractors Environmental Representative will be responsible for:

- The implementation and operation of the environmental control measures as detailed in the SWMP;
- Monitoring the effectiveness of control measures;
- Recording and reporting non-conformances to the SWMP;
- Recording and reporting environmental complaints and incidents;
- Advising the PM and Inspection Officer of all environmental issues;
- Ensuring all staff on-site receive an appropriate environmental induction;
- Taking all reasonable and practical measures to prevent or minimise environmental harm occurring at jobsites under his/her supervision and;
- Seeking advice from the Project Manager if uncertain of environmental requirements.

Works Supervisor (WS):

The Works Supervisor will assist the CER in the implementation of the SWMP, and the ongoing awareness of environmental issues for the Construction Workforce. The overseer shall:

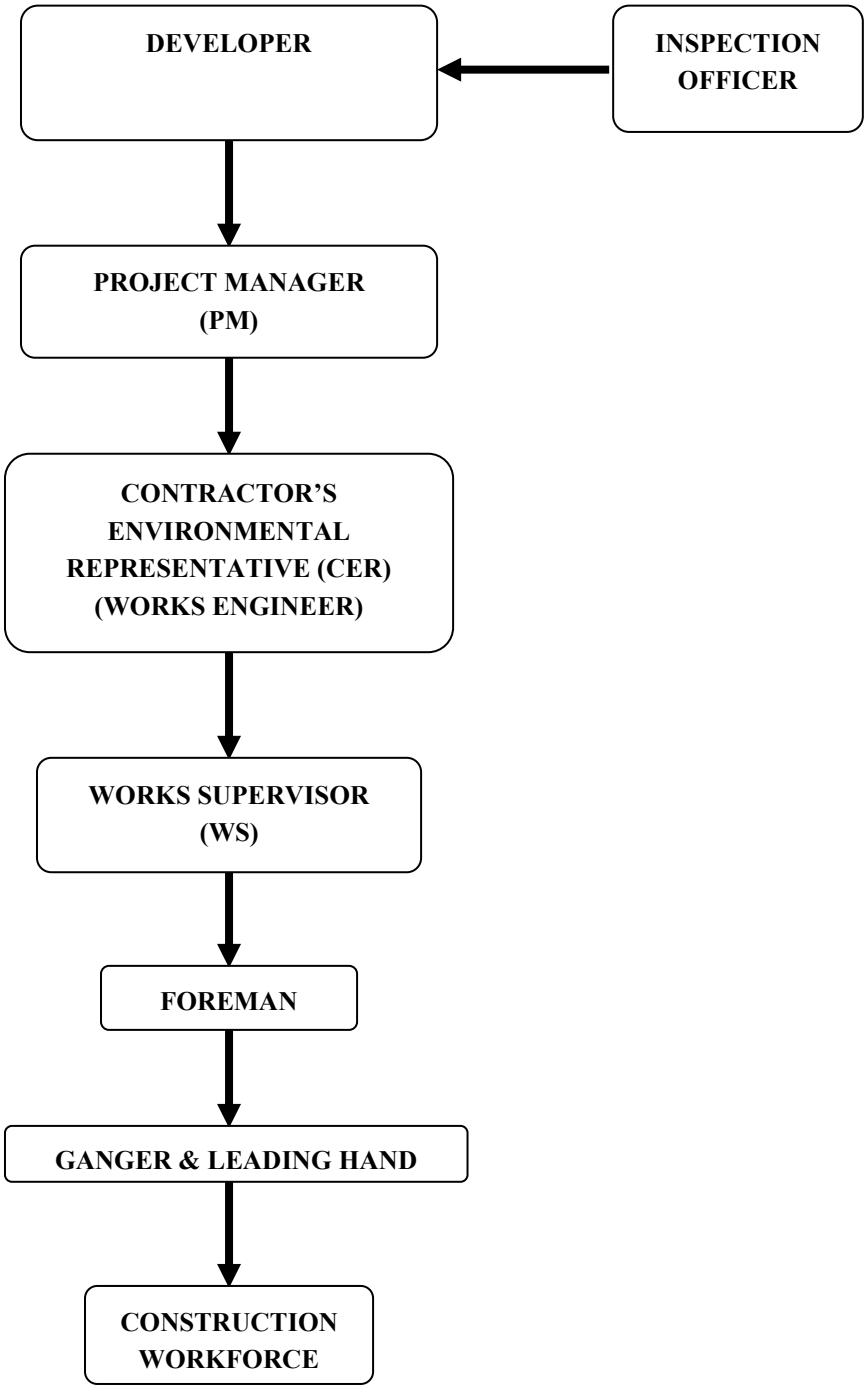
- Have a full understanding of the SWMP;
- Be fully aware of all environmental issues associated with the project; and
- Be responsible for the maintenance of control measures.

Construction Workforce:

Each member of the construction workforce will be responsible for:

- Ensuring they have a full understanding of their own environmental responsibilities;
- Assist in the implementation and maintenance of environmental protection measures in accordance with the SWMP and as directed by the CER; and
- Immediately reporting environmental complaints and incidents to the Environmental Supervisor.

Environmental Organisation Structure



11.3.2 Erosion Potential

Observations from site inspections of topography and soil types and from previous construction experience in the area would concur that the environmental risk of sediment-laden runoff leaving the site and significantly impacting on adjacent waterways is considered low-moderate. The general natural landform is graded moderately with defined surface drainage that could carry a significant volume of silt/sediment. Rock check dams will be placed in defined channels to reduce the amount of silt passing down stream.

Short sharp rainfall events will create silt/sediment that can be trapped on site. In the event of catastrophic failure of sediment control structures (due to vandalism or other undefined event) clean up operations would quickly mitigate the impacts.

The risk of long-term environmental impacts due to sedimentation from the proposed works is considered very low if the SWMP is fully implemented.

11.3.3 Evaluation of the Project

Investigation into erosion and sedimentation control has been reviewed as follows:

Timing of the Works:

Construction works are will be timed to coincide with a moderate to low rainfall month. Stormwater and sewer works will be constructed first which provide a low risk in terms of erosion and sediment control. Once these works are completed, an assessment of the potential rainfall will be made in consultation with Council to determine if bulk earthworks and road construction will proceed immediately after.

Works Program:

It is expected the works will be completed as follows:

- Approval to proceed;
- Install erosion sediment control devices and site facilities;
- Strip and grub;
- Install Services;
- Commence bulk earthworks (after assessment of potential rainfall);
- Construct Roads;
- Turf batters;
- Grass footpath and other exposed areas;
- Complete works; and
- Hand over.

11.3.4 Best Management Practice

The review of this site has been made in conjunction with the Institute of Engineers Australia “Soil Erosion and Sediment Control Guidelines.” All erosion and sedimentation control works are to be completed in accordance with that publication.

The selection methodology for the most appropriate control methods has due regard to cost-effectiveness, availability of materials, feasibility, durability, and compatibility. The most significant of the above is compatibility (i.e. has the system been used and proved on previous local works).

Perimeter Channel and Bunds

Diversion Channels and Cut Off Bunds are to be constructed to direct clean water away from the works and through culvert structures. The surrounding landform is steep with good vegetal cover. Overland flow velocities will be maintained at less than 1.7 m/s, which is considered acceptable (refer IEAust Table A8.5 given full cover).

Permanent Stabilisation Measures

The proposed works do not include hard “engineered” stabilisation methods. It is not considered appropriate (cost effective) to construct “engineered” stabilisation as the existing (where undisturbed) vegetation cover provides appropriate and visually attractive stabilisation.

As part of this SWMP, rehabilitation of vegetation by seeding, drill seeding, turfing and hydro mulching, at an early stage is considered vital to the successful control of erosion (and capture of sedimentation).

Site Office

The site office and plant compound shall be fully fenced with all fuels and hazardous liquids shall be stored in a bunded area 110% the volume of stored liquid. All parking areas shall be maintained in a stable condition including surfacing as required.

Site Entry Points

There shall be only one site entry and exit point. All vehicles must enter and leave the site at these locations only. Site entry points shall also have a wash down area adjacent when stripping, and clearing and grubbing works expose plant and equipment to transportation of weeds.

The following items are proposed for incorporation into the works and details of their use and limitations have been assessed as part of the design process:

- Construction Exits (A5-C3)
- Sediment Fences (A5-C10)
- Catch Drains and Perimeter Banks (A5-A1)
- Rock and Sand Bag Check Dams (A5-A2)
- Buffer Zones (A5-C2)

11.3.5 Erosion and Sediment Control Plan

For ESCP drawing, refer CRE17-018-C18.

11.3.6 Implementation, Monitoring and Review

It is the responsibility of the CER to correctly implement and monitor this ESCP. It is also critical that the CER reviews and documents and provide appropriate suggestions for improvements through the project life.

11.3.7 Implementation Strategies

To ensure the objectives of the Erosion and Sediment Control Plan (ESCP) check list of responsibilities and requirements are provided below.

Actions	Locations	Timing	Responsibility
Induct all personnel as appropriate	All	Prior to Disturbance	CER
Flag the limits of disturbance and advise workforce of these limits.	Each stage of excavation.	Prior to disturbance.	CER
Divert clean water around site using lined or vegetated drains.	Perimeter of site.	Prior to disturbance.	CER
Install sediment control devices.	As per ESCP.	Prior to disturbance.	CER
Flag limits of stockpile sites clear of drainage paths and enclose with sediment fence.	As approved	Duration of works	CER
Prevent stormwater from running over exposed batters by installing catch banks/drains and directing into a stabilized batter chute or off site.	All exposed batters.	As work progresses.	WS
Install check dams in bare earth table drains if required.	Bare earth table drains	As soon as practicable.	WS
Topsoil shall be stockpiled and respread over bare areas prior to grassing to assist re-vegetation.	Bare batters and footpaths	After earthworks are completed	WS
As far as possible, the surface of batters and drains should be left in a roughened state to reduce runoff velocity and promote re-vegetation.	Earth batters and drains	As earthworks proceed.	WS
Bare earth batters to be hydro mulched to protect the surfaces using suitable species mix and application rates.	Earth Batters	As works progress or immediately following final trim of an area.	WS
Footpaths and disturbed areas to be seeded within 1 week of final trim	All exposed areas	As works progress	WS
All ESC devices to remain in place until at least 70% vegetation cover	All exposed areas	At completion of project	WS

11.3.8 Monitoring Requirements

Parameter / Item	Locations	Timing	Responsibility
Visually assess condition of erosion and sediment control devices, clean out sediment (if required), and repair any damage.	All job sites	Daily	WS
Visually inspect the turbidity of runoff leaving the site to determine effectiveness of erosion and sediment controls devices.	All job sites.	During and following any significant rainfall/runoff event.	WS
Record turbidity (photo of turbidity tube) of water over topping sediment control devices.	Downstream of structure.	During and following any significant rainfall/runoff event.	CER
Measure turbidity 50m upstream and 50m downstream.	Downstream of site.	Following rainfall event >10mm	CER
Obtain regular weather forecasts from the Bureau of Meteorology to assess risk.	Forecasts for Cairns district.	Daily.	WS

11.3.9 Reporting

The CER shall maintain appropriate records of each inspection and/or action and shall report any non-conformance incidents to the PM and Inspection Officer for action.

11.3.10 Audit

Auditing shall be completed by the PM following a major non-conformance and during random inspections if deemed necessary

The PM shall report audit findings to the CER for action.

11.3.11 Emergency Procedures

In the event that a significant failure occurs, and that sediment-laden runoff is leaving the site the CER shall immediately protect the erosion source by:

- Covering the affected area with plastic or geofabric if localised;
- Reducing the flow velocities by installing check dams;
- Rock armour channels where velocities and turbulence are excessive;
- Other methods as deemed appropriate;

The PM shall be notified to jointly assess clean up requirements and if further action is required.

11.3.12 Corrective Action

The CER shall record any non-conformance with the EMP(C) on the Non-Conformance Report (NCR) located within Council's Quality System and notify the Inspection Officer.

11.3.13 Environmental Site Induction

All personnel (staff, workforce, sub-contractors, and plant operators) working on site are to receive appropriate induction as to the requirements of this SWMP.

It is the responsibility of the CER to ensure all site personnel receive appropriate awareness training and induction prior to or as soon as practicable after, commencement on site. The induction shall include instruction regarding the following:

- Environmental objectives and policies;
- Due diligence;
- Environmental duty of care;
- Duties and responsibilities of environmental officers;
- Key environmental issues relating to this project;
- Project specific requirements contained in the Management Plans;

Where deemed appropriate for short-term personnel (including visitors), the CER may elect to provide a brief environmental explanation/induction and control access to the site.

The CER shall maintain a register, signed by all inductees. The CER shall also monitor the existing workforce to ascertain if additional training is required.

11.3.14 Environmental Reporting

The Inspection Officer shall submit an Environmental Report on a monthly basis that will cover the following items:

- Results of all monitoring;
- NCR's against the EMP(C) in accordance with the Quality procedures;
- Monthly EMP(C) review and revisions;
- Results of internal and external audits.

Where an event of potential or actual serious environmental harm is identified, the CER shall immediately inform the PM. The PM shall inform the Inspection Officer (or his representative), Council and the EPA as soon as practicable (but no later than 24 hours).

The PM shall monitor environmental performance throughout the project to determine if and when additional Environmental Audits are required.

11.3.15 Environmental Audits

Environmental Audits of the EMP(C) shall be completed by the PM at the following times:

- Following and event of potential or actual serious environmental harm;
- Prior to submission of "Practical Completion";
- As deemed necessary.

APPENDIX A

Negotiated Decision Notice
REC/08/0096
Development application for Reconfiguring A Lot – Subdivision creating a further 64 lots in five (5) stages – Lot 4 on RP739487

Tablelands Regional Council
Atherton Service Centre
PO Box 573, Atherton QLD 4883
Telephone: 1300 362 242

Urban & Regional Planning Group
Brian Millard, Senior Planner
Telephone: (07) 4043 4830
Facsimile: (07) 4092 3323
Email: info@trc.qld.gov.au

File Ref: REC/08/0096
Our Ref: BN:BJM:nj

28 March 2012 (Amended on 20 June 2018)

Comaray Pty Ltd
C/- Planning Far North
PO Box 7801
CAIRNS QLD 4870

Negotiated Decision Notice Approval

Sustainable Planning Act 2009 s363

Dear Sir/Madam

APPLICATION FOR RECONFIGURING A LOT - (SUBDIVISION CREATING A FURTHER 64 LOTS IN FIVE (5) STAGES)
LOT 4 ON RP739487
SITUATED AT 200 EMERALD END ROAD, MAREEBA

I wish to advise that, at Council's Ordinary Meeting held on *7 March 2012*, a decision was made to issue a negotiated decision notice. This negotiated decision notice replaces the decision notice previously issued and dated *23 November 2011.*

The above development application was

- Approved in full with conditions.

The conditions relevant to this approval are detailed in **section** *6* of this notice. These conditions are clearly identified to indicate whether the Assessment Manager or a Concurrence Agency imposed them.

Approval under Section 331

This application **has not** been deemed to be approved under Section 331 of the Sustainable Planning Act 2009 (SPA).

1. Nature of the changes

The nature of the changes are:

(A) Condition 3.7 a) of Council's Decision Notice issued on 23 November 2011 be amended as follows:

3.7 Flood Immunity

a) All allotments must have a minimum area of 2,000 square metres 300mm above the Q100 level.

(B) Condition 3.8 of Council's Decision Notice issued on 23 November 2011 be amended as follows:

3.8 Bushfire Management

Firebreaks

Where new roads are not involved or it is impractical to use new roads as firebreaks, firebreaks are established that:-

- *have a minimum cleared width of 6m;*
- *have a maximum gradient of 12.5%;*
- *are constructed and maintained to prevent erosion and provide continuous access for fire fighting vehicles;*
- *have vehicular access at each end or have suitable clear manoeuvring areas for the turning of emergency fire fighting vehicles;*
- *all internal roads are to include fire hydrants;*
- *are within an easement in favour of Council and the Queensland Fire and Rescue Service or road reserve; and*
- *Are provided in at least the following situations:*

The required firebreaks will be established:

- *Along the eastern boundary of proposed Lots 38 and 41;*
- *Within the unnamed road reserve, for the entire northern road frontage of Lots 32 and 37, immediately adjacent to the agricultural buffer required under Condition 4.11.*
- *Along the southern boundary of proposed Lots 62 and 65.*
- *Long the entire eastern and western boundaries of the Vegetation Corridor identified on Drawing No. 11/4743 - Stages 3-6 (2B)*

Building and Structures (Lots greater than 2,500m2)

- *Are sited in location of lowest hazard within the lot;*
- *Achieve setbacks from hazardous vegetation of 1.5 times the predominant mature canopy tree height or 10 metres, whichever is the greater;*
- *Are 10 metres from any retained vegetation strips or small areas of vegetation;*
- *Are sited so that elements of the development least susceptible to fire are sited closest to the bushfire hazard.*

(C) Condition 3.10 of Council's Decision Notice issued on 23 November 2011 be amended as follows:

3.10 Prior to the approval for any operational works for Stage 6, the subdivision layout will be amended so that the internal road network connects to the common boundary with Lot 219 on NR378 generally in the location of the road network shown on the approved plans as part of any further development of the adjoining Lot 219 on NR378 the configuration of proposed Lot 41 will be effected such that the road provides suitable geometry to the adjoining road network satisfactory of Council's delegated officer.

(D) Conditions 3.11, 3.11 and 3.12 of Council's Decision Notice issued on 23 November 2011 be amended as follows:

3.11 Stage 8 Requirements

a) Prior to lodgement of an application for Operational Works for Stage 8, the applicant will:

i) in addition to any other Stormwater Management Plan requirements, provide a conceptual stormwater design for the stage that details how any threats or impacts from upstream dams will be addressed;

ii) demonstrate, through that stormwater design, how stormwater flows that: originate outside the site, flow through the site, and discharge downstream of the site, will be suitably directed and contained.

iii) demonstrate how stormwater infrastructure will be incorporated into the lot design in accordance with the requirements of this approval;

iv) demonstrate how it is intended to maintain water quality within that storage in accordance with the requirements of Appendix 1 Parts A & C of State Planning Policy 4/10 Healthy Waterways.

v) demonstrate that suitable building platforms can be provided on proposed lots with slopes greater than 1:6.

vi) demonstrate that average lot size for the entire development exceeds 3000 sq m.

These requirements will be to the satisfaction of Council's delegated officer.

b) The developer will prepare a management and operation plan for any artificial storage area within any proposed lot in accordance with Appendix 1 Part C of State Planning Policy 4/10 Healthy Waterways to the satisfaction of Council's delegated officer.

c) the registered owner of any lot containing an artificial storage area within any proposed lot will be responsible for the maintenance and operation of that storage area in accordance with the required management and operation plan.

~~*3.11*~~ ***3.12*** *Design Changes*

i) Prior to lodgement of an application for Operational Works for Stage 6, the developer will provide an amended layout plan for that stage which ensures that the connecting road to the eastern boundary is almost square to that boundary.

ii) Prior to lodgement of an application for Operational Works for Stage 8, the developer will provide an amended layout plan for that stage which complies with the requirements of any other conditions of this approval.

These requirements will be to the satisfaction of Council's delegated officer.

~~*3.12*~~ ***3.13*** *Charges*

All outstanding rates, charges and expenses pertaining to the land are to be paid in full.

(E) Condition 4.1 of Council's Decision Notice issued on 23 November 2011 be amended as follows:

4.1 Access

Access must be constructed to each allotment in accordance with the FNQROC Development Manual, to the satisfaction of Council's delegated officer. The provision of Layback Kerbing along the total frontage of the proposed lots will satisfy this condition, except in the case of axe handle lots).

Where axe handle lots are proposed, a concrete or bitumen sealed driveway shall be provided within any access handles. The driveway will:

- *Have a minimum width of 3 metres.*
- *Be constructed for the full length of the access handle.*
- *Be formed with one-way crossfall to cater for stormwater drainage such that any stormwater runoff is contained within the access strip.*
- *Service and utility conduits are to be provided for the full length of the sealed driveway constructed within the access handle of the battleaxe allotments.*

(F) Condition 4.5.2 of Council's Decision Notice issued on 23 November 2011 be amended as follows:

4.5.2 The following reticulated water supply infrastructure upgrades must be undertaken by the developer:

(i) Prior to the issue of any Development Permit for operational works, the developer must enter into an infrastructure agreement requiring the developer to contribute per additional allotment created (currently $487.00 per lot) towards the construction of the following water infrastructure upgrades:

- *A connection into the existing 375 mm diameter water main in Lloyd Street (at the corner of Constance Street). This connection must be a DN300 PN16 PVCO (or equivalent) pipe (Line A) to a point where the cross river boring commences (Line B).*
- *The cross river pipe must be a PE DN400 (Line B) which is to be directionally drilled under the Barron River, flanged at each end and extended to the eastern side of the Hastie Road reserve; a flanged Tee must be provided to connect the cross river pipe to the DN300 pipe to the left and the DN200 pipe to the right at the outlet on the eastern side of the Hastie Road reserve.*
- *From Line B, a DN200 PN16 PVCO (or equivalent) pipe (Line C) must extend to the current western end of the DN150 main on Hastie Road.*
- *Installation of a PVC DN200 main (Line D) from the current eastern end of the DN150 main on Hastie Rd to the proposed water pump station within the Godfrey Road road reserve.*

The amount of the contribution shall be adjusted on 30th June each financial year in accordance with the Consumer Price Index.

(G) Conditions 4.11 (i), (iii) and (v) must remain as per Council's Decision Notice issued on 23 November 2011.

(H) Condition 4.2(l) should be deleted.

2. Details of the approval –

~~This Decision Notice approves a **Development Permit** for **Reconfiguring a Lot** – *Subdivision creating a further 62 lots in five (5) stages* **made assessable by the Mareeba Shire Planning Scheme 2004.**~~

~~Stage 3 - creating 12 rural residential lots~~
~~Stage 4 - creating 13 rural residential lots~~
~~Stage 5 - creating 15 rural residential lots~~
~~Stage 6 - creating 9 rural residential lots~~
~~Stage 8 - creating 13 rural residential lots~~

~~Where the approved Stages are defined on approved Plan 11/4743 Stages 3-6 (2B), dated 23/8/2011.~~

At Council's Ordinary Meeting held on 20 June 2018, the details of the approval were amended to the extent below:

*This Decision Notice approves a **Development Permit** for **Reconfiguring a Lot** – Subdivision creating a further ~~62~~ **64** lots in five (5) stages **made assessable by the Mareeba Shire Planning Scheme 2004.***

Stage 3 - creating 12 rural residential lots
Stage 4 - creating 13 rural residential lots
Stage 5 - creating 15 rural residential lots
Stage 6 - creating 9 rural residential lots
*Stage 8 - creating ~~13~~ **15** rural residential lots*

*Where the approved Stages are defined on approved Plan 11/4743 Stages 3-6 (2B), dated 23/8/2011 **except for Stage 8 which is defined on amended Plan CRE17-018-C01, dated 29/01/18.***

3. Other necessary development permits and/or compliance permits–

Listed below are other development permits and/or compliance permits that are necessary to allow the development to be carried out –

- Development Permit for Operational Works

4. Other approvals required from Council

- Nil

5. Submissions -

Not applicable

6. Conditions –

(A) ASSESSMENT MANAGER'S CONDITIONS (COUNCIL)

(a) Development assessable against the Planning Scheme

1. Development must be carried out substantially in accordance with the approved plans and the facts and circumstances of the use as submitted with the application, subject to any alterations:

   - found necessary by Council's delegated officer at the time of examination of the engineering plans or during construction of the development because of particular engineering requirements; and
   - to ensure compliance with the following conditions of approval.

2. Timing of Effect

   The conditions of the development permit must be complied with to the satisfaction of Council's delegated officer prior to the endorsement of the plan of survey, except where specified otherwise in these conditions of approval.

3. General

   3.1 The applicant/developer is responsible for the cost of necessary alterations to existing public utility mains, services or installations required by works in relation to the proposed development or any works required by condition(s) of this approval.

   3.2 All payments or bonds required to be made to the Council pursuant to any condition of this approval or the Adopted Infrastructure Charges Notice must be made prior to the endorsement of the plan of survey and at the rate applicable at the time of payment.

   3.3 The developer must relocate (in accordance with FNQROC standards) any services such as water, sewer, drainage, telecommunications and electricity that are not wholly located within the lots that are being created/serviced where required by the relevant authority, unless approved by Council's delegated officer.

   3.4 Where utilities (such as sewers on non-standard alignments) traverse lots to service another lot, easements must be created in favour of Council for access and maintenance purposes. The developer is to pay all costs (including Council's legal expenses) to prepare and register the easement documents.

   3.5 The applicant must provide a letter from any Concurrence Agencies confirming that their conditions have been complied with.

   3.6 All works must be designed, constructed and carried out in accordance with FNQROC Development Manual requirements (as amended) and to the satisfaction of Council's delegated officer.

   3.7 Flood Immunity

      a) All allotments must have a minimum area of 2,000 square metres 300mm above the Q100 level.

      b) Any relevant Operational Works applications will include a Q100 analysis for the subject land. The applicant/developer must provide a plan showing the extent of a 100 ARI year flood event certified by a RPEQ (Registered Professional Engineer of Queensland).

      c) No filling is to occur below the 100 ARI flood level unless accompanied by evidence that filling below the 100 ARI level would

not detrimentally impact upon upstream or downstream properties to the satisfaction of Council's delegated officer.

3.8 Bushfire Management

Firebreaks

Where new roads are not involved or it is impractical to use new roads as firebreaks, firebreaks are established that:-

- have a minimum cleared width of 6m;
- have a maximum gradient of 12.5%;
- are constructed and maintained to prevent erosion and provide continuous access for fire fighting vehicles;
- have vehicular access at each end or have suitable clear manoeuvring areas for the turning of emergency fire fighting vehicles;
- all internal roads are to include fire hydrants;
- are within an easement in favour of Council and the Queensland Fire and Rescue Service or road reserve; and
- Are provided in at least the following situations:

The required firebreaks will be established:

- Along the eastern boundary of proposed Lots 38 and 41;
- Within the unnamed road reserve, for the entire northern road frontage of Lots 32 and 37, immediately adjacent to the agricultural buffer required under Condition 4.11.
- Along the southern boundary of proposed Lots 62 and 65.
- Long the entire eastern and western boundaries of the Vegetation Corridor identified on Drawing No. 11/4743 - Stages 3-6 (2B)

Building and Structures (Lots greater than 2,500m2)

- Are sited in location of lowest hazard within the lot;
- Achieve setbacks from hazardous vegetation of 1.5 times the predominant mature canopy tree height or 10 metres, whichever is the greater;
- Are 10 metres from any retained vegetation strips or small areas of vegetation;
- Are sited so that elements of the development least susceptible to fire are sited closest to the bushfire hazard.

3.9 Environmental Covenant

The applicant shall be responsible for the preparation and registration of a statutory covenant with Council pursuant to S97A of the Land Title Act for the purposes of native vegetation and habitat preservation including the preservation of native plants and natural features.

The covenant will be of a form that is acceptable to the Registrar of Titles and will apply to the area identified on Drawing No. 11/4743-Stages 3-6 (2B) as the Vegetation Corridor. The covenant location and the covenant document provisions will be to the satisfaction of Council's delegated officer.

The covenant agreement shall be signed by the registered owner prior to endorsement of the survey plan by Council and the signed covenant shall be jointly lodged for registration with the survey plan, in the Department of Environment and Resource Management.

The covenant shall require the registered owners of the site to obtain approval of the Council prior to undertaking any earthworks, clearing of vegetation, fencing or placement of water pumps and pipelines within or across the area of the Covenant. The placement of effluent waste disposal systems, building of structures and cultivation shall be specifically excluded from within the area of the Covenant. The maintenance of the area of the Covenant shall be the responsibility of the owner of the land.

Each Covenant must stipulate:-

(i) that it is for the express purpose of vegetation and habitat preservation, including the preservation of native plants and the natural features of the lot (including the water in Unnamed Creek and the soil contained in the covenant area).

(ii) that no building, fixtures, infrastructure or improvements over the Covenant Area shall be permitted, including water pipes and pumps;

(iii) Any maintenance required to be performed in respect of the Covenant Area shall be the responsibility of the lot owner.

The covenant shall be to the satisfaction of Council's delegated officer, and the applicant shall be responsible for the cost of preparation and registration of the Covenant.

3.10 Prior to the approval for any operational works for Stage 6, the subdivision layout will be amended so that the internal road network connects to the common boundary with Lot 219 on NR378 generally in the location of the road network shown on the approved plans as part of any further development of the adjoining Lot 219 on NR378 the configuration of proposed Lot 41 will be effected such that the road provides suitable geometry to the adjoining road network satisfactory of Council's delegated officer.

3.11 Stage 8 Requirements

a) Prior to lodgement of an application for Operational Works for Stage 8, the applicant will:

i) in addition to any other Stormwater Management Plan requirements, provide a conceptual stormwater design for the stage that details how any threats or impacts from upstream dams will be addressed;

ii) demonstrate, through that stormwater design, how stormwater flows that: originate outside the site, flow through the site, and discharge downstream of the site, will be suitably directed and contained.

iii) demonstrate how stormwater infrastructure will be incorporated into the lot design in accordance with the requirements of this approval;

iv) demonstrate how it is intended to maintain water quality within that storage in accordance with the requirements of Appendix 1 Parts A & C of State Planning Policy 4/10 Healthy Waterways.

v) demonstrate that suitable building platforms can be provided on proposed lots with slopes greater than 1:6.

vi) demonstrate that average lot size for the entire development exceeds 3000 sq m.

These requirements will be to the satisfaction of Council's delegated officer.

b) The developer will prepare a management and operation plan for any artificial storage area within any proposed lot in accordance with Appendix 1 Part C of State Planning Policy 4/10 Healthy Waterways to the satisfaction of Council's delegated officer.

c) the registered owner of any lot containing an artificial storage area within any proposed lot will be responsible for the maintenance and operation of that storage area in accordance with the required management and operation plan.

~~*3.11*~~ ***3.12*** Design Changes

i) Prior to lodgement of an application for Operational Works for Stage 6, the developer will provide an amended layout plan for that stage which ensures that the connecting road to the eastern boundary is almost square to that boundary.

ii) Prior to lodgement of an application for Operational Works for Stage 8, the developer will provide an amended layout plan for that stage which complies with the requirements of any other conditions of this approval.

These requirements will be to the satisfaction of Council's delegated officer.

~~*3.12*~~ ***3.13*** Charges

All outstanding rates, charges and expenses pertaining to the land are to be paid in full.

4. Infrastructure Services and Standards

4.1 Access

Access must be constructed to each allotment in accordance with the FNQROC Development Manual, to the satisfaction of Council's delegated officer. The provision of Layback Kerbing along the total frontage of the proposed lots will satisfy this condition, except in the case of axe handle lots).

Where axe handle lots are proposed, a concrete or bitumen sealed driveway shall be provided within any access handles. The driveway will:

- Have a minimum width of 3 metres.
- Be constructed for the full length of the access handle.
- Be formed with one-way crossfall to cater for stormwater drainage such that any stormwater runoff is contained within the access strip.
- Service and utility conduits are to be provided for the full length of the sealed driveway constructed within the access handle of the battleaxe allotments.

4.2 Stormwater Drainage

The applicant must ensure a non-worsening effect on surrounding land as a consequence of the development and the applicant must take all necessary steps to achieve this including the following:

a) The applicant must provide a Stormwater Management Plan prepared and certified by a RPEQ engineer that meets or exceeds

the standards of design and construction set out in the Queensland Urban Development Manual (QUDM) and the Far North Queensland Regional Organisation of Councils Manual (FNQROC).

b) The Stormwater Management Plan must include an erosion and sediment control plan that meets or exceeds the Soil Erosion and Sedimentation Control Guidelines (Institute of Engineers Australia 1996).

c) The Stormwater Management Plan must provide for:

(i) stormwater drainage from roofed and paved areas to be lawfully discharged to an approved drainage system within adjoining road reserves or where stormwater from roofed and paved areas cannot be drained into the approved drainage system within the adjoining road reserves, an inter-allotment drainage collection system must be provided;

(ii) overland flow paths and underground drainage is to be designed in accordance with water sensitive urban design solutions so as not to directly or indirectly cause nuisance or worsen peak flows to downstream or adjoining properties. The completed development discharge rate for a Q100 storm frequency must not exceed the pre-development discharge rates for a Q100 storm frequency;

(iii) The assumed increase in stormwater runoff associated with the construction of future dwelling houses and driveways within the development must provide for an ARI 100 years overland flow through roads, open space areas or easements over adjoining properties. Construction of drainage must be to FNQROC standards;

d) The Stormwater Management Plan must include a plan of the development showing the Q100 Flood Levels as well as a 2,000 square metre building envelope for each lot that is impacted by the Q100 Flow. The building envelopes must be above the Q100 Flood Levels.

e) The applicant must prepare a Stormwater Report, including an assessment of blockages, prepared and certified by a suitably qualified design engineer (RPEQ) clearly indicating measures taken and calculated impacts based upon the Stormwater Management Plan in accordance with the Queensland Urban Development Manual (QUDM) and the Far North Queensland Regional Organisation of Councils Manual (FNQROC).

f) All stormwater channels through private property must be located in a registered easement for drainage purposes, with the easement in favour of Council. Alternatively stormwater channels may be located with drainage reserves or other similar approved land tenure.

g) The applicant must submit the Stormwater Management Plan and Stormwater Report to council as part of the operational works application for its approval.

h) The applicant must construct the stormwater drainage infrastructure in accordance with the approved Stormwater Management Plan and Stormwater Report.

i) Deleted

j) Temporary drainage is to be provided and maintained during the construction phase of the development, discharged to a lawful point and not onto the construction site.

k) The applicant (at its cost) must video all stormwater lines and submit the video for inspection by Council's delegated officer prior to the development being taken "off maintenance" to ensure that no defects have occurred during the 12 month maintenance period.

l) A bond of 50% of the contract value of the drainage works must be lodged with Council during the 12 month maintenance period, as a guarantee for the satisfactory operation of the drainage works. The bond will be returned on satisfactory correction of any defective work after expiration of the maintenance period. During the maintenance period, Council may call up the bond and carry out any drainage repair work required.

m) All stormwater channels through private property must be registered, with the easement for drainage purposes in favour of Council. All documentation leading to the registration of the easement must be completed at no cost to Council.

4.3 Prior to endorsement of the plan of survey creating the first lot of this development, the plan of survey/s for Stages 1, 2 and 7 (Development Approvals RC2005/56, RC2006/27 and REC/08/0110) of Country Road Estate must be registered.

4.4 Roadworks – Internal – <u>All Stages</u>

Internal roads must be constructed to Residential Street standard in accordance with FNQROC Development Manual standards (as amended) for the applicable planning scheme area to the satisfaction of Council's delegated officer.

A temporary turnaround area, with gravel surface, must be provided at the end of the new road construction adjacent to the balance area of the overall subdivision to allow traffic manoeuvring.

4.5 Water Supply

4.5.1 Where the existing reticulated water supply does not currently service the site or is not at an adequate capacity, the developer is required to extend the reticulated water supply infrastructure to connect the site to Council's existing infrastructure at a point that has sufficient capacity to service the development in accordance with FNQROC Development Manual standards (as amended).

4.5.2 The following reticulated water supply infrastructure upgrades must be undertaken by the developer:

(i) Prior to the issue of any Development Permit for operational works, the developer must enter into an infrastructure agreement requiring the developer to contribute per additional allotment created (currently $487.00 per lot) towards the construction of the following water infrastructure upgrades:

- A connection into the existing 375 mm diameter water main in Lloyd Street (at the corner of Constance Street). This

connection must be a DN300 PN16 PVCO (or equivalent) pipe (Line A) to a point where the cross river boring commences (Line B).

- The cross river pipe must be a PE DN400 (Line B) which is to be directionally drilled under the Barron River, flanged at each end and extended to the eastern side of the Hastie Road reserve; a flanged Tee must be provided to connect the cross river pipe to the DN300 pipe to the left and the DN200 pipe to the right at the outlet on the eastern side of the Hastie Road reserve.

- From Line B, a DN200 PN16 PVCO (or equivalent) pipe (Line C) must extend to the current western end of the DN150 main on Hastie Road.

- Installation of a PVC DN200 main (Line D) from the current eastern end of the DN150 main on Hastie Rd to the proposed water pump station within the Godfrey Road road reserve.

The amount of the contribution shall be adjusted on 30th June each financial year in accordance with the Consumer Price Index.

4.5.3 A water service connection must be provided to each proposed lot in accordance with FNQROC Development Manual standards (as amended) to the satisfaction of Council's delegated officer.

4.6 On-Site Wastewater Management

The applicant must provide a site and soil evaluation report (or an evaluation report where existing on-site disposal), prepared by an accredited site and soil evaluator, demonstrating the ability of the lots to accommodate an on-site effluent disposal in compliance with the latest version of On-Site Domestic Wastewater Management Standard (ASNZ1547) to the satisfaction of the Council's delegated officer.

4.7 Electricity provision/supply

The applicant/developer must ensure that an appropriate level of electricity supply is provided to each allotment in accordance with FNQROC Development Manual standards (as amended) to the satisfaction of Council's delegated officer.

Written advice from an Electricity Service Provider is to be provided to Council indicating that an agreement has been made for the provision of **underground** power reticulation.

4.8 Telecommunications

The applicant/developer must enter into an agreement with a telecommunication carrier to provide telecommunication services to each allotment and arrange provision of necessary conduits and enveloping pipes.

4.9 Lighting

Street lighting must be provided to all roads in accordance with FNQROC Development Manual requirements (as amended) and to the satisfaction of Council's delegated officer.

4.10 Street trees

One street tree must be provided in the nature strip of each lot created. The plan depicting species must be submitted to Council's delegated officer for approval. The street trees must be planted in accordance with the approved plan.

4.11 Agricultural Buffering

(i) A 30 metre wide vegetation buffer, 20 metres planted and 10 metres clear on the southern side, is to be planted along northern road frontage of the following lots:

- That part of the northern road frontage of Lot 31, extending from the DERM vegetation corridor, east to the boundary with Lot 32.

- The entire northern road frontage of Lots 32 to 37.

(ii) Appropriate native species will be used in the plantings. A landscaping/planting plan will be developed by a suitably qualified professional in compliance with SPP1/92 Planning Guidelines on Separating Agricultural and Residential Land Uses and must be endorsed by Council's delegated officer prior to any plantings being undertaken.

(iii) The buffer vegetation will be established to a height of 4m on any relevant lot prior to Council signing the relevant plan of survey to the satisfaction of Council's delegated officer.

(iv) The developer will maintain the buffer for two (2) years, and a bond of 50% of the contract value of the works must be lodged with Council during the maintenance period, as a guarantee. The bond will be returned on satisfactory correction of any defective work after expiration of the maintenance period. During the maintenance period, Council may call up the bond and carry out any work required. The bond will be lodged with Council to secure those works prior to Council signing the relevant plan of survey.

(v) The applicant shall be responsible for the preparation and registration of a statutory covenant with Council pursuant to S97A of the Land Title Act for the purposes of establishment, protection and use of the land for a vegetated buffer over the required 30m buffer area.

The required covenant/s will be of a form that is acceptable to the Registrar of Titles and will contain provisions for:

- a management plan for the covenant area;
- protection of any vegetated buffer established as a result of this approval, including a requirement for cattle-proof fencing of the northern boundary of the vegetated buffer; and
- exclusion of buildings.

The covenant agreement shall be signed by the registered owner prior to signing of the relevant survey plan by Council and the signed covenant shall be jointly lodged for registration with the survey plan, in the Department of Environment and Resource Management.

The covenant location and the covenant document provisions will be to the satisfaction of Council's delegated officer. Maintenance of the area of the Covenant shall be the responsibility of the owner of the land.

The covenant shall be to the satisfaction of Council's delegated officer, and the applicant shall be responsible for the cost of preparation and registration of the Covenant.

4.12 Landscaping / Site Maintenance

The required buffer plantings shall be maintained as follows:

- replacement of plantings as required
- site maintenance shall include mowing / slashing of all areas outlined above
- landscaping / site maintenance is to be continued throughout the Defects Liability Period until date of Final Acceptance

Contrary to Section D9.23 Paragraph 7 of the FNQROC Manual, the maintenance period for irrigation works and landscaping shall be a minimum of twelve months.

At Council's Ordinary Meeting held on 20 June 2018, it was resolved to add Condition 4.13 to the extent below;

4.13 Roadworks - External Construction (Stage 8)

The intersection of Emerald End Road and the unnamed road servicing Stage 8 (as shown on Plan CRE-018-C01 dated 29/01/18) must be designed and constructed in accordance with the FNQROC Development Manual, to the satisfaction of Council's delegated officer.

The finished surface of the intersection is to be in asphalt, unless otherwise determined by Council's delegated officer.

Prior to works commencing, plans for the works described above must be approved as part of a subsequent application for operational works.

(B) ASSESSMENT MANAGER'S ADVICE

(a) An Adopted Infrastructure Charges Notice has been issued with respect to the approved development. The Adopted Infrastructure Charges Notice details the type of infrastructure charge/s, the amount of the charge/s and when the charge/s are payable.

(b) The Adopted Infrastructure Charges Notice does not include all charges or payments that are payable with respect to the approved development. A number of other charges or payments may be payable as conditions of approval. The applicable fee is set out in Council's Fees & Charges Schedule for each respective financial year.

(c) Environmental Protection and Biodiversity Conservation Act 1999

The applicant is advised that referral may be required under the *Environmental Protection and Biodiversity Conservation Act 1999* if the proposed activities are likely to have a significant impact on a matter of national environmental significance. Further information on these matters can be obtained from www.deh.gov.au.

(d) Cultural Heritage

In carrying out the activity the applicant must take all reasonable and practicable measures to ensure that no harm is done to Aboriginal cultural heritage (the "cultural heritage duty of care"). The applicant will comply with the cultural heritage duty of care if the applicant acts in accordance with gazetted cultural heritage duty of care guidelines. An assessment of the proposed activity against the duty of care guidelines will determine whether or to what extent Aboriginal cultural heritage may be harmed by the activity. Further information on cultural heritage, together with a copy of the duty of care guidelines and cultural heritage search forms, may be obtained from www.derm.qld.gov.au.

(e) Compliance with applicable codes/policies

The development must be carried out to ensure compliance with the provisions of Council's Local Laws, Planning Scheme Policies, Planning Scheme and Planning Scheme Codes to the extent they have not been varied by a condition of this approval.

(f) Transportation of Soil

All soil transported to or from the site must be covered to prevent dust or spillage during transport. If soil is tracked or spilt onto the road pavements as a result of works on the subject site, is must be removed prior to the end of the working day and within four (4) hours of a request from a Council Officer.

(g) Easement Documents

The Tablelands Regional Council has developed standard easement documentation to assist in the drafting of formal easement documents for Council easements. The applicant should contact the Urban & Regional Planning Section for more information regarding the drafting of easement documents for Council easements.

(h) Endorsement Fees

Please be advised that Council charges a fee for the endorsement of a Survey Plan, Community Management Statements, easement documents, and covenants. The fee is set out in Council's Fees & Charges Schedule applicable for each respective financial year.

(i) Notation on Rates Record

A notation will be placed on Council's Rate record with respect to each lot regarding the following conditions:

Conditions to be reflected as rates notations:
- Bushfire Management
- Flood Immunity
- Environmental Covenant
- Agricultural Buffering

(C) CONCURRENCE AGENCY CONDITIONS

Department of Transport and Main Roads conditions dated 4 March 2011

Department of Environment and Resource Management conditions dated 11 May 2011

7. IDAS referral agencies –

The IDAS Referral Agencies applicable to this application are –

For an application involving	Name of referral agency	Status	Address
RECONFIGURING A LOT			
On land not contiguous to a **State-controlled road**, for a purpose exceeding the thresholds set in schedule 5 of the *Integrated Planning Regulation 1998*	Department of Transport & Main Roads	Concurrence	Department of Main Roads Peninsula District PO Box 6185 CAIRNS QLD 4870
If the reconfiguring involves land with an area of 2 ha or above, 2 or more lots are created and the size of any lot created is 25 ha or smaller, and the land contains– (i) A category 1, 2 or 3 area shown on a property map of assessable vegetation; or (ii) **Remnant vegetation**	Department of Environment & Resource Management	Concurrence	Administration Officer Implementation & Support Unit Department of Environment & Resource Management GPO Box 15155 CITY EAST QLD 4002
If any part of the lot is situated in, or within 100m of, a **wetland** and (i) the reconfiguration results in more than 10 lots, or (ii) any lot resulting from the reconfiguring is less than 5 ha	Environmental Protection Agency	Advice	Administration Officer Implementation & Support Unit Department of Environment & Resource Management GPO Box 15155 CITY EAST QLD 4002

8. Approved Plans

The approved plans and/or documents for this development approval area listed in the following table.

~~Plan/Document Number~~	~~Plan/Document Title~~	~~Prepared by~~	~~Dated~~
~~11/4743-Stages 3-6 (2B)~~	~~Proposed Reconfiguration of Stages 3-6 & 8 Country Road Estate~~	~~Twine Surveys Pty Ltd~~	~~23.8.2011~~

At Council's Ordinary Meeting held on 20 June 2018, condition 1 was amended to the extent below:

Plan/Document Number	*Plan/Document Title*	*Prepared by*	*Dated*
11/4743-Stages 3-6 (2B)	*Proposed Reconfiguration of Stages 3-6 & 8 Country Road Estate*	*Twine Surveys Pty Ltd*	*23.8.2011*
CRE17-018-C01	***Layout Plan - Stage 8 - 1 Lot into 15 Lots***	***Benchmark Survey & Design***	***29/01/18***

9. When approval lapses if development not started (s341)

This development approval will lapse in accordance with Section 341 of the Sustainable Planning Act 2009 if development does not start within relevant period as stated below:

- Reconfiguring a Lot requiring Operational Works – four (4) years (starting the day the approval takes effect);

If there is one (1) or more subsequent related approvals' for a development approval for a Material Change of Use or a reconfiguration, the relevant period for the approval will be taken to have started on the day the latest related approval takes effect.

10. Appeal rights –

Appeals by applicants

An applicant for a development application may appeal to the Planning and Environment Court against the following:

- the refusal, or refusal in part of the development application
- any condition of a development approval, another matter stated in a development approval and the identification or inclusion of a code under section 242 of SPA
- the decision to give a preliminary approval when a development permit was applied for
- the length of a period mentioned in section 341
- a deemed refusal of the development application.

The timeframes for starting an appeal in the Planning and Environment Court are set out in section 461(2) of SPA.

Applicants may also have a right to appeal to the Building and Development Dispute Resolution Committee. For more details, see SPA, chapter 7, part 2.

Appeals by submitters

A submitter for a development application may appeal to the Planning and Environment Court against:

- the part of the approval relating to the assessment manager's decision about any part of the application requiring impact assessment
- the part of the approval relating to the assessment manager's decision under section 327.

Details about submitter appeal rights for the Planning and Environment Court are set out in sections 462, 463 and 464 of SPA.

Submitters may also have a right to appeal to the Building and Development Dispute Resolution Committee. For more details, see SPA, chapter 7, part 2.

Attachment 3 is an extract from SPA which details the applicant's appeal rights and the appeal rights of any submitters regarding this decision.

11. When the development approval takes effect –

This development approval takes effect –

- from the time the decision notice is given, if there is no submitter and the applicant does not appeal the decision to the court

OR

- subject to the decision of the court, when the appeal is finally decided, if an appeal is made to the court.

Should you require any further information please contact Council's **Senior Planner, Brian Millard** on the above telephone number.

