

Chief Executive Officer
Douglas Shire Council
PO Box 723
Mossman Qld 4873

DOUGLAS SHIRE COUNCIL	
Received	
File Name	OP2146/2018
Document No	
30 MAY 2018	
Attention	Planning
Information	

Our Ref: 4975/01
L-RN0029

25th May 2018

Attention: Neil Beck

Dear Neil,

**APPLICATION FOR OPERATIONAL WORKS DEVELOPMENT APPROVAL
241R BAMBOO CREEK ROAD SUB-DIVISION**

On behalf of our client D.J. and J.P. Cobb, we hereby submit our application for an Operational Works Development Permit for the civil works for the above project.

Attached for your information and action are the following:

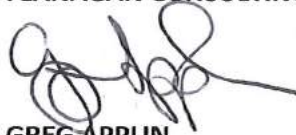
- Civil Construction Drawings (1 x A1 and 2 x A3 size)
- Design Submission Report (R-JD0138)
- A certified Statement of Compliance – Engineering Design
- DA Form 1
- Operational Works Receipting Checklist

We note that a cheque for the civil operational works applications fees has been submitted to Council in person by the client.

We trust that the attached provides sufficient supporting information to enable Council to approve the development and provide an Operational Works Permit for the civil designs acknowledgement. If you have any queries or require further information please do not hesitate to contact this office.

Yours faithfully

FLANAGAN CONSULTING GROUP



GREG APPLIN

Senior Civil Engineer RPEQ: 6073

FNQROC DEVELOPMENT MANUAL

Council Douglas Shire Council

(INSERT COUNCIL NAME)

STATEMENT OF COMPLIANCE OPERATIONAL WORKS DESIGN

This form duly completed and signed by an authorised agent of the Designer shall be submitted with the Operational Works Application for Council Approval.

Name of Development 241R Bamboo Creek Road

Location of Development Bamboo, QLD 4860

Applicant D.J. and J.P. Cobb

Designer Flanagan Consulting Group

It is hereby certified that the Calculations, Drawings, Specifications and related documents submitted herewith have been prepared, checked and amended in accordance with the requirements of the FNQROC Development Manual and that the completed works comply with the requirements therein, **except** as noted below.

Compliance with the requirements of the Operational Works Design Guidelines	Non-Compliance refer to non-compliance report / drawing number
Plan Presentation	Compliant
Geotechnical requirements	N/A
Geometric Road Design	N/A
Pavements	N/A
Structures / Bridges	N/A
Subsurface Drainage	N/A
Stormwater Drainage	Compliant
Site Re-grading	N/A
Erosion Control and Stormwater Management	Compliant
Pest Plant Management	N/A
Cycleway / Pathways	N/A

Landscaping	N/A
Water Source and Disinfection/Treatment Infrastructure (if applicable)	N/A
Water Reticulation, Pump Stations and water storages	Compliant
Sewer Reticulation and Pump Stations	N/A
Electrical Reticulation and Street Lighting	N/A
Public Transport	N/A
Associated Documentation/ Specification	N/A . Shown on drawings
Priced Schedule of Quantities	N/A - water reticulation works only @\$8,000
Referral Agency Conditions	N/A
Supporting Information (AP1.08)	Compliant
Other	N/A

Conscientiously believing the above statements to be true and correct, signed on behalf of:

Designer Flanagan Consulting Group **RPEQ No** 6073

Name in Full Greg Applin

Signature  **Date** 17/05/2018



Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

Name of Council: Douglas Shire Council

Development Name and Location: 241R Bamboo Creek Road, Bamboo

Planning Permit No/Council File No: RoL / 2146 / 2017

<u>DESIGN SUBMISSION</u>	<u>CHECK</u>	<u>COMMENT</u>
1. Completed 'Statement of Compliance' form. (FNQROC - AP1 - Appendix A)	✓	
2. IDAS Forms A, E & IDAS Assessment Checklist (Available from www.ipa.qld.gov.au)	✓	IDAS forms superseded by DA form 1. DA form 1 attached.
3. Payment of Engineering Application Fees (Copy of receipt to be attached)	✓	\$3820 + \$510/lot = \$4330.00
4. Copy of Decision Notice for Development Application Conditions, <u>inc. explanation of how each condition is to be addressed (Statement of Compliance)</u>	✓	
5. Engineering Design drawings - Complete sets (1 x A1 set, 2 x A3 sets and 1 x electronic copy on compact disc in 'PDF' format)	✓	
6. One copy of Design and Standard Specifications (Unbound Copy Preferable)	N/A	Only minor water reticulation works required.
7. Written consent from adjoining property owners authorising any works on their property	N/A	
8. Water reticulation network in electronic format (Engineer to confirm system requirements and compatibility with Cairns Water)	✓	
9. Landscape drawings - Complete set (1 x A1 set, 2 x A3 sets and 1 x electronic copy on compact disc in 'PDF' format). These must be accompanied by elements of the stormwater & street lgt. layout design, to avoid conflicts.	N/A	



Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

<u>DESIGN SUBMISSION</u>	<u>CHECK</u>	<u>COMMENT</u>
10. Overall network drawings (for staged development) for:	✓	
• Water	✓	
• Stormwater	N/A	
• Sewer	N/A	
• Pathways and roads	N/A	
• Street Lighting	N/A	
• Electrical	N/A	
• Gas	N/A	
• Public Transport	N/A	
• Park Reserves	N/A	
• Drainage Reserves	✓	
11. Pavement design criteria	N/A	
12. Geotechnical reports for proposed earthworks	N/A	
13. Structural and geotechnical certificates for retaining walls etc.	N/A	
14. Water supply/sewerage pump station design parameters	N/A	
15. Stormwater drainage calculations	✓	
16. Erosion and Sediment Control Strategy (ESCS)	N/A	
17. Declared Pest Management Plan (if applicable)	N/A	
18. The approval of any other Authorities & concurrence agencies likely to be affected by the works.	N/A	



Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

19. Contact details of the Consulting Engineer who is submitting the Application:

Name of Engineer	Greg Applin	
Name of Company	Flanagan Consulting Group	
Telephone Number (s)	Office: 4031 3199	Mobile: 0414 768 109
Email address	greg@flanaganc consulting.com.au	
RPEQ No.	6073	

20. Date of submission of application 22 / 05 / 2018

(For further information on all of the above refer to the FNQROC Development Manual Section AP1)

DA Form 1 – Development application details

Approved form (version 1.0 effective 3 July 2017) 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 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**, 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)	D.J. and J.P. Cobb
Contact name (only applicable for companies)	C/- Flanagan Consulting Group – Greg Applin
Postal address (P.O. Box or street address)	PO Box 5820
Suburb	Cairns
State	QLD
Postcode	4870
Country	Australia
Contact number	+61 07 4031 3199
Email address (non-mandatory)	greg@flanaganconsulting.com.au
Mobile number (non-mandatory)	0414 768 109
Fax number (non-mandatory)	+61 07 4051 0089
Applicant's reference number(s) (if applicable)	

2) Owner's consent	
2.1) Is written consent of the owner required for this development application?	
<input type="checkbox"/> Yes – the written consent of the owner(s) is attached to this development application	
<input checked="" type="checkbox"/> No – proceed to 3)	

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
		241	Bamboo Creek Road	Bamboo
	Postcode	Lot No.	Plan Type and Number (e.g. RP, SP)	Local Government Area(s)
	4860	3	RP747675	Douglas Shire
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. Only one set of coordinates is required for this part.

☒ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) (if applicable)
145.384	-16.373	<input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> GDA94 <input type="checkbox"/> Other:	Douglas Shire

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) (if applicable)
		<input type="checkbox"/> 54 <input type="checkbox"/> 55 <input type="checkbox"/> 56	<input type="checkbox"/> WGS84 <input type="checkbox"/> GDA94 <input type="checkbox"/> Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and their details have been attached in a schedule to this 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:

Skeleton Creek

☐ 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):*

Operational works approval associated with the reconfiguring of a lot (1 into 3).

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	<input type="checkbox"/> Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	<input type="checkbox"/> Yes – complete division 2
Operational work	<input checked="" type="checkbox"/> Yes – complete division 3
Building work	<input type="checkbox"/> 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)

- | | |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Subdivision (complete 10)) | <input type="checkbox"/> Dividing land into parts by agreement (complete 11)) |
| <input type="checkbox"/> Boundary realignment (complete 12)) | <input type="checkbox"/> Creating or changing an easement giving access to a lot from a construction 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?

- | | | |
|-----------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------|
| <input type="checkbox"/> Road work | <input type="checkbox"/> Stormwater | <input checked="" type="checkbox"/> Water infrastructure |
| <input type="checkbox"/> Drainage work | <input type="checkbox"/> Earthworks | <input type="checkbox"/> Sewage infrastructure |
| <input type="checkbox"/> Landscaping | <input type="checkbox"/> Signage | <input type="checkbox"/> Clearing vegetation |
| <input type="checkbox"/> Other – please specify: <input type="text"/> | | |

14.2) Is the operational work necessary to facilitate the creation of new lots? (e.g. subdivision)

- ☒ Yes – specify number of new lots:
- ☐ No

14.3) What is the monetary value of the proposed operational work? (include GST, materials and labour)

\$8,000

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application

Douglas 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
- ☐ Local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
- ☒ No

PART 5 – REFERRAL DETAILS

17) Do any aspects of the proposed development require referral for 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 Regulation 2017:

- ☐ Clearing native vegetation
- ☐ Contaminated land (unexploded ordnance)

<input type="checkbox"/> Environmentally relevant activities (ERA) <i>(only if the ERA have not been devolved to a local government)</i> <input type="checkbox"/> Fisheries – aquaculture <input type="checkbox"/> Fisheries – declared fish habitat area <input type="checkbox"/> Fisheries – marine plants <input type="checkbox"/> Fisheries – waterway barrier works <input type="checkbox"/> Hazardous chemical facilities <input type="checkbox"/> Queensland heritage place <i>(on or near a Queensland heritage place)</i> <input type="checkbox"/> Infrastructure – designated premises <input type="checkbox"/> Infrastructure – state transport infrastructure <input type="checkbox"/> Infrastructure – state transport corridors and future state transport corridors <input type="checkbox"/> Infrastructure – state-controlled transport tunnels and future state-controlled transport tunnels <input type="checkbox"/> Infrastructure – state-controlled roads <input type="checkbox"/> Land within Port of Brisbane's port limits <input type="checkbox"/> SEQ development area <input type="checkbox"/> SEQ regional landscape and rural production area or SEQ Rural living area – community activity <input type="checkbox"/> SEQ regional landscape and rural production area or SEQ Rural living area – indoor recreation <input type="checkbox"/> SEQ regional landscape and rural production area or SEQ Rural living area – residential development <input type="checkbox"/> SEQ regional landscape and rural production area or SEQ Rural living area – urban activity <input type="checkbox"/> Tidal works or works in a coastal management district <input type="checkbox"/> Urban design <input type="checkbox"/> Water-related development – taking or interfering with water <input type="checkbox"/> Water-related development – removing quarry material <i>(from a watercourse or lake)</i> <input type="checkbox"/> Water-related development – referable dams <input type="checkbox"/> Water-related development – construction of new levees or modification of existing levees <i>(category 2 or 3 levees only)</i> <input type="checkbox"/> Wetland protection area
Matters requiring referral to the local government: <input type="checkbox"/> Airport land <input type="checkbox"/> Environmentally relevant activities (ERA) <i>(only if the ERA have been devolved to local government)</i> <input type="checkbox"/> Local heritage places
Matters requiring referral to the chief executive of the distribution entity or transmission entity: <input type="checkbox"/> Electricity infrastructure
Matters requiring referral to: <ul style="list-style-type: none"> • 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 <input type="checkbox"/> Oil and gas infrastructure
Matters requiring referral to the Brisbane City Council: <input type="checkbox"/> Brisbane core port land
Matters requiring referral to the Minister under the Transport Infrastructure Act 1994: <input type="checkbox"/> Brisbane core port land <input type="checkbox"/> Strategic port land
Matters requiring referral to the relevant port operator: <input type="checkbox"/> Brisbane core port land <i>(below high-water mark and within port limits)</i>
Matters requiring referral to the chief executive of the relevant port authority: <input type="checkbox"/> Land within limits of another port
Matters requiring referral to the Gold Coast Waterways Authority: <input type="checkbox"/> Tidal works, or development in a coastal management district in Gold Coast waters
Matters requiring referral to the Queensland Fire and Emergency Service: <input type="checkbox"/> Tidal works, or development in a coastal management district

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

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

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
<input checked="" type="checkbox"/> Approval	ROL2146/2017	23 rd of August 2017	Douglas Shire Council
<input checked="" type="checkbox"/> Development application			
<input type="checkbox"/> Approval			
<input type="checkbox"/> Development application			

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

☐ Yes – the yellow local government/private certifier's 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

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 EM941) 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 "EM941" 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.justice.qld.gov.au for further information.

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation 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 is accompanied by written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

Note: See www.qld.gov.au for further information.

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 conservation

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

☐ Yes

☒ No

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

Water resources

23.6) Does this development application involve **taking or interfering with artesian or sub artesian water, taking or interfering with water in a watercourse, lake or spring, taking overland flow water or waterway barrier works**?

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

☒ No

Note: DA templates are available from www.dilqp.qld.gov.au.

23.7) Does this application involve **taking or interfering with artesian or sub artesian water, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water** under the *Water Act 2000*?

☐ Yes – I acknowledge that a relevant water authorisation under the *Water Act 2000* may be required prior to

commencing development

☒ No**Note:** Contact the Department of Natural Resources and Mines at www.dnrm.qld.gov.au for further information.**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 and Mines at www.dnrm.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 Heritage Protection at www.ehp.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.dews.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.ehp.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.ehp.qld.gov.au for information requirements regarding development of Queensland heritage places.

Name of the heritage place:

Place ID:

Brothels23.14) 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

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 <i>Note: See the Planning Regulation 2017 for referral requirements</i>	<input checked="" type="checkbox"/> Yes
If building work is associated with the proposed development, Parts 4 to 6 of <i>Form 2 – Building work details</i> have been completed and attached to this development application	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
Supporting information addressing any applicable assessment benchmarks is with development application <i>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.</i>	<input checked="" type="checkbox"/> Yes
Relevant plans of the development are attached to this development application <i>Note: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.</i>	<input checked="" type="checkbox"/> Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued (<i>see 21</i>)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 OFFICE USE ONLYDate 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	
Date receipted form sighted by assessment manager	
Name of officer who sighted the form	

The *Planning Act 2016*, the *Planning Regulation 2017* and the *DA Rules* are administered by the Department of Infrastructure, Local Government and Planning. This form and all other required development application materials should be sent to the assessment manager.

Design Submission Report

241R Bamboo Creek Road, Bamboo QLD 4873

Operational Works Application

For D.J. and J.P. Cobb



Project No. 4975/01
Reference No. JD0138
Date: 25th May 2018

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APPENDIX A – Reconfiguration of Lot Decision Notice

APPENDIX B – Drainage Study Report

APPENDIX C – Water Reticulation

APPENDIX D – Statement of Compliance – Operational Works Design

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Flanagan Consulting Group is a registered business name of South Pacificsands Pty Ltd A.C.N. 052 933 687

1.0 INTRODUCTION

Flanagan Consulting Group has been commissioned by D.J. and J.P. Cobb to undertake the operational works design and associated flood report for the subdivision of Lot 3 on RP747675 situated in the Douglas Shire into 3 rural lots. This includes a drainage study of the site and design and documentation of water reticulation including new road crossings and connections.

