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29 October 2021

Attn: Neil Beck
Douglas Shire Council
64-66 Front Street
MOSSMAN QLD 4873

Oceans Breeze Stage 5E
Our Ref No. IH132900
Operational Works Application (DSC Ref # CA46)

Dear Neil,

Please find enclosed the following Operational Works Application documentation regarding the above mentioned development for your consideration and approval:

1) Operational Works Receipting Checklist.
2) Statement of Compliance.
3) DA Form 1.
4) Amended Decision Notice.
5) Report addressing RoL Conditions.
6) Stormwater Drainage Calculations.
7) PASS report
8) Engineering drawings (1 x PDF set).

Electrical reticulation and street lighting will be part of a separate application. Similarly landscaping will also be part of a separate application.

We trust the above meets with your approval and look forward to receipt of your approval. Should you require any additional information, please do not hesitate to contact this office.

Yours sincerely

Stephanie Best
+61 7 4031 4599
stephanie.best@jacobs.com

Item 1

Operational Works Receipting Checklist

(To be completed by Consulting engineer making the application)

Name of Council: Douglas Shire Council

Development Name and Location: Oceans Breeze Stage 5E

Planning Permit No/Council File No: ……/ ……/ ……

DESIGN SUBMISSION	CHECK	COMMENT
1. Completed 'Statement of Compliance' form. (FNQROC - AP1 – Appendix A)	Y	
2. IDAS Forms A ,E & IDAS Assessment Checklist (Available from www.ipa.qld.gov.au)	Y	DA Form 1
3. Payment of Engineering Application Fees (Copy of receipt to be attached)	Y	
4. Copy of Decision Notice for Development Application Conditions, inc. explanation of how each condition is to be addressed (Statement of Compliance)	Y	
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)	Y	PDF Plans only
6. One copy of Design and Standard Specifications (Unbound Copy Preferable)	N	Using FNQROC Standard Specs
7. Written consent from adjoining property owners authorising any works on their property	NA	
8. Water reticulation network in electronic format (Engineer to confirm system requirements and compatibility with Cairns Water)	Y	
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 ltg. layout design, to avoid conflicts.	NA	

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

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

Name of Engineer	Robert Carman	
Name of Company	Jacobs Group (Australia) Pty Ltd	
Telephone Number (s)	Office: 07 4031 4599	Mobile:
Email address	robert.carman@jacobs.com	
RPEQ No.	6641	

20. Date of submission of application 12 / 10 / 2021

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

Item 2

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 Ocean Breeze Stage 5E

Location of Development Cooya Beach

Applicant Jonpa Pty Ltd

Designer Jacobs Group (Australia) Pty Ltd

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	Y
Geotechnical requirements	NA
Geometric Road Design	Y
Pavements	Y
Structures / Bridges	NA
Subsurface Drainage	Y
Stormwater Drainage	Y
Site Re-grading	Y
Erosion Control and Stormwater Management	Y
Pest Plant Management	NA
Cycleway / Pathways	NA

Landscaping	NA
Water Source and Disinfection/Treatment Infrastructure (if applicable)	NA
Water Reticulation, Pump Stations and water storages	Y
Sewer Reticulation and Pump Stations	Y
Electrical Reticulation and Street Lighting	NA
Public Transport	NA
Associated Documentation/ Specification	Y
Priced Schedule of Quantities	NA
Referral Agency Conditions	NA
Supporting Information (AP1.08)	Y
Other	NA

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

Designer Jacobs Group (Australia) Pty Ltd **RPEQ No** 6641

Name in Full Robert Carman

Signature .. **Date** 27/10/21

Item 3

DA Form 1 – Development application details

Approved form (version 1.2 effective 7 February 2020) made under section 282 of the Planning Act 2016.

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

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

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

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

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

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

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

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	Jonpa Pty Ltd
Contact name *(only applicable for companies)*	Robert Carman
Postal address *(P.O. Box or street address)*	c/- Jacobs Group (Australia) Pty Ltd PO Box 1062
Suburb	Cairns
State	QLD
Postcode	4870
Country	Australia
Contact number	07 4031 4599
Email address *(non-mandatory)*	Robert.carman@jacobs.com
Mobile number *(non-mandatory)*	
Fax number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	IH132900

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

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
			Cooya Beach Road	Cooya Beach
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
		901	SP311505	Douglas
b)	Unit No.	Street No.	Street Name and Type	Suburb
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)

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

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

☐ Coordinates of premises by longitude and latitude

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

☐ Coordinates of premises by easting and northing

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

3.3) Additional premises

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

☒ Not required

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

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

Name of water body, watercourse or aquifer:

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

Lot on plan description of strategic port land:

Name of port authority for the lot:

☐ In a tidal area

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

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

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

Name of airport:

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

5) Are there any existing easements over the premises?

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

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

☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

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

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

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

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

c) What is the level of assessment?

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

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

Operational Works associated with the development of 8 residential 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

6.2) Provide details about the second development aspect

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

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

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

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

c) What is the level of assessment?

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

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

e) Relevant plans

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

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

6.3) Additional aspects of development

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

☒ Not required

Section 2 – Further development details

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

Division 1 – Material change of use

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

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

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

Division 2 – Reconfiguring a lot

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

9.1) What is the total number of existing lots making up the premises?

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

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

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

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

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

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

Division 3 – Operational work

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

14.1) What is the nature of the operational work?		
☒ Road work	☒ Stormwater	☒ Water infrastructure
☒ Drainage work	☒ Earthworks	☒ Sewage infrastructure
☐ Landscaping	☐ Signage	☒ Clearing vegetation
☐ Other – please specify:		
14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*		
☒ Yes – specify number of new lots:	8	
☐ No		
14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*		
$600,000.00		

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
☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
☒ No

PART 5 – REFERRAL DETAILS

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

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

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

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

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

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

☐ Heritage places – Local heritage places

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

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

☐ Infrastructure-related referrals – Oil and gas infrastructure

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

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

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

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

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

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

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

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

Referral requirement	Referral agency	Date of referral response

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

PART 6 – INFORMATION REQUEST

19) Information request under Part 3 of the DA Rules

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

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

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

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

PART 7 – FURTHER DETAILS

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

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

List of approval/development application references	Reference number	Date	Assessment manager
☒ Approval ☐ Development application	CA46	7 September 2007	Douglas Shore Council
☐ Approval ☐ Development application			

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

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

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

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

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

23) Further legislative requirements

Environmentally relevant activities

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

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

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

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

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

Hazardous chemical facilities

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

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

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

Clearing native vegetation

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

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

☒ No

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

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

Environmental offsets

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

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

☒ No

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

Koala habitat in SEQ Region

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

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

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

☒ No

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

Water resources

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

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

☒ No

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

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

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

Waterway barrier works

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

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

☒ No

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

Marine activities

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

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

☒ No

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

Quarry materials from a watercourse or lake

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

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

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

Quarry materials from land under tidal waters

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

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

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

Referable dams

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

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

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

Tidal work or development within a coastal management district

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

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

☒ No

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

Queensland and local heritage places

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

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

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

Name of the heritage place:		Place ID:	

Brothels

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

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

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

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

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

PART 8 – CHECKLIST AND APPLICANT DECLARATION

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

25) Applicant declaration
☒ By making this development application, I declare that all information in this development application is true and correct ☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001* ***Note**: It is unlawful to intentionally provide false or misleading information.*
Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website. Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where: • such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or • required by other legislation (including the *Right to Information Act 2009*); or • otherwise required by law. This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

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

Date received: | Reference number(s):

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

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

Item 4

DOUGLAS SHIRE COUNCIL

ENQUIRIES: Mr Paul Gleeson – Manager Planning Services
DEPARTMENT: Planning Services - ☎ (07) 4099 9450
EMAIL:

OUR REF: PTG
YOUR REF: CA46

Salson Pty Ltd as Trustee for the Simon White Family Trust
C/- C & B Group
P O Box 1949
CAIRNS QLD 4870

7 September 2007

INTEGRATED PLANNING ACT
AMENDED DECISION NOTICE

DEVELOPMENT APPLICATION

Applicant's Name	:	**Salson Pty Ltd as Trustee for the Simon White Family Trust**
Owner's Name	:	**Salson Pty Ltd**
Proposal	:	**Material Change of Use and Reconfiguring a Lot to permit 250 Residential A lots, 38 Residential B lots, 0.7 hectares to be used for commercial and community uses and 11.1 hectares to be used generally as open space**
Application Number	:	**CA46**
Site Address	:	**Cooya Beach Road, Bonnie Doon Road and Melaleuca Drive, Cooya Beach**
Property Description	:	**Lot 1 on RP 720316 and Lots 2 and 3 on SR 614**

This Amended Decision Notice supersedes the Negotiated Decision Notice dated 15 June 2005. Advice note 1 has been added to reflect the specific conditions required to be addressed with each stage of the subdivision. All other conditions remain unchanged.

1. Decision: **Decision Date:** 8 June 2005

Approved subject to Conditions

2. Type of Development Approval:

Material Change of Use	Preliminary Approval
Reconfiguration a Lot	Development Permit

3. Referral Agencies:

Concurrence Agencies:

Department of Main Roads	Conditions attached
Environmental Protection Agency	
Natural Resources & Mines	

4. Conditions

Assessment Manager Conditions

Plan of Reconfiguration

1. The approved reconfiguration and the carrying out of any works on the premises associated with the development must generally be in accordance with Plan of Reconfiguration No. 8021-3, Issue G, dated 18th May 2004, prepared by the C &B Group, and attached to this approval subject to:

   (a) Modifications required by any condition of this approval and any minor alterations found necessary by Council at the time of examination of engineering plans; and

   (b) Any development permit for operational works relating to the reconfiguration.

2. The Plan of Reconfiguration No. 8021-3 Issue G, dated 18th May 2004, must be amended as follows:

   (a) A pathway with a minimum width of four (4) metres must be provided from the cul-de-sac in the south-eastern corner of the site to Melaleuca Drive and a 1.5 metre wide concrete footpath must be constructed within the pathway.

Water Supply

3. The reticulated water supply must be constructed with the design plans approved by Council.

Internal

4. The applicant must provide a reticulated water supply to the development.

5. This system must make provision for services to the boundaries of all lots, including main works, enveloper pipes at cross street services, valve and hydrant markers and a water meter to each lot.

6. The plans and specifications of the internal water supply must be submitted to Council at Operational Works application stage for this reconfiguration for review.

External

7. Provision of water supply headworks contributions in accordance with Council's Policy on Applicant Contributions for Water Supply and Sewerage Services and Council's Schedule of Fees and Charges which provides for contribution amounts to be varied if not paid in full within12 months of the date of this approval. Headworks are to apply based on $4,449.00 per E.D.C. for water supply. Payment of such contributions shall be made prior to Council Signing and Sealing of the Plan of Survey except that in relation to the Commercial/ Community Purpose land (proposed Lot 900) the payment equivalent to one (1) EDC for water supply headworks shall be paid prior to Council Signing and Sealing the Plan of Survey. The balance of the water supply headworks contribution is to be paid prior to the issue of a Building Works Development Permit in respect of any development on the Commercial/Community Purposes land (proposed Lot 900). A notice will be placed on Council's rates database to this effect on Lot 900 when the title is created.

8. (a) The applicant is responsible for the external works to connect the site with Council's water supply at Cooya Beach Road and to upgrade the water main to 200mm diameter for the full length of the site frontage to Cooya Beach Road.

(b) The applicant must design and construct a 3.5 megalitre reservoir at the existing reservoir site.

The total cost of the works to install this reservoir will be determined on the basis of the ratio of the number of lots in the proposed development to the number of existing and currently approved lots in Cooya Beach. The applicant will construct all works and the equivalent amount for Council's contribution (existing allotments) to the reservoir will be subtracted from the applicant's water supply headworks contributions for the development.

Sewerage

Internal

9. Provision of sewerage reticulation to plans approved by Council. Provision shall be made for house connection branches for each allotment.

10. The plans and specifications of the internal sewerage works must be submitted to Council at Operational Works application stage for review.

11. Pumping stations are to be located on land vested under Council's control.

12. The design information submitted for Operational Works approval shall include design flows, pipe sizes, grades, pump rates, catchments and pressure main hydraulics.

13. Pumping stations shall incorporate aluminium fabricated covers to Council's standards. Switchboards are to be aluminium or stainless steel construction. Amp meters are required for each pump motor.

External

14. Provision of sewerage headworks contributions in accordance with Council's Policy on Applicant Contributions for Water Supply and Sewerage Services and Council's Schedule of Fees and Charges which provides for contribution amounts to be varied if not paid in full within 12months of the date of this approval. Headworks are to apply based on $2,665.00 per E.D.C. for sewerage. Payment of such contributions shall be made prior to Council Signing and Sealing of the Plan of Survey except that in relation to the Commercial/Community Purpose land (proposed Lot 900) the payment equivalent to one (1) EDC for sewerage headworks shall be paid prior to Council Signing and Sealing the Plan of Survey. The balance of the sewerage headworks contribution is to be paid prior to the issue of a Building Works Development Permit in respect of any development on the Commercial/Community Purposes land (proposed Lot 900). A notice will be placed on Council's rates database to this effect on Lot 900 when the title is created.

15. (a) The applicant must construct a pump station and rising main between the site and the Mossman Treatment Plant to provide a sewerage service to the proposed lots.

(b) The pump station is to be located adjacent to Cooya Beach Road at the eastern end of the park.

(c) The pump station and the rising main are to be sized to cater for the proposed development and for other areas of Cooya Beach which may ultimately be included in the sewerage scheme.

(d) The total cost of these works to install this reservoir will be determined on the basis of the ratio of the number of lots in the proposed development to the number of existing and currently approved lots in Cooya Beach. The applicant will construct all works and the equivalent amount for Council's contribution (existing allotments) to the reservoir will be subtracted from the applicant's water supply headworks contributions for the development.

Electrical & Telephone Services

16. Prior to the approval of the Plan of Survey, the Applicant must submit to Council a copy of a letter from Ergon Energy stating that satisfactory arrangements have been made for the provision of:

(a) an underground electrical supply to each lot; and

(b) street lighting in accordance with Council's adopted standards.

(c) locating of all above ground transformer cubicles clear of footpath and parkland areas.

17. Prior to the approval of the Plan of Survey, the Applicant must submit to Council a copy of a letter from Telstra stating that satisfactory arrangements have been made for the provision of:

(a) an underground telephone service to each lot; and

(b) locating of all above ground switching station cubicles clear of footpath and parkland areas.

18. (a) The applicant must transfer the area shown as Park and Mangrove on the Proposed Plan to Council in partial satisfaction of the applicant's obligation to provide parkland to Council in accordance with Local Planning Policy No.5 – Applicant Contributions – Parks. The applicant must bear all costs of the transfer.

(b) The applicant must contribute $250.00 per lot in partial satisfaction of the applicant's obligation to provide parkland to Council in accordance with the Local Planning Policy. This amount is based on the usable parkland area being 75% of the total parkland required and $250.00 being 25% of the standard Parkland Contribution under Planning Policy No. 5.

Alternatively, the amount of the contribution may be expended on works within the proposed parkland including landscaping, pathways, play equipment, shelter structures and water supply. In this case, a detailed design and costing is to be submitted for approval by Council at Operational Works stage.

Earthworks

19. All proposed lots must be drained from the rear boundary to the frontage of the lot in accordance with the Far North Queensland Regional Organisation of councils Development Manual, except as otherwise modified by these conditions or an Operational Works Development Permit.

20. All allotment and footpath slopes must be designed in accordance with the Far North Queensland Regional Organisation of Councils Development Manual.

21. Details of the proposed filling and excavation for the reconfiguration must be included in a plan and submitted at the time of lodgement of the application for Operational Works.

Stormwater Drainage

22. The proposed drainage area must be designed in accordance with the Far North Queensland Regional Organisation of Councils Development Manual. All easements and/or reserves are to be transferred to Council as a drainage easement and/or reserve in fee simple at the applicant's cost.

23. Prior to lodgement of the Plan of Survey for Signing and Sealing / an application for Operational Works, the applicant must submit to Council a plan:

(a) Detailing the drainage works to be undertaken on the land in connection with the reconfiguration;

(b) Detailing the ability of the proposed drainage works to meet with the requirements of the Far North Queensland Regional Organisation of Councils Development Manual.

24. Drainage (including underground), together with acceptable points of discharge are required in localities to be determined following submission of engineering drawings and designs at Operational Works stage.

25. The calculated design frequency for all storm water drainage shall be determined on a five (5) year recurrence interval and all relevant design data shall be submitted with the engineering drawings at Operational Works application stage.

26. Such storm water drainage work shall be designed and constructed in accordance with the requirements of the Far North Queensland Regional Organisation of Councils Development Manual and will not cause scouring, erosion, loss of vegetation, excess turbidity and landslip either within or external to the site.

27. The Applicants are required to place pollution control devices in stormwater drains in accordance with the requirements of the Far North Queensland Regional Organisation of Councils Development Manual. The design and location of these devices must be submitted at Operational Works application stage.

Truncations

28. Truncations in accordance with the provisions of Council's subdivisional Local Laws are to be provided.

Bikeway/Pathway

29 (a) A bikeway/walkway shall be constructed to a minimum width of two (2) metres on the southern side of Cooya Beach Road for the full frontage of the site from the eastern extent of the site to the north-western extent of the site adjacent to the unnamed road reserve along the northern boundary of the site. This pathway is intended to be constructed of bitumen with concrete edge restraints. This part of the bikeway/walkway is to be constructed at the applicant's expense.

(b) A bikeway/walkway shall be constructed to a minimum width of two (2) metres from the north-western extent of the site along Cooya Beach Road to connect to the existing bikeway/walkway at the Junction Bridge. . This pathway is intended to be constructed of bitumen with concrete edge restraints. This part of the bikeway/walkway is to be constructed by Council. The total cost of these works to install this part of the bikeway/walkway will be determined on the basis of the ratio of the number of lots in the proposed development to the number of existing and currently approved lots in Cooya Beach. The applicant is to provide cost estimates for this work at Operational Works stage.

30. The bikeway/walkway shall be suitably designed in accordance with the relevant Standards Association of Australia Code. The style and construction of all footpaths and bikeways internal and external to the development is to be bitumen centre with concrete edge restraints.

Operational Works Development Permit

31. The applicant must submit as part of an application for a Development Permit for Operational Works information and plans in accordance with the Far North Queensland Regional Organisation of Councils Development Manual.

32. Full engineering drawings, prepared and/or checked by a Registered Professional Engineer, shall be submitted for all road works, stormwater drainage and allotment improvement at Operational Works Application stage. Drawings should, in general, include the following:

    (a) locality plan;

    (b) layout and staging plan, where applicable;

    (c) layout plan for each new road;

    (d) longitudinal section of each road;

    (e) cross sections for each road, including standard cross sections;

    (f) detailed plan of each intersection and cul-de-sac head where longitudinal grades do not exceed 1%;

    (g) layout plan for each stormwater drainage;

    (h) longitudinal sections for each stormwater drain line;

    (i) details for non-standard drainage structures; and

    (j) such other details for the proper construction of the works i.e. retaining walls etc.

Street Names

33. At the time of lodging the Survey Plan with Council for endorsement, the applicant must lodge a plan of the reconfiguration displaying the proposed street names for the reconfiguration.

34. The street name signs shall be supplied and erected by the Applicant. The signs shall be aluminium on steel posts with reflective white legend (on both sides) on a green background.

Currency Period

35. The development authorised by this Development Permit must cease at the expiration of four (4) years from the day that this Development Permit takes effect under the *Integrated Planning Act 1997* unless a detailed plan of survey has been lodged with Council for endorsement and all conditions of this approval complied with.

Compliance with Conditions

36. The Plan of Survey with associated documents shall not be endorsed by Council until all of the conditions of approval have been complied with.

Acid Sulphate Soils

37. At the time of lodgement of an application for development approval for Operational Works for the reconfiguration, the applicant must submit to Council a report identifying:

(a) The location and extent of acid sulphate soils on the site;
(b) The applicant's proposed treatment of the acid sulphate soils identified.

Road Works

38. The applicant must undertake the following works:

Internal

Provision of kerb-to-kerb bitumen streets to widths required by the Far North Queensland Regional Organisation of Councils Development Manual.

Construction of a 1.5 metre wide footpath on one side of the full length of the internal loop road in the southern sector of the site and on one side of the full length of the loop road in the northern sector of the site and, in both cases, extending to Cooya Beach Road.

External

Provision is to be made for the following works external to the subject site in accordance with the Far North Queensland Regional Organisation of Councils Development Manual (FNQ ROC Development Manual).

The plans and specifications of the internal and external road works must be submitted to Council at Operational Works application stage for review.

39. Cooya Beach Road

Upgrading to the full frontage of the site in accordance with the Development Manual and generally as described in the Engineering Report submitted with the application to provide:

- a ten (10) metre wide sealed carriageway;
- kerb and channel and any associated drainage works on both sides of the carriageway;
- formed footpaths with a nominal width of 4.5 metres.

The design and construction of the works must provide for the retention of the grove of Melaleucas and other trees at the eastern end of Cooya Beach Road.

Bonnie Doon Road

Upgrading to the full frontage of the site in accordance with the FNQ ROC Development Manual. In regard to the minimum standard for the construction of Bonnie Doon Road

for the frontage of the development. Council's engineers have indicated that the carriageway will need to be upgraded to the following minimum standards in accordance with Section D1.27 part 1 of the FNQ Development Manual:

Traffic Volume/Road Class:	**1000 –7999 vpd (or sub-arterial)**
Formation	10m
Pavement Width	8m
Seal Width	8m
Shoulders	Incl. 0.5m seal on each side

Cooya Beach Road/Bonnie Doon Road Intersection

Construction of a channelised intersection in accordance with the FNQ ROC Development Manual.

Landscaping, Buffering and Fencing

40. (a) A street landscaping plan providing for street tree planting within the proposed internal roads and Cooya Beach Road and for landscaping of the proposed roundabouts must be submitted for approval at Operational Works stage.

(b) A planted buffer must be established to the full frontages of the site to Melaleuca Drive, Bonnie Doon Road and the un-constructed Palm Road adjacent to the northern boundary of the site. This buffer is to be densely planted and is to have a minimum width of 6.0metres.

The buffer must generally be in accordance with the details provided in the advice from the C&B Group dated 22nd October 2004.

Details including design of the buffer must be submitted for approval at the Operational Works stage.

The buffer must be established to the respective road frontages of each stage of the proposed development as a particular stage is constructed.

The applicant is to install a 1.8metre high fence along the un-constructed road reserve frontage to separate the agricultural uses from the residential uses. The purpose of this fence is for safety.

41. The subdivider shall lodge with the Council cash or bank bond calculated at the rate of ten percent (10%) of the contract price for the works concerned in the subdivision as a security that the maintenance works be not completed to the satisfaction of the Director Engineering Services the Council shall make good any of the said defects and deduct the costs thereof from the cash deposit or bank bond.

Commercial Development

42. The maximum permissible gross floor area for retail uses on the land designated for commercial purposes is 450m².

43. A detailed plan of development will be required to be submitted to Council prior to any self-assessable use commencing on the area designated for commercial and community purposes.

44. The Applicant shall pay to the Council headworks contributions for water supply and sewerage in accordance with Council's Local Planning Policy: "*Determination of Contributions for Water Supply and Sewerage Headworks and External Works*" ("the Policy").

The contribution shall be calculated at the rate per Equivalent Domestic Connection ("EDC") applicable at the time of payment in accordance with the Policy.

For information purposes only:

(a) The current rates per EDC at the time of this approval are:

Water Supply	$ 4,449.00
Sewerage	$ 2,665.00

(b) The current number of EDCs for the approved use are:

Water Supply	7
Sewerage	7

The payment equivalent to one (1) EDC each for water supply and sewerage headworks shall be paid prior to Council Signing and Sealing the Plan of Survey. The balance of the water supply and sewerage headworks contribution is to be paid prior to the issue of a Building Works Development Permit in respect of any development on the Commercial/ Community Purposes land (proposed Lot 900). A notice will be placed on Council's rates database to this effect on Lot 900 when the title is created.

Advice Note 1

The following is a ready reference to the specific conditions that must be met before the Plan of Survey for each stage can be endorsed by Council. The reference to stages is specific to Plan No.8021-3. If staged layout is amended, then the conditions relevant to the lots contained within the stages as shown on Plan No.8021-3 will need to be met when those lots are submitted for endorsement. All other conditions not referenced below relate to all stages and are to be met prior to the endorsement of the Plan of Survey.

Condition	**Stages as shown staged on Plan** 8021-3 Issue G
2	2
part 7 (commercial)	3
8	1
part 14 (commercial)	3
15	1
18(a)	1

29(a)	1; 2; 3; 4; 5
38	1
39 (Cooya Beach Rd)	1; 2; 3; 4; 5
39 (Bonnie Doon Rd)	4;
40(b)	2; 3; 4; 5; 6
42	2
43	2
44	2

5. Further Development Approvals Required:

Operational Works Development Permit

Paul Trotman
General Manager Development & Environment

Division 8 – Appeals to court relating to development applications

Appeals by applicants

4.1.27. **(1)** An applicant for a development application may appeal to the court against any of the following:-

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

(b) a matter stated in a development approval, including any condition applying to the development, and the identification of a code under Section 3.1.6;66

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

(d) the length of a currency period;

(e) a deemed refusal.

(2) An appeal under subsection (1)(a) to (d) must be started within twenty (20) business days (the **"applicant's appeal period")** after the day the decision notice or negotiated decision notice is given to the applicant.

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

DOUGLAS SHIRE COUNCIL

COUNCIL & CORPORATE SERVICES GENERAL MEETING
30th November 2004
CONSULTANT PLANNER'S REPORT
APPLICATION FOR MATERIAL CHANGE OF USE AND RECONFIGURING A LOT
APPLICATION NO CA46

CONCURRENCE AGENCY – DEPT OF MAIN ROADS – APPENDIX A

Queensland Government

Department of Main Roads

14 July 2004

Mr T Melchert
Chief Executive Officer
Douglas Shire Council
PO Box 357
Mossman Qld 4873

Dear Mr Melchert

Douglas Shire : Captain Cook Highway
Located at Bonnie Doon Road, Cooya Beach Road & Melaleuca Drive, Cooya Beach
Lot 1 on RP 720316, and Lots 2 & 3 on SR 614, Parish of Victory
Salson Pty Ltd
Proposed Material Change of Use & Reconfiguration of Lot (250 Residential A allotments, 38 Residential B allotments, Community Centre/ Commercial allotment, Park & New Roads) Application
Referral Agency's Response (conditions apply)

I refer to the above application received at the Department 25 & 28 November 2003 and 27 & 31 May 2004 requesting consideration of the above development.

A. CONDITIONS OF DEVELOPMENT

Pursuant to the *Integrated Planning Act 1997*, the Queensland Department of Main Roads, as a Concurrence Agency, has assessed the impact of the proposed development on the State-controlled road network and requires that Council include the following conditions of development for the subject application:

1. Permitted Road Access Location

(i) Access between the State-controlled road (i.e. Captain Cook Highway) and the subject land shall be via Bonnie Doon Road and Cooya Beach Road, to the satisfaction of Douglas Shire Council.

(ii) No direct access between the State-controlled road reserve (i.e. Captain Cook Highway) and the subject land is permitted.

2. Road Intersection Works

(i) Road intersection works at the intersections of Captain Cook Highway and Bonnie Doon Road and of Captain Cook Highway and Junction Street (in Mossman) are required and shall be constructed in accordance with:

North Queensland Region
Peninsula District
PO Box 6185
CAIRNS Queensland 4870
ABN 57 836 727 711

Our ref 45/20A/102(3152)
Your ref CA 46/03
Enquiries MALCOLM HARDY
Telephone +61 7 4050 5511
Facsimile +61 7 4050 5438

- the Department of Main Roads *Road Planning and Design Manual*, and
- current Department of Main Roads standards.

A recent site inspection indicates the requirement for the provision of the following works:

- at the intersection of Captain Cook Highway and Bonnie Doon Road – upgrade to a Type CHR (channelised right turn treatment) in accordance with the Department's *Road Planning and Design Manual*, and
- at the intersection of Captain Cook Highway and Junction Street (in Mossman) – construct a through lane and right turn lane along the Highway travelling north, with the minimum storage capacity of the right turn lane in accordance with the Department's *Road Planning and Design Manual*.

(ii) The landowner/ applicant shall submit intersection design drawings prepared by a suitably qualified Registered Professional Engineer Queensland (RPEQ) for approval of the Cairns office of the Department of Main Roads prior to commencing any onsite works within the State-controlled road reserve (i.e. Captain Cook Highway).

(iii) All required works shall be completed to the satisfaction of the Director-General of the Department of Main Roads:

- at the intersection of Captain Cook Highway and Bonnie Doon Road – prior to Council sealing the plan of survey creating the 100th residential allotment (proposed Stage 2C), and
- at the intersection of Captain Cook Highway and Junction Street (in Mossman) – prior to Council sealing the first plan of survey of the subject land.

3. Advertising

No advertising device for the proposed development is permitted within the State-controlled road reserve (i.e. Captain Cook Highway).

Reasons

The reasons and information used in the setting of conditions detailed above include:

- Department of Main Roads Access Policy,
- Department of Main Roads Involvement in Development Applications Referrals and Assessment Guide, and
- Douglas Shire Planning Scheme.

B. GENERAL DISCUSSION

Council is requested to reflect Conditions 1 and 3 above on its Rates Record, to ensure that the planning intentions of Conditions 1and 3 are secured.

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

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

Yours sincerely

Brad Finegan
A/MANAGER (TRANSPORT PLANNING) PENINSULA

Item 5

Jacobs

Project Notes

2 James Street
PO Box 1062
Cairns, QLD 4870
Australia
T +61 7 4031 4599
F +61 7 4031 3967
www.jacobs.com

Subject	Response to Amended RaL Decision Notice		
Client	Jonpa Pty Ltd	Date	27 October 2021
Project	Ocean Breeze Stage 5E		
Project No.	IH132900 (DSC Ref# CA46)		

Below is our response (*in blue italics*) to the conditions of approval provided in the Amended Decision Notice of Reconfiguring a Lot dated 7th September 2007.

Assessment Manager Conditions

Plan of Reconfiguration

1. The approved reconfiguration and the carrying out of any works on the premises associated with the development must generally be in accordance with Plan of Reconfiguration No. 8021-3, Issue G, dated 18th May 2004, prepared by the C&B Group, and attached to this approval subject to:

   (a) Modifications required by any condition of this approval and any minor alterations found necessary by Council at the time of examination of engineering plans; and

   (b) Any development permit for operational works relating to the reconfiguration.

   Lot 226 and 225 have been combined and a building envelope has been shown to maintain the 30m setback to the Sewerage Lift Station in Stage 5D.

   The road reserve boundary on the ROAD 5 right hand side verge between chainage 12 and 26 has been widened to better accommodate new culverts, GPT and their associated earthworks.

2. The Plan of Reconfiguration No. 8021-3 Issue G, dated 18th May 2004, must be amended as follows:

   (a) A pathway with a minimum width of four (4) metres must be provided from the cul-de-sac in the south-eastern comer of the site to Melaleuca Drive and a 1.5 metre wide concrete footpath must be constructed within the pathway.

   NA to this stage.

Water Supply

3. The reticulated water supply must be constructed with the design plans approved by Council.

   Noted.

Internal

4. The applicant must provide a reticulated water supply to the development.

   Done.

5. This system must make provision for services to the boundaries of all lots, including main works, enveloper pipes at cross street services, valve and hydrant markers and a water meter to each lot.

No water meters are provided to individual lots. This is consistent with previous stages.

6. The plans and specifications of the internal water supply must be submitted to Council at Operational Works application stage for this reconfiguration for review.

Noted.

External

7. Provision of water supply headworks contributions in accordance with Council's Policy on Applicant Contributions for Water Supply and Sewerage Services and Council's Schedule of Fees and Charges which provides for contribution amounts to be varied if not paid in full within12 months of the date of this approval. Headworks are to apply based on $4,449.00 per E.D.C. for water supply. Payment of such contributions shall be made prior to Council Signing and Sealing of the Plan of Survey except that in relation to the Commercial/ Community Purpose land (proposed Lot 900) the payment equivalent to one (1) EDC for water supply headworks shall be paid prior to Council Signing and Sealing the Plan of Survey. The balance of the water supply headworks contribution is to be paid prior to the issue of a Building Works Development Permit in respect of any development on the Commercial/Community Purposes land (proposed Lot 900). A notice will be placed on Council's rates database to this effect on Lot 900 when the title is created.

NA to Op Works.

8. (a) The applicant is responsible for the external works to connect the site with Council's water supply at Cooya Beach Road and to upgrade the water main to 200mm diameter for the full length of the site frontage to Cooya Beach Road.

NA to this stage.

(b) The applicant must design and construct a 3.5 megalitre reservoir at the existing reservoir site.

The total cost of the works to install this reservoir will be determined on the basis of the ratio of the number of lots in the proposed development to the number of existing and currently approved lots in Cooya Beach. The applicant will construct all works and the equivalent amount for Council's contribution (existing allotments) to the reservoir will be subtracted from the applicant's water supply headworks contributions for the development.

NA to this stage.

Sewerage

Internal

9. Provision of sewerage reticulation to plans approved by Council. Provision shall be made for house connection branches for each allotment.

Done.

10. The plans and specifications of the internal sewerage works must be submitted to Council at Operational Works application stage for review.

Noted.

11. Pumping stations are to be located on land vested under Council's control.

NA to this Stage

12. The design information submitted for Operational Works approval shall include design flows, pipe sizes, grades, pump rates, catchments and pressure main hydraulics.

Pipe size and grades are shown on the drawings.

13. Pumping stations shall incorporate aluminium fabricated covers to Council's standards. Switchboards are to be aluminium or stainless steel construction. Amp meters are required for each pump motor.

NA to this Stage

External

14. Provision of sewerage headworks contributions in accordance with Council's Policy on Applicant Contributions for Water Supply and Sewerage Services and Council's Schedule of Fees and Charges which provides for contribution amounts to be varied if not paid in full within 12months of the date of this approval. Headworks are to apply based on $2,665.00 per E.D.C. for sewerage. Payment of such contributions shall be made prior to Council Signing and Sealing of the Plan of Survey except that in relation to the Commercial/Community Purpose land (proposed Lot 900) the payment equivalent to one (1) EDC for sewerage headworks shall be paid prior to Council Signing and Sealing the Plan of Survey. The balance of the sewerage headworks contribution is to be paid prior to the issue of a Building Works Development Permit in respect of any development on the Commercial/Community Purposes land (proposed Lot 900). A notice will be placed on Council's rates database to this effect on Lot 900 when the title is created.

NA to Op Works.

15. (a) The applicant must construct a pump station and rising main between the site and the Mossman Treatment Plant to provide a sewerage service to the proposed lots.

NA to this stage.

(b) The pump station is to be located adjacent to Cooya Beach Road at the eastern end of the park.

NA to this stage.

(c) The pump station and the rising main are to be sized to cater for the proposed development and for other areas of Cooya Beach which may ultimately be included in the sewerage scheme.

NA to this stage.

(d) The total cost of these works to install this reservoir will be determined on the basis of the ratio of the number of lots in the proposed development to the number of existing and currently approved lots in Cooya Beach. The applicant will construct all works and the equivalent amount for Council's contribution (existing allotments) to the reservoir will be subtracted from the applicant's water supply headworks contributions for the development.

NA to this Stage

Electrical & Telephone Services

16. Prior to the approval of the Plan of Survey, the Applicant must submit to Council a copy of a letter from Ergon Energy stating that satisfactory arrangements have been made for the provision of:

(a) an underground electrical supply to each lot; and

(b) street lighting in accordance with Council's adopted standards.