Yours faithfully

22/6/2018

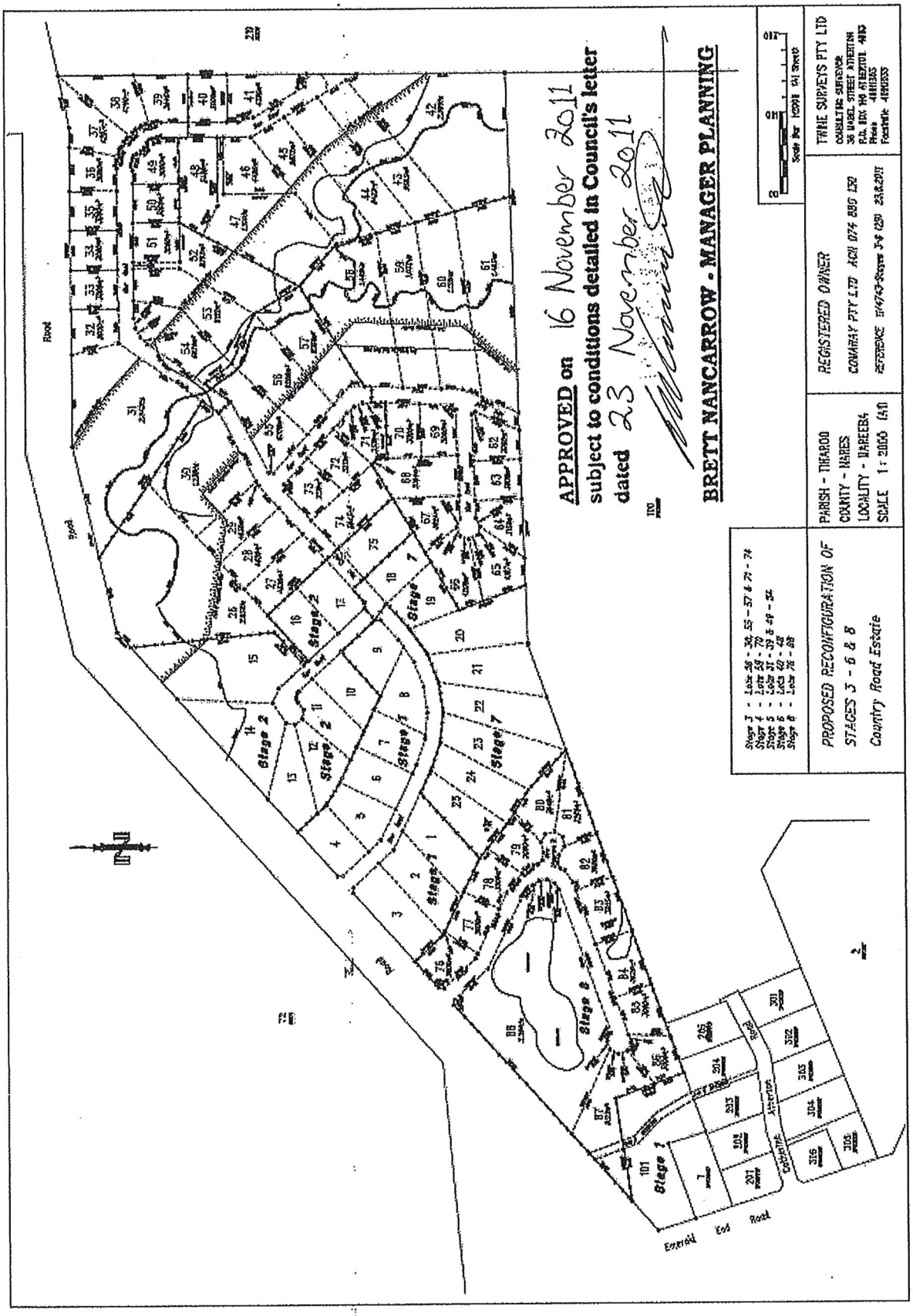
BRETT NANCARROW
MANAGER URBAN & REGIONAL PLANNING

Enclosures: **Attachment 1 - Approved Plans of Development**
Attachment 2 - Concurrence Agency Conditions
Attachment 3 - SPA Extract on Appeal Rights

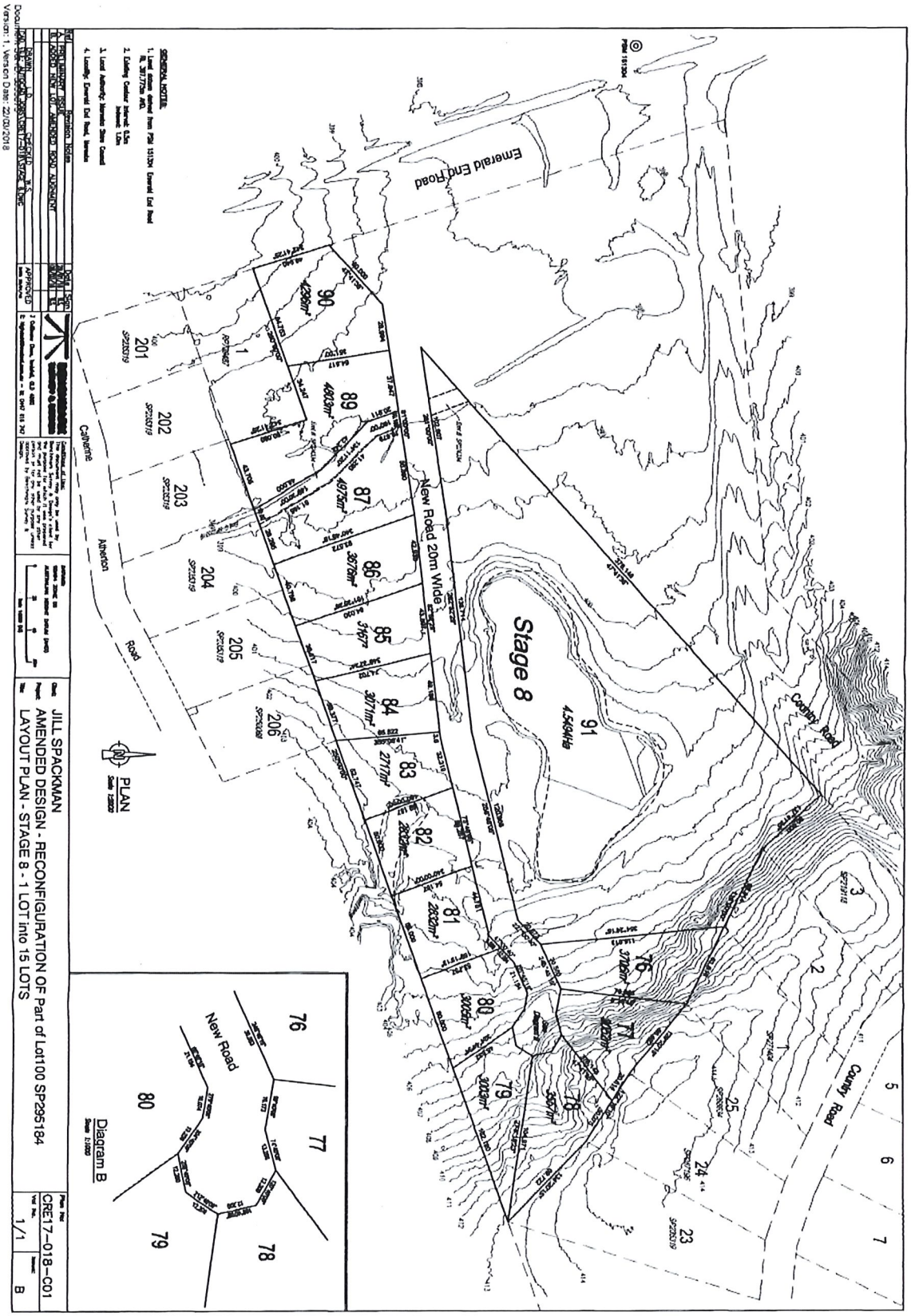
Copy: **Mr Malcolm Hardy**
Department of Transport Main Roads
Far North Region (Cairns)
PO Box 6185
CAIRNS QLD 4870

Administration Officer
Implementation and Support Group
Department of Environment and Resource Management
GPO Box 15155
CITY EAST QLD 4002

ATTACHMENT 1 - SUPERSEDED PLAN



APPROVED PLAN



ATTACHMENT 2 - CONCURRENCE AGENCY CONDITIONS

URP-ROL
B. Millard

Queensland Government

Council Ref: REC/08/0096

4 March 2011

THE **ORIGINAL** OF THIS DOCUMENT CAN BE FOUND ON **PHYSICAL FILE**
REC/08/0096
LOCATION ...PLANNING - MBA.....

RECORDS - 7 MAR 2011

Chief Executive Officer
Tablelands Regional Council
PO Box 154
Mareeba Qld 4880

Attention Mr Brian Millard

Dear Mr Millard

Amended Referral Agency Response – s. 287 of the *Sustainable Planning Act 2009*

Applicant: **Comaray Pty Ltd**
Application: **Reconfiguration of Lot (71 Residential Allotments & New Roads)**
Location: **Lot 4 on RP 739487, Parish of Tinaroo**
Emerald End Road, Mareeba

I refer to:

- the above application received at the former Department of Main Roads (DMR) 1 September 2008 requesting consideration of the above development,
- DMR letter 4 September 2008 of conditions of development, and
- request to review conditions received at the Department of Transport and Main Roads (TMR) 2 March 2011, with an amended lot layout.

Pursuant to section 287 of the *Sustainable Planning Act 2009*, TMR, as a Concurrence Agency, has reviewed the impact of the proposed development on the State-controlled road network and requests that Council include the following **amended** conditions of development for the subject application:

1. Layout

Unless otherwise approved in writing by TMR the development site layout must generally comply with Twine Surveys plan numbered 11/4743-Stages 3-6 (2) dated 18.2.2011.

2. Permitted Road Access Location

(i) Access between the State-controlled road (i.e. Kennedy Highway) and the subject land shall be via Emerald End Road and Hastie Road, to the satisfaction of Tablelands Regional Council.

(ii) No additional access between the State-controlled road (i.e. Kennedy Highway) and the subject land is permitted.

3. Intersection Works

(i) The intersection of the Kennedy Highway and Hastie Road shall be upgraded in

Department of Transport and Main Roads
Assets and Operations
Far North Region / Cairns Office
Floor 4 Cairns Corporate Tower 15 Lake Street
PO Box 6185 CAIRNS Queensland 4870
ABN 39 407 690 291

Enquiries MALCOLM HARDY
Our ref 264/32A/102(122.01)
Telephone +61 7 4050 5511
Facsimile +61 7 4050 5438
Website www.tmr.qld.gov.au
Email malcolm.r.hardy@tmr.qld.gov.au

accordance with:

- TMR *Road Planning and Design Manual (RP&DM)*, and
- current TMR standards,

and to the Department's satisfaction.

(ii) The intersection of the Kennedy Highway and Hastie Road shall be upgraded as specified below:

- Provide a channelised right turn treatment (CHR) in accordance with Figure 13.60 of RP&DM.

Design aspects that include or address the following:

- 1.5 metre wide shoulders and 3.5 metre wide traffic lanes and turn lanes shall be provided on the Kennedy Highway.
- Painted traffic islands shall be used between the Highway traffic lanes, and these islands shall have raised reflective pavement markers (RRPMs) installed in accordance with the Manual of Uniform Traffic Control Devices (MUTCD).
- Redundant sections of existing white lining shall be "blacked out" with hot bitumen and 7mm chip.
- Intersection lighting shall be upgraded to V5 standard to ensure new works are appropriately lit. The completed lighting installation will need to comply with: The Electrical Act,
  - Australian Standards (AS1158, 3000), and
  - Chapter 17 of the RP&D manual.

  All works are to be certified by RPEQ (electrical).
- All associated works are to be completed to the Department's satisfaction [eg, services relocation, drainage (incl. extension of culverts), line marking (incl. RRPM's), and signage in accordance with the MUTCD].
- Any necessary relocation of Council water mains, Telstra and electrical services are to be undertaken at no cost to TMR and works completed to the service provider's satisfaction. No existing water mains within 3.0 m. of the new sealed shoulder edge shall be permitted.

(iii) The landowner/ applicant shall submit design drawings prepared and certified by a suitably experienced RPEQ (civil) engineer, for approval to the Cairns office of TMR prior to commencing any works within the State-controlled road reserve (i.e. Kennedy Highway). No works shall commence on site until TMR has approved the plans.

(iv) All required intersection works shall be completed to the satisfaction of the Director-General of TMR prior to Council approval and dating of the plan of survey creating the 30th Rural Residential allotment on the subject land.

4. Advertising

No advertising device for the proposed development is permitted within the Kennedy Highway road reserve.

Council is requested to reflect the above conditions on its Rates Record, to ensure that the planning intentions of the conditions are secured.

This Department would appreciate a copy of Council's decision notice regarding the application.

A copy of this letter has been sent to the applicant.

Yours sincerely

Malcolm Hardy
SENIOR PLANNER (ASSETS & OPERATIONS) FAR NORTH

Department of Environment and Resource Management

Notice

Amended Concurrence Agency Response

This notice is issued by the Department of Environment and Resource Management pursuant to section 3.3.17 of the Integrated Planning Act 1997 ("the Act").

The Chief Executive
Tablelands Regional Council
PO Box 154
Mareeba QLD 4880

cc. Comaray Pty Ltd
PO Box 146
Atherton QLD 4883

Our reference: 2008/007471

Re: Amended Concurrence Agency Response

1. **Application Details**

Assessment Manager ref.: REC/08/0096

Date application referred to DERM:

2 September 2008

Development approval applied for:

Reconfiguring a Lot – Clearing Vegetation

Aspect of development:

Schedule 2, table 2, item 4 of the *Integrated Planning Act 1997* (for Reconfiguring a Lot)

DERM ref. no: 328683
eLVAS: 20008/007471
RecFind: MBA/000617

Development description:

Reconfiguring a Lot – Public safety and infrastructure

Property/Location description:

Lot 4 RP739487 – Tablelands Regional Council

2. The Chief Executive, Department of Environment and Resource Management (DERM) has imposed conditions on this development. Conditions are attached to this Notice

Notice
Concurrence Agency Response

3. **Approved plans / specifications**

Document No.	Document Name	Date
RARP 2008/007471	Referral Agency Response Plan 2008/007471	15/04/2011

4. **General advice to assessment manager**

Pursuant to sections 3.5.15 and 3.5.17 of the Act, a copy of a decision notice or negotiated decision notice issued by the assessment manager must be forwarded to DERM as a referral agency for the relevant application at

Administration Officer
Vegetation Management and Use
Department of Environment and Resource Management
PO Box 156
Mareeba Qld 4880

and an electronic copy to *eco.access@derm.qld.gov.au*.

The State's Native Title Work Procedures provide that responsibility for assessment of native title issues for an IDAS application rests with the assessment manager. Therefore, DERM as a referral agency for the relevant application has not provided notification to native title parties.

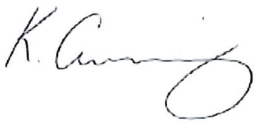
5. **Additional information for applicants**

This notification refers to the provisions of the *Vegetation Management Act 1999* and *Integrated Planning Regulation 1998* only and is based on the information you have provided regarding the proposed activities on the land. Should any issue subsequently emerge on site that requires further consideration by DERM, it is the responsibility of the landholder to contact DERM. Other legislation, including the acts listed below may affect clearing activities. You should contact the business units below to determine if your clearing activity will be affected.

It should be noted that all native plants in Queensland are protected under the *Nature Conservation Act 1992*. You must contact the QPWS Wildlife Branch of DERM on the details below before clearing vegetation.

Notice
Concurrence Agency Response

Act(s)	Agency	Contact details
• *Water Act 2000* • *Wild Rivers Act 2005* • *Soil Conservation Act 1986* • *Aboriginal Cultural Heritage Act 2003* • *Torres Strait Islander Cultural Heritage Act 2003* • *Nature Conservation Act 1992* • *Environmental Protection Act 1994* • *Coastal Protection and Management Act 1995* • *Queensland Heritage Act 1992* • *Forestry Act 1959*	Department of Environment and Resource Management (DERM)	Ph: 1300 130 372
• *Fisheries Act 1994*	Department of Employment, Economic Development and Innovation (DEEDI)	Ph: 13 25 23 Email: callweb@dpi.qld.gov.au
• *Environment Protection and Biodiversity Conservation Act 1999*	Department of Sustainability, Water, Population and Communities	Ph: (02) 6274 1111 Epbc.referals@environment.gov.au
• *Local Government Act 1993* • Sustainable *Planning Act 1997*	Local Government	Contact your nearest local government office.



Delegate
Kate Cumming
Delegate, Chief Executive administering the *Vegetation Management Act 1999*
Department of Environment and Resource Management
11 May 2011

Enquiries:
Rebecca Silcock
Department of Environment and Resource Management
PO Box 156
Mareeba Qld 4880
Phone: (07) 4048 4719
Fax: (07) 4092 2366
Email: Rebecca.silcock@derm.qld.gov.au

Attachment(s)
Amended Referral Agency Response (including conditions)
Referral Agency Response (Vegetation) Plan: 2008/007471

Amended Referral Agency Response – Reconfiguring a Lot

s 3.3.17 Integrated Planning Act 1997

1. Application information

1.1. **Applicant's name:** Comaray Pty. Ltd. C/- Twine Surveys Pty Ltd

1.2. **Property description:** 4 RP739487 - Tablelands Regional Council

1.3. **Assessment Manager/Reference:** REC/08/0096

1.4. **Date application was referred to Department:** 2 September 2008

1.5. **Departmental Reference:** eLVAS Case No: 2008/007471, File Ref. No: MBA/000617.

1.6. **Type of development sought by the application:**

- Reconfiguring a Lot

2. Concurrence Agency response:

The Chief Executive of the Department of Environment and Resource Management directs that the following conditions must be imposed on any approval given by the Assessment Manager:

2.1 No clearing of native vegetation as a result of this Reconfiguration of a Lot is to occur within Areas A1 and A2 shown on the Referral Agency Response (Vegetation) Plan 2008/007471 dated 15 April 2011.

2.2 The Reconfiguration of a Lot must be conducted in accordance with *the Reconfiguration Plan for Lot 4 RP739487, Twine Surveys Pty. Ltd., Reference No. 11/4743-Stages 3-6 (2),* dated 18 February 2011.

2.3 These conditions do not prevent vegetation being cleared for a purpose described in Schedule 8 of the *Integrated Planning Regulation 1997* (except where the extent of clearing is inconsistent with Conditions 2.1 and 2.3) or if cleared in accordance with any subsequent development approval.

3. Reasons:

A Statement of Reasons is attached at Schedule 1.

4. Additional comments or information:

Clearing not authorised under this Amended Referral Agency Response

Additional clearing within the subject area that is not authorised under this amended referral agency response, must be applied for as operational works, that is the clearing of native vegetation made assessable under Schedule 8, Part 1, Table 4 of the *Integrated Planning Act 1997.*

Clearing Regrowth Vegetation

The *Vegetation Management Act 1999* now regulates the clearing of certain regrowth vegetation as well as remnant vegetation. These regulations came into effect on the 8 October 2009. The aim of the new arrangement is to control the clearing of High Value Regrowth

Vegetation, particularly that which is associated with watercourses, wetlands, steep slopes and habitat for rare and threatened fauna.
The Regrowth Vegetation Map identifies Regulated Regrowth Vegetation on land that is subject to this application. The Regrowth Vegetation Map is available online at: http://www.derm.qld.gov.au/vegetation/regrowth_vegetation_regulations.html

While no permit is required to authorise clearing of regulated regrowth vegetation, the code requires landholders to notify DERM of their intention to clear before they start any clearing activity.

Clearing that does not comply with the code is unlawful and may be subject to a compliance response including the possibility of prosecution or the restoration of the cleared area.

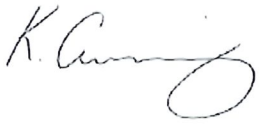
Cultural Heritage

A search has been performed on the inventory of recorded Aboriginal cultural heritage sites over subject area and no Aboriginal cultural heritage notings were found. However, the Chief Executive of DERM advises all Aboriginal cultural heritage in Queensland is protected under the *Aboriginal Cultural Heritage Act 2003*, and penalty provisions apply for any unauthorised harm. A person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care"). Maximum penalties for breaching the duty of care are $750,000 for a corporation and $75,000 for an individual. This applies whether or not such places are recorded in an official register and whether or not they are located in, on or in under private land.

The gazetted cultural heritage Duty of Care Guidelines sets out how you can comply with the cultural heritage duty of care. An assessment of the proposed activity against the Duty of Care Guidelines will help determine whether, or to what extent, Aboriginal cultural heritage may be harmed. Upon assessment, if you believe cultural heritage may be harmed by the proposed activity, you should contact the Cultural Heritage Coordination Unit for further advice on (07) 3238 3838 or e-mail: cultural.heritage@derm.qld.gov.au.

Further information on cultural heritage a copy of the Duty of Care Guidelines or cultural heritage search forms visit: http://www.derm.qld.gov.au/cultural_heritage/index.html.

5. Authorised Officer Signature:



Kate Cumming
Senior Vegetation Management Officer

Date of Response: 11 May 2011

Att. Schedule 1 – Statement of Reasons

eLVAS Case No:	2008/007471
File Ref. No:	MBA/000617
Project No:	328683

Schedule 1

Statement of Reasons
Referral Agency Response
Application for Reconfiguring a Lot
Comaray Pty. Ltd. C/- Twine Surveys.

The following Statement of Reasons is provided pursuant to s. 3.3.18(8) of the *Integrated Planning Act 1997*

Introduction

1. The Department of Environment and Resource Management (DERM) received an application from Comaray Pty. Ltd. C/- Twine Surveys Pty. Ltd. on 2 September 2008.
2. The application is for Reconfiguring a Lot on 4 RP739487 - Tablelands Regional Council.
3. DERM refused the original application on 19 October 2009.
4. DERM received a request to amend the original RAR as well as amended layout plans from the applicant on 1 March 2011.
5. An Assessment Report was sent to the Delegate of the Chief Executive, Kate Cumming, on 11 May 2011.
6. The Delegate determined an Amended Referral Agency Response on 11 May 2011.

Evidence

1. Application dated 2 September 2008.
   a) Completed IDAS Form 1 Part "J".
   b) Property Vegetation Management Plan.
2. *Integrated Planning Act 1997& Integrated Planning Regulation 1998 (Schedule 2)*
3. *Vegetation Management Act 1999*
4. Department of Environment and Resource Management Concurrence Agency Policy for Reconfiguring a Lot dated 23 August 2007.
5. *State Planning Policy (SPP) 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire, and Landslide.*
6. Letter from Matt Andrejic of Twine Surveys Pty Ltd, requesting an amended Referral Agency Response (with amended plans dated 18 February 2011) - dated 1 March 2011
7. The applicant's Reconfiguration Plan for Lot 4 RP739487, Twine Surveys Pty Ltd, Reference No. 11/4743-Stages 3-6 (2) dated 18 February 2011
8. Vegetation Information Network database (VIN)
9. Assessment Report dated 11 May 2011.

Findings of fact

1. The application confirmed that the purpose was to reconfigure lot 4 RP739487 into 72 lots.

2. Smartmap identifies the land tenure for the subject area is freehold
3. Regional ecosystem mapping identifies the subject area contains *Least Concern* and non remnant vegetation.
4. The applicant's Reconfiguration Plan for Lot 4 RP739487, Twine Surveys Pty Ltd, Reference No. 11/4743-Stages 3-6 (2) dated 18 February 2011 confirmed the location of the proposed roads & allotment boundaries.
5. The subject area has been identified as being located within a low bushfire risk hazard area within the Tablelands Regional Council Planning Scheme
6. VIN confirmed the location, extent and types of vegetation on lot 4 RP739487.
7. Topographic Mapping confirmed the location of stream order 1 and a stream order 2 water courses on lot 4 RP739487.
8. The application is assessable against Criteria Table H of the Concurrence Agency Policy for Reconfiguring a Lot: performance requirements where clearing will occur as a result of the RaL within assessable vegetation.

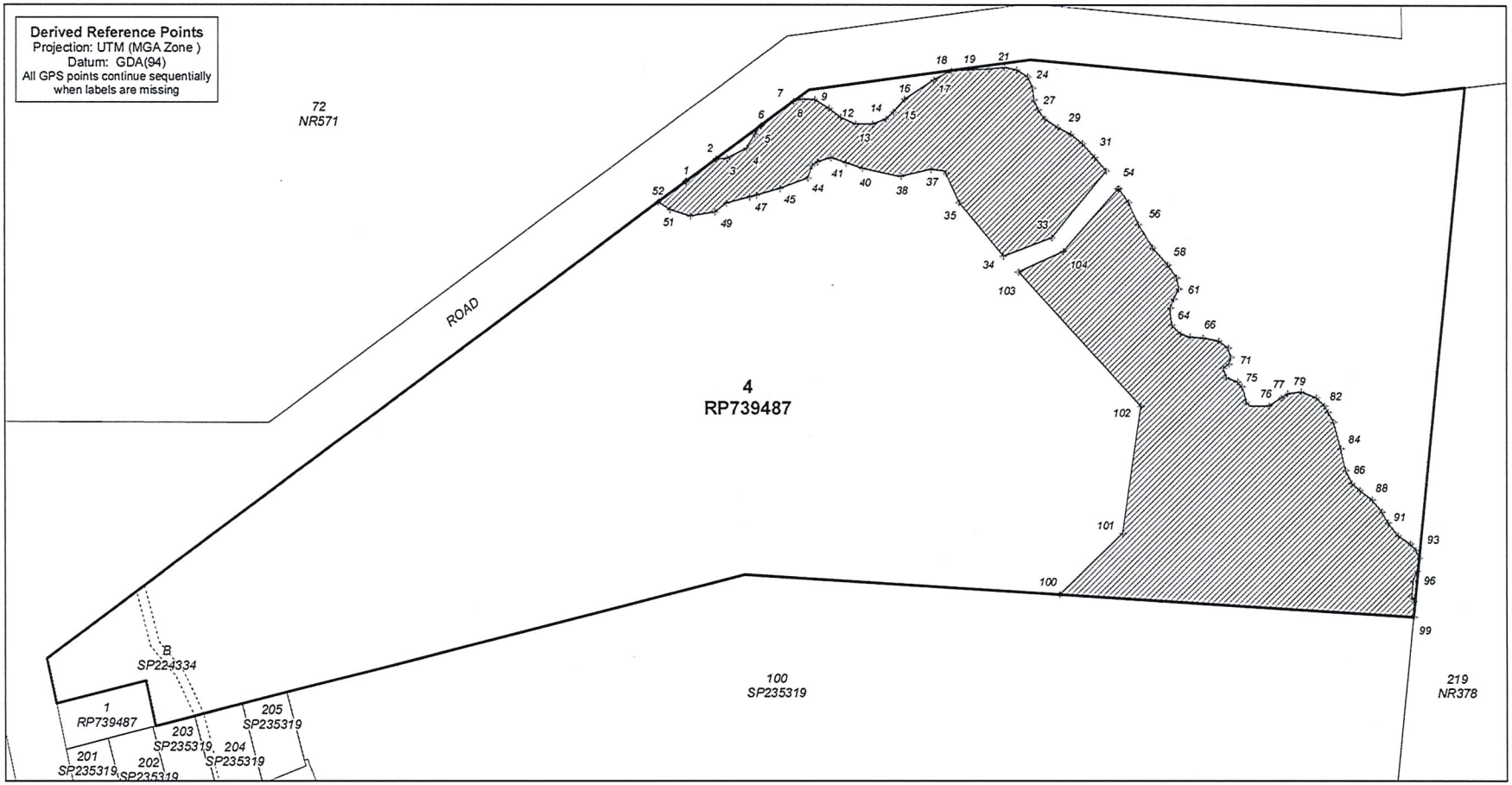
Reasons

1. The application complies with the performance requirement of Criteria Table H of the Concurrence Agency Policy – with the inclusion of conditions 2.1, 2.2 & 2.3 of the referral agency response – as clearing as a result of the RaL will occur within assessable vegetation.
2. The application is consistent with the purpose of the Concurrence Agency Policy for Reconfiguring a Lot which achieves the outcomes of the *Vegetation Management Act 1999*

To ensure that a decision regarding this development application is consistent with the *Vegetation Management Act 1999* it is required conditions 2.1, 2.2 & 2.3 of this referral agency response be applied to the development.

Kate Cumming
Senior Vegetation Management Officer
North Region

11 May 2011



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Projection: UTM (MGA Zone 55) Datum: GDA94

Note: Derived Reference Points are provided to assist in the location of the Referral Agency Response boundaries.
Responsibility for locating these boundaries lies solely with the landholder and delegated contractor(s).

The property boundaries shown on this plan are APPROXIMATE ONLY. They are NOT an accurate representation of the legal boundaries.

Note: This plan must be read in conjunction with the Referral Agency Response 2011/002003

LEGEND

- Derived Reference Points for GPS
- Subject Lot(s)
- Areas A1 and A2

Referral Agency Response (Vegetation) Plan

Plan of Areas A1 and A2 in Lot 4 on RP739487

N

Queensland Government

CENTRE: MAREEBA LOCALITY OF MAREEBA	REGION: NORTH LOCAL GOVT: TABLELANDS
Map Reference: 7964	Compiled from: DCDB, PVMP & VMO Notes
File Reference: MBA/000617	Prepared by: J4926 Jason Allen Date: 15 April 2011

RARP 2008/007471
Sheet 1 of 1

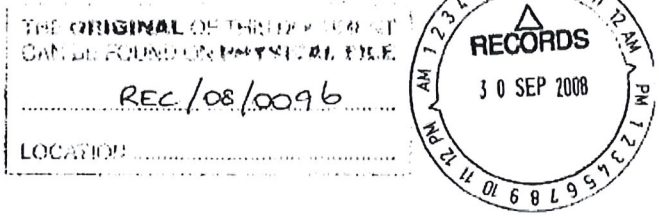
NOTICE

Advice Agency Response –Wetland

This notice is issued by the Environmental Protection Agency pursuant to sections 3.3.16 and 3.3.19 of the *Integrated Planning Act 1997*.

Tableland Regional Council
PO Box 154
MAREEBA QLD 4880

cc. Comaray Pty Ltd
C/- Planning Far North
PO Box 7801
CAIRNS QLD 4870



Your reference : REC/08/0096

Our reference : CNS7912

Attention: Mr Brian Millard

Dear Mr Brian Millard

Re: Advice concerning application for development at 200 Emerald End Road, Mareeba (Lot 4 on Plan RP739487). Please treat this response as a properly made submission.

EPA referral number: **IPAR01185308**

Response type: Advice Agency Response

Date application received by EPA: **03 September 2008**

ADVICE AGENCY JURISDICTION:	Item 38 of Table 2 of Schedule 2 of the *Integrated Planning Regulation 1998*.
ASSESSMENT MANAGER REFERENCE NUMBER:	**REC/08/0096**
APPLICANT:	**Comaray Pty ltd**
ACTIVITY DESCRIPTION:	**Development application for Reconfiguration of 1 Lot into 71 Lots in Four Stages.**
DESCRIPTION OF SUBJECT LAND:	**200 Emerald End Road, Mareeba**
	Lots: 4 Plan: RP739487

Response to Development Application

The lot is within 100m of a Wetland. The EPA, acting as an advice agency under the *Integrated Planning Act 1997*, provides the following advice to the application as detailed above.

EPA advice

The application is for the reconfiguration of Lot 4 on RP739487 (62.94ha), 200 Emerald End Road Mareeba, into 71 rural residential lots.The property has two swathes of 'not of concern' Regional Ecosytem with seasonally flowing gullies running through them and a patch of referrable wetlands near the north eastern boundary.

The Overall Layout and Staging Plan (drawing 0807COMRAY) shows that most of the 'not of concern' Regional Ecosystem, seasonal streamlines and all of the wetland will be subdivided. This will inevitably lead to a loss of natural values associated with these features. It is noted that new lots 15 and 16 in the mapped wetland area in Stage 2 have previously been approved.

From EPA's perspective, a better environmental outcome would result if the wetland parts of lots 17 – 21 and a gully riparian easement of around 40m in width were kept in a natural state, made public land and protected. The subdivision could then be configured around these natural features. Similarly, if the gully and associated vegetation of lot 101 and adjacent parts of lot 100 could be afforded protection, it would add to the natural amenity of the subdivision.

Considering the close proximity of the Barron River it is important to ensure that any on-site effluent disposal is of a high standard. The risks of contamination of the groundwater and potentially the Barron River should be kept to a minimum. Further details demonstrating that on site effluent disposal can take place with minimal risks should be supplied to the satisfaction of the Tableland Regional Council.

Additional information for applicants

It is a requirement of the *Environmental Protection Act 1994* that if the owner or occupier of this site becomes aware that a Notifiable Activity (as defined under Schedule 2 of the *Environmental Protection Act 1994*) is being carried out on this land or that the land has been affected by a hazardous contaminant, they must, within thirty (30) days after becoming aware the activity is being carried out, give notice to the Environmental Protection Agency. A list of Notifiable Activities is provided within Schedule 2 of the *Environmental Protection Act 1994*.

Yours sincerely

Signature

26 - SEP - 2008

Date

Gary Innis

Manager Planning

Far Northern Region

Environmental Protection Agency

Enquiries:
Mike Trenerry
Environmental Protection Agency
PO Box 2066
CAIRNS QLD 4870
Telephone: 4046 6694
Facsimile: 4046 6606

ATTACHMENT 3 - APPEAL RIGHTS

DIVISION 8 APPEALS TO COURT RELATING TO DEVELOPMENT APPLICATIONS AND APPROVALS

461 APPEALS BY APPLICANTS

(1) An applicant for a development application may appeal to the court against any of the following—

(a) the refusal, or the refusal in part, of the development application;

(b) any condition of a development approval, another matter stated in a development approval and the identification or inclusion of a code under section 242;

(c) the decision to give a preliminary approval when a development permit was applied for;

(d) the length of a period mentioned in section 341;

(e) a deemed refusal of the development application.

(2) An appeal under subsection (1)(a), (b), (c) or (d) must be started within 20 business days (the ***applicant's appeal period***) after—

(a) if a decision notice or negotiated decision notice is given—the day the decision notice or negotiated decision notice is given to the applicant; or

(b) otherwise—the day a decision notice was required to be given to the applicant.

(3) An appeal under subsection (1)(e) may be started at any time after the last day a decision on the matter should have been made.

462 APPEALS BY SUBMITTERS—GENERAL

(1) A submitter for a development application may appeal to the court only against—

(a) the part of the approval relating to the assessment manager's decision about any part of the application requiring impact assessment under section 314; or

(b) the part of the approval relating to the assessment manager's decision under section 327.

(2) To the extent an appeal may be made under subsection (1), the appeal may be against 1 or more of the following—

(a) the giving of a development approval;

(b) any provision of the approval including—

(i) a condition of, or lack of condition for, the approval; or

(ii) the length of a period mentioned in section 341 for the approval.

(3) However, a submitter may not appeal if the submitter—

(a) withdraws the submission before the application is decided; or

(b) has given the assessment manager a notice under section 339(1)(b)(ii).

(4) The appeal must be started within 20 business days (the ***submitter's appeal period***) after the decision notice or negotiated decision notice is given to the submitter.

463 ADDITIONAL AND EXTENDED APPEAL RIGHTS FOR SUBMITTERS FOR PARTICULAR DEVELOPMENT APPLICATIONS

(1) This section applies to a development application to which chapter 9, part 7 applies.

(2) A submitter of a properly made submission for the application may appeal to the court about a referral agency's response made by a prescribed concurrence agency for the application.

(3) However, the submitter may only appeal against a referral agency's response to the extent it relates to—

(a) if the prescribed concurrence agency is the chief executive (environment)—development for an aquacultural ERA; or

(b) if the prescribed concurrence agency is the chief executive (fisheries)—development that is—

(i) a material change of use of premises for aquaculture; or

(ii) operational work that is the removal, damage or destruction of a marine plant.

(4) Despite section 462(1), the submitter may appeal against the following matters for the application even if the matters relate to code assessment—

(a) a decision about a matter mentioned in section 462(2) if it is a decision of the chief executive (fisheries);

(b) a referral agency's response mentioned in subsection (2).

464 APPEALS BY ADVICE AGENCY SUBMITTERS

(1) Subsection (2) applies if an advice agency, in its response for an application, told the assessment manager to treat the response as a properly made submission.

(2) The advice agency may, within the limits of its jurisdiction, appeal to the court about—

(a) any part of the approval relating to the assessment manager's decision about any part of the application requiring impact assessment under section 314; or

(b) any part of the approval relating to the assessment manager's decision under section 327.

(3) The appeal must be started within 20 business days after the day the decision notice or negotiated decision notice is given to the advice agency as a submitter.

(4) However, if the advice agency has given the assessment manager a notice under section 339(1)(b)(ii), the advice agency may not appeal the decision.

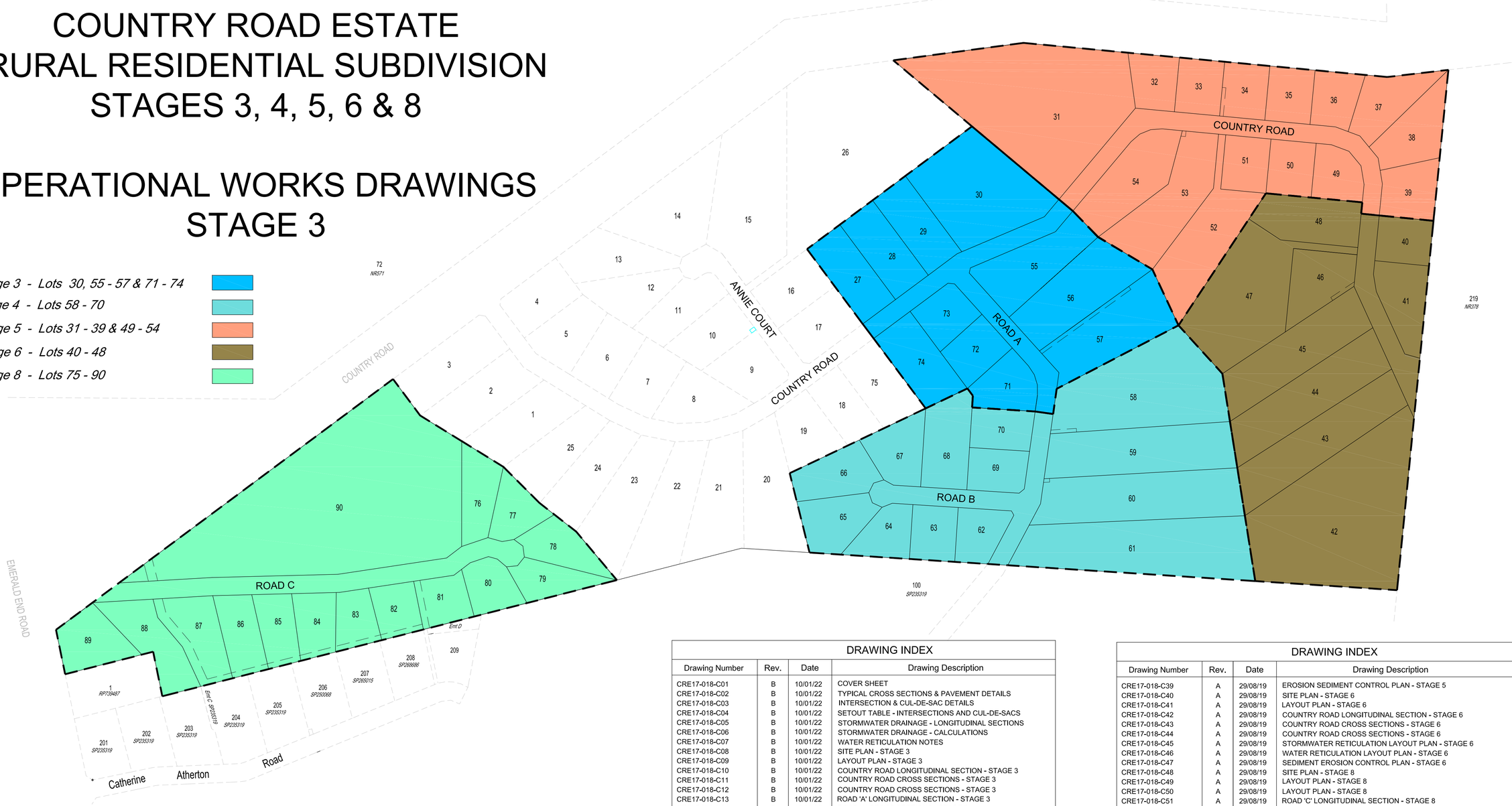
APPENDIX B

Design Drawings

COUNTRY ROAD ESTATE
RURAL RESIDENTIAL SUBDIVISION
STAGES 3, 4, 5, 6 & 8

OPERATIONAL WORKS DRAWINGS
STAGE 3

Stage 3 - Lots 30, 55 - 57 & 71 - 74
Stage 4 - Lots 58 - 70
Stage 5 - Lots 31 - 39 & 49 - 54
Stage 6 - Lots 40 - 48
Stage 8 - Lots 75 - 90



FNQROC STANDARD DRAWINGS

Drawing Number	Rev.	Drawing Description
S1040	E	STREET NAME SIGNS
S1046	A	EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE PIPES
S1050	B	GRATED KERB INLET PIT PIPE DIA. <600
S1055	D	GRATED KERB INLET PIT PIPE DIA. >600
S1065	B	STORMWATER MANHOLES 1050 & 1500.
S2000	A	MSC VALVE BOX INSTALLATION
S2005	A	MSC HYDRANT BOX INSTALLATION
S2010	D	KERB/ROAD MARKERS
S2015	A	MSC THRUST BLOCK DETAILS
S2016	B	WATER RETICULATION BEDDING DETAILS
S2020	D	MSC MAIN CONNECTION DETAILS
S2060	A	MSC DOMESTIC WATER SERVICE CONNECTION DETAILS

DRAWING INDEX

Drawing Number	Rev.	Date	Drawing Description
CRE17-018-C01	B	10/01/22	COVER SHEET
CRE17-018-C02	B	10/01/22	TYPICAL CROSS SECTIONS & PAVEMENT DETAILS
CRE17-018-C03	B	10/01/22	INTERSECTION & CUL-DE-SAC DETAILS
CRE17-018-C04	B	10/01/22	SETOUT TABLE - INTERSECTIONS AND CUL-DE-SACS
CRE17-018-C05	B	10/01/22	STORMWATER DRAINAGE - LONGITUDINAL SECTIONS
CRE17-018-C06	B	10/01/22	STORMWATER DRAINAGE - CALCULATIONS
CRE17-018-C07	B	10/01/22	WATER RETICULATION NOTES
CRE17-018-C08	B	10/01/22	SITE PLAN - STAGE 3
CRE17-018-C09	B	10/01/22	LAYOUT PLAN - STAGE 3
CRE17-018-C10	B	10/01/22	COUNTRY ROAD LONGITUDINAL SECTION - STAGE 3
CRE17-018-C11	B	10/01/22	COUNTRY ROAD CROSS SECTIONS - STAGE 3
CRE17-018-C12	B	10/01/22	COUNTRY ROAD CROSS SECTIONS - STAGE 3
CRE17-018-C13	B	10/01/22	ROAD 'A' LONGITUDINAL SECTION - STAGE 3
CRE17-018-C14	B	10/01/22	ROAD 'A' CROSS SECTIONS - STAGE 3
CRE17-018-C15	B	10/01/22	ROAD 'A' CROSS SECTIONS - STAGE 3
CRE17-018-C16	B	10/01/22	STORMWATER DRAINAGE LAYOUT PLAN - STAGE 3
CRE17-018-C17	B	10/01/22	WATER RETICULATION LAYOUT PLAN - STAGE 3
CRE17-018-C18	B	10/01/22	EROSION SEDIMENT CONTROL PLAN - STAGE 3
CRE17-018-C19	A	29/08/19	SITE PLAN - STAGE 4
CRE17-018-C20	A	29/08/19	LAYOUT PLANE - STAGE 4
CRE17-018-C21	A	29/08/19	ROAD 'A' LONGITUDINAL SECTION - STAGE 4
CRE17-018-C22	A	29/08/19	ROAD 'A' CROSS SECTIONS - STAGE 4
CRE17-018-C23	A	29/08/19	ROAD 'A' CROSS SECTIONS - STAGE 4
CRE17-018-C24	A	29/08/19	ROAD 'B' LONGITUDINAL SECTION - STAGE 4
CRE17-018-C25	A	29/08/19	ROAD 'B' CROSS SECTIONS - STAGE 4
CRE17-018-C26	A	29/08/19	STORMWATER DRAINAGE LAYOUT PLAN - STAGE 4
CRE17-018-C27	A	29/08/19	WATER RETICULATION LAYOUT PLAN - STAGE 4
CRE17-018-C28	A	29/08/19	EROSION SEDIMENT CONTROL PLAN - STAGE 4
CRE17-018-C29	A	29/08/19	SITE PLAN - STAGE 5
CRE17-018-C30	A	29/08/19	LAYOUT PLAN - STAGE 5
CRE17-018-C31	A	29/08/19	COUNTRY ROAD LONGITUDINAL SECTION - STAGE 5
CRE17-018-C32	A	29/08/19	COUNTRY ROAD LONGITUDINAL SECTION - STAGE 5
CRE17-018-C33	A	29/08/19	COUNTRY ROAD CROSS SECTIONS - STAGE 5
CRE17-018-C34	A	29/08/19	COUNTRY ROAD CROSS SECTIONS - STAGE 5
CRE17-018-C35	A	29/08/19	COUNTRY ROAD CROSS SECTIONS - STAGE 5
CRE17-018-C36	A	29/08/19	COUNTRY ROAD CROSS SECTIONS - STAGE 5
CRE17-018-C37	A	29/08/19	STORMWATER RETICULATION LAYOUT PLAN - STAGE 5
CRE17-018-C38	A	29/08/19	WATER RETICULATION LAYOUT PLAN - STAGE 5

DRAWING INDEX

Drawing Number	Rev.	Date	Drawing Description
CRE17-018-C39	A	29/08/19	EROSION SEDIMENT CONTROL PLAN - STAGE 5
CRE17-018-C40	A	29/08/19	SITE PLAN - STAGE 6
CRE17-018-C41	A	29/08/19	LAYOUT PLAN - STAGE 6
CRE17-018-C42	A	29/08/19	COUNTRY ROAD LONGITUDINAL SECTION - STAGE 6
CRE17-018-C43	A	29/08/19	COUNTRY ROAD CROSS SECTIONS - STAGE 6
CRE17-018-C44	A	29/08/19	COUNTRY ROAD CROSS SECTIONS - STAGE 6
CRE17-018-C45	A	29/08/19	STORMWATER RETICULATION LAYOUT PLAN - STAGE 6
CRE17-018-C46	A	29/08/19	WATER RETICULATION LAYOUT PLAN - STAGE 6
CRE17-018-C47	A	29/08/19	SEDIMENT EROSION CONTROL PLAN - STAGE 6
CRE17-018-C48	A	29/08/19	SITE PLAN - STAGE 8
CRE17-018-C49	A	29/08/19	LAYOUT PLAN - STAGE 8
CRE17-018-C50	A	29/08/19	LAYOUT PLAN - STAGE 8
CRE17-018-C51	A	29/08/19	ROAD 'C' LONGITUDINAL SECTION - STAGE 8
CRE17-018-C52	A	29/08/19	ROAD 'C' LONGITUDINAL SECTION - STAGE 8
CRE17-018-C53	A	29/08/19	ROAD 'C' CROSS SECTIONS - STAGE 8
CRE17-018-C54	A	29/08/19	ROAD 'C' CROSS SECTIONS - STAGE 8
CRE17-018-C55	A	29/08/19	ROAD 'C' CROSS SECTIONS - STAGE 8
CRE17-018-C56	A	29/08/19	ROAD 'C' CROSS SECTIONS - STAGE 8
CRE17-018-C57	A	29/08/19	EARTHWORKS LAYOUT PLAN - STAGE 8
CRE17-018-C58	A	29/08/19	EARTHWORKS LAYOUT PLAN - STAGE 8
CRE17-018-C59	A	29/08/19	STORMWATER DRAINAGE LAYOUT PLAN - STAGE 8
CRE17-018-C60	A	29/08/19	STORMWATER DRAINAGE LAYOUT PLAN - STAGE 8
CRE17-018-C61	A	29/08/19	WATER RETICULATION LAYOUT PLAN - STAGE 8
CRE17-018-C62	A	29/08/19	WATER RETICULATION LAYOUT PLAN - STAGE 8
CRE17-018-C63	A	29/08/19	EROSION SEDIMENT CONTROL PLAN - STAGE 8
CRE17-018-C64	A	29/08/19	EROSION SEDIMENT CONTROL PLAN - STAGE 8
CRE17-018-C65	B	10/01/22	EMERALD END ROAD WIDENING - LAYOUT PLAN
CRE17-018-C66	B	10/01/22	EMERALD END ROAD WIDENING - TYPICAL SECTIONS
CRE17-018-C67	B	10/01/22	EMERALD END ROAD WIDENING - LONGITUDINAL SECTION
CRE17-018-C68	B	10/01/22	EMERALD END ROAD WIDENING - CROSS SECTIONS
CRE17-018-C69	B	10/01/22	EMERALD END ROAD WIDENING - SEDIMENT EROSION CONTROL PLAN

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

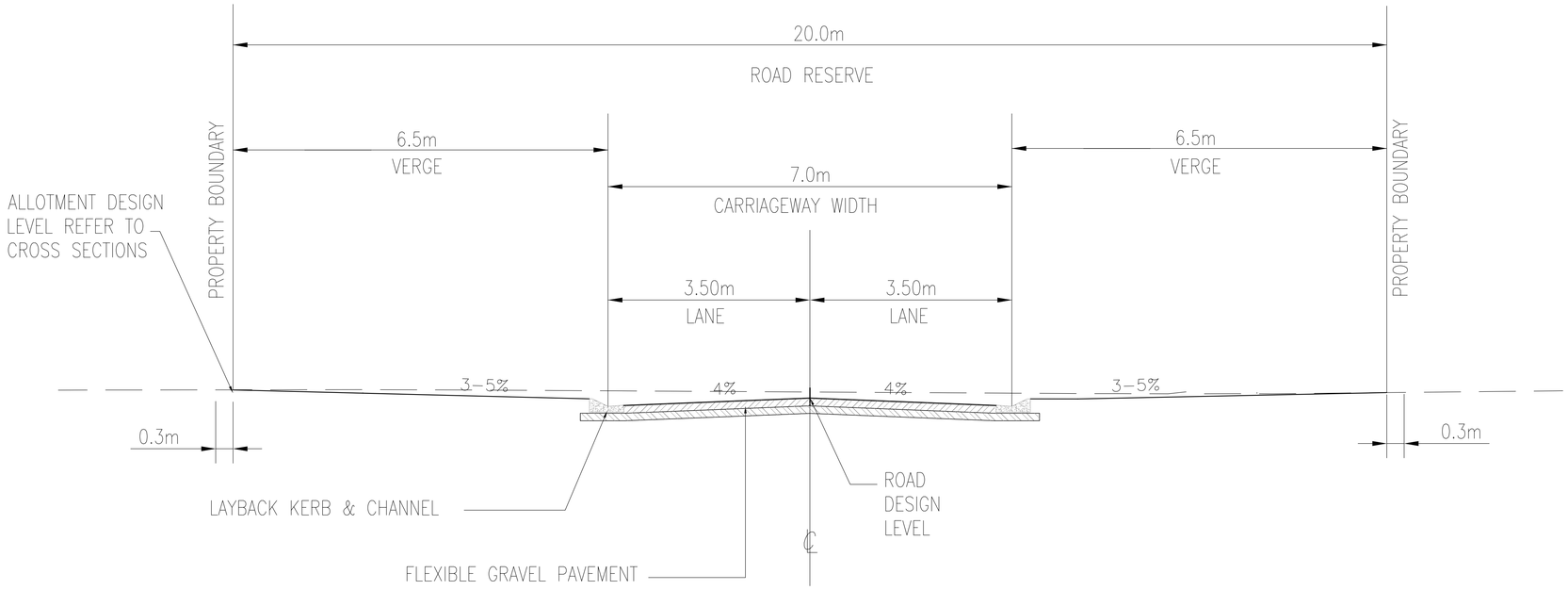
DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 20 40 60m
Scale 1:2000 (A1)

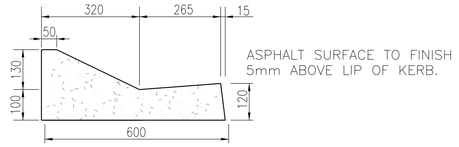
Client: CONMAT No. 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: COVER SHEET

CRE17–018–C01
1/69 B



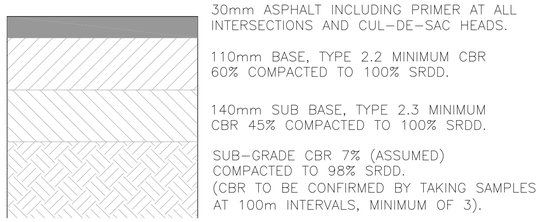
TYPICAL CROSS SECTION-ROAD 'B', ROAD 'C'

Scale 1:50 (A1)



LAYBACK KERB AND CHANNEL

SCALE 1:10 (A1)



NOTE: SUBGRADE CBR RESULTS AND FINAL PAVEMENT DESIGN ARE TO BE SUBMITTED TO COUNCIL FOR APPROVAL PRIOR TO PLACEMENT OF GRAVEL.