A Reconfiguration of a Lot Application for 241R Bamboo Creek Road, Bamboo was approved subject to conditions by Douglas Shire Council on 23 August 2017 (DSC ref: ROL2146/2017). The approved plans submitted as part of this application are in accordance with the approved Plan of Reconfiguration (drawing reference 9674). For council's reference, a copy of the ROL Decision Notice is attached in **Appendix A**. The development hereby submitted has been prepared in compliance with the conditions of the original Decision Notice where relevant.

2.0 ENGINEERING DOCUMENTATION

Attached in accordance with Council's requirements are the following:

- Project Construction Drawings
4975-C01 Proposed Water Reticulation
- Statement of Compliance – Operational Works Design

3.0 COMPLIANCE WITH SUBDIVISION CONDITIONS

As noted previously, this Operational Works application is being lodged in association with the Reconfiguration of Lot application and current development conditions have been prepared by council which apply to the development.

To demonstrate compliance, the following responses have been prepared to each condition of the Reconfiguration of Lot Decision Notice (ROL2146/2017):

Assessment Manger Conditions

1. Carry out the approved development generally in accordance with the approved drawing(s) and/or document(s), and in accordance with: -
 - a. The specifications, facts and circumstances as set out in the application submitted to Council;
 - b. The following conditions of approval and the requirements of Council's Planning Scheme and the FNQROC Development Manual.

Except where modified by these conditions of approval.

The design of the subdivision on Lot 3 RP747675 has generally been carried out in accordance with the approved drawings, documents, specification, ROL approval, Council Planning Scheme and the FNQROC Development Manual.

Timing of Effect

2. The conditions of the Development Permit must be effected prior to Commencement of Use, except where specified otherwise in these conditions of approval.

The conditions of the Development Permit will be effected prior to Commencement of Use of the subdivision.

Water Supply Works External

3. Undertake the following water supply works external to the site to connect the site to existing water supply infrastructure:
 - a. Locate the existing main on Bamboo Creek Road and confirm how connections can be made to the new lots. Where the main is located on the opposite side of the road, new crossings are to be installed at no cost to Council.

Three (3) copies of a plan of the works must be endorsed by the Chief Executive Officer prior to the issue of a Development Permit for Operational Works.

All works must be carried out in accordance with the approved plans, to the requirements and satisfaction of the Chief Executive Officer, prior to the issue of a Compliance Certificate for the Plan of Survey.

The existing main on Bamboo Creek Road is located on the opposite side of the road to the site (as shown on DSC water plan in **Appendix C**) hence a new crossing is proposed to service proposed Lots 30 and 31, whilst the existing water meter will service the remaining. Three copies of a plan of the works (Dwg. No. 4975-C01 in **Appendix C**) will be submitted for endorsement by the CEO.

On-Site Effluent Disposal

4. The method of on-site effluent disposal must be in accordance with the Queensland Plumbing & Wastewater Code. Details of the wastewater treatment system to be installed must be approved by the Chief Executive Officer prior to the issue of a Compliance Certificate for the Plan of Survey.

Details to be confirmed by plumbing contractor under separate cover.

Drainage Study of Site

5. Undertake a local drainage study of the site to determine the drainage impacts on upstream and downstream properties and the mitigation measures required to minimise such impacts. In particular, the study must address the following:
 - a. The contributing catchment boundaries;
 - b. The extent of the 100-year ARI flood event in relation to the site both pre- and post-development;
 - c. Primary and secondary flow paths for the 5, 10 and 100-year ARI flood events;
 - d. Nominate the minimum floor level for the future houses to provide immunity to the 100-year ARI flood event including the appropriate freeboard as required by the Queensland Urban Drainage Manual;
 - e. Identify any requirement for drainage easements;
 - f. Information on the proposed works and any impacts on the flow paths, particularly if filling of the building envelopes is required or proposed;
 - g. Information on the drainage outlet(s) from the proposed development into the creek.
 - h. Lawful point of discharge.

The study must be endorsed by the Chief Executive Officer prior to the issue of a Compliance Certificate for the Plan of Survey.

- a. The catchment boundaries contributing to the site have been determined and are presented in **Appendix B**, sketch '4975-SK01'.
- b. The current extent of the 100-year ARI flood event has been calculated and a cross-sectional analysis of the extents at Skeleton Creek has been presented in **Appendix B**, sketch '4975-SK02'. Due to the size of the catchment (283ha), the difference in Q100 flood extents pre- and post- development is negligible.
- c. Primary and secondary flow paths for 5, 10 and 100-year ARI flood events do not change following the ROL – stormwater continues to flow overland to the Skeleton Creek catchment and Bamboo Creek Road drainage channel.
- d. Anecdotal information from neighbouring landowners advised that two of the highest flood levels observed (in the 150 years that their family have lived alongside Skeleton Creek) reached a maximum level of RL 8.59m AHD at the shed located to the rear of Lot 4 RP746675. This location approximates to RL 8.6m AHD and is significantly above the assessed Q100 flood level.

In view of the above, a conservative minimum habitable floor level of RL 8.90m AHD is recommended for any new dwellings proposed within the sub-division boundary. The RL 8.90m AHD level includes for a 300mm freeboard allowance.

- e. A drainage easement set to the calculated Q100 level of RL 7.15m AHD is identified as being required within proposed Lot 32. This is identified in **Appendix B**, sketch '4975-SK02'.
- f. Filling of building envelopes is not proposed. Any filling outside of the proposed drainage easement will not impact on Q100 levels.
- g. No drainage infrastructure was deemed necessary for installation and the majority of the site stormwater will flow overland to Skeleton Creek.
- h. The lawful point of discharge does not change post-development – it is retained as Skeleton Creek and the Bamboo Creek Road channel for the front of the lots.

Extent of Earthworks

- 6. Subject to the drainage study findings, the site may require filling to provide immunity at the building envelopes from the 100-year ARI flood event. The details of any earthworks proposed to the building envelopes are to be documented on plans and submitted for approval by Council.

The plans are to be lodged with the application for a Development Permit for Operational Works (Earthworks), with the works to be completed prior to the issue of a Compliance Certificate for the Plan of Survey.

Filling of building envelopes is not proposed. See **Appendix B** for drainage study findings.

Building Envelope Plan

- 7. A building envelope plan for the new lots must be lodged with Council prior to approval and dating of the Plan of Survey. The Building envelope plan must comply with the following requirements:
 - a. The building envelope must be pegged on site to the requirements and satisfaction of the Chief Executive Officer;
 - b. No building envelope shall extend into an existing or proposed easement;
 - c. No building envelope shall contain slopes in excess of 1:3 and contain limited areas having slopes between 1:4 and 1:6;
 - d. A suitable building envelope, which seeks to exclude all or most significant vegetation, must be identified for each new allotment. The vegetation which is approved to be cleared must be removed prior to the issue of a Compliance Certificate for the Plan of Survey;
 - e. Building envelopes must be located to accommodate any necessary setbacks from drainage paths and sewerage soakage envelopes;
 - f. The building envelope plan must show the actual edge of the existing drainage path;

The applicant/owner must also ensure that the endorsed building envelope plans are made known to all prospective purchasers of the lots.

Proposed clearing on these lots is to be nominated on the engineering drawings submitted for Operational Works approval.

The boundary of building envelopes must be delineated with marker pegs prior to any removal of vegetation. Driveway access corridors must also be clearly marked within the designated vegetation retention areas.

Details to be confirmed by surveyor under separate cover.

Stockpiling and Transportation of Fill Material

8. Soil used for filling or spoil from the excavation is not to be stockpiled in locations that can be viewed from adjoining premises or a road frontage for any longer than one (1) month from the commencement of works.

Transportation of fill or spoil to and from the site must not occur within:

- a. Peak traffic times; or
- b. Before 7:00am or after 6:00pm Monday to Friday; or
- c. Before 7:00am or after 1:00pm Saturdays; or
- d. On Sundays or Public Holidays.

Stockpiling and transportation of fill material not applicable to the development.

9. Dust emissions or other air pollutants must not extend beyond the boundary of the site and cause a nuisance to the surrounding properties.

Noted and agreed.

Storage of Machinery and Plant

10. The storage of any machinery, material and vehicles must not cause a nuisance to surrounding properties, to the satisfaction of the Chief Executive Officer.

Noted and agreed.

Existing Creek and Drainage Systems

11. All existing creek systems and drainage areas must be left in their current state, including no channel alterations and no removal of vegetation unless consented to in writing by the Chief Executive Officer.

The applicant/owner must obtain any necessary approvals from the Department of Natural Resources and Mines for carrying out works in a watercourse.

Noted and agreed.

Lawful Point of Discharge

- 12. All stormwater from each lot must be directed to a lawful point of discharge such that it does not adversely affect surrounding properties or properties downstream from the development to the requirements and satisfaction of the Chief Executive Officer.**

The lawful point of discharge does not change post-development. Presently, stormwater sheet flows overland to either Skeleton Creek or Bamboo Creek Road. No changes to minor or major flow paths are proposed. Minor increases in post development drainage flow rates will not adversely affect surrounding or downstream properties.

Sediment and Erosion Control

- 13. An erosion and sediment control plan (ESC Plan) must be submitted prior to the issue of a Development Permit for Operational Works for any filling proposed on the land. The measures detailed on the ESC Plans must be installed/implemented prior to the discharge of water from the site, such that no external stormwater flow from the site adversely affects surrounding or downstream properties (in accordance with the requirements of the *Environmental Protection Act 1994*, and the FNQROC Development Manual).**

An Erosion and Sediment Control Strategy is not required as no filling has been commissioned in this ROL.

Existing Service

- 14. Written confirmation of the location of existing services for the land must be provided. In any instance where existing services are contained within another lot, the following applies, either:**
- a. Relocate the services to comply with this requirement; or**
 - b. Arrange registration of necessary easements over services located within another lot prior to, or in conjunction with, the lodgement of a Compliance Certificate for the Plan of Survey creating the lot.**

Details to be confirmed by surveyor under separate cover.

For water reticulation, the existing house is currently serviced from the water meter off Miallo-Bamboo Creek Road and their existing water connection will be replumbed, to be wholly contained within lot 31, to the proposed meter feed from the 100mm road crossing.

Electricity Supply

- 15. Written evidence from Ergon Energy advising if distribution substation/s are required within the development must be provided. If required, details regarding the location of these facilities must be submitted to the Chief Executive Officer accompanied by written confirmation from Ergon Energy. Details regarding electricity supply must be provided prior to the issue of a Development Permit for Operational Works.**

Details to be confirmed by surveyor under separate cover.

Electricity and Telecommunications

- 16. Written evidence of negotiations with Ergon Energy and the telecommunication authority must be submitted to Council stating that both an underground electricity supply and the telecommunications**

service will be provided to the development prior to the issue of a Compliance Certificate for the Plan of Survey.

Details to be confirmed by surveyor under separate cover.

4.0 COMPLIANCE WITH COUNCIL'S DEVELOPMENT CONDITION

We confirm that the design and documentation of this development is generally in accordance with Council's Development Manual – "FNQROC Development Manual" as outlined in this report.

5.0 SUPPORTING INFORMATION

5.1 Site Drainage Study (Skeleton Creek Q100 Flood Study)

Site hydrology was assessed based on methodology from DTMR's – Road Drainage Manual (Ch 5.). The catchment area contributing to the point of interest at Skeleton Creek was evaluated as being approximately 283 hectares. A contoured plan showing the catchment area (4975-SK01), as well as hydrological information including catchment details, time of concentration, runoff, stream profiles and rainfall data can be found in **Appendix B**.

To gauge the Q100 flood extents, a hydraulic analysis of the Skeleton Creek channel and culvert crossing at Miallo-Bamboo Creek Road was conducted. Using the survey provided by T.J. Stewart, multiple cross-sections along Skeleton Creek were set up and an irregular-shaped open channel assessment was performed. Individual cross-section analysis output spreadsheets are available in **Appendix B**.

Based on rainfall intensity data from the Bureau of Meteorology, conservative Q100 flood levels were determined and are shown on sketch "4975-SK02" in **Appendix B**. The aforementioned sketch also depicts the proposed drainage easement on proposed Lot 30.

The culvert nest which consists of 4 x 3.6m diameter corrugated mild steel culverts at the Miallo-Bamboo Creek Road crossing was analysed hydraulically using the CulvertW software package. The output from this assessment – while made conservatively – is presented in **Appendix B**.

In summary, a small area within lot 30 will require a drainage easement to be registered. No filling is required for flood immunity based on the assessment, however, anecdotal advice has been adopted and we recommend Council to set habitable floor levels at RL 8.9m AHD.

5.2 Water Reticulation

The water reticulation has been designed in accordance with the FNQROC Design Guidelines and WSA 03-2002 – Water Supply Code of Australia.

Proposed Lots 30 and 31 will be serviced by installing a road crossing and connecting to the existing DN100 PVC main on the opposite side of Bamboo Creek Road and installing a fire hydrant to allow coverage of the proposed lots.

The existing house is currently serviced from the water meter off Miallo-Bamboo Creek Road and their existing water connection will be replumbed, to be wholly contained within Lot 31, to the proposed meter feed from the 100mm road crossing. The existing water meter, off the 150mm main in Miallo-Bamboo Creek Road will be used to service Lot 32.

The proposed water reticulation plan "4975-C01" is located in **Appendix C**.

5.3 Utility Services

The electrical and NBN designs will be undertaken under a separate cover following correspondence with both entities.

6.0 RECOMMENDATIONS

Following consideration of this design submission report and the accompanying design documentation it is requested that:

1. Council approve the design and documentation of the subdivision as presented in this report.
2. Council issue an Operational Works Permit for the civil works.



GREG APPLIN

Senior Civil Engineer – Cairns

RPEQ - 6073

APPENDIX: A

Reconfiguration of Lot Decision Notice ROL2146/2017

23 August 2017

Enquiries: Daniel Lamond
Phone: (07) 4099 9456
Reference: ROL2146_2017 (825322)

Administration Office
64 - 66 Front St Mossman
P 07 4099 9444
F 07 4098 2902

T J Stewart
9 Ross Road
DEERAL QLD 4871

Dear Sir

**NOTICE OF DECISION – MATERIAL CHANGE OF USE
FOR 241R BAMBOO CREEK ROAD, BAMBOO (LOT 3 ON RP747675)
(GIVEN UNDER SECTION 63 PLANNING ACT 2016)**

Douglas Shire Council advises that the development application described below has been approved via delegated authority on 23 August 2017.

1. Applicant details

Applicant name: T J Stewart

2. Site details

Lot on plan: Lot 3 on RP747675
Local government area: Douglas Shire Council

3. Application descriptions

Application: Reconfiguration of a lot (1 into 3).

4. Description of assessment benchmarks –

Benchmarks Applying	Benchmark Reference	Compliance
State Development Assessment Requirements	State Planning Policy Far North Queensland Regional Plan	Complies
2006 Douglas Shire Planning Scheme	Codes	Complies

5. Submissions

There were no submissions received against the application. The development is code assessable against the current and proposed planning schemes.

6. Reasons for decision

- a. The proposal required an approval under the Planning Act 2016.
- b. The application was properly made.
- c. The application contained a report which Council reviewed together with Council's own investigation in making the assessment.
- d. The acceptable solutions within the relevant codes of the planning scheme are considered to be achieved by the proposal.

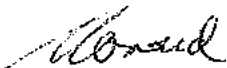
7. Matters prescribed by a regulation

Not applicable.