(c) locating of all above ground transformer cubicles clear of footpath and parkland areas.

NA to Op Works.

17. Prior to the approval of the Plan of Survey, the Applicant must submit to Council a copy of a letter from Telstra stating that satisfactory arrangements have been made for the provision of:

(a) an underground telephone service to each lot; and

(b) locating of all above ground switching station cubicles clear of footpath and parkland areas.

NA to Op Works.

18. (a) The applicant must transfer the area shown as Park and Mangrove on the Proposed Plan to Council in partial satisfaction of the applicant's obligation to provide parkland to Council in accordance with Local Planning Policy No.5 - Applicant Contributions - Parks. The applicant must bear all costs of the transfer.

NA this stage.

(b) The applicant must contribute $250.00 per lot in partial satisfaction of the applicant's obligation to provide parkland to Council in accordance with the Local Planning Policy. This amount is based on the usable parkland area being 75% of the total parkland required and $250.00 being 25% of the standard Parkland Contribution under Planning Policy No. 5.

Alternatively, the amount of the contribution may be expended on works within the proposed parkland including landscaping, pathways, play equipment, shelter structures and water supply. In this case, a detailed design and costing is to be submitted for approval by Council at Operational Works stage.

NA to Op Works.

Earthworks

19. All proposed lots must be drained from the rear boundary to the frontage of the lot in accordance with the Far North Queensland Regional Organisation of councils Development Manual, except as otherwise modified by these conditions or an Operational Works Development Permit.

Done.

20. All allotment and footpath slopes must be designed in accordance with the Far North Queensland Regional Organisation of Councils Development Manual.

Done.

21. Details of the proposed filling and excavation for the reconfiguration must be included in a plan and submitted at the time of lodgement of the application for Operational Works.

Done, refer to the earthworks drawing.

Stormwater Drainage

22. The proposed drainage area must be designed in accordance with the Far North Queensland Regional Organisation of Councils Development Manual. All easements and/or reserves are to be transferred to Council as a drainage easement and/or reserve in fee simple at the applicant's cost.

Done.

23. Prior to lodgement of the Plan of Survey for Signing and Sealing/ an application for Operational Works, the applicant must submit to Council a plan:

(a) Detailing the drainage works to be undertaken on the land in connection with the reconfiguration;

Done.

(b) Detailing the ability of the proposed drainage works to meet with the requirements of the Far North Queensland Regional Organisation of Councils Development Manual.

Done.

24. Drainage (including underground), together with acceptable points of discharge are required in localities to be determined following submission of engineering drawings and designs at Operational Works stage.

Done

25. The calculated design frequency for all storm water drainage shall be determined on a five (5) year recurrence interval and all relevant design data shall be submitted with the engineering drawings at Operational Works application stage.

The piped network has been designed for a 5 year event.

26. Such storm water drainage work shall be designed and constructed in accordance with the requirements of the Far North Queensland Regional Organisation of Councils Development Manual and will not cause scouring, erosion, loss of vegetation, excess turbidity and landslip either within or external to the site.

Done.

27. The Applicants are required to place pollution control devices in stormwater drains in accordance with the requirements of the Far North Queensland Regional Organisation of Councils Development Manual. The design and location of these devices must be submitted at Operational Works application stage.

Done, an end of line GPT has been used.

Truncations

28. Truncations in accordance with the provisions of Council's subdivisional Local Laws are to be provided.

Lots are truncated to maintain the minimum verge width.

Bikeway/Pathway

29. (a) A bikeway/walkway shall be constructed to a minimum width of two (2) metres on the southern side of Cooya Beach Road for the full frontage of the site from the eastern extent of the site to the north-western extent of the site adjacent to the unnamed road reserve along the northern boundary of the site. This pathway is intended to be constructed of bitumen with concrete edge restraints. This part of the bikeway/walkway is to be constructed at the applicant's expense.

NA to this stage.

(b) A bikeway/walkway shall be constructed to a minimum width of two (2) metres from the north-western extent of the site along Cooya Beach Road to connect to the existing bikeway/walkway at the Junction Bridge. This pathway is intended to be constructed of bitumen with concrete edge restraints. This part of the bikeway/walkway is to be constructed by Council. The total cost of these works to install this part of the bikeway/walkway will be determined on the basis of the ratio of the number of lots in the proposed development to the number of existing and currently approved lots in Cooya Beach. The applicant is to provide cost estimates for this work at Operational Works stage.

NA to this stage.

30. The bikeway/walkway shall be suitably designed in accordance with the relevant Standards Association of Australia Code. The style and construction of all footpaths and bikeways internal and external to the development is to be bitumen centre with concrete edge restraints.

NA to this stage.

Operational Works Development Permit

31. The applicant must submit as part of an application for a Development Permit for Operational Works information and plans in accordance with the Far North Queensland Regional Organisation of Councils Development Manual.

Done.

32. Full engineering drawings, prepared and/or checked by a Registered Professional Engineer, shall be submitted for all road works, stormwater drainage and allotment improvement at Operational Works Application stage. Drawings should, in general, include the following:

(a) locality plan;

Done.

(b) layout and staging plan, where applicable;

Done.

(c) layout plan for each new road;

Done.

(d) longitudinal section of each road;

Done.

(e) cross sections for each road, including standard cross sections;

Done.

(f) detailed plan of each intersection and cul-de-sac head where longitudinal grades do not exceed 1%;

Done

(g) layout plan for each stormwater drainage;

Done.

(h) longitudinal sections for each stormwater drain line;

Done.

(i) details for non-standard drainage structures; and

Done.

(j) such other details for the proper construction of the works i.e. retaining walls etc.

Retaining walls are to be designed by the supplier.

Street Names

33. At the time of lodging the Survey Plan with Council for endorsement, the applicant must lodge a plan of the reconfiguration displaying the proposed street names for the reconfiguration.

NA to Op Works.

34. The street name signs shall be supplied and erected by the Applicant. The signs shall be aluminium on steel posts with reflective white legend (on both sides) on a green background.

NA to Op Works

Currency Period

35. The development authorised by this Development Permit must cease at the expiration of four (4) years from the day that this Development Permit takes effect under the Integrated Planning Act 1997 unless a detailed plan of survey has been lodged with Council for endorsement and all conditions of this approval complied with.

Noted.

Compliance with Conditions

36. The Plan of Survey with associated documents shall not be endorsed by Council until all of the conditions of approval have been complied with

Noted.

Acid Sulphate Soils

37. At the time of lodgement of an application for development approval for Operational Works for the reconfiguration, the applicant must submit to Council a report identifying:

(a) The location and extent of acid sulphate soils on the site;

(b) The applicant's proposed treatment of the acid sulphate soils identified.

A PASS report is included with this submission which includes the treatment methodology of acid sulphate soils.

Road Works

38. The applicant must undertake the following works:

Internal

Provision of kerb-to-kerb bitumen streets to widths required by the Far North Queensland Regional Organisation of Councils Development Manual.

Done.

Construction of a 1.5 metre wide footpath on one side of the full length of the internal loop road in the southern sector of the site and on one side of the full length of the loop road in the northern sector of the site and, in both cases, extending to Cooya Beach Road.

NA to this Stage

External

Provision is to be made for the following works external to the subject site in accordance with the Far North Queensland Regional Organisation of Councils Development Manual (FNQ ROC Development Manual).
The plans and specifications of the internal and external road works must be submitted to Council at Operational Works application stage for review.

39. Cooya Beach Road

Upgrading to the full frontage of the site in accordance with the Development Manual and generally as described in the Engineering Report submitted with the application to provide:

- a ten (10) metre wide sealed carriageway;
- kerb and channel and any associated drainage works on both sides of the carriageway;
- formed footpaths with a nominal width of 4.5 metres.

The design and construction of the works must provide for the retention of the grove of Melaleucas and other trees at the eastern end of Cooya Beach Road.

NA this stage.

Bonnie Doon Road

Upgrading to the full frontage of the site in accordance with the FNQ ROC Development Manual. In regard to the minimum standard for the construction of Bonnie Doon Road for the frontage of the development. Council's engineers have indicated that the carriageway will need to be upgraded to the following minimum standards in accordance with Section DI.27 part 1 of the FNQ Development Manual:

Traffic Volume/Road Class:	1000 - 7999 vpd (or sub-arterial)
Formation	10m
Pavement Width	8m
Seal Width	8m
Shoulders	Incl. 0.5m seal on each side

NA this stage.

Cooya Beach Road/Bonnie Doon Road Intersection

Construction of a channelised intersection in accordance with the FNQ ROC Development Manual.

NA this stage.

Landscaping, Buffering and Fencing

40. (a) A street landscaping plan providing for street tree planting within the proposed internal roads and Cooya Beach Road and for landscaping of the proposed roundabouts must be submitted for approval at Operational Works stage.

Landscaping plans will be submitted separately

(b) A planted buffer must be established to the full frontages of the site to Melaleuca Drive, Bonnie Doon Road and the un-constructed Palm Road adjacent to the northern boundary of the site. This buffer is to be densely planted and is to have a minimum width of 6.0metres.

The buffer must generally be in accordance with the details provided in the advice from the C&B Group dated 22nd October 2004.

Details including design of the buffer must be submitted for approval at the Operational Works stage.
The buffer must be established to the respective road frontages of each stage of the proposed development as a particular stage is constructed.
The applicant is to install a 1.8metre high fence along the un-constructed road reserve frontage to separate the agricultural uses from the residential uses. The purpose of this fence is for safety.

It is proposed to install a 1.8m high fence along the northern and north western boundary as per Stages 5C & 5D.

41. The subdivider shall lodge with the Council cash or bank bond calculated at the rate of ten percent (10%) of the contract price for the works concerned in the subdivision as a security that the maintenance works be not completed to the satisfaction of the Director Engineering Services the Council shall make good any of the said defects and deduct the costs thereof from the cash deposit or bank bond.

NA to Op Works.

Commercial

42. The maximum permissible gross floor area for retail uses on the land designated for commercial purposes is 450m^2.

NA to this stage.

43. A detailed plan of development will be required to be submitted to Council prior to any self-assessable use commencing on the area designated for commercial and community purposes.

NA to this stage.

44. The Applicant shall pay to the Council headworks contributions for water supply and sewerage in accordance with Council's local Planning Policy: "*Determination of Contributions for Water Supply and Sewerage Headworks and External Works"* ("the Policy").

The contribution shall be calculated at the rate per Equivalent Domestic Connection ("EDC") applicable at the time of payment in accordance with the Policy.
For information purposes only:

(a) The current rates per EC at the time of this approval are:

Water Supply	$ 4,449.00
Sewerage	$ 2,665.00

(b) The current number of EDCs for the approved use are:

Water Supply	7
Sewerage	7

The payment equivalent to one (1) EDC each for water supply and sewerage headworks shall be paid prior to Council Signing and Sealing the Plan of Survey. The balance of the water supply and sewerage headworks contribution is to be paid prior to the issue of a Building Works Development Permit in respect of any development on the Commercial / Community Purposes Land (proposed Lot 900). A notice will be placed on Council's rates database to this effect on Lot 900 when the title is created.

NA to Operational Works.

Item 6

Jacobs

Project Notes

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Subject	**Stormwater Drainage Calculations Project Notes**		
Client	Jonpa Pty Ltd	**Date**	12 October 2021
Project	Oceans Breeze Estate – Stage 5E		
Project No.	IH132900	**File**	Stormwater File Note - Stage 5E
Prepared by	Gavin Stanley	**Reviewed by**	Jeremy Evans

1. Stormwater System

The stormwater system for the Ocean Breeze Estate has been designed to cater for the relevant minor and major storm events in accordance with the FNQROC & QUDM guidelines. The internal subdivision roads have been designed for a Q_5 minor storm event and Q_{100} major event. The designed network complies with the FNQROC Development Manual and QUDM requirements for; flow widths, freeboard, pipe grades & velocities.

Refer Appendix A for the internal drainage layout plan and calculation results.

Refer Appendix D for previously approved drainage calculations for external catchment.

The site naturally falls to the adjacent mangroves towards the northern boundary of the subject site.

2. Catchment Hydrology Inputs

2.1 Time of Concentration (ToC)

A standard inlet time of 15 minutes in accordance with section 4.6.4 of QUDM has been adopted for the internal stormwater network due to the average slope of the development.

2.2 Coefficient of runoff

A fraction impervious (fi) of 0.5 has been adopted due to the pervious sandy soil conditions and low density of development. A corresponding coefficient of runoff (C_{10}) of 0.80 has been adopted. This is consistent with historical stages.

2.3 Rainfall Intensity

Rainfall intensities have been adopted from BOM data and verified against FNQROC tables.

2.4 Catchment Area

Catchment areas have been determined from available detail survey and topographical information.

Refer Appendix B.

3. Q100 Overland Flow

Refer to Appendix C where the following locations have been checked for Q_{100} overland flow:

- Section A

  Capacity = 1.09 m^3/s, limited by 200mm flow depth

  Overland Flow = 0.22 m^3/s (Q_{100} of 0.46m^3/s less 0.24m^3/s piped flow)

- Section B (Ultimate)

  Q_{100} flow depth of 0.935m for 6.8m^3/s

  Proposed Lot 218 is 1.56m above the invert of the ultimate drain.

- Section C (Ultimate)

  Q_{100} flow depth of 0.679m for 10.45m^3/s

  Proposed Lot 226 is 1.71m to 2.08m above the invert of the ultimate drain.

- Road 5 culverts (2/2400 x 750 RCBC's)

  Q_{100} headwater elevation of 2.77m for 6.80m^3/s

  Q_{100} headwater elevation of 3.09m for 6.80m^3/s with 20% blockage of culvert

  Proposed lots either side of drain have a minimum pad level of 3.4m and the verge level at the culvert headwall is 3.10m.

4. Tail Water Level

The tailwater level for the Q_5 analysis has been set based on the Q_5 flow depth within the out letting drain. Taking into account all upstream catchments, the calculated Q_5 flow rate coinciding with the pipe outlet is 7.57m^3/s and 559mm in depth.

The tailwater level for the Q_{100} analysis has determined from a flow rate of 10.45m^3/s, resulting in a 679mm flow depth within the drain.

5. Severe Impact Statement

All lots have been designed to fall towards the road frontage, and all roads ultimately grade towards the drain adjacent Lots 218 & 226. The Road 5 culvert (2/2400 x 750 RCBC's) have been designed to cater for the Q100 event of 6.8m^3/s with a headwater elevation of 2.77m and the severe event of 8.68m^3/s with a headwater elevation of 3.04m. Proposed lots either side of drain have a minimum pad level of 3.4m and the verge level at the culvert headwall is 3.10m.

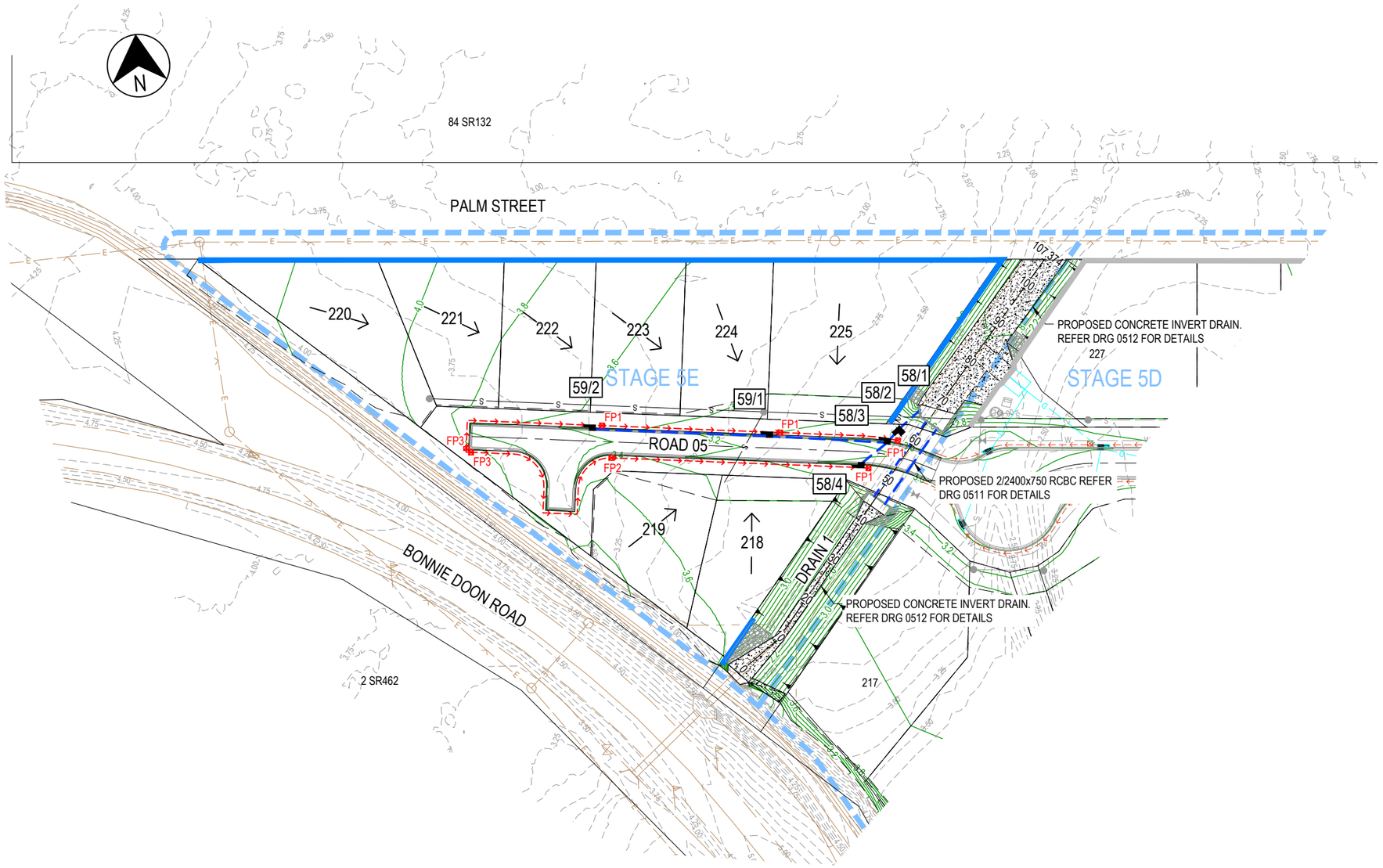
The culverts were also assessed with a 20% blockage factor applied to the base of the culvert (150mm). The Q100 event of 6.8m^3/s increased the headwater elevation to 3.09m and the severe

event of 8.68m^3/s increased the headwater elevation to 3.23m. This would result in a flow of approximately 130mm across the verge and onto the roadway. This flow would then run along the road to overland flow path and back into the drain on the downstream side of the culverts. The lots have all been designed with a minimum pad level of 3.40m.

A peak flow rate within the drain for the purposes of assessing the severe case has been calculated downstream of the Road 5 culverts at 13.41m^3/s with flow depth of 0.788m. These depths are less than the minimum depths of the drain. Refer to Appendix C for flow depth calculations, and Appendix D for the separate file note "Stages 5C & 5D, External Catchment" for external flow rate calculations.

Appendix A.

Internal Drainage Calculations



LEGEND

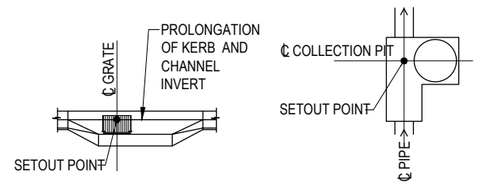
- 2/1 — LINE NUMBER / STRUCTURE No.
- STORMWATER DRAINAGE PIPE & MANHOLE
- SUBSURFACE DRAINAGE
- PROPOSED SEWER
- KERB INLET PIT
- HEADWALL
- GROSS POLLUTANT TRAP
- FALL OF LOTS
- BATTER
- STAGE BOUNDARY
- DESIGN SURFACE CONTOURS (0.2m INTERVAL)
- EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- RETAINING WALL
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.

FLUSHING POINT LEGEND

FP1	FLUSHING POINT IN PIT
FP2	FLUSHING POINT IN LINE
FP3	FLUSHING POINT HEAD



KERB INLET PIT — GROSS POLLUTANT TRAP

STRUCTURE SETOUT POINTS

N.T.S.

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

OCEAN BREEZE estate

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CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: STORMWATER DRAINAGE

SCALE	DRAWING No	REV
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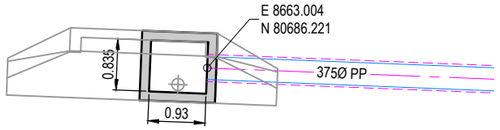

STORMWATER PIT 59/2 DETAIL
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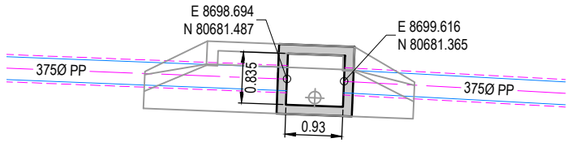

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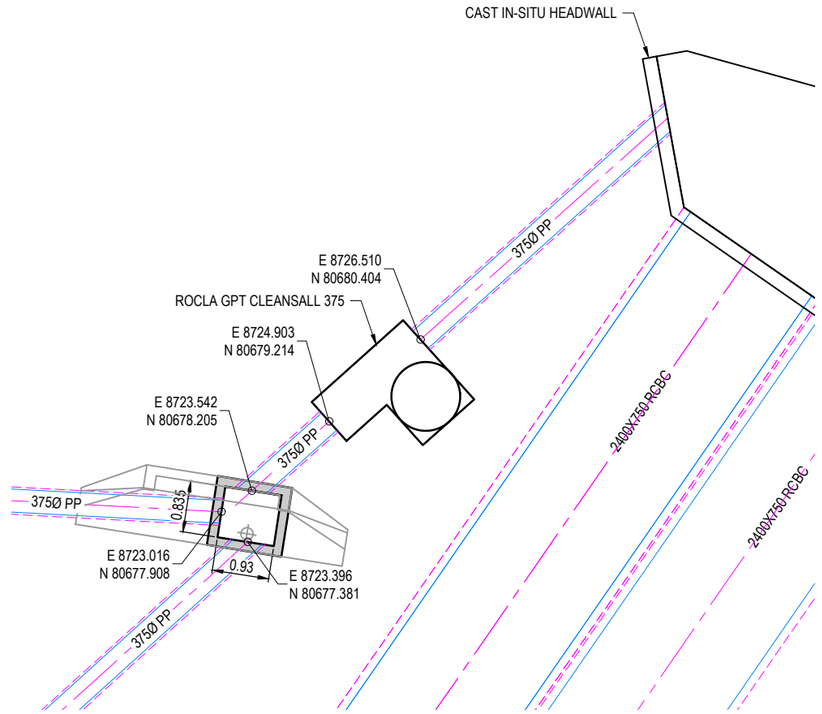
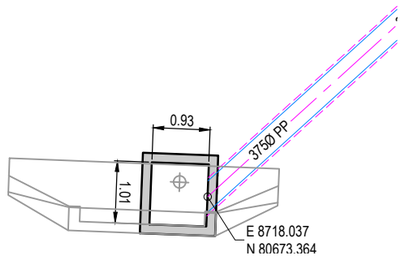


STORMWATER PIT 58/3 DETAIL
SCALE 1:50



STORMWATER PIT 58/4 DETAIL
SCALE 1:50

SCALE 1:50 (A1)
1:100 (A3)
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1 0.5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

OCEAN BREEZE estate

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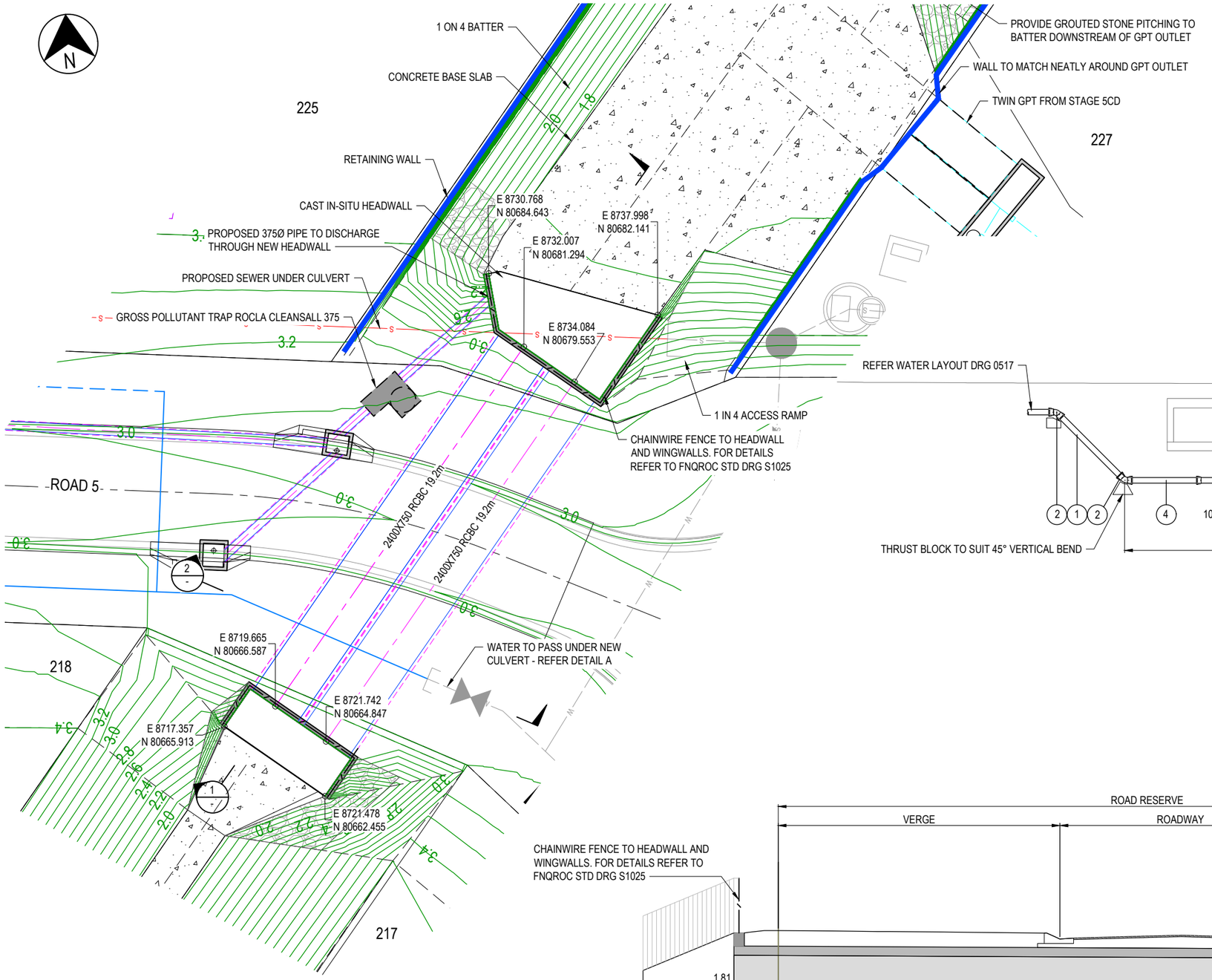
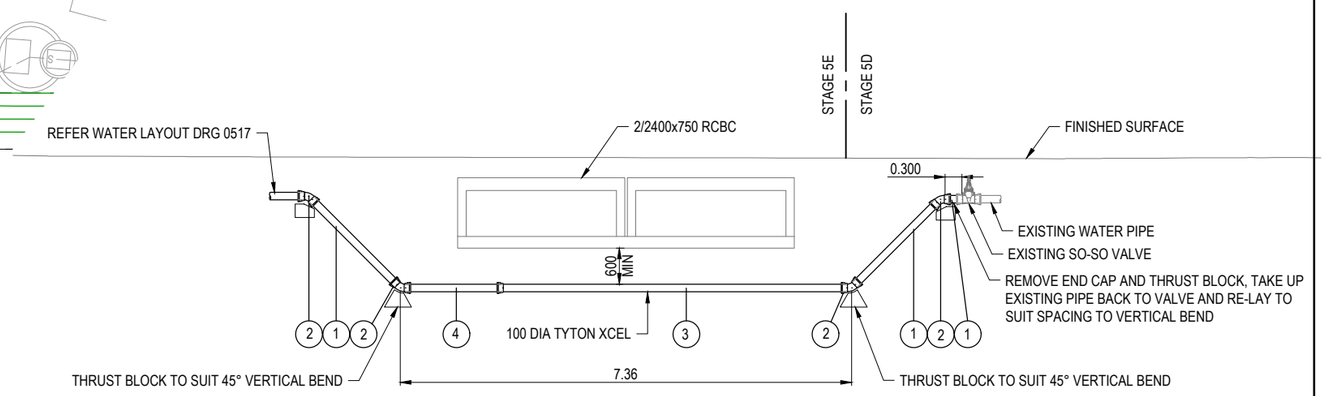
CLIENT: JONPA PTY LTD			
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E			
DRAWN: RC	DRAWING CHECK: RJB	REVIEWED: N. LEE LONG	APPROVED
DESIGNED: RC	DESIGN REVIEW: RJC	DATE: 27.10.21	DATE: 27.10.21

TITLE: STORMWATER DRAINAGE PIT DETAILS

SCALE	DRAWING No	REV
AS SHOWN	IH132900-5E-CI-DRG-0510	A

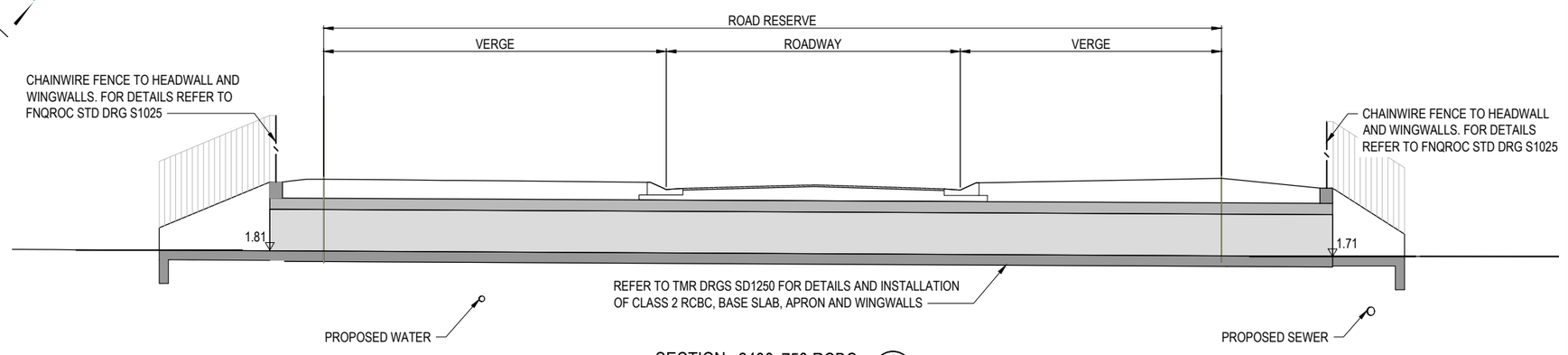


CULVERT DETAILS PLAN
1:100



SECTION 2
SCALE 1:50

FITTINGS SCHEDULE		
ITEM	DESCRIPTION	QTY.
1	DN100 PVC-U PIPE SP-SP	4.1m
2	DN100 DICL BEND 45° SO-SO	4
3	DN100 DIMAX TYTON XCEL SP-SO	1
4	DN100 DIMAX TYTON XCEL SO-SO (1.6m)	1



SECTION 2400x750 RCBC 1
SCALE 1:50

SCALE 1:100 (A1) 1:200 (A3) 0 2 4 6 8 10m (2 1)
SCALE 1:50 (A1) 1:100 (A3) 0 1 2 3 4 5m (1 0.5)

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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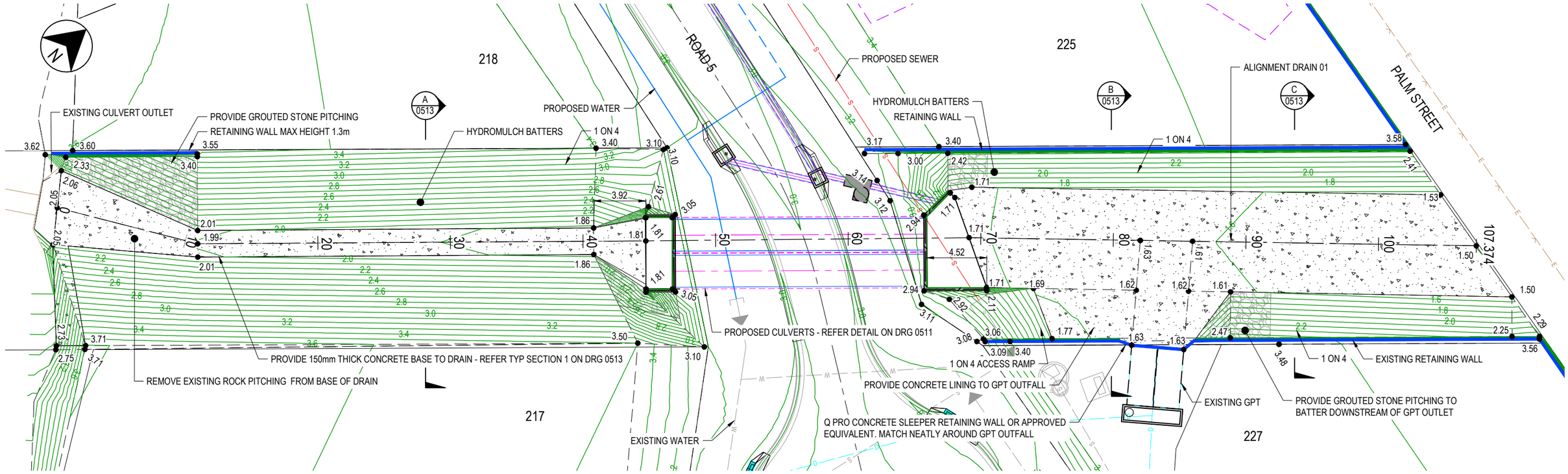
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: STORMWATER DRAINAGE CROSS DRAINAGE DETAILS

SCALE: AS SHOWN | DRAWING No: IH132900-5E-CI-DRG-0511 | REV: A



DRAIN 01 PLAN
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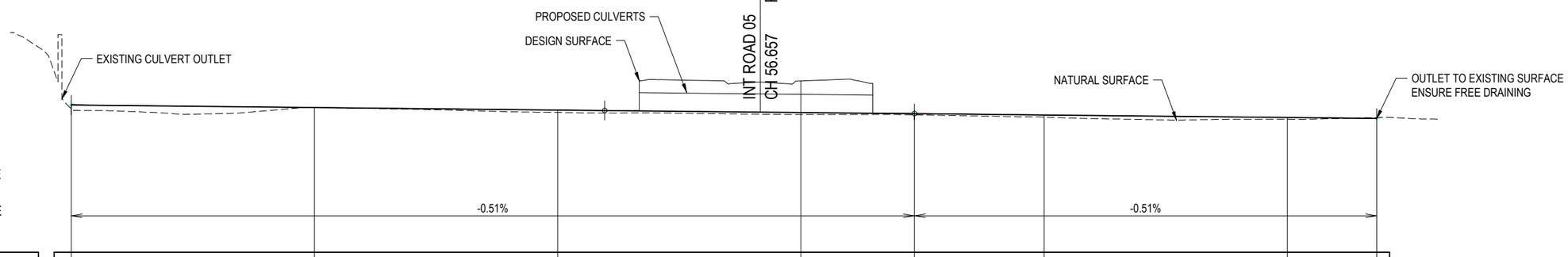

VERTICAL CURVE														
VERTICAL GRADE														
DATUM RL -4.0														
CUT - FILL +	0.147		-0.002		0.098		0.082		0.047		0.084		0.073	-0.037
DESIGN SURFACE LEVEL	2.050		1.947		1.845		1.742		1.694		1.640		1.537	1.500
EXISTING SURFACE LEVEL	1.903		1.950		1.747		1.660		1.647		1.555		1.464	1.536
CHAINAGE	0.000		20.000		40.000		60.000		69.330		80.000		100.000	107.342
HORIZONTAL DATA														

LONGITUDINAL SECTION DRAIN 01
SCALE 1:200H
1:100V

SCALE 1:200 (A1) 1:400 (A3) 0 4 8 12 16 20m (4 2)

SCALE 1:150 (A1) 1:300 (A3) 0 3 6 9 12 15m (3 1.5)

NOTE

1. FOR NOTES REFER DRG-0502.
2. FOR DRAIN CONTROL LINE SETOUT REFER DRG-0505.
3. PROPOSED CONCRETE DRAIN TO TIE INTO EXISTING AND PROPOSED CONCRETE AND APRONS.