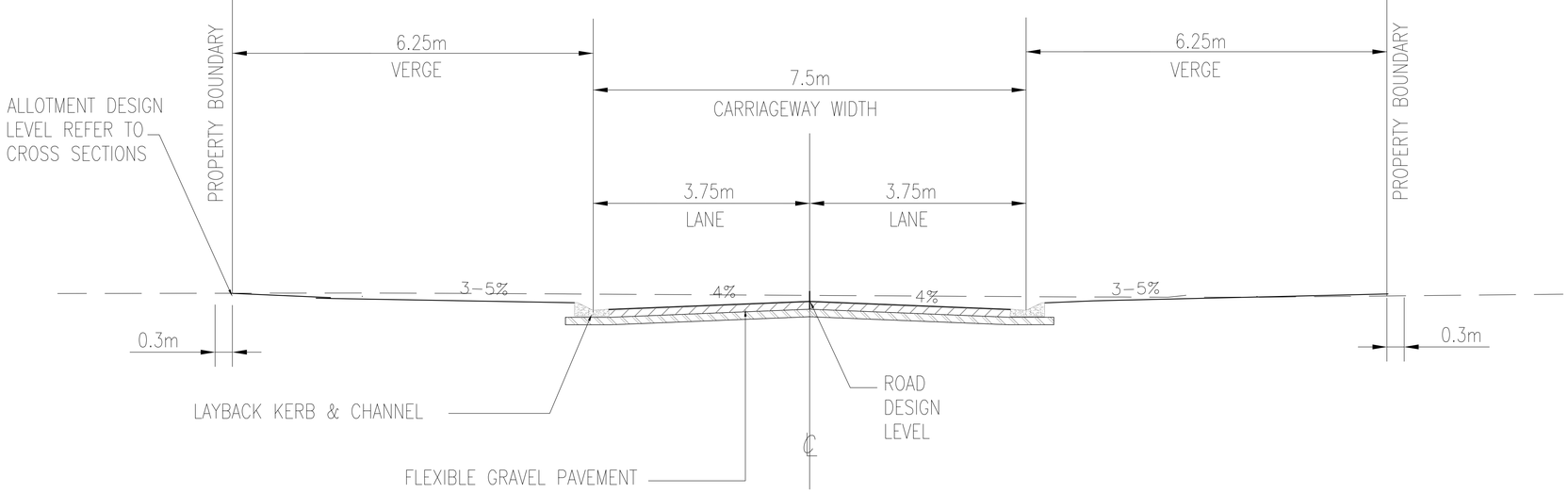
PAVEMENT DETAIL - INTERSECTIONS & CUL-DE-SAC

N.T.S.

NOTE: SUBGRADE CBR RESULTS AND FINAL PAVEMENT DESIGN ARE TO BE SUBMITTED TO COUNCIL FOR APPROVAL PRIOR TO PLACEMENT OF GRAVEL.

PAVEMENT DETAIL

N.T.S.



TYPICAL CROSS SECTION-COUNTRY ROAD, ROAD 'A'

Scale 1:50 (A1)

PAVEMENT NOTES

1.ALL CUL-DE-SAC HEADS AND INTERSECTION TURNOUTS ARE REQUIRED TO HAVE A MINIMUM 30MM ASPHALT SURFACE TREATMENT WITH A SINGLE COAT SEAL.

2. THE SUB-BASE LAYER SHALL EXTEND A MINIMUM OF 150MM BEHIND THE REAR FACE OF THE KERB AND CHANNEL.

THE BASE AND SURFACING SHALL EXTEND TO THE FACE OF ANY KERBING. WHERE THE TOP SURFACE OF THE SUB-BASE LAYER IS BELOW THE LEVEL OF THE UNDERSIDE OF THE KERB AND CHANNEL, THE BASE LAYER SHALL ALSO EXTEND A MINIMUM OF 150MM BEHIND THE REAR FACE OF THE KERB AND CHANNEL.

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
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DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

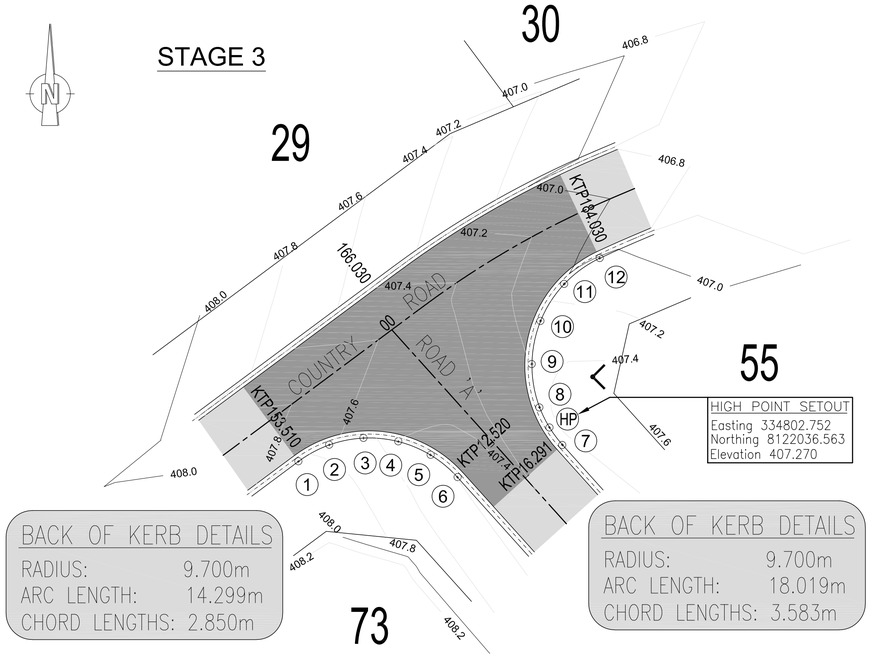
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 1 2 3m
Scale 1:50 (A1)

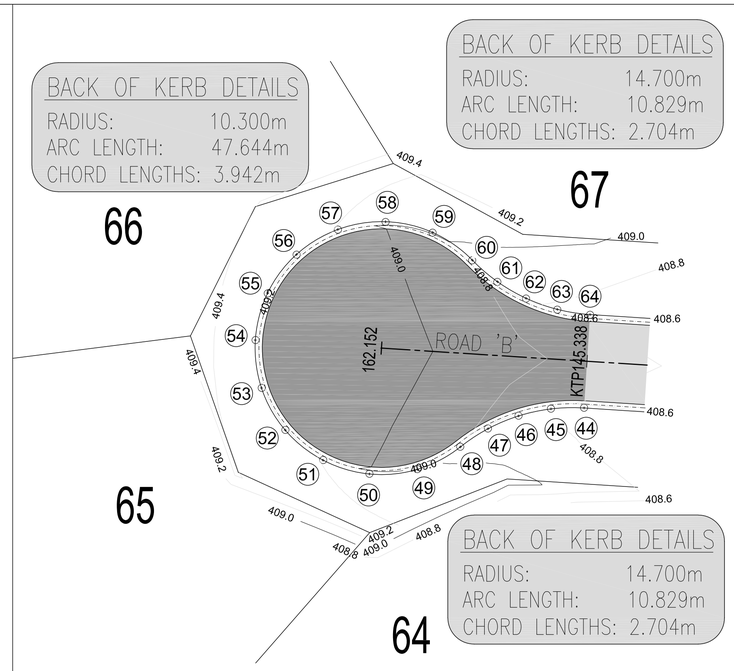
Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: TYPICAL CROSS SECTIONS AND PAVEMANT DETAILS

CRE17-018-C02
2/69 B



INTERSECTION DETAIL - COUNTRY ROAD & ROAD A

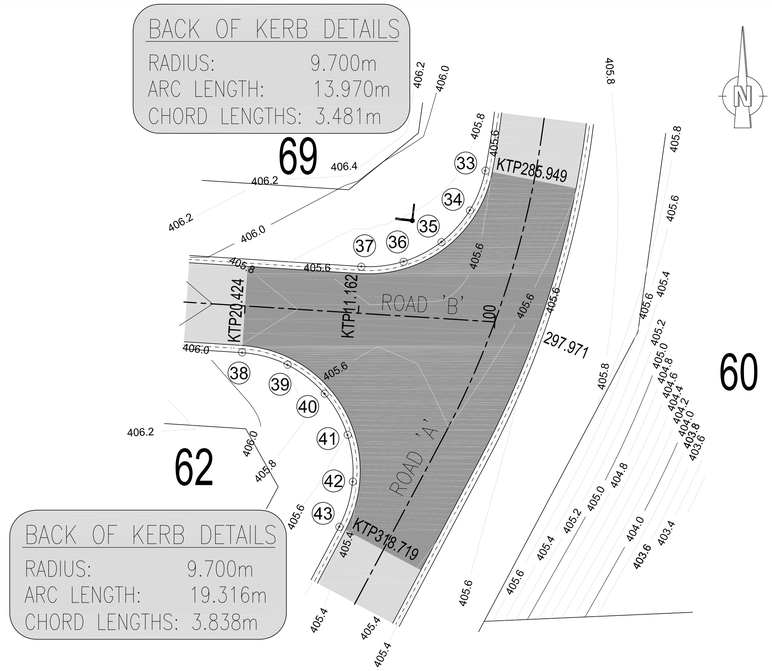
Scale 1:250 (A1)



CUL-DE-SAC DETAIL - ROAD 'B'

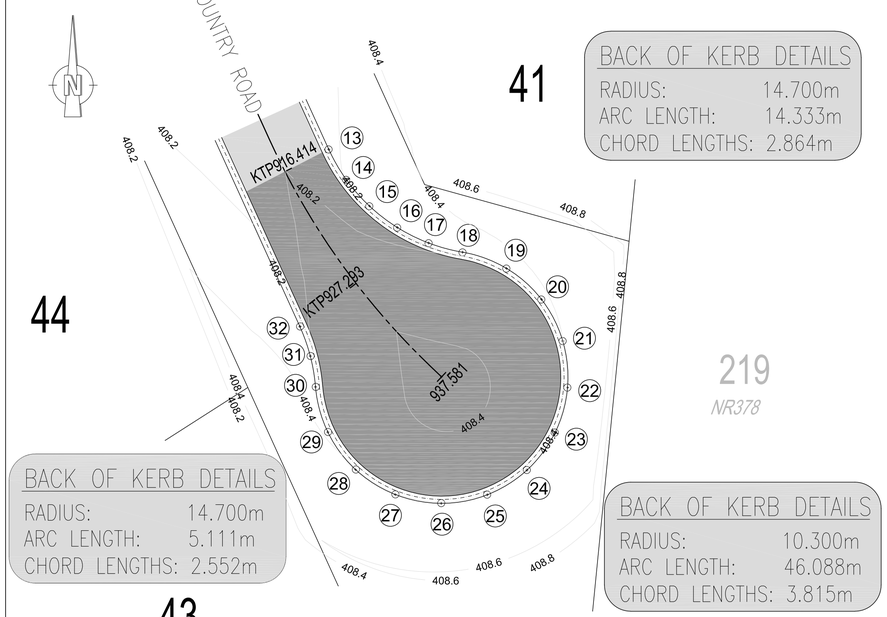
Scale 1:250 (A1)

STAGE 4



INTERSECTION DETAIL - ROAD A & ROAD 'B'

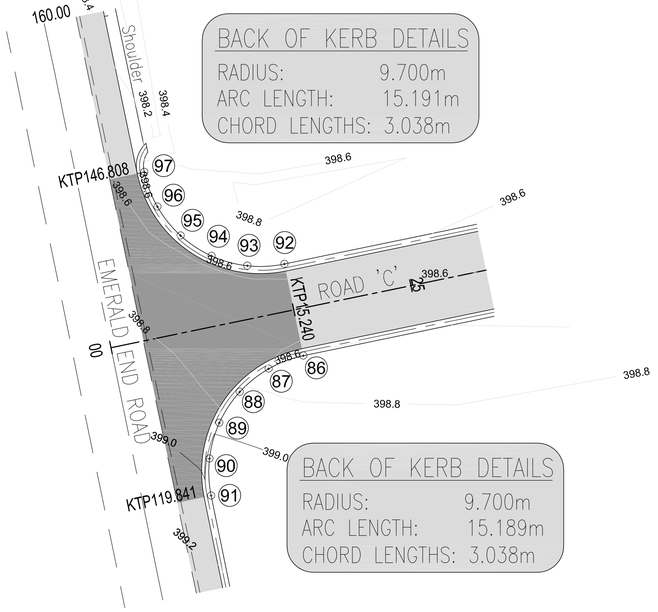
Scale 1:250 (A1)



CUL-DE-SAC DETAIL - COUNTRY ROAD

Scale 1:250 (A1)

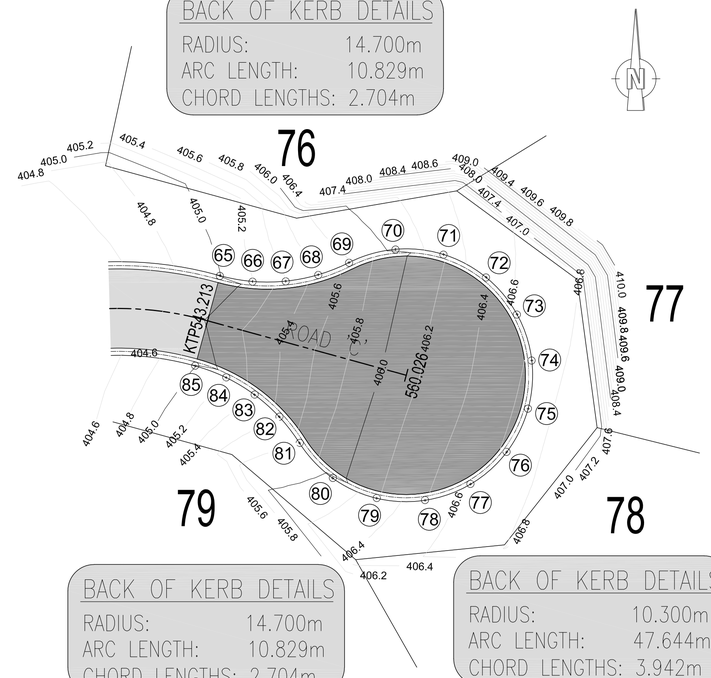
STAGE 6



INTERSECTION DETAIL - EMERALD END ROAD & ROAD 'C'

Scale 1:250 (A1)

STAGE 8



CUL-DE-SAC DETAIL - ROAD 'C'

Scale 1:250 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

For Setout Details Refer to Plan No CRE17-018-C04

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. CHECKED W.S. APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG DATE: 10/01/22

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.net.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 7.5 15m
Scale 1:250 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: INTERSECTION & CUL-DE-SAC DETAILS

CRE17-018-C03
3/69 B

SETOUT POINTS - BACK OF KERB - INTERSECTION AND CUL-DE-SAC DETAILS

	NO	EASTING	NORTHING	LEVEL
STAGE 3 COUNTRY ROAD & ROAD A INTERSECTION DETAILS	1	334782.268	8122033.792	407.827
	2	334784.780	8122035.137	407.749
	3	334787.574	8122035.694	407.645
	4	334790.410	8122035.412	407.525
	5	334793.040	8122034.317	407.439
	6	334795.238	8122032.503	407.396
	7	334803.810	8122035.147	407.374
	8	334801.947	8122038.207	407.372
	9	334801.324	8122041.736	407.329
	10	334802.028	8122045.249	407.247
	11	334803.962	8122048.265	407.153
	12	334806.860	8122050.371	407.051
STAGE 6 COUNTRY ROAD CUL-DE-SAC DETAILS	13	335279.715	8121953.062	408.186
	14	335281.151	8121950.586	408.210
	15	335283.039	8121948.435	408.244
	16	335285.309	8121946.692	408.275
	17	335287.874	8121945.422	408.303
	18	335290.636	8121944.674	408.329
	19	335294.219	8121943.355	408.356
	20	335297.077	8121940.822	408.380
	21	335298.819	8121937.424	408.400
	22	335299.206	8121933.625	408.415
	23	335298.184	8121929.946	408.427
	24	335295.895	8121926.890	408.431
	25	335292.651	8121924.876	408.436
	26	335288.896	8121924.179	408.432
	27	335285.146	8121924.895	408.423
	28	335281.912	8121926.926	408.408
	29	335279.639	8121929.994	408.387
	30	335278.637	8121933.679	408.361
	31	335278.214	8121936.196	408.332
	32	335277.361	8121938.601	408.303
STAGE 4 ROAD A & ROAD B INTERSECTION & CUL-DE-SAC DETAILS	33	334874.052	8121798.465	405.714
	34	334872.790	8121795.229	405.689
	35	334867.381	8121792.646	405.664
	36	334870.466	8121791.050	405.645
	37	334863.969	8121790.687	405.628
	38	334854.199	8121783.614	405.904
	39	334857.905	8121782.615	405.787
	40	334860.930	8121780.254	405.684
	41	334862.801	8121776.903	405.598
	42	334863.222	8121773.089	405.534
	43	334862.128	8121769.411	405.495
	44	334729.541	8121791.590	408.711
	45	334726.839	8121791.513	408.771
	46	334724.196	8121790.943	408.831
	47	334721.703	8121789.897	408.892
	48	334719.444	8121788.412	408.952
	49	334715.947	8121786.584	409.032

	NO	EASTING	NORTHING	LEVEL
STAGE 4 ROAD A & ROAD B INTERSECTION & CUL-DE-SAC DETAILS	50	334712.019	8121786.204	409.112
	51	334708.236	8121787.325	409.191
	52	334705.150	8121789.784	409.251
	53	334703.213	8121793.221	409.287
	54	334702.707	8121797.134	409.299
	55	334703.707	8121800.952	409.287
	56	334706.067	8121804.114	406.251
	57	334709.441	8121806.160	409.191
	58	334713.337	8121806.789	409.112
	59	334717.183	8121805.911	409.032
	60	334720.419	8121803.653	408.952
	61	334722.471	8121801.892	408.892
	62	334724.810	8121800.537	408.831
	63	334727.358	8121799.634	408.771
	64	334730.029	8121799.214	408.711
STAGE 8 EMERALD END ROAD & ROAD C INTERSECTION & ROAD C CUL-DE-SAC DETAILS	65	334287.387	8121738.974	404.996
	66	334290.049	8121738.502	405.192
	67	334292.752	8121738.527	405.390
	68	334295.405	8121739.047	405.587
	69	334297.917	8121740.044	405.784
	70	334301.712	8121741.126	406.046
	71	334305.635	8121740.705	406.294
	72	334309.114	8121738.842	406.489
	73	334311.639	8121735.810	406.628
	74	334312.841	8121732.051	406.712
	75	334312.545	8121728.117	406.739
	76	334310.793	8121724.581	406.712
	77	334307.842	8121721.961	406.628
	78	334304.124	8121720.640	406.489
	79	334300.182	8121720.811	406.294
	80	334296.592	8121722.449	406.046
	81	334293.880	8121725.315	405.784
	82	334292.227	8121727.455	405.587
	83	334290.210	8121729.255	405.390
	84	334287.897	8121730.654	405.192
	85	334285.367	8121731.606	404.996
	86	333767.400	8121668.297	398.683
	87	333764.569	8121667.229	398.729
	88	333762.207	8121665.339	398.824
	89	333760.543	8121662.812	398.959
	90	333759.740	8121659.895	399.076
	91	333759.877	8121656.873	399.167
	92	333765.855	8121675.778	398.683
	93	333762.832	8121675.636	398.698
	94	333759.914	8121676.434	398.701
	95	333757.384	8121678.094	398.691
	96	333755.491	8121680.454	398.665
	97	333754.418	8121683.283	398.621

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

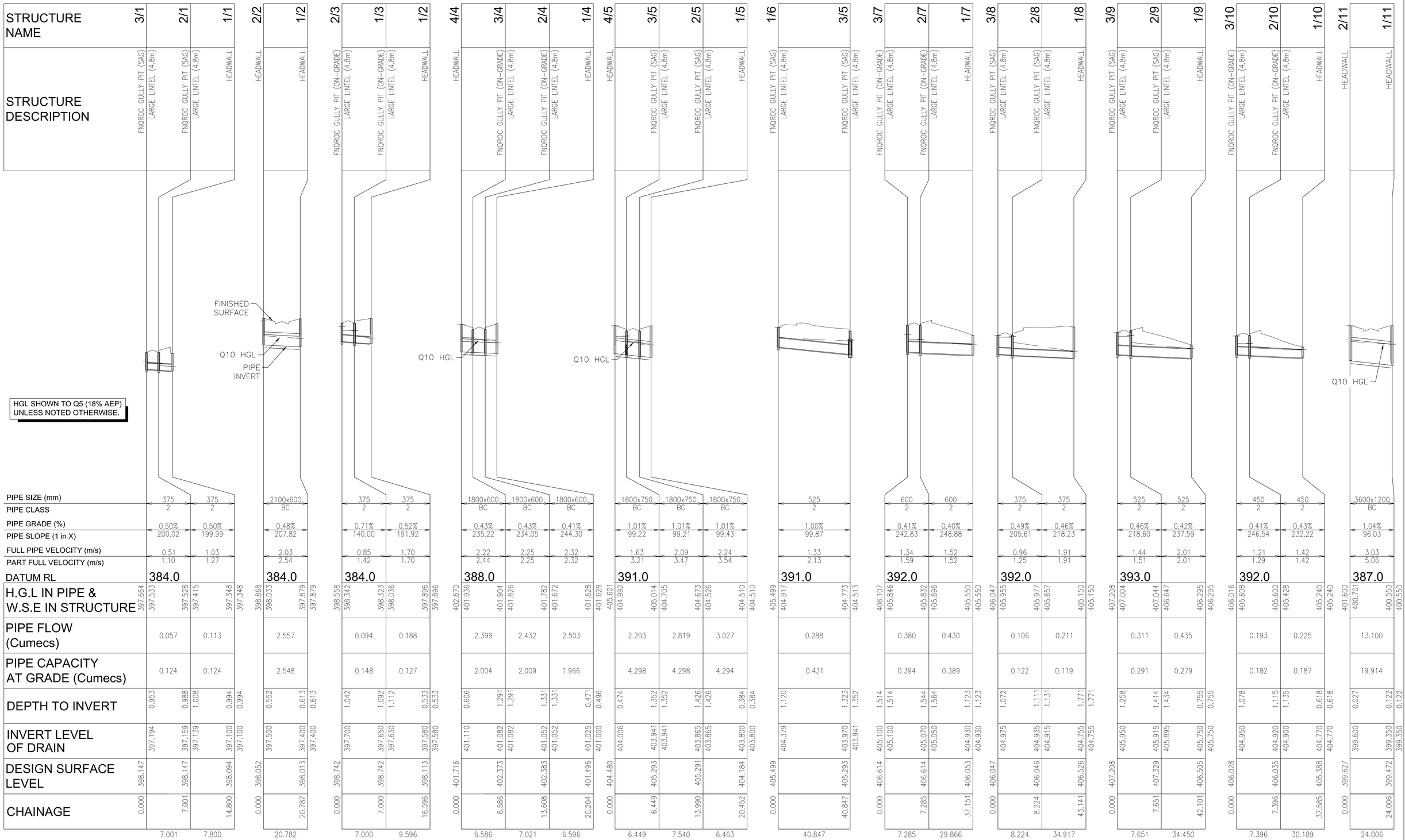
BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: SETOUT TABLES - INTERSECTIONS AND CUL-DE-SACS.

CRE17-018-C04
4/69 | B



ISSUED FOR APPROVAL
JANUARY, 2022

LONGITUDINAL SECTION - COUNTRY ROAD

Horz 1:500
Vert 1:50

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
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BENCHMARK SURVEY & DESIGN
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ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: STORMWATER DRAINAGE - LONGITUDINAL SECTIONS

CRE17-018-C05
5/69 B

			tc	I	C	A	(CxA)	Q	Qa			Wf	dg	Vg	dg.Vg			Qg	Qb		tc	I	(CxA)	Qrat	Qrc	Qb(net)	Qo	L	S		V	Vt		S/Do	Qg/Qo	Du/Do	V2/2g	Ku	hu	Kw	hw	Sf	hf	dn	Vn						
DESIGN A.R.I.	STRUCTURE NO.	DRAIN SECTION	SUB-CATCHMENT TIME OF CONCENTRATION	RAINFALL INTENSITY	COEFFICIENT OF RUNOFF	SUB-CATCHMENT AREA	TOTAL CONTRIBUTING EQUIVALENT AREA	SUB-CATCHMENT DISCHARGE	FLOW IN K & C (INCLUDING BYPASS)	ROAD GRADE AT INLET	ROAD XFALL AT INLET	FLOW WIDTH	FLOW DEPTH AT INVERT	GUTTER FLOOD VELOCITY	VELOCITY-DEPTH	STRUCTURE TYPE	INLET CAPACITY CURVE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE NO.	CRITICAL TIME OF CONCENTRATION	RAINFALL INTENSITY	TOTAL CONTRIBUTING EQUIVALENT AREA	TOTAL PEAK FLOW	HALF ROAD CAPACITY	NET BYPASS FLOW	FLOW IN PIPE	REACH LENGTH	PIPE GRADE	PIPE / BOX DIMENSIONS	FULL-PIPE FLOW VELOCITY	PIPE TRAVEL TIME VELOCITY	12D Ku / Kw CHART IDENTIFIERS	SUBMERGENCE RATIO	FLOW RATIO	DIAMETER RATIO	VELOCITY HEAD	U/S PRESSURE HEAD CHANGE COEFFICIENT	CHANGE IN U/S PRESSURE HEAD	W.S.E. COEFFICIENT	CHANGE IN W.S.E.	PIPE FRICTION SLOPE	PIPE FRICTION TOTAL HEAD LOSS	DEPTH	VELOCITY	PIPE U/S INVERT LEVEL	PIPE D/S INVERT LEVEL	PIPE U/S H.G.L.	PIPE D/S H.G.L.	W.S.E.	SURFACE OR K & C INVERT LEVEL	FREEBOARD
years			min	mm/hr		ha	ha	m3/s	m3/s		%	m	m	m/s	m2/s			m3/s	m3/s		min	mm/hr	ha	m3/s	m3/s	m3/s	m3/s	m	%	mm	m/s	m/s					m		m		m	%	m	m	m/s	m	m	m	m	m	m	m
5	3/1	3/1 to 2/1	5	171	0.826	0.143	0.118	0.056	0.057	0.04			0.009			SAL4D		0.057	0		5	171	0.118	0.056	0.427	-0.001	0.057	7.001	0.5	375	0.51	2	G2	1.35	1		0.014	9.7	0.131		0.131	0.07	0.006	0.178	1.1	397.194	397.159	397.533	397.528	397.664	398.147	0.483
5	2/1	2/1 to 1/1	5	171	0.826	0.143	0.118	0.056	0.057	0.04			0.009			SAL4D		0.057	0		5.06	170	0.236	0.112	0.427	-0.002	0.113	7.8	0.5	375	1.03	2	T1/T2	1.3	0.5	1	0.054	2.11	0.113		0.113	0.86	0.044	0.282	1.27	397.139	397.1	397.415	397.348	397.528	398.147	0.619
5	1/1															HW outlet																																397.348	398.094	
5	2/2	2/2 to 1/2	15	114	0.618	10.98	6.789	2.149	2.149							HW inlet		2.149	0		15	114	6.789	2.149		0	2.149	20.782	0.48	2100x600	1.71	2	G1	2.12	1		0.148	4.54	0.674		0.674	0.72	0.091	0.425	2.41	397.5	397.4	397.975	397.825	398.649	399.024	0.375
5	1/2															HW outlet																																397.825	398.995	
5	2/3	3/3 to 2/3	5	171	0.826	0.243	0.201	0.095	0.095	0.59	4	2.693	0.108	0.703	0.076	AL4D	0.5G,3.3X	0.094	0.001	3/1	5	171	0.201	0.095	0.224	0.001	0.094	7	0.71	375	0.85	2	G2	2.29	1		0.037	5.79	0.216		0.216	0.29	0.02	0.217	1.42	397.7	397.65	398.342	398.322	398.558	398.742	0.184
5	1/3	2/3 to 1/3	5	171	0.826	0.243	0.201	0.095	0.095	0.59	4	2.696	0.108	0.702	0.076	AL4D	0.5G,3.3X	0.094	0.001	2/1	5.06	170	0.401	0.19	0.223	0.002	0.188	9.596	0.52	375	1.7	2	T5	1.85	0.5	1	0.148	1.93	0.286	1.94	0.287	1.45	0.105	0.375	1.7	397.63	397.58	398.036	397.896	398.323	398.742	0.419
5	1/2															HW outlet																																397.896	399.012	
5	4/4	4/4 to 3/4	15	114	0.618	10.3	6.369	2.016	2.016							HW inlet		2.016	0		15	114	6.369	2.016		0	2.016	6.586	0.43	1800x600	1.87	2	G1	2.41	1		0.178	3.95	0.702		0.702	0.43	0.028	0.483	2.32	401.11	401.012	401.852	401.824	402.554	402.67	0.116
5	3/4	3/4 to 2/4	5	171	0.826	0.107	0.088	0.042	0.042	1.85	4	1.589	0.067	0.872	0.059	AL4D	2G,3.3X	0.042	0	3/3	15.05	114	6.467	2.044	0.39	0	2.044	7.021	0.43	1800x600	1.89	2	T1	1.24	0.02	1	0.183	0.3	0.055		0.055	0.44	0.031	0.487	2.33	401.082	401.052	401.769	401.738	401.824	402.373	0.549
5	2/4	2/4 to 1/4	5	171	0.826	0.23	0.19	0.09	0.09	1.85	4	2.135	0.088	1.053	0.092	AL4D	2G,3.3X	0.09	0	2/3	15.11	114	6.678	2.107	0.39	0	2.107	6.596	0.41	1800x600	1.95	2	T1/T2	1.14	0.04	1	0.194	0.41	0.079		0.079	0.47	0.031	0.505	2.32	401.052	401.025	401.659	401.628	401.738	402.383	0.645
5	1/4															HW outlet																																401.628	402.71	
5	4/5	4/5 to 3/5	15	114	0.618	9.46	5.85	1.852	1.852							HW inlet		1.852	0		15	114	5.85	1.852		0	1.852	6.449	0.47	2400x600	1.29	2	G1	1.99	1		0.084	4.86	0.41		0.41	0.19	0.012	0.351	2.2	404.275	404.245	405.057	405.045	405.467	405.601	0.134
5	3/5	3/5 to 2/5	5	171	0.826	0.304	0.251	0.119	0.415	0.28	4		0.18			SAL4D	SAG	0.415	0	2/5	15.05	114	7.487	2.366	0.427	-0.074	2.441	7.54	0.46	2400x600	1.69	2	T1/T3	1.38	0.17	1	0.147	1.28	0.188	1.47	0.215	0.33	0.025	0.422	2.41	404.245	404.21	404.857	404.832	405.072	405.29	0.218
5	2/5	2/5 to 1/5	5	171	0.826	0.234	0.193	0.092	0.092	0.22			0.028			SAL4D		0.092	0		15.12	114	7.701	2.43	0.427	-0.074	2.504	6.463	0.4	2400x600	1.74	2	T1	1.1	0.04	1	0.154	0.37	0.058		0.058	-0.09	0.012	0.45	2.32	404.21	404.184	404.774	404.78	404.832	405.288	0.456
5	1/5															HW outlet																																404.78	405.595	
5	1/6	1/6 to 3/5	15	114	0.644	2.14	1.377	0.436	0.51	2.83	4		0.2			SAL4D	SAG	0.214	0.296	3/5	15	114	1.377	0.436	0.214	0.222	0.214	40.847	0.5	525	0.99	2	G2	1.99	1		0.05	7.06	0.353		0.353	0.25	0.101	0.325	1.52	404.445	404.25	405.146	405.045	405.499	405.499	0
5	3/5															SAL4D																																405.072	405.29	
5	3/7	3/7 to 2/7	15	114	0.694	0.775	0.538	0.17	0.182	0.67	4	3.549	0.135	0.84	0.113	AL4D	0.5G,3.3X	0.167	0.015	3/10	15	114	1.076	0.34	0.288	0.015	0.325	7.285	0.41	600	1.15	2	G2/T9/T10	1.43	0.51	0.88	0.068	2.54	0.172	2.88	0.195	0.28	0.02	0.416	1.56	405.1	405.07	405.762	405.741	405.956	406.626	0.67
5	2/7	2/7 to 1/7	5	171	0.826	0.113	0.093	0.044	0.044	0.67	4	1.975	0.082	0.602	0.049	AL4D	0.5G,3.3X	0.044	0	2/10	5.08	170	0.802	0.379	0.281	0.015	0.364	29.866	0.4	600	1.29	2	T1/T3	1.17	0.12	1	0.084	1.02	0.086	1.14	0.096	0.35	0.105	0.46	1.56	405.05	404.93	405.655	405.55	405.751	406.606	0.855
5	1/7															HW outlet																																405.55	406.053	
5	3/8	3/8 to 2/8	5	171	0.826	0.225	0.186	0.088	0.088	0.11			0.026			SAL4D		0.088	0		5	171	0.186	0.088	0.427	0	0.088	8.224	0.49	375	0.8	2	G2	2.47	1		0.033	5.03	0.164		0.164	0.25	0.021	0.236	1.21	404.975	404.935	405.736	405.716	405.901	406.047	0.146
5	2/8	2/8 to 1/8	5	171	0.826	0.225	0.186	0.088	0.088	0.07			0.026			SAL4D		0.088	0		5.07	170	0.373	0.176	0.427	0	0.176	34.917	0.46	375	1.59	2	T3/T6	2.25	0.5	1	0.13	1.65	0.214	1.97	0.256	1.01	0.352	0.375	1.59	404.915	404.755	405.502	405.15	405.758	406.046	0.289
5	1/8															HW outlet																																405.15	406.526	
5	3/9	3/9 to 2/9	15	114	0.694	1.19	0.826	0.261	0.261	0.02						SAL4D		0.261	0		15	114	0.826	0.261		0	0.261	7.651	0.46	525	1.21	2	G2	2.4	1		0.073	5.33	0.388		0.388	0.36	0.028	0.389	1.52	405.95	405.915	406.821	406.793	407.208	407.208	0
5	2/9	2/9 to 1/9	5	171	0.826	0.269	0.222	0.105	0.105	0.06						SAL4D		0.105	0		5.06	170	0.766	0.362		0	0.362	34.45	0.42	525	1.67	2	T3/T6	1.81	0.29	1	0.143	1.78	0.254	2.15	0.306	0.71	0.244	0.525	1.67	405.895	405.75	406.539	406.295	406.845	407.329	0.484
5	1/9															HW outlet																																406.295	406.505	
5	3/10	3/10 to 2/10	15	114	0.644	1.25	0.805	0.255	0.27	0.67	4	4.493	0.156	0.895	0.139	AL4D	0.5G,3.3X	0.195	0.074	1/6	15	114	0.805	0.255	0.288	0.059	0.195	7.396	0.41	450	1.23	2	G2	2.37	1		0.077	5.45	0.419		0.419	0.47	0.035	0.418	1.27	404.95	404.92	405.597	405.563	406.016	406.028	0.012
5	2/10	2/10 to 1/10	5	171	0.826	0.095	0.079	0.037	0.037	0.67	4	1.852	0.077	0.578	0.045	AL4D	0.5G,3.3X	0.037	0	2/5	15.06	114	0.892	0.282	0.282	0.059	0.222	30.189	0.43	450	1.4	2	T1/T3	1.53	0.16	1	0.1	1.39	0.139	1.64	0.164	0.61	0.184	0.45	1.4	404.9	404.77	405.424	405.24	405.588	406.035	0.448
5	1/10															HW outlet																																405.24	405.388	

ISSUED FOR APPROVAL
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DRAWN L.D. | CHECKED W.S. | APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG | DATE: 10/01/22

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 1 2 3m
Scale 1:50 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: STORMWATER DRAINAGE - CALCULATIONS

CRE17-018-C06
6/69 B

REF	CODE	DESCRIPTION
1		150 x 150 x 150 D.I.C.L. Tee with concrete thrust block.
2		150 x 150 x 100 D.I.C.L. Tee with concrete thrust block.
3		150 x 150 x 50 D.I.C.L. Tee with concrete thrust block.
4		100 x 100 x 100 D.I.C.L. Tee with concrete thrust block.
5		100 x 100 x 50 D.I.C.L. Tee with concrete thrust block.
6		50 x 50 x 50 D.I.C.L. Tee with concrete thrust block.
7	FH	80 dia. Spring Hydrant "Maxi Flow" 2000 type (DN80) complete with D.I.C.L. Tee, Riser, C.I. cover box margin and kerb marker. (100 Main)
8	150SV	150 dia. Sluice Valve Class 600 M.E. complete with C.I. cover box margin and kerb marker.
9	100SV	100 dia. Sluice Valve Class 600 M.E. complete with C.I. cover box margin and kerb marker.
10	50GV	50 dia. Gate Valve DR Brass complete with C.I. cover box margin and kerb marker.
11		150 dia. steel or bronze tapping band to 40 or 20Ø copper service to brass stop cock, meter & dirt box.
12		100 dia. steel or bronze tapping band to 40 or 20Ø copper service to brass stop cock, meter & dirt box.
13		50 dia. service fitting to 40 or 20Ø copper service to brass stop cock, meter & dirt box.
14		150 dia. D.I.C.L. 11¼° bend with concrete thrust block.
15		150 dia. D.I.C.L. 22½° bend with concrete thrust block
16		150 dia. D.I.C.L. 45° bend with concrete thrust block.
17		150 dia. D.I.C.L. 90° bend with concrete thrust block.
18		100 dia. D.I.C.L. 11¼° bend with concrete thrust block.
19		100 dia. D.I.C.L. 22½° bend with concrete thrust block
20		100 dia. D.I.C.L. 45° bend with concrete thrust block.
21		100 dia. D.I.C.L. 90° bend with concrete thrust block.
22		50 dia. 90° bend with concrete thrust block.
23		150 dia. D.I.C.L. Dead end cap with concrete thrust block.
24		100 dia. D.I.C.L. Dead end cap with concrete thrust block.
25		50 dia. D.I.C.L. Dead end cap with concrete thrust block.
	150 150 150	Proposed Water Main 150ø (Class 16)
	100	Proposed Water Main 100ø (Class 16)
	63 63	63OD: PE Pressure Pipe PE 100 Blue Stripe SDR11 PN16
	W W W	Existing Water Main

WATER RETICULATION NOTES

1. WATER SUPPLY PRESSURE PIPES TO COMPLY WITH AS1477.
2. WATER RETICULATION TO BE HYDRAULICALLY PRESSURE TESTED TO 1250 KPA AFTER LAYING AND BEFORE BEING CONNECTED TO THE EXISTING COUNCIL PIPELINE. THE TEST PRESSURE SHALL BE HELD FOR 15 MINUTES MIN. WITHOUT LOSS.
3. MINIMUM COVER TO ALL PIPES (TOP OF PIPE TO FINISHED SURFACE LEVEL) SHALL BE 600MM IN NON-TRAFFICKED AREAS AND 800MM IN TRAFFICKED AREAS.
4. WATER RETICULATION ALIGNMENT FOR ALL ROADS SHALL BE 2.0M FROM PROPERTY BOUNDARY.
5. WHERE NON-METALLIC PIPE IS LAID A CONTINUOUS STAINLESS STEEL WIRE, 1.6mm DIAMETER SHALL BE LAID IMMEDIATELY ABOVE THE FILL SAND. THIS WIRE SHALL BE WRAPPED ONCE AROUND ALL HYDRANTS AND SLUICE VALVES.
6. FOR MINIMUM BENDING RADIUS TO 63OD POLTETHYLENE REFER TO MANUFACTURERS SPECIFICATIONS.
7. BENDING OF PE PIPES IS PERMITTED. BENDING OF ALL OTHER PIPES IS NOT PERMITTED.
8. PROVIDE WATER SERVICE AND METER TO EACH PROPERTY.
9. PROPERTIES LOCATED ON THE OPPOSITE SIDE OF THE ROAD TO THE RETICULATION MAIN SHALL BE SERVICED BY A 63OD POLYETHYLENE LOOP PE100 BLUE STRIPE SDR11 PN16
10. RETICULATION MAINS TO BE 100 or 150Dia (As Noted) PVC Series 2 MIN PN16
11. PRESSURE AT EMERALD END ROAD TO BE CHECKED AGAINST FIRE FIGHTING FLOWS TO ACHIEVE 38M RESIDUAL PRESSURE (RL473.00)

FNQROC DRAWINGS

S2000A – MSC VALVE BOX INSTALLATION
S2005A – MSC HYDRANT BOX INSTALLATION
S2010D – KERB/ROAD MARKERS
S2015A – MSC THRUST BLOCK DETAILS
S2016B – WATER RETICULATION BEDDING DETAILS
S2020D – MSC MAIN CONNECTION DETAILS
S2060A – MSC DOMESTIC WATER SERVICE CONNECTION DETAILS

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG | DATE: 10/01/22

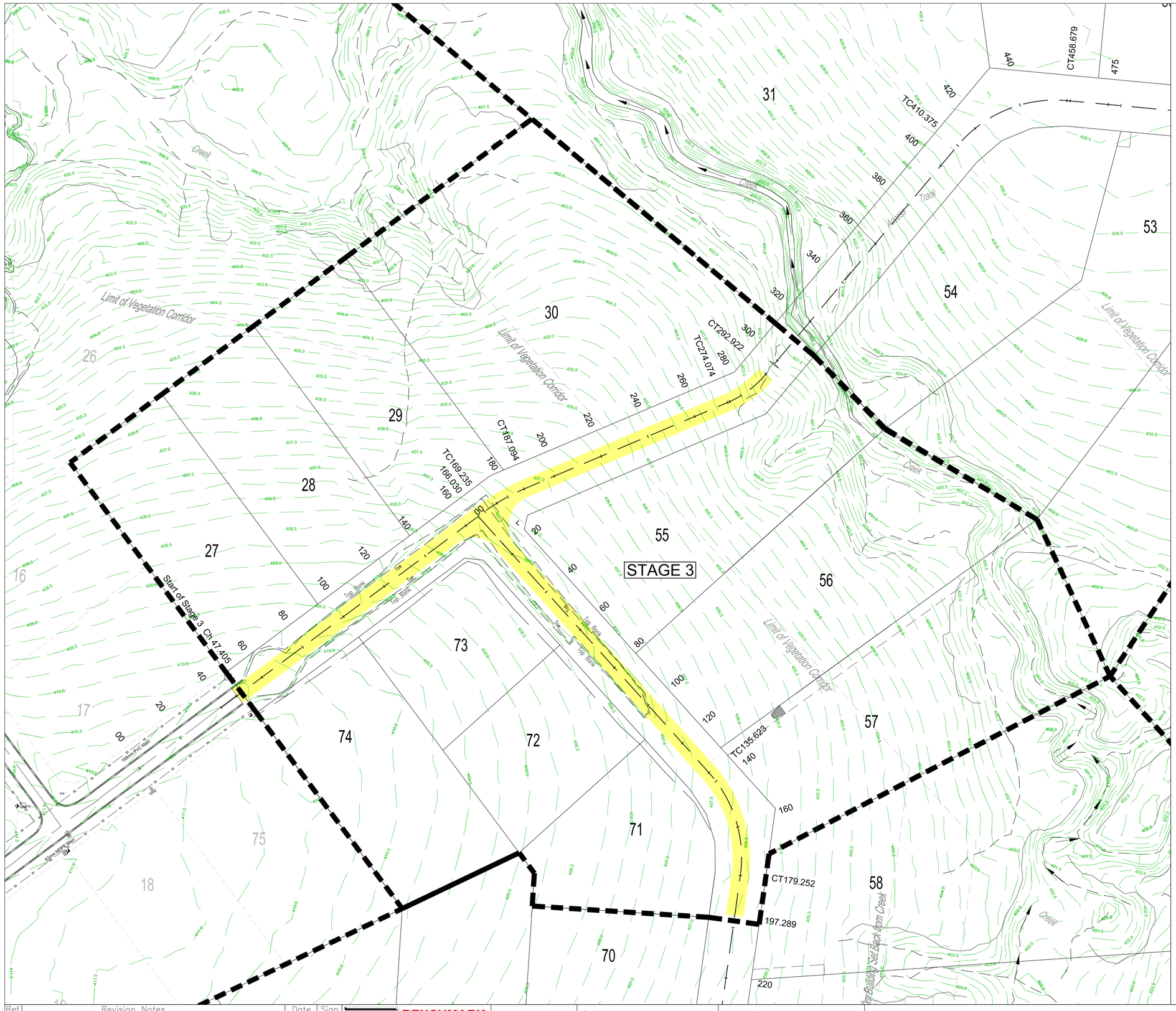
BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: WATER RETICULATION NOTES

CRE17-018-C07
7/69 | B



LEGEND

Contour interval 0.25m

- Bitumen
- Elec cablefind
- Fence
- Telstra cablefind
- Toe of bank
- Top of bank
- Vegetation
- Water cablefind
- Electricity Pillar
- Electricity Light Pole
- Telstra Pit
- Water Fire Hydrant
- Water Meter
- Water Stop Valve
- Water Tap

NOTES

1. LEVEL DATUM: AHD
2. ORIGIN OF LEVELS: PSM151304; RL 397.775 EMERALD END ROAD
3. NATURAL SURFACE CONTOUR INTERVAL: 0.25m INDEXED: 0.50m
4. DETAILS OF EXISTING SERVICES ARE PROVIDED FOR INFORMATION ONLY AND THE CONTRACTOR IS TO LOCATE ALL SERVICES PRIOR TO COMMENCEMENT OF WORK.
5. REFER TO FNQROC SPECIFICATIONS AND DRAWINGS FOR EARTHWORKS, ROADWORKS, WATER AND STORMWATER DRAINAGE.
6. FOR INTERSECTION DETAILS, REFER TO PLAN No CRE17–018–C03. LAYBACK KERB AND CHANNEL TO BE CONSTRUCTED IN ACCORDANCE WITH FNQROC SPECIFICATIONS AND DRAWINGS.
7. FOR ROAD TYPICAL CROSS SECTIONS AND DETAILS, REFER PLAN No CRE17–018–C02

SITE PLAN

Scale 1:750

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
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B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17–018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 15 30 45m
Scale 1:750 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: SITE PLAN

CRE17–018–C08
8/69 B

COUNTRY ROAD CENTRELINE			
CHAINAGE	EASTING	NORTHING	RL
0	334656.672	8121945.432	410.773
20	334672.719	8121957.369	410.524
40	334688.766	8121969.307	410.254
60	334704.812	8121981.244	409.885
80	334720.859	8121993.181	409.451
100	334736.906	8122005.119	409.017
120	334752.953	8122017.056	408.583
140	334768.999	8122028.994	408.150
160	334785.046	8122040.931	407.713
TC169.235	334792.456	8122046.443	407.488
178.16	334799.654	8122051.798	407.245
180	334801.524	8122052.227	407.193
CT187.094	334807.913	8122055.304	406.994
200	334819.793	8122060.347	406.632
220	334838.203	8122068.162	406.035
240	334856.613	8122075.977	405.183
260	334875.023	8122083.792	404.041
TC274.074	334887.978	8122089.292	403.135
280	334893.241	8122092.002	402.754
283.5	334896.816	8122093.044	402.530
CT292.922	334902.989	8122100.400	402.020
300	334907.538	8122105.822	401.741

ROAD 'A' CENTRELINE			
CHAINAGE	EASTING	NORTHING	RL
0.00	334789.884	8122044.530	407.571
20.00	334803.267	8122029.668	407.385
40.00	334816.650	8122014.805	407.285
60.00	334830.033	8121999.942	407.185
80.00	334843.416	8121985.080	407.085
100.00	334856.799	8121970.217	406.985
120.00	334870.182	8121955.355	406.851
TC135.623	334880.636	8121943.745	406.747
140.00	334883.419	8121940.368	406.718
157.44	334896.237	8121926.420	406.601
160.00	334891.980	8121922.440	406.584
CT179.252	334892.993	8121903.334	406.456
180.00	334892.889	8121902.593	406.451
200.00	334890.106	8121882.788	406.317

30 29 28 27 73 74 72 75 55 56 57 71 70 58 17 16

COUNTRY ROAD

ROAD 'A'

Start of Stage 3 Ch 47.405

CT292.922 TC274.074 CT187.094 TC169.235 166.030 TC135.623 CT179.252 197.289

Install barrier boards

Construct temporary gravel turn around including outlet protection to kerb and channel at the end of Stage 3 Works.