A Decision Notice for the applications is attached.

Please quote Council's application number ROL2146/2017 in all subsequent correspondence relating to this development application. Should you require any clarification regarding this please contact Daniel Lamond on telephone 07 4099 9456.

Yours faithfully



TRACEY COUCH
A/Manager Sustainable Communities

encl: Decision Notice
 Schedule 1 – Conditions and Advice
 Schedule 2 - *Planning Act 2016* appeal provisions

**DECISION NOTICE —
APPROVAL (WITH CONDITIONS)
(GIVEN UNDER SECTION 63 OF THE PLANNING ACT 2016)**

Thank you for your development application detailed below which was properly made on 28 July 2017.
Please be aware that Douglas Shire Council has assessed your application and decided it as follows:

1. Applicant's details

Name: T J Stewart
Postal Address: 9 Ross Road
DEERAL QLD 4871

2. Location details

Street Address: 241R BAMBOO CREEK ROAD BAMBOO
Real Property Description: LOT: 3 RP: 747675
Local Government Area: Douglas Shire Council

3. Details of proposed development

Reconfiguration of a lot (1 into 3)

4. Decision

Date of decision: 23 August 2017

Decision details: Approved in full with conditions. These conditions are set out in Schedule 1 and are clearly identified to indicate whether the assessment manager or a concurrence agency imposed them.

5. Approved plans and specifications

Copies of the following plans, specifications and/or drawings are enclosed.

Drawing/report title	Prepared by	Date	Reference no.	Version/issue
Aspect of development: All				
Plan of Reconfiguration	T Stewart	20 June 2017	9674	Not shown

6. Conditions

This approval is subject to the conditions in Schedule 1. These conditions are clearly identified to indicate whether the assessment manager or concurrence agency imposed them.

7. Further development permits

Please be advised that the following development permits are required to be obtained before the development can be carried out:

- Development Permit for Operational Works

8. Properly made submissions

Not applicable — No part of the application required public notification.

9. Currency period for the approval

This development approval will lapse at the end of the period set out in section 85 of *Planning Act 2016*.

10. Rights of appeal

The rights of applicants to appeal to a tribunal or the Planning and Environment Court against decisions about a development application are set out in chapter 6, part 1 of the *Planning Act 2016*. For particular applications, there may also be a right to make an application for a declaration by a tribunal (see chapter 6, part 2 of the *Planning Act 2016*).

A copy of the relevant appeal provisions are included in Schedule 2.

SCHEDULE 1 – CONDITIONS AND ADVICE

PART 1A—CONDITIONS IMPOSED BY THE ASSESSMENT MANAGER

Assessment Manager Conditions

1. Carry out the approved development generally in accordance with the approved drawing(s) and/or document(s), and in accordance with:-
- The specifications, facts and circumstances as set out in the application submitted to Council;
 - The following conditions of approval and the requirements of Council's Planning Scheme and the FNQROC Development Manual.

Except where modified by these conditions of approval

Timing of Effect

2. The conditions of the Development Permit must be effected prior to Commencement of Use, except where specified otherwise in these conditions of approval.

Water Supply Works External *x DESIGN/CONSTRUCT / VSP?*

3. Undertake the following water supply works external to the site to connect the site to existing water supply infrastructure:
- Locate the existing main on Bamboo Creek Road and confirm how connections can be made to the new lots. Where the main is located on the opposite side of the road, new road crossings are to be installed at no cost to Council.

Three (3) copies of a plan of the works must be endorsed by the Chief Executive Officer prior to the issue of a Development Permit for Operational Works.

All works must be carried out in accordance with the approved plans, to the requirements and satisfaction of the Chief Executive Officer, prior to the issue of a Compliance Certificate for the Plan of Survey.

On-Site Effluent Disposal *check QLD PLUMBING APPROVED FOR THIS*

4. The method of on-site effluent disposal must be in accordance with the Queensland Plumbing & Wastewater Code. Details of the wastewater treatment system to be installed must be approved by the Chief Executive Officer prior to the issue of a Compliance Certificate for the Plan of Survey.

If earthworks are proposed to facilitate immunity to the disposal area from flooding, the earthworks are to be designed in accordance with the conditions of this approval.

Drainage Study of Site . STUDY / PLANS / SUBMIT TO COUNCIL

ENG

5. Undertake a local drainage study of the site to determine the drainage impacts on upstream and downstream properties and the mitigation measures required to minimise such impacts. In particular, the study must address the following:
- The contributing catchment boundaries;
 - The extent of the 100 year ARI flood event in relation to the site both pre- and post-development;
 - Primary and secondary flow paths for the 5, 10 and 100 year ARI flood events;
 - Nominate the minimum floor level for the future houses to provide immunity to the 100 year ARI flood event including the appropriate freeboard as required by the Queensland Urban Drainage Manual;
 - Identify any requirement for drainage easements;
 - Information on the proposed works and any impacts on the flow paths, particularly if filling of the building envelopes is required or proposed;
 - Information on the drainage outlet(s) from the proposed development into the creek.
 - Lawful point of discharge.

The study must be endorsed by the Chief Executive Officer prior to the issue of a Compliance Certificate for the Plan of Survey.

ENG

Extent of Earthworks - / P WORKS ONLY

6. Subject to the drainage study findings, the site may require filling to provide immunity at the building envelopes from the 100 year ARI flood event. The details of any earthworks proposed to the building envelopes are to be documented on plans and submitted for approval by Council.

The plans are to be lodged with the application for a Development Permit for Operational Works (Earthworks), with the works to be completed prior to the issue of a Compliance Certificate for the Plan of Survey.

Building Envelope Plan SURVEYOR

7. A building envelope plan for the new lots must be lodged with Council prior to approval and dating of the Plan of Survey. The building envelope plan must comply with the following requirements:
- The building envelope must be pegged on site to the requirements and satisfaction of the Chief Executive Officer;
 - No building envelope shall extend into an existing or proposed easement;
 - No building envelope shall contain slopes in excess of 1:3 and contain

Limited areas having slopes between 1:4 and 1:6;

- d. A suitable building envelope, which seeks to exclude all or most significant vegetation, must be identified for each new allotment. The vegetation which is approved to be cleared must be removed prior to the issue of a Compliance Certificate for the Plan of Survey;
- e. Building envelopes must be located to accommodate any necessary setbacks from drainage paths and sewerage soakage envelopes;
- f. The building envelope plan must show the actual edge of the existing drainage path;

The applicant / owner must also ensure that the endorsed building envelope plans are made known to all prospective purchasers of the lots.

Proposed clearing on these lots is to be nominated on the engineering drawings submitted for Operational Works approval.

NO ENVIRONMENTAL CLEARING

The boundary of building envelopes must be delineated with marker pegs prior to any removal of vegetation. Driveway access corridors must also be clearly marked within the designated vegetation retention areas.

Stockpiling and Transportation of Fill Material

- 8. Soil used for filling or spoil from the excavation is not to be stockpiled in locations that can be viewed from adjoining premises or a road frontage for any longer than one (1) month from the commencement of works.

Transportation of fill or spoil to and from the site must not occur within:

- a. peak traffic times; or
 - b. before 7:00 am or after 6:00 pm Monday to Friday; or
 - c. before 7:00 am or after 1:00 pm Saturdays; or
 - d. on Sundays or Public Holidays.
- 9. Dust emissions or other air pollutants must not extend beyond the boundary of the site and cause a nuisance to surrounding properties.

Storage of Machinery and Plant

- 10. The storage of any machinery, material and vehicles must not cause a nuisance to surrounding properties, to the satisfaction of the Chief Executive Officer.

Existing Creek and Drainage Systems

- 11. All existing creek systems and drainage areas must be left in their current state, including no channel alterations and no removal of vegetation unless consented to in writing by the Chief Executive Officer.

The applicant / owner must obtain any necessary approvals from the Department

of Natural Resources and Mines for carrying out works in a watercourse.

Lawful Point of Discharge

IF REQUIRED

12. All stormwater from each lot must be directed to a lawful point of discharge such that it does not adversely affect surrounding properties or properties downstream from the development to the requirements and satisfaction of the Chief Executive Officer.

Sediment and Erosion Control

IF REQUIRED

13. An erosion and sediment control plan (ESC Plan) must be submitted prior the issue of a Development Permit for Operational Works for any filling proposed on the land. The measures detailed on the ESC Plans must be installed / implemented prior to discharge of water from the site, such that no external stormwater flow from the site adversely affects surrounding or downstream properties (in accordance with the requirements of the *Environmental Protection Act 1994*, and the *FNQROC Development Manual*).

Existing Service

14. Written confirmation of the location of existing services for the land must be provided. In any instance where existing services are contained within another lot, the following applies, either:
 - a. Relocate the services to comply with this requirement; or
 - b. Arrange registration of necessary easements over services located within another lot prior to, or in conjunction with, the lodgement of a Compliance Certificate for the Plan of Survey creating the lot.

Electricity Supply

SURVIVOR

15. Written evidence from Ergon Energy advising if distribution substation/s are required within the development must be provided. If required, details regarding the location of these facilities must be submitted to the Chief Executive Officer accompanied by written confirmation from Ergon Energy. Details regarding electricity supply must be provided prior to the issue of a Development Permit for Operational Works.

Electricity and Telecommunications

SURVIVOR

16. Written evidence of negotiations with Ergon Energy and the telecommunication authority must be submitted to Council stating that both an underground electricity supply and telecommunications service will be provided to the development prior to the issue of a Compliance Certificate for the Plan of Survey.

ADVICE

1. This approval, granted under the provisions of the *Sustainable Planning Act 2009*, shall lapse four (4) years from the day the approval takes effect in accordance with the provisions of the *Sustainable Planning Act 2009*.

2. All building site managers must take all action necessary to ensure building materials and / or machinery on construction sites are secured immediately following the first cyclone watch and that relevant emergency telephone contacts are provided to Council officers, prior to commencement of works.
3. This approval does not negate the requirement for compliance with all other relevant Local Laws and other statutory requirements.

Infrastructure Charges Notice

1. A charge levied for the supply of trunk infrastructure is payable to Council towards the provision of trunk infrastructure in accordance with the Adopted Infrastructure Charges Notice, a copy of which is attached for reference purposes only. The original Adopted Infrastructure Charges Notice will be provided under cover of a separate letter.

The amount in the Adopted Infrastructure Charges Notice has been calculated according to Council's Adopted Infrastructure Charges Resolution.

Please note that this Decision Notice and the Adopted Infrastructure Charges Notice are stand-alone documents. The Planning Act 2016 confers rights to make representations and appeals in relation to a Decision Notice and an Adopted Infrastructure Charges Notice separately.

The amount in the Adopted Infrastructure Charges Notice is subject to index adjustments and may be different at the time of payment. Please contact Development Assessment and Coordination at Council for review of the charge amount prior to payment.

The time when payment is due is contained in the Adopted Infrastructure Charges Notice.

SCHEDULE 2 – PLANNING ACT EXTRACT ON APPEAL RIGHTS

CHAPTER 6, PART 1 APPEAL RIGHTS

229 Appeals to tribunal or P&E Court

(1) Schedule 1 states—

- (a) matters that may be appealed to—
 - (i) either a tribunal or the P&E Court; or
 - (ii) only a tribunal; or
 - (iii) only the P&E Court; and
- (b) the person—
 - (i) who may appeal a matter (the appellant); and
 - (ii) who is a respondent in an appeal of the matter; and
 - (iii) who is a co-respondent in an appeal of the matter; and
 - (iv) who may elect to be a co-respondent in an appeal of the matter.

(2) An appellant may start an appeal within the appeal period.

(3) The appeal period is—

- (a) for an appeal by a building advisory agency—10 business days after a decision notice for the decision is given to the agency; or
- (b) for an appeal against a deemed refusal—at any time after the deemed refusal happens; or
- (c) for an appeal against a decision of the Minister, under chapter 7, part 4, to register premises or to renew the registration of premises—20 business days after a notice is published under section 269(3)(a) or (4); or
- (d) for an appeal against an infrastructure charges notice—20 business days after the infrastructure charges notice is given to the person; or
- (e) for an appeal about a deemed approval of a development application for which a decision notice has not been given—30 business days after the applicant gives the deemed approval notice to the assessment manager; or
- (f) for any other appeal—20 business days after a notice of the decision for the matter, including an enforcement notice, is given to the person.

Note — See the P&E Court Act for the court's power to extend the appeal period.

(4) Each respondent and co-respondent for an appeal may be heard in the appeal.

(5) If an appeal is only about a referral agency's response, the assessment manager may apply to the tribunal or P&E Court to withdraw from the appeal.

(6) To remove any doubt, it is declared that an appeal against an infrastructure charges notice must not be about—

- (a) the adopted charge itself; or
- (b) for a decision about an offset or refund—
 - (i) the establishment cost of trunk infrastructure identified in a LGIP; or
 - (ii) the cost of infrastructure decided using the method included in the local government's charges resolution.

230 Notice of appeal

(1) An appellant starts an appeal by lodging, with the registrar of the tribunal or P&E Court, a notice of appeal that—

- (a) is in the approved form; and
- (b) succinctly states the grounds of the appeal.

(2) The notice of appeal must be accompanied by the required fee.

- (3) The appellant or, for an appeal to a tribunal, the registrar must, within the service period, give a copy of the notice of appeal to—
 - (a) the respondent for the appeal; and
 - (b) each co-respondent for the appeal; and
 - (c) for an appeal about a development application under schedule 1, table 1, item 1—each principal submitter for the development application; and
 - (d) for an appeal about a change application under schedule 1, table 1, item 2—each principal submitter for the change application; and
 - (e) each person who may elect to become a co-respondent for the appeal, other than an eligible submitter who is not a principal submitter in an appeal under paragraph (c) or (d); and
 - (f) for an appeal to the P&E Court—the chief executive; and
 - (g) for an appeal to a tribunal under another Act—any other person who the registrar considers appropriate.
- (4) The service period is—
 - (a) if a submitter or advice agency started the appeal in the P&E Court—2 business days after the appeal is started; or
 - (b) otherwise—10 business days after the appeal is started.
- (5) A notice of appeal given to a person who may elect to be a co-respondent must state the effect of subsection (6).
- (6) A person elects to be a co-respondent by filing a notice of election, in the approved form, within 10 business days after the notice of appeal is given to the person.