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

OCEAN BREEZE estate

Jacobs
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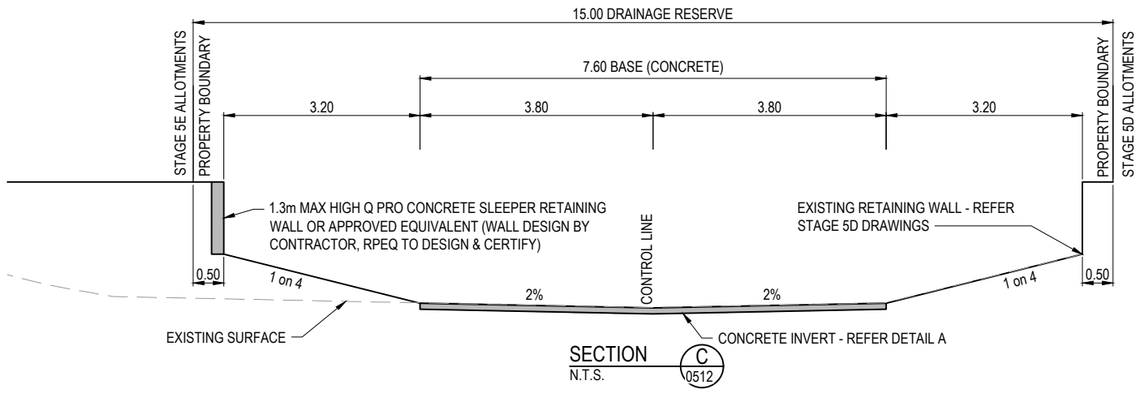
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

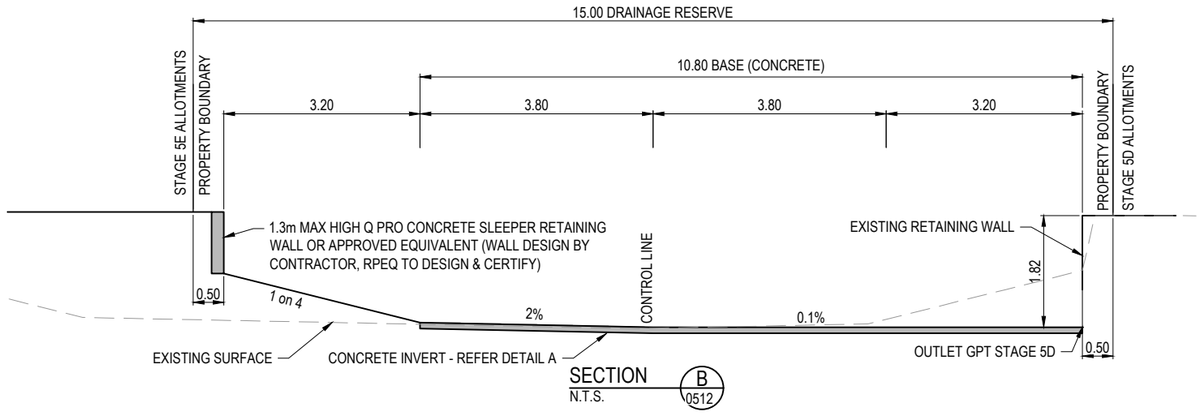
DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	DATE 27.10.21
DESIGNED	DESIGN REVIEW	DATE 27.10.21	
RC	RJC		

TITLE: STORMWATER DRAINAGE
DRAIN 01
PLAN AND LONGITUDINAL SECTION

SCALE: AS SHOWN
DRAWING No: IH132900-5E-CI-DRG-0512
REV: A



SECTION C
N.T.S. 0512



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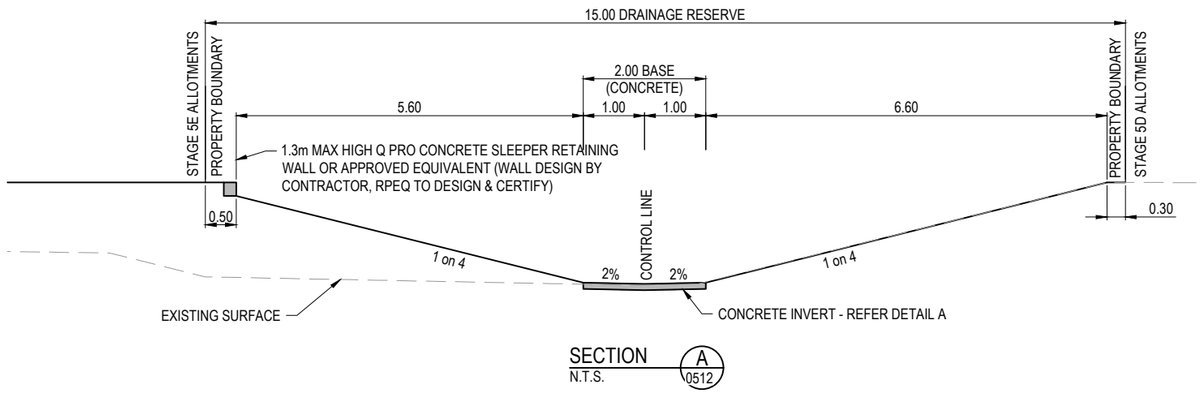
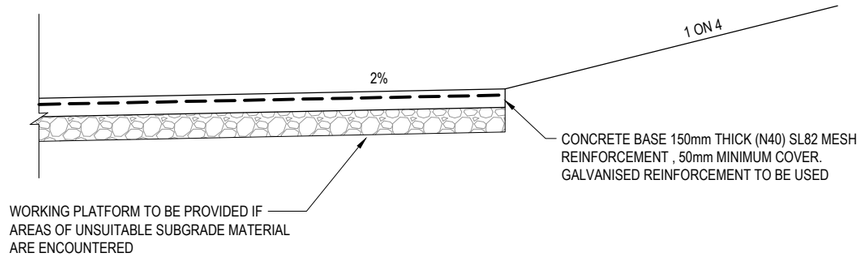
N.T.S. 0512



SECTION A
N.T.S. 0512



DETAIL A
NTS -

SCALE 1:250 (A1)
1:500 (A3)
0 5 10 15 20 25m
5 2.5

REV	DATE	DRAWN	REVD	APPD	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

OCEAN BREEZE estate

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Web: www.jacobs.com

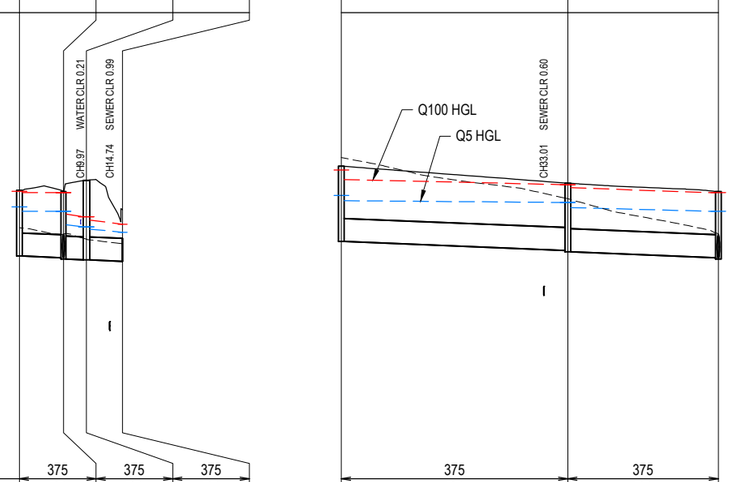
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE
STORMWATER DRAINAGE
DRAIN 01
TYPICAL SECTIONS AND DETAILS

SCALE	DRAWING No	REV
AS SHOWN	IH132900-5E-CI-DRG-0513	A

STRUCTURE NAME	58/4	58/3	58/2	58/1	59/2	59/1	58/3
STRUCTURE DESCRIPTION	ON-GRADE KERB INLET PIT; LINTEL TYPE S	ON-GRADE KERB INLET PIT; LINTEL TYPE S	GROSS POLLUTANT TRAP; CLEANSALL 375	HEADWALL	ON-GRADE KERB INLET PIT; LINTEL TYPE S	ON-GRADE KERB INLET PIT; LINTEL TYPE S	ON-GRADE KERB INLET PIT; LINTEL TYPE S
PIPE SIZE (mm)		375	375	375	375	375	375
PIPE CLASS		PP	PP	PP	PP	PP	PP
PIPE GRADE (%)		0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
PIPE SLOPE (1 in X)		249.91	249.68	250.00	250.00	250.01	
FULL PIPE VELOCITY (m/s)		0.46	1.89	1.89	0.58	1.04	
PART FULL VELOCITY (m/s)		1.19	1.89	1.89	1.27	1.45	
DATUM RL		-4.0			-4.0		
H.G.L IN PIPE & W.S.E IN STRUCTURE	2.682	2.613 2.609 2.609	2.390 2.358 2.358	2.319 2.270 2.270	2.868 2.784 2.754 2.754	2.671 2.609 2.609	2.390
PIPE FLOW (Cumecs) (Q5 PIPE FLOW) (Q100 PIPE FLOW)		0.051 0.034	0.208 0.245	0.208 0.244	0.064 0.109	0.115 0.131	
PIPE CAPACITY AT GRADE (Cumecs)		0.144	0.144	0.144	0.144	0.144	
DEPTH TO INVERT		1.071 1.079	1.099 1.297	1.297 0.838	0.838 1.227 1.098	1.118 1.079	1.099
INVERT LEVEL OF DRAIN		1.882 1.853	1.833 1.818	1.818 1.795	1.795 2.119 1.972	1.952 1.853	1.833
DESIGN SURFACE LEVEL	2.953	2.932	3.115	2.633	3.347 3.070	2.932	
SETOUT COORDINATES	E 8717.605 N 80673.645	E 8723.396 N 80677.515	E 8726.059 N 80680.071	E 8730.871 N 80683.447	E 8662.505 N 80685.997	E 8699.117 N 80681.141	E 8723.396 N 80677.515
CHAINAGE	0.000	7.183 7.183	3.758 10.942	5.878 16.820	0.000 36.933 36.933	24.551 61.484	
LINE		58			59		



VERTICAL SCALE 1:50 (A1) 1:100 (A3) 0 1 2 3 4 5m / 1 0.5

HORIZONTAL SCALE 1:500 (A1) 1:1000 (A3) 0 10 20 30 40 50m / 10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: STORMWATER DRAINAGE LONGITUDINAL SECTIONS

SCALE: 1:500H, 1:50V (A1) | DRAWING No: IH132900-5E-CI-DRG-0514 | REV: A

Project: OCEAN BREEZE ESTATE - STAGE 5E

12D MODEL - DESIGN SHEET (QUDM) MINOR STORM EVENT Q5

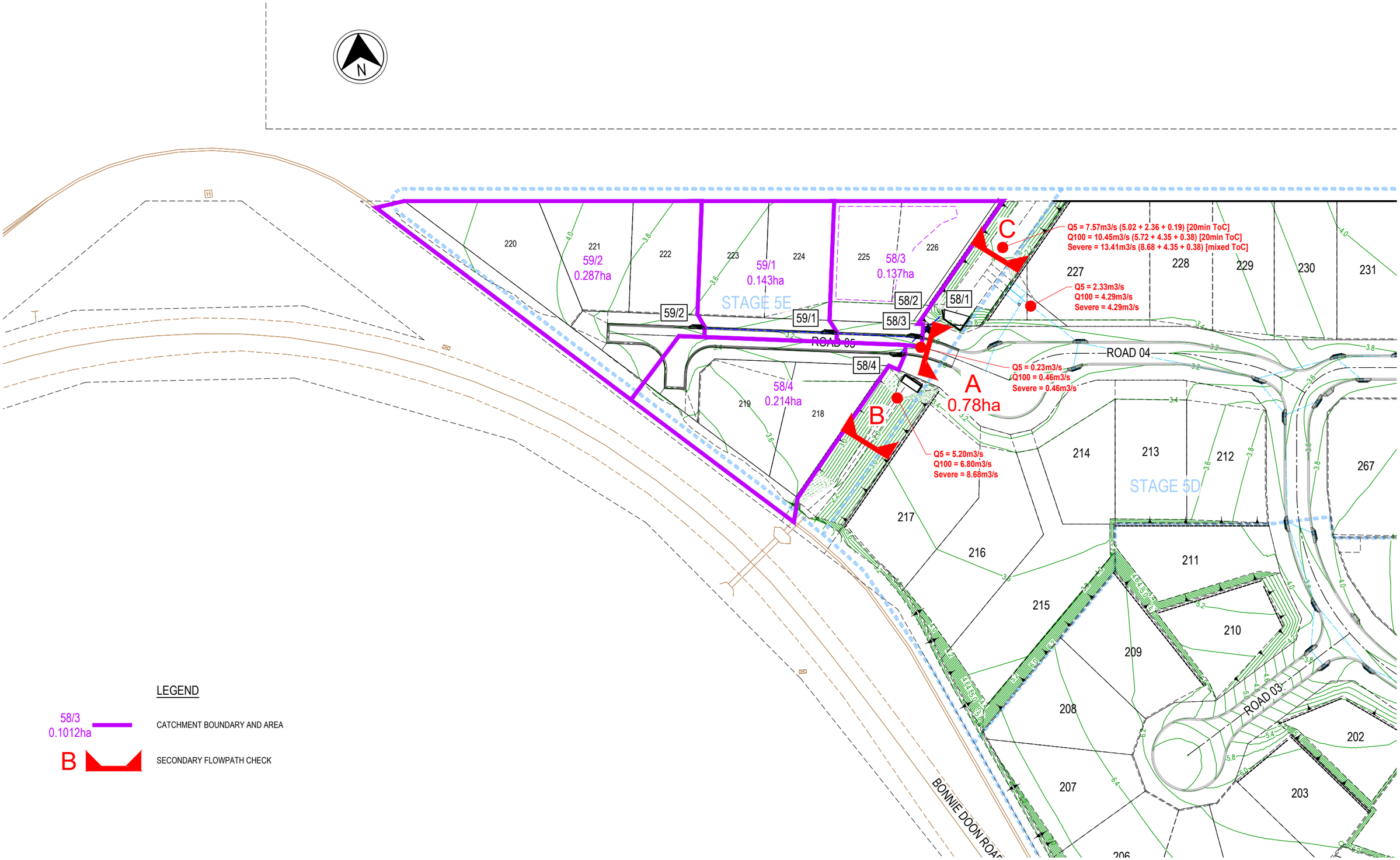
LOCATION		SUB-CATCHMENT RUNOFF					INLET DESIGN											DRAIN DESIGN											HEAD LOSSES								PART FULL		DESIGN LEVELS							
		Tc	I	A	CA	Qc	Qa									Qg	Qb		Tc	I	CA	Qrat	Q	L	S			Vf=Q/A	Qcap	Vcap	Vt		Vf²/2g	Ku	hu	Kw	hw	Sf	hf	dn	Vn							
STRUCTURE No.	DRAIN SECTION	SUB-CATCHMENT TIME OF CONC.	RAINFALL INTENSITY	SUB-CATCHMENT AREA	EQUIVALENT AREA	SUB-CATCHMENT DISCHARGE	FLOW IN K&C (INC. BYPASS)	HALF ROAD CAPACITY	FLOW WIDTH	FLOW DEPTH	FLOW DxV	ROAD GRADE AT INLET	ROAD XFALL AT INLET	INLET TYPE	INLET CURVE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE No.	CRITICAL TIME OF CONC.	RAINFALL INTENSITY	TOTAL (C x A)	PEAK FLOW	PIPE FLOW	REACH LENGTH	PIPE GRADE	PIPE SIZE	PIPE CLASS	FULL PIPE VELOCITY	CAPACITY FLOW	CAPACITY VELOCITY	TRAVEL VELOCITY	CHART(S) USED	VELOCITY HEAD	U/S HEAD LOSS COEFFICIENT	U/S HEAD LOSS	W.S.E COEFFICIENT	CHANGE IN W.S.E	PIPE FRICTION SLOPE	PIPE FRICTION HEAD LOSS	NORMAL DEPTH	NORMAL DEPTH VEL.	PIPE U/S I.L	PIPE D/S I.L	PIPE U/S H.G.L	PIPE D/S H.G.L	W.S.E	GRATE LEVEL	STRUCTURE No.
		min	mm/h	ha	ha	L/s	L/s	L/s	m	m	m^2/s	%	%			L/s	L/s		min	mm/hr	ha	L/s	L/s	m	%	mm		m/s	L/s	m/s	m/s		m		m		m	%	m	m	m/s							
58/4	58/4 to 58/3	15	142	0.214	0.163	64	64	56	2.687	0.09	0.052	0.5	3	KIP-OG-S	0.01	51	13	57/2	15	142	0.163	64	51	7.183	0.4	375	BlackMAX	0.46	144	1.31	2	G2	0.011	6.44	0.07		0.07	0.05	0.004	0.154	1.19	1.882	1.853	2.613	2.609	2.682	2.953	58/4
58/3	58/3 to 58/2	15	142	0.137	0.104	41	55	53	2.682	0.087	0.046	0.52	3.01	KIP-OG-S	0.01	45	10	57/1	15.2	141	0.589	232	208	3.758	0.4	375	BlackMAX	1.89	144	1.31	2	T2/T4	0.182	1.21	0.219		0.219	0.84	0.031	0.375	1.89	1.833	1.818	2.39	2.358	2.609	2.932	58/3
58/2	58/2 to 58/1													GPT-CA375					15.24	141	0.589	231	208	5.878	0.4	375	BlackMAX	1.89	144	1.31	2	T1/T2	0.181	0.22	0.039		0.039	0.83	0.049	0.375	1.89	1.818	1.795	2.319	2.27	2.358	3.115	58/2
58/1														HW																															2.27	3.1	58/1
59/2	59/2 to 59/1	15	142	0.287	0.218	86	86	68	2.693	0.093	0.067	0.75	3	KIP-OG-S	0.01	64	22	59/1	15	142	0.218	86	64	36.933	0.4	375	BlackMAX	0.58	144	1.31	2	G1	0.017	4.82	0.084		0.084	0.08	0.03	0.176	1.27	2.119	1.972	2.784	2.754	2.868	3.347	59/2
59/1	59/1 to 58/3	15	142	0.143	0.108	43	65	68	2.635	0.085	0.055	0.75	3	KIP-OG-S	0.01	51	14	58/3	15.31	141	0.327	128	115	24.551	0.4	375	BlackMAX	1.04	144	1.31	2	T1	0.055	1.52	0.084		0.084	0.25	0.062	0.252	1.45	1.952	1.853	2.671	2.609	2.754	3.07	59/1

12D MODEL - DESIGN SHEET (QUDM) MINOR STORM EVENT Q100

LOCATION		SUB-CATCHMENT RUNOFF					INLET DESIGN											DRAIN DESIGN											HEAD LOSSES								PART FULL		DESIGN LEVELS							
		Tc	I	A	CA	Qc	Qa									Qg	Qb		Tc	I	CA	Qrat	Q	L	S			Vf=Q/A	Qcap	Vcap	Vt		Vf²/2g	Ku	hu	Kw	hw	Sf	hf	dn	Vn							
STRUCTURE No.	DRAIN SECTION	SUB-CATCHMENT TIME OF CONC.	RAINFALL INTENSITY	SUB-CATCHMENT AREA	EQUIVALENT AREA	SUB-CATCHMENT DISCHARGE	FLOW IN K&C (INC. BYPASS)	HALF ROAD CAPACITY	FLOW WIDTH	FLOW DEPTH	FLOW DxV	ROAD GRADE AT INLET	ROAD XFALL AT INLET	INLET TYPE	INLET CURVE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE No.	CRITICAL TIME OF CONC.	RAINFALL INTENSITY	TOTAL (C x A)	PEAK FLOW	PIPE FLOW	REACH LENGTH	PIPE GRADE	PIPE SIZE	PIPE CLASS	FULL PIPE VELOCITY	CAPACITY FLOW	CAPACITY VELOCITY	TRAVEL VELOCITY	CHART(S) USED	VELOCITY HEAD	U/S HEAD LOSS COEFFICIENT	U/S HEAD LOSS	W.S.E COEFFICIENT	CHANGE IN W.S.E	PIPE FRICTION SLOPE	PIPE FRICTION HEAD LOSS	NORMAL DEPTH	NORMAL DEPTH VEL.	PIPE U/S I.L	PIPE D/S I.L	PIPE U/S H.G.L	PIPE D/S H.G.L	W.S.E	GRATE LEVEL	STRUCTURE No.
		min	mm/h	ha	ha	L/s	L/s	L/s	m	m	m^2/s	%	%			L/s	L/s		min	mm/hr	ha	L/s	L/s	m	%	mm		m/s	L/s	m/s	m/s		m		m		m	%	m	m	m/s							
58/4	58/4 to 58/3	15	224	0.214	0.206	128	128	56	2.732	0.112	0.084	0.5	3	KIP-OG-S	0.01	34	94	57/2	15	224	0.206	128	34	7.183	0.4	375	BlackMAX	0.3	144	1.31	2	G2	0.005	4.22	0.02		0.02	0.02	0.002	0.123	1.06	1.882	1.853	2.915	2.914	2.935	2.953	58/4
58/3	58/3 to 58/2	15	224	0.137	0.131	82	205	53	3.125	0.138	0.115	0.52	3.01	KIP-OG-S	0.01	84	121	57/1	15.2	222	0.745	460	245	3.758	0.4	375	BlackMAX	2.21	144	1.31	2	T2/T4	0.25	1.4	0.349		0.349	1.15	0.043	0.375	2.21	1.833	1.818	2.564	2.521	2.914	2.932	58/3
58/2	58/2 to 58/1													GPT-CA375					15.24	222	0.745	460	244	5.878	0.4	375	BlackMAX	2.21	144	1.31	2	T1/T2	0.249	0.22	0.054		0.054	1.15	0.067	0.375	2.21	1.818	1.795	2.467	2.4	2.521	3.115	58/2
58/1														HW																															2.4	3.1	58/1
59/2	59/2 to 59/1	15	224	0.287	0.276	171	171	68	2.74	0.116	0.109	0.75	3	KIP-OG-S	0.01	109	62	59/1	15	224	0.276	171	109	36.933	0.4	375	BlackMAX	0.99	144	1.31	2	G1	0.05	3.08	0.154		0.154	0.23	0.085	0.244	1.44	2.119	1.972	3.129	3.045	3.283	3.347	59/2
59/1	59/1 to 58/3	15	224	0.143	0.137	85	147	68	2.728	0.11	0.097	0.75	3	KIP-OG-S	0.01	24	124	58/3	15.31	222	0.413	254	131	24.551	0.4	375	BlackMAX	1.18	144	1.31	2	T1	0.071	0.71	0.05		0.05	0.33	0.081	0.28	1.48	1.952	1.853	2.994	2.914	3.045	3.07	59/1

Appendix B.

Catchment Plan



LEGEND

58/3
0.1012ha — CATCHMENT BOUNDARY AND AREA

B — SECONDARY FLOWPATH CHECK

PROJECT
OCEAN BREEZE ESTATE - STAGE 5E

TITLE
CATCHMENT PLAN

DATE 23.09.21 | SCALE AS SHOWN | PROJ. No IH132900

JACOBS
ABN 37 001 024 095 and ACN 001 024 095
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SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

PRELIMINARY ISSUE

DATE: 12/10/2021 2:18:24 PM LOGIN NAME: STANLEY, GAVIN
LOCATION: C:\Users\stanlegm1\appdata\local\projectwise\jacobs_anz_ie\d0181121\10923-Stage 5E Catchment Plan.dwg

Appendix C.

Q100 Overland Flow

Secondary Overland Flow Catchment Calculations

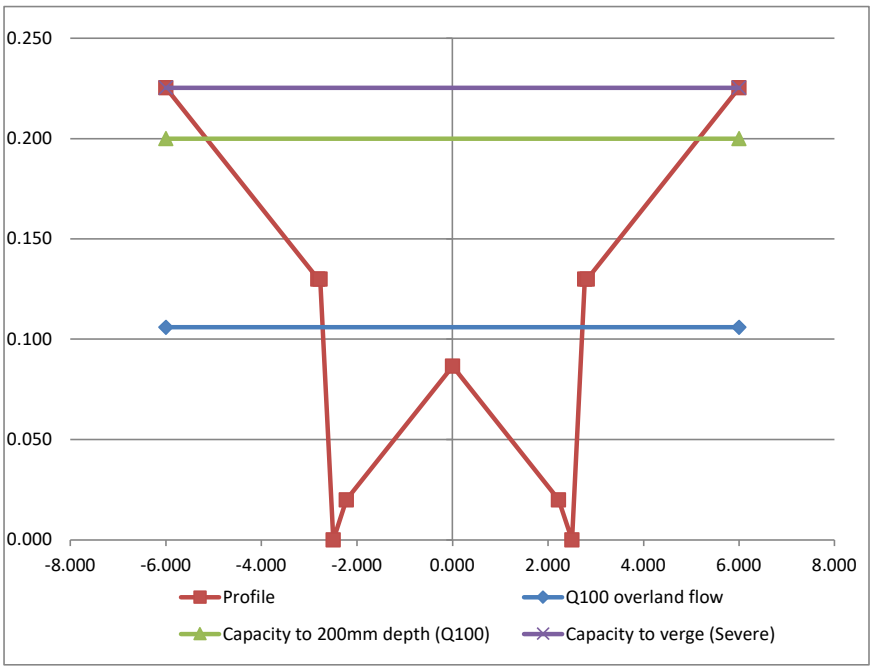
Ocean Breeze Estate - Stage 5E

Catchment	Area	c10	c1	c2	c5	c10	c50	c100	Adopted tc	(mm/h | m3/s) for ARI												Overland Minor Q100-Q5	Comment	Capacity
										100		50		10		5		2		1				
										mm/h	m3/s	mm/h	m3/s	mm/h	m3/s	mm/h	m3/s	mm/h	m3/s	mm/h	m3/s			
A	0.78	0.8	0.64	0.68	0.76	0.8	0.92	0.96	15.50	220.50	0.46	200.60	0.40	154.50	0.27	140.40	0.23	115.70	0.17	91.50	0.13	0.23		

Catchment	Area		Adopted tc	100	50	10	5	2	2	Q100-Q2		
				(mm/h | m3/s) for ARI						Overland Minor		

Project Description			
File name	SECTION A		Xsectn
Irregular Channel Details			
Xsectn	Offset	Height	Man N
	-6.000	0.225	0.035
	-2.820	0.130	0.013
	-2.770	0.130	
	-2.500	0.000	
	-2.220	0.020	0.015
	0.000	0.087	
	2.220	0.020	0.013
	2.500	0.000	
	2.770	0.130	
	2.820	0.130	0.035
	6.000	0.225	

Correction factor 0.9

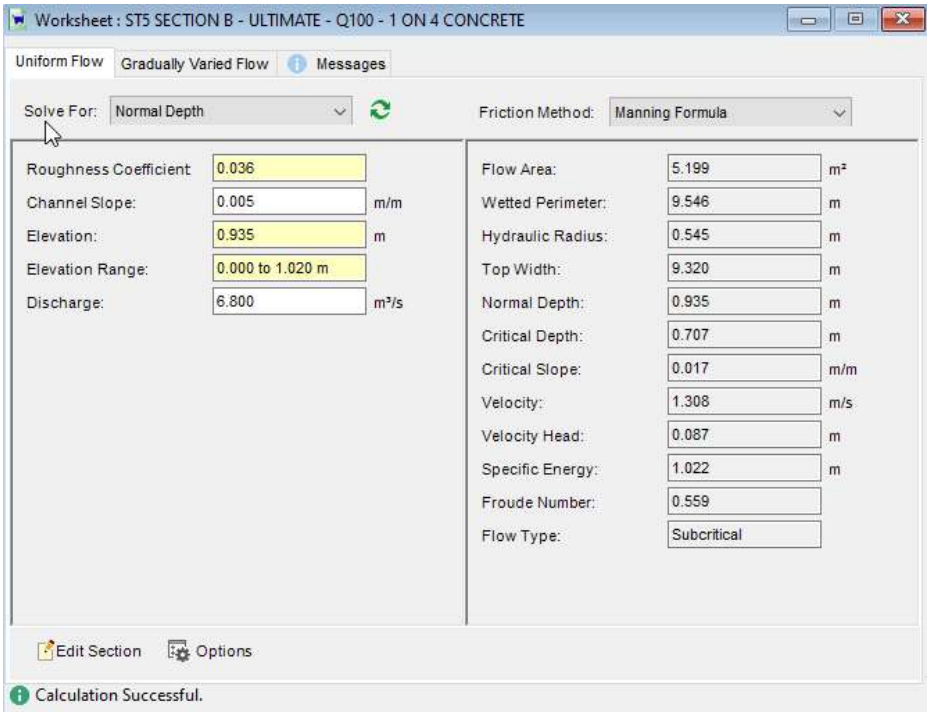


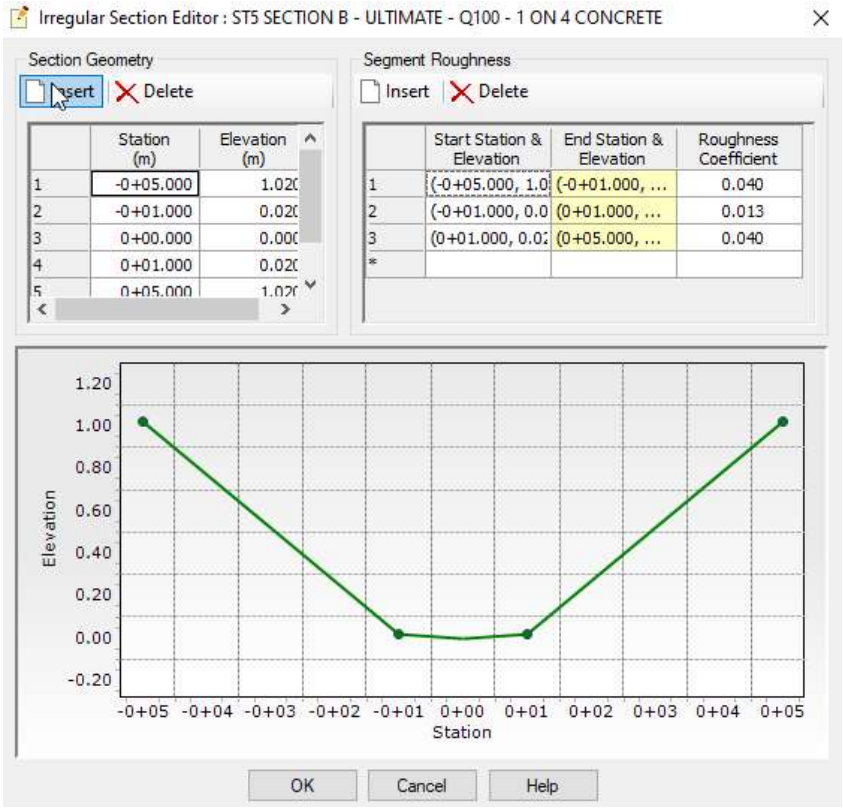
Results using Izzard's Equation

Location	Slope %	Flow Depth (m)	Flow (m3/s)	Velocity (m/s)	dxV
Q100 overland flow	0.5	0.106	0.224	0.721	0.076
Capacity to 200mm depth (Q100)	0.5	0.200	1.090	1.089	0.218
Capacity to verge (Severe)	0.5	0.225	1.447	1.127	0.254