Trim back 0.5m from end of existing bitumen to form a uniform join to new works.

Extent of works.

Refer Drawing C16 for Stormwater Drainage Details

GULLY

STAGE 3 FUTURE

EXISTING STAGE 3

STAGE 4 STAGE 3

STAGE 3

NOTES

1. LEVEL DATUM: AHD
2. ORIGIN OF LEVELS: PSM151304; RL 397.775 EMERALD END ROAD
3. DESIGN SURFACE CONTOUR INTERVAL: 0.20m INDEXED: 0.20m
4. REFER DWG CRE17-018-C03 FOR INTERSECTION DETAILS

LEGEND

ASPHALT SURFACING REFER DRAWING CRE17-018-C02 FOR PAVEMENT DETAILS

BITUMEN SURFACING REFER DRAWING CRE17-018-C02 FOR PAVEMENT DETAILS

402.0 DESIGN CONTOURS WITH LABELS

STREET SIGNS IN PLACE REFER FNQROC STD DWG S1040

PLAN
Scale 1:500

ISSUED FOR APPROVAL
JANUARY, 2022

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A.	PRELIMINARY ISSUE	09/12/19	W.S.
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CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG DATE: 10/01/22

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

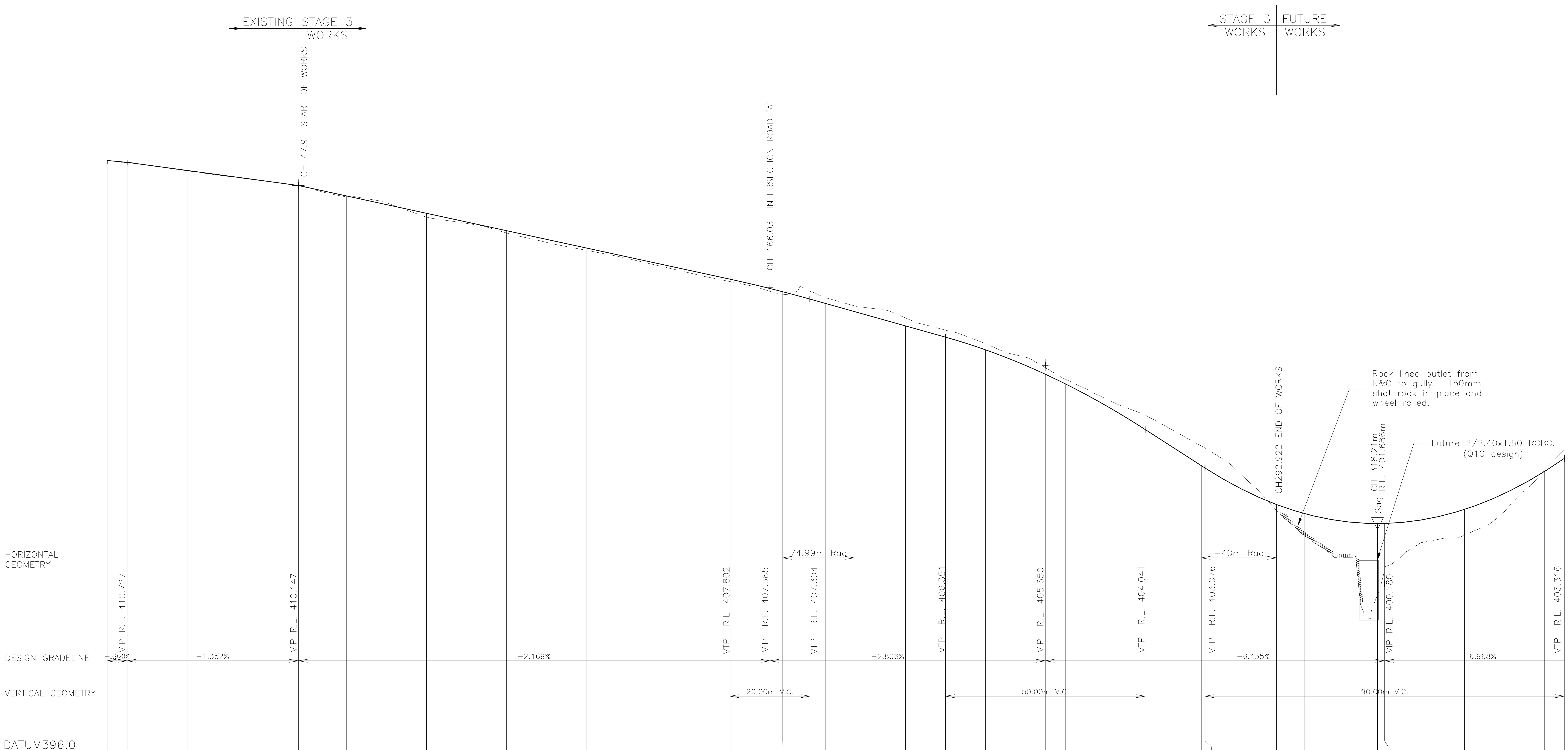
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: LAYOUT PLAN

CRE17-018-C09
9/69 B



CHAINAGE	CUT/FILL	DESIGN LEVEL	EXISTING SURFACE
0	0.003	410.773	410.77
5	0.001	410.727	410.726
20	0.009	410.524	410.515
40	0.004	410.254	410.25
47.9	-0	410.147	410.147
60	0.024	409.885	409.861
80	0.094	409.451	409.357
100	0.057	409.017	408.96
120	0.057	408.583	408.526
140	0.054	408.15	408.096
156.03	0.059	407.802	407.743
160	0.05	407.713	407.663
166.03	0.071	407.569	407.498
169.235	0.062	407.488	407.425
176.03	-0.197	407.304	407.502
180	-0.144	407.193	407.337
187.094	-0.144	406.994	407.138
200	-0.2	406.632	406.832
210	-0.175	406.351	406.526
220	-0.154	406.035	406.189
235	-0.164	405.423	405.587
240	-0.117	405.183	405.3
260	-0.359	404.041	404.4
274.074	-0.492	403.135	403.628
275	-0.501	403.076	403.576
280	-0.498	402.773	403.27
292.922	0.151	402.162	402.01
300	0.559	401.932	401.373
318.21	1.786	401.686	399.975
320	1.163	401.688	400.525
340	0.648	402.039	401.391
360	-0.037	402.986	403.023
365	-0.212	403.316	403.528

LONGITUDINAL SECTION - COUNTRY ROAD

Horz 1:500
Vert 1:50

ISSUED FOR APPROVAL
JANUARY, 2022

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CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

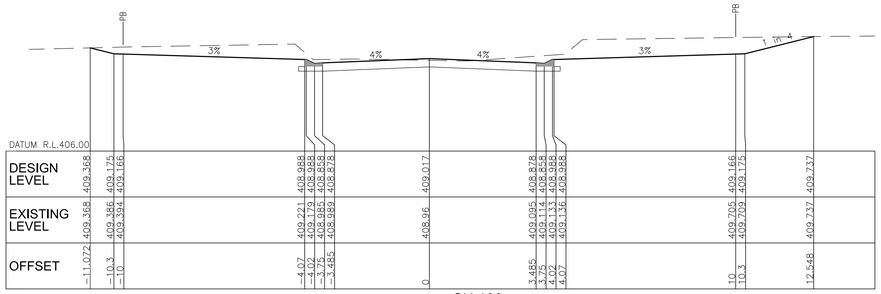
BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: COUNTRY ROAD LONDITUDINAL SECTION

CRE17-018-C10
10/69 B

Refer to Intersection Detail
DRG CRE17-018-C03



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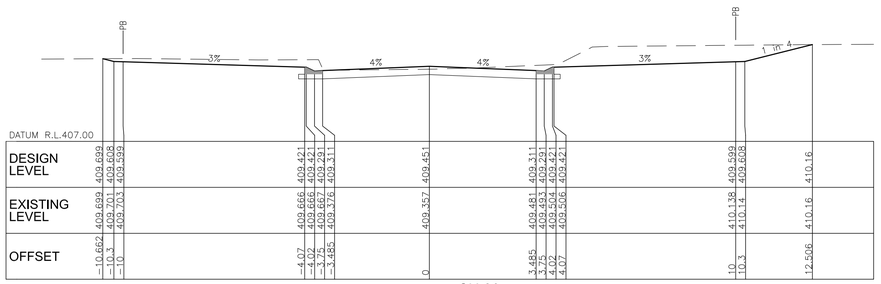

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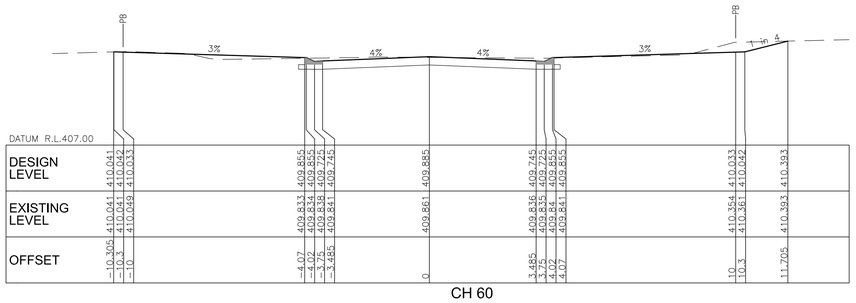

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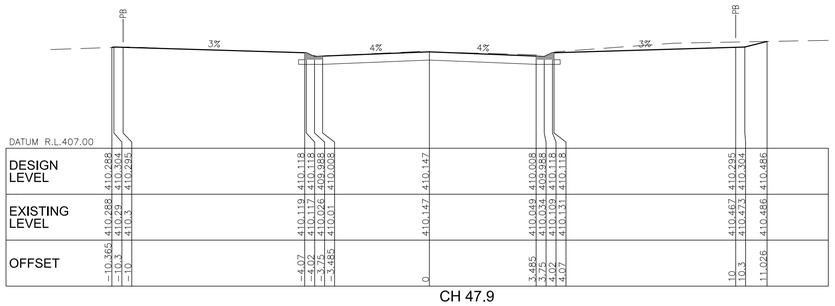
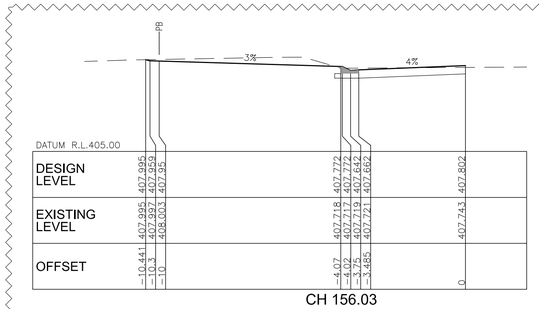
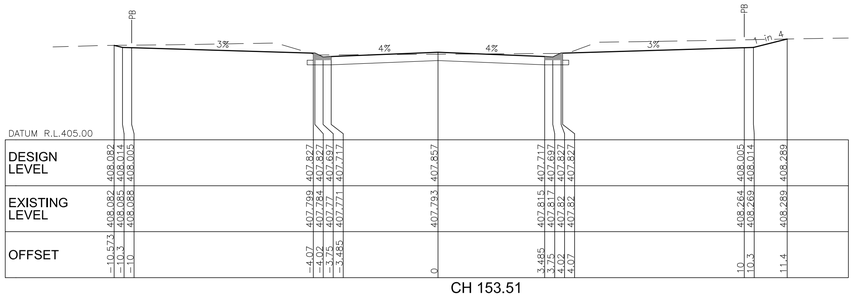


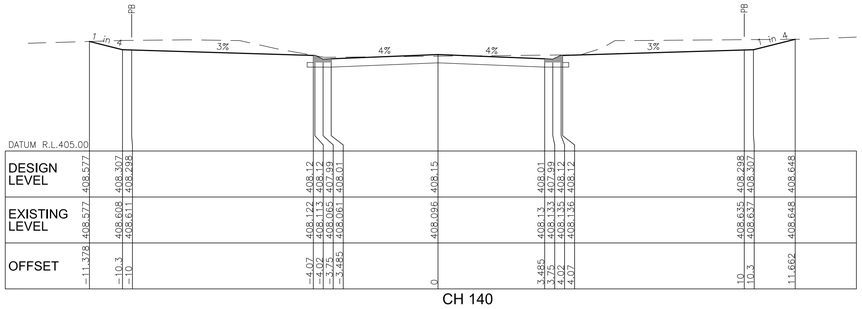
CH 47.9



CH 156.03



CH 153.51



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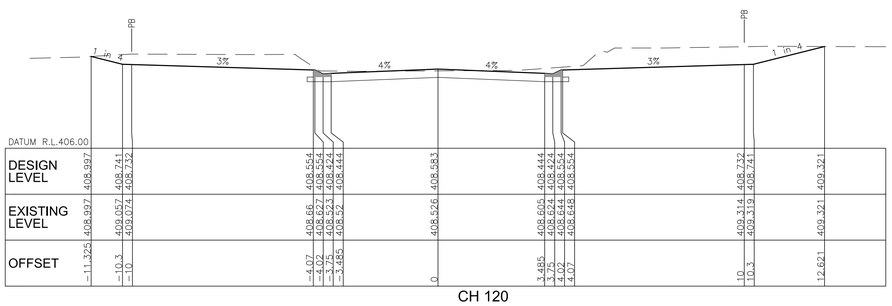

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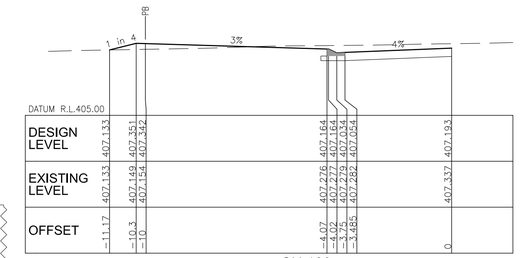
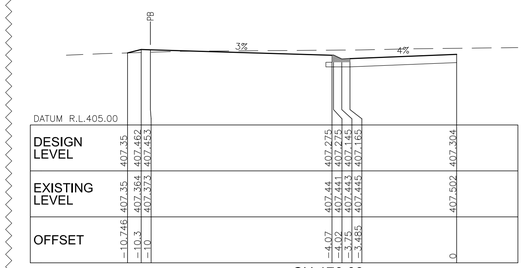
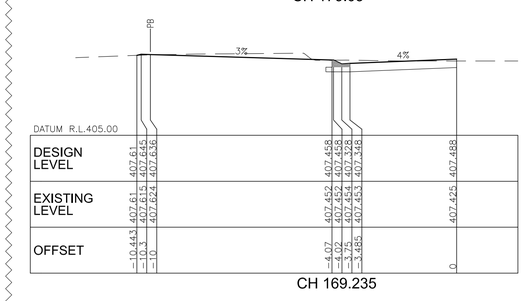


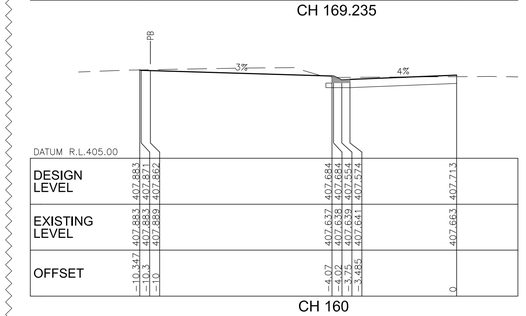
CH 180



CH 176.03



CH 169.235



CH 160

COUNTRY ROAD - CROSS SECTIONS -Ch.47.9 to Ch.180.00

Scale 1:100 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

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A.	PRELIMINARY ISSUE	09/12/19	W.S.
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DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

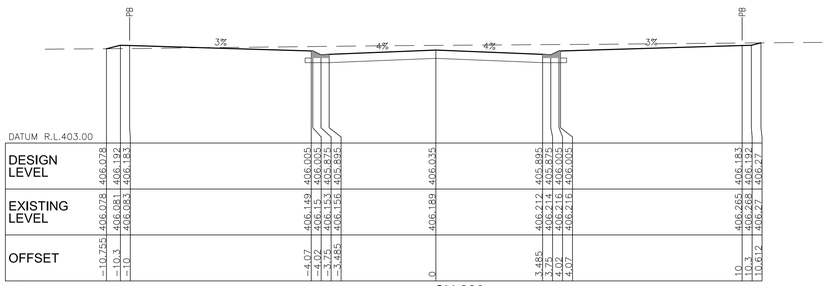
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 2 4 6m
Scale 1:100 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: COUNTRY ROAD CROSS SECTIONS - Ch47.9 TO Ch180.00

CRE17-018-C11
11/69 B



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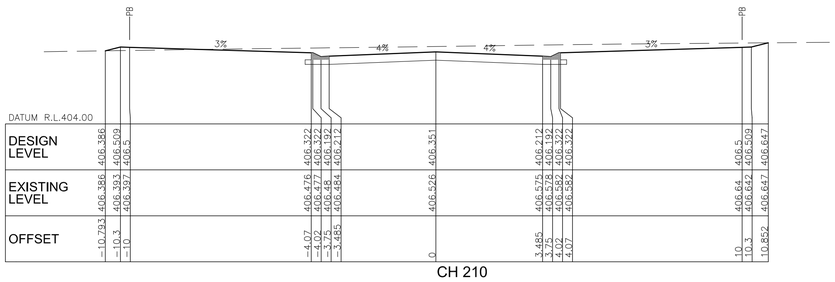

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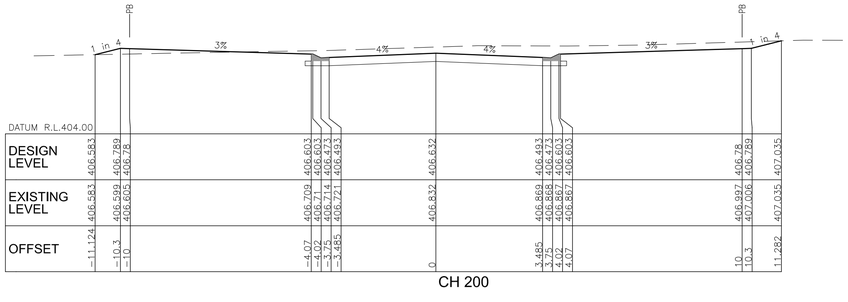

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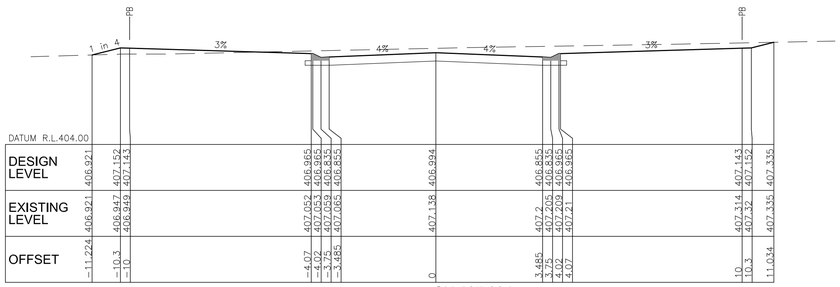
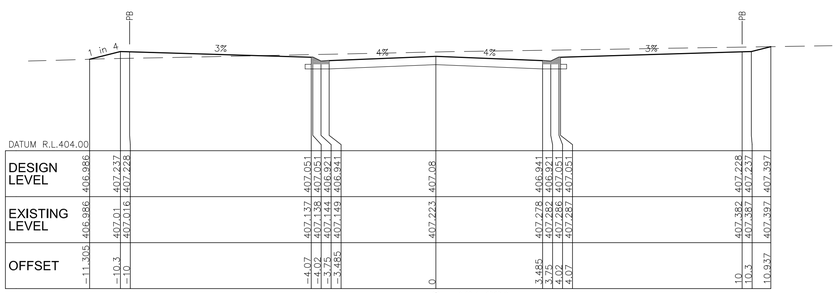
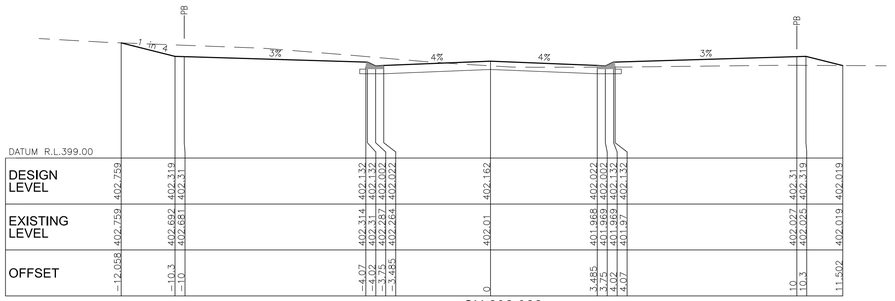


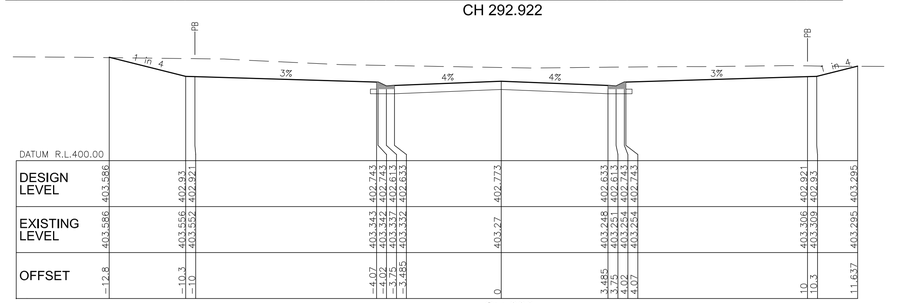
CH 187.094



CH 184.031



CH 292.922



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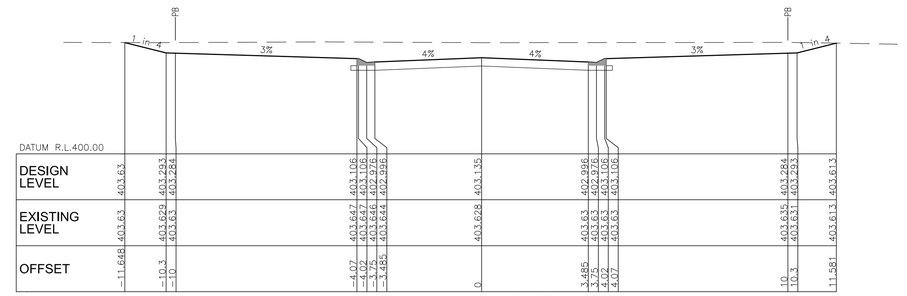

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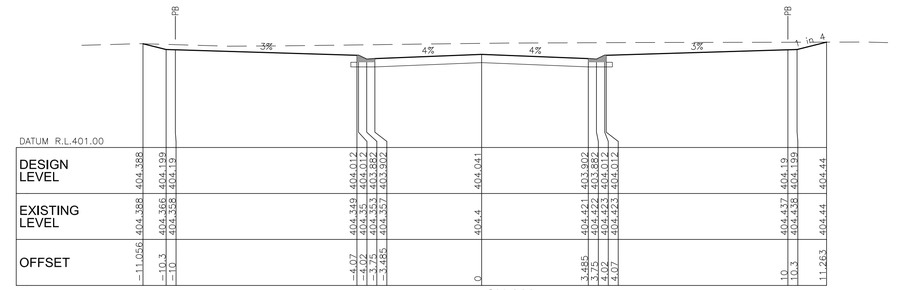
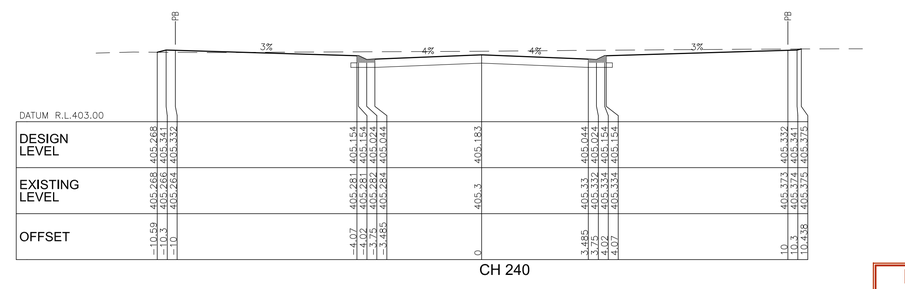


CH 260



CH 240

COUNTRY ROAD - CROSS SECTIONS -Ch.184.031 to Ch.292.922

Scale 1:100 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG | DATE: 10/01/22

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 2 4 6m
Scale 1:100 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: COUNTRY ROAD CROSS SECTIONS - Ch184.031 TO Ch292.922

CRE17-018-C12
12/69 B

CUT/FILL	0.073	0.052	-0.003	-0.06	-0.115	-0.339	-0.383	-0.233	-0.869	-0.448	-0.267	-0.212	-0.047	-0.161	-0.172		-0.189	-0.27				
DESIGN LEVEL	407.571	407.503	407.446	407.41	407.385	407.285	407.185	407.085	406.985	406.851	406.747	406.718	406.584	406.456	406.451	406.335	406.317	406.183				
EXISTING SURFACE	407.498	407.451	407.449	407.47	407.5	407.624	407.568	407.318	407.854	407.299	407.015	406.93	406.631	406.616	406.622		406.506	406.454				
CHAINAGE	0	5	10	15	20	40	60	80	100	120	135.623	140	160	179.252	180	197.289	200	220				

LONGITUDINAL SECTION - ROAD 'A'

Hor. 1:500
Vert. 1:50

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au - M: 0447 616 747

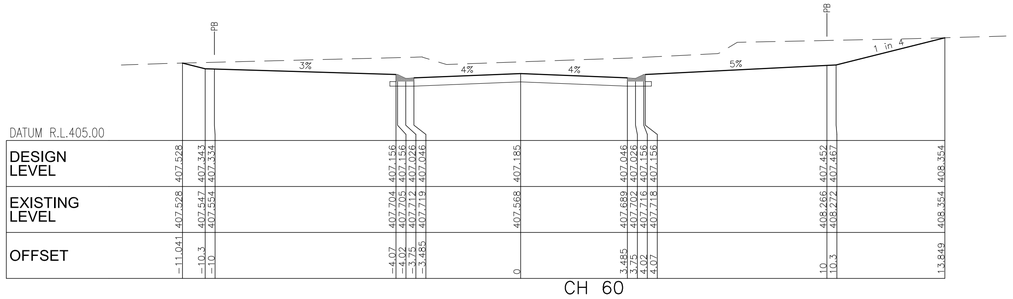
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

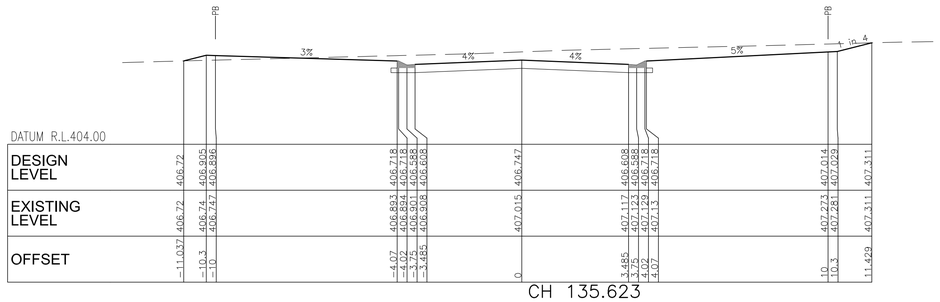
0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: ROAD 'A' LONDITUDINAL SECTION

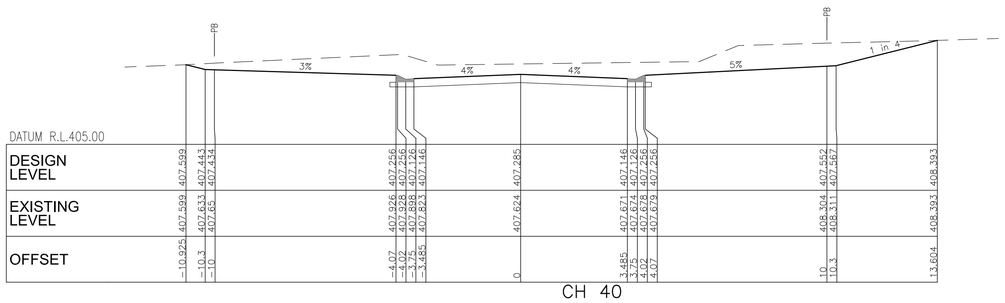
CRE17-018-C13
13/69 B



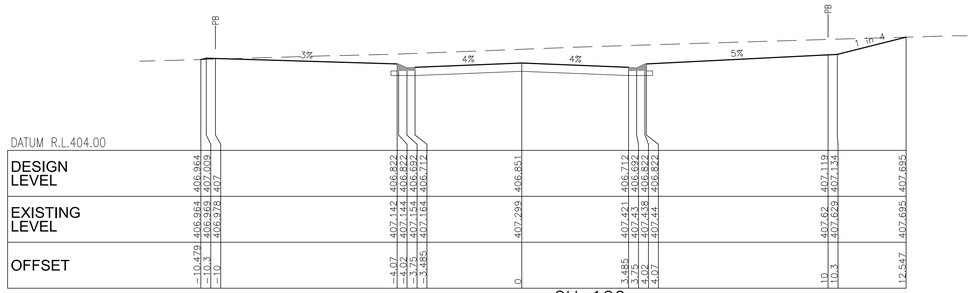
CH 60



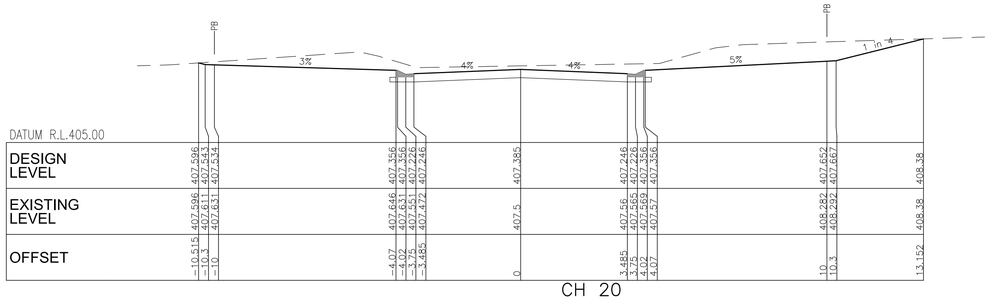
CH 135.623



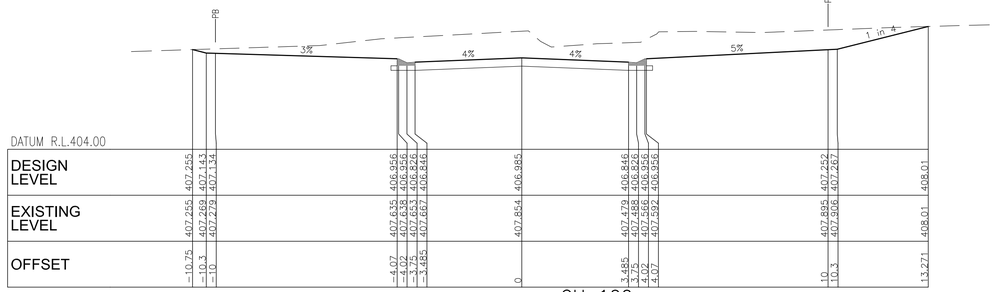
CH 40



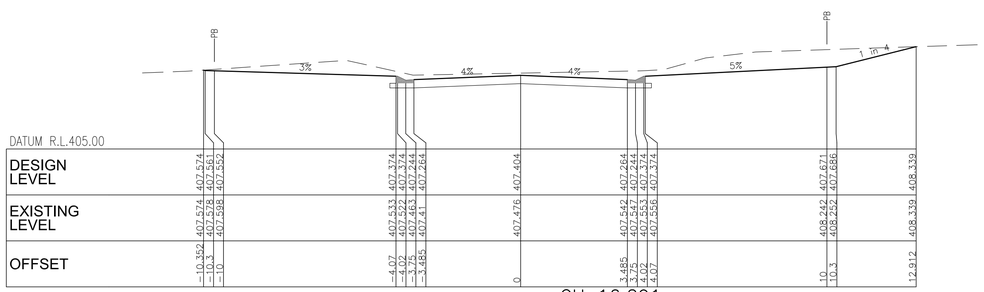
CH 120



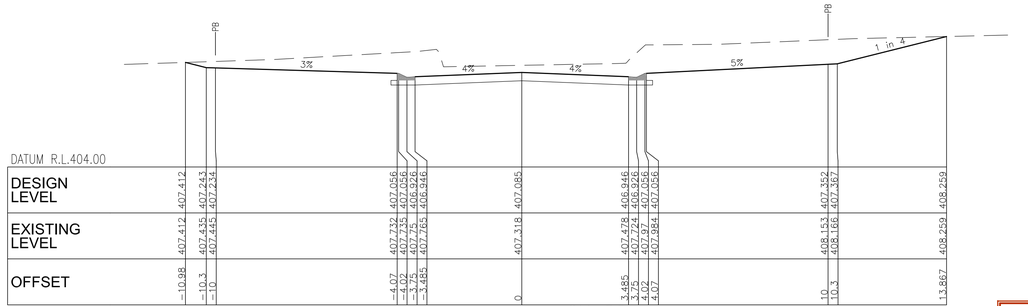
CH 20



CH 100



CH 16.291



CH 80

ROAD 'A' - CROSS SECTIONS -Ch.16.291 to Ch.135.623

Scale 1:100 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

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CAD FILE: AUTOCAD JOBS\CRE17−018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

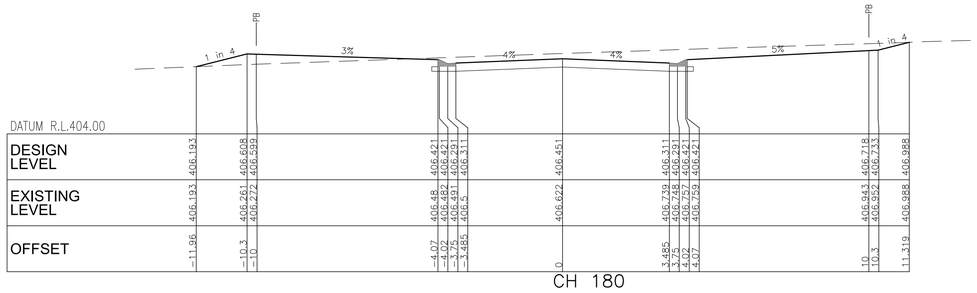
DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 2 4 6m
Scale 1:100 (A1)

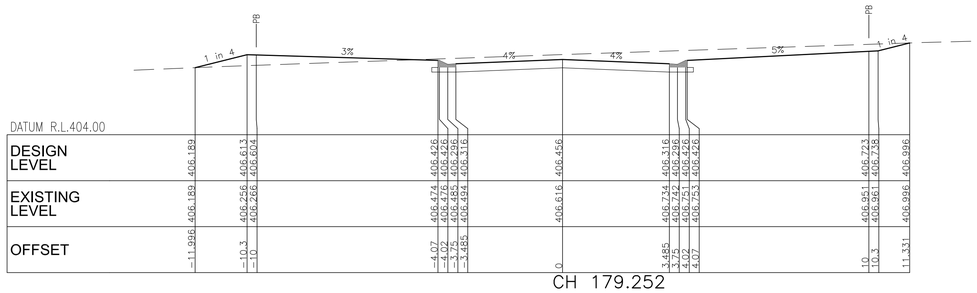
Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: ROAD 'A' CROSS SECTIONS - Ch.16.291 to Ch.135.623

CRE17−018−C14

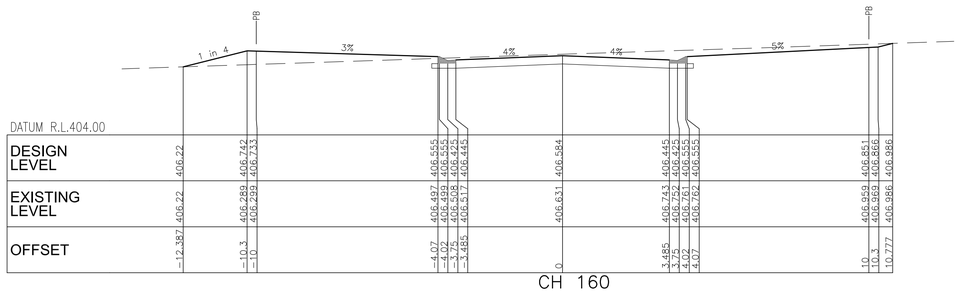
14/69 | B



CH 180



CH 179.252



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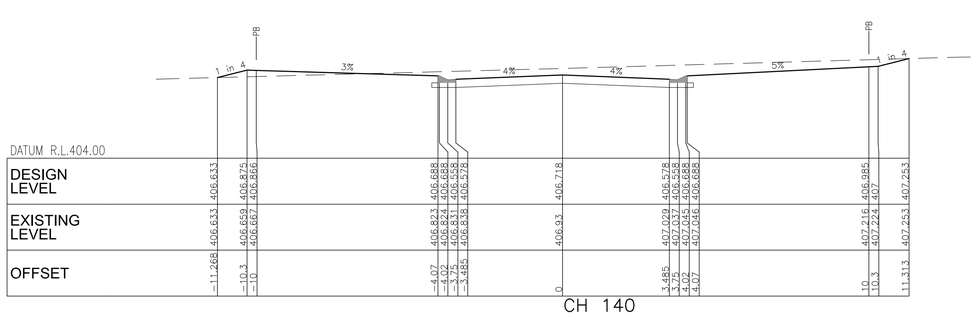

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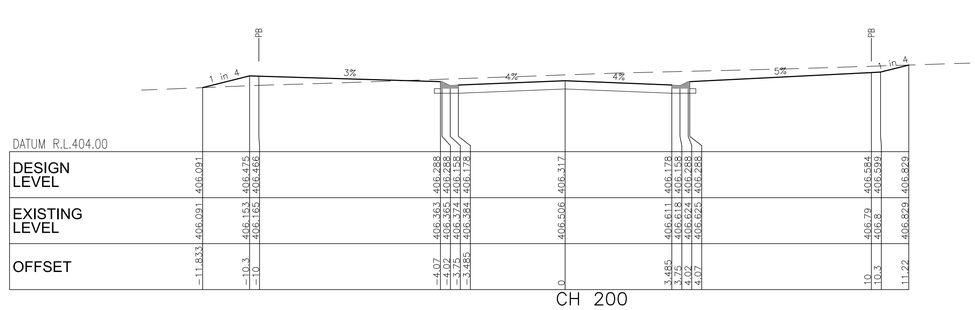

CH 200

ROAD 'A' - CROSS SECTIONS -Ch.140.00 to Ch.200.00

Scale 1:100 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

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DRAWN L.D. CHECKED W.S. APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 2 4 6m
Scale 1:100 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: ROAD 'A' CROSS SECTIONS - Ch.140.00 to Ch.200.00

CRE17-018-C15
15/69 B

STORMWATER STRUCTURE TABLE

NO.	TYPE	EASTING	NORTHING
3/7	KERB INLET PIT ON GRADE (L)	334876.187	8121943.479
2/7	KERB INLET PIT ON GRADE (S)	334881.366	8121948.143
1/7	HEADWALL	334905.673	8121965.767

CO–ORDINATES REFER TO MIDDLE OF HEADWALL AS SHOWN.

SETOUT REFERS TO MID POINT OF GRATE ON LIP OF KERB AS SHOWN.

STORMWATER PIPE TABLE

PIPE	SIZE (dia)	LENGTH	GRADE (%)	U.S.I.L.	D.S.I.L.
1	1/600 Cl 2	7.32m	-0.41	405.100	405.070
2	1/600 Cl 2	29.28m	-0.40	405.050	404.930

STORMWATER NOTES

1 ORIGIN OF LEVELS: PSM151304; RL 397.775 AHD EMERALD END ROAD

2 DESIGN SURFACE CONTOUR INTERVAL: 0.20m INDEXED: 0.20m

3 DETAILS OF EXISTING SERVICES ARE PROVIDED FOR INFORMATION ONLY AND THE CONTRACTOR IS TO LOCATE ALL SERVICES PRIOR TO COMMENCEMENT OF WORK.

4 FOR SPECIFICATIONS OF STORMWATER DRAINAGE REFER TO FNQROC STANDARD SPECIFICATIONS.

5 FOR STANDARD STORMWATER DRAINAGE DETAILS REFER FNQROC STD DWGS S1045 – S1100

6 STORMWATER PIPES TO BE REINFORCED CONCRETE TO AS 4058

7 REFER DRAWING CRE17–018–C05 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS

LEGEND

- STORMWATER STRUCTURE LABEL (1/2)
- STORMWATER PIPE LABEL (2)
- PROPOSED STORMWATER DRAINAGE PIPE
- GRATED KERB INLET PIT REFER TO FNQROC STD DWG S1055 FOR DETAILS
- 401.0 DESIGN CONTOURS WITH LABELS
- ROCK PROTECTION

ISSUED FOR APPROVAL
JANUARY, 2022

PLAN
Scale 1:500 (A1)

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CAD FILE: AUTOCAD JOBS\CRE17–018 OP WORKS DRAWINGS.DWG DATE: 10/01/22

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1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: STORMWATER DRAINAGE - LAYOUT PLAN

CRE17–018–C16
16/69 B

26 30 29 28 27 55 56 73 74 72 57 71 75 58 70

COUNTRY ROAD

ROAD 'A'

STAGE 3 FUTURE

EXISTING STAGE 3

STAGE 4 STAGE 3

PRESSURE AT EMERALD END ROAD TO BE CHECKED AGAINST FIRE FIGHTING FLOWS TO ACHIEVE 38M RESIDUAL PRESSURE (RL473.00)

Connect to existing MSC water main.