SCHEDULE 1 APPEALS

1 Appeal rights and parties to appeals

- (1) Table 1 states the matters that may be appealed to—
 - (a) the P&E court; or
 - (b) a tribunal.
- (2) However, table 1 applies to a tribunal only if the matter involves—
 - (a) the refusal, or deemed refusal of a development application, for—
 - (i) a material change of use for a classified building; or
 - (ii) operational work associated with building work, a retaining wall, or a tennis court; or
 - (b) a provision of a development approval for—
 - (i) a material change of use for a classified building; or
 - (ii) operational work associated with building work, a retaining wall, or a tennis court; or
 - (c) if a development permit was applied for—the decision to give a preliminary approval for—
 - (i) a material change of use for a classified building; or
 - (ii) operational work associated with building work, a retaining wall, or a tennis court; or
 - (d) a development condition if—
 - (i) the development approval is only for a material change of use that involves the use of a building classified under the Building Code as a class 2 building; and
 - (ii) the building is, or is proposed to be, not more than 3 storeys; and
 - (iii) the proposed development is for not more than 60 sole-occupancy units; or
 - (e) a decision for, or a deemed refusal of, an extension application for a development approval that is only for a material change of use of a classified building; or
 - (f) a decision for, or a deemed refusal of, a change application for a development approval that is only for a material change of use of a classified building; or
 - (g) a matter under this Act, to the extent the matter relates to—

- (i) the Building Act, other than a matter under that Act that may or must be decided by the Queensland Building and Construction Commission; or
 - (ii) the Plumbing and Drainage Act, part 4 or 5; or
 - (h) a decision to give an enforcement notice in relation to a matter under paragraphs (a) to (g); or
 - (i) a decision to give an infrastructure charges notice; or
 - (j) the refusal, or deemed refusal, of a conversion application; or
 - (k) a matter that, under another Act, may be appealed to the tribunal; or
 - (l) a matter prescribed by regulation.
- (3) Also, table 1 does not apply to a tribunal if the matter involves—
- (a) for a matter in subsection (2)(a) to (d)—
 - (i) a development approval for which the development application required impact assessment; and
 - (ii) a development approval in relation to which the assessment manager received a properly made submission for the development application; or
 - (b) a provision of a development approval about the identification or inclusion, under a variation approval, of a matter for the development.
- (4) Table 2 states the matters that may be appealed only to the P&E Court.
- (5) Table 3 states the matters that may be appealed only to the tribunal.
- (6) In each table—
- (a) column 1 states the appellant in the appeal; and
 - (b) column 2 states the respondent in the appeal; and
 - (c) column 3 states the co-respondent (if any) in the appeal; and
 - (d) column 4 states the co-respondents by election (if any) in the appeal.
- (7) If the chief executive receives a notice of appeal under section 230(3)(f), the chief executive may elect to be a co-respondent in the appeal.

Extract of Schedule 1 of the Planning Act 2016

Table 1 Appeals to the P&E Court and, for certain matters, to a tribunal			
1. Development applications An appeal may be made against— <ul style="list-style-type: none"> (a) the refusal of all or part of the development application; or (b) the deemed refusal of the development application; or (c) a provision of the development approval; or (d) if a development permit was applied for—the decision to give a preliminary approval. 			
Column 1 Appellant	Column 2 Respondent	Column 3 Co-respondent (if any)	Column 4 Co-respondent by election (if any)
The applicant	The assessment manager	If the appeal is about a concurrence agency's referral response—the concurrence agency	1 A concurrence agency that is not a co-respondent 2 If a chosen assessment manager is the respondent—the prescribed assessment manager 3 Any eligible advice agency for the application 4 Any eligible submitter for the application

Table 2
Appeals to the P&E Court only

2. Eligible submitter appeals

An appeal may be made against the decision to give a development approval, or an approval for a change application, to the extent that the decision relates to—

- (a) any part of the development application for the development approval that required impact assessment; or
- (b) a variation request.

Column 1 Appellant	Column 2 Respondent	Column 3 Co-respondent (if any)	Column 4 Co-respondent by election (if any)
<p>1 For a development application—an eligible submitter for the development application</p> <p>2 For a change application—an eligible submitter for the change application</p>	<p>1 For a development application—the assessment manager</p> <p>2 For a change application—the responsible entity</p>	<p>1 The applicant</p> <p>2 If the appeal is about a concurrence agency's referral response—the concurrence agency</p>	<p>Another eligible submitter for the application</p>
<p>3. Eligible submitter and eligible advice agency appeals</p> <p>An appeal may be made against a provision of a development approval, or failure to include a provision in the development approval, to the extent the matter relates to—</p> <ul style="list-style-type: none"> (a) any part of the development application or the change application, for the development approval, that required impact assessment; or (b) a variation request. 			
Column 1 Appellant	Column 2 Respondent	Column 3 Co-respondent (if any)	Column 4 Co-respondent by election (if any)
<p>1 For a development application—an eligible submitter for the development application</p> <p>2 For a change application—an eligible submitter for the change application</p> <p>3 An eligible advice agency for the development application or change application</p>	<p>1 For a development application—the assessment manager</p> <p>2 For a change application—the responsible entity</p>	<p>1 The applicant</p> <p>2 If the appeal is about a concurrence agency's referral response—the concurrence agency</p>	<p>Another eligible submitter for the application</p>

Administration Office
64 - 66 Front St Mossman
P 07 4099 9444
F 07 4098 2902

OUR REF: ROL2146_2017 (825322)

23 August 2017

D J & J P Cobb
C/- Terence James Stewart
9 Ross Road
DEERAL QLD 4871

Dear Sir

**ADOPTED INFRASTRUCTURE CHARGES NOTICE FOR
241R BAMBOO CREEK ROAD, BAMBOO**

Please find attached an Adopted Infrastructure Charges Notice issued in accordance with section 118 of the *Planning Act 2016* (the Act).

The amount in the Adopted Infrastructure Charges Notice has been calculated according to Council's Adopted Infrastructure Charges Resolution.

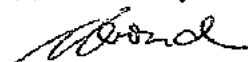
These charges are payable prior to the change of use occurring, or prior to the issue of a Compliance Certificate for the Building Format Plan, or which ever occurs first, in accordance with section 118 of the Act.

Please also find attached extracts from the Act regarding the following:

- your right to make representations to Council about the Adopted Infrastructure Charges Notice; and
- your Appeal rights with respect to the Adopted Infrastructure Charges Notice.

Should you have any enquiries in relation to this Adopted Infrastructure Charges Notice, please contact Daniel Lamond of Development Assessment and Coordination on telephone number no 4099 9456.

Yours faithfully



Tracey Crouch

A/ Manager Sustainable Communities

Att

INFRASTRUCTURE CHARGES NOTICE

D.J.S.J.P. Gable		8		5	
DEVELOPER'S NAME		ESTATE NAME		STAGE	
2414 Hawthorn Creek Road		Lot 3 on SP747073		2044	
STREET No. & NAME		LOT & SP No.s		PARCELS No.	
Recon/qualifier of a lot		15-100-15		Four (4)	
DEVELOPMENT TYPE		COUNCIL No.		VALUITY PL/1000 (sqm)	
825141		1			
DSC Reference Doc. No.		VERSION No.			

	Use	Charges per Use	Amount Due	Amount Paid	Receipt Refs & GL Code
Rural Areas - Water Only	proposed	3	14,761.53	21,791.99	
	existing	7	14,761.53	14,443.51	
	Total				
Urban Areas - Water only	proposed	0	0.00	0.00	
	existing	0	0.00	0.00	
	Total				
Urban Areas - Water & Sewer	proposed	0	0.00	0.00	
	existing	0	0.00	0.00	
	Total				
			26,527.63		
TOTAL			26,527.63		

Prepared by	S. L. Gable	22-Aug-17	Amount Paid	
Checked by	N. B. Gable	23-Aug-17	Date Paid	
Date Payable				
Amount Due	26,527.63			
Receipt No.				
Cashier				

Notes:

The Infrastructure Charges in this Notice are payable in accordance with Part 2 Division 1 of the Sustainable Planning Act 2008 (SPA)

Charges are payable to Douglas Shire Council. You can make payment at any of Council's Business Offices or by mail with your cheque or money order to Douglas Shire Council, PO Box 723, Mossman QLD 4873. Cheques must be made payable to Douglas Shire Council and marked 'Not Negotiable'. Acceptance of a cheque is subject to collection of the proceeds. Post dated cheques will not be accepted.

Any enquiries regarding Infrastructure Charges can be directed to the Development & Environment, Douglas Shire Council, on 07 4299 8444 or by email on enquiries@dsq.qld.gov.au

APPENDIX: B

Drainage Study Report

Drainage Study Report

241R Bamboo Creek Road, Bamboo QLD 4873

For D.J. & J.P. Cobb



Project No. 4975/01
Reference No. JD0150
Date: 23/05/2018

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APPENDIX A – T.J. Stewart Site Survey

APPENDIX B – Hydrology

APPENDIX C – Hydraulics

APPENDIX D – Manning's 'n' and Entrance Loss Coefficient 'Ke' Tables

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Flanagan Consulting Group is a registered business name of South Pacificsands Pty Ltd A.C.N. 052 933 687

1.0 INTRODUCTION

D.J. and J.P. Cobb are proposing to subdivide Lot 3 on RP747675 situated in the Douglas Shire into 3 rural lots. As part of the supporting information for the development application, Flanagan Consulting Group have been commissioned to prepare a drainage study of the site.

The drainage study includes an analysis of the catchment, determination of flows for a Q100 rainfall event, assessment of the hydraulic performance of the culvert nest at the Skeleton Creek crossing and the determination of stream flow levels, velocities and the extent of inundation during peak events.

This report also considers any impacts of the proposed development including any work required to achieve a non-worsening effect.

This report has been prepared by Engineer Jacob Donnan, and has been reviewed and issued by Engineer Greg Applin, RPEQ No. 6073.

2.0 SITE DESCRIPTION

D.J. and J.P. Cobb propose to subdivide the site into 3 lots as shown in the approved plans in the decision notice (T.J. Stewart drawing reference no. 9674).

The site is described as Lot 3 on RP747675 and is located on Bamboo Creek Road, Bamboo QLD 4873.

The site has a varied profile. The eastern frontage onto Bamboo Creek Rd is relatively flat with a slight grade to the south-east (from approx. RL 9.70m AHD at the north-east corner to approx. RL 9.22m AHD at the south-east corner). The remainder of the site falls towards the western boundary to Skeleton Creek at a varying grade from 2-10%. The site is predominantly covered in grasses with trees of varying species lining both the northern and southern boundaries. The western boundary is significantly vegetated and is lined by a mixture of thick shrubbery and trees of varying species at Skeleton Creek.

There is an existing dwelling in the centre of the site which has an access driveway from Bamboo Creek Rd. Trees of varying species surround this dwelling and span the length of the driveway on either side. A detached shed structure is located to the north of the main dwelling and backs on to Skeleton Creek.

The Skeleton Creek channel which is approximately 30m in width and forms the western boundary of the site. It has a significant catchment area to the north of 283Ha. Approximately 97Ha of this is relatively flat farmland while 186Ha is steep and densely vegetated. A culvert nest consisting of 4 x 3.6m diameter helical culverts exists in Skeleton Creek at the Miallo-Bamboo Creek Road crossing to the south-west of the site.

A preliminary survey of the site was undertaken by T.J. Stewart and is attached in **Appendix A**.

3.0 HYDROLOGY AND HYDRAULICS FOR EXISTING CONDITIONS

3.1 Hydrology

Site hydrology was assessed based on methodology from DTMR's – Road Drainage Manual (Ch 5.). The Skeleton Creek drainage channel bounding the site to the west has a significant catchment area of 283Ha. The catchment consists predominantly of hill-side forest (approx. 186Ha) and farmland (approx. 96Ha) with minor rural residential development along Bamboo Creek Rd.

The combined flow entering the site for different ARI Rainfall Events is summarised in **Table 1** below.

ARI (Years)	Flow (m ³ /s)
5	27.26
10	30.23
20	38.70
50	49.86
100	57.90

TABLE 1: FLOW FOR DIFFERENT ARI RAINFALL EVENTS

A contoured plan showing the catchment area (4975-SK01), as well as hydrological information including catchment details, time of concentration, runoff, stream profiles and rainfall data can be found in **Appendix B**.

3.2 Hydraulics

The major control structure for the drainage channel is the culvert nest consisting of 4 x 3.6m diameter corrugated mild steel helical culverts at the Miallo-Bamboo Creek Rd crossing. These culverts are located at the south-west corner of the site. Based on the hydrology identified in **Table 1**, hydraulic analysis of this culvert nest was conducted using the "CulvertW" software package. When subjected to a Q100 approach flow of 57.90m³/s, outlet control was achieved with a headwater level of RL 7.025m AHD and tailwater level of RL 6.80m AHD. Just upstream of the culvert, the channel boundary is at RL 7.85m AHD – indicating that the Q100 flow is maintained within the Skeleton Creek channel and does not encroach the site. The outlet velocity was calculated at 1.422m/s. This analysis was conducted using conservative values for the entrance loss coefficient 'Ke' (0.9) and Manning's 'n' value (0.024). See **Appendix D** for coefficient selection tables – it is noted that the 'n' value of 0.022 was adopted for corrugated metal, then increased to account for minor silting within some of the culverts. The detailed output from this design case can be found in **Appendix C**.

Further to the "CulvertW" analysis, four cross sections behind the site were defined along Skeleton Creek and subjected to an irregular-shaped open channel assessment. The extent of survey does not adequately cover the entire flood plain to the west of the site. The extent of the hydraulic assessment is restricted to the extent of survey. Consequently, the model has been "glass walled" along the extent of survey

For the cross-sectional analysis, a Manning's 'n' value of 0.07 was adopted for channel roughness. This was a conservative approach given that natural channels in very poor condition are considered to have a roughness coefficient of 0.06. Refer to **Appendix D** for coefficient selection tables.

The assessment has identified that for cross sections 2-4, the flow is contained entirely within the creek banks. The flow at cross section 1 overtops the bank into a low-lying area of the site during the ARI 100-year event. This area of inundation, defined by RL 7.15m AHD, will require a drainage easement to be registered over the proposed. The remainder of the site has a 100-year ARI rainfall event immunity.

Details of 100-year ARI water surface elevations and channel velocities at vary cross sections are summarised in Table 2 below. The cross sections and proposed drainage easement area are depicted on the Hydraulic Assessment Plan "4975-SK02" in **Appendix C**.

Cross Section (#)	Site Boundary Level (m AHD)	100-year ARI Flood Level (m AHD)	Velocity (m/s)
1	6.01	7.142	1.49
2	7.88	6.814	2.12
3	8.00	6.555	1.91
4	7.75	6.115	1.97

TABLE 2: 100-YEAR ARI FLOOD LEVELS AND FLOW VELOCITIES AT SKELETON CREEK

4.0 HYDROLOGY AND HYDRAULICS FOR PROPOSED DEVELOPMENT

The proposed development requires no filling works to be undertaken on-site, with only some minor water reticulation works being required to service the new lots. Ultimately the newly created 2 lots will have single residences built upon them. Given the sheer size of the catchment area (283Ha) and acknowledging that a single residence (and possible shed) on the new created 2 additional lots will have an insignificant change to the hydraulic performance of the site in the developed state, the impact is deemed negligible.

Anecdotal information from neighbouring landowners advised that two of the highest flood levels observed (in the 150 years that their family have lived alongside Skeleton Creek) reached a maximum level of RL 8.59m AHD at the shed located to the rear of Lot 4 RP746675. This location approximates to RL 8.60m AHD and is significantly above the assessed Q100 flood level.

In view of the above, a conservative minimum habitable floor level of RL 8.90m AHD is recommended for any new dwellings proposed within the sub-division boundary. The RL 8.90m AHD level includes for a 300mm freeboard allowance. This is a conservative assessment given the significant recent 2018 rainfall events fell short of RL 8.59m AHD at the neighbouring landowner's shed.

5.0 CONCLUSIONS

Hydrological and hydraulic analysis of the Skeleton Creek catchment and surrounding site has been undertaken.

The extent of survey does not adequately cover the entire flood plain to the west of the site. This does not impair the analysis however, as the calculated Q100 flood extents do not exceed the available survey boundaries.

Modelling has shown that 100-year ARI event flow is not wholly contained within the creek banks and inundates a section of lower-lying land on proposed Lot 30. It is proposed that a drainage easement be registered over this area, as detailed in 4975-SK02.