The following screenshots show the flow depth calculations adjacent Lot 218

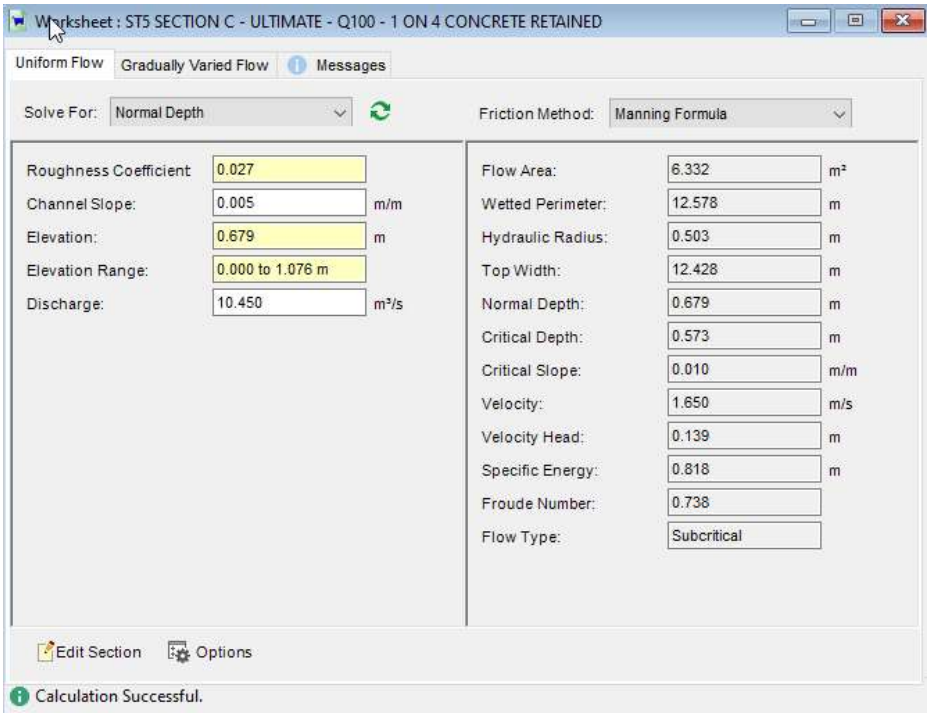
SECTION B – ULTIMATE

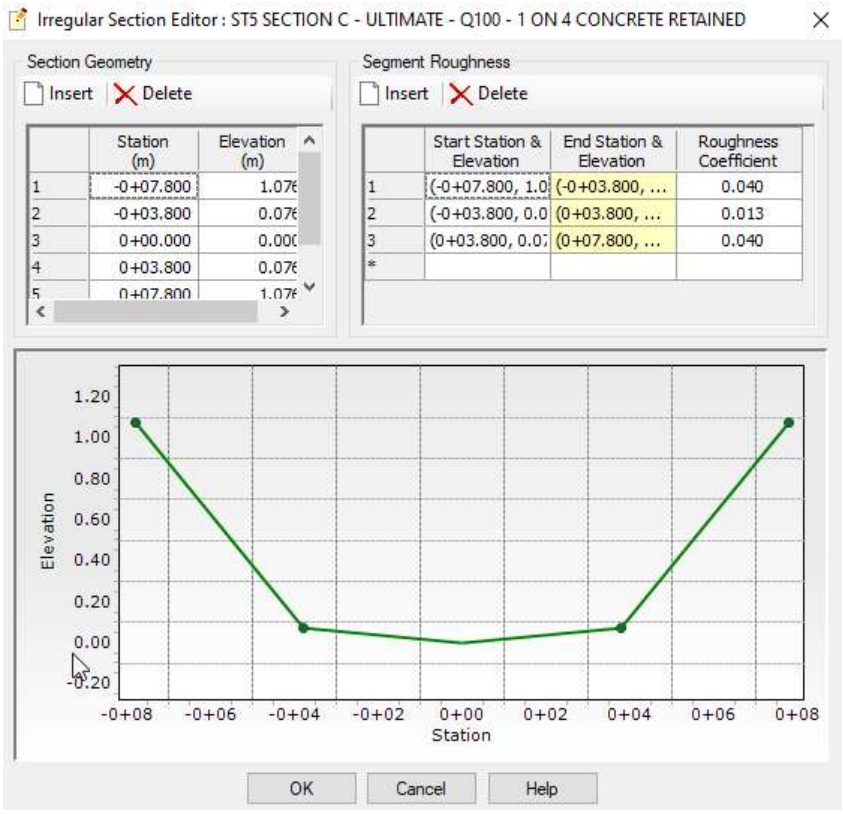




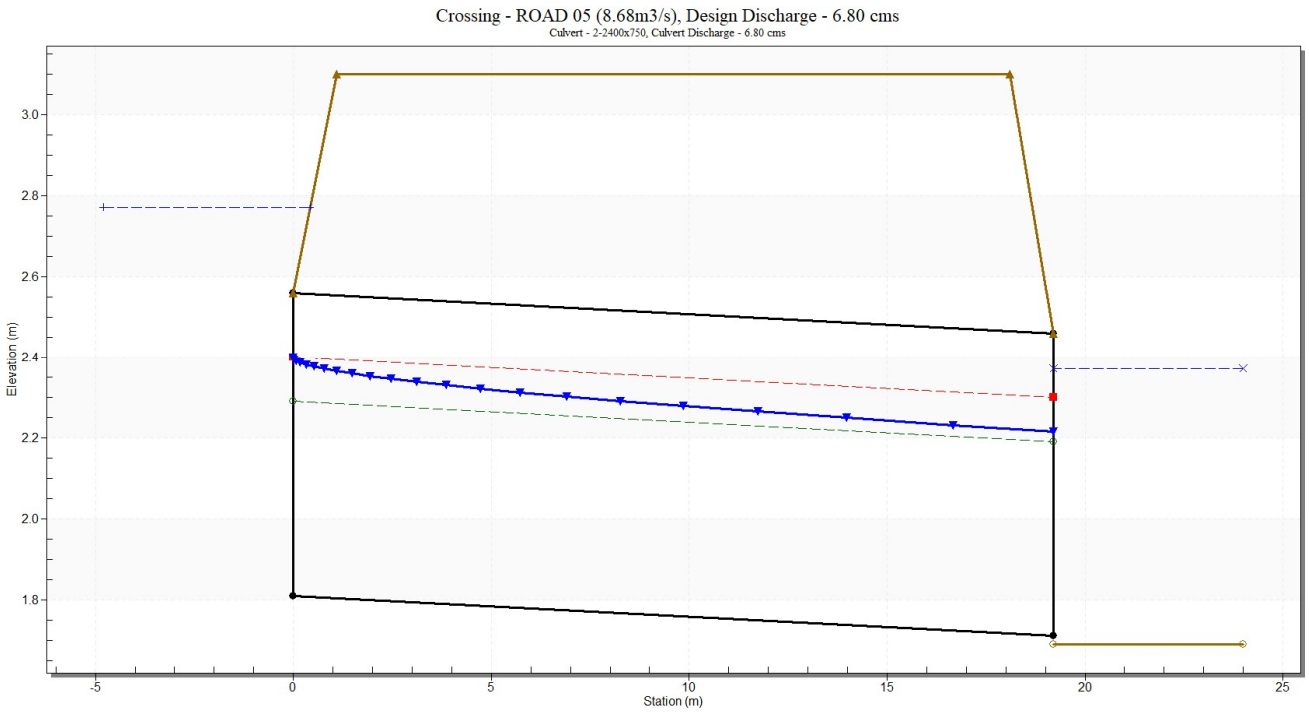
The following screenshots show the flow depth calculations adjacent Lot 226

SECTION C – ULTIMATE





Road 5 culvert (2/2400x750 RCBC's) Q100 Flow



Summary of Flows at Crossing - ROAD 05 (8.68m3/s)

Headwater Elevation (m)	Total Discharge (cms)	2-2400x750 Discharge (cms)	Roadway Discharge (cms)	Iterations	
2.58	5.20	5.20	0.00	1	ARI 5
2.62	5.55	5.55	0.00	1	
2.66	5.90	5.90	0.00	1	
2.70	6.24	6.24	0.00	1	
2.74	6.59	6.59	0.00	1	
2.77	6.80	6.80	0.00	1	ARI 100
2.84	7.29	7.29	0.00	1	
2.88	7.64	7.64	0.00	1	
2.93	7.98	7.98	0.00	1	
2.99	8.33	8.33	0.00	1	
3.04	8.68	8.68	0.00	1	SEVERE
3.10	9.03	9.03	0.00	Overtopping	

Display
- (•) Crossing Summary Table
- ( ) Culvert Summary Table — 2-2400x750
- ( ) Water Surface Profiles
- ( ) Tapered Inlet Table
- ( ) Customized Table — Options...

Geometry

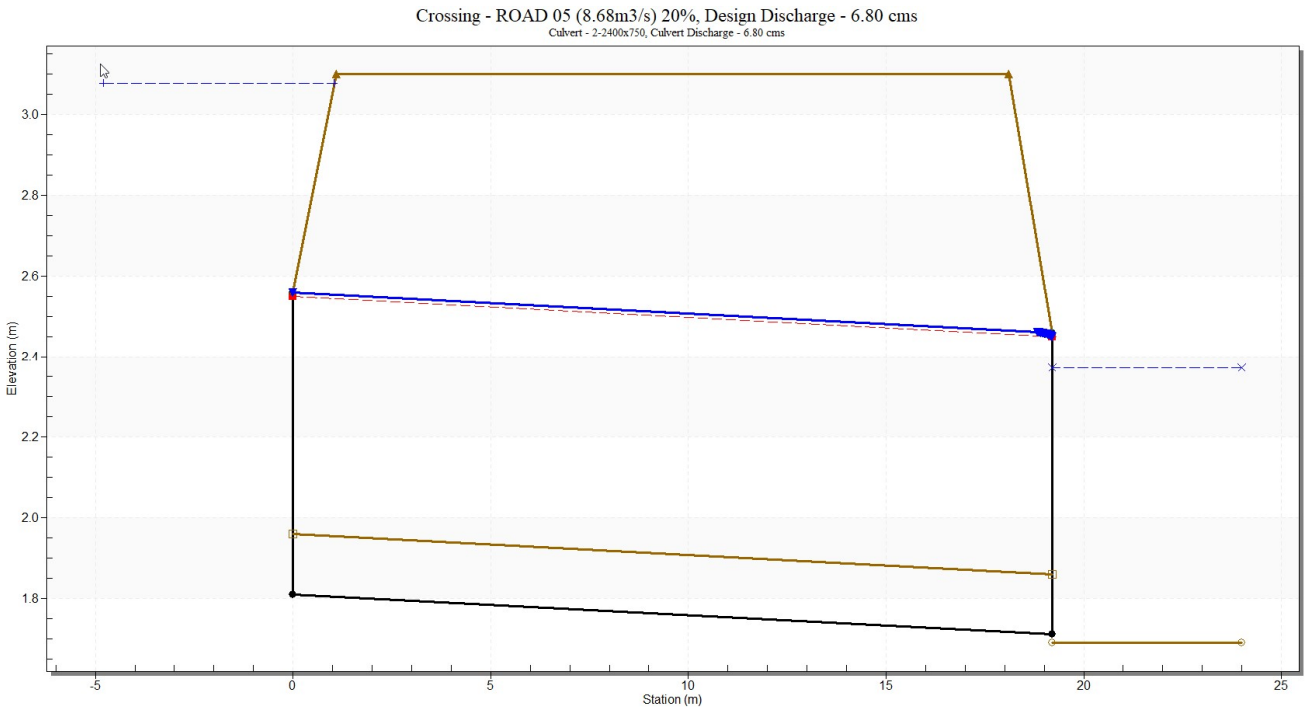
Inlet Elevation:	1.81 m
Outlet Elevation:	1.71 m
Culvert Length:	19.20 m
Culvert Slope:	0.0052
Inlet Crest:	0.00 m
Inlet Throat:	0.00 m

Outlet Control: Profiles

Plot
- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | Adobe PDF (*.pdf) | Close

Road 5 culvert (2/2400x750 RCBC's) Q100 Flow with 20% blockage



Summary of Flows at Crossing - ROAD 05 (8.68m3/s) 20%

Headwater Elevation (m)	Total Discharge (cms)	2-2400x750 Discharge (cms)	Roadway Discharge (cms)	Iterations	
2.79	5.20	5.20	0.00	1	ARI 5
2.83	5.55	5.55	0.00	1	
2.89	5.90	5.90	0.00	1	
2.95	6.24	6.24	0.00	1	
3.03	6.59	6.59	0.00	1	
3.08	6.80	6.80	0.00	1	ARI 100
3.14	7.29	7.11	0.17	7	
3.16	7.64	7.24	0.40	5	
3.19	7.98	7.35	0.63	5	
3.21	8.33	7.46	0.87	4	
3.23	8.68	7.55	1.12	4	SEVERE
3.10	6.91	6.91	0.00	Overtopping	

Display
- Crossing Summary Table
- Culvert Summary Table (2-2400x750)
- Water Surface Profiles
- Tapered Inlet Table
- Customized Table (Options...)

Geometry
- Inlet Elevation: 1.96 m
- Outlet Elevation: 1.86 m
- Culvert Length: 19.20 m
- Culvert Slope: 0.0052
- Inlet Crest: 0.00 m
- Inlet Throat: 0.00 m

Outlet Control: Profiles

Plot
- Crossing Rating Curve
- Culvert Performance Curve
- Selected Water Profile
- Water Surface Profile Data

Help | Flow Types... | Edit Input Data... | Energy Dissipation... | AOP... | Low Flow... | Export Report | Adobe PDF (*.pdf) | Close

Appendix D.

Stages 5C & 5D, External Catchment

1. External Catchment

There is a significant external catchment adjacent to the subject site. The drainage regime and characteristics of this catchment have been analysed to determine what flows are directed through the Ocean Breeze Estate, and to select an appropriate Q_{100} flow through the development.

The catchment is approx. 92Ha in size, and is predominately used for farming purposes. This is consistent with the zoning of the land within the catchment. The catchment ultimately concentrates flows to a series of 2/1200 RCP pipes under Bonnie Doon Road and the adjacent Rail. Both the road and the rail form a significant bunded area. Refer to **Appendix A & Appendix B** for the catchment plan and a schematic overview of the catchment.

Using the rational method for the external catchment, a peak Q_{100} discharge has been calculated as follows:

$Q_{100} = 33m^3/s$

Where

ToC = 35mins (Bransby Williams)

$C_{100} = 0.84$

$^{35}I_{100} = 152.6\ ^{mm}/_{hr}$

A = 91.48 Ha

The 2/1200 RCP structures do not have capacity for this peak flow rate. Further analysis of the catchment has been performed to determine where the excess flows are directed. As part of this analysis, the impacts of the basins have been taken into account.

The road, and the rail, both form bunded basins upstream of their respective out-letting cross drainage culverts. In calculating the peak storage and peak outflow, the basins have been considered as 1 storage mass with 1 outletting structure. The provision of 2/1200 RCP in series effectively retards the peak discharge from the second outlet, so the calculations have been simplified and are conservative.

The performance of the basin was analysed for a series of rainfall events (10min => 72hour) at 5min time steps. The following peaks were calculated and coincide with the 24hour storm:

Peak storage height = 1.88m (RL 4.08)

Peak outflow = $6.64m^3/s$ ($1992m^3/_{5min}$)

The detention analysis shows that the Q_{100} event is stored within the upstream basin with a water surface level of RL 4.08 with an outlet of $1992m^3/_{5min}$. At this point $33,460m^3$ is stored within the basin. Since the above peak outflow is calculated from a 5min average, the WSL RL of 4.08 has been analysed for the rail culverts to further refine a peak Q_{100} discharge of ***$6.80m^3/s$***.

2. Catchment Hydrology Inputs

2.1 Time of Concentration (ToC)

Due to the area and flowpath length of the catchment the Bransby Williams equation was used to calculate the time of concentration as follows:

- The Bransby Williams Eq has been used to calculate a ToC of 35mins, refer **Appendix C**.

2.2 Coefficient of runoff

A fraction impervious (fi) of 0.0 has been adopted due to the pervious sandy soil conditions and land use. A corresponding coefficient of runoff (C_{10}) of 0.70 has been adopted.

2.3 Rainfall Intensity

Rainfall intensities have been adopted from BOM data and verified against FNQROC tables.

2.4 Temporal Pattern

The Zone 3 Temporal Pattern has been adopted from ARR Book 2 Table 3.2.

2.5 Catchment Area

Catchment areas have been determined from available detail survey and topographical information.

3. Severe Impact Statement

Stormwater impacts need to be assessed for a total blockage of the cross drainage pipes under the road and the rail.

Having a series of cross drainage culverts provides some protection in that the road RCP's provide upstream blockage protection to the rail RCP's.

In the event of a total pipe blockage the 2 basins provide protection for the approach flows by detaining and storing flows upstream of the development.

In the event that the storage in the basins is exhausted, the full 33m3/s Q_{100} flow rate (calculated from the rational method) has been analysed as a weir flow over the respective rail/road. This scenario shows that flow over the rail would occur with an approx. WSL of 4.82. The level of the adjacent rail level above the pipes is 4.97. On this basis, overflow of the rail occurs downstream of the 2/1200 flow path.

As a further belts and braces approach to calculating the maximum discharge potential of the 2/1200 RCP's, the WSL RL of 4.82 has been analysed to calculate a potential ***8.68m^3/s*** flow rate from the culverts. This flow rate has been adopted for the purposes of checking severe impacts from the external catchment and through the Ocean Breeze Estate Development.

4. Summary of Flow Rates

6.80m^3/s is the calculated ***Q_{100}*** design flow rate through the development.

8.68m^3/s is the calculated flow rate for assessing the ***severe impact*** through the development.

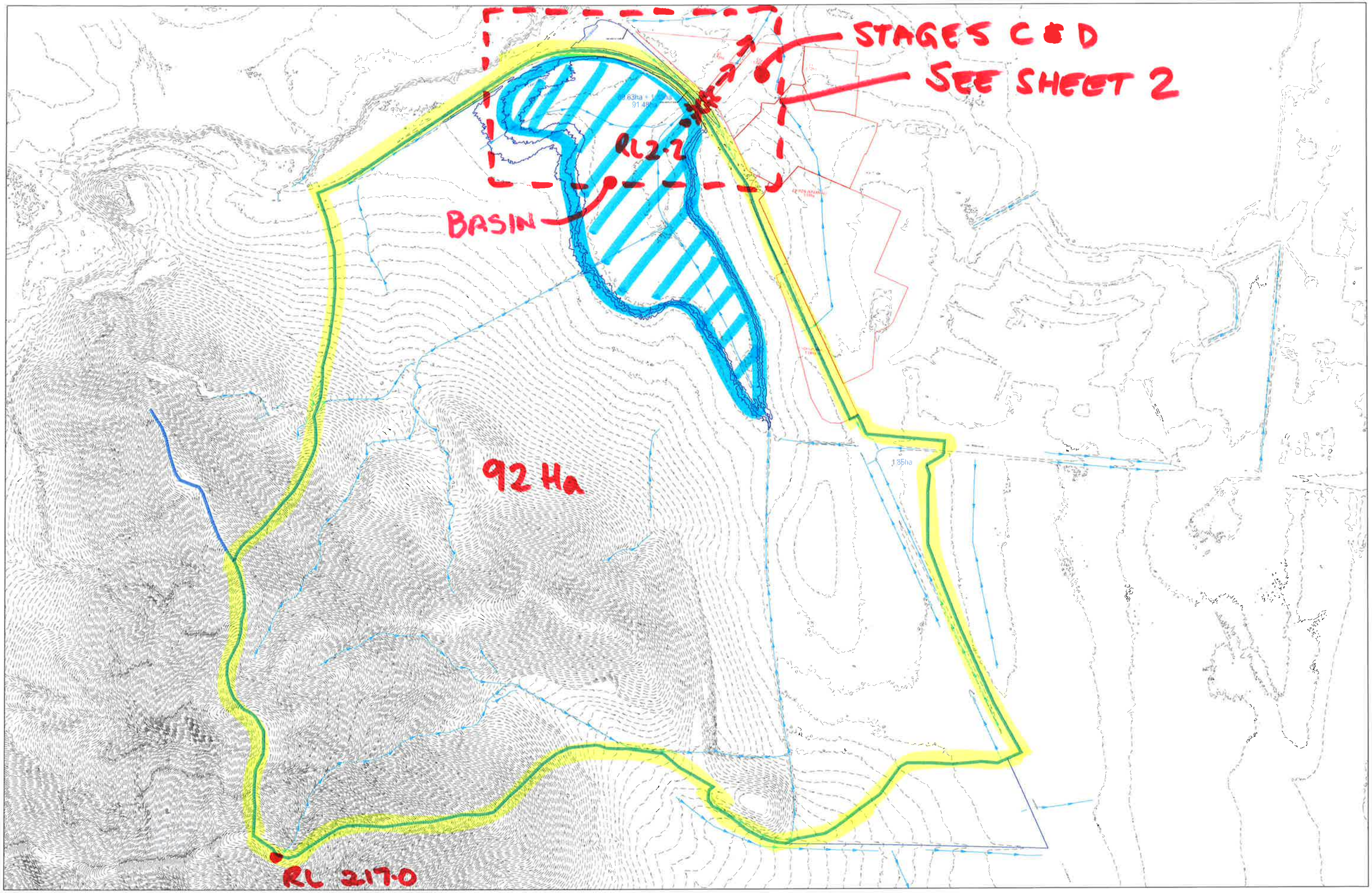
The following results have also been extracted from the basin calculations.

Q_5 peak flow rate of 5.20m^3/s (occurs at 35min ToC)

Q_5 flow rate at 20min ToC is 5.02m^3/s

Q_{100} flow rate at 20min ToC is 5.72m^3/s

Appendix A. Catchment Plan



PROJECT
OCEAN BREEZE ESTATE

TITLE
EXTERNAL CATCHMENT
SHEET 1 (OVERALL)

DATE	SCALE	PROJ. No.
12.12.18	N.T.S.	IH132900

JACOBS

ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
2 James Street
CAIRNS, QLD 4870
AUSTRALIA
Tel: +61 7 4031 4599
Fax: +61 7 4031 3967
Web: www.jacobs.com

SCALE 1:100 (A1)
1:200 (A3)
0 2 4 6 8 10m
2 1

PRELIMINARY ISSUE

SHEET 1

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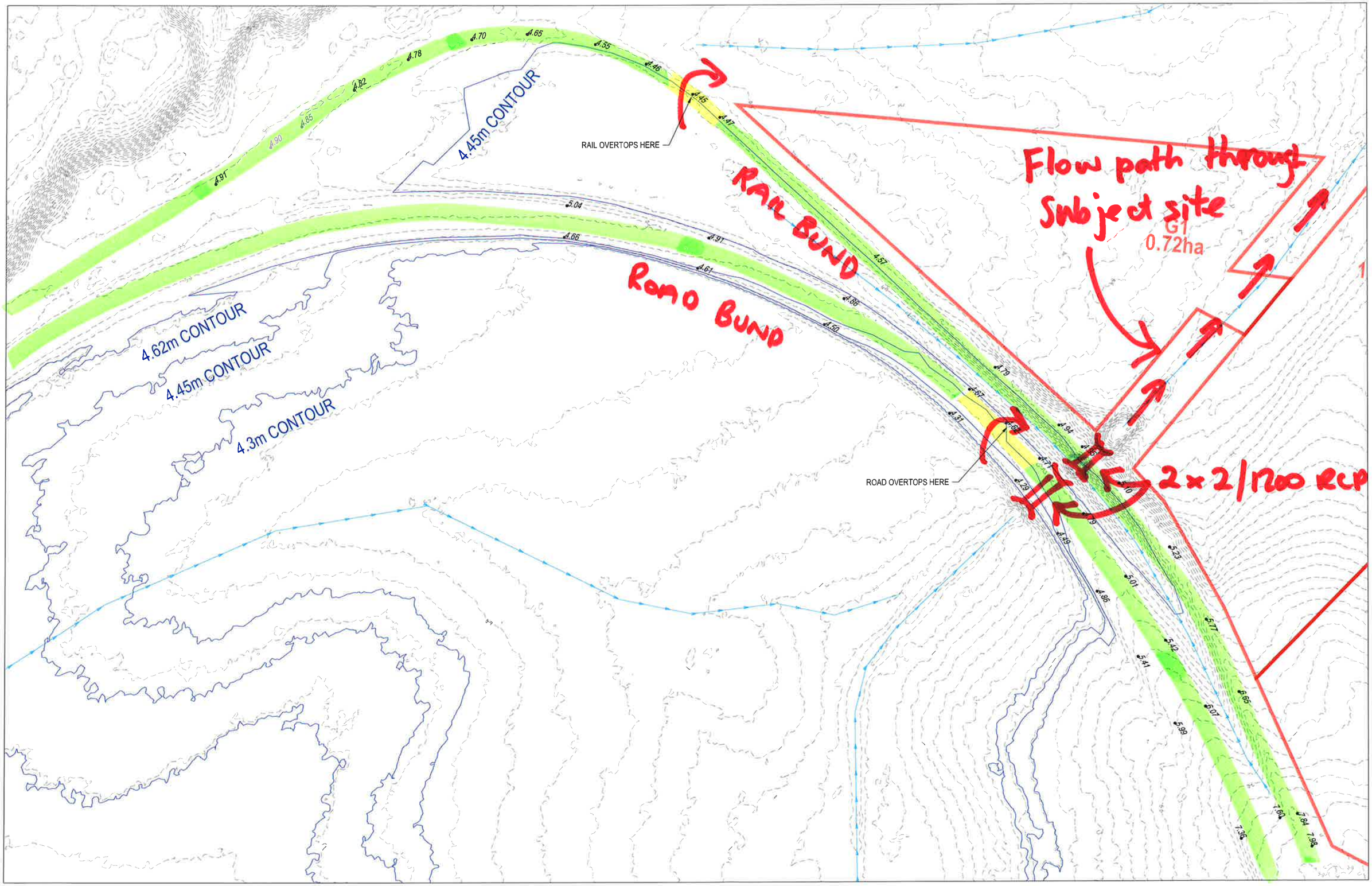

PROJECT
OCEAN BREEZE ESTATE
TITLE
EXTERNAL CATCHMENT
SHEET 2 (DETAIL)
DATE 12.12.18 SCALE N.T.S. PROJ. No IH132900

JACOBS
ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
2 James Street
CAIRNS, QLD 4870
AUSTRALIA
Tel: +61 7 4031 4599
Fax: +61 7 4031 3967
Web: www.jacobs.com

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1:4000 (A3)
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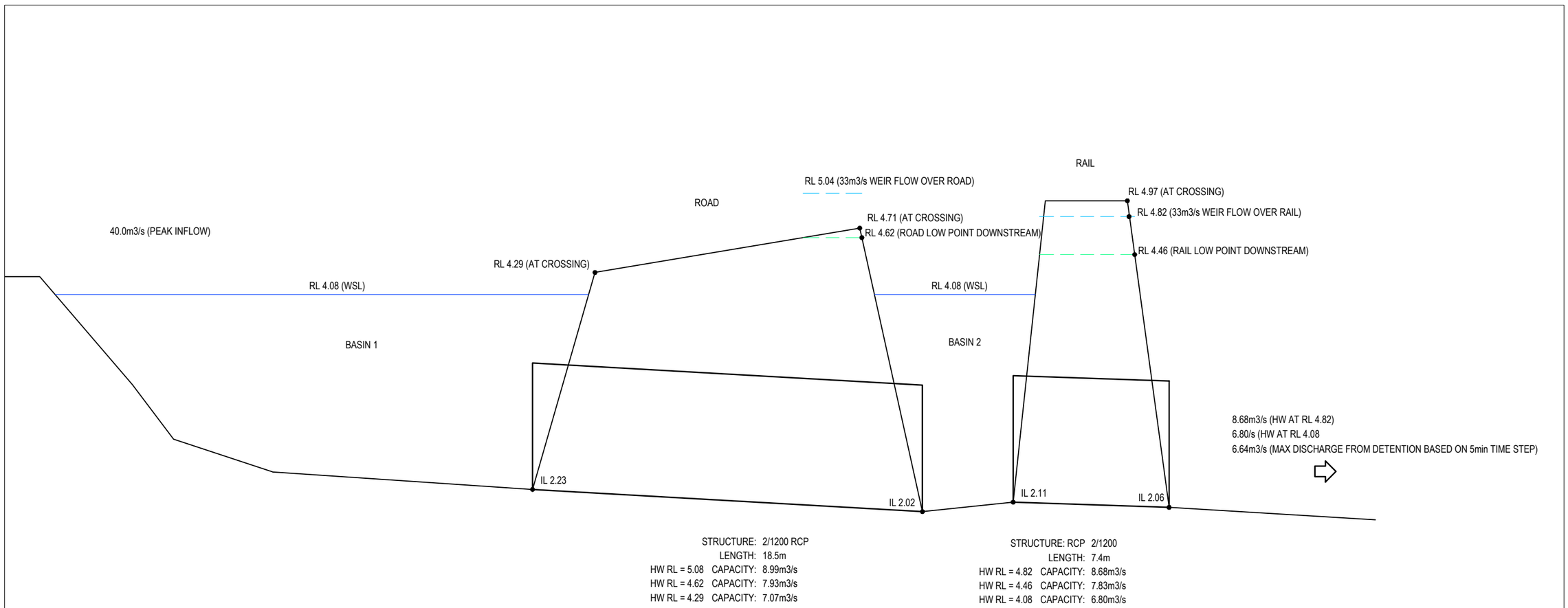
40 20

PRELIMINARY ISSUE

SHEET 2

Appendix B. Catchment Schematic



EXTERNAL DRAINAGE SCHEMATIC

PROJECT
OCEAN BREEZE ESTATE
TITLE
EXTERNAL CATCHMENT
BASIN SCHEMATIC
DATE 12.12.18
SCALE N.T.S.
PROJ. No. IH132900

JACOBS
ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
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CAIRNS, QLD 4870
AUSTRALIA
Tel: +61 7 4031 4599
Fax: +61 7 4031 3967
Web: www.jacobs.com

SCALE 1:100 (A1)
1:200 (A3)
0 2 4 6 8 10m
2 1

PRELIMINARY ISSUE

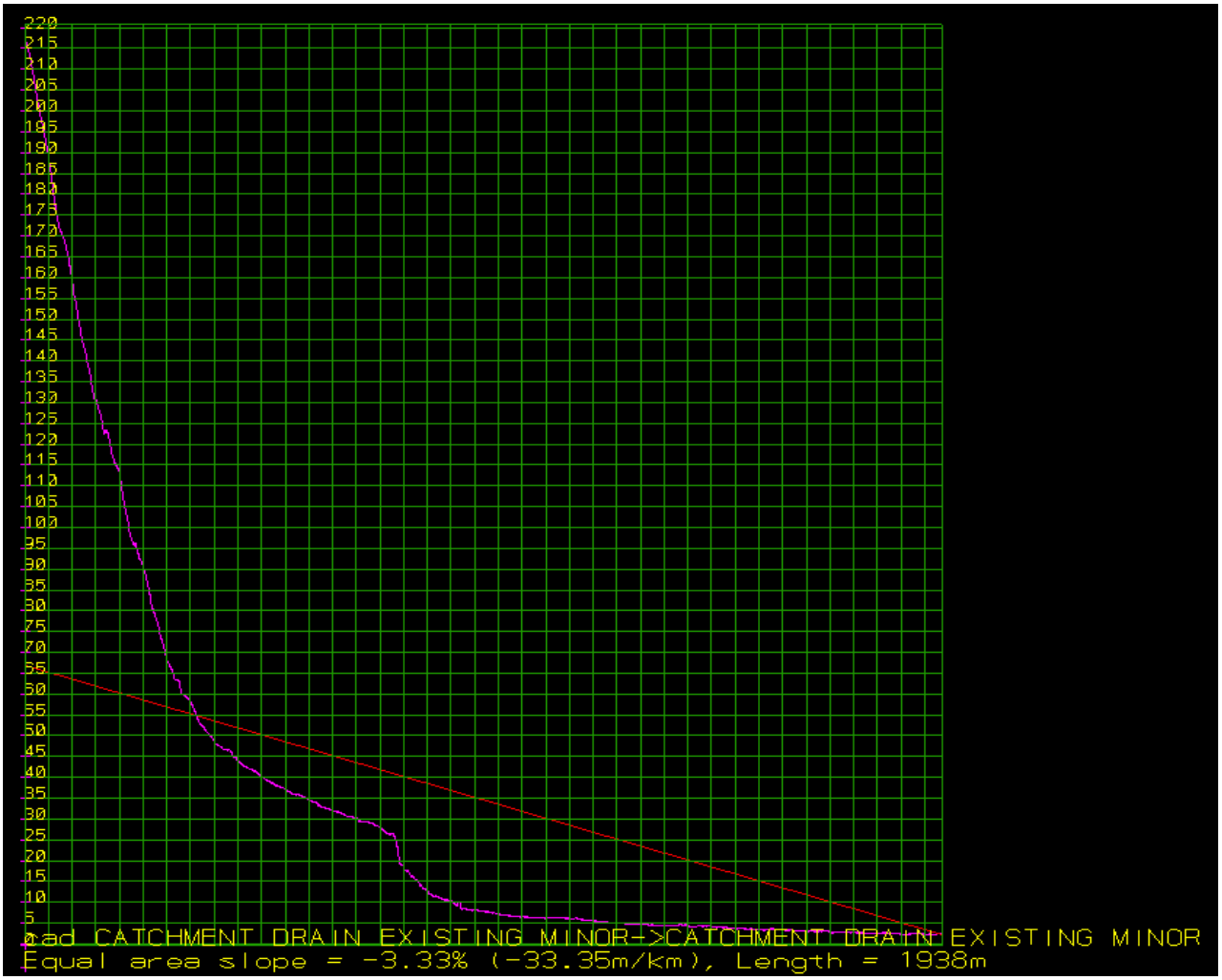
Appendix C. ToC Calculations

Bransby Williams Eq

tc = 25 L / (a 0.1 x Se 0.2) (eq 4.9 QUDM 2018)

L	=	1.938	km
A	=	91.48	Ha
Se	=	33.35	m/km

tc **=** ***35.48*** mins



Appendix D. Detention Basin Calculations

Rainfall Intensity

RETURN PERIOD	A	B	C	D	E	F	G
1	3.905673	-5.19E-01	-3.92E-02	1.00E-02	3.41E-04	-7.24E-04	7.31E-05
2	4.138775	-5.13E-01	-3.41E-02	9.57E-03	6.12E-05	-6.45E-04	6.95E-05
5	4.329513	-4.96E-01	-2.12E-02	7.38E-03	-4.17E-04	-3.09E-04	2.98E-05
10	4.424163	-4.88E-01	-1.46E-02	6.52E-03	-6.76E-04	-1.65E-04	1.45E-05
20	4.544536	-4.80E-01	-8.59E-03	5.35E-03	-8.96E-04	7.03E-06	-6.48E-06
50	4.682847	-4.71E-01	-1.96E-03	4.42E-03	-1.16E-03	1.56E-04	-2.28E-05
100	4.776829	-4.65E-01	2.49E-03	3.68E-03	-1.31E-03	2.73E-04	-3.69E-05

ARI = 100 years
C = 0.7
A = 92 ha

$$\ln({}^{t}I_{ARI}) = A + B\,x\,(\ln(t)) + C\,x\,(\ln(t))^{2} + D\,x\,(\ln(t))^{3} + E\,x\,(\ln(t))^{4} + F\,x\,(\ln(t))^{5} + G\,x\,(\ln(t))^{6}$$

Max Depth = 1.949

Max Outlet = 2046.00 m3/5min
6.82 m3/s

Rainfall Intensity

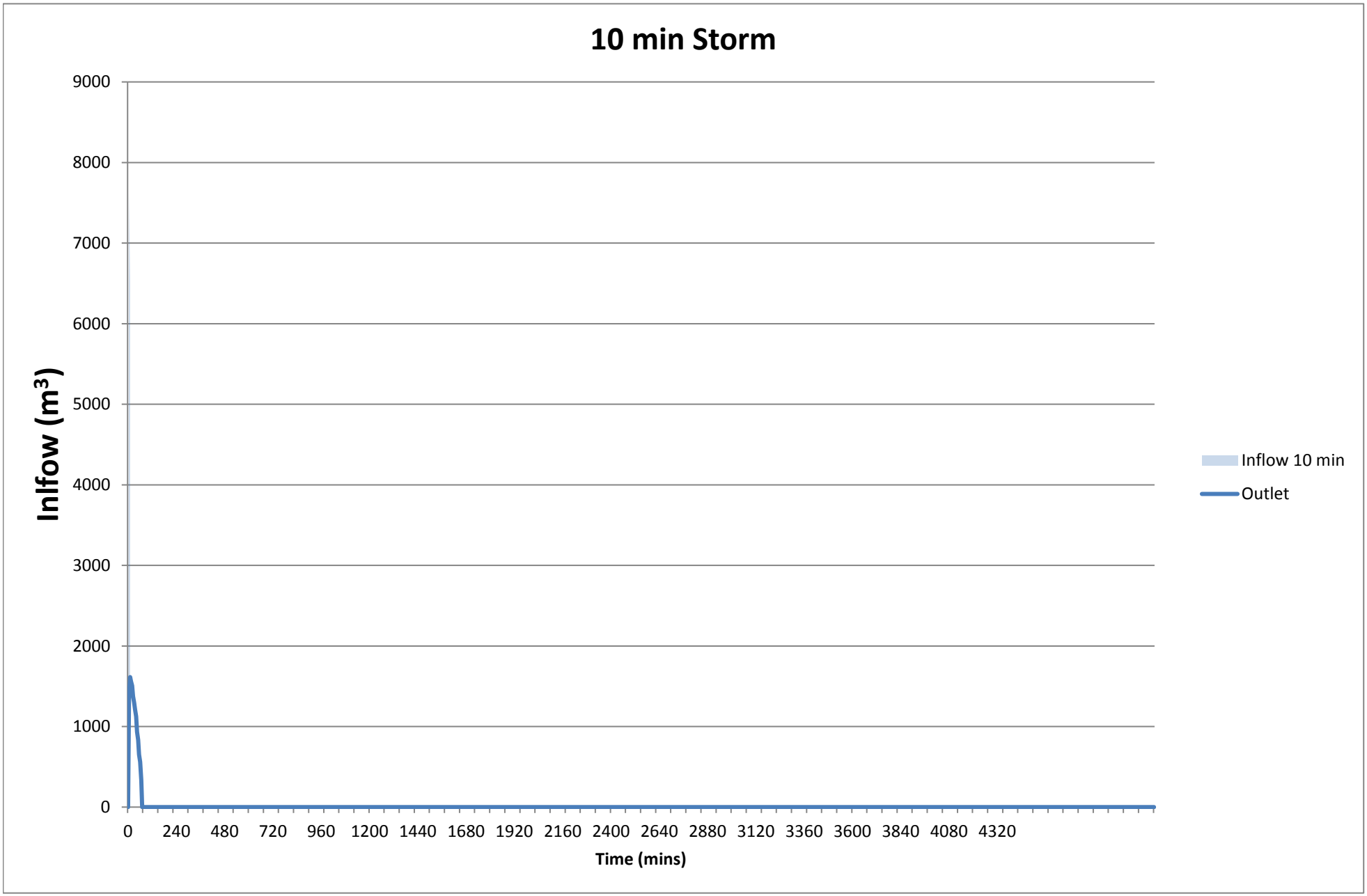
RETURN PERIOD	A	B	C	D	E	F	G
1	3.905673	-5.19E-01	-3.92E-02	1.00E-02	3.41E-04	-7.24E-04	7.31E-05
2	4.138775	-5.13E-01	-3.41E-02	9.57E-03	6.12E-05	-6.45E-04	6.95E-05
5	4.329513	-4.96E-01	-2.12E-02	7.38E-03	-4.17E-04	-3.09E-04	2.98E-05
10	4.424163	-4.88E-01	-1.46E-02	6.52E-03	-6.76E-04	-1.65E-04	1.45E-05
20	4.544536	-4.80E-01	-8.59E-03	5.35E-03	-8.96E-04	7.03E-06	-6.48E-06
50	4.682847	-4.71E-01	-1.96E-03	4.42E-03	-1.16E-03	1.56E-04	-2.28E-05
100	4.776829	-4.65E-01	2.49E-03	3.68E-03	-1.31E-03	2.73E-04	-3.69E-05