FH

FOR WATER RETICULATION NOTES REFER TO DWG NO. CRE17-018-C07

N

PLAN

Scale 1:500 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

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ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

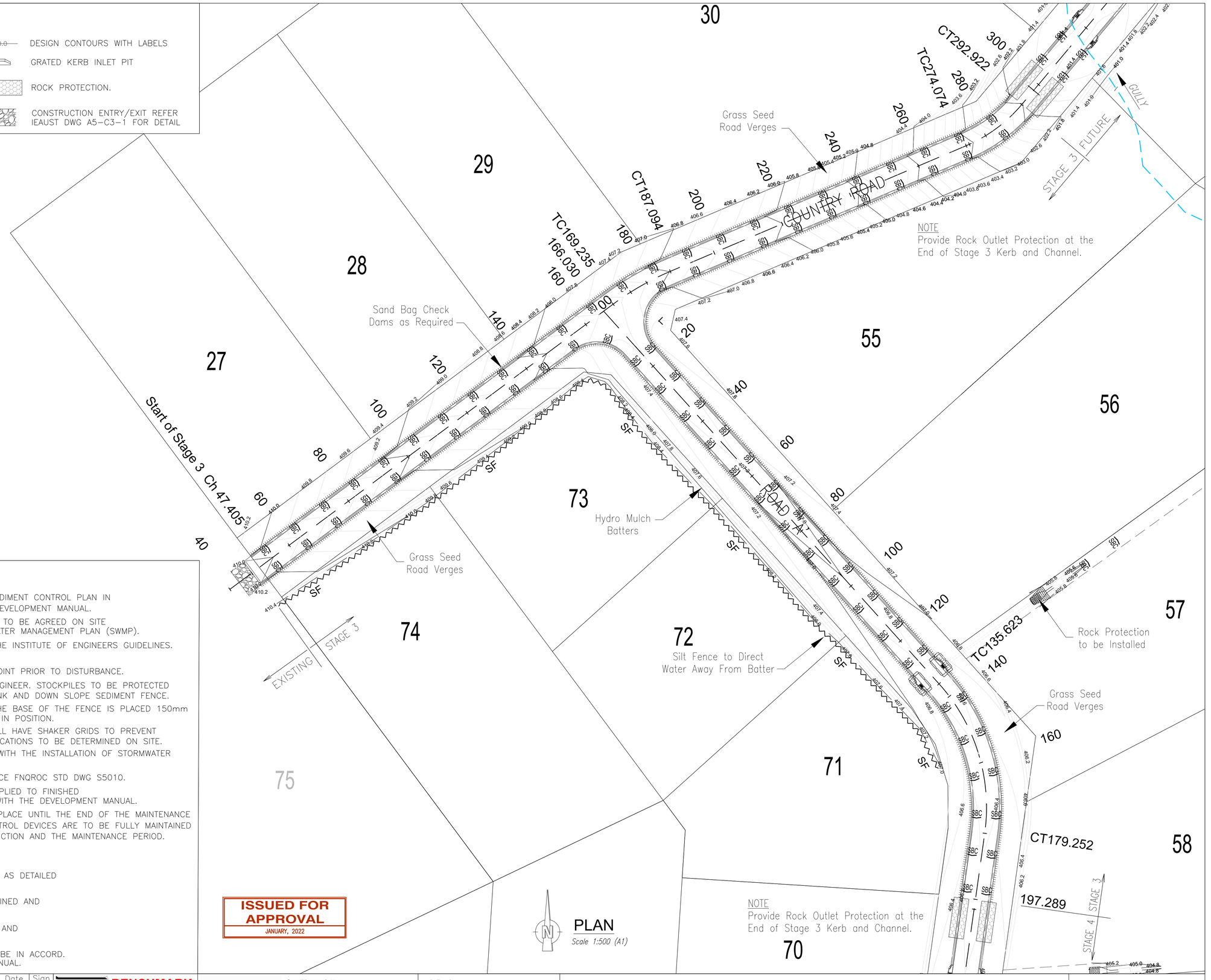
0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: WATER RETICULATION PLAN

CRE17-018-C17
17/69 B

LEGEND

- SAND BAG SURROUND
- COCONUT FIBRE LOGS
- SBC — SAND BAG CHECK DAMS
- 300MM TURF STRIP PLACED BEHIND KERB.
- SF — SILT FENCE (RETURN TO BE CONSTRUCTED EVERY PROPERTY BOUNDARY)
- 400.0 — DESIGN CONTOURS WITH LABELS
- GRATED KERB INLET PIT
- ROCK PROTECTION.
- CONSTRUCTION ENTRY/EXIT REFER IEAUST DWG A5-C3-1 FOR DETAIL



EROSION AND SEDIMENT CONTROL NOTES:

1. THE CONTRACTOR SHALL PREPARE AN EROSION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH THE PROVISIONS OF THE FNQROC DEVELOPMENT MANUAL.
2. EXACT LOCATION OF SEDIMENT CONTROL DEVICES (SCD) TO BE AGREED ON SITE AND IN ACCORDANCE WITH THE CONTRACTORS STORMWATER MANAGEMENT PLAN (SWMP).
3. ALL SCD TO BE CONSTRUCTED IN ACCORDANCE WITH THE INSTITUTE OF ENGINEERS GUIDELINES.
4. DESIGN CONTOURS SHOWN ARE AT 0.1M INTERVALS.
5. INSTALL PERIMETER SCD AND STABILISED ENTRY/EXIT POINT PRIOR TO DISTURBANCE.
6. STOCKPILE LOCATIONS TO BE AGREED ON SITE WITH ENGINEER. STOCKPILES TO BE PROTECTED AS THEY ARE CREATED WITH UP-SLOPE PERIMETER BANK AND DOWN SLOPE SEDIMENT FENCE.
7. SEDIMENT FENCES ARE TO BE INSTALLED SUCH THAT THE BASE OF THE FENCE IS PLACED 150mm MIN. BELOW GROUND LEVEL AND ANCHORED SECURELY IN POSITION.
8. ALL VEHICLES AND EQUIPMENT ENTRY/EXIT POINTS SHALL HAVE SHAKER GRIDS TO PREVENT VEHICLES FROM TRACKING MUD AND SOIL OFF SITE. LOCATIONS TO BE DETERMINED ON SITE.
9. SAND BAG CHECK DAM INSTALLATION TO CORRESPOND WITH THE INSTALLATION OF STORMWATER MANHOLES AND KERB & CHANNEL.
10. PLACE 300mm TURF STRIP BEHIND KERB IN ACCORDANCE FNQROC STD DWG S5010.
11. GRASS SEEDING, HYDROMULCH AND/OR TURF TO BE APPLIED TO FINISHED IMMEDIATELY FOLLOWING COMPLETION IN ACCORDANCE WITH THE DEVELOPMENT MANUAL.
12. ALL SEDIMENT CONTROL MEASURES ARE TO REMAIN IN PLACE UNTIL THE END OF THE MAINTENANCE PERIOD UNLESS NOTED OTHERWISE. ALL SEDIMENT CONTROL DEVICES ARE TO BE FULLY MAINTAINED IN AN EFFECTICE WORKING CONDITION DURING CONSTRUCTION AND THE MAINTENANCE PERIOD.

MAINTENANCE:

1. CONTRACTOR TO MONITOR SCD ON A DAILY BASIS OR AS DETAILED IN COUNCIL APPROVED SWMP.
2. CONTRACTOR TO ENSURE ALL SCD ARE FULLY MAINTAINED AND CLEAN UNTIL 80% GRASS COVER.
3. ALL REVEGETATED (GRASSED) AREAS TO BE WATERED AND MAINTAINED UNTIL GRASS IS FULLY ESTABLISHED.
4. WATERING AND MAINTENANCE OF GRASSED AREAS TO BE IN ACCORD. WITH CLAUSE 4.8 OF THE FNQROC DEVELOPMENT MANUAL.

ISSUED FOR APPROVAL
JANUARY, 2022

N

PLAN
Scale 1:500 (A1)

Ref.	Revision Notes	Date	Sign
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BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

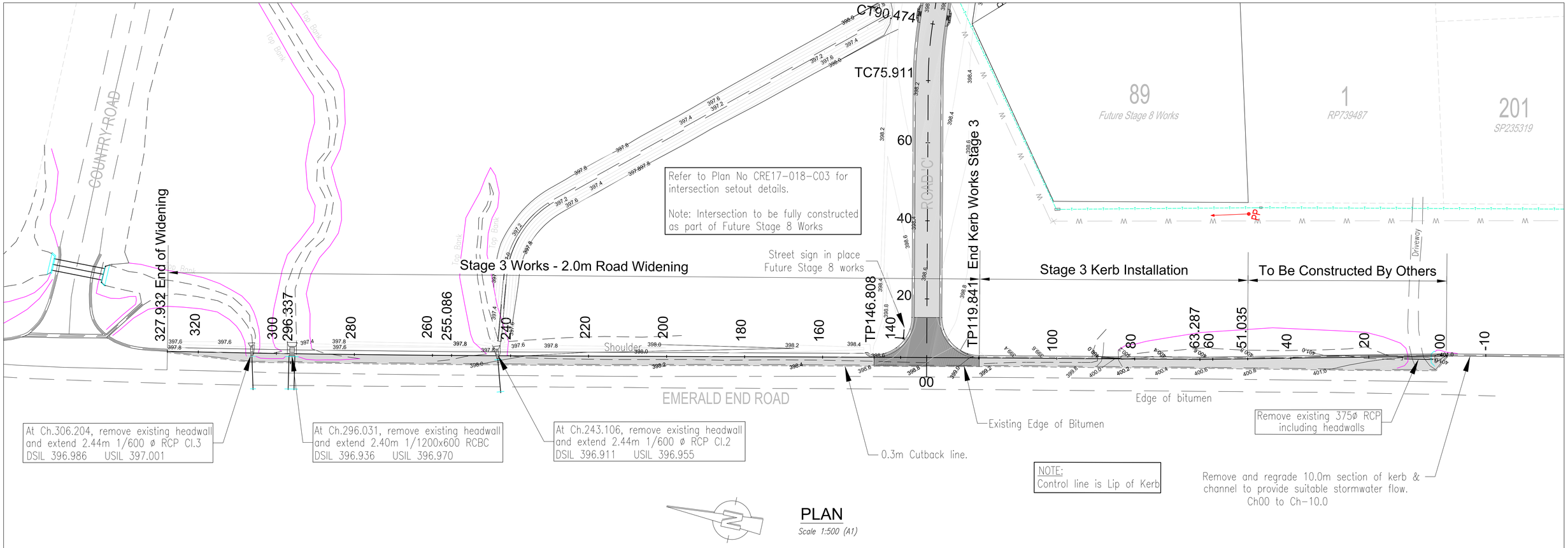
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: EROSION & SEDIMENT CONTROL PLAN

CRE17-018-C18
18/69 B



PLAN

Scale 1:500 (A1)

NOTES

1. LEVEL DATUM: AHD
2. ORIGIN OF LEVELS: PSM151304; RL 397.775 EMERALD END ROAD
3. DESIGN SURFACE CONTOUR INTERVAL: 0.20m INDEXED: 0.20m
4. REFER DWG CRE17-018-C03 FOR INTERSECTION DETAILS
5. LANDSCAPING PLAN TO BE SUBMITTED TO MAREEBA SHIRE COUNCIL FOR APPROVAL PRIOR TO WORKS COMMENCING

LEGEND

ASPHALT SURFACING REFER DRAWING CRE17-018-C66 FOR PAVEMENT DETAILS

BITUMEN SURFACING REFER DRAWING CRE17-018-C66 FOR PAVEMENT DETAILS

402.0 DESIGN CONTOURS WITH LABELS

STREET SIGNS IN PLACE REFER FNQROC STD DWG S1040

FNQROC STANDARD DRAWINGS		
Drawing Number	Rev.	Drawing Description
S1000	F	CONCRETE KERB & CHANNEL
S1040	E	STREET NAME SIGNS
S1045	A	EXCAVATION, BEDDING AND BACKFILLING OF PRECAST BOX CULVERTS
S1046	A	EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE PIPES

EMERALD END ROAD WIDENING CONTROL LINE

CHAINAGE	EASTING	NORTHING	RL	BEARING
0.00	333784.685	8121539.639	400.970	347°12'04"
20.00	333780.254	8121559.142	400.960	347°12'04"
40.00	333775.824	8121578.645	400.815	347°12'04"
60.00	333771.393	8121598.148	400.517	347°12'04"
63.29	333770.665	8121601.354	400.459	
80.00	333767.308	8121617.726	400.122	348°24'40"
100.00	333763.290	8121637.318	399.598	348°24'40"
119.84	333759.304	8121656.755	399.057	
120.00	333759.272	8121656.910	399.053	348°19'15"
140.00	333755.223	8121676.496	398.637	348°19'15"
146.81	333753.845	8121683.164	398.511	
160.00	333751.154	8121696.078	398.365	348°13'48"
180.00	333747.074	8121715.657	398.253	348°13'48"
200.00	333742.995	8121735.237	398.131	348°13'48"
220.00	333738.915	8121754.816	398.030	348°13'48"
240.00	333734.835	8121774.396	397.979	348°13'48"
255.09	333731.758	8121789.165	397.902	
260.00	333730.791	8121793.983	397.896	348°38'45"
280.00	333726.853	8121813.591	397.862	348°38'45"
296.34	333723.637	8121829.608	397.808	
300.00	333722.945	8121833.205	397.796	349°06'25"
320.00	333719.165	8121852.845	397.817	349°06'25"
327.85	333717.681	8121860.557	397.844	349°06'25"

ISSUED FOR APPROVAL
JANUARY, 2022

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DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 09/12/19
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

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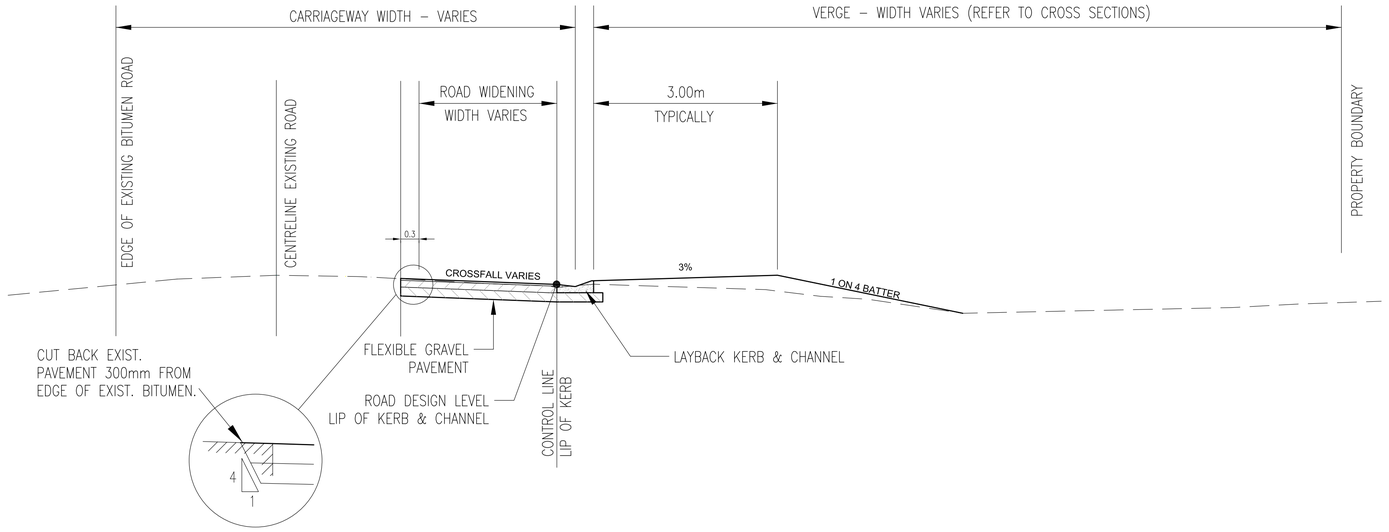
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 10 20 30m
Scale 1:500 (A1)

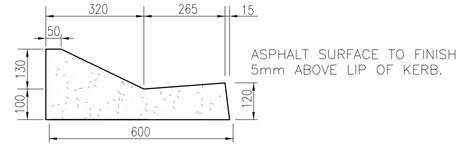
Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - EMERALD END ROAD WIDENING
Title: LAYOUT PLAN

CRE17-018-C65
65/69 B



TYPICAL CROSS SECTION - CH 00 - TP119.841

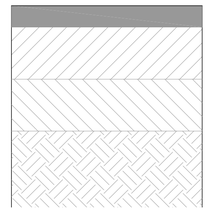
N.T.S.



ASPHALT SURFACE TO FINISH
5mm ABOVE LIP OF KERB.

LAYBACK KERB AND CHANNEL

SCALE 1:10 (A1)



30mm ASPHALT INCLUDING PRIMER AT ALL INTERSECTIONS AND CUL–DE–SAC HEADS.

110mm BASE, TYPE 2.2 MINIMUM CBR 60% COMPACTED TO 100% SRDD.

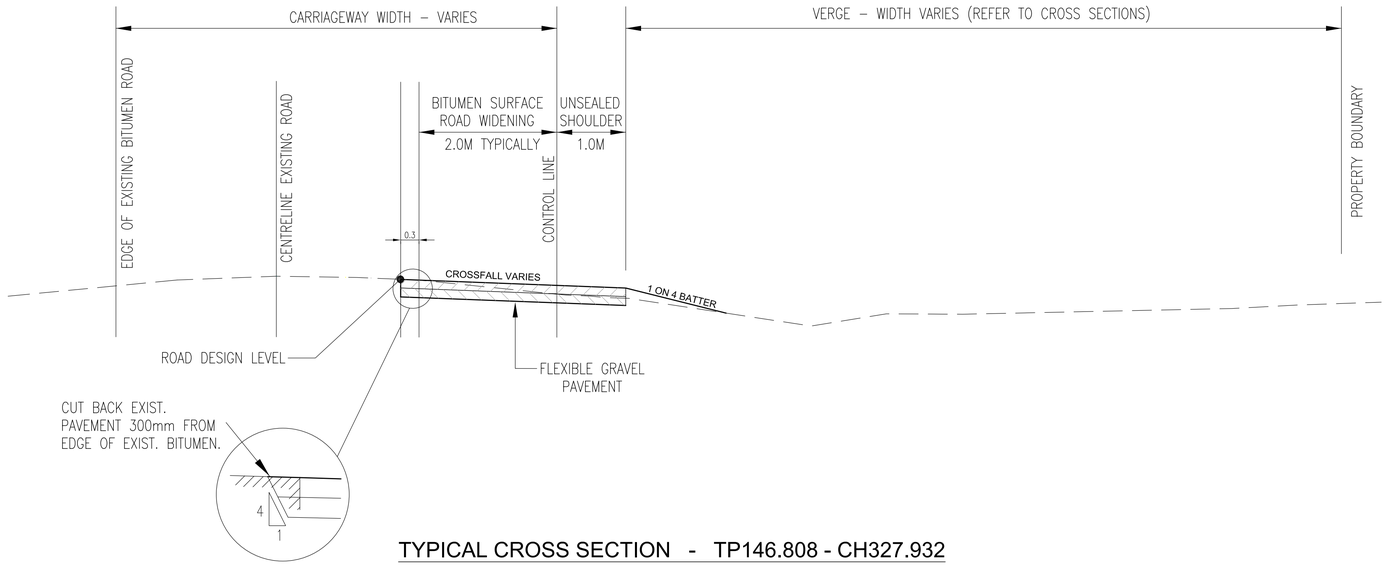
140mm SUB BASE, TYPE 2.3 MINIMUM CBR 45% COMPACTED TO 100% SRDD.

SUB–GRADE CBR 7% (ASSUMED) COMPACTED TO 98% SRDD.
(CBR TO BE CONFIRMED BY TAKING SAMPLES AT 100m INTERVALS.

NOTE: SUBGRADE CBR RESULTS AND FINAL PAVEMENT DESIGN ARE TO BE SUBMITTED TO COUNCIL FOR APPROVAL PRIOR TO PLACEMENT OF GRAVEL.

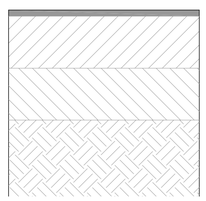
PAVEMENT DETAIL - INTERSECTION

N.T.S.



TYPICAL CROSS SECTION - TP146.808 - CH327.932

N.T.S.



PRIMER, PLUS 2 COAT SPRAYED BITUMEN SEAL (16mm / 10mm AGGREGATE

110mm BASE, TYPE 2.2 MINIMUM CBR 60% COMPACTED TO 100% SRDD.

140mm SUB BASE, TYPE 2.3 MINIMUM CBR 45% COMPACTED TO 100% SRDD.

SUB–GRADE CBR 7% (ASSUMED) COMPACTED TO 98% SRDD.
(CBR TO BE CONFIRMED BY TAKING SAMPLES AT 100m INTERVALS, MINIMUM OF 3).

NOTE: SUBGRADE CBR RESULTS AND FINAL PAVEMENT DESIGN ARE TO BE SUBMITTED TO COUNCIL FOR APPROVAL PRIOR TO PLACEMENT OF GRAVEL.

PAVEMENT DETAIL

N.T.S.

PAVEMENT NOTES

1.ALL CUL–DE–SAC HEADS AND INTERSECTION TURNOUTS ARE REQUIRED TO HAVE A MINIMUM 30MM ASPHALT SURFACE TREATMENT WITH A SINGLE COAT SEAL.

2. THE SUB–BASE LAYER SHALL EXTEND A MINIMUM OF 150MM BEHIND THE REAR FACE OF THE KERB AND CHANNEL.

3. THE BASE AND SURFACING SHALL EXTEND TO THE FACE OF ANY KERBING. WHERE THE TOP SURFACE OF THE SUB–BASE LAYER IS BELOW THE LEVEL OF THE UNDERSIDE OF THE KERB AND CHANNEL, THE BASE LAYER SHALL ALSO EXTEND A MINIMUM OF 150MM BEHIND THE REAR FACE OF THE KERB AND CHANNEL.

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/05/20	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 09/12/19

CAD FILE: AUTOCAD JOBS\CRE17–018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
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ERSCON CONSULTING ENGINEERS

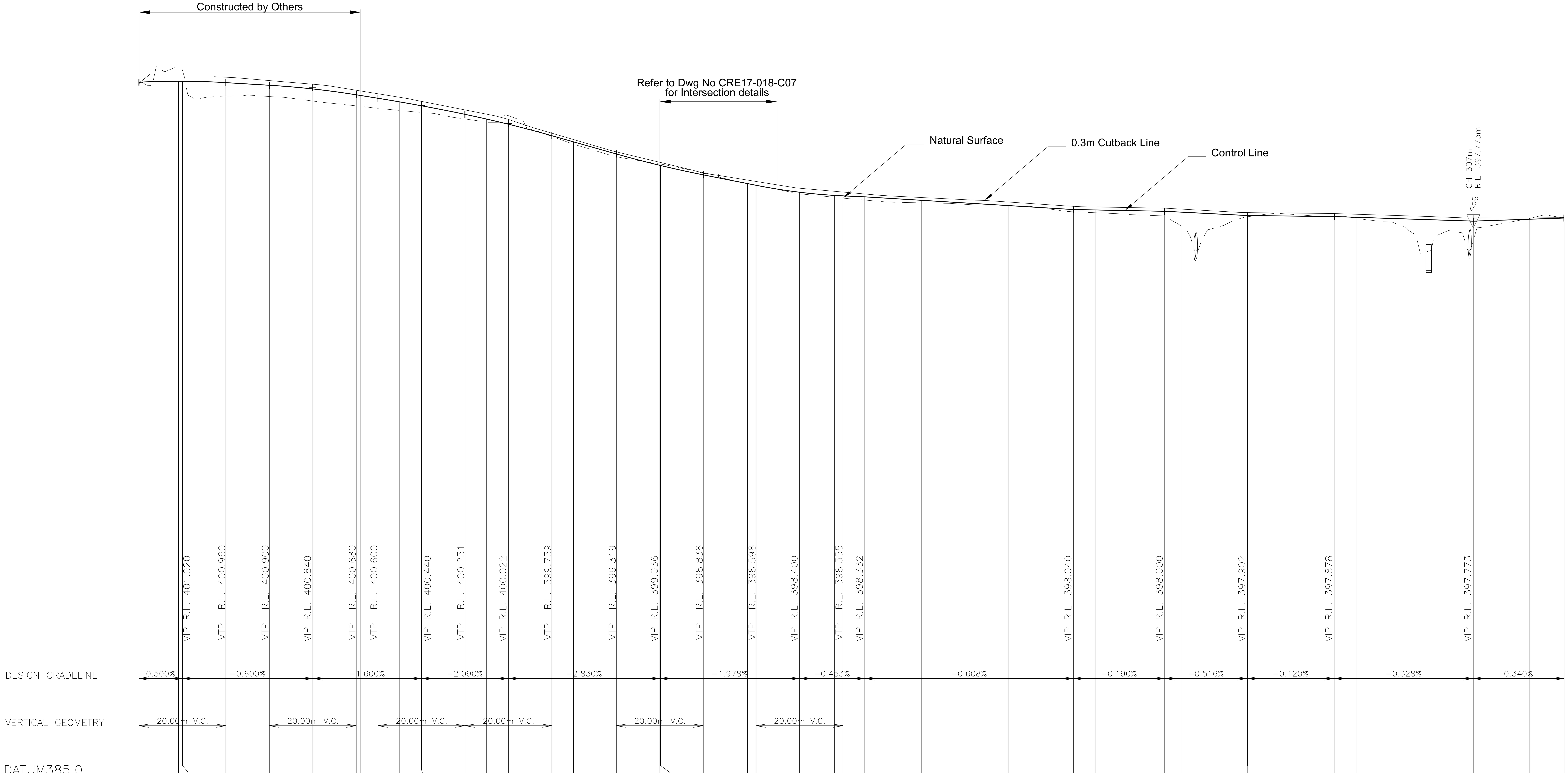
DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 1 2 3m
Scale 1:50 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - EMERALD END ROAD WIDENING
Title: TYPICAL CROSS SECTIONS AND PAVEMANT DETAILS

CRE17–018–C66

66/69 | B



DATUM385.0

CHAINAGE	CUT/FILL	DESIGN LEVEL	EXISTING SURFACE
0	0.05	400.97	400.92
9.091	−0.32	400.993	401.312
10	−0.258	400.993	401.25
20	0.309	400.96	400.651
30	0.26	400.9	400.64
40	0.278	400.815	400.537
50	0.254	400.68	400.426
55	0.231	400.6	400.369
60	0.197	400.517	400.32
63.287	0.17	400.459	400.289
65	0.153	400.428	400.275
75	0.107	400.231	400.124
80	0.076	400.122	400.046
85	−0.198	400.004	400.201
95	0.017	399.739	399.722
100	0.056	399.598	399.542
109.841	0.061	399.319	399.258
119.841	−0.03	399.057	399.088
120	−0.032	399.053	399.085
129.841	−0.051	398.838	398.889
140	−0.005	398.637	398.642
142	−0.004	398.598	398.602
146.809	0.007	398.511	398.504
152	0.036	398.438	398.402
160	0.043	398.365	398.322
162	0.052	398.355	398.303
167	0.074	398.332	398.258
180	0.058	398.253	398.194
200	0.007	398.131	398.124
215	0.052	398.04	397.988
220	0.064	398.03	397.967
236	0.116	398	397.884
240	0.324	397.979	397.656
255	0.029	397.902	397.873
260	−0.043	397.896	397.939
275	0.001	397.878	397.877
280	0.02	397.862	397.842
296.337	0.737	397.808	397.071
300	0.292	397.796	397.504
307	0.445	397.773	397.328
320	−0.019	397.817	397.837
327.853	0	397.844	397.844

LONGITUDINAL SECTION - EMERALD END ROAD WIDENING

Horz 1:500
Vert 1:50

ISSUED FOR APPROVAL
JANUARY, 2022

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DRAWN L.D. CHECKED W.S. APPROVED DATE: 09/12/19
CAD FILE: AUTOCAD JOBS\CRE17−018 OP WORKS DRAWINGS.DWG

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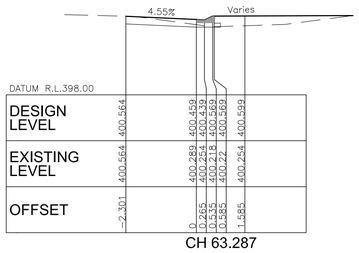
ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: EMERALD END ROAD WIDENING - LONDITUDINAL SECTION

CRE17−018−C67
67/69 B



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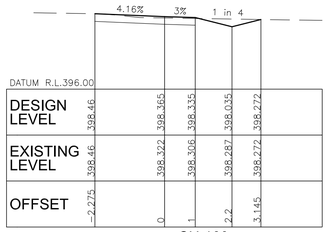

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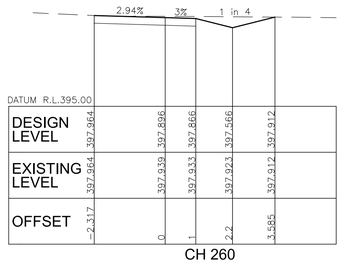

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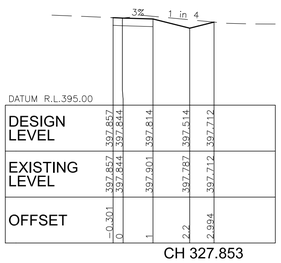

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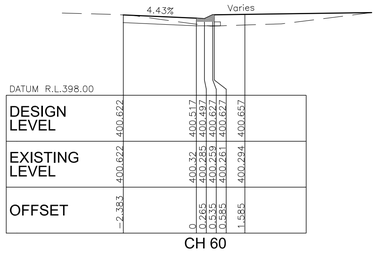

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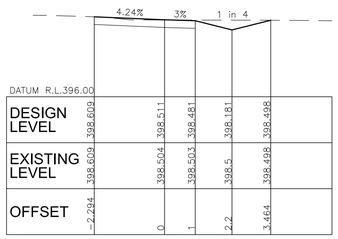

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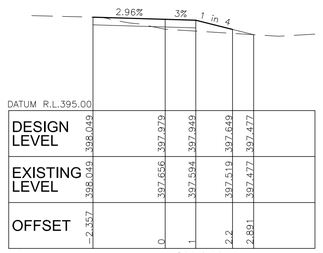

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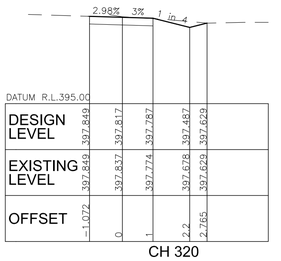

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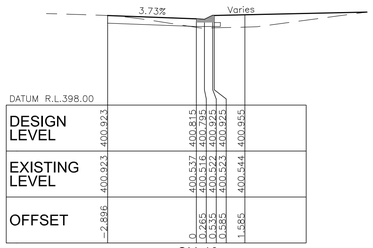

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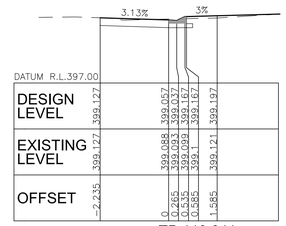

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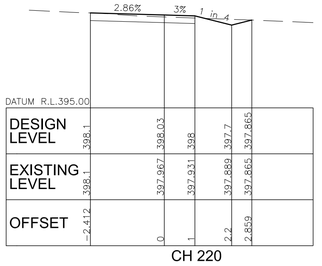

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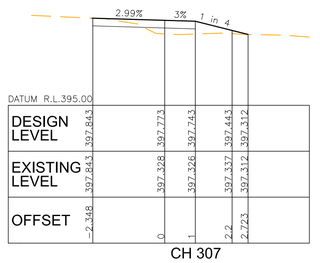

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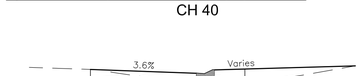

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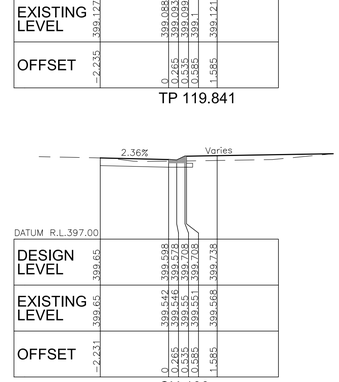

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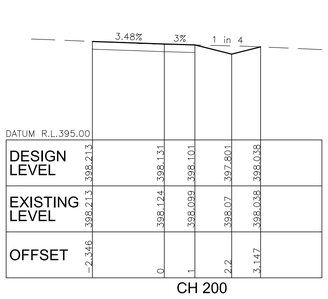

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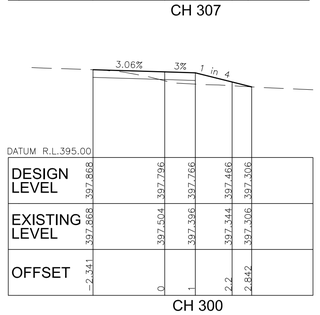

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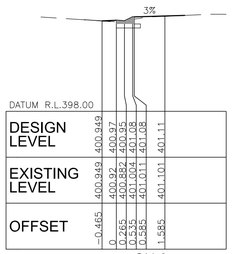

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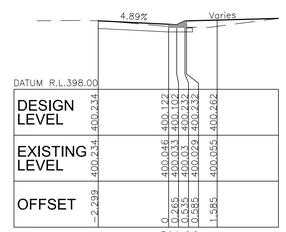

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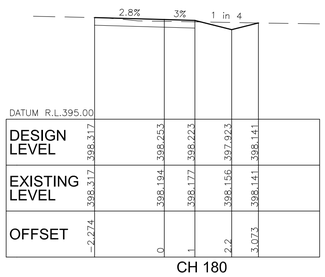

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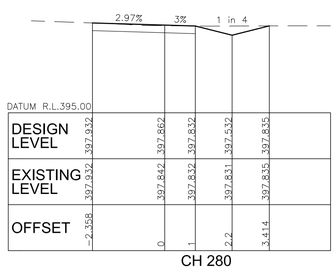


CH 280

EMERALD END ROAD WIDENING - CROSS SECTIONS - Ch.00 to Ch.327.853

Scale 1:100 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/05/20	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG | DATE: 09/12/19

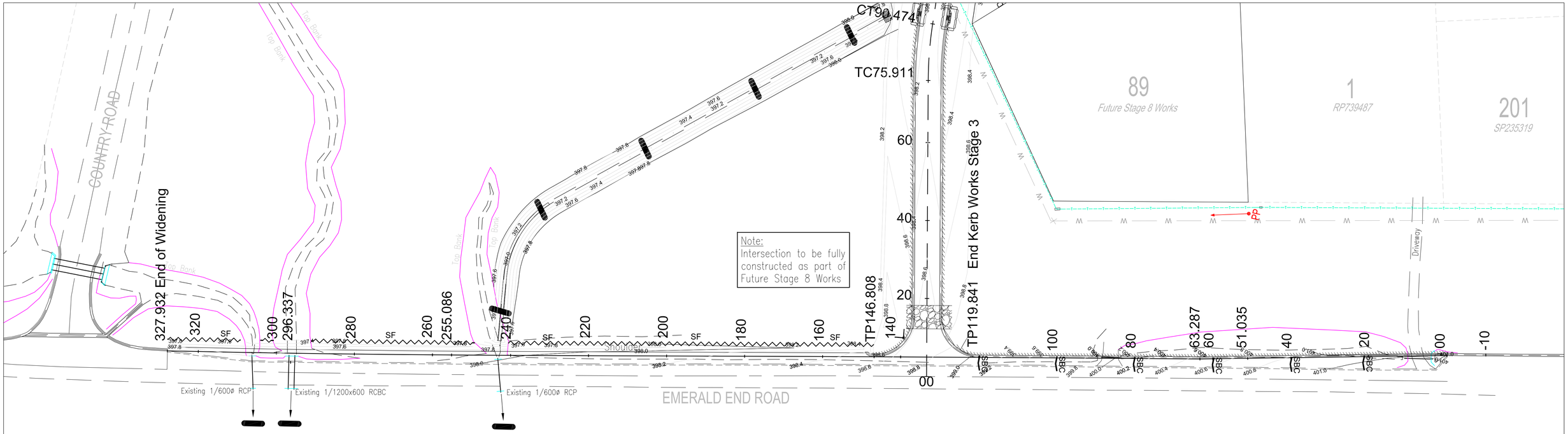
BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 2 4 6m
Scale 1:100 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: EMERALD END ROAD WIDENING - CROSS SECTIONS - 00 to 327.853

CRE17-018-C68
68/69
B



PLAN

Scale 1:500 (A1)

LEGEND

- SAND BAG SURROUND
- COCONUT FIBRE LOGS
- SBC — SAND BAG CHECK DAMS
- 300MM TURF STRIP PLACED BEHIND KERB.
- SF — SILT FENCE (RETURN TO BE CONSTRUCTED EVERY PROPERTY BOUNDARY)
- 400.0 — DESIGN CONTOURS WITH LABELS (0.20M INTERVAL)
- GRATED KERB INLET PIT
- ROCK PROTECTION.
- CONSTRUCTION ENTRY/EXIT REFER IEAUST DWG A5-C3-1 FOR DETAIL REQUIRED DURING STAGE 8 WORKS

EROSION AND SEDIMENT CONTROL NOTES:

1. THE CONTRACTOR SHALL PREPARE AN EROSION AND SEDIMENT CONTROL PLAN IN ACCORDANCE WITH THE PROVISIONS OF THE FNQROC DEVELOPMENT MANUAL.
2. EXACT LOCATION OF SEDIMENT CONTROL DEVICES (SCD) TO BE AGREED ON SITE AND IN ACCORDANCE WITH THE CONTRACTORS STORMWATER MANAGEMENT PLAN (SWMP).
3. ALL SCD TO BE CONSTRUCTED IN ACCORDANCE WITH THE INSTITUTE OF ENGINEERS GUIDELINES.
4. DESIGN CONTOURS SHOWN ARE AT 0.2M INTERVALS.
5. INSTALL PERIMETER SCD AND STABILISED ENTRY/EXIT POINT PRIOR TO DISTURBANCE.
6. STOCKPILE LOCATIONS TO BE AGREED ON SITE WITH ENGINEER. STOCKPILES TO BE PROTECTED AS THEY ARE CREATED WITH UP-SLOPE PERIMETER BANK AND DOWN SLOPE SEDIMENT FENCE.
7. SEDIMENT FENCES ARE TO BE INSTALLED SUCH THAT THE BASE OF THE FENCE IS PLACED 150mm MIN. BELOW GROUND LEVEL AND ANCHORED SECURELY IN POSITION.
8. ALL VEHICLES AND EQUIPMENT ENTRY/EXIT POINTS SHALL HAVE SHAKER GRIDS TO PREVENT VEHICLES FROM TRACKING MUD AND SOIL OFF SITE. LOCATIONS TO BE DETERMINED ON SITE.
9. SAND BAG CHECK DAM INSTALLATION TO CORRESPOND WITH THE INSTALLATION OF STORMWATER MANHOLES AND KERB & CHANNEL.
10. PLACE 300mm TURF STRIP BEHIND KERB IN ACCORDANCE FNQROC STD DWG S5010.
11. GRASS SEEDING, HYDROMULCH AND/OR TURF TO BE APPLIED TO FINISHED IMMEDIATELY FOLLOWING COMPLETION IN ACCORDANCE WITH THE DEVELOPMENT MANUAL.
12. ALL SEDIMENT CONTROL MEASURES ARE TO REMAIN IN PLACE UNTIL THE END OF THE MAINTENANCE PERIOD UNLESS NOTED OTHERWISE.
13. ALL SEDIMENT CONTROL DEVICES ARE TO BE FULLY MAINTAINED IN AN EFFECTIVE WORKING CONDITION DURING CONSTRUCTION AND THE MAINTENANCE PERIOD.

MAINTENANCE:

1 CONTRACTOR TO MONITOR SCD ON A DAILY BASIS OR AS DETAILED IN COUNCIL APPROVED SWMP.

2 CONTRACTOR TO ENSURE ALL SCD ARE FULLY MAINTAINED AND CLEAN UNTIL 80% GRASS COVER.

3 ALL REVEGETATED (GRASSED) AREAS TO BE WATERED AND MAINTAINED UNTIL GRASS IS FULLY ESTABLISHED.

4 WATERING AND MAINTENANCE OF GRASSED AREAS TO BE IN ACCORDANCE WITH CLAUSE 4.8 OF THE FNQROC DEVELOPMENT MANUAL.

ISSUED FOR APPROVAL

JANUARY, 2022

Ref.	Revision Notes	Date	Sign
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CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

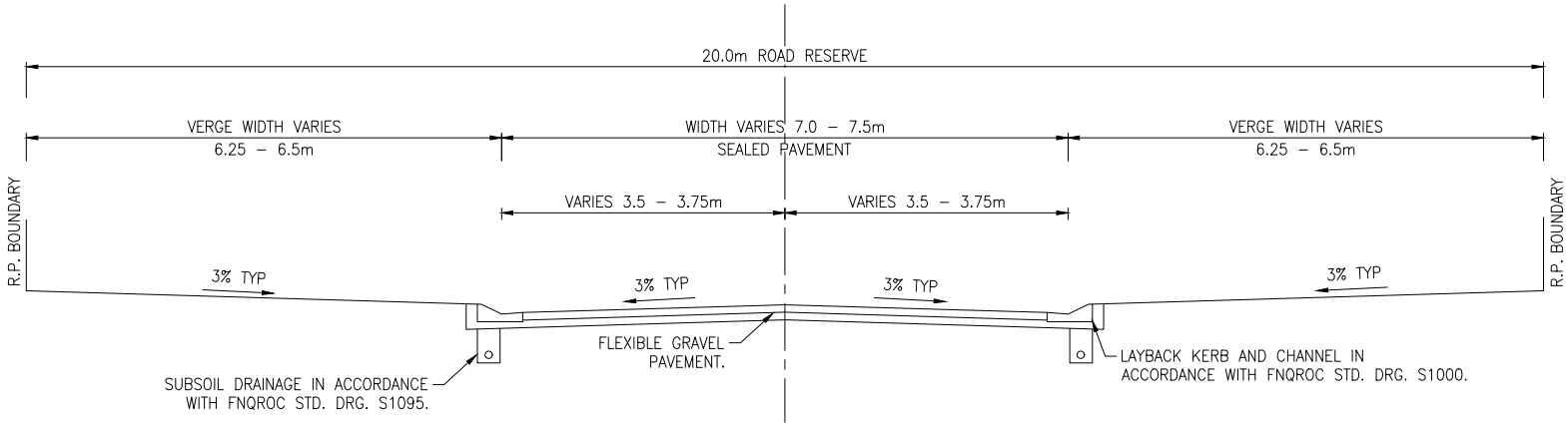
DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - EMERALD END ROAD WIDENING
Title: EROSION & SEDIMENT CONTROL PLAN

CRE17-018-C69

69/69 B



LOW DENSITY RESIDENTIAL ROAD

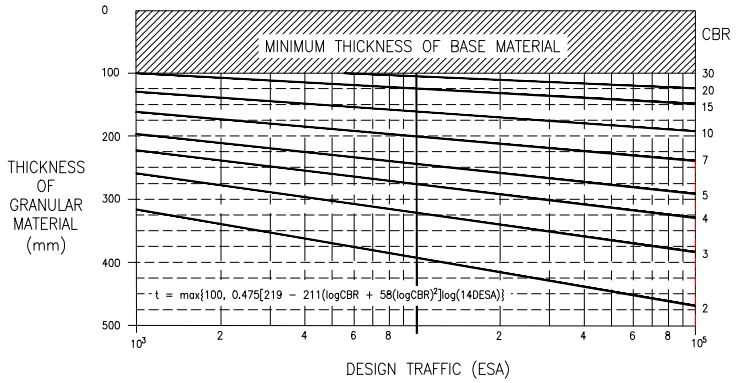
SCALE 1:100

NOTES:

1. THIS DRAWING IS PROVIDED TO ASSIST IN THE INTERPRETATION OF TABLE D1.1 OF THE FNQROC REGIONAL DEVELOPMENT MANUAL. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE ABOVE TABLE AND THE REMAINDER OF THE MANUAL. WHERE CONFLICTS OCCUR TABLE D1.1 SHALL TAKE PRECEDENCE.
2. ALL DIMENSIONS ARE IN METRES U.N.O.
3. REFER TO FNQROC STANDARD DRAWING (S1005–C) FOR TYPICAL ROAD CROSS SECTION.
4. REFER TO PROJECT DRAWINGS FOR PAVEMENT & SEAL DETAILS.
5. SUBSOIL DRAINAGE (FNQROC – DRAWING S1095–B).
6. KERB DETAIL (FNQROC – DRAWING S1000–E)
7. THE MINIMUM RESERVE WIDTH OVERRIDES THE SUM OF OTHER MINIMUM DIMENSIONS.
8. DRIVEWAY CUTS OR FILLS MUST NOT ENCROACH ON THE ROAD RESERVE.

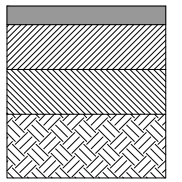
NO. OF DWELLINGS	n/a	FNQROC TABLE D1.1
RESERVE WIDTH (MINIMUM)	20m	
CARRIAGEWAY WIDTH	MIN. 7.0m	
VERGE WIDTHS (EACH SIDE)	MIN. 6.25m	
DESIGN SPEED	60 km/h	
MAXIMUM GRADE (DESIRABLE)	16% (12%)	
MINIMUM ESA'S	5×10^5	FNQROC TABLE D3.1

PAVEMENT CHARACTERISTICS



LIGHT TRAFFIC DESIGN CHART

(REFERENCE: AUSTROADS (AP–T36/06) – "PAVEMENT DESIGN FOR LIGHT TRAFFIC: A SUPPLEMENT TO AUSTROADS PAVEMENT DESIGN GUIDE" – FIG. 8.5) SUBGRADE CBR = 7 ASPHALT MODULUS = 1000 MPa



30mm ASPHALT

100mm BASE, TYPE 2.2

100mm SUB BASE, TYPE 2.3

SUB–GRADE CBR 7% (ASSUMED)

NOTWITHSTANDING SUBGRADE TESTING AND SUBSEQUENT PAVEMENT THICKNESS DESIGN, THE PAVEMENT THICKNESS SHALL NOT BE LESS THAN THE FOLLOWING.

MINIMUM ALLOWABLE PAVEMENT DEPTH 30mmAC AND 200mm GRANULAR (FNQROC TABLE D3.2)

PAVEMENT DETAIL

N.T.S.

FOR INFORMATION ONLY

PLOT DATE:17/10/2018 2:30:45 PM
FILE LOCATION:X:\137 Benchmark\001 Country Road Estate\Drawings\137-001-SK01 Pavement.dwg

REVISIONS					
NO.	DATE	DESCRIPTION	DESIGN	APPROVED	
1	17/10/18	ISSUED FOR INFORMATION			

ERSCON CONSULTING ENGINEERS

SCALE 1:100 (A4) 0 1 2 3

ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE

DRAWN	HM	DESIGNED	
DRAWING APPROVED	MT	DESIGNED APPROVED	
DATE:		RPEQ:	

PROJECT REF: COUNTRY ROAD ESTATE STAGES 3,4,5,6 & 8

DRAWING REF: TYPICAL PAVEMENT DETAIL

DRAWING NO: 137-001-SK01 | SIZE: A4 | REVISION: 1

APPENDIX C

Stormwater Calculations

STORMWATER STRUCTURE TABLE

NO.	TYPE	EASTING	NORTHING
3/7	KERB INLET PIT ON GRADE (L)	334876.187	8121943.479
2/7	KERB INLET PIT ON GRADE (S)	334881.366	8121948.143
1/7	HEADWALL	334905.673	8121965.767

CO–ORDINATES REFER TO MIDDLE OF HEADWALL AS SHOWN.