No filling of building envelopes is proposed; however, it is noted that any filling outside of the proposed drainage easement would have no impact on Q100 flood levels. A conservative minimum habitable floor level of RL 8.90m AHD is recommended for any future dwellings proposed within the sub-division boundary based on anecdotal information only.

The site can be developed without any impacts to existing flood levels of the site or the surrounding area.

6.0 SUMMARY AND RECOMMENDATIONS

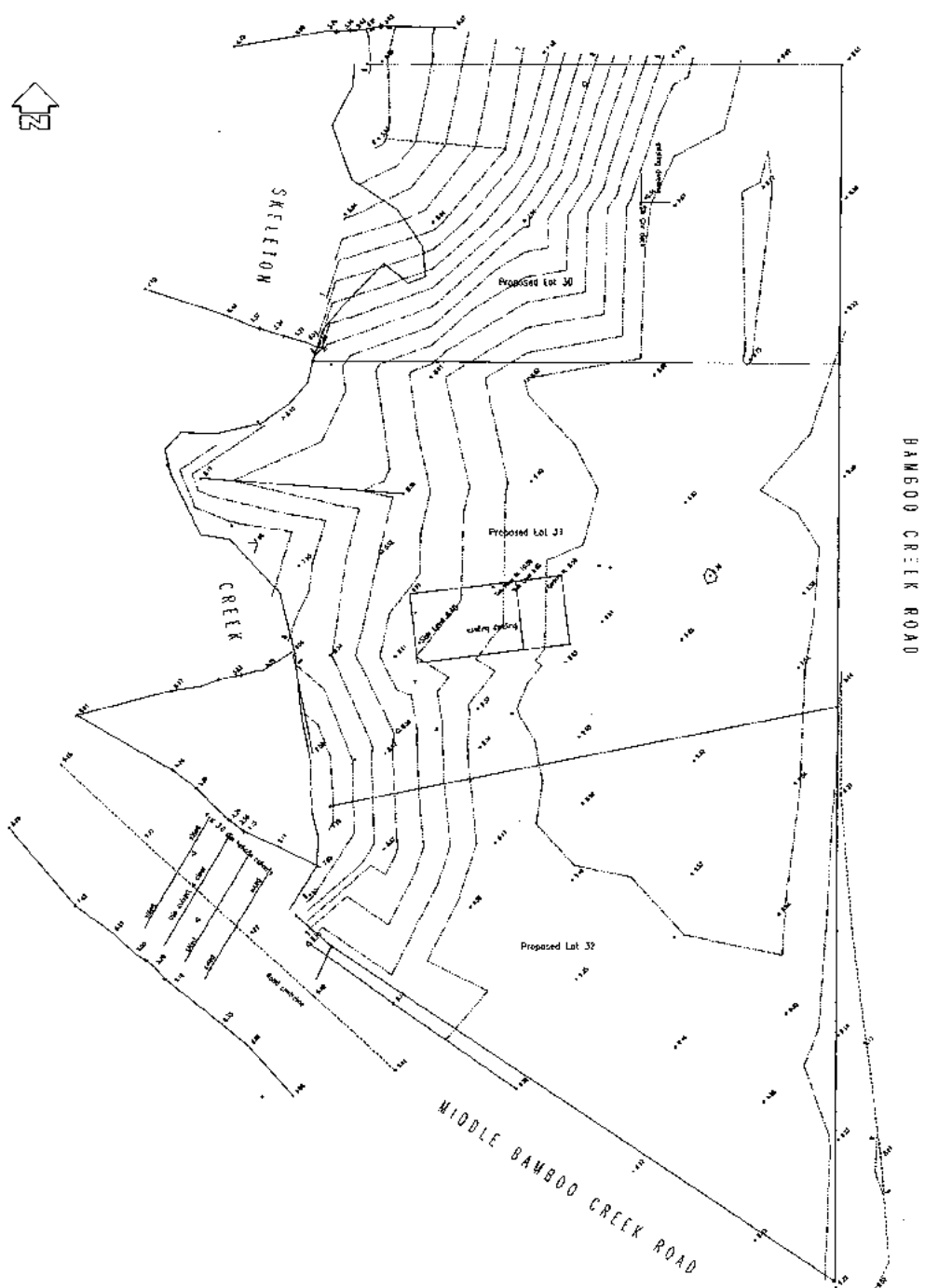
This report provides the following summary and recommendations:

- No filling of building envelopes is proposed; however, it is noted that any filling outside of the proposed drainage easement would have no impact on Q100 flood levels.
- No drainage infrastructure is deemed necessary for installation as the development does not affect the existing overland flow paths which adequately drain the site.
- A drainage easement should be registered at RL 7.15m AHD on proposed Lot 30 as detailed on 4975-SK02.
- A conservative minimum habitable floor level of RL 8.90m AHD is recommended for any new dwellings within the sub-division boundary.
- Maintenance of the Miallo-Bamboo Creek Rd culvert nest and Skeleton Creek channel should be conducted as per Douglas Shire Council's schedule to ensure vegetation overgrowth and silting does not build up and hinder hydraulic capacity.
- The site may be developed as proposed.

APPENDIX: A - Drainage Study

T.J. Stewart Site Survey - 241R Bamboo Creek Road

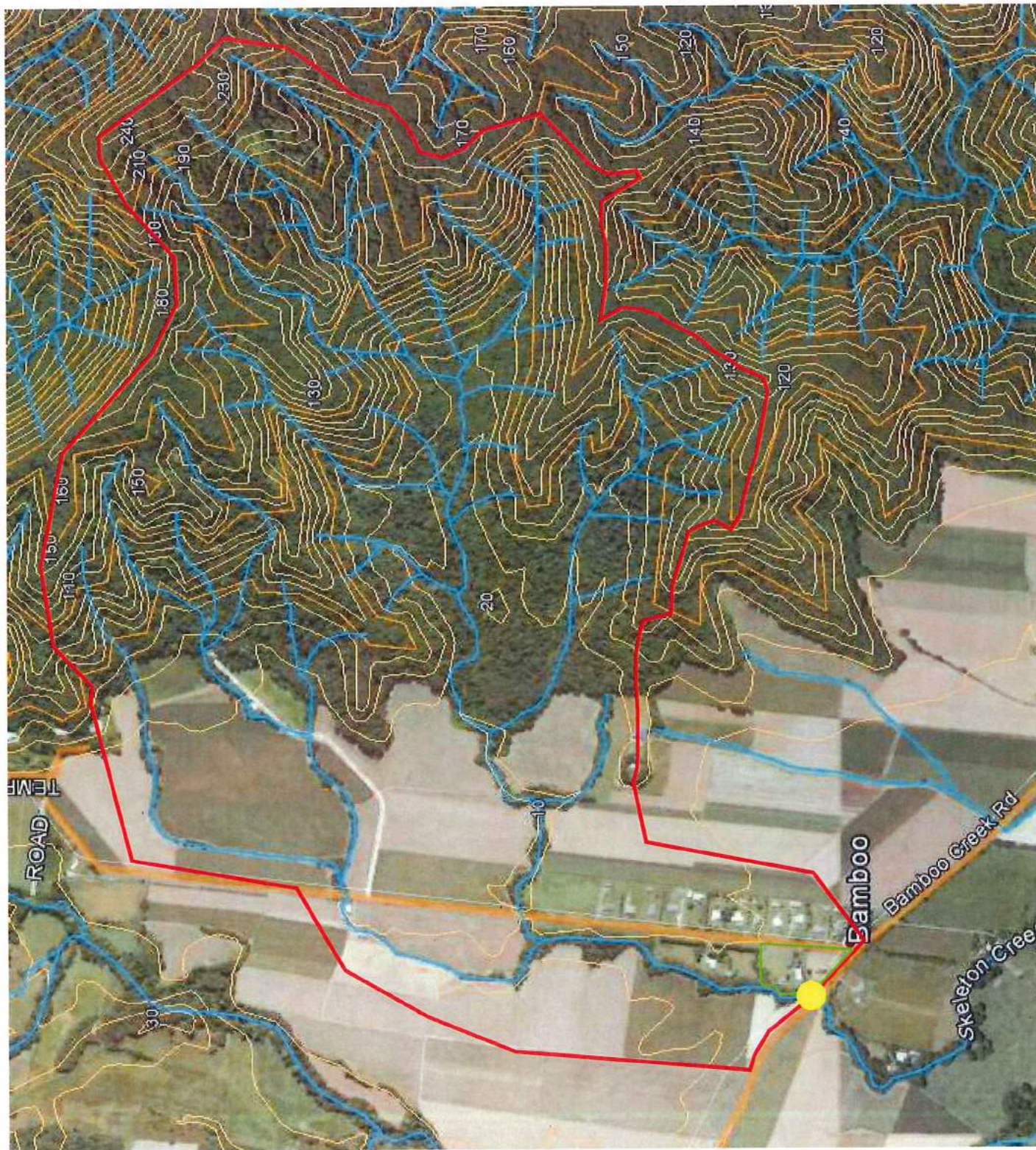
- Shaded relief
 10' contour
 20' contour



PROPOSALS				DATE	
NO.	DATE	BY	REVISION	NO.	DATE
1	10-10-2013	10-10-2013	10-10-2013	2	10-10-2013
PROJECT NAME				PROJECT NAME	
1. CONSTRUCTION OF				1. CONSTRUCTION OF	
PROPOSED LOTS 30 - 32				PROPOSED LOTS 30 - 32	
BAMBOO CREEK ROAD, BAMBOO				BAMBOO CREEK ROAD, BAMBOO	
CREEK, OLD 401				CREEK, OLD 401	
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APPENDIX: B - Drainage Study

Hydrology



LEGEND

Point of Interest

Lot to be Reconfigured (1 into 3)

Catchment Boundary

ASSESSED AREAS

TOTAL CATCHMENT = 283ha

FLAT AREA = 97ha

STEEP AREA = 186ha



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241 Bamboo Creek Road Catchment Area

Prepared By: J Donnan 1/5/18

Checked By: R Northcott 1/5/18

4975-SK01

A3 Full Size

Not to Scale

01/05/2018

Based on DMR - Road Drainage Manual March 2010 (Chapter 5)

Bamboo Creek
4975
R Northcott
19 April 2018

[illegible]

The Bransby-Williams formula is:

Time of Concentration	=	t _c	=	87	mins	1.4	hours
Conversion Factor	=	F	=	92.7	if ha	58.5	if km ²
Length	=	L	=	3.13	km		
Area	=	A	=	283.0	ha		
Equal Area Slope	=	S _e	=	24.68	m/km	2.47	%

$$\begin{aligned} \text{Runoff Coefficient} &= C_{50} = \frac{a + b + c + d}{100} \\ &= 0.67 \end{aligned}$$

The Rational Method formula is:

Flow Rate for an ARI of y years	Q _y	=	27.26	5 years	30.23	10 years
Conversion Factor	k	=	0.00278	ha	0.278	km ²
Runoff Coefficient	C _y	=	0.54	5 years	0.54	10 years
ARI for t hours and y years	t _{xy}	=	64.4	5 years	71.4	10 years
Catchment Area	A	=	283.0	ha	-	km ²

Characteristic	Runoff producing values (in brackets) as % in calculation of 'C' for a 50 year average recurrence interval event			
Rainfall Intensity	$(C) = 0.3 / I_{50} + 1$			
Catchment Relief	Very steep slopes > 15% (10)	Hilly to steep slopes 4 - 15% (5)	Flat to rolling slopes < 4% (0)	
Catchment Storage	Well defined water courses, negligible storage. (10)	Overland flow is significant, some floodplain storage. (5)	Poorly defined water courses, large flood plain storage capacity (0)	
Ground Characteristics	Grazing land and open forest (40)	Agricultural land (30)	Dense vegetation and rainforest (20)	Heath and sand dunes (10)
Notes	<p>Catchment storage is defined as; a catchment's ability to detain or temporarily hold water within a stream's adjacent floodplain. Water will slowly drain after flood water recedes.</p> <p>Example:- Determine C_{50} for a Rainfall intensity of 40 mm/h over a catchment with the following characteristics; Catchment Relief = 1 hilly with average slopes 4-10%; Catchment Storage = Well defined system of small watercourses with little storage capacity; Ground Characteristics = Open forest.</p>			
	$C_{50} = \frac{16 + 5 + 10 + 40}{100} = 0.71$			

Hydrology Calculations

Stormwater Runoff for Simple Rural Catchment

Based on 1048 - Road Drainage Manual March 2010 (Chapter 5)

Project Name:
Project Number:
Designer:
Date:

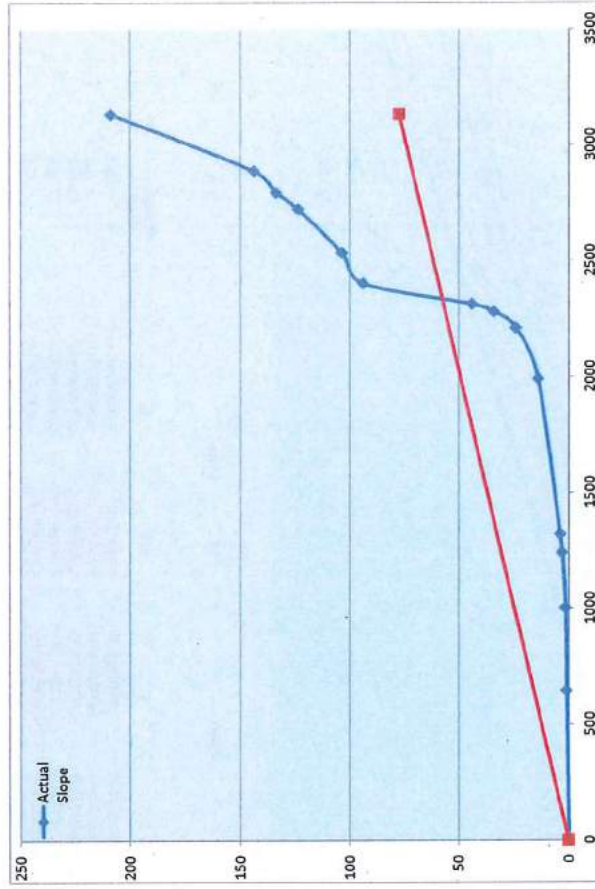
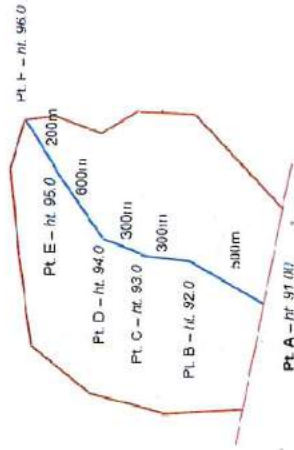
Bamboo Creek
4975
R Northcott
19 April 2018

Stream Profile:
Catchment Number:

1

Catchment Area = 283.0 ha
Length of Stream = 3133.0 m
Stream Slope = 24.7 m/km 2.47 %

POINT (DATUM)	CHAINAGE	HEIGHT	LENGTH	CALC HEIGHT	AREA
0	0.0	6.0	0.0	0.00	0.0
1	645.0	7.0	645.0	1.00	322.5
2	1003.0	7.5	358.0	1.50	447.5
3	1241.0	9.0	238.0	3.00	535.5
4	1320.0	10.0	79.0	4.00	276.5
5	1992.0	20.0	672.0	14.00	6048.0
6	2211.0	30.0	219.0	24.00	4161.0
7	2282.0	40.0	71.0	34.00	2059.0
8	2315.0	50.0	33.0	44.00	1287.0
9	2403.0	100.0	88.0	94.00	6072.0
10	2536.0	110.0	133.0	104.00	13167.0
11	2724.0	130.0	188.0	124.00	21432.0
12	2796.0	140.0	72.0	134.00	9288.0
13	2888.0	150.0	92.0	144.00	12788.0
14	3133.0	215.0	245.0	209.00	43242.5