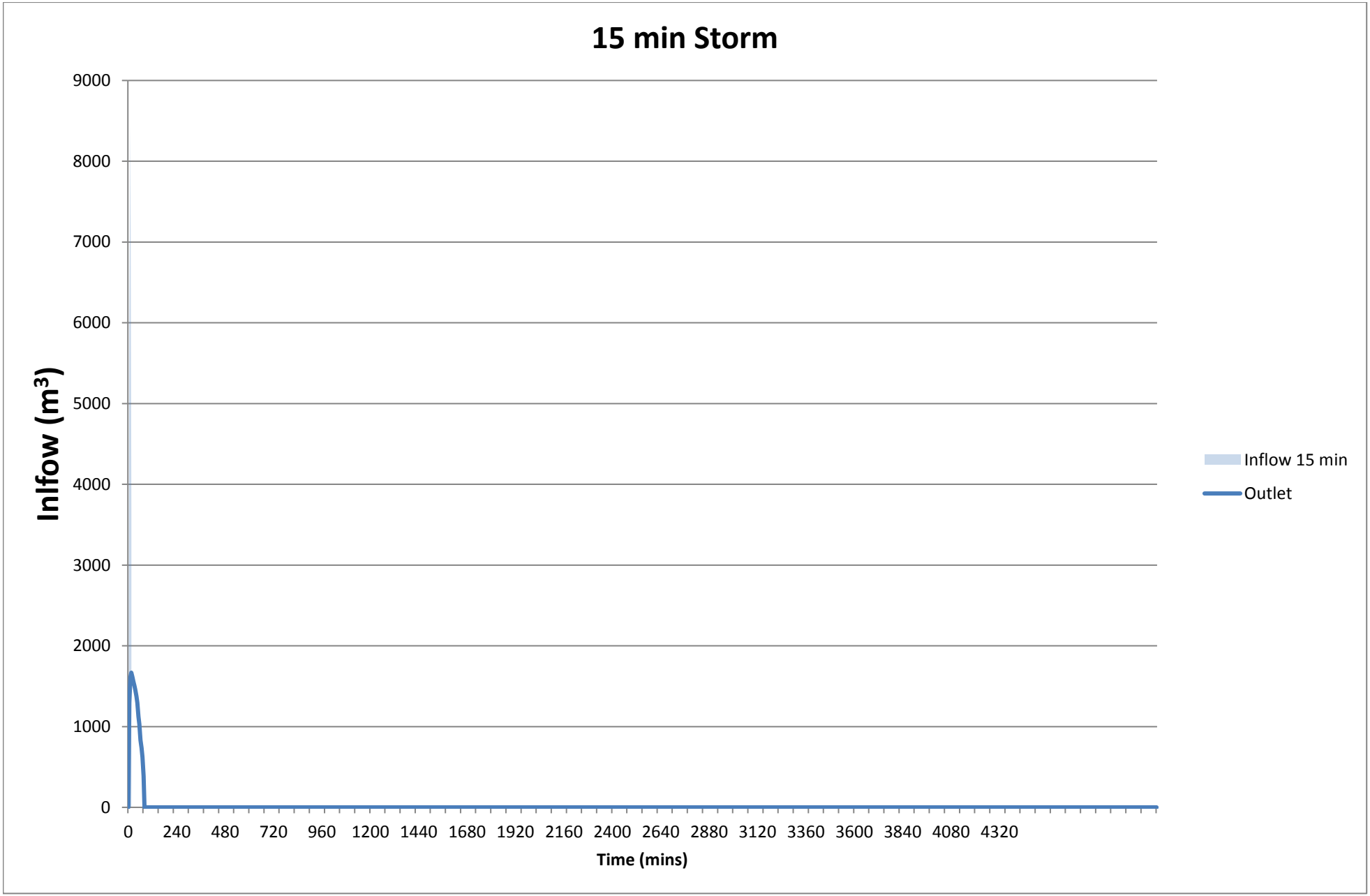
ARI = 100 years
C = 0.7
A = 92 ha

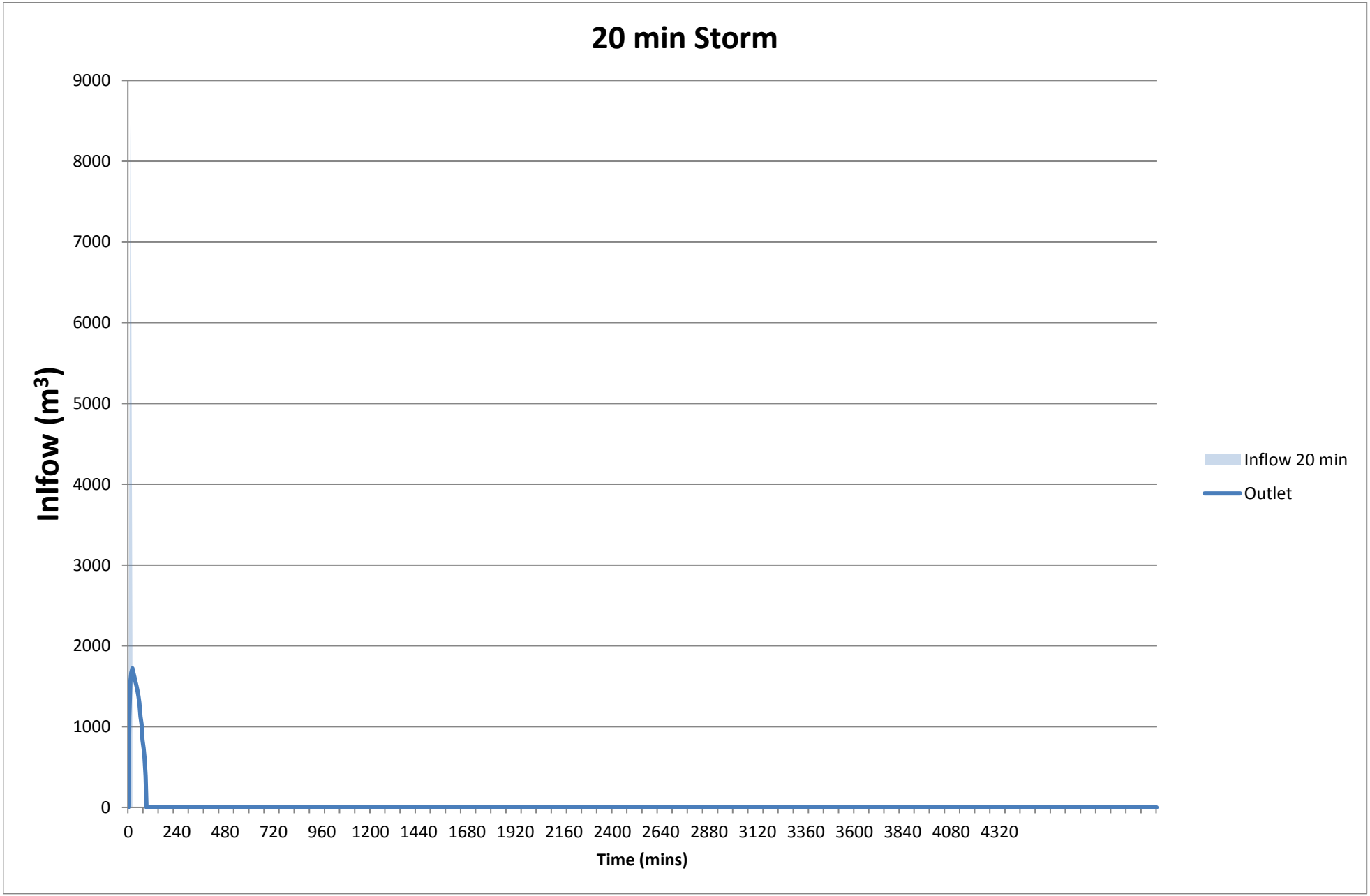
$$\ln({}^{t}I_{ARI}) = A + B\,x\,(\ln(t)) + C\,x\,(\ln(t))^{2} + D\,x\,(\ln(t))^{3} + E\,x\,(\ln(t))^{4} + F\,x\,(\ln(t))^{5} + G\,x\,(\ln(t))^{6}$$

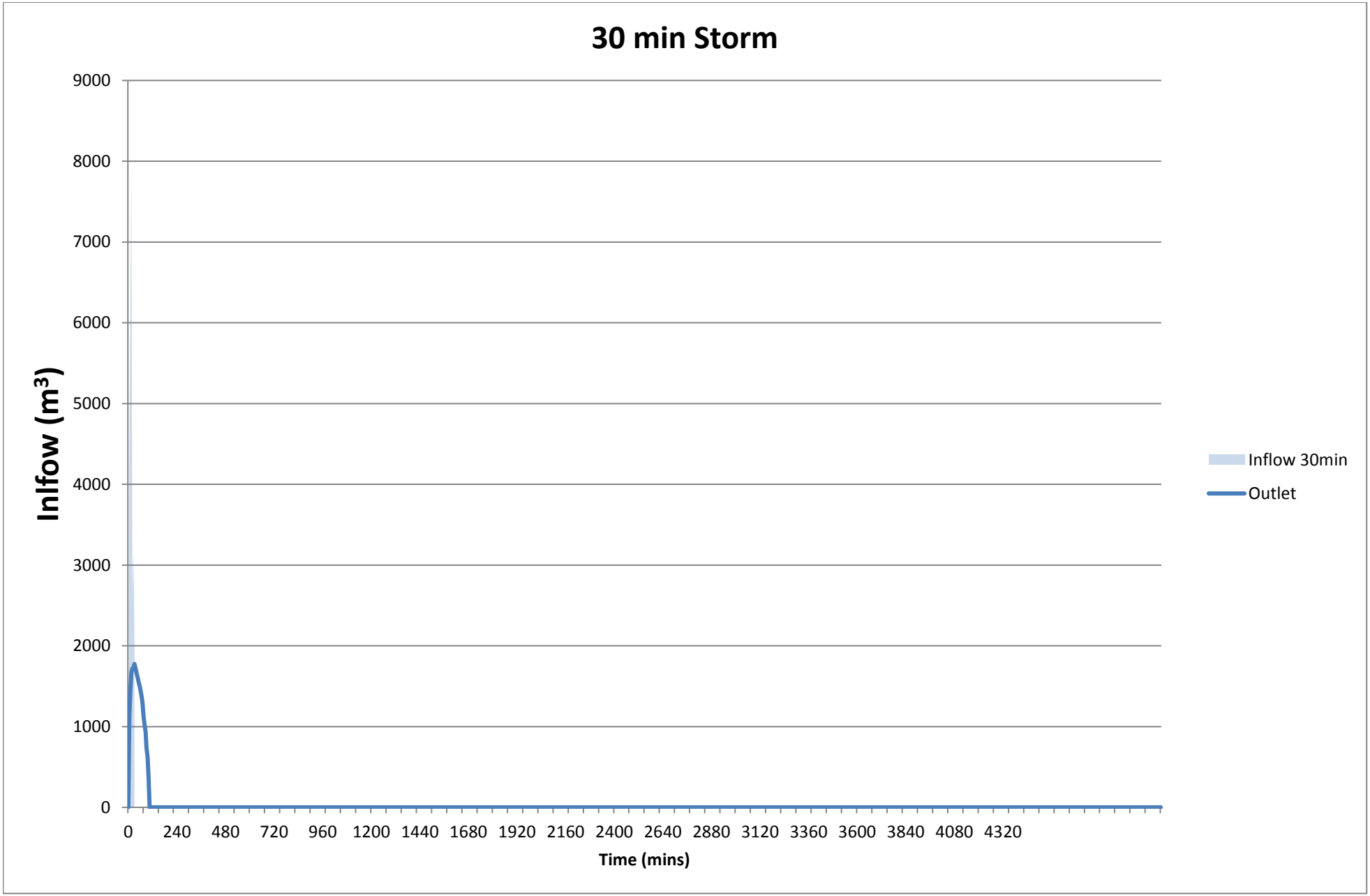
Max Depth = 1.949

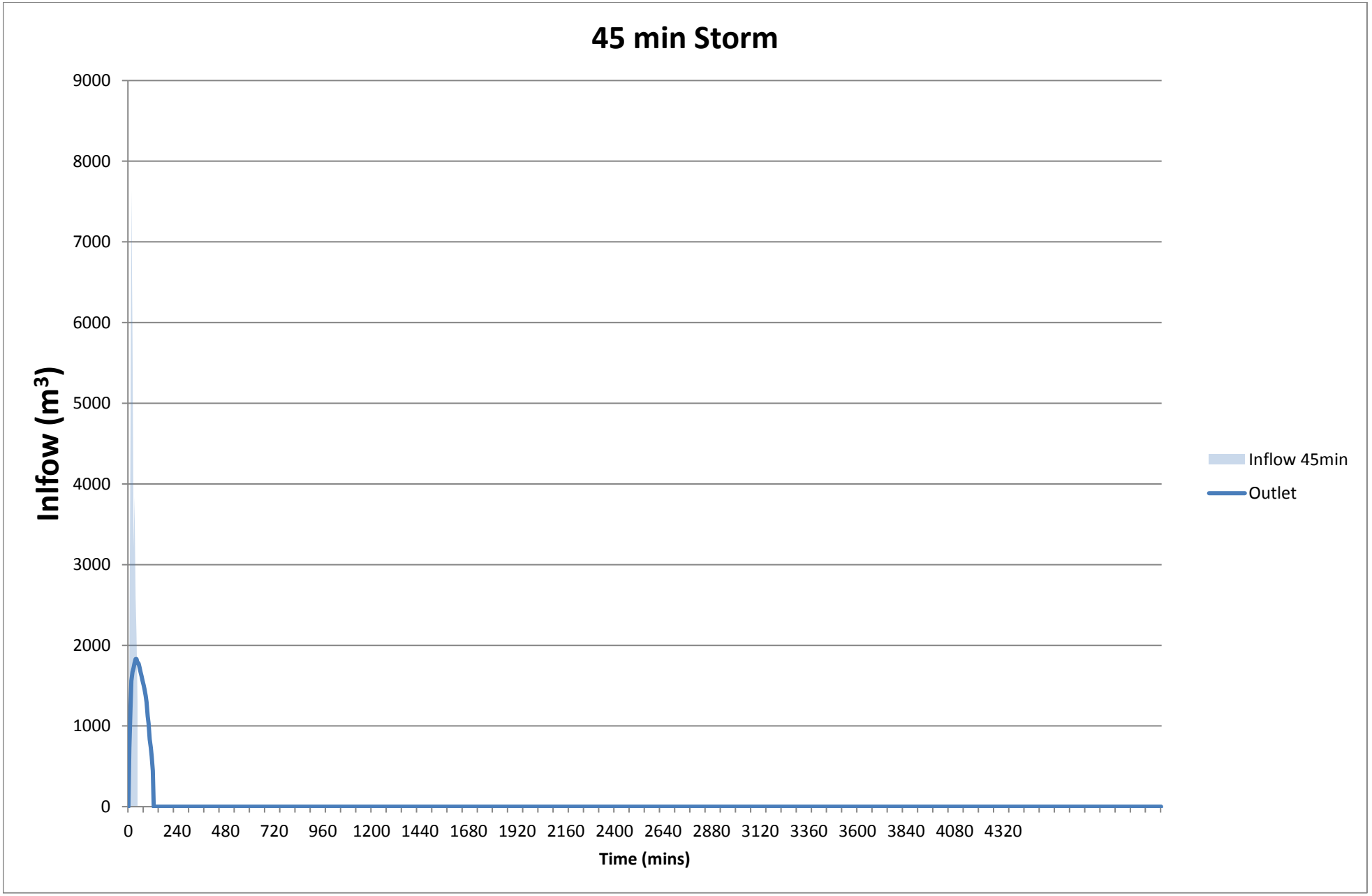
Max Outlet = 2046.00 m3/5min
6.82 m3/s

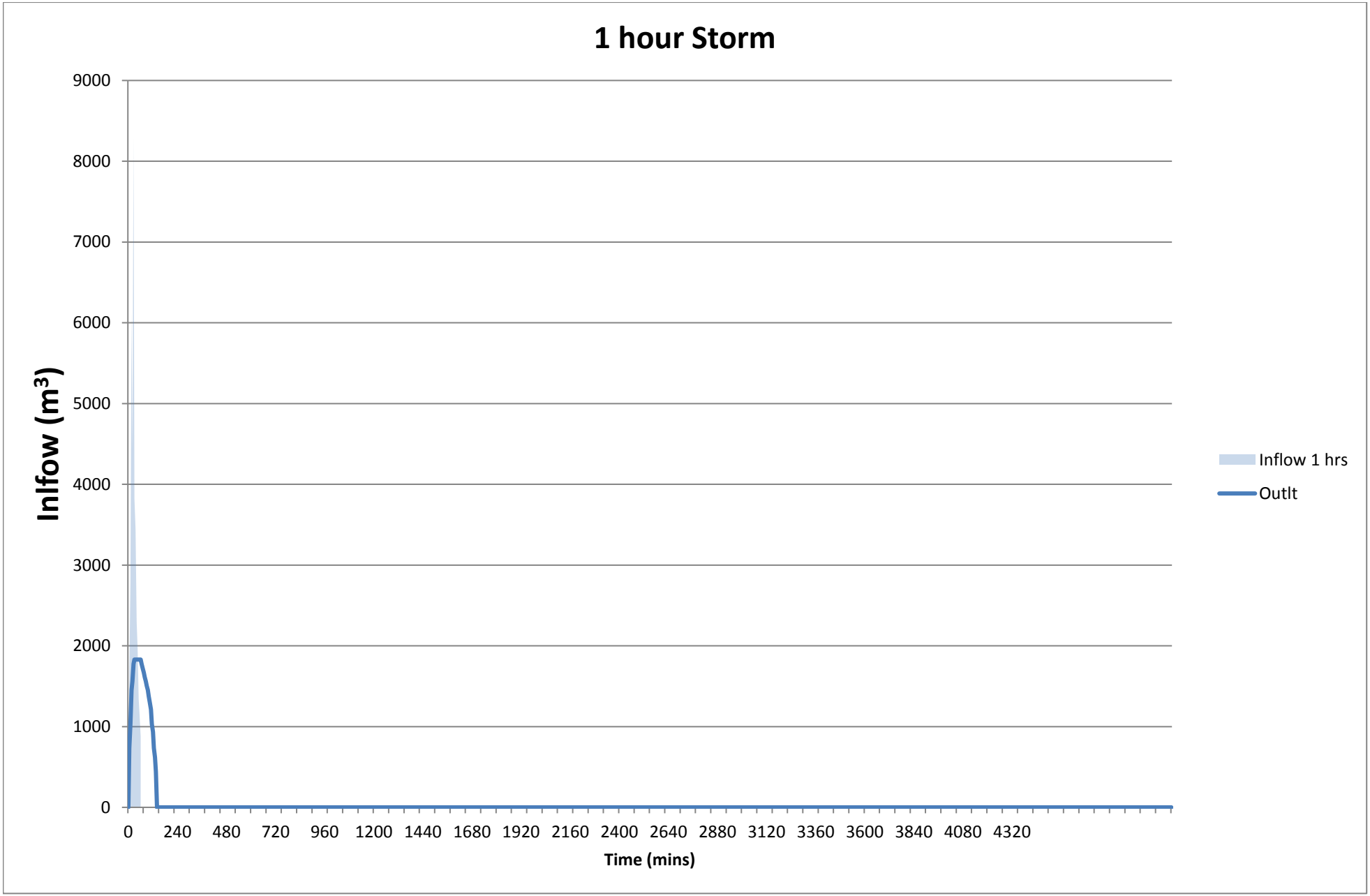

10 min Storm
Inlfow (m³)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 10 min
Outlet

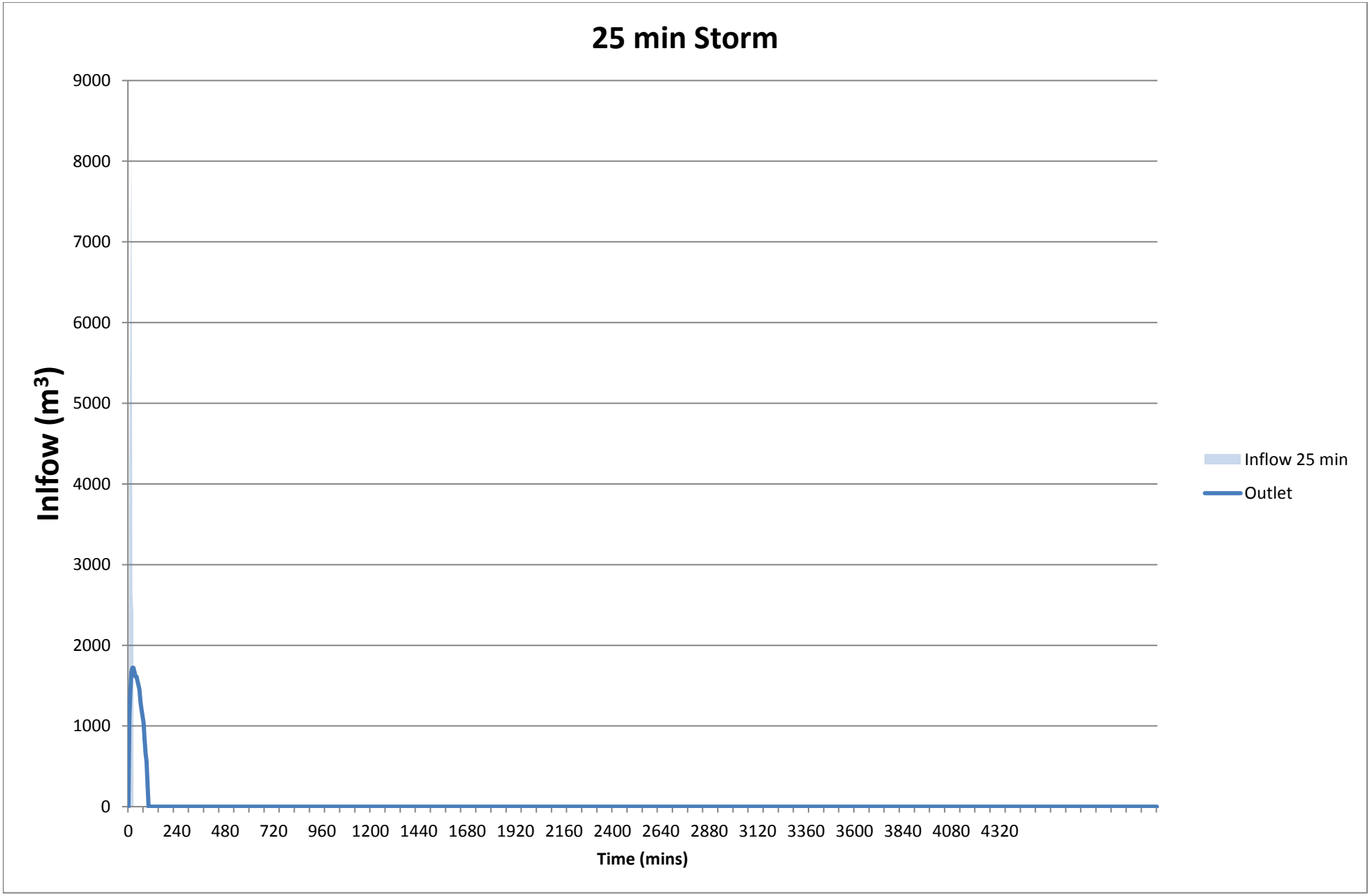

15 min Storm
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Inlfow (m³)
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 15 min
Outlet

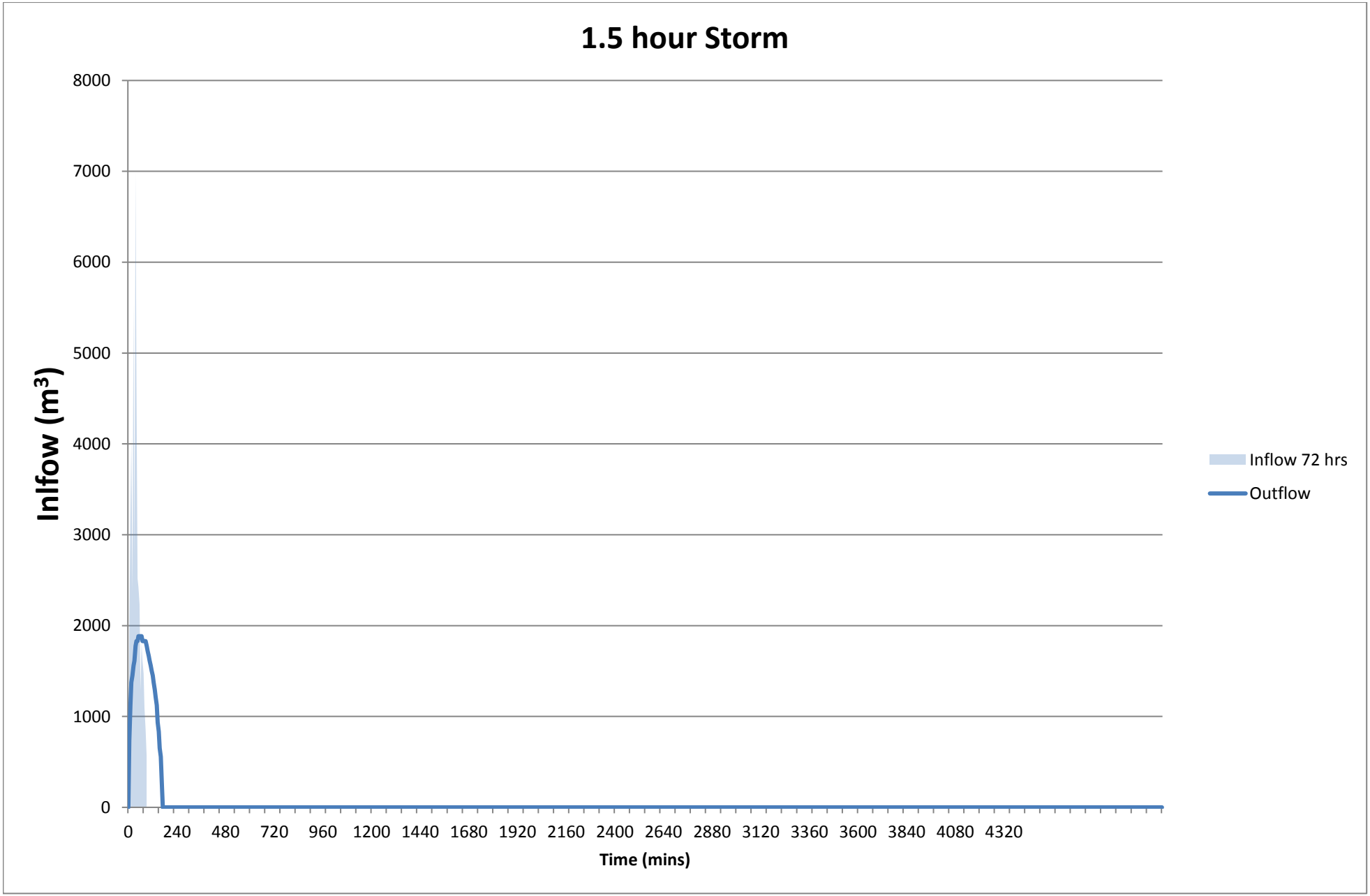

20 min Storm
Inlfow (m³)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 20 min
Outlet

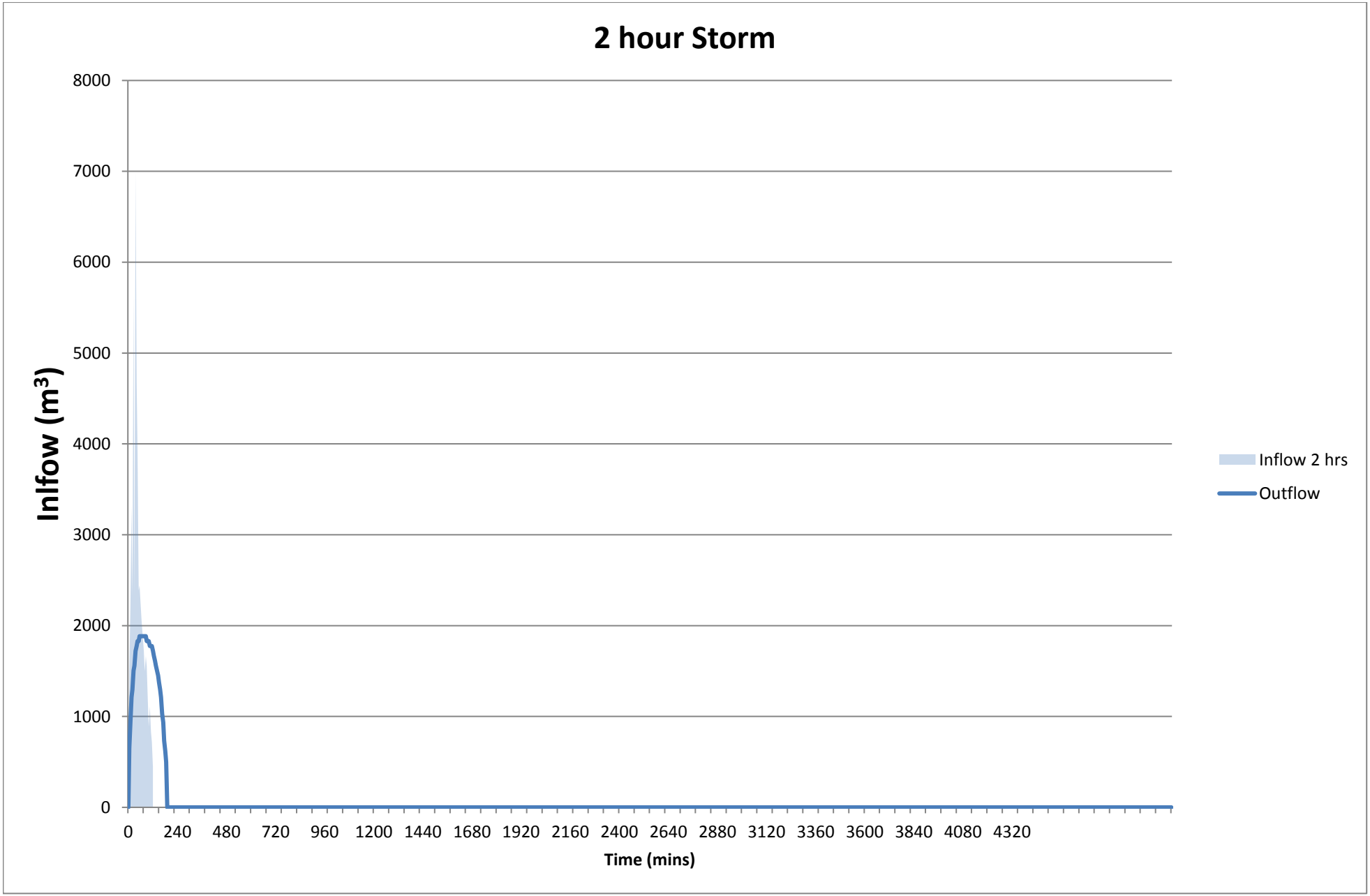

30 min Storm
Inlfow (m³)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 30min
Outlet

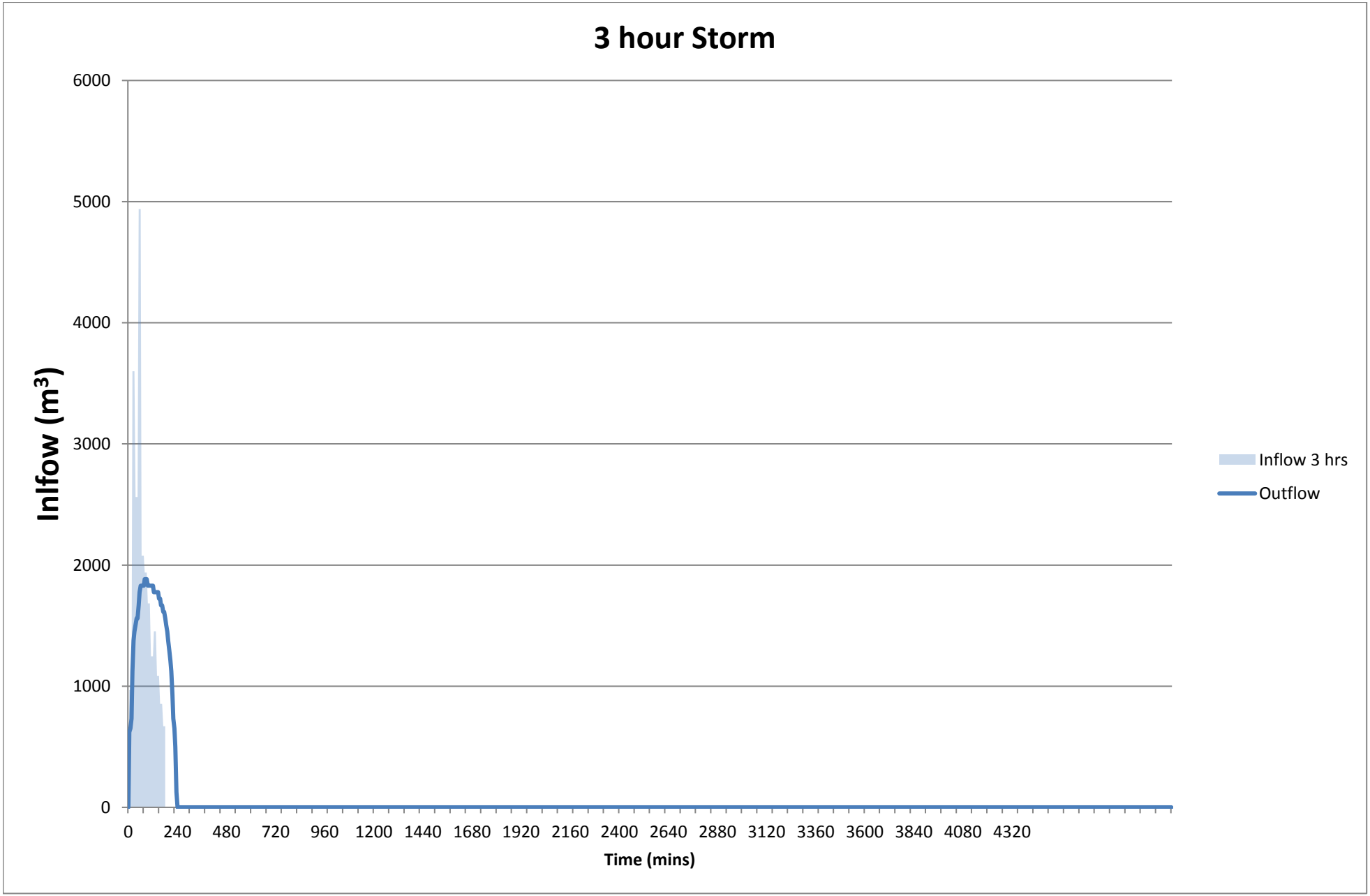

45 min Storm
Inlfow (m³)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 45min
Outlet