SETOUT REFERS TO MID POINT OF GRATE ON LIP OF KERB AS SHOWN.

STORMWATER PIPE TABLE

PIPE	SIZE (dia)	LENGTH	GRADE (%)	U.S.I.L.	D.S.I.L.
1	1/600 Cl 2	7.32m	-0.41	405.100	405.070
2	1/600 Cl 2	29.28m	-0.40	405.050	404.930

STORMWATER NOTES

1 ORIGIN OF LEVELS: PSM151304; RL 397.775 AHD EMERALD END ROAD

2 DESIGN SURFACE CONTOUR INTERVAL: 0.20m INDEXED: 0.20m

3 DETAILS OF EXISTING SERVICES ARE PROVIDED FOR INFORMATION ONLY AND THE CONTRACTOR IS TO LOCATE ALL SERVICES PRIOR TO COMMENCEMENT OF WORK.

4 FOR SPECIFICATIONS OF STORMWATER DRAINAGE REFER TO FNQROC STANDARD SPECIFICATIONS.

5 FOR STANDARD STORMWATER DRAINAGE DETAILS REFER FNQROC STD DWGS S1045 – S1100

6 STORMWATER PIPES TO BE REINFORCED CONCRETE TO AS 4058

7 REFER DRAWING CRE17–018–C05 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS

LEGEND

- STORMWATER STRUCTURE LABEL (1/2)
- STORMWATER PIPE LABEL (2)
- PROPOSED STORMWATER DRAINAGE PIPE
- GRATED KERB INLET PIT REFER TO FNQROC STD DWG S1055 FOR DETAILS
- 401.0 DESIGN CONTOURS WITH LABELS
- ROCK PROTECTION

ISSUED FOR APPROVAL
JANUARY, 2022

PLAN
Scale 1:500 (A1)

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. CHECKED W.S. APPROVED
CAD FILE: AUTOCAD JOBS\CRE17–018 OP WORKS DRAWINGS.DWG DATE: 10/01/22

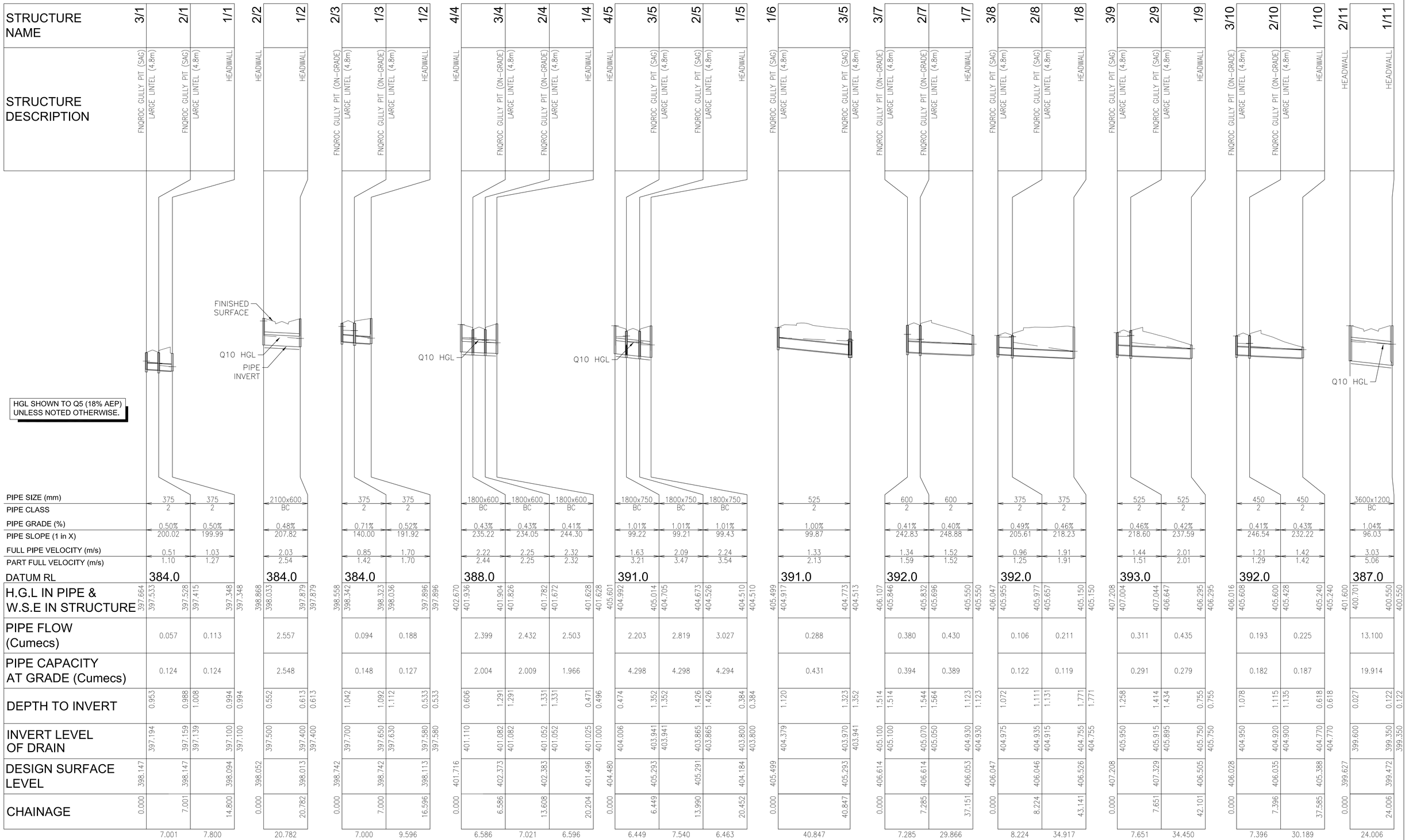
BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: STORMWATER DRAINAGE - LAYOUT PLAN

CRE17–018–C16
16/69 B



ISSUED FOR APPROVAL
JANUARY, 2022

LONGITUDINAL SECTION - COUNTRY ROAD

Horz 1:500
Vert 1:50

Ref.	Revision Notes	Date	Sign
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DRAWN L.D. CHECKED W.S. APPROVED DATE: 10/01/22
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: STORMWATER DRAINAGE - LONGITUDINAL SECTIONS

CRE17-018-C05
5/69 B

			tc	I	C	A	(CxA)	Q	Qa			Wf	dg	Vg	dg.Vg			Qg	Qb		tc	I	(CxA)	Qrat	Qrc	Qb(net)	Qo	L	S		V	Vt		S/Do	Qg/Qo	Du/Do	V2/2g	Ku	hu	Kw	hw	Sf	hf	dn	Vn						
DESIGN A.R.I.	STRUCTURE NO.	DRAIN SECTION	SUB-CATCHMENT TIME OF CONCENTRATION	RAINFALL INTENSITY	COEFFICIENT OF RUNOFF	SUB-CATCHMENT AREA	TOTAL CONTRIBUTING EQUIVALENT AREA	SUB-CATCHMENT DISCHARGE	FLOW IN K & C (INCLUDING BYPASS)	ROAD GRADE AT INLET	ROAD XFALL AT INLET	FLOW WIDTH	FLOW DEPTH AT INVERT	GUTTER FLOOD VELOCITY	VELOCITY-DEPTH	STRUCTURE TYPE	INLET CAPACITY CURVE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE NO.	CRITICAL TIME OF CONCENTRATION	RAINFALL INTENSITY	TOTAL CONTRIBUTING EQUIVALENT AREA	TOTAL PEAK FLOW	HALF ROAD CAPACITY	NET BYPASS FLOW	FLOW IN PIPE	REACH LENGTH	PIPE GRADE	PIPE / BOX DIMENSIONS	FULL-PIPE FLOW VELOCITY	PIPE TRAVEL TIME VELOCITY	12D Ku / Kw CHART IDENTIFIERS	SUBMERGENCE RATIO	FLOW RATIO	DIAMETER RATIO	VELOCITY HEAD	U/S PRESSURE HEAD CHANGE COEFFICIENT	CHANGE IN U/S PRESSURE HEAD	W.S.E. COEFFICIENT	CHANGE IN W.S.E.	PIPE FRICTION SLOPE	PIPE FRICTION TOTAL HEAD LOSS	DEPTH	VELOCITY	PIPE U/S INVERT LEVEL	PIPE D/S INVERT LEVEL	PIPE U/S H.G.L.	PIPE D/S H.G.L.	W.S.E.	SURFACE OR K & C INVERT LEVEL	FREEBOARD
years			min	mm/hr		ha	ha	m3/s	m3/s		%	m	m	m/s	m2/s			m3/s	m3/s		min	mm/hr	ha	m3/s	m3/s	m3/s	m3/s	m	%	mm	m/s	m/s					m		m		m	%	m	m	m/s	m	m	m	m	m	m	m
5	3/1	3/1 to 2/1	5	171	0.826	0.143	0.118	0.056	0.057	0.04			0.009			SAL4D		0.057	0		5	171	0.118	0.056	0.427	-0.001	0.057	7.001	0.5	375	0.51	2	G2	1.35	1		0.014	9.7	0.131		0.131	0.07	0.006	0.178	1.1	397.194	397.159	397.533	397.528	397.664	398.147	0.483
5	2/1	2/1 to 1/1	5	171	0.826	0.143	0.118	0.056	0.057	0.04			0.009			SAL4D		0.057	0		5.06	170	0.236	0.112	0.427	-0.002	0.113	7.8	0.5	375	1.03	2	T1/T2	1.3	0.5	1	0.054	2.11	0.113		0.113	0.86	0.044	0.282	1.27	397.139	397.1	397.415	397.348	397.528	398.147	0.619
5	1/1															HW outlet																																397.348	398.094	
5	2/2	2/2 to 1/2	15	114	0.618	10.98	6.789	2.149	2.149							HW inlet		2.149	0		15	114	6.789	2.149		0	2.149	20.782	0.48	2100x600	1.71	2	G1	2.12	1		0.148	4.54	0.674		0.674	0.72	0.091	0.425	2.41	397.5	397.4	397.975	397.825	398.649	399.024	0.375
5	1/2															HW outlet																																397.825	398.995	
5	2/3	3/3 to 2/3	5	171	0.826	0.243	0.201	0.095	0.095	0.59	4	2.693	0.108	0.703	0.076	AL4D	0.5G,3.3X	0.094	0.001	3/1	5	171	0.201	0.095	0.224	0.001	0.094	7	0.71	375	0.85	2	G2	2.29	1		0.037	5.79	0.216		0.216	0.29	0.02	0.217	1.42	397.7	397.65	398.342	398.322	398.558	398.742	0.184
5	1/3	2/3 to 1/3	5	171	0.826	0.243	0.201	0.095	0.095	0.59	4	2.696	0.108	0.702	0.076	AL4D	0.5G,3.3X	0.094	0.001	2/1	5.06	170	0.401	0.19	0.223	0.002	0.188	9.596	0.52	375	1.7	2	T5	1.85	0.5	1	0.148	1.93	0.286	1.94	0.287	1.45	0.105	0.375	1.7	397.63	397.58	398.036	397.896	398.323	398.742	0.419
5	1/2															HW outlet																																397.896	399.012	
5	4/4	4/4 to 3/4	15	114	0.618	10.3	6.369	2.016	2.016							HW inlet		2.016	0		15	114	6.369	2.016		0	2.016	6.586	0.43	1800x600	1.87	2	G1	2.41	1		0.178	3.95	0.702		0.702	0.43	0.028	0.483	2.32	401.11	401.012	401.852	401.824	402.554	402.67	0.116
5	3/4	3/4 to 2/4	5	171	0.826	0.107	0.088	0.042	0.042	1.85	4	1.589	0.067	0.872	0.059	AL4D	2G,3.3X	0.042	0	3/3	15.05	114	6.467	2.044	0.39	0	2.044	7.021	0.43	1800x600	1.89	2	T1	1.24	0.02	1	0.183	0.3	0.055		0.055	0.44	0.031	0.487	2.33	401.082	401.052	401.769	401.738	401.824	402.373	0.549
5	2/4	2/4 to 1/4	5	171	0.826	0.23	0.19	0.09	0.09	1.85	4	2.135	0.088	1.053	0.092	AL4D	2G,3.3X	0.09	0	2/3	15.11	114	6.678	2.107	0.39	0	2.107	6.596	0.41	1800x600	1.95	2	T1/T2	1.14	0.04	1	0.194	0.41	0.079		0.079	0.47	0.031	0.505	2.32	401.052	401.025	401.659	401.628	401.738	402.383	0.645
5	1/4															HW outlet																																401.628	402.71	
5	4/5	4/5 to 3/5	15	114	0.618	9.46	5.85	1.852	1.852							HW inlet		1.852	0		15	114	5.85	1.852		0	1.852	6.449	0.47	2400x600	1.29	2	G1	1.99	1		0.084	4.86	0.41		0.41	0.19	0.012	0.351	2.2	404.275	404.245	405.057	405.045	405.467	405.601	0.134
5	3/5	3/5 to 2/5	5	171	0.826	0.304	0.251	0.119	0.415	0.28	4		0.18			SAL4D	SAG	0.415	0	2/5	15.05	114	7.487	2.366	0.427	-0.074	2.441	7.54	0.46	2400x600	1.69	2	T1/T3	1.38	0.17	1	0.147	1.28	0.188	1.47	0.215	0.33	0.025	0.422	2.41	404.245	404.21	404.857	404.832	405.072	405.29	0.218
5	2/5	2/5 to 1/5	5	171	0.826	0.234	0.193	0.092	0.092	0.22			0.028			SAL4D		0.092	0		15.12	114	7.701	2.43	0.427	-0.074	2.504	6.463	0.4	2400x600	1.74	2	T1	1.1	0.04	1	0.154	0.37	0.058		0.058	-0.09	0.012	0.45	2.32	404.21	404.184	404.774	404.78	404.832	405.288	0.456
5	1/5															HW outlet																																404.78	405.595	
5	1/6	1/6 to 3/5	15	114	0.644	2.14	1.377	0.436	0.51	2.83	4		0.2			SAL4D	SAG	0.214	0.296	3/5	15	114	1.377	0.436	0.214	0.222	0.214	40.847	0.5	525	0.99	2	G2	1.99	1		0.05	7.06	0.353		0.353	0.25	0.101	0.325	1.52	404.445	404.25	405.146	405.045	405.499	405.499	0
5	3/5															SAL4D																																405.072	405.29	
5	3/7	3/7 to 2/7	15	114	0.694	0.775	0.538	0.17	0.182	0.67	4	3.549	0.135	0.84	0.113	AL4D	0.5G,3.3X	0.167	0.015	3/10	15	114	1.076	0.34	0.288	0.015	0.325	7.285	0.41	600	1.15	2	G2/T9/T10	1.43	0.51	0.88	0.068	2.54	0.172	2.88	0.195	0.28	0.02	0.416	1.56	405.1	405.07	405.762	405.741	405.956	406.626	0.67
5	2/7	2/7 to 1/7	5	171	0.826	0.113	0.093	0.044	0.044	0.67	4	1.975	0.082	0.602	0.049	AL4D	0.5G,3.3X	0.044	0	2/10	5.08	170	0.802	0.379	0.281	0.015	0.364	29.866	0.4	600	1.29	2	T1/T3	1.17	0.12	1	0.084	1.02	0.086	1.14	0.096	0.35	0.105	0.46	1.56	405.05	404.93	405.655	405.55	405.751	406.606	0.855
5	1/7															HW outlet																																405.55	406.053	
5	3/8	3/8 to 2/8	5	171	0.826	0.225	0.186	0.088	0.088	0.11			0.026			SAL4D		0.088	0		5	171	0.186	0.088	0.427	0	0.088	8.224	0.49	375	0.8	2	G2	2.47	1		0.033	5.03	0.164		0.164	0.25	0.021	0.236	1.21	404.975	404.935	405.736	405.716	405.901	406.047	0.146
5	2/8	2/8 to 1/8	5	171	0.826	0.225	0.186	0.088	0.088	0.07			0.026			SAL4D		0.088	0		5.07	170	0.373	0.176	0.427	0	0.176	34.917	0.46	375	1.59	2	T3/T6	2.25	0.5	1	0.13	1.65	0.214	1.97	0.256	1.01	0.352	0.375	1.59	404.915	404.755	405.502	405.15	405.758	406.046	0.289
5	1/8															HW outlet																																405.15	406.526	
5	3/9	3/9 to 2/9	15	114	0.694	1.19	0.826	0.261	0.261	0.02						SAL4D		0.261	0		15	114	0.826	0.261		0	0.261	7.651	0.46	525	1.21	2	G2	2.4	1		0.073	5.33	0.388		0.388	0.36	0.028	0.389	1.52	405.95	405.915	406.821	406.793	407.208	407.208	0
5	2/9	2/9 to 1/9	5	171	0.826	0.269	0.222	0.105	0.105	0.06						SAL4D		0.105	0		5.06	170	0.766	0.362		0	0.362	34.45	0.42	525	1.67	2	T3/T6	1.81	0.29	1	0.143	1.78	0.254	2.15	0.306	0.71	0.244	0.525	1.67	405.895	405.75	406.539	406.295	406.845	407.329	0.484
5	1/9															HW outlet																																406.295	406.505	
5	3/10	3/10 to 2/10	15	114	0.644	1.25	0.805	0.255	0.27	0.67	4	4.493	0.156	0.895	0.139	AL4D	0.5G,3.3X	0.195	0.074	1/6	15	114	0.805	0.255	0.288	0.059	0.195	7.396	0.41	450	1.23	2	G2	2.37	1		0.077	5.45	0.419		0.419	0.47	0.035	0.418	1.27	404.95	404.92	405.597	405.563	406.016	406.028	0.012
5	2/10	2/10 to 1/10	5	171	0.826	0.095	0.079	0.037	0.037	0.67	4	1.852	0.077	0.578	0.045	AL4D	0.5G,3.3X	0.037	0	2/5	15.06	114	0.892	0.282	0.282	0.059	0.222	30.189	0.43	450	1.4	2	T1/T3	1.53	0.16	1	0.1	1.39	0.139	1.64	0.164	0.61	0.184	0.45	1.4	404.9	404.77	405.424	405.24	405.588	406.035	0.448
5	1/10															HW outlet																																405.24	405.388	

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
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DRAWN L.D. | CHECKED W.S. | APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG | DATE: 10/01/22

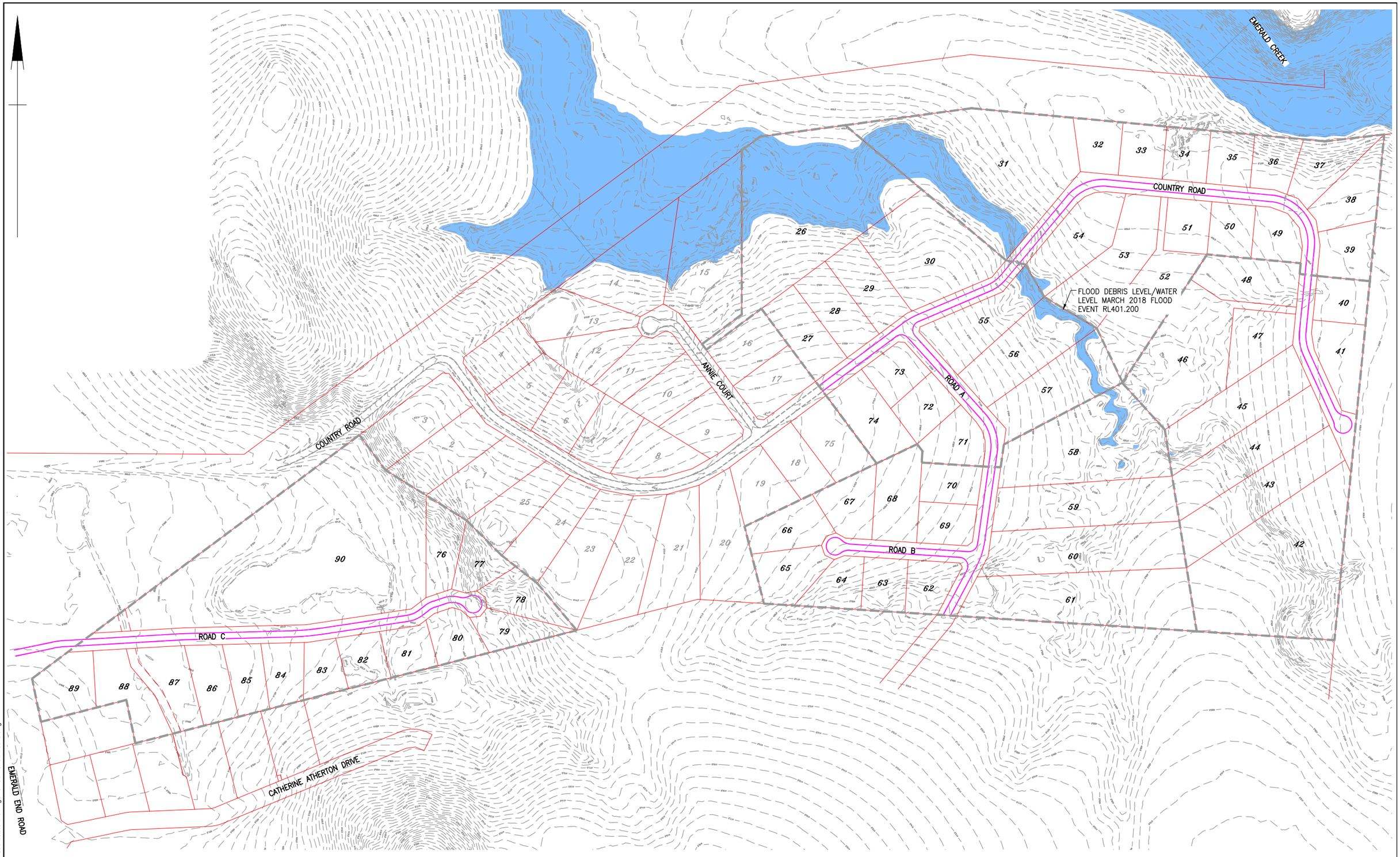
BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)
0 1 2 3m
Scale 1:50 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: STORMWATER DRAINAGE - CALCULATIONS

CRE17-018-C06
6/69 B



PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS				
NO.	DATE	DESCRIPTION	DESIGN	APPROVED
1	17/10/18	ISSUED FOR INFORMATION		

ERSCON CONSULTING ENGINEERS

CLIENT

SCALE 1:4000 (0 20 40 60 80 100 120) A3

ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE

DRAWN	MT	DESIGNED	-
DRAWN APPROVED	JM	DESIGN APPROVED	-
CIVIL SIGNOFF APPROVAL			
		DATE:	RPEQ:

PROJECT REF: COUNTRY VIEW ESTATE STAGES 3,4,5,6 & 8

DRAWING REF: MARCH 2018 FLOOD EXTENTS

DRAWING NO: 137-001-SK02 | SIZE: A3 | REVISION: 1

PLOT DATE:17/10/2018 2:29:48 PM
FILE LOCATION:X:\137 Benchmark\001 Country Road Estate\Drawings\137-001-SK02 Debris.dwg

Mareeba SHIRE COUNCIL

LEGEND

Modelled Flood Hazard Levels[1]

1% AEP Defined Flood Event (DFE):

- Extreme Flood Hazard
- High Flood Hazard
- Significant Flood Hazard
- Low Flood Hazard
- General Extent of Modelled Flood Hazard Levels

Queensland Floodplain Assessment Overlay Mapping[2]

- Potential Flood Hazard Area

Other

- Cadastre
- Watercourse

(1) *The Modelled Flood Hazard Levels are sourced from the Queensland Reconstruction Authority - Flood Hazard Mapping - Mareeba, Kuranda, Biboohra, Bilwon and Koah, 12 April 2013 which models the predicted flood impact of the Defined Flood Event (DFE).*

(2) *In areas outside the limits of the specific flood modelling undertaken in (1) above Flood Hazard Areas are sourced from the State Wide Queensland Floodplain Overlay mapping. These maps have been derived from various state-wide datasets and the result is a spatial extent of where flooding has previously or has the potential to occur.* ***These maps are not based on any flood model and do not represent a particular flood event.***

Information

Note

Where information on the map is obscured by text or other map elements contact Council for a determination.

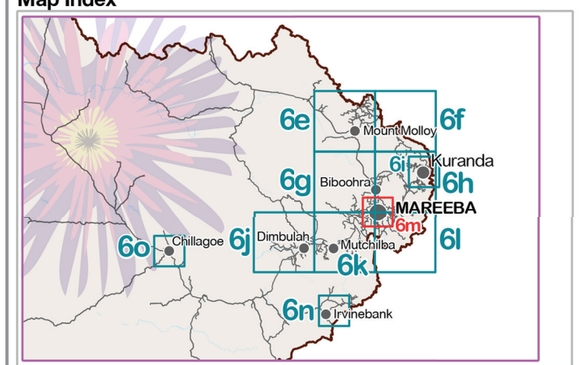
N W E S

0 0.25 0.50 0.75 1.0 1.25

1:25,000 (kilometres)

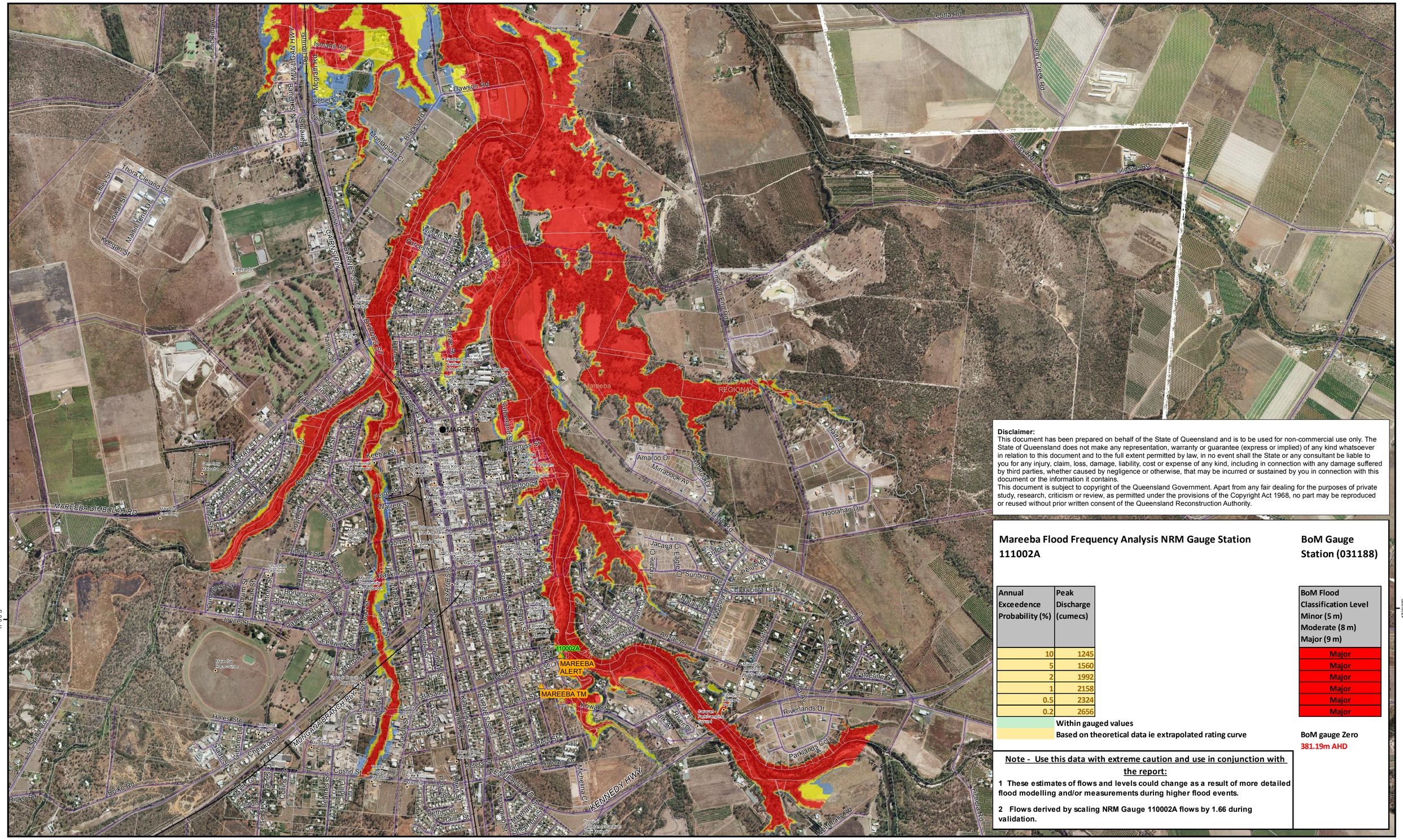
Geocentric Datum of Australia 1994 (GDA94)

Map Index



Overlay Map
Flood Hazard- Mareeba

OVERLAY MAP - OM006m



17°00'S

145°24'E

Mareeba Flood Frequency Analysis NRM Gauge Station 111002A

Annual Exceedence Probability (%)	Peak Discharge (cumecs)
10	1245
5	1560
2	1992
1	2158
0.5	2324
0.2	2656

Within gauged values

Based on theoretical data ie extrapolated rating curve

Note - Use this data with extreme caution and use in conjunction with the report:

1 These estimates of flows and levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.

2 Flows derived by scaling NRM Gauge 110002A flows by 1.66 during validation.

BoM Gauge Station (031188)

BoM Flood Classification Level Minor (5 m) Moderate (8 m) Major (9 m)
Major
Major
Major
Major
Major
Major

BoM gauge Zero
381.19m AHD

AECOM
www.aecom.com

Points of interest
Roads
Rail
BoM gauging station
NRM gauging station
Cadastre

Flood Hazard
Low
Significant
High
Extreme

Local Authority: Tablelands Regional
Locality: Mareeba
Projection: GDA 1994 MGA Zone 55
Datum: GDA 1994

Queensland Reconstruction Authority
1800 110 841
www.qldreconstruction.org.au

Queensland Reconstruction Authority

0 0.25 0.5
Kilometres

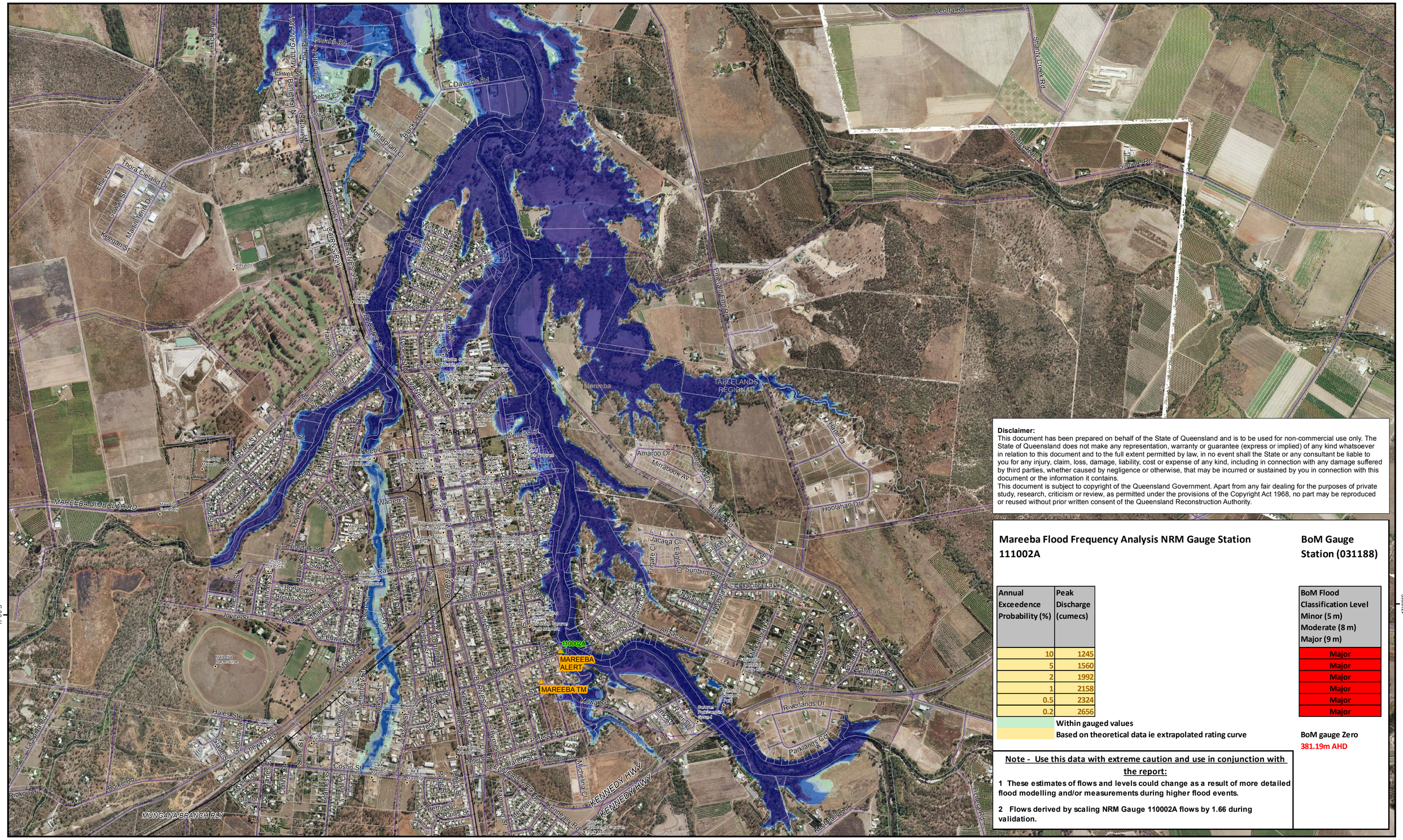
Scale at A2 - 1:15,000

Mareeba Flood Investigation
Flood Hazard Map
1% AEP Event
396.06m AHD
at BoM Gauge 031188

16/04/2013

06

Document Set ID: 4057608
Version: 1, Version Date: 10/02/2022



Mareeba Flood Frequency Analysis NRM Gauge Station 111002A

BoM Gauge Station (031188)

Annual Exceedence Probability (%)	Peak Discharge (cumecs)
10	1245
5	1560
2	1992
1	2158
0.5	2324
0.2	2656

BoM Flood Classification Level
Minor (5 m)
Moderate (8 m)
Major (9 m)
Major
Major
Major
Major
Major
Major

Within gauged values
Based on theoretical data ie extrapolated rating curve

BoM gauge Zero
381.19m AHD

Note - Use this data with extreme caution and use in conjunction with the report:

1 These estimates of flows and levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.

2 Flows derived by scaling NRM Gauge 110002A flows by 1.66 during validation.

AECOM
www.aecom.com

Points of interest
Roads
Rail
BoM gauging station
NRM gauging station
Cadastre

Depth (m)
0 - 0.5
0.5 - 0.8
0.8 - 1
1-2
>2

Local Authority: Tablelands Regional
Locality: Mareeba
Projection: GDA 1994 MGA Zone 55
Datum: GDA 1994

Queensland Reconstruction Authority
1800 110 841
www.qldreconstruction.org.au

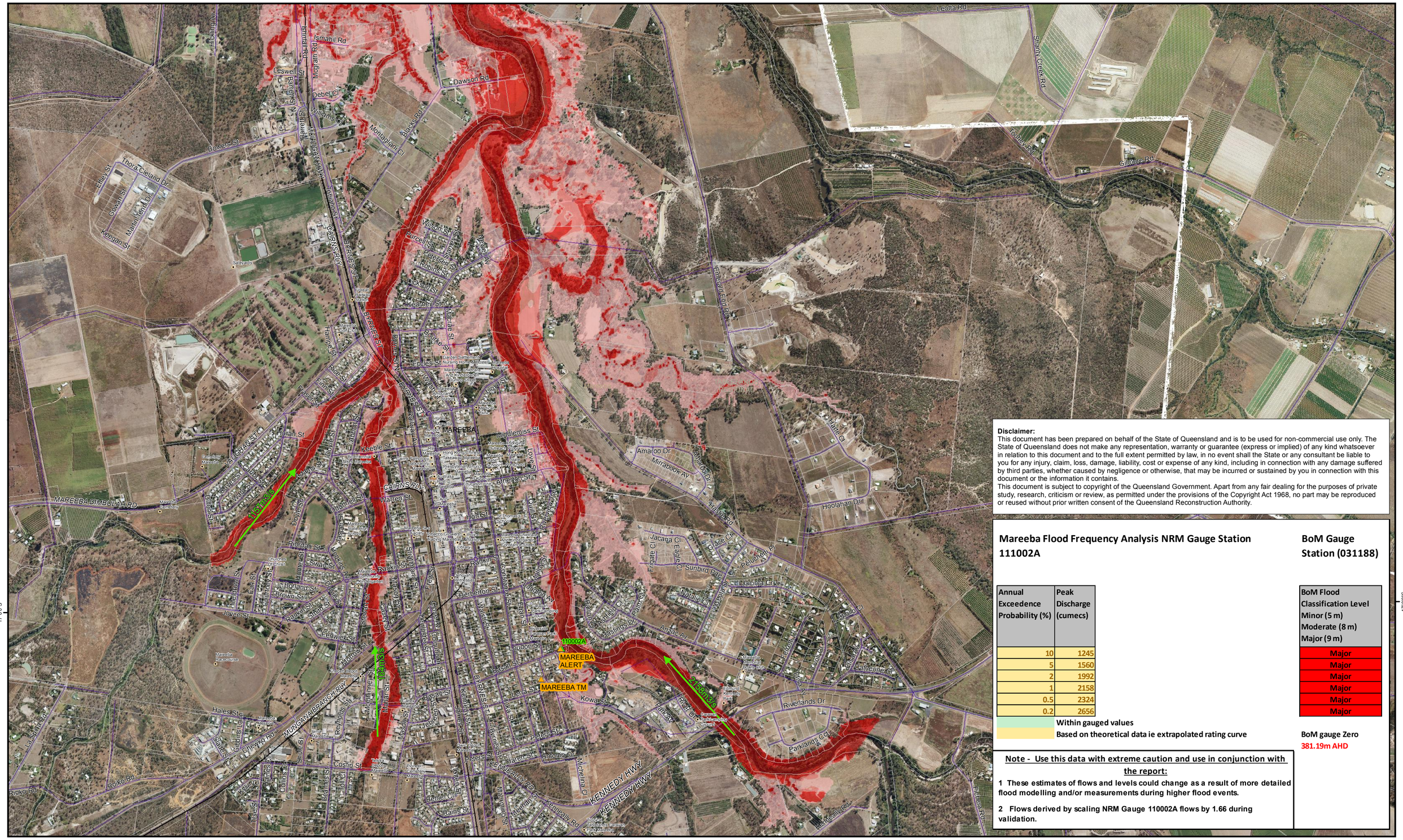
Queensland Reconstruction Authority

0 0.25 0.5
Kilometres
Scale at A2 - 1:15,000

Mareeba Flood Investigation
Flood Hazard Map
Flood Component
1% AEP Event
396.06m AHD at BoM Gauge 031188

16/04/2013

04



Mareeba Flood Frequency Analysis NRM Gauge Station 111002A

BoM Gauge Station (031188)

Annual Exceedence Probability (%)	Peak Discharge (cumecs)
10	1245
5	1560
2	1992
1	2158
0.5	2324
0.2	2656

Within gauged values
Based on theoretical data ie extrapolated rating curve

BoM Flood Classification Level
Minor (5 m)
Moderate (8 m)
Major (9 m)
Major
Major
Major
Major
Major
Major

BoM gauge Zero
381.19m AHD

Note - Use this data with extreme caution and use in conjunction with the report:

1 These estimates of flows and levels could change as a result of more detailed flood modelling and/or measurements during higher flood events.

2 Flows derived by scaling NRM Gauge 110002A flows by 1.66 during validation.

AECOM
www.aecom.com

Points of interest
Roads
Rail
BoM gauging station
NRM gauging station
Cadastre

Velocity
0 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
>2

Local Authority: Tablelands Regional
Locality: Mareeba
Projection: GDA 1994 MGA Zone 55
Datum: GDA 1994

Queensland Reconstruction Authority
1800 110 841
www.qldreconstruction.org.au

Queensland Reconstruction Authority

0 0.25 0.5
Kilometres

Scale at A2 - 1:15,000

Mareeba Flood Investigation
Flood Hazard Map
Velocity Component
1% AEP Event
396.06m AHD at BoM Gauge 031188

16/04/2013

08

Document Set ID: 4057608
Version: 1, Version Date: 10/02/2022

APPENDIX D

Water calculations

26 30 29 28 27 55 56 73 74 72 57 71 75 58 70

COUNTRY ROAD

ROAD 'A'

STAGE 3 FUTURE

EXISTING STAGE 3

STAGE 4 STAGE 3

PRESSURE AT EMERALD END ROAD TO BE CHECKED AGAINST FIRE FIGHTING FLOWS TO ACHIEVE 38M RESIDUAL PRESSURE (RL473.00)

Connect to existing MSC water main.

FH

FOR WATER RETICULATION NOTES REFER TO DWG NO. CRE17-018-C07

N

PLAN

Scale 1:500 (A1)

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
A.	PRELIMINARY ISSUE	09/12/19	W.S.
B.	ISSUED FOR APPROVAL	10/01/22	W.S.