Profile Area (m²) 121126.5
Stream Ordinate 77.32

(TOP CHANNEL)

Hydrology Calculations

Stormwater Runoff for Simple Rural Catchment

Based on 2014 - Rural Drainage Manual March 2010 (Chapter 3)

Project Name: Bamboo Creek
Project Number: R Northcott
Designer: 19 April 2018
Date:

Stream Profile:

Catchment Number:	1
Catchment Area	A = 283.0 ha
Length of Stream	L = 3133.0 m
Stream Slope	Se = 24.7 m/km

Rainfall Intensity

Location: lat long
Near:

<http://www.bom.gov.au/hydro/haa/efirstwebb/efirstwebb.shm>

<http://www.bom.gov.au/water/design/raintools/raintools-revised-1d/?year=2016>

List of coefficients to the equations of the form:

$$LN(I) = A + B \cdot (LN(T))^2 + C \cdot (LN(T))^3 + D \cdot (LN(T))^4 + E \cdot (LN(T))^5 + F \cdot (LN(T))^6$$

Intensity in mm/hr
Time in hours

5 years
10 years
20 years
50 years
100 years

71.4
1.4
81.3
94.2

50 years
100 years

Intensity (mm)

Return Period (years)

Poste Values From BOM Website ->

Return Period (years)	1	2	5	10	20	50	100	500	1000
1	3.9130806923	-0.5176000600	-0.0394394400	0.0093613360	0.0006287570	-0.0006168127	0.000493223	0.000563741	0.000805179
2	4.1466934691	-0.5101791000	-0.034152620	0.0090512761	0.0001359828	-0.0005757362	0.000563741	0.000805179	0.000940572
5	4.3495526857	-0.4923302800	-0.0175284040	0.0085997302	-0.0012128478	-0.0004961176	0.000805179	0.000940572	0.001036012
10	4.4484071732	-0.4824859300	-0.0087652262	0.0083059296	-0.0019572938	-0.0004505057	0.000940572	0.001036012	0.001136655
20	4.5735263824	-0.4741652000	-0.0015531164	0.0080057569	-0.0025647809	-0.0004045840	0.001036012	0.001136655	0.001252104
50	4.7167406082	-0.4645069800	0.0069538690	0.0076704766	-0.0032836630	-0.0003534321	0.001136655	0.001252104	0.0013655
100	4.8143134117	-0.4581793000	0.0124891380	0.0075648134	-0.0037594379	-0.0003320969	0.001252104	0.0013655	0.001462

Duration (Hours)

1 Year
2 Years
5 Years
10 Years
20 Years
50 Years
100 Years

Intensity (mm)

Area (ha)

Intensity (mm)

Area (ha)

Intensity (mm)

Area (ha)

Intensity (mm)

Area (ha)

Intensity (mm)

APPENDIX: C - Drainage Study

Hydraulics

LEGEND

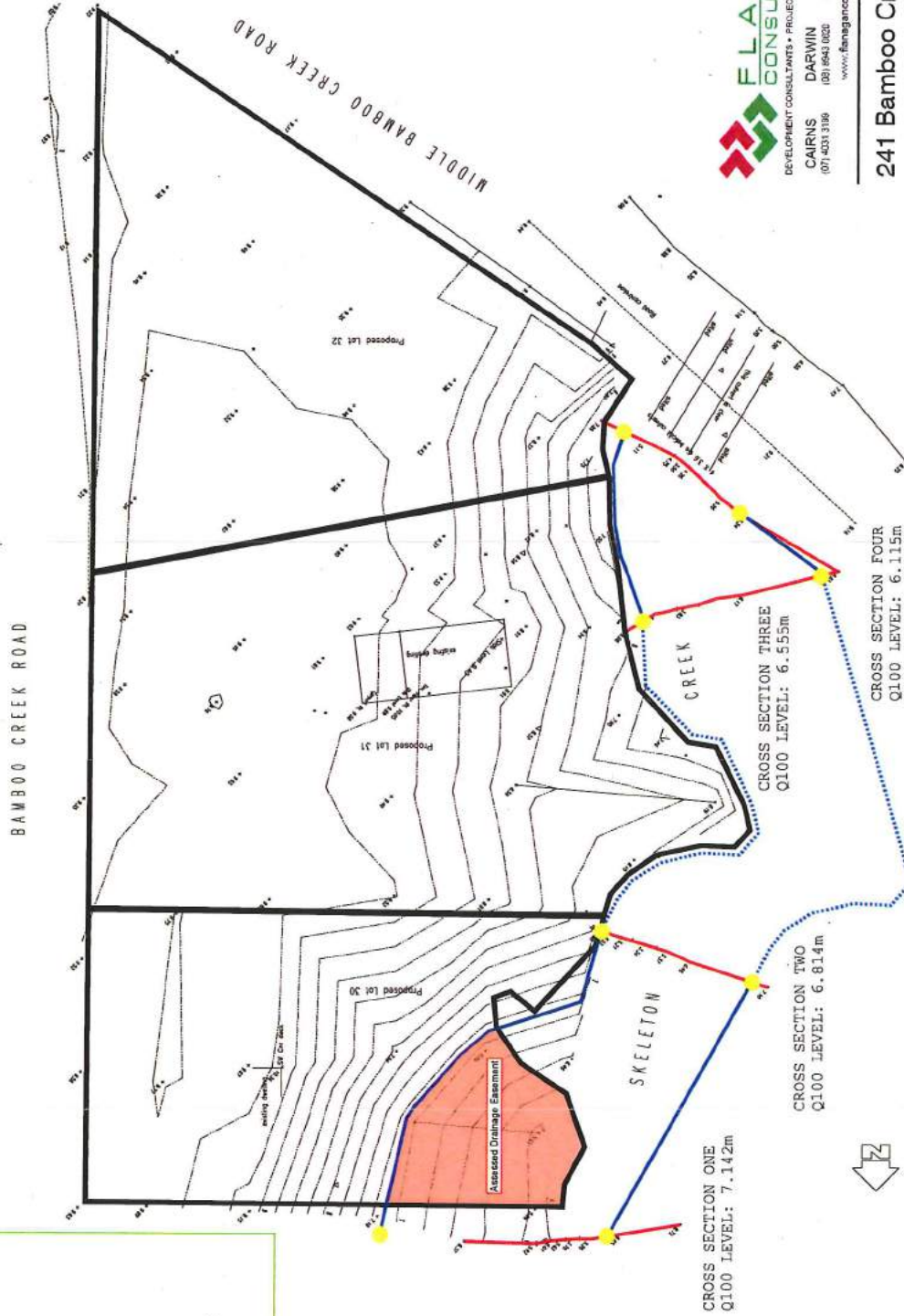
Assessed Channel Cross Section

Assessed Q100 Flow Level

Assessed Q100 Extent

Predicted Q100 Extent

Proposed Lot Boundaries



241 Bamboo Creek Road Hydraulic Assessment Plan

Prepared By: J Donnan 3/5/18

Checked By: R Northcott 3/5/18

4975-SK02

A3 Full Size

Not to Scale

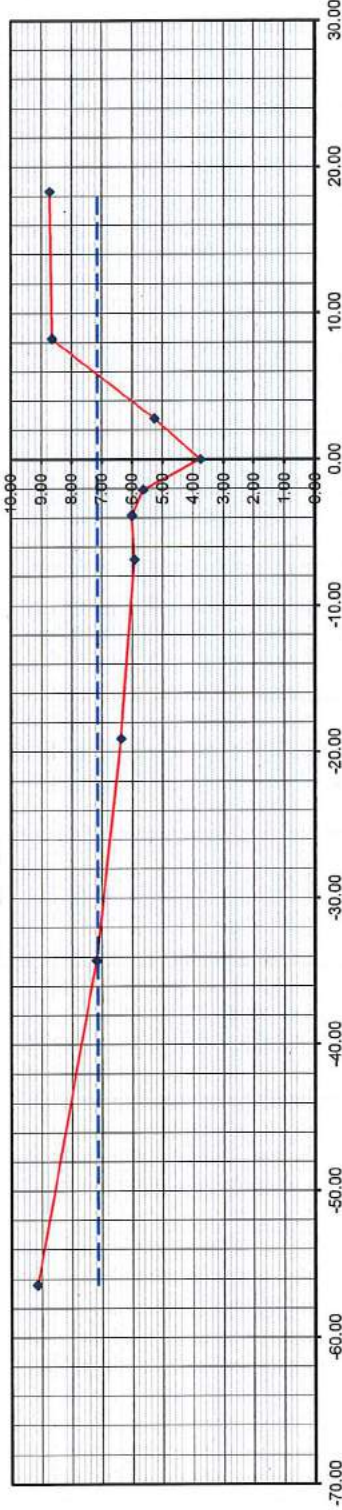
03/05/2018

Channel Flow (Irregular shape)

Location 241 Bamboo Creek Road - Channel Section One
Downstream view.

Project No. 4975
Calc's By J Donnan
Checked By R Northcott

Profile



Depth of flow (m)	3.382
Slope (%)	0.820
LL	3.760
A	38.972
P	41.091
R	0.948
WSE	7.142

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} × P	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
	22.140	1.970	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	15.170	0.810	0.070	5.581	0.000	0.772	14.458	14.479	0.385	3.824	0.268	2.956	42.227
	12.250	0.450	0.070	12.213	0.772	1.222	12.250	12.258	0.996	15.761	0.227	12.183	174.048
	3.010	-0.090	0.070	3.543	1.222	1.132	3.010	3.011	1.176	5.107	0.056	3.948	56.403
	1.780	0.390	0.070	2.362	1.132	1.522	1.780	1.822	1.296	3.633	0.034	2.808	40.116
	2.060	1.860	0.070	5.051	1.522	3.382	2.060	2.775	1.820	9.740	0.051	7.529	107.561
Centre	0.000	0.000	0.000										
	2.800	1.500	0.070	7.370	1.882	3.382	2.800	3.176	2.320	16.708	0.059	12.915	184.505
	5.460	3.390	0.070	2.852	0.000	1.882	3.031	3.568	0.799	3.178	0.066	2.457	35.099
	10.050	0.070	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				38.972						57.951	0.761	44.797	639.959

Calculated Design Flows	
Q	10.000 m ³ /s
Q	20.000 m ³ /s
Q	50.000 m ³ /s
Q	100.000 m ³ /s

Recommended Freeboard Calc's	
Calcd channel velocity	1.49 m/s
Minimum	0.30 m
20% channel depth	0.68 m
V ² /2g	0.11 m

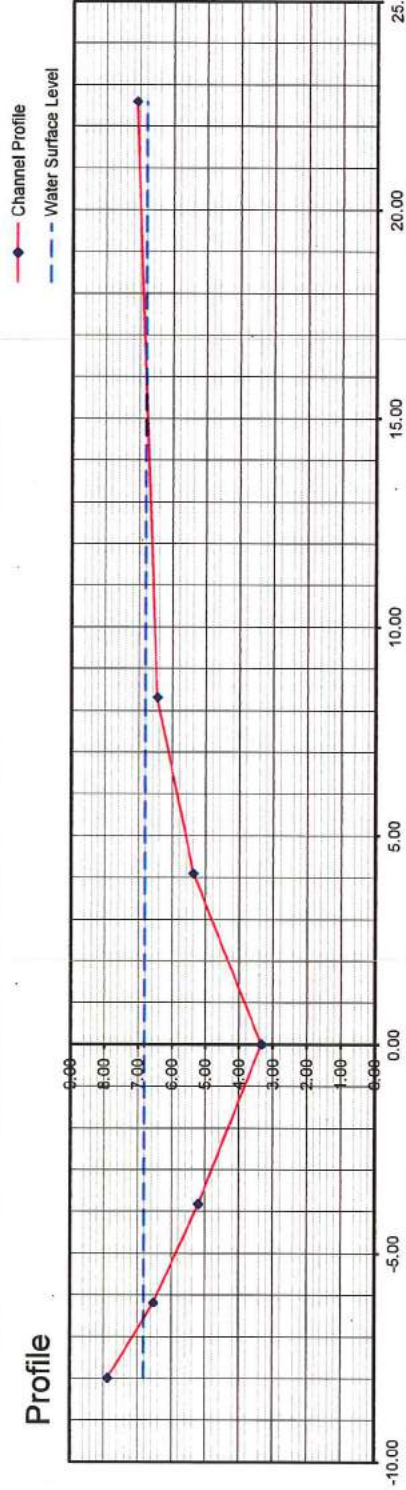
Comments

Channel Flow (Irregular shape)

Location 241 Bamboo Creek Road - Channel Section Two
Downstream view.

Project No. 4975
Calc's By J Donnan
Checked By R Northcott

Profile



Depth of flow (m)	3.474
Slope (%)	1.040
IL	3.340
A	27.255
P	24.272
R	1.123
WSE	6.814

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} x P	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1.810	1.350	0.070	0.054	0.000	0.284	0.381	0.475	0.114	0.019	0.009	0.013	0.181
	2.360	1.320	0.070	2.228	0.284	1.604	2.360	2.704	0.824	2.852	0.050	1.958	27.970
	3.820	1.870	0.070	9.699	1.604	3.474	3.820	4.253	2.280	24.481	0.079	16.804	240.050
Centre	0.000	0.000	0.000										
	4.100	2.030	0.070	10.082	1.444	3.474	4.100	4.575	2.204	24.873	0.085	17.073	243.898
	4.220	1.090	0.070	3.794	0.354	1.444	4.220	4.358	0.870	5.039	0.081	3.459	49.408
	14.280	0.640	0.070	1.398	0.000	0.354	7.859	7.907	0.177	0.642	0.146	0.440	6.292
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				27.255						57.905	0.450	39.746	567.800

Calculated Design Flows	
Q	10.000 m ³ /s
Q	20.000 m ³ /s
Q	50.000 m ³ /s
Q	100.000 m ³ /s

Recommended Freeboard Calc's	
Calc'd channel velocity	2.12 m/s
Minimum	0.30 m
20% channel depth	0.69 m
V ² /2g	0.23 m

Comments

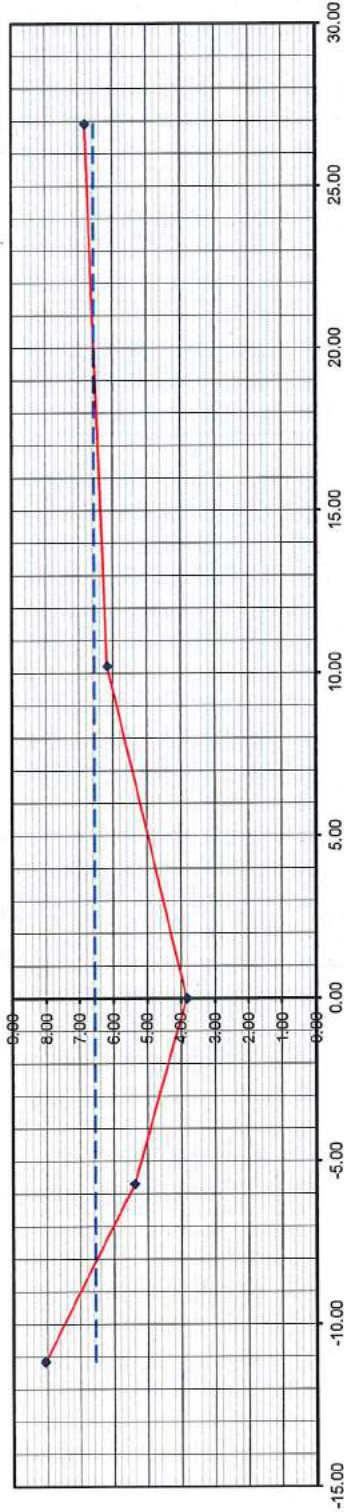
Channel Flow (Irregular shape)

Location

241 Bamboo Creek Road - Channel Section Three

Downstream view.