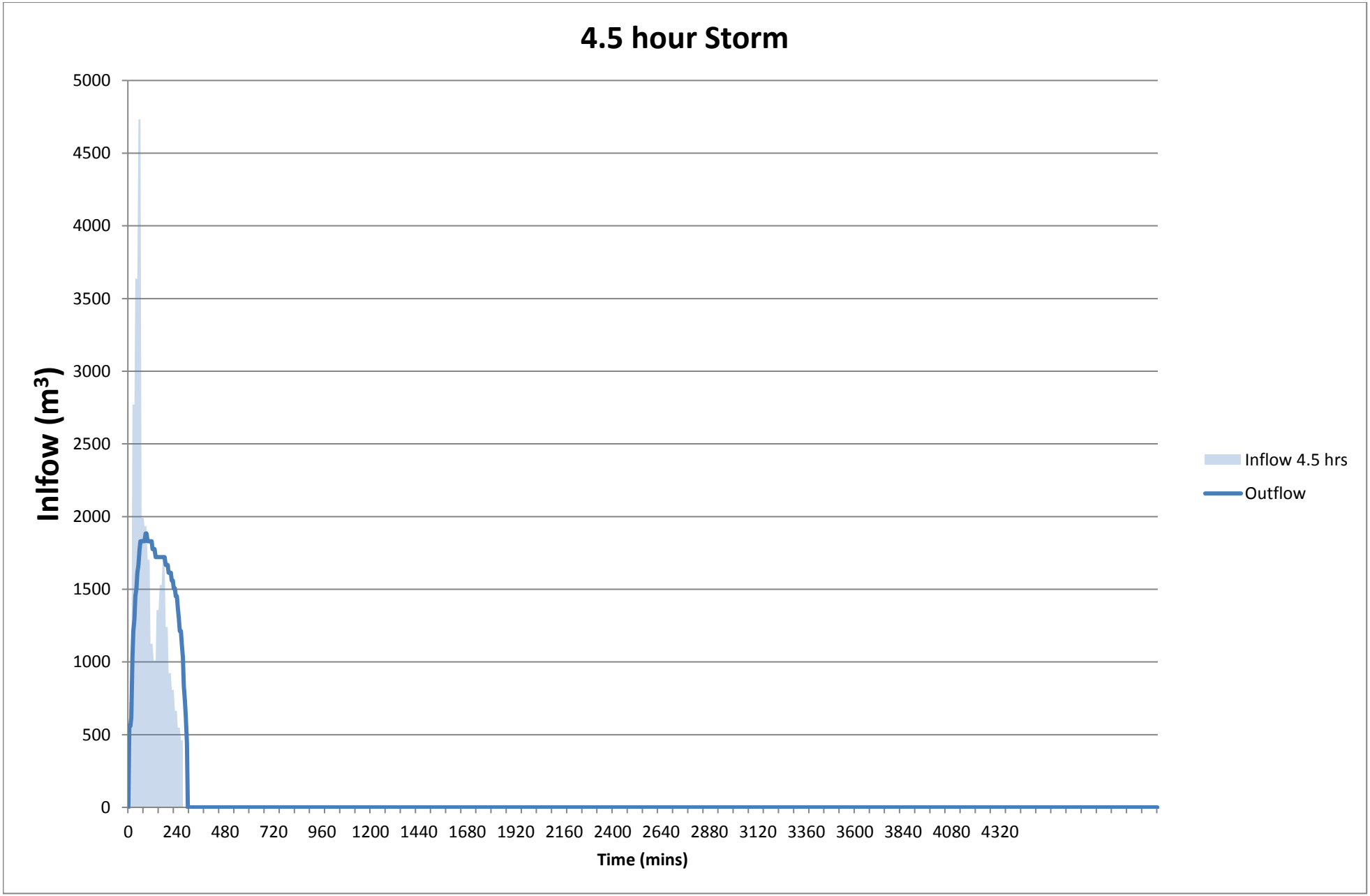

1 hour Storm
Inlfow (m³)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 1 hrs
Outlt

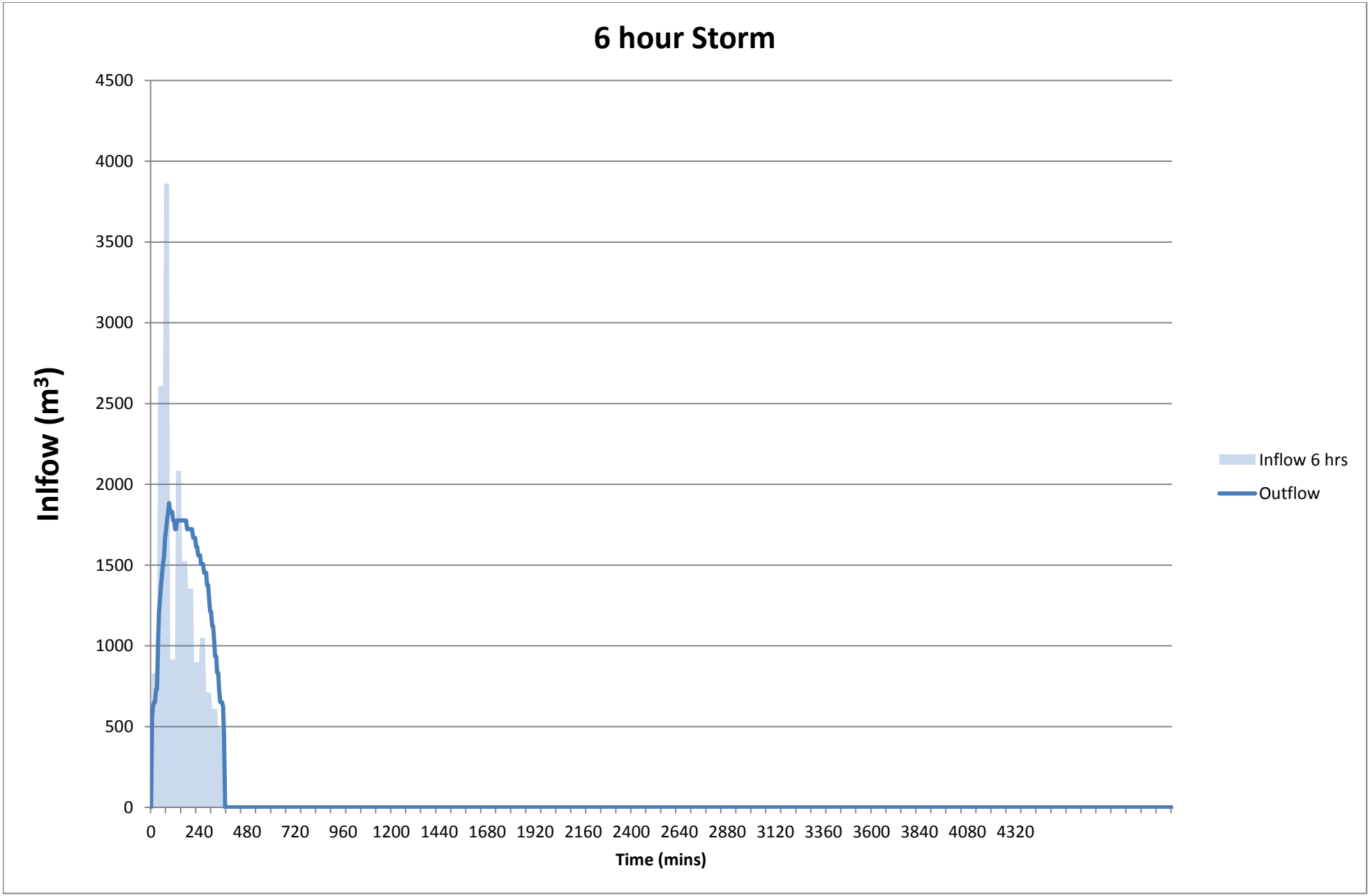

25 min Storm
Inlfow (m³)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 25 min
Outlet

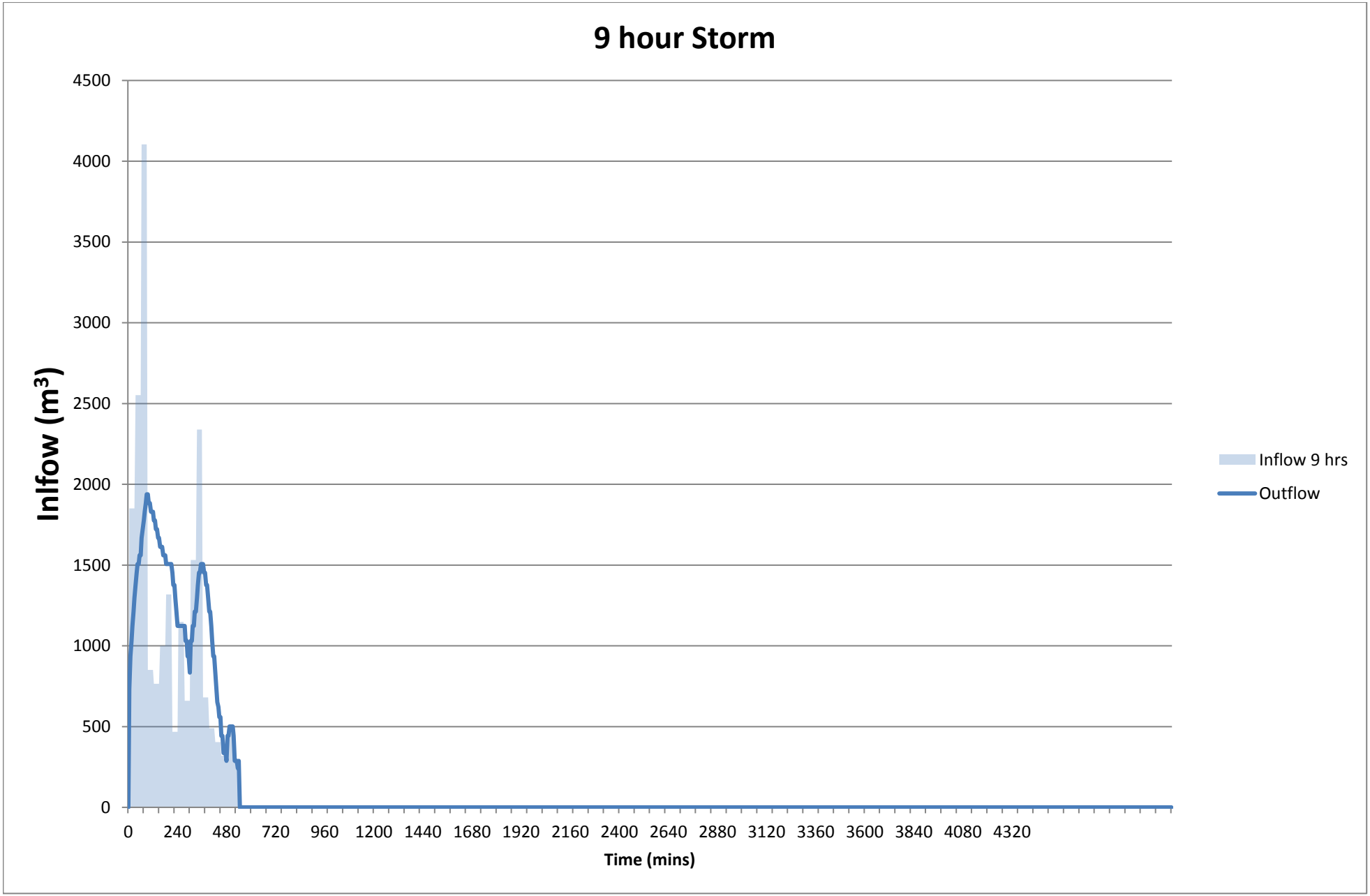

1.5 hour Storm
Inlfow (m³)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 72 hrs
Outflow

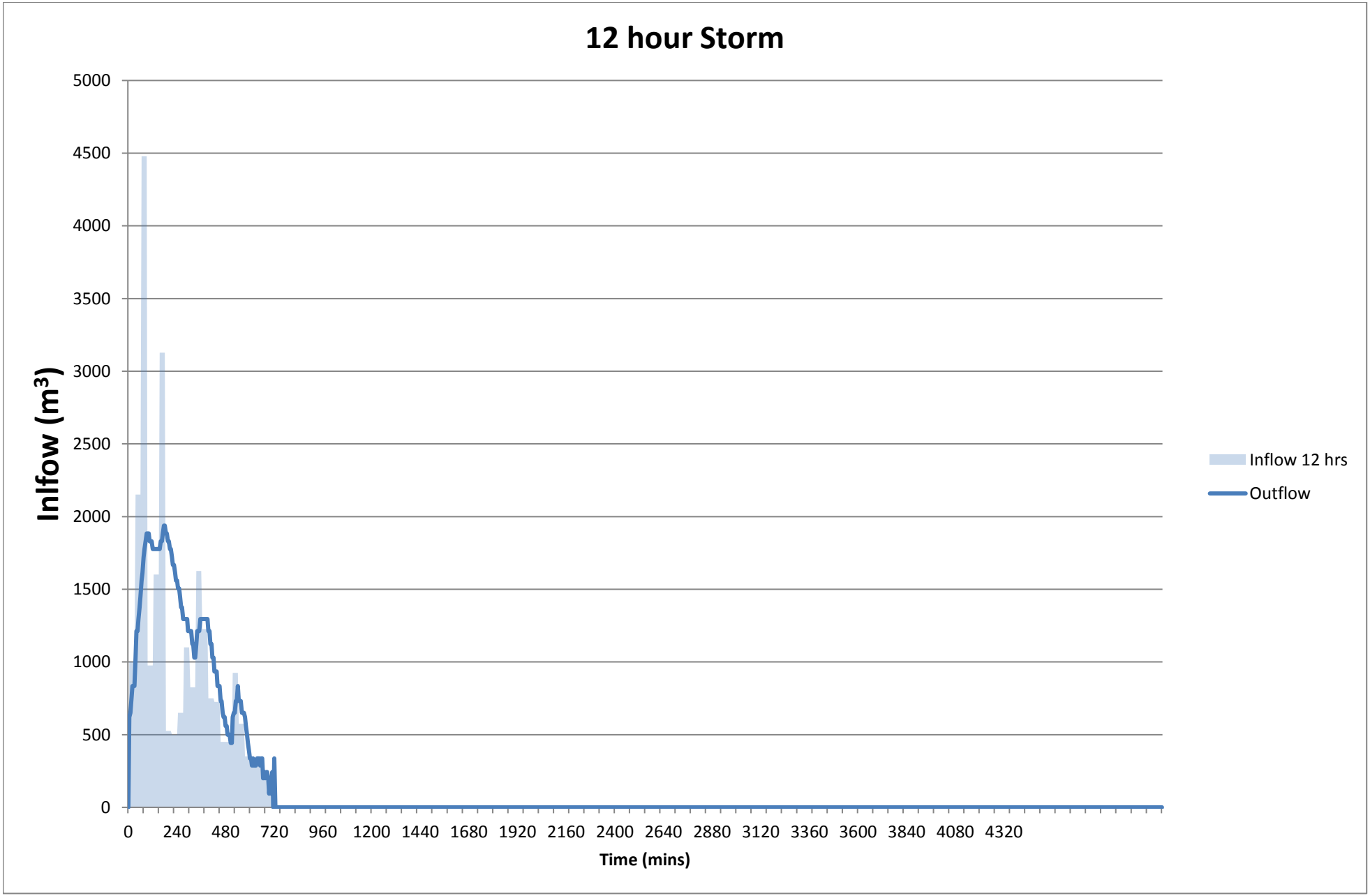

2 hour Storm
Inlfow (m³)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 2 hrs
Outflow

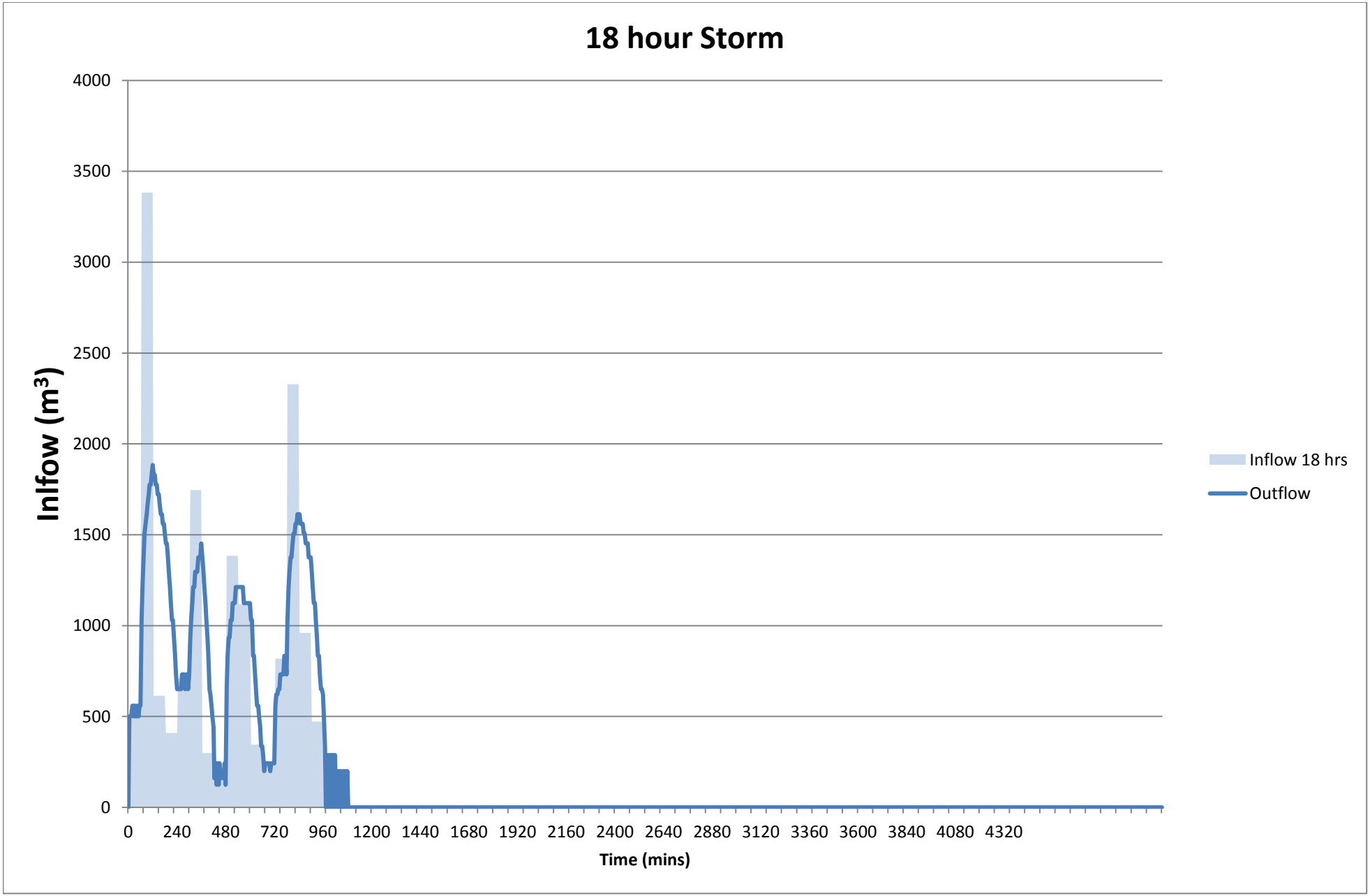

3 hour Storm
Inlfow (m³)
6000
5000
4000
3000
2000
1000
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 3 hrs
Outflow

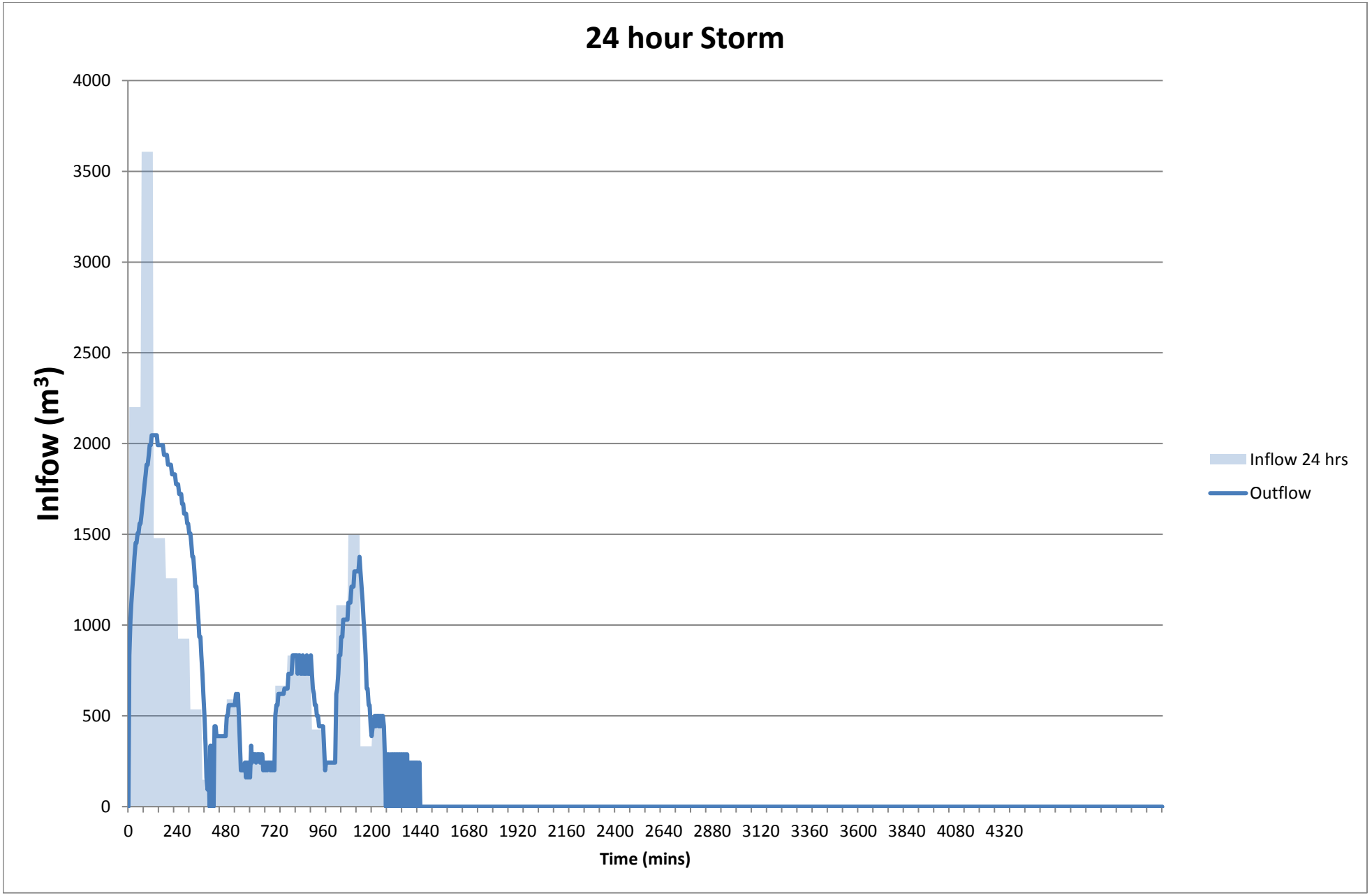

4.5 hour Storm
Inlfow (m³)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 4.5 hrs
Outflow

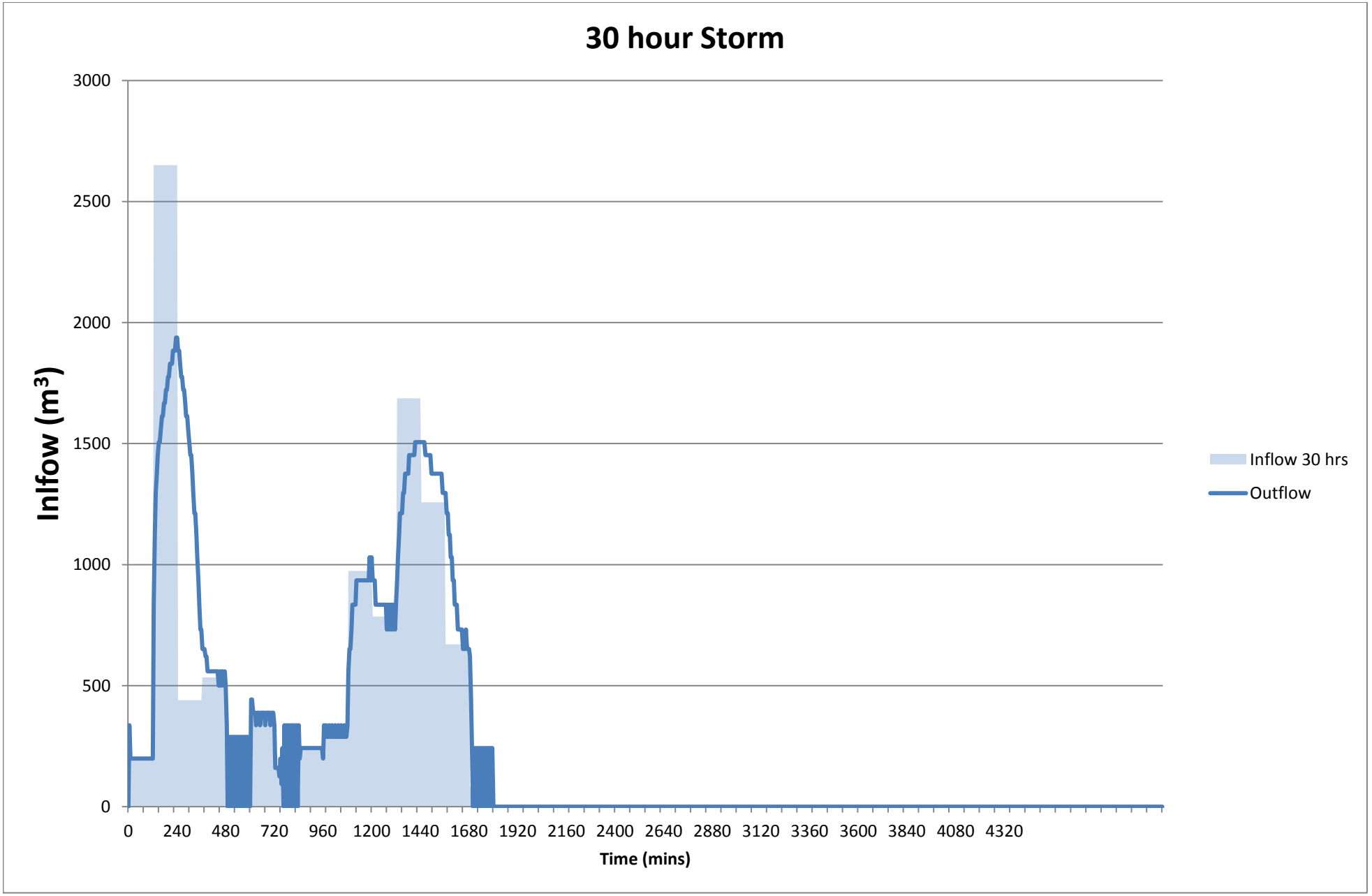

6 hour Storm
Inlfow (m³)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0 240 480 720 960 1200 1440 1680 1920 2160 2400 2640 2880 3120 3360 3600 3840 4080 4320
Time (mins)
Inflow 6 hrs
Outflow

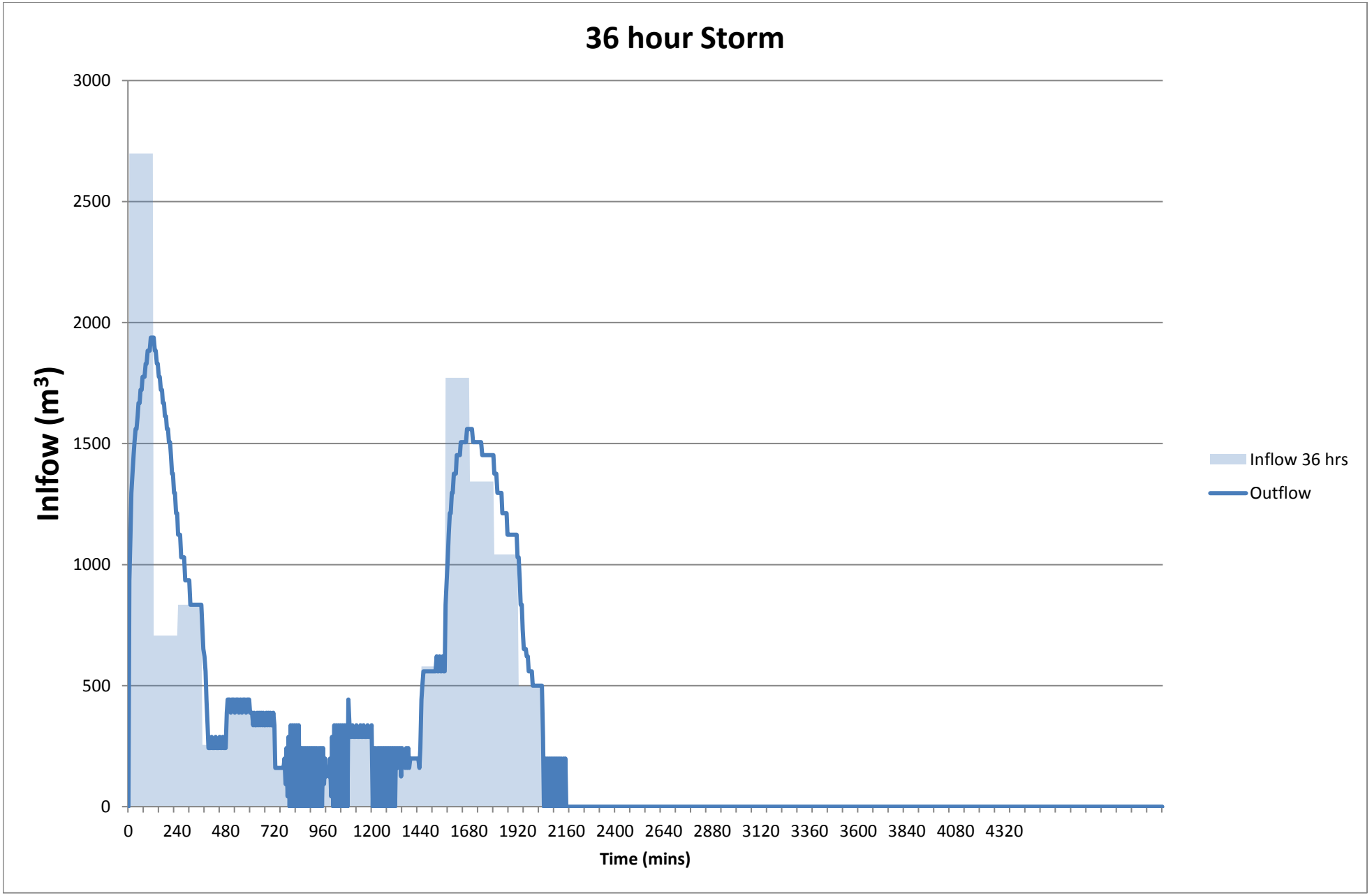

9 hour Storm
Inlfow (m³)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 9 hrs
Outflow

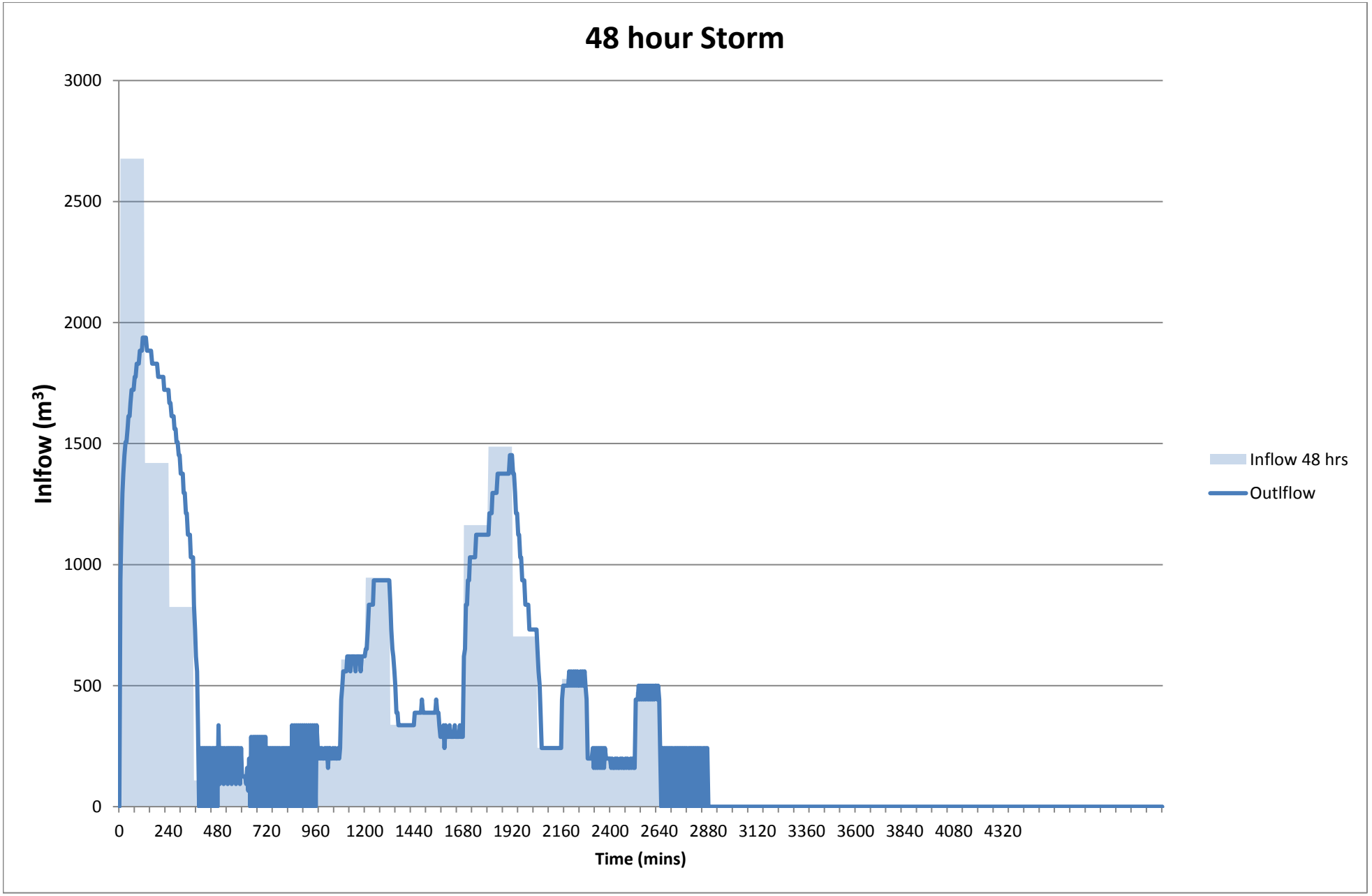

12 hour Storm
Inlfow (m³)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 12 hrs
Outflow