DRAWN L.D. | CHECKED W.S. | APPROVED DATE: 10/01/22

CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG

BENCHMARK SURVEY & DESIGN
1 Possum Close, Innisfail, QLD 4860
E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

0 10 20 30m
Scale 1:500 (A1)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGE 3
Title: WATER RETICULATION PLAN

CRE17-018-C17
17/69 B

REF	CODE	DESCRIPTION
1		150 x 150 x 150 D.I.C.L. Tee with concrete thrust block.
2		150 x 150 x 100 D.I.C.L. Tee with concrete thrust block.
3		150 x 150 x 50 D.I.C.L. Tee with concrete thrust block.
4		100 x 100 x 100 D.I.C.L. Tee with concrete thrust block.
5		100 x 100 x 50 D.I.C.L. Tee with concrete thrust block.
6		50 x 50 x 50 D.I.C.L. Tee with concrete thrust block.
7	FH	80 dia. Spring Hydrant "Maxi Flow" 2000 type (DN80) complete with D.I.C.L. Tee, Riser, C.I. cover box margin and kerb marker. (100 Main)
8	150SV	150 dia. Sluice Valve Class 600 M.E. complete with C.I. cover box margin and kerb marker.
9	100SV	100 dia. Sluice Valve Class 600 M.E. complete with C.I. cover box margin and kerb marker.
10	50GV	50 dia. Gate Valve DR Brass complete with C.I. cover box margin and kerb marker.
11		150 dia. steel or bronze tapping band to 40 or 20Ø copper service to brass stop cock, meter & dirt box.
12		100 dia. steel or bronze tapping band to 40 or 20Ø copper service to brass stop cock, meter & dirt box.
13		50 dia. service fitting to 40 or 20Ø copper service to brass stop cock, meter & dirt box.
14		150 dia. D.I.C.L. 11¼° bend with concrete thrust block.
15		150 dia. D.I.C.L. 22½° bend with concrete thrust block
16		150 dia. D.I.C.L. 45° bend with concrete thrust block.
17		150 dia. D.I.C.L. 90° bend with concrete thrust block.
18		100 dia. D.I.C.L. 11¼° bend with concrete thrust block.
19		100 dia. D.I.C.L. 22½° bend with concrete thrust block
20		100 dia. D.I.C.L. 45° bend with concrete thrust block.
21		100 dia. D.I.C.L. 90° bend with concrete thrust block.
22		50 dia. 90° bend with concrete thrust block.
23		150 dia. D.I.C.L. Dead end cap with concrete thrust block.
24		100 dia. D.I.C.L. Dead end cap with concrete thrust block.
25		50 dia. D.I.C.L. Dead end cap with concrete thrust block.
	150 150 150	Proposed Water Main 150ø (Class 16)
	100	Proposed Water Main 100ø (Class 16)
	63 63	63OD: PE Pressure Pipe PE 100 Blue Stripe SDR11 PN16
	W W W	Existing Water Main

WATER RETICULATION NOTES

1. WATER SUPPLY PRESSURE PIPES TO COMPLY WITH AS1477.
2. WATER RETICULATION TO BE HYDRAULICALLY PRESSURE TESTED TO 1250 KPA AFTER LAYING AND BEFORE BEING CONNECTED TO THE EXISTING COUNCIL PIPELINE. THE TEST PRESSURE SHALL BE HELD FOR 15 MINUTES MIN. WITHOUT LOSS.
3. MINIMUM COVER TO ALL PIPES (TOP OF PIPE TO FINISHED SURFACE LEVEL) SHALL BE 600MM IN NON-TRAFFICKED AREAS AND 800MM IN TRAFFICKED AREAS.
4. WATER RETICULATION ALIGNMENT FOR ALL ROADS SHALL BE 2.0M FROM PROPERTY BOUNDARY.
5. WHERE NON-METALLIC PIPE IS LAID A CONTINUOUS STAINLESS STEEL WIRE, 1.6mm DIAMETER SHALL BE LAID IMMEDIATELY ABOVE THE FILL SAND. THIS WIRE SHALL BE WRAPPED ONCE AROUND ALL HYDRANTS AND SLUICE VALVES.
6. FOR MINIMUM BENDING RADIUS TO 63OD POLTETHYLENE REFER TO MANUFACTURERS SPECIFICATIONS.
7. BENDING OF PE PIPES IS PERMITTED. BENDING OF ALL OTHER PIPES IS NOT PERMITTED.
8. PROVIDE WATER SERVICE AND METER TO EACH PROPERTY.
9. PROPERTIES LOCATED ON THE OPPOSITE SIDE OF THE ROAD TO THE RETICULATION MAIN SHALL BE SERVICED BY A 63OD POLYETHYLENE LOOP PE100 BLUE STRIPE SDR11 PN16
10. RETICULATION MAINS TO BE 100 or 150Dia (As Noted) PVC Series 2 MIN PN16
11. PRESSURE AT EMERALD END ROAD TO BE CHECKED AGAINST FIRE FIGHTING FLOWS TO ACHIEVE 38M RESIDUAL PRESSURE (RL473.00)

FNQROC DRAWINGS

S2000A – MSC VALVE BOX INSTALLATION
S2005A – MSC HYDRANT BOX INSTALLATION
S2010D – KERB/ROAD MARKERS
S2015A – MSC THRUST BLOCK DETAILS
S2016B – WATER RETICULATION BEDDING DETAILS
S2020D – MSC MAIN CONNECTION DETAILS
S2060A – MSC DOMESTIC WATER SERVICE CONNECTION DETAILS

ISSUED FOR APPROVAL
JANUARY, 2022

Ref.	Revision Notes	Date	Sign
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DRAWN L.D. | CHECKED W.S. | APPROVED
CAD FILE: AUTOCAD JOBS\CRE17-018 OP WORKS DRAWINGS.DWG | DATE: 10/01/22

BENCHMARK SURVEY & DESIGN
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E: highdodd@westnet.com.au – M: 0447 616 747

ERSCON CONSULTING ENGINEERS

DATUMS:
GDA94 ZONE 55
AUSTRALIAN HEIGHT DATUM (AHD)

Client: CONMAT No 2 PTY LTD
Project: COUNTRY ROAD ESTATE - STAGES 3, 4, 5, 6 & 8
Title: WATER RETICULATION NOTES

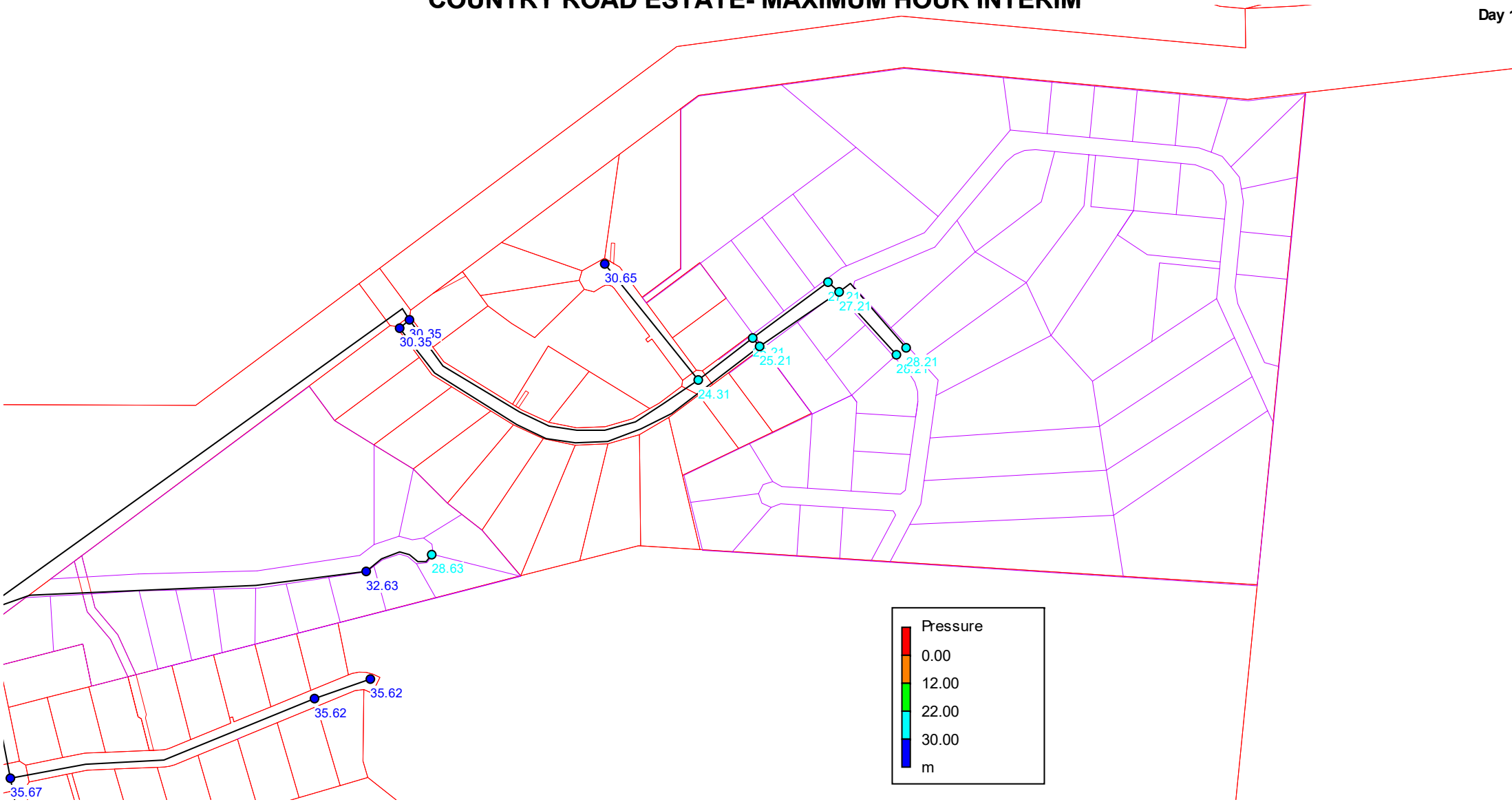
CRE17-018-C07
7/69 | B

COUNTRY ROAD ESTATE- MAXIMUM HOUR INTERIM

Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Demand LPS	Head m	Pressure m
Junc 6	403	16	1.54	435.63	32.63
Junc 8	407	0	0.00	435.63	28.63
Junc EXISTSUPPLY1	399	0	0.00	435.68	36.68
Junc EXISTSUPPLY2	410	0	0.00	435.21	25.21
Junc 11	410	685	65.76	435.60	25.60
Junc 36	400	0	0.00	435.62	35.62
Junc 37	400	17	1.63	435.62	35.62
Junc 39	400	0	0.00	435.67	35.67
Junc 40	408	5	0.48	435.21	27.21
Junc 2	400	0	0.00	439.14	39.14
Junc 3	410	0	0.00	435.21	25.21
Junc 4	405	6	0.58	435.35	30.35
Junc 5	405	0	0.00	435.35	30.35
Junc 13	408	0	0.00	435.21	27.21
Junc 14	410	0	0.00	438.73	28.73
Junc 16	410.9	11	1.06	435.21	24.31
Junc 17	404.5	10	0.96	435.15	30.65
Junc 10	407	3	0.29	435.21	28.21
Junc 12	407	0	0.00	435.21	28.21
Resvr 1	440	#N/A	-72.29	440.00	0.00

COUNTRY ROAD ESTATE- MAXIMUM HOUR INTERIM



COUNTRY ROAD ESTATE- MAXIMUM HOUR ULTIMATE

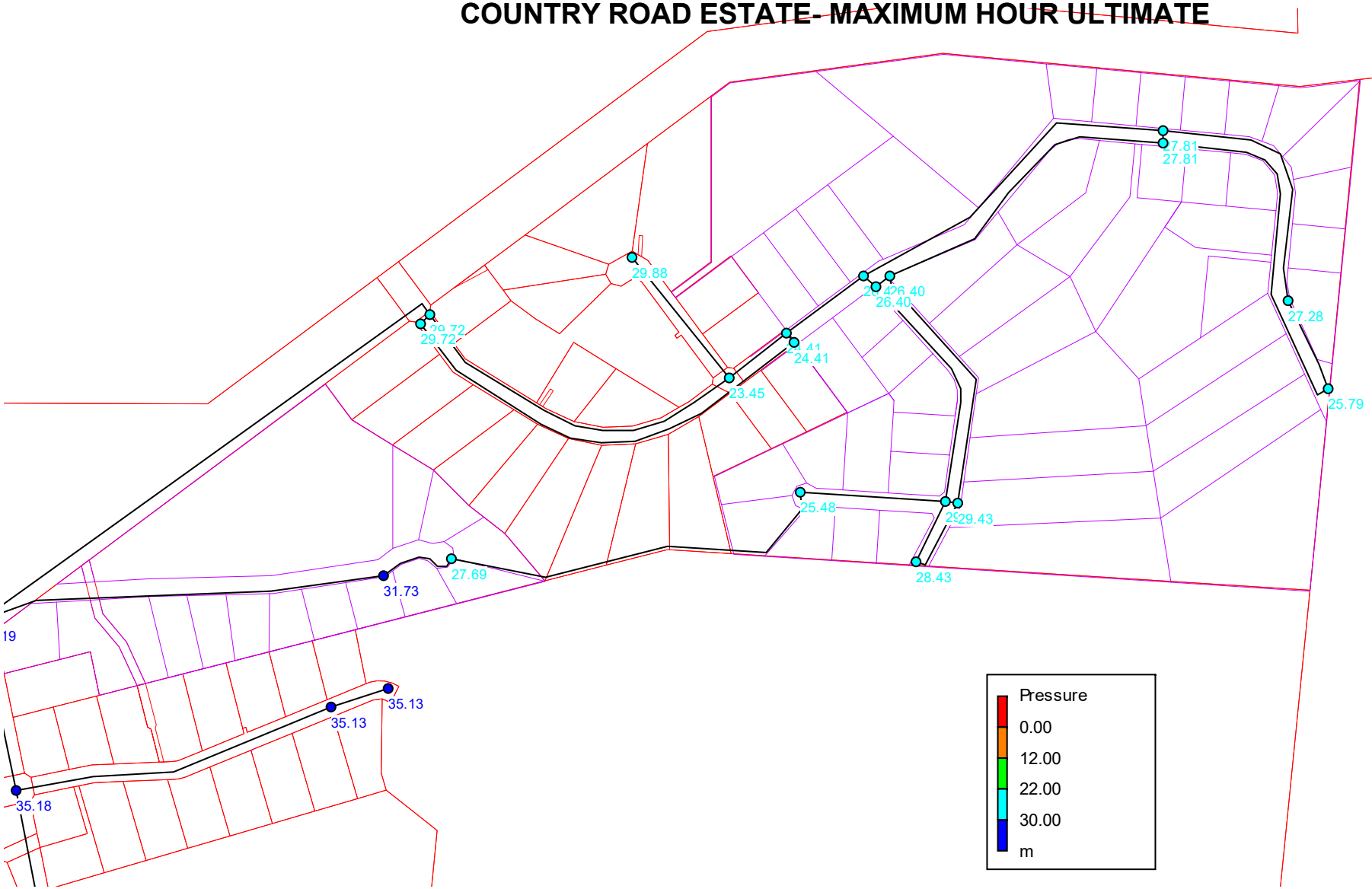
Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Demand LPS	Head m	Pressure m
Junc 6	403	16	1.54	434.73	31.73
Junc 8	407	0	0.00	434.69	27.69
Junc EXISTSUPPLY1	399	0	0.00	435.19	36.19
Junc EXISTSUPPLY2	410	17	1.63	434.41	24.41
Junc 22	407	16	1.54	434.28	27.28
Junc 23	408.5	0	0.00	434.29	25.79
Junc 31	405	9	0.86	434.43	29.43
Junc 33	406	0	0.00	434.43	28.43
Junc 11	410	685	65.76	435.17	25.17
Junc 36	400	0	0.00	435.13	35.13
Junc 37	400	17	1.63	435.13	35.13
Junc 39	400	0	0.00	435.18	35.18
Junc 40	408	7	0.67	434.40	26.40
Junc 2	400	0	0.00	439.06	39.06
Junc 3	410	0	0.00	434.41	24.41
Junc 4	405	0	0.00	434.72	29.72
Junc 5	405	0	0.00	434.72	29.72
Junc 7	408	0	0.00	434.40	26.40
Junc 9	406.5	8	0.77	434.31	27.81
Junc 10	406.5	0	0.00	434.31	27.81
Junc 12	405	0	0.00	434.43	29.43
Junc 13	408	0	0.00	434.40	26.40
Junc 14	410	0	0.00	438.60	28.60
Junc 15	409	8	0.77	434.48	25.48

COUNTRY ROAD ESTATE- MAXIMUM HOUR ULTIMATE

Node ID	Elevation m	Base Demand LPS	Demand LPS	Head m	Pressure m
Junc 16	411	0	0.00	434.45	23.45
Junc 17	404.5	10	0.96	434.38	29.88
Resvr 1	440	#N/A	-76.13	440.00	0.00

COUNTRY ROAD ESTATE- MAXIMUM HOUR ULTIMATE

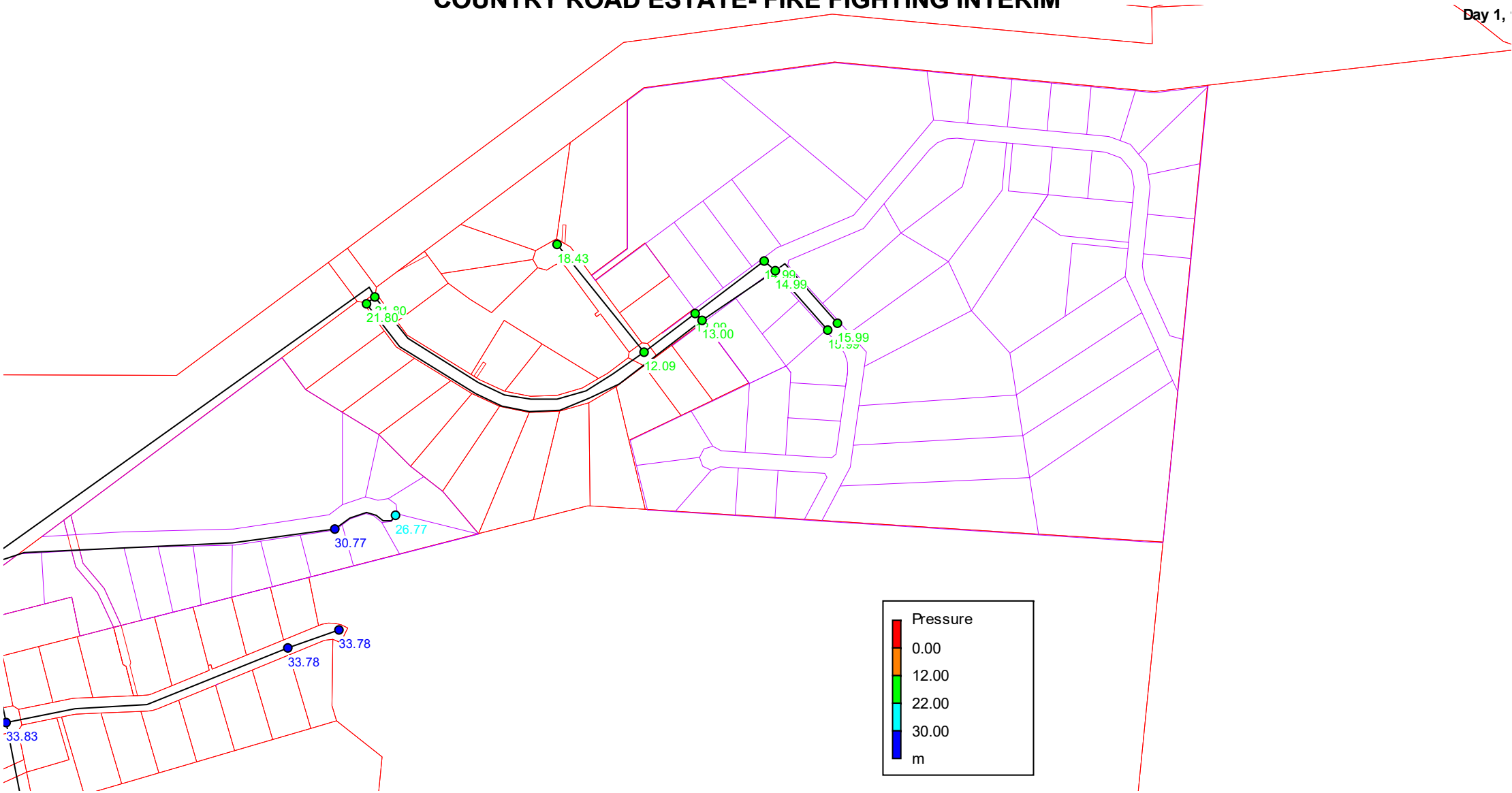


COUNTRY ROAD ESTATE- FIRE FIGHTING INTERIM

Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Demand LPS	Head m	Pressure m
Junc 6	403	16	1.54	433.77	30.77
Junc 8	407	0	0.00	433.77	26.77
Junc EXISTSUPPLY1	399	0	0.00	433.83	34.83
Junc EXISTSUPPLY2	410	0	0.00	422.99	12.99
Junc 11	410	685	65.76	433.93	23.93
Junc 36	400	0	0.00	433.78	33.78
Junc 37	400	17	1.63	433.78	33.78
Junc 39	400	0	0.00	433.83	33.83
Junc 40	408	5	0.48	422.99	14.99
Junc 2	400	0	0.00	438.81	38.81
Junc 3	410	0	0.00	423.00	13.00
Junc 4	405	6	0.58	426.80	21.80
Junc 5	405	0	0.00	426.80	21.80
Junc 13	408	0	0.00	422.99	14.99
Junc 14	410	0	0.00	438.23	28.23
Junc 16	410.9	157	15.07	422.99	12.09
Junc 17	404.5	10	0.96	422.93	18.43
Junc 10	407	3	0.29	422.99	15.99
Junc 12	407	0	0.00	422.99	15.99
Resvr 1	440	#N/A	-86.30	440.00	0.00

COUNTRY ROAD ESTATE- FIRE FIGHTING INTERIM



COUNTRY ROAD ESTATE- FIRE FIGHTING ULTIMATE

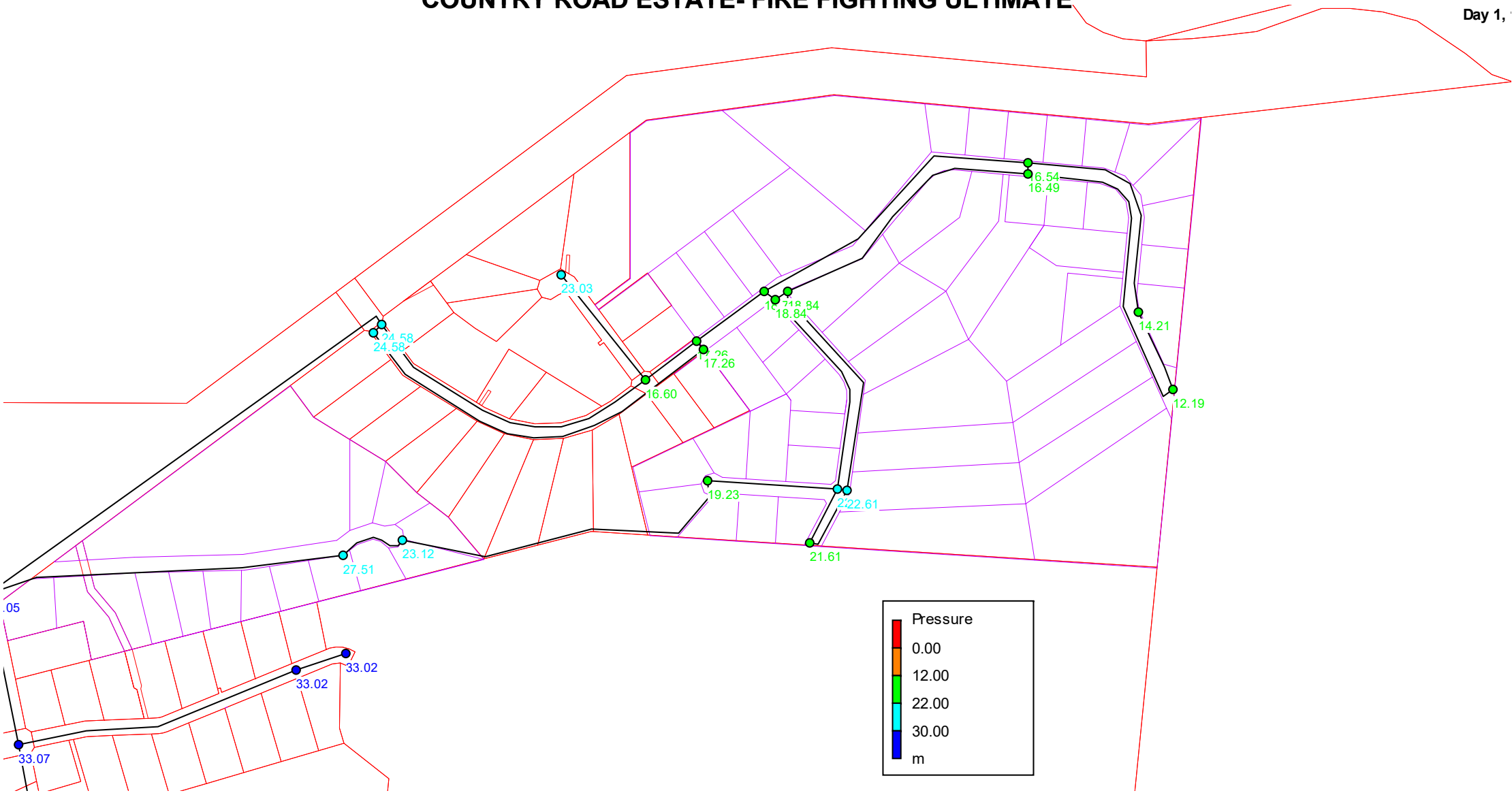
Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Demand LPS	Head m	Pressure m
Junc 6	403	16	1.54	430.51	27.51
Junc 8	407	0	0.00	430.12	23.12
Junc EXISTSUPPLY1	399	0	0.00	433.05	34.05
Junc EXISTSUPPLY2	410	17	1.63	427.26	17.26
Junc 22	407	16	1.54	421.21	14.21
Junc 23	408.5	156.3	15.00	420.69	12.19
Junc 31	405	9	0.86	427.61	22.61
Junc 33	406	0	0.00	427.61	21.61
Junc 11	410	685	65.76	433.31	23.31
Junc 36	400	0	0.00	433.02	33.02
Junc 37	400	17	1.63	433.02	33.02
Junc 39	400	0	0.00	433.07	33.07
Junc 40	408	7	0.67	426.79	18.79
Junc 2	400	0	0.00	438.69	38.69
Junc 3	410	0	0.00	427.26	17.26
Junc 4	405	0	0.00	429.58	24.58
Junc 5	405	0	0.00	429.58	24.58
Junc 7	408	0	0.00	426.84	18.84
Junc 9	406.5	8	0.77	423.04	16.54
Junc 10	406.5	0	0.00	422.99	16.49
Junc 12	405	0	0.00	427.61	22.61
Junc 13	408	0	0.00	426.84	18.84
Junc 14	410	0	0.00	438.04	28.04
Junc 15	409	8	0.77	428.23	19.23

COUNTRY ROAD ESTATE- FIRE FIGHTING ULTIMATE

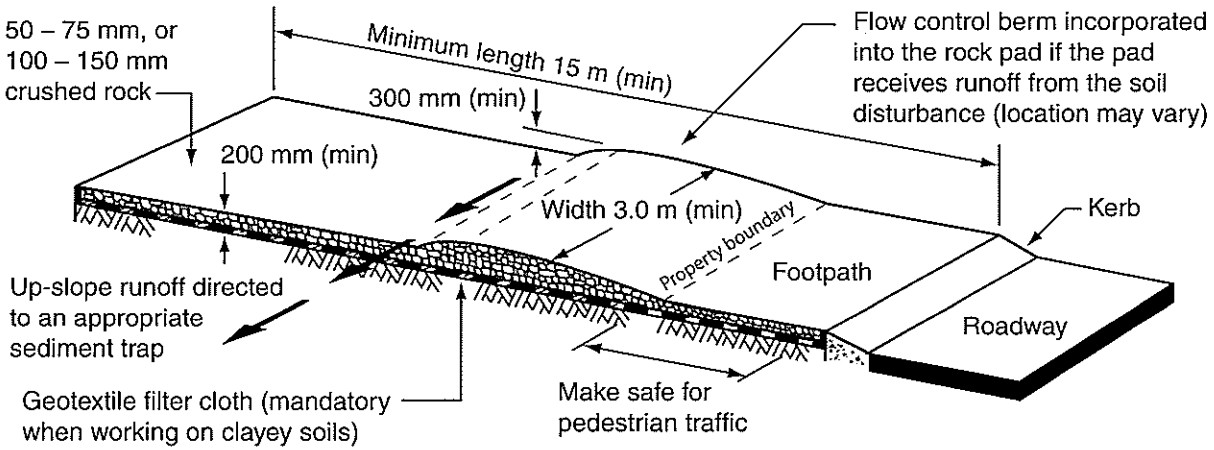
Node ID	Elevation m	Base Demand LPS	Demand LPS	Head m	Pressure m
Junc 16	411	0	0.00	427.60	16.60
Junc 17	404.5	10	0.96	427.53	23.03
Resvr 1	440	#N/A	-91.13	440.00	0.00

COUNTRY ROAD ESTATE- FIRE FIGHTING ULTIMATE

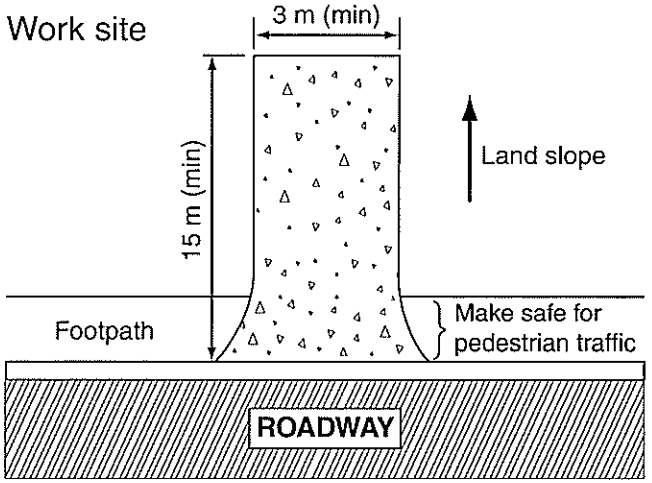


APPENDIX E

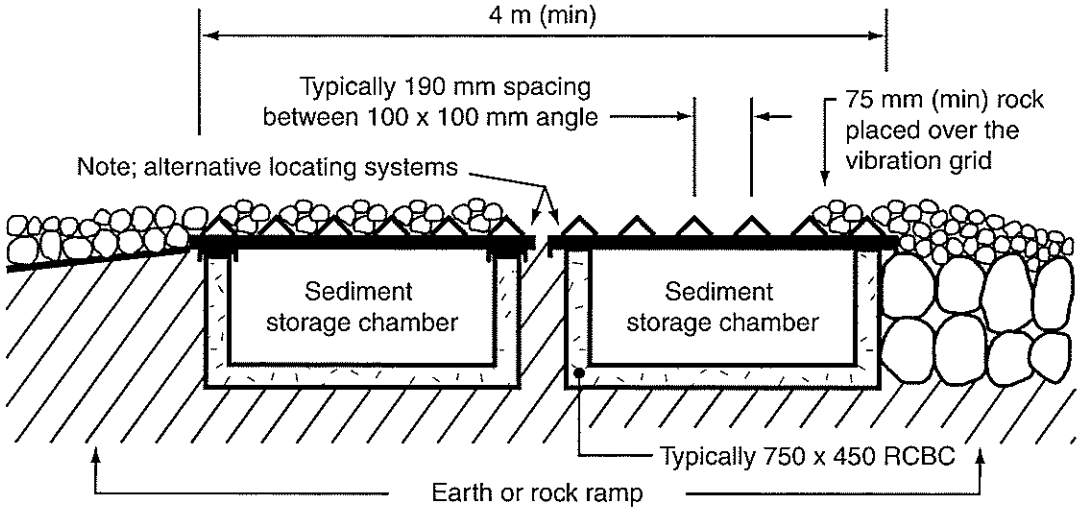
ESC Measures



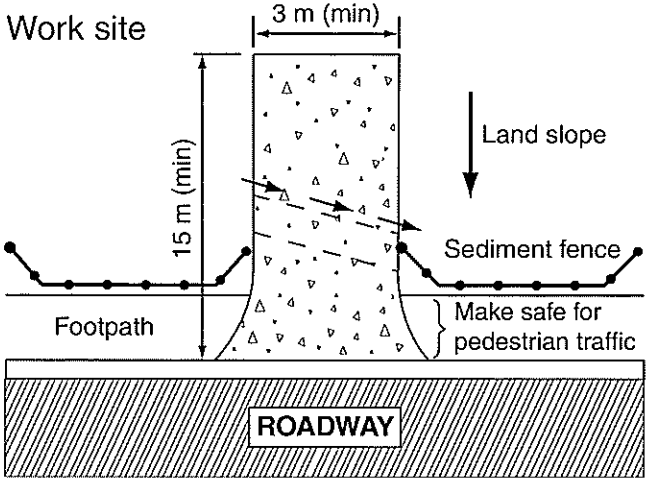
(a) Rock entry/exit pad for construction sites (refer to Standard Drawing Exit-03 for building sites)



(b) Rock pad sloping away from road



(c) Alternative low maintenance arrangement (still under development)



(d) Rock pad sloping towards the road

Drawn:	Date:		
GMW	Apr-10	Construction Exit - Rock Pad (construction sites only)	Exit-01

MATERIALS

ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, NOMINAL DIAMETER OF 50 TO 75mm (SMALL DISTURBANCES) OR 100 TO 150mm (LARGE DISTURBANCES). ALL REASONABLE MEASURES MUST BE TAKEN TO OBTAIN ROCK OF NEAR UNIFORM SIZE.

FOOTPATH STABILISING AGGREGATE: 25 TO 50mm GRAVEL OR AGGREGATE.

GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH ('BIDIM' A24 OR EQUIVALENT).

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION OF THE ROCK PAD, REMOVING STUMPS, ROOTS AND OTHER VEGETATION TO PROVIDE A FIRM FOUNDATION SO THAT THE ROCK IS NOT PRESSED INTO SOFT GROUND. CLEAR SUFFICIENT WIDTH TO ALLOW PASSAGE OF LARGE VEHICLES, BUT CLEAR ONLY THAT NECESSARY FOR THE EXIT. DO NOT CLEAR ADJACENT AREAS UNTIL THE REQUIRED EROSION AND SEDIMENT CONTROL DEVICES ARE IN PLACE.

3. IF THE EXPOSED SOIL IS SOFT, PLASTIC OR CLAYEY, PLACE A SUB-BASE OF CRUSHED ROCK OR A LAYER OF HEAVY-DUTY FILTER CLOTH TO PROVIDE A FIRM FOUNDATION.

4. PLACE THE ROCK PAD FORMING A MINIMUM 200mm THICK LAYER OF CLEAN, OPEN-VOID ROCK.

5. IF THE ASSOCIATED CONSTRUCTION SITE IS UP-SLOPE OF THE ROCK PAD, THUS CAUSING STORMWATER RUNOFF TO FLOW TOWARDS THE ROCK PAD, THEN FORM A MINIMUM 300mm HIGH FLOW CONTROL BERM ACROSS THE ROCK PAD TO DIVERT SUCH RUNOFF TO A SUITABLE SEDIMENT TRAP.

6. THE LENGTH OF THE ROCK PAD SHOULD BE AT LEAST 15m WHERE PRACTICABLE, AND AS WIDE AS THE FULL WIDTH OF THE ENTRY OR EXIT AND AT LEAST 3m. THE ROCK PAD SHOULD COMMENCE AT THE EDGE OF THE OFF-SITE SEALED ROAD OR PAVEMENT.

7. FLARE THE END OF THE ROCK PAD WHERE IT MEETS THE PAVEMENT SO THAT THE WHEELS OF TURNING VEHICLES DO NOT TRAVEL OVER UNPROTECTED SOIL.

8. IF THE FOOTPATH IS OPEN TO PEDESTRIAN MOVEMENT, THEN COVER THE COARSE ROCK WITH FINE AGGREGATE OR GRAVEL, OR OTHERWISE TAKE WHATEVER MEASURES ARE NEEDED TO MAKE THE AREA SAFE.

MAINTENANCE

1. INSPECT ALL SITE ENTRY AND EXIT POINTS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER RUNOFF-PRODUCING RAINFALL, OR OTHERWISE AT FORTNIGHTLY INTERVALS.

2. IF SAND, SOIL, SEDIMENT OR MUD IS TRACKED OR WASHED ONTO THE ADJACENT SEALED ROADWAY, THEN SUCH MATERIAL MUST BE PHYSICALLY REMOVED, FIRST USING A SQUARE-EDGED SHOVEL, AND THEN A STIFF-BRISTLED BROOM, AND THEN BY A MECHANICAL VACUUM UNIT, IF AVAILABLE.

3. IF NECESSARY FOR SAFETY REASONS, THE ROADWAY SHALL ONLY BE WASHED CLEAN AFTER ALL REASONABLE EFFORTS HAVE BEEN TAKEN TO SHOVEL AND SWEEP THE MATERIAL FROM THE ROADWAY.

4. WHEN THE VOIDS BETWEEN THE ROCK BECOMES FILLED WITH MATERIAL AND THE EFFECTIVENESS OF THE ROCK PAD IS REDUCED TO A POINT WHERE SEDIMENT IS BEING TRACKED OFF THE SITE, A NEW 100mm LAYER OF ROCK MUST BE ADDED AND/OR THE ROCK PAD MUST BE EXTENDED.

5. ENSURE ANY ASSOCIATED DRAINAGE CONTROL MEASURES (e.g. FLOW CONTROL BERM) ARE MAINTAINED IN ACCORDANCE WITH THEIR DESIRED OPERATIONAL CONDITIONS.

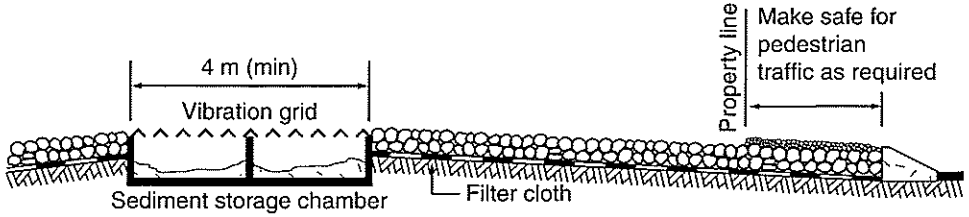
6. DISPOSE OF SEDIMENT AND DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

REMOVAL

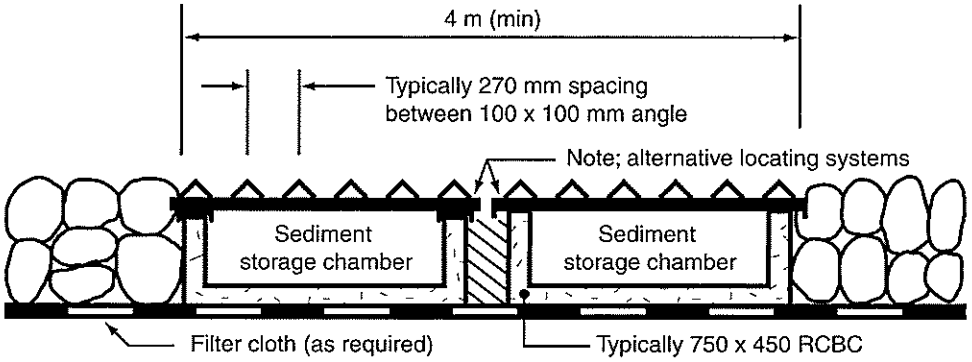
1. THE ROCK PAD SHOULD BE REMOVED ONLY AFTER IT IS NO LONGER NEEDED AS A SEDIMENT TRAP.

2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
3. RE-GRADE AND STABILISE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

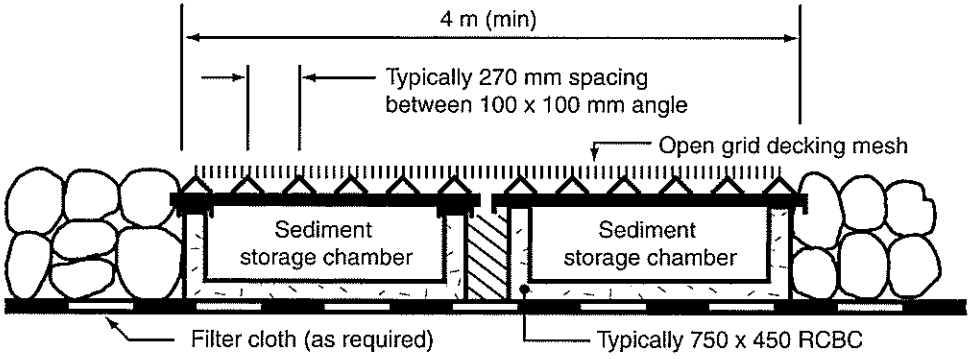
Drawn:	Date:		
GMW	Apr-10	Construction Exit - Rock Pad (construction sites only)	Exit-02



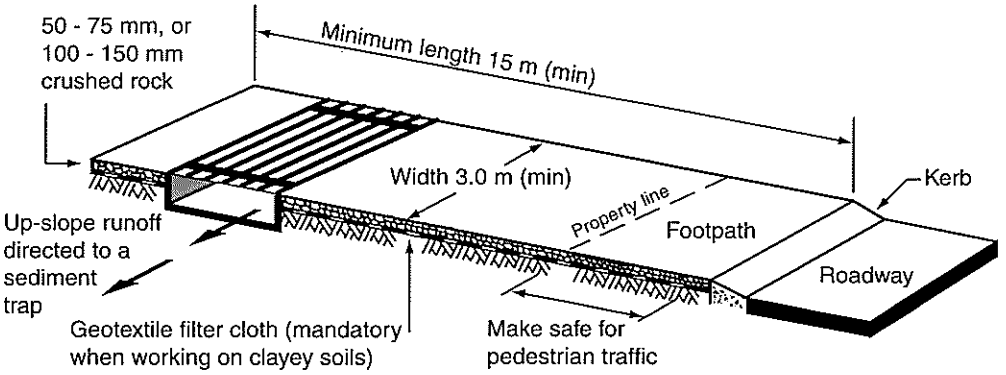
(a) Typical profile of a vibration grid



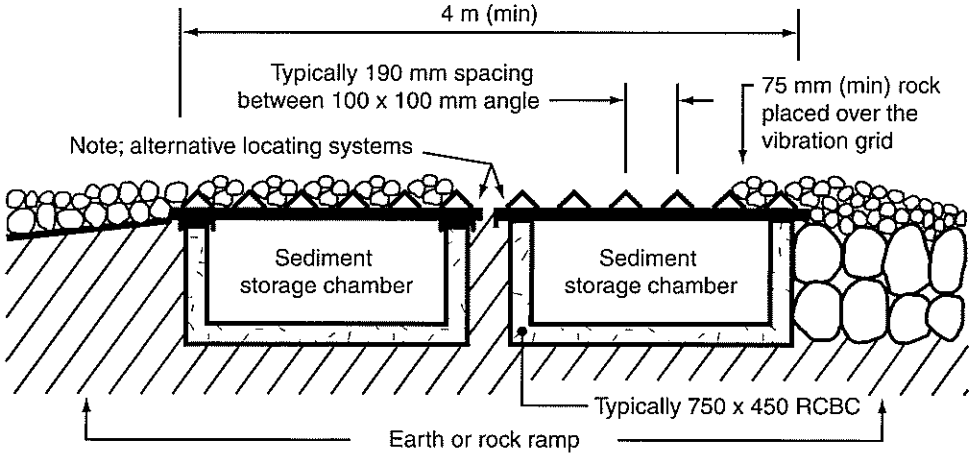
(b) Typical profile of the vibration panels



(c) Alternative, high travel speed arrangement (concept still under development)



(d) Typical layout of a vibration grid



(e) Alternative, medium travel speed arrangement (concept still under development)

Drawn:	Date:		
GMW	Dec-09	Construction Exit - Vibration Grid	Exit-04

MATERIALS

ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, NOMINAL DIAMETER OF 50 TO 75mm (SMALL DISTURBANCES) OR 100 TO 150mm (LARGE DISTURBANCES). ALL REASONABLE MEASURES MUST BE TAKEN TO OBTAIN ROCK OF NEAR UNIFORM SIZE.

FOOTPATH STABILISING AGGREGATE: 25 TO 50mm GRAVEL OR AGGREGATE.

GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH ('BIDIM' A24 OR EQUIVALENT).

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION OF THE VIBRATION GRID, REMOVING STUMPS, ROOTS AND OTHER VEGETATION TO PROVIDE A FIRM FOUNDATION SO THAT THE ROCK IS NOT PRESSED INTO SOFT GROUND. CLEAR SUFFICIENT WIDTH TO ALLOW PASSAGE OF LARGE VEHICLES, BUT CLEAR ONLY THAT NECESSARY FOR THE EXIT. DO NOT CLEAR ADJACENT AREAS UNTIL THE REQUIRED EROSION AND SEDIMENT CONTROL DEVICES ARE IN PLACE.

3. GRADE THE LOCATION OF THE VIBRATION GRID SO THAT RUNOFF FROM THE UNIT WILL NOT FLOW INTO THE STREET, BUT WILL FLOW TOWARDS AN APPROPRIATE SEDIMENT-TRAPPING DEVICE.

4. ENSURE THAT THE INSTALLATION OF THE VIBRATION GRID HAS ADEQUATE SEDIMENT STORAGE VOLUME UNDER THE GRID. WHERE NECESSARY, INSTALL SUITABLE PRECAST SEDIMENT COLLECTION CHAMBERS.

5. PLACE A ROCK PAD/RAMP FORMING A MINIMUM 200mm THICK LAYER OF CLEAN, OPEN-VOID ROCK OVER THE ROADWAY BETWEEN THE VIBRATION GRID AND THE SEALED STREET TO PREVENT TYRES FROM PICKING UP MORE SOIL AFTER THEY HAVE BEEN CLEANED.

6. THE TOTAL LENGTH OF THE VIBRATION GRID AND ROCK RAMPS SHOULD BE AT LEAST 15m WHERE PRACTICABLE, AND AS WIDE AS THE FULL WIDTH OF THE ENTRY OR EXIT AND AT LEAST 3m. THE ROCK RAMP SHOULD COMMENCE AT THE EDGE OF THE OFF-SITE SEALED ROAD OR PAVEMENT.

7. FLARE THE END OF THE ROCK PAD WHERE IT MEETS THE PAVEMENT SO THAT THE WHEELS OF TURNING VEHICLES DO NOT TRAVEL OVER UNPROTECTED SOIL.

8. IF THE FOOTPATH IS OPEN TO PEDESTRIAN MOVEMENT, THEN COVER THE COARSE ROCK WITH FINE AGGREGATE OR GRAVEL, OR OTHERWISE TAKE WHATEVER MEASURES ARE NEEDED TO MAKE THE AREA SAFE

MAINTENANCE

1. INSPECT VIBRATION GRID PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF-PRODUCING RAINFALL, OR OTHERWISE AT FORTNIGHTLY INTERVALS.

2. IF SAND, SOIL, SEDIMENT OR MUD IS TRACKED OR WASHED ONTO THE ADJACENT SEALED ROADWAY, THEN SUCH MATERIAL MUST BE PHYSICALLY REMOVED, FIRST USING A SQUARE-EDGED SHOVEL, AND THEN A STIFF-BRISTLED BROOM, AND THEN BY A MECHANICAL VACUUM UNIT, IF AVAILABLE.

3. IF NECESSARY FOR SAFETY REASONS, THE ROADWAY SHALL ONLY BE WASHED CLEAN AFTER ALL REASONABLE EFFORTS HAVE BEEN TAKEN TO SHOVEL AND SWEEP THE MATERIAL FROM THE ROADWAY.

4. WHEN THE VOIDS BETWEEN THE ROCK BECOMES FILLED WITH MATERIAL AND THE EFFECTIVENESS OF THE ROCK RAMPS ARE REDUCED TO A POINT WHERE SEDIMENT IS BEING TRACKED OFF THE SITE, A NEW 100mm LAYER OF ROCK MUST BE ADDED AND/OR THE ROCK PAD MUST BE EXTENDED.

5. ENSURE ANY ASSOCIATED DRAINAGE CONTROL MEASURES ARE MAINTAINED IN ACCORDANCE WITH THEIR DESIRED OPERATIONAL CONDITION.

6. DISPOSE OF SEDIMENT AND DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

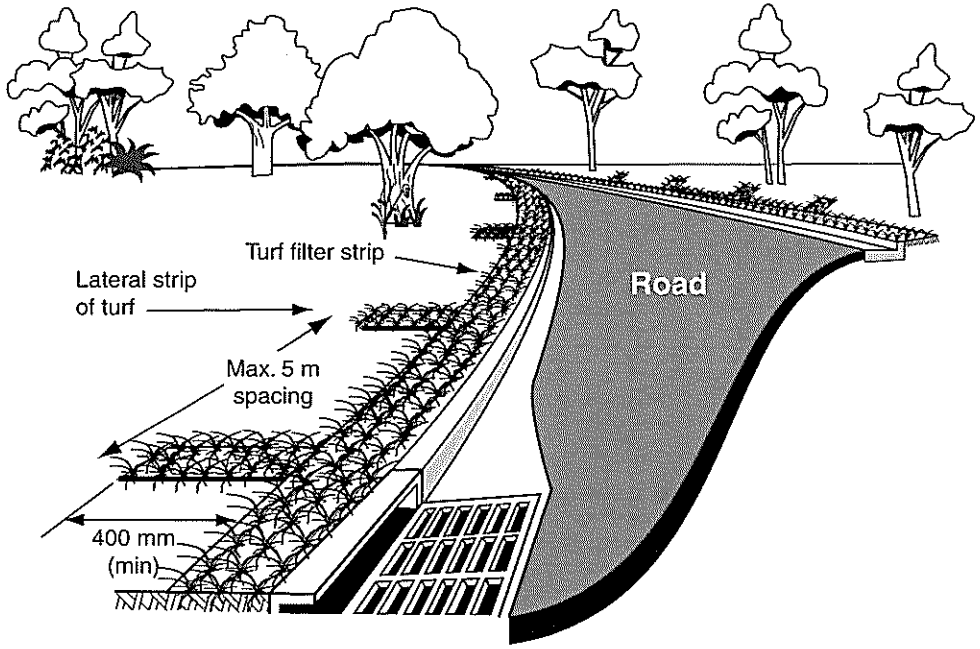
REMOVAL

1. THE VIBRATION GRID SHOULD BE REMOVED ONLY AFTER IT IS NO LONGER NEEDED AS A SEDIMENT CONTROL DEVICE.

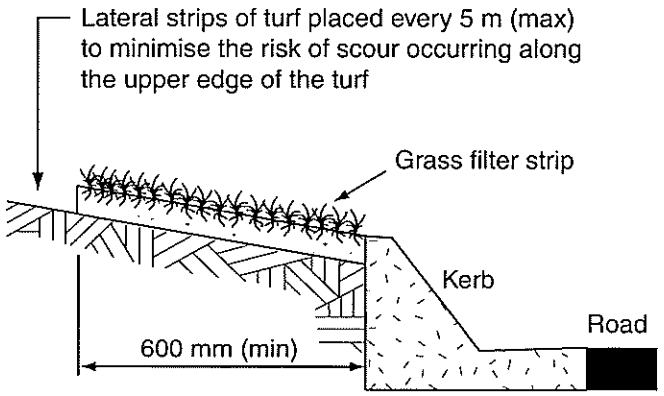
2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. RE-GRADE AND STABILISE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

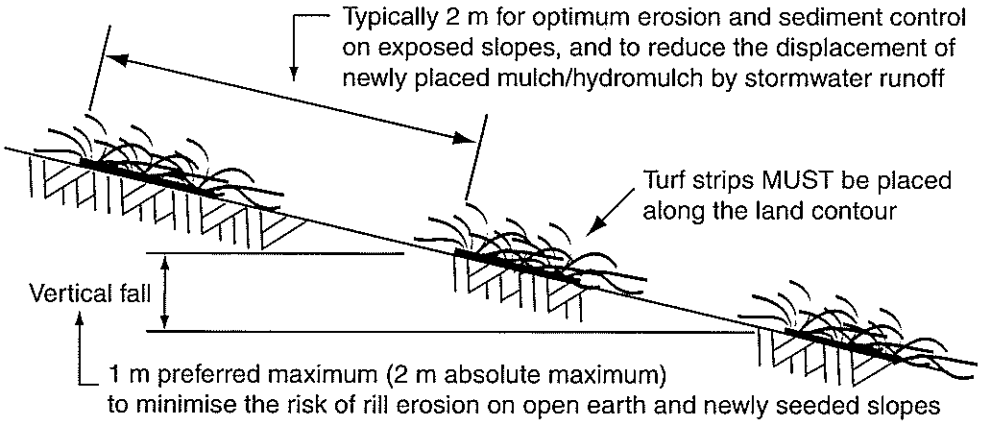
Drawn:	Date:		
GMW	Apr-10	Construction Exit - Vibration Grid	Exit-05



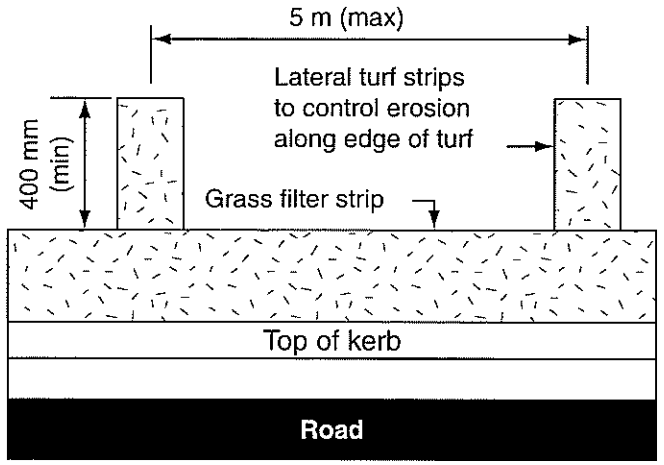
(a) Placement of grass filter strips along road kerb



(b) Placement of grass filter strips along edge of impervious surface



(c) Placement of grass filter strips along the contour of a slope



(d) Placement of grass filter strips along edge of impervious surface

Drawn:	Date:		
GMW	Dec-09	Grass Filter Strips	GFS-01

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE ALL NECESSARY SOIL TESTING (e.g. SOIL pH, NUTRIENT LEVELS) HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED, PRIOR TO PLANTING.