Profile



Depth of flow (m)	2.725
Slope (%)	1.060
LL	3.830
A	30.313
P	29.097
R	1.042
WSE	6.555

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} × P	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5.460	2.670	0.070	1.388	0.000	1.165	2.382	2.652	0.523	1.325	0.049	0.901	12.874
	5.700	1.560	0.070	11.087	1.165	2.725	5.700	5.910	1.876	24.803	0.109	16.864	240.908
Centre	0.000	0.000	0.000										
	10.230	2.340	0.070	15.908	0.385	2.725	10.230	10.494	1.516	30.874	0.194	20.991	299.878
	16.680	0.640	0.070	1.932	0.000	0.385	10.034	10.041	0.192	0.947	0.186	0.644	9.195
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				30.313						57.950	0.539	39.400	562.854

Calculated Design Flows

Q	10.000	30.23	m ³ /s
Q	20.000	38.70	m ³ /s
Q	50.000	49.86	m ³ /s
Q	100.000	57.90	m ³ /s

Recommended Freeboard Calc's

Calc'd channel velocity	1.91	m/s
Minimum	0.30	m
20% channel depth	0.55	m
V ² /2g	0.19	m

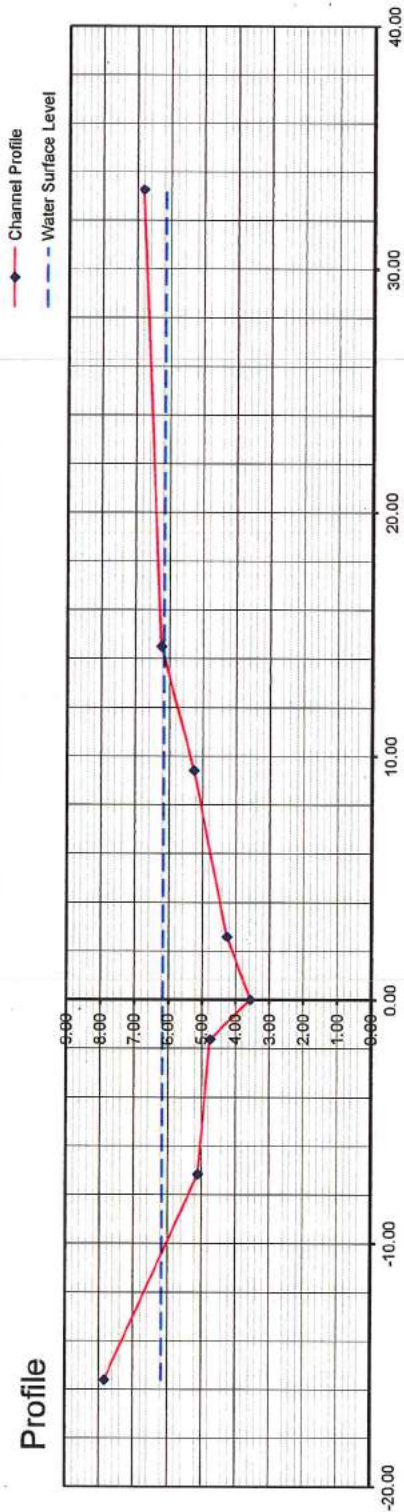
Comments

Channel Flow (Irregular shape)

Location 241 Bamboo Creek Road - Channel Section Four
Downstream view.

Project No. 4975
Calc's By R Northcott
Checked By J Donnan

Profile



Depth of flow (m)	2.607
Slope (%)	1.230
LL	3.560
A	29.451
P	25.389
R	1.160
WSE	6.167

SECTION	Width	Height	n	A	H ₁	H ₂	W	P	A/P	Q	n ^{1.5} x P	A ^{1.66} /P ^{0.66}	A ^{1.66} /P ^{0.66} /n
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	8.450	2.740	0.070	1.723	0.000	1.057	3.260	3.427	0.503	1.726	0.063	1.089	15.560
	5.540	0.360	0.070	6.853	1.057	1.417	5.540	5.552	1.234	12.494	0.103	7.886	112.655
	1.630	1.190	0.070	3.280	1.417	2.607	1.630	2.018	1.625	7.182	0.037	4.533	64.757
Centre	0.000	0.000	0.000										
	2.590	0.700	0.070	5.846	1.907	2.607	2.590	2.683	2.179	15.566	0.050	9.825	140.350
	6.830	1.000	0.070	9.610	0.907	1.907	6.830	6.903	1.392	18.983	0.128	11.981	171.162
	5.100	0.980	0.070	2.141	0.000	0.907	4.720	4.806	0.445	1.978	0.089	1.248	17.833
	18.760	0.570	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
				29.451						57.928	0.470	36.562	522.318

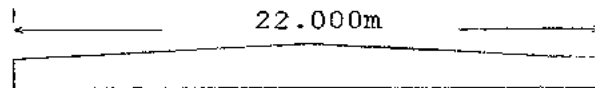
Calculated Design Flows	
Q	10.000 m ³ /s
Q	20.000 m ³ /s
Q	50.000 m ³ /s
Q	100.000 m ³ /s

Recommended Freeboard Calc's	
Calc'd channel velocity	1.97 m/s
Minimum	0.30 m
20% channel depth	0.52 m
V ² /2g	0.20 m

Comments

CulvertW - Design Case No 1

(File: - Date: 8-5-2018)



4 No User Pipe (3.600m dia) at a slope= 1.6364%

Inlet RL 3.560m	Outlet RL 3.200m
-----------------	------------------

Culvert Data

Using Mannings 'n' = 0.024
Entrance Loss Coefficient = 0.900
Entrance - Socket end projecting

No Weir Data specified to be used

Outlet Channel Data

Channel Width= 0.500m Channel Roughness = 0.070
Channel Slope= 0.0010m/m Right Slope: 1 Vert.to 5.0000Hor.
Left Slope: 1 Vert.to 5.000(Velocity of Flow = 0.478m/s

Headwater

Approach Flow	= 57.900m ³ /s
Flow in each Culvert	= 14.475m ³ /s
Tailwater depth	= 3.600m (RL 6.800m)
Using fixed Tailwater depth	
Critical depth at outlet	= 1.569m (RL 4.769m)
Effective tailwater depth	= 3.600m (RL 6.800m)
Head Loss in Culvert	= 0.225m
Depth at outlet adopted to calculate outlet velocity	= 3.600m (RL 6.800m)
Outlet Velocity	= 1.422m/s

OUTLET control

Headwater is 3.465m above culvert inlet invert
Headwater is at RL 7.025m - 3.465m above inlet invert
Tailwater is at RL 6.800m - 0.000m above outlet obvert

APPENDIX: D - Drainage Study

Manning's 'n' and Entrance Loss Coefficient 'Ke' Selection Tables

Surface Material	Manning's Roughness Coefficient - n -
Asphalt	0.016
Brick	0.015
Cast-iron, new	0.012
Concrete (Cement) - finished	0.012
Corrugated metal	0.022
Earth, smooth	0.018
Earth channel - clean	0.022
Earth channel - gravelly	0.025
Earth channel - weedy	0.03
Earth channel - stony, cobbles	0.035
Floodplains - pasture, farmland	0.035
Floodplains - light brush	0.05
Floodplains - heavy brush	0.075
Floodplains - trees	0.15
Gravel, firm	0.023
Metal - corrugated	0.022
Natural streams - clean and straight	0.03
Natural streams - major rivers	0.035
Natural streams - sluggish with deep pools	0.04
Natural channels, very poor condition	0.06

TABLE 3: EXERPT FROM ENGINEERING TOOLBOX – MANNING'S ROUGHNESS COEFFICIENTS

Entrance Loss Coefficients for Pipe or Pipe Arch Culverts

Type of Culvert and Inlet Design	Coefficient, Ke
Concrete Pipe Projecting from Fill (no headwall)	
Square cut end	0.5
Socket end	0.2
Concrete Pipe with Headwall and/or Wingwall	
Square cut end	0.5
Socket end (grooved end)	0.2
Rounded entrance (radius = 1/12 of diameter)	0.2
Concrete Pipe	
Mitered to conform to fill slope	0.7
End section conformed to fill slope	0.5
Beveled edges, 33.7 or 45 degree bevels	0.2
Side slope tapered inlet	0.2
Corrugated Metal Pipe or Pipe Arch	
Projecting form fill (no headwall)	0.9
Mitered (beveled to conform to fill slope)	0.7
Headwall or headwall with square edge wingwalls	0.5
End section conforming to fill slope	0.5
Beveled Ring	0.25
Headwall, rounded edge	0.2

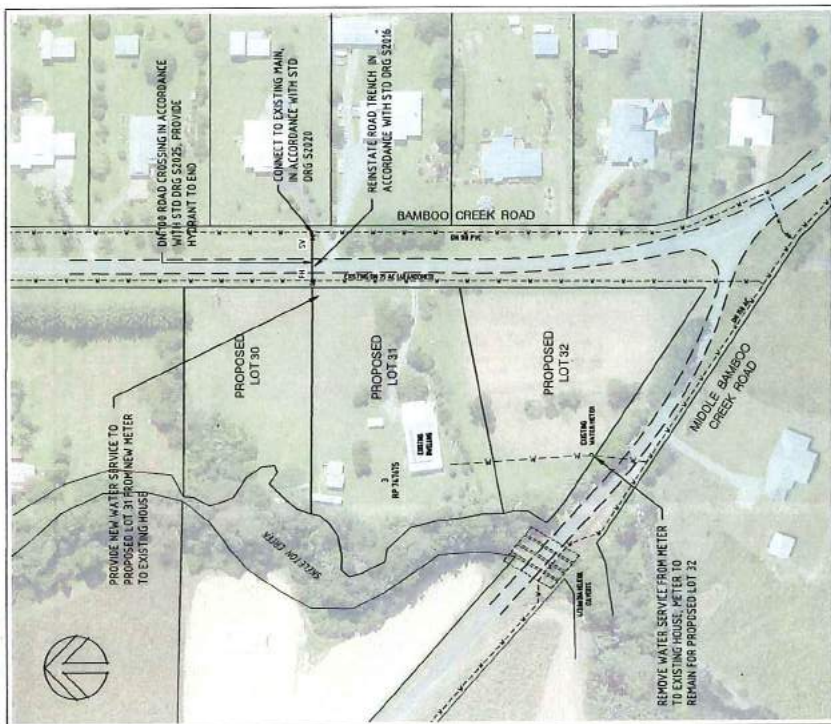
TABLE 4: CORVALLIS FORESTRY RESEARCH COMMUNITY – ENTRANCE LOSS COEFFICIENTS FOR PIPE OR PIPE ARCH CULVERTS

APPENDIX: C

Water Reticulation

WATER RETICULATION NOTES

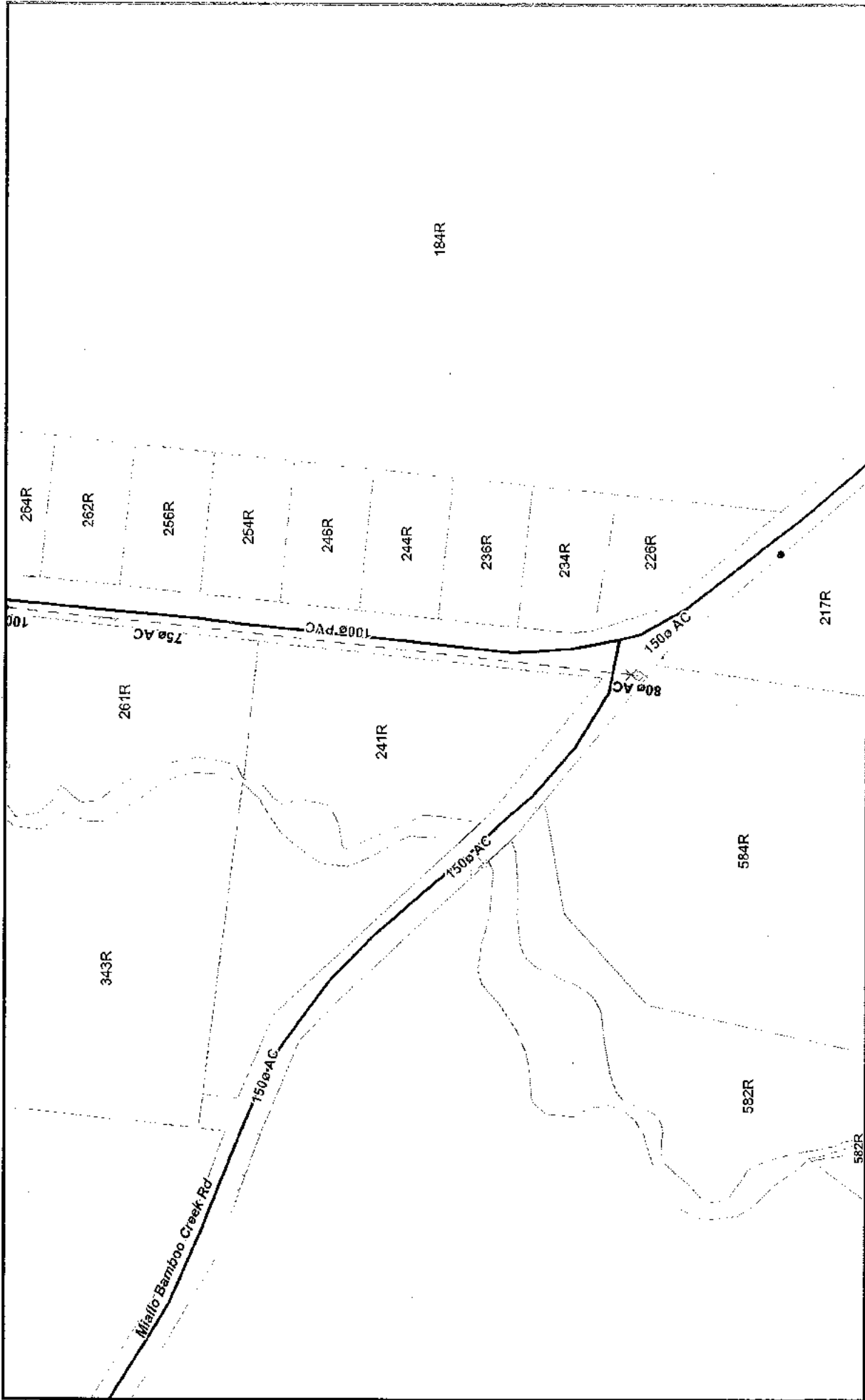
1. ALL PVC SHALL BE CLASS PNB. PVC PIPES SHALL BE RUBBER RING JOINTED AND DUCTILE IRON COMPATIBLE.
2. FOR VALVES & HYDRANT BOXES INSTALLATION DETAILS REFER FNRDC STD DRGS S2000 & S2005.
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5. FOR MAIN TRENCHING, BEDDING & ANCHORAGE DETAILS REFER FNRDC STD DRG S2005 & S2006. INSURE COVER TO WATERMANS IS 800MM MINIMUM UNDER ROADWAYS AND 600MM MINIMUM ELSEWHERE.
6. FOR MAIN CONNECTION DETAILS, REFER FNRDC STD DRG S2020.
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WATER RETICULATION
1:800

CLIENT / PROJECT				ASSOCIATED CONSULTANTS				DESIGNED				TITLE			
DJ & J.P. COBB PROPOSED SUBDIVISION OF LOT 3 ON RP747675				FLANAGAN CONSULTING GROUP DEVELOPMENT CONSULTANTS • PROJECT MANAGEMENT • ENGINEERING • PLANNING CAIRNS DARWIN MACKAY TOWNSVILLE PH 08 921 1716 www.flanagancollaborative.com.au				IRM				PROPOSED WATER RETICULATION			
								IRM				A1			
								ACAD No. 4975-C01				DRAWING No. 4975-C01			
								SCALE 1:1000				FULL SIZE			
								SHEET 1 OF 1				SHEETS			
												A			

Title



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DOUGLAS
SHIRE COUNCIL

Scale 1cm = (???) m or km) at A4
Map Grid of Australia Zone 55 (GDA94)



FLANAGAN
CONSULTING GROUP
Trusted Advisor to Northern Australia

APPENDIX: D

Statement of Compliance

FNQROC DEVELOPMENT MANUAL

Council Douglas Shire Council

(INSERT COUNCIL NAME)

STATEMENT OF COMPLIANCE OPERATIONAL WORKS DESIGN

This form duly completed and signed by an authorised agent of the Designer shall be submitted with the Operational Works Application for Council Approval.