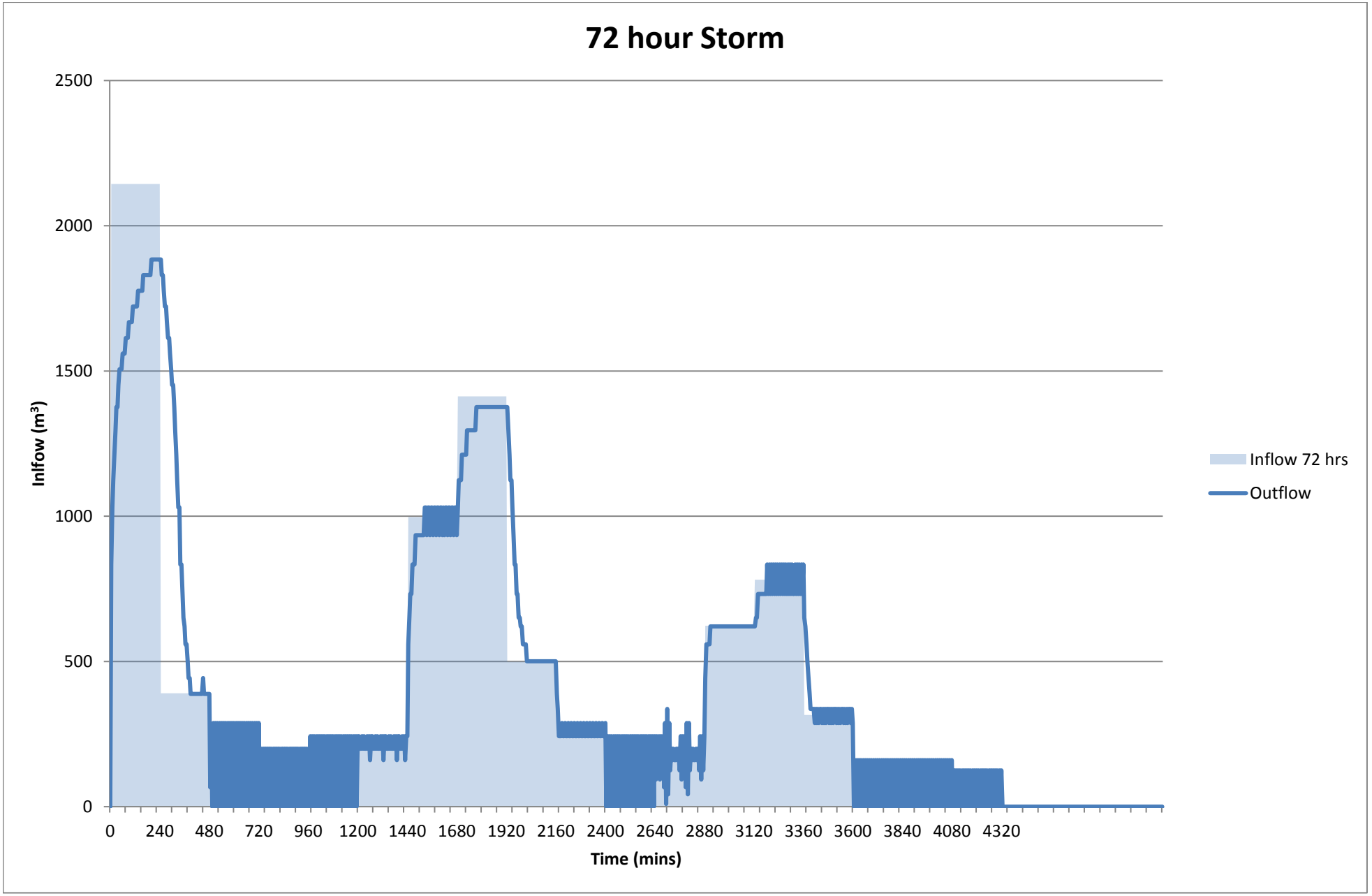

18 hour Storm
Inlfow (m³)
4000
3500
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 18 hrs
Outflow


24 hour Storm
Inlfow (m³)
4000
3500
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 24 hrs
Outflow

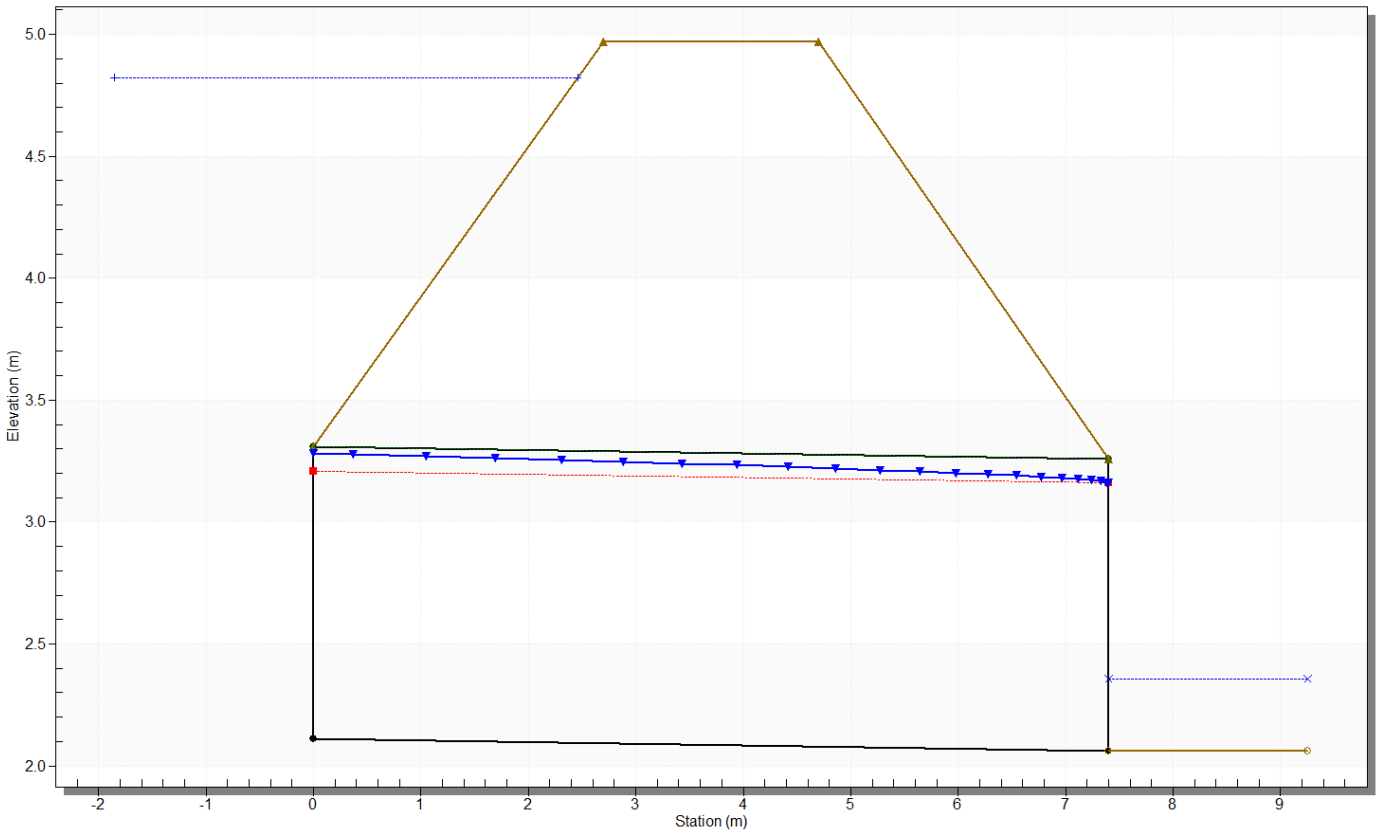

30 hour Storm
Inlfow (m³)
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 30 hrs
Outflow


36 hour Storm
Inlfow (m³)
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 36 hrs
Outflow

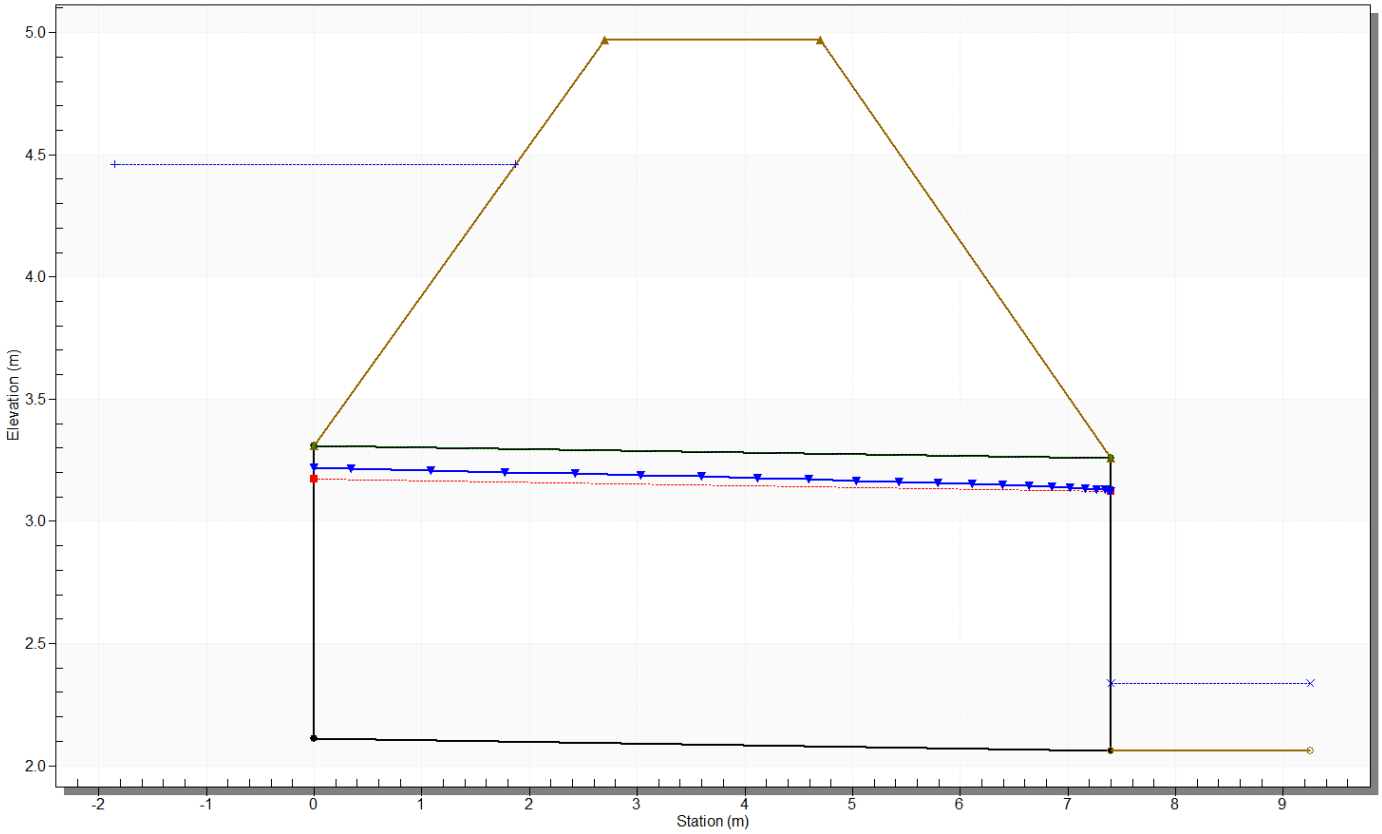

48 hour Storm
Inlfow (m³)
3000
2500
2000
1500
1000
500
0
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 48 hrs
Outlflow


72 hour Storm
2500
2000
1500
1000
500
0
Inlfow (m³)
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
Time (mins)
Inflow 72 hrs
Outflow

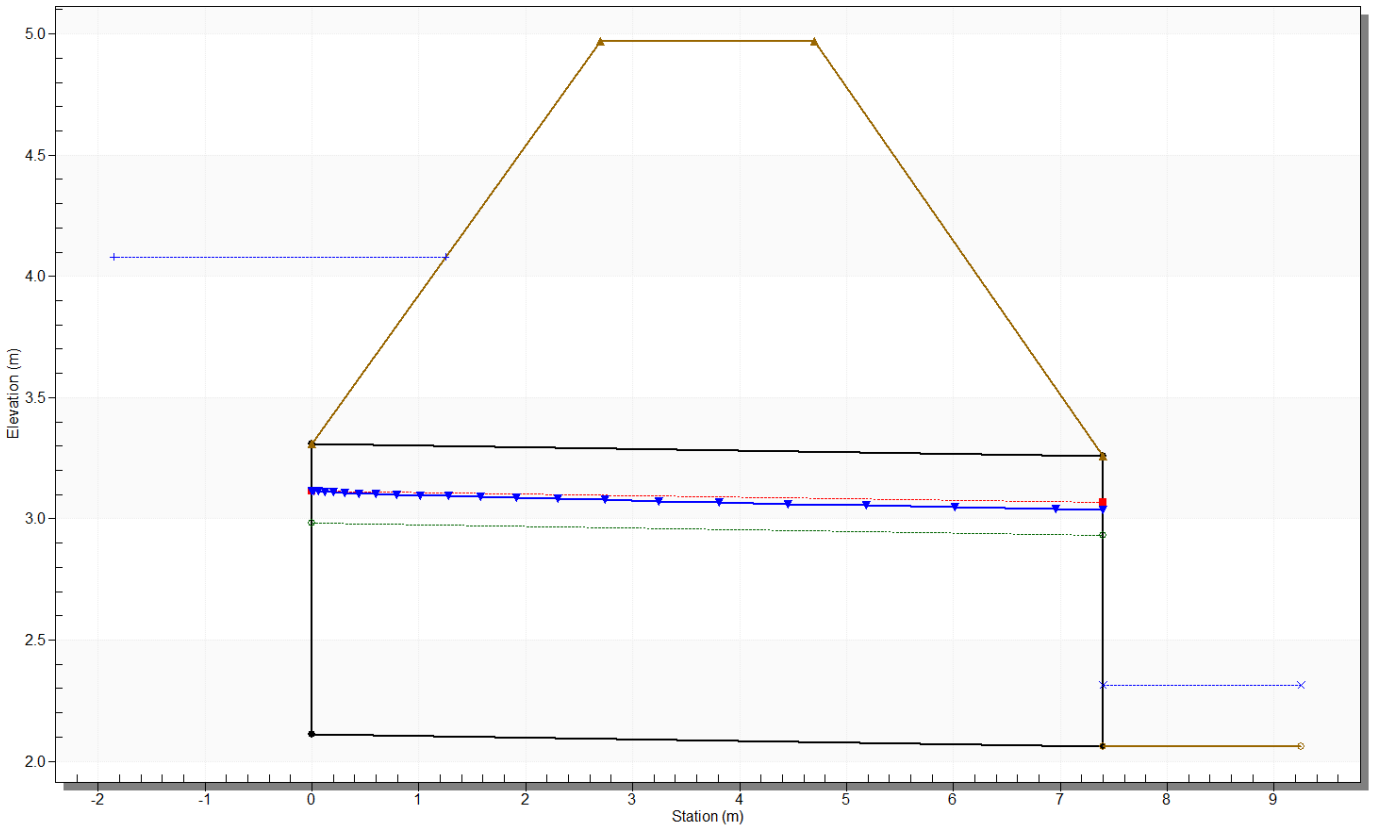
Appendix E. Cross Drainage Pipe Flow Calculations & Weir Flow Calculations



Headwater Elevation (m)	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.82	8.68	8.68	0.00	1
4.97	9.01	9.01	0.00	Overtopping



Headwater Elevation (m)	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.46	7.83	7.83	0.00	1
4.97	9.01	9.01	0.00	Overtopping



Crossing - EX-2/1200-02-RAIL, Design Discharge - 6.80 cms

Culvert - Culvert 1, Culvert Discharge - 6.80 cms

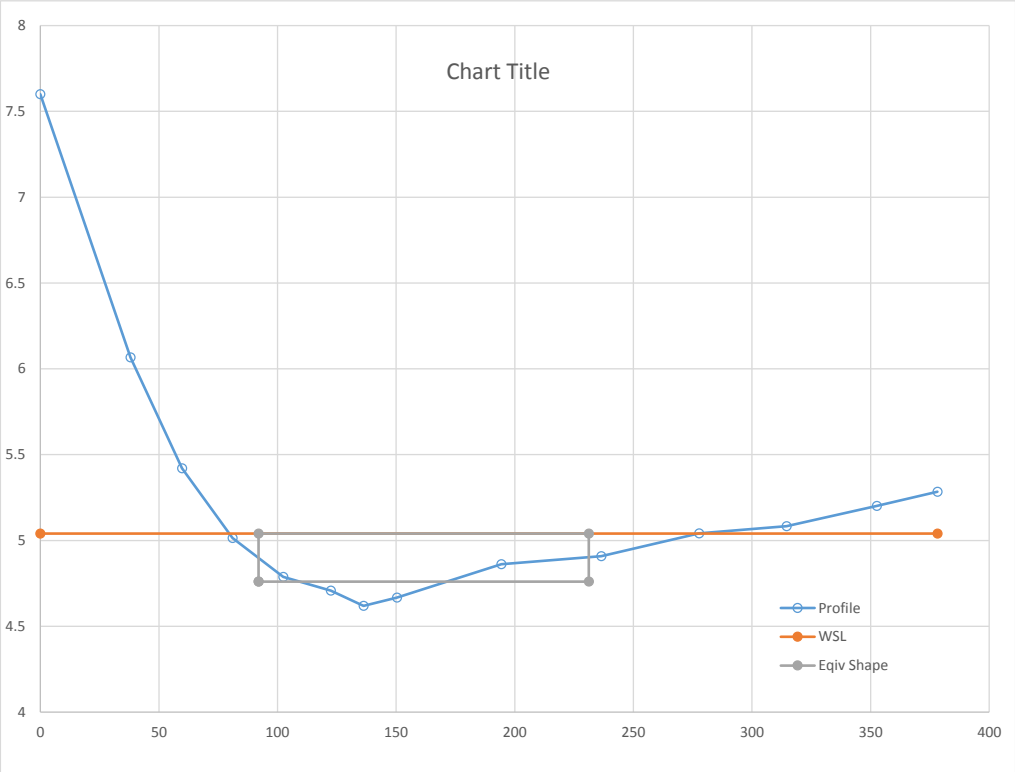
Headwater Elevation (m)	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.08	6.80	6.80	0.00	1
4.97	9.01	9.01	0.00	Overtopping

Chainage	RL
0	7.6
37.978	6.067
59.761	5.421
81.051	5.014
102.429	4.788
122.458	4.708
136.225	4.619
150.355	4.667
194.308	4.862
236.472	4.909
277.749	5.042
314.561	5.083
352.634	5.202
378.17	5.284

Weir flow (Q) = C.L.H^1.5

LOCATION: ROAD WEIR

	5.040	m	Water Surface Level (RL)
C =	1.60		weir coefficient
L =	139.21	m	Equivalent Weir Crest Length
H =	0.28	m	Equivalent Head (Depth)
Q =	**33.00**	**m^3/s**	**Calculated Flow Rate**
	40.98	m2	Irregular Weir Area
	0.37	m	Irregular Weir Max Depth
	197.56	m	Irregular Weir Top Crest Length
	0.81	m2/s	Calculated velocity (flow rate / flow area)
	38.98	m2	Equivalent Weir Area
	75.00	%	Equivelent weir depth as a percentage of maximum weir depth

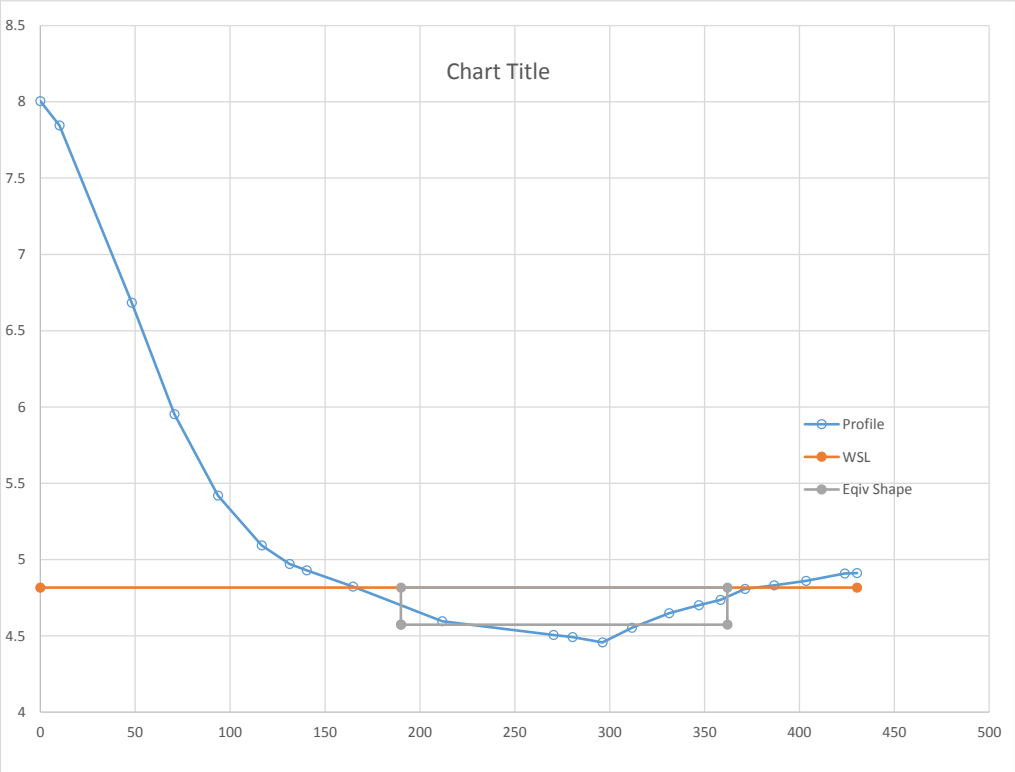


Chainage	RL
0	8.005
10.045	7.845
48.227	6.684
70.66	5.952
93.616	5.419
116.676	5.093
131.321	4.971
140.387	4.93
164.753	4.823
211.749	4.596
270.409	4.505
280.496	4.492
296.206	4.457
311.772	4.553
331.336	4.648
347.062	4.701
358.433	4.735
371.28	4.807
386.718	4.831
403.462	4.86
423.902	4.908
430.29	4.912

Weir flow (Q) = C.L.H^1.5

LOCATION: RAIL WEIR

	4.816	m	Water Surface Level (RL)
C =	1.60		weir coefficient
L =	172.01	m	Equivalent Weir Crest Length
H =	0.24	m	Equivalent Head (Depth)
Q =	**33.01**	**m^3/s**	**Calculated Flow Rate**
	42.22	m2	Irregular Weir Area
	0.32	m	Irregular Weir Max Depth
	211.12	m	Irregular Weir Top Crest Length
	0.78	m2/s	Calculated velocity (flow rate / flow area)
	41.84	m2	Equivalent Weir Area
	75.00	%	Equivelent weir depth as a percentage of maximum weir depth



Item 7

C&B GROUP

- Project Management
- Planning
- Environmental Services
- Surveying

Potential Acid Sulfate Soil Investigation

Lot 1 on RP720316 & Lots 2 & 3 on SR614 Cooya Beach

Salson Pty Ltd

Date: October 2003
Ref: 8021 (R43337)

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FIGURES

Figure 1 C&B Group Plan 8021-4 Location and Layout of the Proposed Residential Development including Test Pit locations

Figure 2 C&B Group Plan 8021-5 Elevation, Drainage and areas requiring fill

Figure 3 C&B Group Plan 8021-9 Soils on Lot 1 RP 720316 and Lots 2 & 3 on SR614

ANNEXURES

Annexure 1 PASS/ASS Investigation Summary Results

Annexure 2 Laboratory Report

C&B GROUP

1.0 INTRODUCTION

C&B Consulting Group was commissioned by Salson Pty Ltd. to conduct an assessment of the presence and location of Potential Acid Sulphate Soils (PASS) in the area including Lot 1 RP720316 and Lots 2 & 3 on SR614 Cooya Beach. The site has been proposed for a 270 lot residential estate. The following report provides supporting information in the form of a baseline survey and an assessment of risk from earthworks during site construction.

During field investigations, PASS was identified at approximately 0.0 metres AHD. The development constraints that PASS poses to the proposed development and management options are identified in this report.

2.0 SITE DESCRIPTION

Bonnie Doon Road in the West and Melaleuca Drive in the south bound the subject lot 1 on RP 720316 and Lots 2 & 3 on SR614 (Refer **Figure 1**). Cooya Beach Road bisects the subject lots 2 on SR614 and Lot 3 on SR614 and extends in a roughly west to east direction providing access to the community of Cooya Beach. The eastern boundaries of Lot 1 on RP720316 and Lot 2 & 3 on SR614 are located directly adjacent to residential housing.

The highest point of the subject lands (8 metres AHD) is located towards the western corners of both Lots 2 & 3 on SR614 (Refer **Figure 2**). From this point, land recedes gently towards the east and northeast, intersecting a shallow drain towards the central areas of Lot 1 on RP 720316 and Lot 2 on SR614. Elevated lands in the west (3 to 8 metres AHD) are proposed for residential housing, with areas below 3 metres in the central and eastern sections being maintained for a park and mangrove regeneration.

From the corner of Bonnie Doon Road and Melaleuca Drive in the south west of Lot 3 on SR614, land recedes gently towards the east intersecting shallow drain between existing and proposed residential housing.

Drainage relief from Lot 1 on RP 720316 and Lot 2 on SR614 is provided by a shallow easterly flowing drain in the north and east (Refer **Figure 2**). Drainage from Lot 3 on SR614 flows into a shallow northerly flowing drain along the eastern boundary. Both drains flow into the Mossman River estuary. Vegetation on all three allotments has been extensively cleared for sugar cane production. Vegetation remains in the riparian zone along the easterly flowing drain in Lot 1 on RP720316 and Lot 2 on SR614. Vegetation in this riparian zone will be retained as part of the proposed park and mangrove regeneration areas.

3.0 NATURE OF DISTURBANCE

3.1 EXCAVATION OF FILL MATERIAL

It is intended that fill for low-lying areas be sourced on-site from the high area (7 to 8 metres AHD) in the west near the existing shed (Refer **Figure 2**). All fill will be sourced from above 5 metres AHD and therefore does not trigger the SPP 2/02 Planning and Managing Development involving Acid Sulfate Soils.

Proposed fill material was sampled at three sites including waypoint 6, 8 and 15 (Refer **Figures 1 & 2**). Fill material sampled at these sites generally consists of organic sandy loams underlain by red and yellow clayey sands. PASS was not detected in these more elevated areas however the re-activity of some soils during field-testing indicated the presence of manganese.

3.2 FILLING ACTIVITIES

Disturbances associated with the proposed development include filling of selected low lying lands to 3.2 metres AHD, being the minimum site level required by Douglas Shire Council. Areas to be filled are included as the hatched areas on **Figure 2**. Areas requiring fill are also included in the Flanagan Consulting Group Report 1329/01 Engineering Issues, Material Change of Use and Reconfiguration Lot 1 on RP720316 and Lots 2 and 3 on SR614 Cooya Beach, **Figure 2**.

The three areas requiring fill include:

1. The NE corner of Lot 3 on SR614

This 1.9-Hectare area including Lots 1 through to 6 (Refer **Figure 1 & 2**) is bounded by a shallow drain in the East. Elevation of land to be filled ranges from 2 to 3.2 metres with an average fill depth of 0.8 metres (approx). Fill volume will exceed 500m^3 and 0.5 metre depth thereby triggering the State Planning Policy 2/02 Planning and Managing Development involving Acid Sulfate soils, Section 3.6.

Test pits excavated in this area include waypoint 9, 10 and 13 (Refer **Figure 2**). No actionable PASS was encountered at any of these three test pits however low levels of reduced sulfur species were encountered towards the base of waypoint 10 and 13. Non-actionable material was encountered below 1 metre AHD with a gentle increase in re-activity with increasing depth.

Below 0.45 metres AHD a sulfurous odour was identifiable however this is believed to be a gradual transition into the PASS layer identified elsewhere at 0 metres AHD. Using a conservative approach, actionable PASS may occur below 0.45 metres AHD.

Fill depth along the drain will approach 1.2 metres however the risk of any de-watering or hydraulic movement of PASS material into the shallow drain is negligible due to:

- Deposition of fill will not de-water underlying coarse sands as coarse sand does not pack tightly. Loosely packed coarse sand allows almost unimpeded groundwater movement.

- Coarse Sand does not undergo subsoil displacement. Subsoil displacement is usually associated with heavy wet marine clays. Any PASS occurring below 0.4 metres AHD would have to be forced in excess of 1 metre (vertically) in order to intercept the shallow drain.

Due to the coarse texture of sands and sandy clays adjacent to the drain, it would be advisable to stabilise the western drainage embankment. Sands and sandy clays exposed in the drain batters are predominantly unconsolidated and could erode causing erosion issues on site and sedimentation problems in the culvert under Cooya Beach Road.

2. The NW corner of Lot 1 on RP720316

This 0.3-Hectare area includes Lots 237 to 243 and Lots 248 to 250 (Refer (**Figure 1 & 2**) and is bisected by a shallow NE flowing drain. Elevation of land to be filled ranges from 2.25 to 3.2 metres AHD with an average fill depth of 0.6 metres (approx). Fill volume will exceed 500 m^3 and 0.5 metres depth thereby triggering the State Planning Policy 2/02 Planning and Managing Development involving Acid Sulfate Soils, Section 3.6.

The test pit at waypoint 18 is representative of soils in the NW corner of Lot 1 on RP720316. Testing of soils from WP 18 suggests that non-actionable quantities of reduced sulfide species occur below 0.5 metres AHD with actionable PASS likely to occur below 0 metres AHD. Using the most conservative approach, actionable PASS may occur below 0.5 metres AHD.

3. The Northern Central area of Lot 1 on RP720316

This 0.82-Hectare area includes Lots 226 to 228 (Refer **Figure 1 & 2**). Elevation of land to be filled ranges between 2 to 3.2 metres AHD with an average fill depth of 0.6 metres (approx). Fill volume will exceed 500 m^3 and 0.5 metres depth thereby triggering the State Planning Policy 2/02 Planning and Managing Development involving Acid sulfate Soils, Section 3.6.

Test pits excavated in this area include waypoint 17 and 19. No PASS was encountered in the test pit at WP17, which reached a maximum depth of 0.75 metres AHD. Marginally actionable PASS material was encountered below 0 metres AHD at WP19 however these lands are to become part of the proposed parkland area (Refer **Figure 1**).

3.3 SEWERAGE AND WATER INFRASTRUCTURE

As the residential development will require water supply and sewerage services, excavation will be required to facilitate installation. It is anticipated that the deepest excavation would be in the order of 2.5 m below filled ground level (maximum depth 0.7 metres AHD) and be associated with the sewerage service. Excavation volume will exceed 100 m^3 at or below 5 metres AHD thereby triggering the State Planning Policy 2/02 Planning and Managing Development involving Acid Sulfate Soils, Section 3.6.

4.0 SOIL DESCRIPTION

Soil mapping (Murtha, 1989), (Refer **Figure 3**), indicates that soil comprises;

Br (Brosnan) Dark Grey Sandy loam A1; yellowish red or red sandy loam to sandy clay loam massive B horizon

Mm (Mossman) Dark grey brown medium clay Ap to 30 cm; olive brown or brownish yellow, moderate to strong fine blocky structured medium clay B horizon.

Surface soils in the more elevated lands on Brosnan soil type (waypoints 6, 8, 9, and 15) typically comprised dark organic sandy loams underlain by well-drained red and yellow clayey sands respectively. In low-lying areas represented by waypoints 10, 13, 16, 17 and 19, surface soil comprised dark organic sandy loams underlain by grey coarse sands and sandy clays.

The Mossman soil type represented by waypoint 18 consisted of brown clays surface soils underlain by sandy grey clays and grey sand respectively.

5.0 FIELD INVESTIGATIONS

Field investigations, excluding sampling intensity were undertaken in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998 (QASSIT Guidelines).

The investigation involved the excavation of 10 test pits over the 41.202 Hectare site. Whilst up to 84 test pits are recommended for a site up to 41 Hectares, this number was reduced due to the following;

- The majority of subject lands will not require any filling and therefore will not trigger the SPP 2/02. Over the 41.2 Hectare site, approximately 3.04 Hectares will require some filling (Refer **Figure 2**)

- Test pits were strategically located to provide good coverage across the areas proposed for the location of fill. Locating test pits in low-lying areas increased the likelihood of locating PASS (Refer **Figure 2**).

- Excavations associated with the proposed development will only be shallow (associated with the provision of drainage and sewerage infrastructure) and are considered to be of low risk.

- Soil strata appeared to be relatively uniform across the site. PASS encountered appeared to be weak and closely associated with the permanent groundwater level around RL = 0 metres AHD.

Field works involved test pitting with a backhoe and sampling of each soil horizon or every 0.25 m interval to depth of approximately 2 m below ground level.

The test pits allowed good opportunity for observation and sampling of soil horizons. Samples were immediately placed in sealable High-Density Poly-Ethylene (HDPE) plastic bags, air excluded and then sealed. Samples were placed on ice after the excavation of each test pit.

Soil colour and texture descriptions were recorded for each soil horizon and are presented in **Annexure 1**.

Field acid sulphate soil tests were then carried out on the soil samples. Field tests involve the determination of field pH (pH_F) using a pH meter and distilled water, followed by oxidation of the soil sample with pH buffered 30% hydrogen peroxide and determination of the field oxidation pH (pH_{FOX}).

The pH_F and pH_{FOX} values were recorded in addition to the strength of the observed reaction of the sample with hydrogen peroxide.

Interpreted correctly, field tests can indicate the possible presence of acid sulphate soil and can be used to assist in the selection of samples submitted for laboratory determination. It is noted that while field tests indicate the likely presence of a potential acid sulphate soil, they do not replace laboratory techniques, which confirm the presence or quantify the risk of a PASS. Refer to Section 7.1.2 for laboratory analysis. Complete soil descriptions for each test pit are presented in **Annexure 1**.

5.1 GROUND WATER QUALITY

Ground water levels were determined during the field test pitting exercise by observation of the level where ground water was observed to be flowing freely into the pit. Ground waters at waypoints 10, 13, 16, 18 and 19 were measured for pH, Electrical Conductivity and Salinity.