3. REMOVE ALL OBJECTIONABLE MATERIAL FROM THE AREA TO BE TURFED.

4. ALL TURF SHOULD BE USED WITHIN 12-HOURS OF DELIVERY, OTHERWISE ENSURE THE TURF IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER CONDITIONS.

5. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.

6. TURF SHOULD BE LAID ON A MINIMUM 75mm BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING THE TURF.

7. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES.

8. ENSURE THAT INTIMATE CONTACT IS ACHIEVED AND MAINTAINED BETWEEN THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS AVOIDED.

9. IF THE FILTER STRIPS ARE REQUIRED TO BE PLACED ALONG THE CONTOUR, THEN ENSURE EACH ROW OF TURF IS PLACED ALONG A LINE OF CONSTANT LAND ELEVATION.

10. IF THE FILTER STRIPS ARE PLACED AT AN ANGLE TO THE LAND SLOPE (i.e. SUCH THAT UP-SLOPE RUNOFF WILL BE DEFLECTED ALONG THE UPPER EDGE OF THE TURF), THEN LATERAL STRIPS OF TURF MUST BE PLACED AT MAXIMUM 5m INTERVALS AND EXTENDING AT LEAST 400mm UP-SLOPE OF THE FILTER STRIP.

11. WATER UNTIL THE SOIL IS WET 100mm BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH.

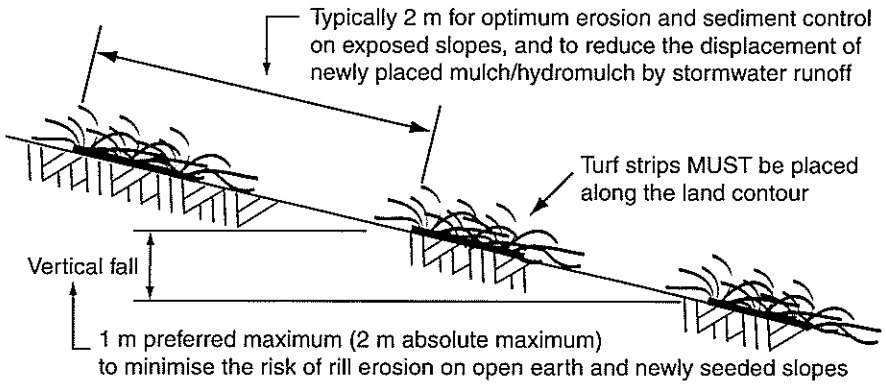
MAINTENANCE

1. INSPECT THE GRASS FILTER STRIPS AFTER EACH RUNOFF EVENT. CHECK FOR EVIDENCE OF CONCENTRATED RILL-FORMING FLOW ALONG THE UPPER EDGE OF THE TURF.

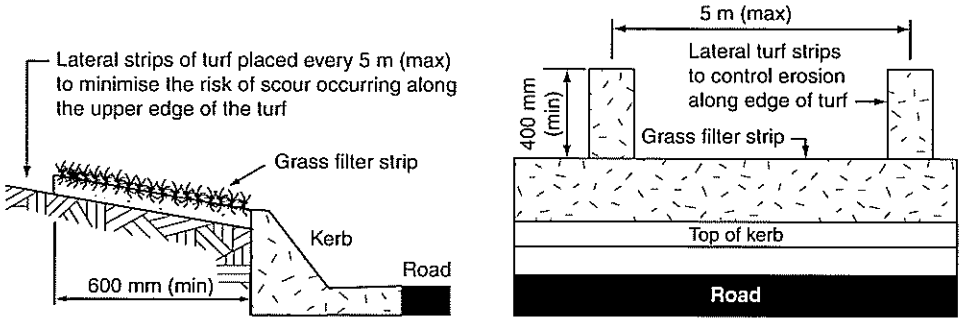
2. IF EXCESSIVE EROSION IS OCCURRING ALONG THE UP-SLOPE EDGE OF THE TURF, THEN PLACE ADDITIONAL DIAGONAL TURF STRIPS. ALTERNATIVELY, USE SANDBAGS TO APPROPRIATELY DIVERT RUNOFF THROUGH THE GRASS.

3. MAINTAIN A HEALTHY AND VIGOROUS GRASS CONDITION WHENEVER AND WHEREVER POSSIBLE, INCLUDING WATERING AND FERTILISING AS NEEDED.

4. WHERE PRACTICABLE, MAINTAIN A MINIMUM LEAF LENGTH OF 50mm. MOWING SHOULD NOT BE ATTEMPTED UNTIL THE TURF IS FIRMLY ROOTED, USUALLY 2 TO 3 WEEKS AFTER LAYING.



(a) Placement of grass filter strips along the contour of a slope



(b) Placement of grass filter strips along edge of impervious surface

Drawn:	Date:		
GMW	Apr-10	Grass Filter Strips	GFS-02

MATERIALS

(i) MULCH MUST COMPLY WITH THE REQUIREMENTS OF AS4454.

(ii) MAXIMUM SOLUBLE SALT CONCENTRATION OF 5dS/m.

(iii) MOISTURE CONTENT OF 30 TO 50% PRIOR TO APPLICATION.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND EXTENT. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, MATERIAL TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. WHEN SELECTING THE LOCATION OF A MULCH FILTER BERM, TO THE MAXIMUM DEGREE PRACTICAL, ENSURE THE BERM IS LOCATED:

(i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;

(ii) ALONG A LINE OF CONSTANT ELEVATION (PREFERRED, BUT NOT ALWAYS PRACTICAL);

(iii) AT LEAST 1m, IDEALLY 3m, FROM THE TOE OF A FILL EMBANKMENT;

(iv) AWAY FROM AREAS OF CONCENTRATED FLOW.

3. ENSURE THE BERM IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM, OR THE UNDESIRABLE DISCHARGE OF WATER AROUND THE END OF THE BERM.

4. ENSURE THE BERM HAS BEEN PLACED SUCH THAT PONDING UP-SLOPE OF THE BERM IS MAXIMISED.

5. ENSURE BOTH ENDS OF THE BERM ARE ADEQUATELY TURNED UP THE SLOPE TO PREVENT FLOW BYPASSING PRIOR TO WATER PASSING OVER THE BERM.

6. ENSURE 100% CONTACT WITH THE SOIL SURFACE.

7. WHERE SPECIFIED, TAKE APPROPRIATE STEPS TO VEGETATE THE BERM.

MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT ALL BERMS AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR OR REPLACE ANY DAMAGED SECTIONS.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 100mm OR 1/3 THE HEIGHT OF THE BERM.

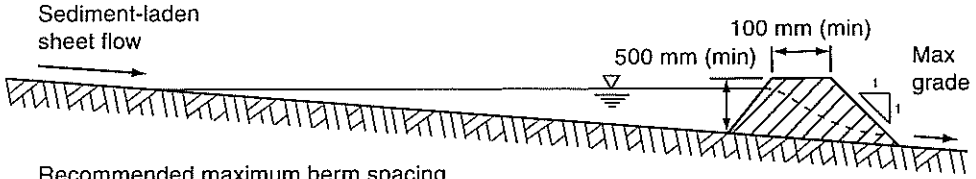
5. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL (IF REQUIRED)

1. WHEN DISTURBED AREAS UP-SLOPE OF THE BERM ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE BERM MAYBE REMOVED.

2. REMOVE ANY COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

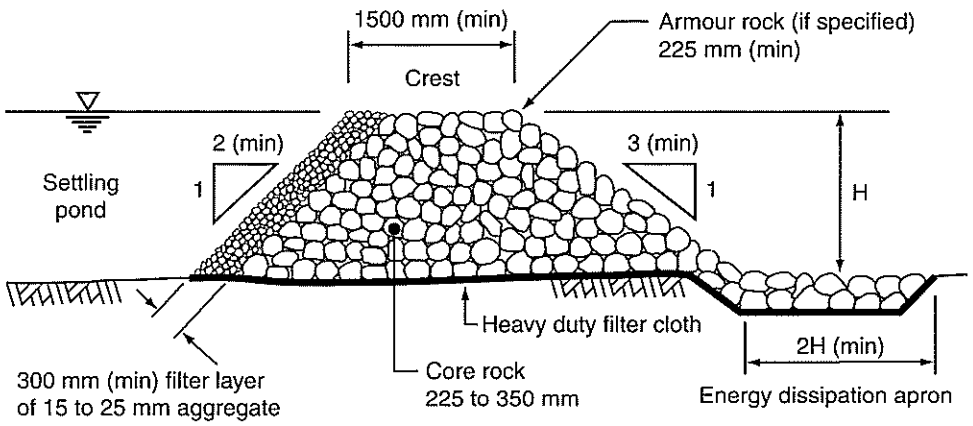


Recommended maximum berm spacing

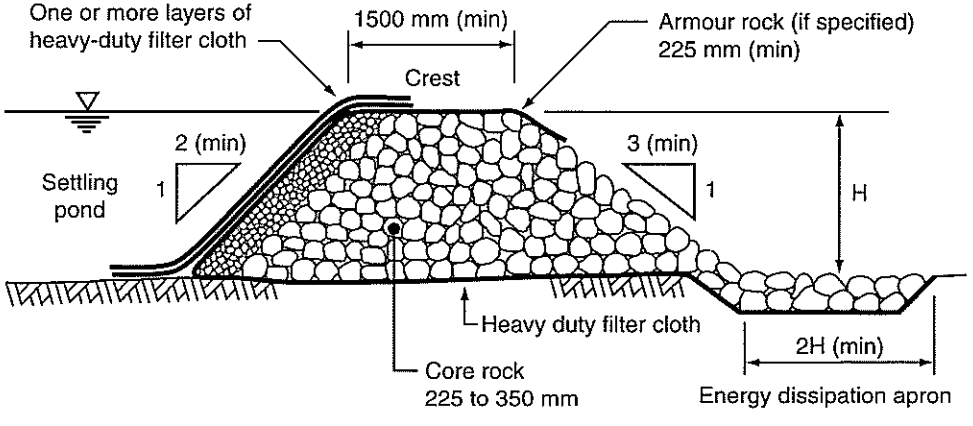
Land slope	Max spacing
< 2%	30 m
5%	25 m
10%	15 m
20%	8 m

Figure 1 - Typical placement of mulch filter berm

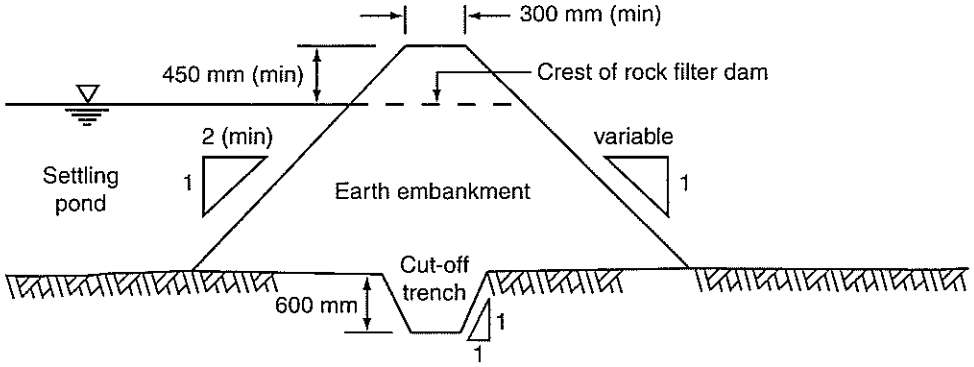
Drawn:	Date:		
GMW	Apr-10	Mulch Filter Berms	MB-01



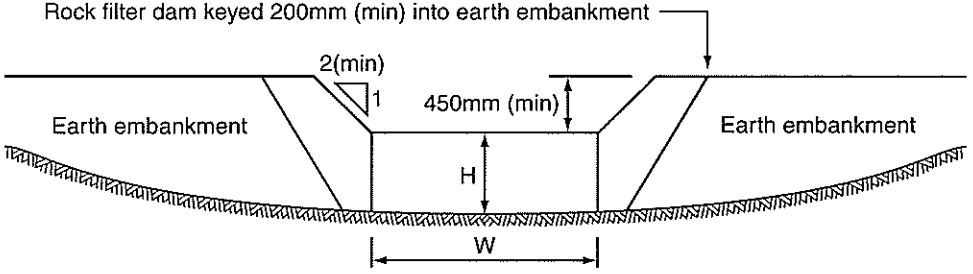
(a) Rock filter dam with aggregate filter



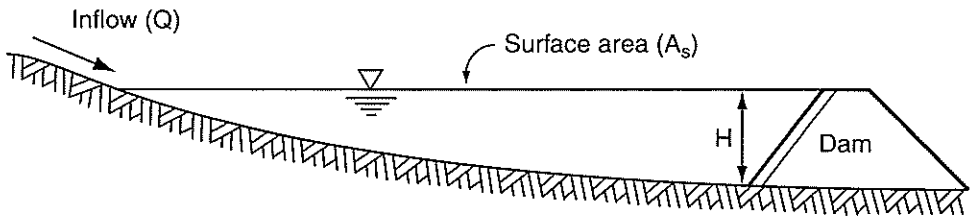
(b) Rock filter dam with geotextile and aggregate filter



(c) Typical cross-section of constructed earth abutment



(d) Typical profile of rock filter dam crest when integrated into an earth embankment



(e) Settling pond

Drawn:	Date:		
GMW	Feb-10	Rock Filter Dam	RFD-01

MATERIALS

PRIMARY CORE ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, WITH MEAN SIZE AS SPECIFIED IN THE APPROVED PLAN, BUT NOT LESS THAN 225mm, OR GREATER THAN 350mm.

ARMOUR ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, WITH MEAN SIZE AS SPECIFIED IN THE APPROVED PLAN, BUT NOT LESS THAN 225mm.

AGGREGATE FILTER: 15 TO 25mm CLEAN AGGREGATE.

GEOTEXTILE FILTER FABRIC: HEAVY-DUTY NON-WOVEN, NEEDLE-PUNCHED FILTER FABRIC, MINIMUM 'BIDIM' A34 OR EQUIVALENT.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE FOUNDATION AREA OF THE ROCK FILTER DAM OF WOODY VEGETATION AND ORGANIC MATTER. DELAY CLEARING THE UP-SLOPE POND AREA UNTIL THE DAM IS FORMED AND IS ABLE TO ACT AS A SUITABLE SEDIMENT TRAP, OTHERWISE AN ALTERNATIVE TEMPORARY DOWNSTREAM SEDIMENT TRAP MAY BE REQUIRED DURING CONSTRUCTION OF THE ROCK FILTER DAM.

3. IF SPECIFIED ON THE PLANS, EXCAVATE A CUT-OFF TRENCH ALONG THE CENTRE-LINE OF THE DAM AND EARTH ABUTMENTS (IF ANY).

4. COVER THE FOUNDATION AREA AND CUT-OFF TRENCH WITH HEAVY-DUTY FILTER FABRIC BEFORE BACKFILLING WITH THE CORE ROCK. OVERLAP ADJOINING FABRIC SHEETS A MINIMUM OF 600mm.

5. CONSTRUCT THE ASSOCIATED EARTH ABUTMENT (IF ANY). ALL CUT AND FILL SLOPES SHOULD BE 2:1(H:V) OR FLATTER. THE DOWNSTREAM FACE OF EARTH ABUTMENTS SHOULD BE 3:1(H:V) OR FLATTER. EARTH ABUTMENTS SHOULD BE CONSTRUCTED OF WELL-COMPACTED, EROSION RESISTANT SOIL THAT IS FREE OF VEGETATION AND ROOTS. OVERFILL EARTH ABUTMENTS 150mm TO ALLOW FOR SETTLEMENT.

6. PLACE THE CORE ROCK FOR THE ROCK FILTER DAM. ENSURE THE UPSTREAM FACE IS 2:1(H:V) OR FLATTER, AND THE DOWNSTREAM FACE IS 3:1(H:V) OR FLATTER.

7. ENSURE THE ROCK IS MACHINE PLACED WITH THE SMALLER ROCKS WORKED INTO THE VOIDS OF THE LARGER ROCKS.

8. IF SPECIFIED, CONSTRUCT THE SPILLWAY SECTION USING THE SPECIFIED ARMOUR ROCK. THE SPILLWAY SHOULD HAVE A MINIMUM PROFILE DEPTH OF 300mm. THE SPILLWAY WEIR CREST MUST BE LEVEL ACROSS ITS FULL WIDTH. THE MAXIMUM LONGITUDINAL SLOPE OF THE ROCK SPILLWAY SHOULD BE 3:1(H:V). THE MINIMUM THICKNESS OF ARMOUR ROCK PROTECTION SHOULD BE 500mm, OR TWICE THE NOMINAL ROCK SIZE, WHICHEVER IS THE GREATER.

9. ENSURE THE SPILLWAY OUTLET SECTION EXTENDS DOWNSTREAM PAST THE TOE OF THE FORMED EMBANKMENT UNTIL STABLE CONDITIONS ARE REACHED, OR A DISTANCE EQUAL TO THE HEIGHT OF THE DAM, WHICHEVER IS THE GREATER. THE EDGES OF THE SPILLWAY SHOULD BE LEFT FLUSH WITH THE SURROUNDING GROUND.

10. INSTALL THE SPECIFIED FILTER (AGGREGATE AND/OR FILTER CLOTH) ON THE UPSTREAM FACE OF THE ROCK FILTER DAM.

11. IF FILTER CLOTH IS USED, THEN:
(i) EXTEND THE FABRIC OVER THE CREST OF THE ROCK FILTER DAM INTO THE SPILLWAY CHUTE;
(ii) CONSIDER THE PLACEMENT OF SEVERAL LAYERS OF OVERLAPPING FABRIC, THUS ALLOWING EACH LAYER TO BE REMOVED INDIVIDUALLY ONCE THE FABRIC BECOMES BLOCKED WITH SEDIMENT.

12. CLEAR THE SETTLING POND AREA OF WOODY VEGETATION AND ORGANIC MATTER TO THE DIMENSIONS SPECIFIED WITHIN THE PLANS.

13. WHERE NECESSARY, EXCAVATE THE UPSTREAM SETTLING POND AND/OR SEDIMENT STORAGE PIT IN ACCORDANCE WITH THE APPROVED PLANS. EXCAVATED PITS TYPICALLY HAVE SIDE SLOPES OF 2:1(H:V) OR FLATTER UNLESS STEEPER SLOPES ARE KNOWN TO BE STABLE.

14. STABILISE ANY ASSOCIATED EARTH EMBANKMENTS IMMEDIATELY AFTER CONSTRUCTION THROUGH APPROPRIATE COMPACTION, VEGETATION AND/OR EROSION CONTROL MATTING.

15. ESTABLISH ALL NECESSARY UP-SLOPE DRAINAGE CONTROL MEASURES TO ENSURE THAT SEDIMENT-LADEN RUNOFF IS APPROPRIATELY DIRECTED INTO THE SEDIMENT TRAP.

16. TAKE ALL NECESSARY MEASURE TO MINIMISE THE SAFETY RISK CAUSED BY THE STRUCTURE.

MAINTENANCE

1. CHECK ALL ROCK FILTER DAMS AFTER EACH RUNOFF EVENT AND MAKE REPAIRS IMMEDIATELY.

2. INSPECT ALL ROCK AND EARTH EMBANKMENTS FOR UNDERCUTTING OR UNDESIRABLE SEEPAGE FLOWS.

3. IDEALLY, ROCK FILTER DAMS SHOULD DISCHARGE (FROM FULL) OVER NO LESS THAN 8 HOURS. IF DRAINAGE IS TOO RAPID, THEN ADDITIONAL FILTER AGGREGATE MAYBE REQUIRED TO ACHIEVE OPTIMUM HYDRAULIC PERFORMANCE.

4. IF FLOW THROUGH THE STRUCTURE IS REDUCED TO AN UNACCEPTABLE LEVEL, THE UPSTREAM FILTER MEDIUM (AGGREGATE OR FILTER CLOTH) SHOULD BE REMOVED AND REPLACED.

5. IF A GREATER DEGREE OF WATER TREATMENT (FILTRATION) IS REQUIRED, EXTRA GEOTEXTILE FILTER FABRIC SHOULD BE PLACED OVER THE UPSTREAM FACE OF THE STRUCTURE.

6. CHECK THE STRUCTURE AND DOWNSTREAM CHANNEL BANKS FOR DAMAGE FROM OVERTOPPING FLOWS. MAKE REPAIRS AS NECESSARY.

7. IMMEDIATELY REPLACE ANY ROCK DISPLACED FROM THE SPILLWAY.

8. REMOVE SEDIMENT AND RESTORE ORIGINAL SEDIMENT STORAGE VOLUME WHEN COLLECTED SEDIMENT EXCEEDS 10% OF THE SPECIFIED STORAGE VOLUME.

9. DISPOSE OF SEDIMENT AND DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN THE UP-SLOPE DRAINAGE AREA HAS BEEN STABILISED, REMOVE ALL MATERIALS INCLUDED DEPOSITED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

2. ALL WATER AND SEDIMENT SHOULD BE REMOVED FROM THE SETTLING POND PRIOR TO THE DAM'S REMOVAL. DISPOSE OF SEDIMENT AND WATER IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. BRING THE DISTURBED AREA TO A PROPER GRADE, THEN SMOOTH, COMPACT AND STABILISE AND/OR REVEGETATE AS REQUIRED TO MINIMISE THE EROSION HAZARD.

Drawn:	Date:		
GMW	Apr-10	Rock Filter Dam	RFD-02

MATERIALS

GEOTEXTILE FABRIC: NON-WOVEN FILTER CLOTH (MINIMUM 'BIDIM' A34 OR THE EQUIVALENT), WIDE STRIP TENSILE STRENGTH (AS3706.2) MINIMUM 15kN/m IN BOTH DIRECTIONS, PORE SIZE (EOS, O95, AS 3706.7) LESS THAN 110mm, MASS PER UNIT AREA (AS3706.1) MINIMUM 200GSM.

SUPPORT POSTS/STAKES: 1500mm^2 (MIN) HARDWOOD, 2500mm^2 (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

BACKING MESH: PLASTIC OR STEEL MESH WITH A MAXIMUM MESH OPENING OF 200mm.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. UNLESS OTHERWISE DIRECTED BY THE RESPONSIBLE ON-SITE OFFICER, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED ALIGNMENT OF THE FILTER FENCE, PLACING THE EXCAVATED MATERIAL UP-SLOPE OF THE FENCE.

3. IF THE FILTER FENCE IS TO BE STAKED WITHOUT A MESH BACKING, THEN SECURE THE SUPPORT POSTS INTO THE GROUND AT A SPACING NO GREATER THAN 1.5m.

4. IF THE FILTER FENCE IS TO BE STAKED WITH A MESH BACKING, SECURE THE SUPPORT POSTS INTO THE GROUND AT A SPACING NO GREATER THAN 2.0m, THEN SECURELY ATTACH THE BACKING MESH TO THE UP-SLOPE SIDE OF THE SUPPORT POSTS FROM A CONTINUOUS LENGTH OF MESH. EXTEND THE MESH INTO THE EXCAVATED TRENCH.

5. IF THE FILTER FENCE IS THE BE SUPPORTED BY STRAW BALES, THEN AFTER SUITABLE ANCHORING THE BOTTOM 300mm OF FABRIC, PLACE A CONTINUOUS ROW OF STRAW BALES IMMEDIATELY DOWN-SLOPE OF THE FABRIC AND WRAP THE FABRIC OVER THE TOP OF THE STRAW BALES. SECURELY ANCHOR THE FILTER FENCE WITH A SINGLE STAKE DRIVEN THROUGH THE FABRIC AND CENTRE OF EACH BALE.

6. USING A CONTINUOUS LENGTH OF NON-WOVEN GEOTEXTILE, SECURELY ATTACH THE FABRIC TO THE UP-SLOPE SIDE OF THE SUPPORT POSTS OR BACKING MESH, WITH THE FABRIC EXTENDED AT LEAST 200mm INTO THE TRENCH.

7. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC TO PREVENT DISPLACEMENT OF THE FABRIC AND TO PREVENT THE FREE MOVEMENT OF WATER UNDER THE FABRIC.

8. IN ALL CASES, INSTALL THE FILTER FENCE IN A MANNER THAT WILL MINIMISE THE RISK OF SEDIMENT-LADEN WATER FLOWING AROUND THE FENCE.

MAINTENANCE

1. INSPECT THE FILTER FENCE REGULARLY AND AT LEAST DAILY DURING DE-WATERING OPERATIONS. MAKE REPAIRS AS NEEDED TO THE FABRIC AND SUPPORT FRAME.

2. INSPECT THE FABRIC FOR OBVIOUS LEAKS RESULTING FROM HOLES, TEARS OR JOINT FAILURE IN THE FABRIC.

3. CHECK THAT WATER HAS NOT OVERTOPPED THE FENCE AT LOW POINTS.

4. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC PLACED INSIDE THE OLD FABRIC, EXTENDING AT LEAST FROM SUPPORT POST TO SUPPORT POST.

5. CHECK FOR MATERIALS LEANING UP AGAINST THE FILTER FENCE. MAKE REPAIRS AS NEEDED TO THE FABRIC AND SUPPORT FRAME.

REMOVAL

1. REMOVE ALL ACCUMULATED SEDIMENT AND DISPOSE OF IT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

2. REMOVE ALL MATERIALS AND REPAIR DAMAGE TO THE GROUND SURFACE AS NECESSARY.

3. APPROPRIATELY REHABILITATE (E.G. REVEGETATE) THE GROUND AS NECESSARY TO MINIMISE THE RISK OF AN ONGOING EROSION HAZARD.

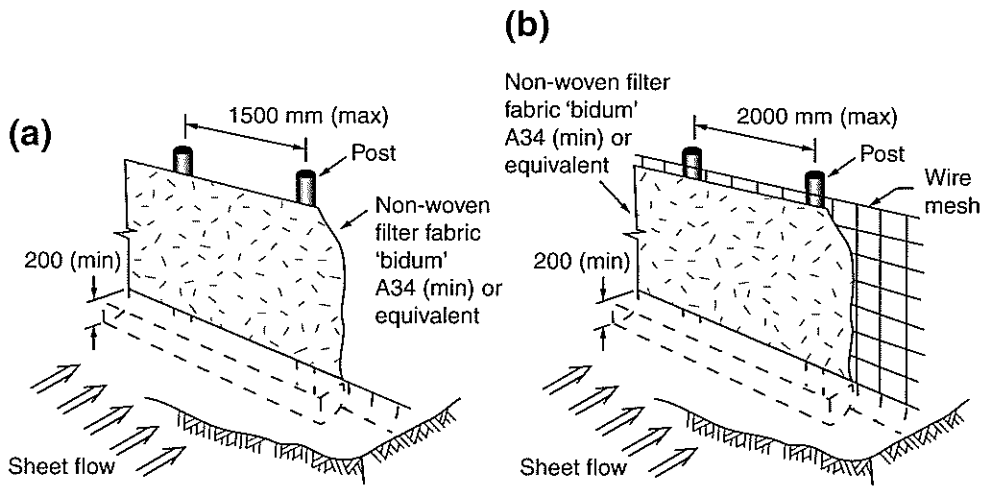


Figure 1 - Various installation methods

Drawn:	Date:		
GMW	Apr-10	Filter Fence	FF-01

MATERIALS

ROCK: 150 TO 300mm EQUIVALENT DIAMETER, HARD, EROSION RESISTANT ROCK.

SANDBAGS: GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, OR COMPOST.

INSTALLATION (ROCK CHECK DAM)

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO PLACEMENT OF THE SEDIMENT TRAP, ENSURE THE DRAINAGE CHANNEL IS DEEP ENOUGH TO PREVENT WATER BEING UNSAFELY DIVERTED OUT OF THE DRAIN ONCE THE CHECK DAMS ARE INSTALLED.

3. LOCATE EACH CHECK DAM SEDIMENT TRAP AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED SEDIMENT TRAPPING OUTCOMES.

4. IF THE CHECK DAMS ARE ALSO BEING USED TO CONTROL EROSION WITHIN THE DRAINAGE CHANNEL, THEN LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM CHECK DAM.

5. CONSTRUCT EACH CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.

6. WHERE SPECIFIED, THE CHECK DAMS MUST BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.

7. EACH CHECK DAM MUST BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150mm ABOVE THE CREST LEVEL OF THE DAM.

INSTALLATION (COMPOST-FILLED SOCKS)

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO PLACEMENT OF THE SEDIMENT TRAP, ENSURE THE DRAINAGE CHANNEL IS DEEP ENOUGH TO PREVENT WATER BEING UNSAFELY DIVERTED OUT OF THE DRAIN ONCE THE CHECK DAMS ARE INSTALLED.

3. LOCATE EACH SOCK AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED SEDIMENT TRAPPING OUTCOMES.

4. PLACE EACH SOCK TO THE LINES AND PROFILE SHOWN IN THE APPROVED PLAN OR AS DIRECTED BY THE SITE SUPERVISOR.

5. ENSURE EACH SOCK EXTENDS UP THE CHANNEL BANKS (WHERE PRACTICAL) TO A LEVEL AT LEAST 100mm ABOVE THE CREST LEVEL OF THE CHECK DAM.

MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF THE DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.

3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS.

4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.

5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.

6. DE-SILT SEDIMENT TRAP IF THE SEDIMENT LEVEL EXCEEDS 1/3 THE CREST HEIGHT.

7. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED AND DISTURBED AREAS SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE DAMS MUST BE REMOVED, UNLESS THE SEDIMENT TRAPS ARE TO REMAIN AS A PERMANENT FEATURE.

2. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REMOVE AND APPROPRIATELY DISPOSE OF ALL MATERIALS INCLUDING ANY GEOTEXTILE FABRIC.

4. STABILISE THE DISTURBED CHANNEL WITH A LINING OF FABRIC AND ROCK, OR ESTABLISH VEGETATION AS APPROPRIATE.

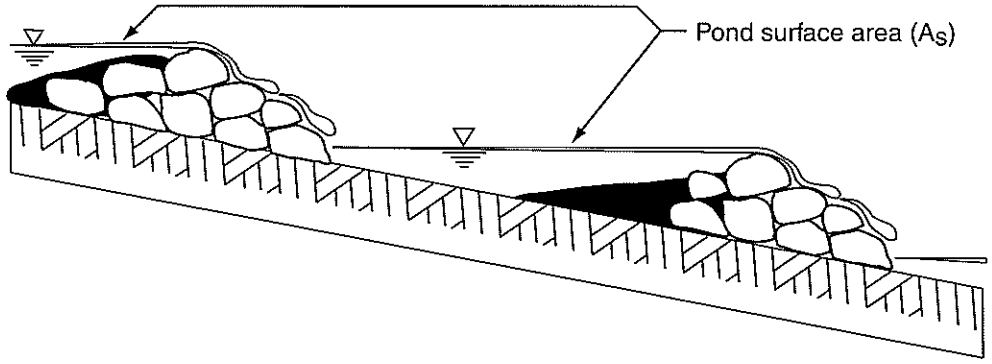


Figure 1 - Placement of check dam sediment traps

Drawn:	Date:		
GMW	Apr-10	Check Dam Sediment Trap	CDT-01

PREPARATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, OR EXTENT, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. TAKE ALL NECESSARY STEPS TO ENSURE DISTURBANCE TO THE BUFFER ZONE IS MINIMISED THROUGHOUT THE TIME IT IS USED AS A SEDIMENT TRAP.

3. TO THE MAXIMUM DEGREE PRACTICABLE, ENSURE FLOW PASSING THROUGH THE BUFFER ZONE IS NOT ALLOWED TO CONCENTRATE WITHIN DRAINAGE DEPRESSIONS, SWALES, RILLS OR WHEEL TRACKS.

4. WHERE NECESSARY, INSTALL APPROPRIATE DRAINAGE CONTROLS UP-SLOPE OF THE BUFFER ZONE TO DISTRIBUTE THE INFLOW ALONG THE FULLY LENGTH OF THE BUFFER ZONE AS 'SHEET FLOW'.

5. WHERE NECESSARY, INSTALL A COARSE SEDIMENT TRAP, SUCH AS A SEDIMENT FENCE, UP-SLOPE OF THE BUFFER ZONE TO REDUCE THE QUANTITY OF SEDIMENT PASSING ONTO THE GRASS. GENERALLY THIS IS REQUIRED IF LARGE QUANTITIES OF COARSE SEDIMENT ARE EXPECTED.

6. IF REQUIRED, INSTALL A LIGHT BARRIER FENCE TO CLEARLY IDENTIFY THE BUFFER ZONE AND HELP EXCLUDE CONSTRUCTION TRAFFIC.

MAINTENANCE

1. INSPECT THE BUFFER ZONE ON A REGULAR BASIS AND AFTER RUNOFF-PRODUCING RAINFALL.

2. ENSURE THAT THERE IS NO SOIL EROSION AND THAT SEDIMENT DEPOSITION IS NOT CAUSING THE CONCENTRATION OF FLOW THROUGH THE BUFFER ZONE, OR FLOW BYPASSING.

3. IF THE BUFFER ZONE HAS BEEN DISTURBED, TAKE NECESSARY STEPS TO RE-ESTABLISH SUITABLE SHEET FLOW CONDITIONS.

4. REMOVE EXCESSIVE ACCUMULATIONS OF SEDIMENT THAT MAY CAUSE THE CONCENTRATION OF FLOW. EXCESSIVE SEDIMENT SHOULD BE REMOVED AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT, OR WHERE APPROPRIATE, EVENLY RAKED INTO THE SOIL. SEDIMENT SHOULD BE REMOVED IN A MANNER THAT AVOIDS DAMAGE TO THE BUFFER ZONE OR THE CREATION OF WHEEL TRACKS DOWN THE SLOPE.

5. EXCESSIVE SEDIMENT MAY BE DEFINED AS:

(i) ANY SEDIMENT THAT COVERS A PORTION OF THE GRASSED SURFACE; OR

(ii) SEDIMENT DEPOSITION SUCH THAT THE GRASS STRAND HEIGHT ABOVE THE SEDIMENT IS LESS THAN 50mm; OR

(iii) A DEPOSITION OF SEDIMENT IN EXCESS OF 750g/m^2 (APPROXIMATELY THE EQUIVALENT OF THREE 70mm DIAMETER BALLS OF DRY SOIL).

6. THE SOURCE OF ANY EXCESSIVE SEDIMENT SHOULD BE INVESTIGATED AND CONTROLLED WHERE PRACTICAL.

7. TAKE APPROPRIATE STEPS TO MAINTAIN AT LEAST 75% GRASS COVER OVER THE BUFFER ZONE.

8. WHERE PRACTICAL, MAINTAIN ANY GROUNDCOVER VEGETATION AT A HEIGHT GREATER THAN THE EXPECTED DEPTH OF WATER FLOW AND AT LEAST 50mm.

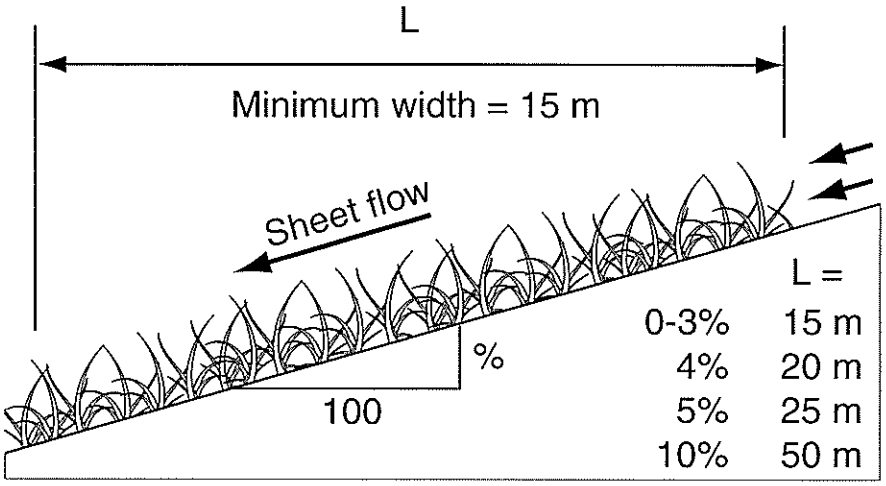
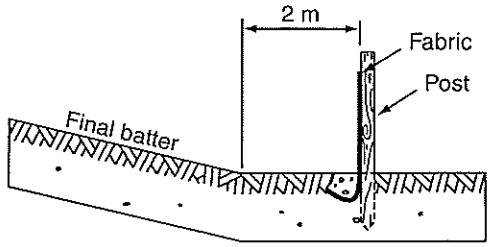
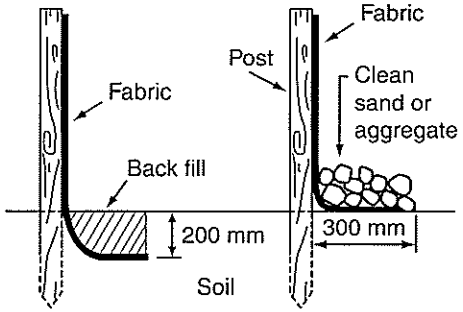


Figure 1 - Minimum dimensional requirements of a grassed buffer zone

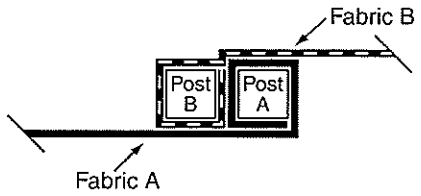
Drawn:	Date:		
GMW	Apr-10	Buffer Zones (grassed)	BZ-01



(a) Location of fence relative to base of slope

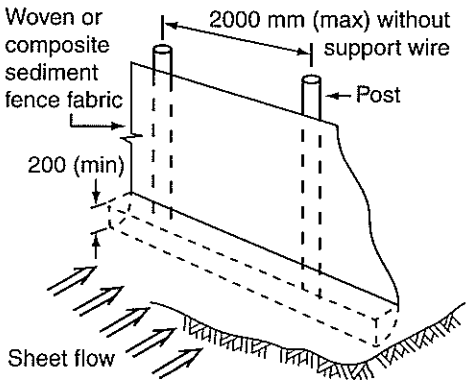


(b) Anchoring base of fabric

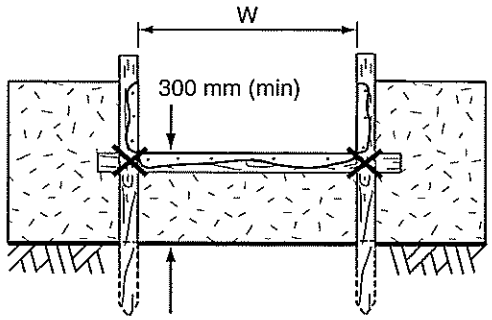


Fabric to fold around each stake one full turn.
Stake B to be drive tightly against Stake A.
The tops of both stakes to be secured with wire.

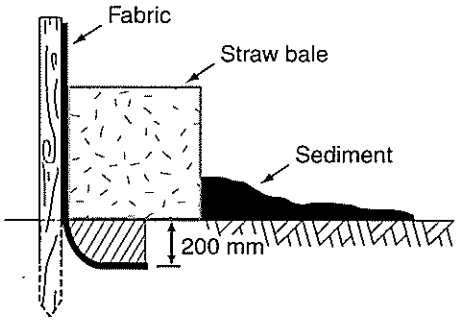
(c) Joining fabric - Method 1



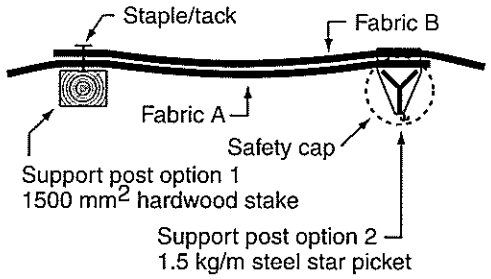
(d) Installation without backing support



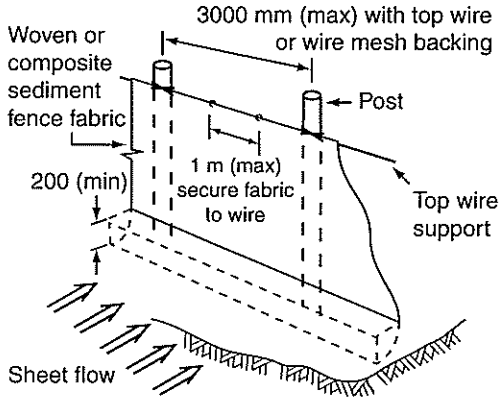
(e) Spill-through weir



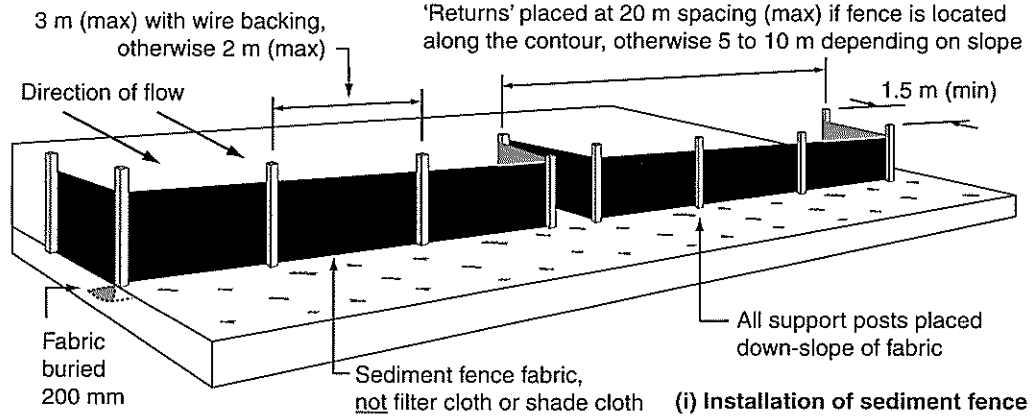
(f) Placement of up-slope straw bale



(g) Joining fabric - Method 2



(h) Installation with top wire support



(i) Installation of sediment fence

Notes:

1. Sediment fence to be installed along a line of constant ground elevation wherever practical.
2. Both end of the sediment fence to extend up the slope at least 1m.
3. Support post to be spaced a maximum 2m unless the fence is supported by a top wire or wire mesh backing, in which case 3m maximum spacing.
4. Fence 'returns' shall be installed at maximum 20m spacing if fence is installed along the contour, otherwise 5 to 10m maximum spacing.
5. Minimum 4 staples or tie wires per stake.

Drawn:	Date:		
GMW	Dec-09	Sediment Fence	SF-01

MATERIALS

FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140GSM. ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

FABRIC REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm.

SUPPORT POSTS/STAKES: 1500mm^2 (MIN) HARDWOOD, 2500mm^2 (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED:
(i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;
(ii) ALONG A LINE OF CONSTANT ELEVATION WHEREVER PRACTICAL;
(iii) AT LEAST 2m FROM THE TOE OF ANY FILLING OPERATIONS THAT MAY RESULT IN SHIFTING SOIL/FILL DAMAGING THE FENCE.

3. INSTALL RETURNS WITHIN THE FENCE AT MAXIMUM 20m INTERVALS IF THE FENCE IS INSTALLED ALONG THE CONTOUR, OR 5 TO 10m MAXIMUM SPACING (DEPENDING ON SLOPE) IF THE FENCE IS INSTALLED AT AN ANGLE TO THE CONTOUR. THE 'RETURNS' SHALL CONSIST OF EITHER:
(i) V-SHAPED SECTION EXTENDING AT LEAST 1.5m UP THE SLOPE; OR
(ii) SANDBAG OR ROCK/AGGREGATE CHECK DAM A MINIMUM 1/3 AND MAXIMUM 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5m UP THE SLOPE.

4. ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5m, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE FENCE.

5. ENSURE THE SEDIMENT FENCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FENCE, AND THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE FENCE.

6. IF THE SEDIMENT FENCE IS TO BE INSTALLED ALONG THE EDGE OF EXISTING TREES, ENSURE CARE IS TAKEN TO PROTECT THE TREES AND THEIR ROOT SYSTEMS DURING INSTALLATION OF THE FENCE. DO NOT ATTACH THE FABRIC TO THE TREES.

7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED FENCE LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.

8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAKES INTO THE GROUND SPACED NO GREATER THAN 3m IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO GREATER THAN 2m.

9. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE UP-SLOPE SIDE OF THE STAKES WITH THE MESH EXTENDING AT LEAST 200mm INTO THE EXCAVATED TRENCH. ENSURE THE MESH AND FABRIC IS ATTACHED TO THE UP-SLOPE SIDE OF THE STAKES EVEN WHEN DIRECTING A FENCE AROUND A CORNER OR SHARP CHANGE OF DIRECTION.

10. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC EITHER:
(i) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH THE TWO STAKES TIED TOGETHER WITH WIRE; OR
(ii) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST.

11. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS USING 25 X 12.5mm STAPLES, OR TIE WIRE AT MAXIMUM 150mm SPACING.

12. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH (IF ANY) AT A MAXIMUM SPACING OF 1m.

13. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 450mm, BUT NOT MORE THAN 700mm HIGH. IF A SPILL-THOUGH WEIR IS INSTALLED, ENSURE THE CREST OF THE WEIR IS AT LEAST 300mm ABOVE GROUND LEVEL.

14. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE FENCE.

ADDITIONAL REQUIREMENTS FOR THE INSTALLATION OF A SPILL-THROUGH WEIR

1. LOCATE THE SPILL-THROUGH WEIR SUCH THAT THE WEIR CREST WILL BE LOWER THAN THE GROUND LEVEL AT EACH END OF THE FENCE.

2. ENSURE THE CREST OF THE SPILL-THROUGH WEIR IS AT LEAST 300mm THE GROUND ELEVATION.

3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/ STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST AND FOLD THE FABRIC OVER THE CROSS MEMBER AND APPROPRIATELY SECURE THE FABRIC.

4. INSTALL A SUITABLE SPLASH PAD AND/OR CHUTE IMMEDIATELY DOWN-SLOPE OF THE SPILL-THROUGH WEIR TO CONTROL SOIL EROSION AND APPROPRIATELY DISCHARGE THE CONCENTRATED FLOW PASSING OVER THE WEIR.

MAINTENANCE

1. INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC FROM POST TO POST.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. IF THE FENCE IS SAGGING BETWEEN STAKES, INSTALL ADDITIONAL SUPPORT POSTS.

5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE.

6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS.

REMOVAL

1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED.

2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

Drawn:	Date:		
GMW	Apr-10	Sediment Fence	SF-02