Name of Development 241R Bamboo Creek Road

Location of Development Bamboo, QLD 4860

Applicant D.J. and J.P. Cobb

Designer Flanagan Consulting Group

It is hereby certified that the Calculations, Drawings, Specifications and related documents submitted herewith have been prepared, checked and amended in accordance with the requirements of the FNQROC Development Manual and that the completed works comply with the requirements therein, **except** as noted below.

Compliance with the requirements of the Operational Works Design Guidelines	Non-Compliance refer to non-compliance report / drawing number
Plan Presentation	Compliant
Geotechnical requirements	N/A
Geometric Road Design	N/A
Pavements	N/A
Structures / Bridges	N/A
Subsurface Drainage	N/A
Stormwater Drainage	Compliant
Site Re-grading	N/A
Erosion Control and Stormwater Management	Compliant
Pest Plant Management	N/A
Cycleway / Pathways	N/A

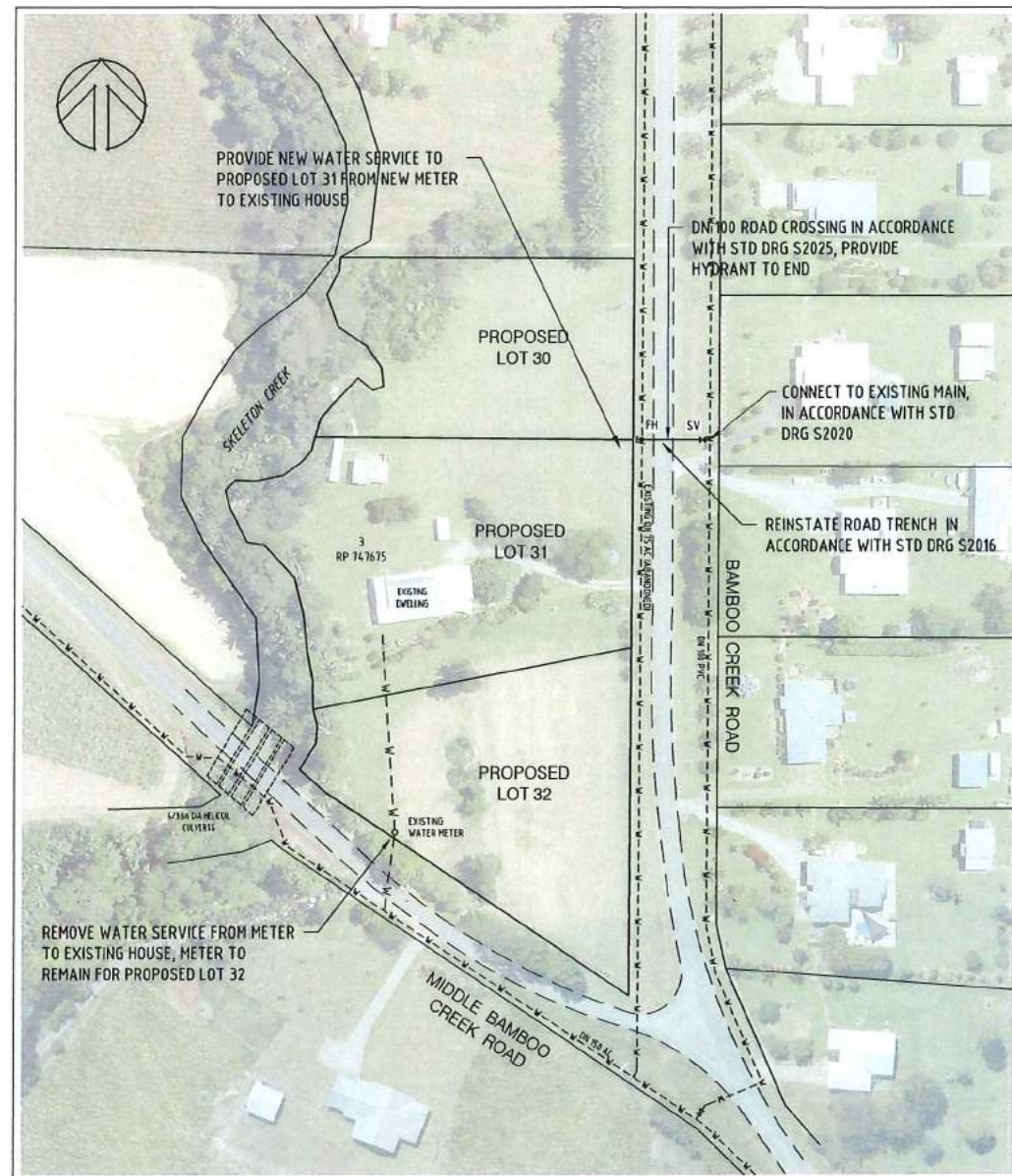
Landscaping	N/A
Water Source and Disinfection/Treatment Infrastructure (if applicable)	N/A
Water Reticulation, Pump Stations and water storages	Compliant
Sewer Reticulation and Pump Stations	N/A
Electrical Reticulation and Street Lighting	N/A
Public Transport	N/A
Associated Documentation/ Specification	N/A. Shown on drawings
Priced Schedule of Quantities	N/A - water reticulation works only @ \$8,000
Referral Agency Conditions	N/A
Supporting Information (AP1.08)	Compliant
Other	N/A

Conscientiously believing the above statements to be true and correct, signed on behalf of:

Designer Flanagan Consulting Group RPEQ No 6073

Name in Full Greg Applin

Signature  Date 17/05/2018

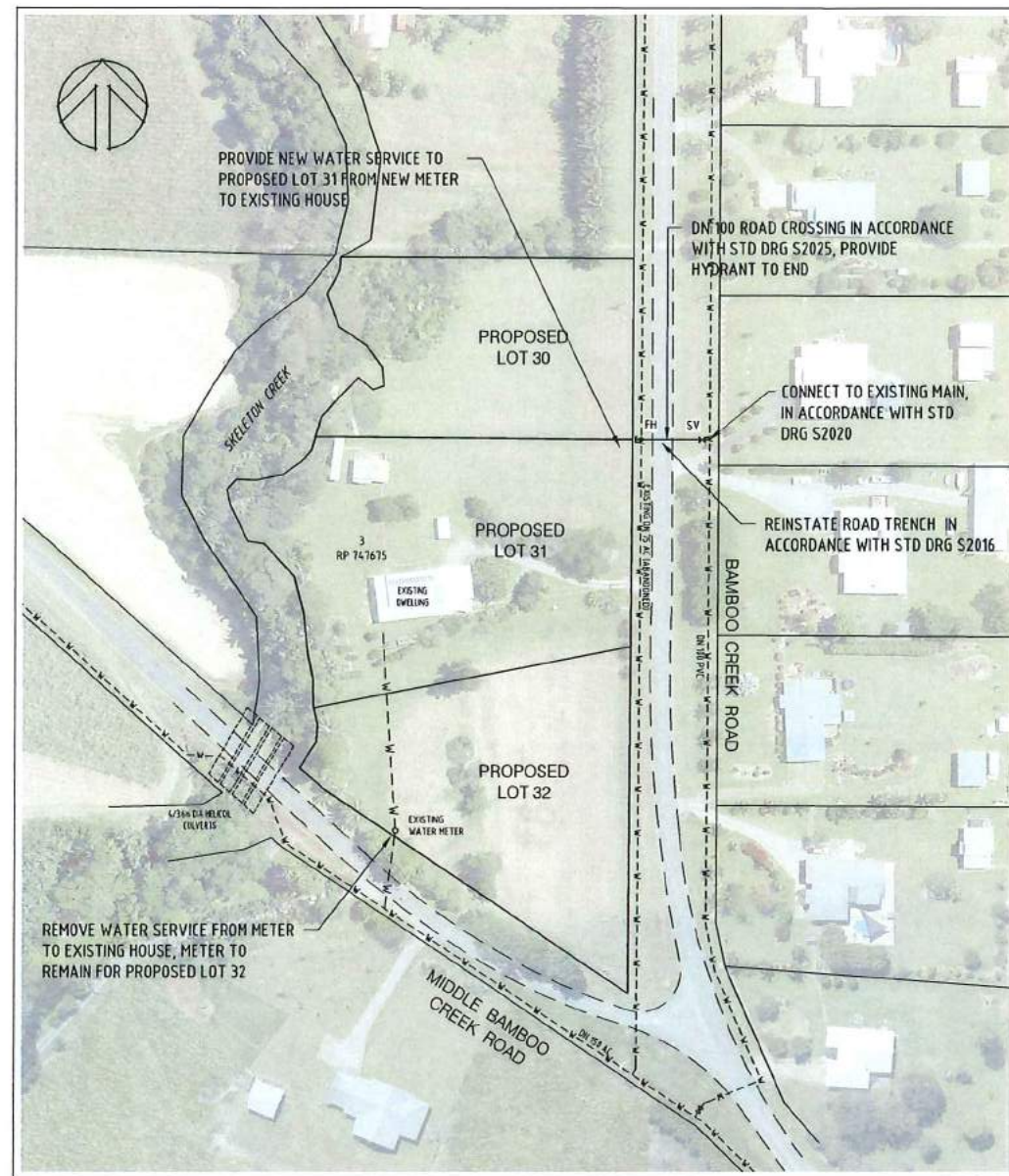


WATER RETICULATION
1:1000

WATER RETICULATION NOTES

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						DJ & JP COBB PROPOSED SUBDIVISION OF LOT 3 ON RP747675		DRAWN IRM		PROPOSED WATER RETICULATION	
								ACAD No. 4975-C01		DRAWING No. 4975-C01	
								SCALE 1:1000		SHEET 1 OF 1 SHEETS	
										REVISION A	



WATER RETICULATION
1:1000

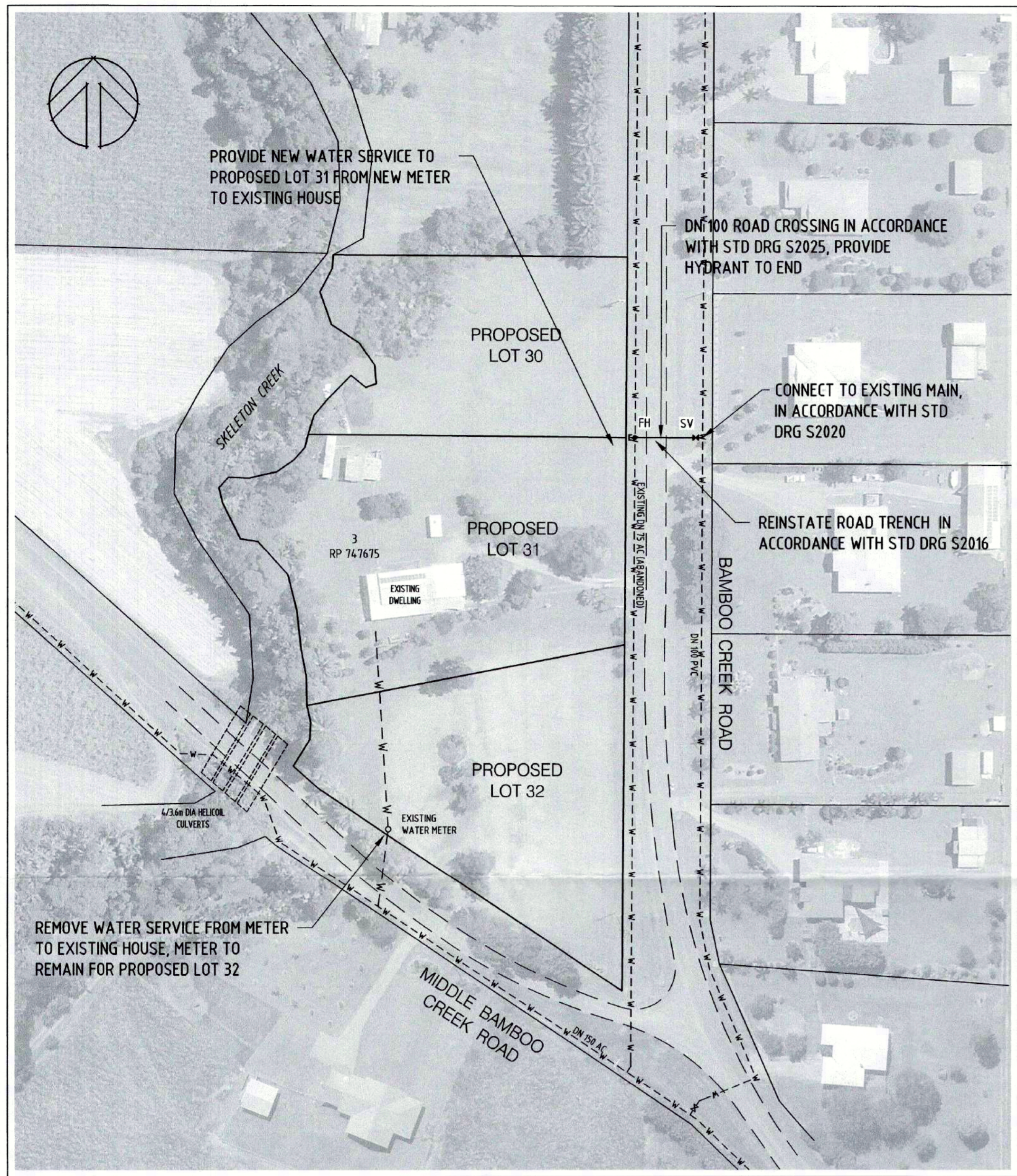
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								SCALE 1:1000		SHEET 1 OF 1 SHEETS	
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CAIRNS (07) 4031 3189 DARWIN (08) 8543 0620 MACKAY (07) 4944 1200 TOWNSVILLE (07) 4724 5737
www.flanaganconsulting.com.au



WATER RETICULATION
1:1000

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