Location	PH	EC	Salinity
WP10	5.29	100.3 uS	46.8 ppm
WP13	5.36	141 uS	67.3 ppm
WP16 (Brackish)	5.19	227.9 uS	108 ppm
WP18	5.14	149.6 uS	71 ppm
WP19 (Saline)	5.38	15.85mS	9.30ppK

6.0 SAMPLE AND LABORATORY INTEGRITY

Soil samples were collected and recorded by a suitably qualified and experienced environmental scientist.

Samples were presented to the laboratory in a chilled state and in good condition within sample holding times.

Samples submitted for laboratory determination were analysed for Action criteria using a Combination of TAA (Total Actual Acidity) and Scr (Chromium Reducible Sulfur) method. One sample was analysed for manganese.

Laboratory determinations were carried out by NATA Registered laboratory (Australian Environmental Laboratories, Cairns).

The portable field meter used to determine soil and water pH and electrical conductivity was calibrated prior to and after use.

7.0 RESULTS

7.1 DELINEATION OF THE PASS HORIZON

7.1.1 Field Testing

Field-testing was used to determine if PASS occurs on lands defined as Lot 1 on RP720316 and Lots 2 & 3 on SR614. Field-testing suggests that PASS occurs below 0 metres (AHD) and may occur below 0.5 metres AHD (Refer **Annexure 1**). After field testing, twelve soil samples were selected laboratory analysis. Samples were taken from the depth considered to represent the NON-PASS/PASS boundary so that a maximum cut depth for sewerage infrastructure might be determined.

7.1.2 Lab Analysis

PASS action criteria, as presented in the QASSIT Guidelines, for three broad soil texture categories are provided in Table 1. The action criteria have been prepared with consideration of the texture of coarse, medium and fine textured soils which each have variable buffering capacity against acidity.

Table 1 – ASS Action Criteria (For 3 Broad Texture Classes)

Type of Material		**Action Criteria**			
		1 – 1000 t disturbed		**> 1000 t disturbed**	
Texture Range	**Approx. clay content (%)**	Sulfur trail % S	Acid trail mol H^+ / t	Sulfur trail % S	Acid trail mol H^+ / t
Coarse Texture	≤5	0.03	18	0.03	18
Medium Texture Sandy loams to light clays	5 – 40	0.06	36	0.03	18
Fine Texture Medium to heavy clays	≥ 40	0.1	62	0.03	18

Sulfur Trail (% S) is determined by dividing the TAA (Total Actual Acidity) by a conversion factor of 30.59 and adding the result to the Scr (Chromium Reducible Sulfur).

%S = (TAA/30.59) + Scr

Note that the laboratory analysis results for TAA (Total Actual Acidity) are expressed with a limit of reporting of 0.5 kg H_2SO_4/t (dry weight). When the TAA is <0.5, 0.5 is used to allow margin or a "worst case" figure. The TAA for all laboratory samples was less than 0.5 kg H_2SO_4/tonne (dry weight).

Laboratory testing confirmed that the PASS/NON-PASS boundary was successfully identified at 0.0 metres AHD with some residual low-level sulfidic material detected between 0.5 and 0 metres AHD (Refer **Annexure 1**). Residual sulfidic material above 0.0 metres AHD suggests that the water table is transitional, usually residing above 0.5 metres AHD with permanent water below 0 metres AHD.

7.2 LIMING RATE FOR THE STRONGEST PASS SOIL ENCOUNTERED

From laboratory analysis of PASS found on the site, the strongest PASS was used to formulate an interim-liming rate. In the event that PASS is exposed during excavations this liming rate can be used to treat soils until proper laboratory results for the exposed PASS become available.

Liming Rate = %S * Conversion to $H_2SO_4^-$ * conversion to $CaCO_3^-$ * 1.5 (Safey Factor)

= 0.016634 * 30.52 * 1.02 * 1.5

= **7.768 Kg $CaCO_3^-$/tonne**

Conversion to Kg $CaCO_3^-$ /m^3 (Approximate Specific Gravity of wet sand is 1.92 tonnes/m^3)

= 7.768 * 1.92

= **14.914 Kg $CaCO_3^-$/m^3**

7.3 ACTUAL ACID SULFATE SOILS

The pH_F field test results indicate that the soils in their natural state are acidic with pH ranging from pH 4.40 to 6.44 (Refer **Annexure 1**). Acidic soils are commonly encountered in north Queensland where soils are strongly weathered and in locations where soils have previously underlain freshwater swamps rich in organic matter.

Total Actual Acidity (TAA) values were not within detection limits indicating that while some of the soils are mildly acidic, they are not AASS (Actual Acid Sulphate Soil). Interpolation of laboratory and field assessments indicates the absence of ASS soils (Refer **Annexure 2**).

8.0 ENVIRONMENTAL MANAGEMENT PLAN

Objective/Target

To ensure that during construction/excavation, potential acid sulfate soils are not disturbed, however if they are disturbed, to undertake the necessary mitigation measures to neutralise the soil and prevent any runoff of acidic waters.

Tasks/Actions

- An acid sulfate soil investigation of the site (C&B Group, September 2003) indicates potential acid sulfate soils (PASS) may occur below 0.5 metres AHD. The investigation was confined to a maximum excavation depth of -0.4 metres AHD. Any proposed excavation works below –0.4 metres AHD shall be subject to further investigation prior to commencement of works.

- In the event that soils with PASS or ASS characteristics are disturbed and remain exposed to the atmosphere, the area shall be treated with up to 15 kg / m^3 (to be confirmed through laboratory analysis) fine agricultural lime. This figure was calculated from the highest %S found in the test pit at waypoint 16 between –0.22 to –0.4 m AHD. The calculations are in accordance with the Queensland Acid Sulfate Technical Manual Soil Management Guidelines (version 3.8)

- Prevent any lowering of the permanent groundwater table height that may be caused by the proposed activity. If groundwater table height is expected to be lowered by activities such as temporary dewatering, implement groundwater monitoring. As a minimum pH, EC and the chloride and sulfate concentration should be monitored for each aquifer. This activity should be continued should the pH drop by greater than 1 pH unit, or EC increase by 10 % or more.

- Any suspected PASS material disturbed shall be stockpiled separately and tested using pH field oxidation tests and laboratory analysis to confirm if the soil is PASS. Bunding, diversion drains, and contaminated water treatment impoundments shall be used to contain run off from the storage area.

- Prior to release, impounded stormwater from the bunded area will be monitored to ensure acceptable turbidity and pH concentrations (Total suspended solids (TSS) 50mg/L and pH 6.0-8.5)

- As an alternative to liming treatment, PASS may be buried below the water table. However, AASS (Actual Acid Sulfate Soil) will require neutralisation prior to burial under the water table.

- Minimise the depth in essential drainage structures. Manage drainage to maintain the watertable surrounding drainage structures above any sulfidic layer (ie above 0.5 metres AHD) in the soil (eg. Shallow grassed drains)

- In the event that an alternative procedure to neutralisation by lime is to be undertaken, the efficiency of the techniques shall be trialed using material from the site. If the techniques are found to be suitable, the use shall be approved in writing by the EPA and DNRM prior to commencement of construction.

- Removal of any neutralised PASS material offsite shall be approved by the Douglas Shire Council, Environmental Protection Agency and or the Department of Natural Resources and Mines.

- Earthwork contractors (if required) shall be briefed in relation to the identification and potential environmental risks associated with PASS.

Performance Indicators

The pH of any off site discharge or runoff from any excavations below 0.5 metres AHD or stockpiled PASS shall be within QASSIT guidelines (6.0-8.5 pH units) or above background surface water pH.

Monitoring

Visual monitoring should be undertaken to identify signs of ASS oxidation, including:

- Rust coloured deposits on plants and on banks of drains, water bodies and watercourses indicating iron precipitates;
- Areas of green-blue water or extremely clear water indicating high concentrations of dissolved metals in solution;
- Sulfurous smells (eg. Mangrove Mud Smell);
- Formation of the mineral jarosite and other acidic salts in exposed or excavated soils;
- Black or odorous waters indicating de-oxygenation;
- Unexplained scalding, degradation or death of vegetation;
- Unexplained death or disease in aquatic organisms;
- A transition to, or establishment of, a community dominated by acid tolerant species;
- Invasion of a community or area by acid tolerant species;
- Corrosion of concrete and/or steel structures in contact with soil or water;
- Monitoring the pH of soil and runoff, to be undertaken as required.

Responsible Person/Organisation

The earthwork contractor shall be responsible for the appointment of suitably qualified personnel to undertake PASS testing of any suspicious soils and routine monitoring of site runoff and stockpiles.

Corrective Action

In the event that monitoring indicates the presence of PASS or acidic runoff, application of agricultural or hydrated lime (water) at rates appropriate to neutralise acidic soils or runoff shall be immediately undertaken.

Reporting/Review

A review of the PASS management plan to be undertaken following any exceedance of performance criteria.

9.0 CONCLUSION

9.1 FILLING ACTIVITIES

From the analysis of field and laboratory results, filling activities described in Section 3.2 and **Figure 2** are not considered to pose any foreseeable risk in relation to the exposure and/or disturbance of potential acid sulfate soils.

Due to the porous nature and low compaction of sandy Brosnan Soils, compaction related de-watering is highly unlikely. Filling on Mossman soils will be light (around 0.6 metres depth) and it is unlikely that the deep PASS layer could hydraulically penetrate the shallow drain. Actual Acid Sulfate Soils were not encountered during laboratory analysis and therefore any acidity released from soils being moved beneath the water table is considered to be negligible.

9.2 CUTTING ACTIVITIES

The design plan for sewerage system installation is available in the Flanagan Consulting Group Report 1329/01 Engineering Issues, Material Change of Use and Reconfiguration Lot 1 on RP720316 and Lots 2 and 3 on SR614 Cooya Beach, **Figure 6**.

Depth of sewerage system infrastructure generally ranges from 1 to 2.5 metres below ground surface level. From the required minimum ground surface level of 3.2 metres AHD, sewerage pipes would lie between 2.2 and 0.7 metres AHD. Therefore trenches cut for the emplacement of sewerage infrastructure will be above the weak marginally actionable layer at 0.5 metres AHD and are highly unlikely to disturb PASS below 0 metres AHD.

To avoid PASS disturbance, it would be considered prudent that any disturbances or excavations below 0.5 metres AHD should be subject to further on-site testing and performance criteria set out in the Environmental Management Plan (Refer Section 8.0).

10.0 REFERENCES

State Planning Policy Guideline, 2/02, Planning and Managing Development involving Acid Sulfate Soils V2, Queensland Government.

Queensland Acid Sulphate Soils Investigation Team (1998) Guidelines for Sampling and Analysis of Lowland Acid Sulphate Soils (ASS) in Queensland 1998 (October 1998, Revision 4.0), Department of Natural Resources, Brisbane.

Instructions for the Treatment and management of Acid Sulfate Soils (2001) (version 1.0) Produced by the Environmental Protection Agency in consultation with the Department of Natural Resources and Mines and the Department of Primary Industries.

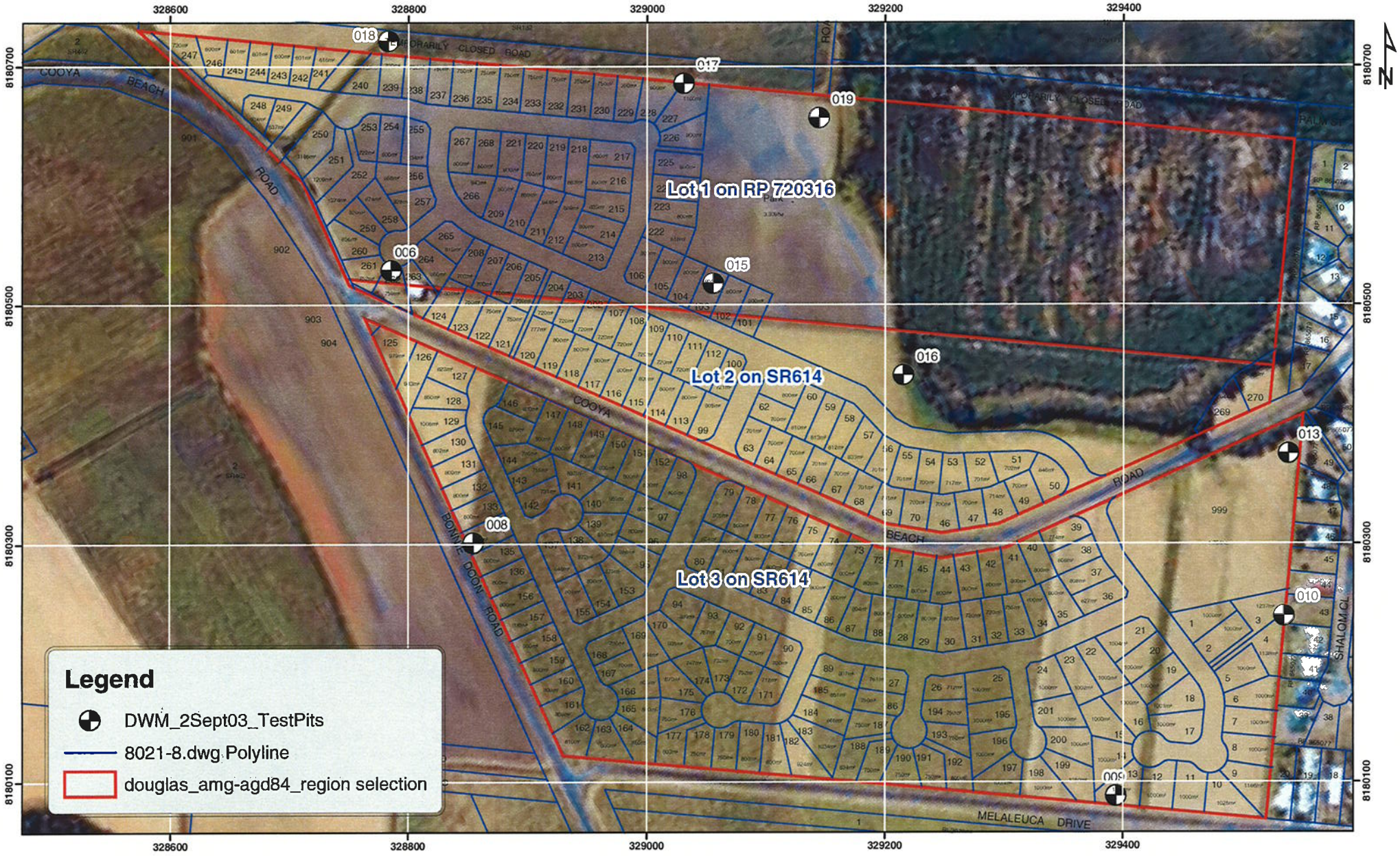
Dear SE, Moore NG, Dobos SK, Watling KM, Ahern CR (2002) Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines (version 3.8) Department of Natural Resources and Mines, Brisbane.

Murtha, G. G. (1989) Soils of the Mossman Cape Tribulation Area, North Queensland. CSIRO.

Figure 1

C&B Group Plan 8021-4 Location and Layout of the Proposed Residential Development including Test Pit locations

Borehole Locations on Lot 1 RP720316 and Lots 2 & 3 on SR614



C&B GROUP

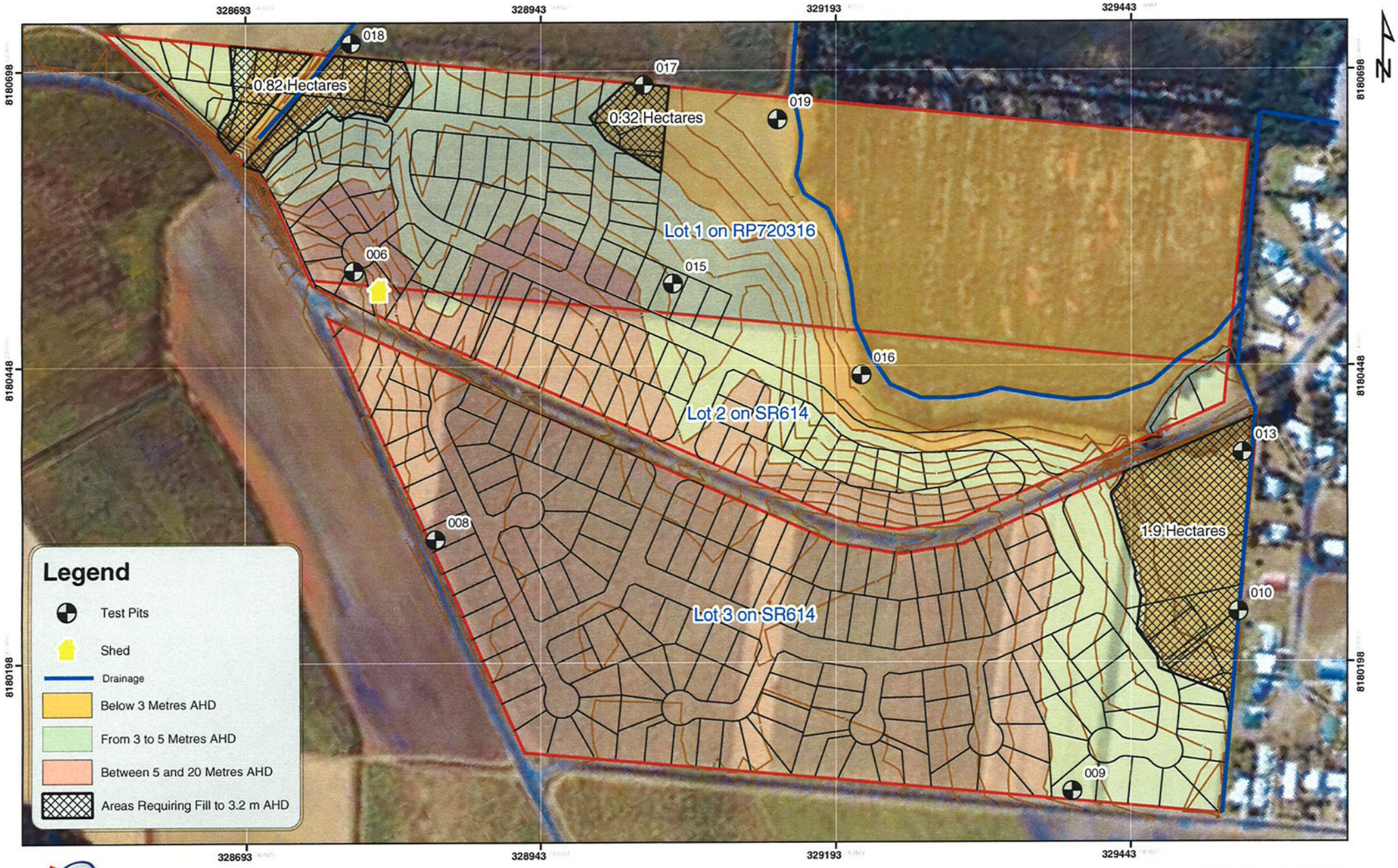
Note : Borehole Locations were taken with a hand held GPS unit and may be subject to errors up to 5 metres

Borehole Location Plan
C&B Group Plan 8021-4
Drafted by DwM 29-09-2003
Scale 1:3000 @ A3

Figure 2

C&B Group Plan 8021-5 Elevation, Drainage and areas requiring fill

Elevation (AHD) over Lot 1 on RP720316 and Lots 2 & 3 on SR614



C&B GROUP

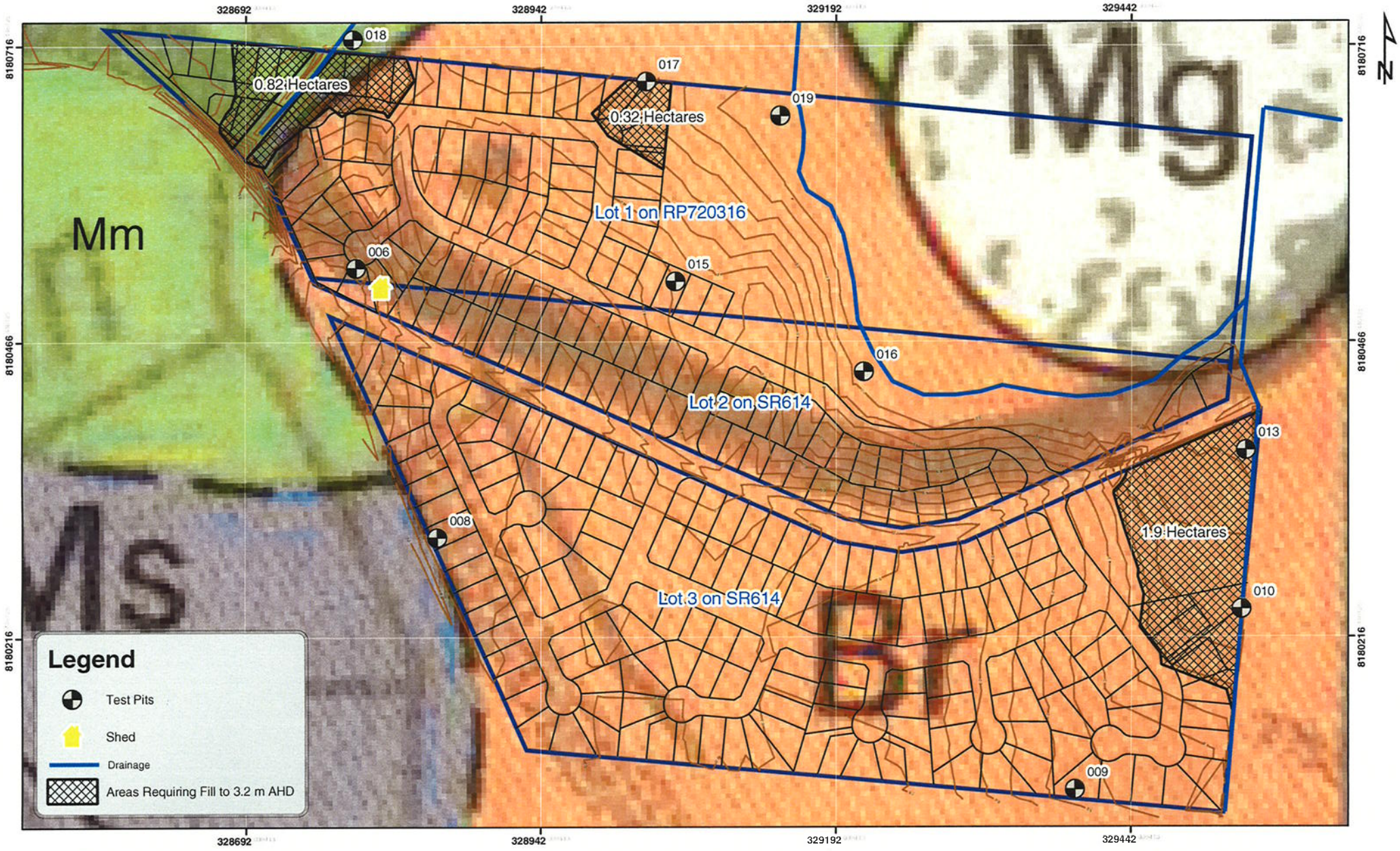
Note : Borehole Locations were taken with a hand held GPS unit and may be subject to errors up to 5 metres

C&B Group Plan 8021-5
Drafted DwM 30-09-2003
Scale 1:3000 @ A3

Figure 3

C&B Group Plan 8021-9 Soils on Lot 1 RP 720316 and Lots 2 & 3 on SR614

Soils on Lot 1 on RP720316 and Lots 2 & 3 on SR614



C&B GROUP

SOIL TYPES

Br (Brosnan)	Dark Grey Sandy loam A1; yellowish red or red sandy loam to sandy clay loam massive B horizon.
Mm (Mossman)	Dark grey bown medium clay Ap to 30 cm; olive brown or brownish yellow, moderate to strong fine blocky structured medium clay B horizon.

C&B Group Plan 8021-9
Drafted DwM 3-10-2003
Scale 1:3000 @ A3

Annexure 1

PASS/ASS Investigation Summary Results

Annexure 1 2/06/2003

Test Site	Depth Below GSL	RL (AHD) (metres)	Description	pH	pHfox	Difference	Reaction	Manganese (mg/kg)	%S (Pocas) (% w/w)	Scr (% w/w)	TAA (kg H2SO4 / tonne)	TAA (as %S) (%S)	Action Criteria (%S)	Comment
WP5 Ground Surface	0	7.25	Greyey Brown Organic Sandy Loam	5.73	5.02	0.71	L							Organic Reaction
	0.3	6.95	Reddy Brown Clayey Fine Sand	5.77	4.7	1.07	VL							Organic Reaction
	0.51	6.74	Red Fine-Medium Sand	5.59	5.05	0.51	-							
	1	6.25	Red Fine-Medium Sand	5.75	4.46	1.29	-							
	1.5	5.75	Red Fine-Medium Sand	5.35	4.75	0.59	-							
	2	5.25	Yellow Fine-Med Sand (slight orange motle)	5.15	4.38	0.77	-							
Pit Base	2.5	4.75												
WP8 Ground Surface	0	6.25	Light Brown Pebbly Clay (likely imported fill)	6.44	5.18	1.26	H							
	0.22	6.03	Chocolate Brown Organic Sandy Loam	5.25	4.39	0.88	M							
	0.4	5.85	Brown Loamy Sand	5.21	4.25	0.98	L-M							
	0.52	5.73	Browny Red Clayey Pebly Sand	4.52	4.48	0.04	M							
	0.8	5.45	Browny Red Course Clayey Sand (poorly sorted)	4.4	4.79	-0.39	M							
	1.2	5.05	Browny Red Course Clayey Pebly Sand	5.25	5.48	-0.23	M							
	1.5	4.75	Reddy Yellow Clayey Sand (poorly sorted)	4.87	5.62	-0.85	M							
	2	4.25	Yellow Clayey Sand (Dark mineral agregate ~30% manganese?)	5.41	5.35	0.05	H							Reaction with Manganese
Pit Base	2.3	3.95												
WP9 Ground Surface	0	4.75	Dark Organic Sandy Loam	4.79	4.57	0.22	-							
	0.49	4.26	Light Gray Loamy Sand (poorly sorted)	4.64	4.61	0.03	-							
	0.7	4.05	White Grey Loamy Sand (poorly sorted)	4.59	4.45	0.14	-							
	0.89	3.86	Yellowy Orange Clayey Sand (poorly sorted)	4.89	4.81	0.08	-							
	1.3	3.45	Yellow Clayey Sand (minor orange motle)	4.81	4.37	0.44	-							
	1.6	3.15	Light Grey Coarse Sand (heavy red motle)	8.04	8.57	-0.53	H	50	<0.005		<0.5	0.016345211		Manganese Nodules Found
Pit Base	2	2.75												
WP13 Ground Surface	0	2	Dark Grey Black Silty Sand	4.82	3.73	1.09	-							
	0.35	1.65	Grey Brown Clayey Sand (poorly sorted)	5.08	4.44	0.64	-							
	0.6	1.4	Damp Browny Grey Coarse Sand	5.15	4.7	0.45	-							
	0.8	1.2	Damp Grey Brown Clayey Coarse Sand	5.27	4.27	1	-							
	1	1	Damp Grey Clayey Coarse Sand	5.22	4.27	0.95	-			0.01	<0.5	0.016345211		
	1.3	0.7	Damp Light Grey Coarse Sand	5.13	3.2	1.93	VL			0.005	<0.5	0.016345211		
		0.45	Wet Light Grey Coarse Sand (sulfurous smell)	5.32	2.93	2.39	L							
		0.3												
WP13 Ground Surface	0	2	Dark Organic Sandy Silt	5.42	3.44	1.98	L							Organic Reaction
	0.32	1.68	Yellow Grey Coarse Sandy Clay	5.36	4.22	1.14	-							
	0.49	1.51	Molse Grey Brown Clayey Sand	5.32	4.61	0.71	-							
	0.69	1.31	Yellow Grey Coarse Sandy Clay (heavy orange motle)	5.56	4.37	1.19	-							
	1	1	Damp Yellowy Grey Coarse Sand	5.49	4.24	1.25	-			0.005	<0.5	0.016345211		
	1.2	0.8	Coarse Grey Sand (yellow motle, no smell)	5.79	2.99	2.8	L-M			0.007	<0.5	0.016345211		
	1.5	0.5	Medium Grey Coarse Clayey Sand (minor yellow motle)	5.77	3.83	1.94	L-M							Likely Transitional Horizon
		0.27	Wet Medium Grey Coarse Sand	5.37	3.98	1.39	L							Likely Transitional Horizon
		0												
WP15 Ground Surface	0	4.5	Dark Organic Sandy Loam	4.78	3.66	1.12	L							Organic Reaction
	0.32	4.18	Brown Sandy Clay	4.77	3.86	0.91	L							Organic Reaction
	0.66	3.84	Yellowy Red Sandy Clay	4.72	3.82	0.9	L							
	1	3.5	Reddy Yellow Sandy Clay	4.64	4.07	0.57	L							
	1.22	3.28	Yellowy Grey Sandy Clay	4.42	4.1	0.32	L							
	1.5	3	Yellowy Grey Sandy Clay	4.55	4.06	0.49	-							
	1.75	2.75	Light Grey Sandy Clay (minor reddy yellow motle)	4.88	3.87	1.01	L-M			0.005	<0.5	0.016345211		Likely Reaction with Manganese
	2	2.6	Light Grey Sandy Clay (minor motle)	5.37	4.14	1.23	-							
Pit Base	2.2	2.3												
WP16 Ground Surface	0	1.5	Dark Organic Sandy Silt	5.21	4.05	1.16	-							
	0.4	1.1	Dark Browny Grey Sandy Clay	5.09	4.34	0.75	-							
	0.6	0.9	Dark Grey Clayey Sand	6.78	6.16	0.62	-							
	0.8	0.7	Dark Grey Clayey Sand	5.57	5.05	0.52	-							
	1	0.5	Light Grey Sandy Clay (no odour)	5.54	4.87	0.67	-							
	1.2	0.3	Moist Grey Clay	5.65	4.71	0.94	-							
	1.5	0	Wet Grey Sand (no smell)	5.52	4.38	1.14	-			0.02	<0.5	0.016345211		Weak PASS
		-0.22	Light to Medium Grey Clayey Sand (Sulfurous Smell)	5.78	1.65	4.13	H			0.15	<0.5	0.016345211		PASS
		-0.4												
WP17 Ground Surface	0	2.75	Dark Organic Coarse Sandy Loam	4.97	3.86	1.11	L							
	0.5	2.25	Yellow Grey Sandy Clay	5.29	4.6	0.69	-							
	1	1.75	Grey Sandy Clay (heavy orange motle)	5.15	4.3	0.85	-							
	1.3	1.45	Grey Coarse Sand (heavy orange motle)	5.1	4.21	0.89	-							
	1.6	1.15	Coarse Grey Sand	5.22	4.15	1.07	-							
Pit Base	2	0.75												
WP18 Ground Surface	0	2	Brown Medium Clay	5.08	3.86	1.22	H							Organic Reaction
	0.32	1.68	Dark Brown Medium Clay	5.13	3.48	1.65	M							Organic Reaction
	0.6	1.4	Dark Browny Grey Clay	5.25	3.79	1.46	L							
	0.83	1.17	Dark Grey Medium Clay	5.31	4.18	1.13	L							
	1.2	0.8	Med Grey Medium Clay	5.59	4.05	1.54	H							
	1.5	0.5	Heavy Grey Clay	5.47	3.89	1.58	VL			0.009	<0.5	0.016345211		
		0.28	Grey Clayey Coarse Sand (Sulfurous smell)	5.79	2.68	3.11	VL			0.021	<0.5	0.016345211		Weak PASS
		0												
WP19 Ground Surface	0	1.5	Browny Grey Organic Clay	4.88	3.91	0.97	VL							Organic Reaction
	0.3	1.2	Medium Grey Clay	5.16	4	1.16	-							
	0.6	0.9	Light Grey Sandy Clay	5.71	4.29	1.42	-							
	0.9	0.6	Moist Light Grey Sandy Clay	5.8	4.28	1.52	-							
	1.1	0.4	Light Grey Sandy Clay	5.58	4.15	1.43	-							Likely Transitional Horizon
	1.3	0.2	Light Grey Medium Clay	5.31	4.38	0.93	-			0.072	<0.5	0.016345211		Weak PASS
	1.5	0	Medium Grey Clay (sulfurous smell)	5.9	1.72	4.08	L-M			0.08	<0.5	0.016345211		Weak PASS
		-0.3												

Key (Groundwater)

Top of Groundwater
Pit Base

Key (Action Criteria)

Non-PASS	Below Action Criteria
	Below Action Criteria
PASS	Above Action Criteria

Annexure 2

Laboratory Report

SGS

CERTIFICATE OF ANALYSIS

25 September, 2003

Mr David Morrison
C & B Group
PO Box 1949
CAIRNS QLD 4870

Your Order No: -
Laboratory Report No: 45871

Date Received: 8 September 2003

Dear Sir:

Twelve soil samples labelled according to the following tables were received and analysed for the parameters as listed. Please find the results in the attached report.

Yours faithfully,

SGS Environmental Services

Jon Dicker
Operations Manager
CAIRNS

Jon Scott
Inorganic Chemist
CAIRNS

NATA Accredited Laboratory No: 2562
NATA Endorsed Test Report
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Environmental Services Unit 2, 58 Comport Street, Portsmith 4870 QLD Australia www.sgs.com
t +61 (0)7 4035 5111 f +61 (0)7 4035 5122

SGS

Laboratory Report No: 45871

RESULTS I

SGS Reference	Your Reference	Moisture* % H_2O	pH KCl	TAA (pH 5.5) kg H_2SO_4/tonne
Blank		-	5.8	-
45871-02	**WP10: 1.0-1.3**	14	4.8	<0.5
45871-03	**WP10: 1.3-1.5**	16	4.9	<0.5
45871-04	**WP13: 1.0-1.2**	15	4.8	<0.5
45871-05	**WP13: 1.2-1.5**	14	4.8	<0.5
45871-06	**WP15: 1.75-2.0**	10	5.3	<0.5
45871-07	**WP16: 1.5-1.72**	11	5.5	<0.5
45871-08	**WP16: 1.72-2.0**	9	5.0	<0.5
45871-09	**WP18: 1.5-1.64**	23	4.4	<0.5
45871-10	**WP18: 1.64-2.0**	16	4.8	<0.5
45871-11	**WP19: 1.3-1.5**	16	5.1	<0.5
45871-12	**WP19: 1.5-1.8**	17	5.0	<0.5
	Limit of Reporting	1	0.1	0.5
	ASSMAC Method	2B1	21A	21F

Results determined on a dry basis.

* NATA accreditation does not cover the performance of this analysis.

SGS

Laboratory Report No: 45871

RESULTS II

SGS Reference	Your Reference	Chromium Reducible Sulphur[*] (S_{Cr}) % w/w
45871-02	**WP10: 1.0-1.3**	0.010
45871-03	**WP10: 1.3-1.5**	0.005
45871-04	**WP13: 1.0-1.2**	<0.005
45871-05	**WP13: 1.2-1.5**	0.007
45871-06	**WP15: 1.75-2.0**	<0.005
45871-07	**WP16: 1.5-1.72**	0.020
45871-08	**WP16: 1.72-2.0**	0.15
45871-09	**WP18: 1.5-1.64**	0.009
45871-10	**WP18: 1.64-2.0**	0.021
45871-11	**WP19: 1.3-1.5**	0.072
45871-12	**WP19: 1.5-1.8**	0.080
	Limit of Reporting	0.005
	ASSMAC[†] Method	22B

Results determined on a dry basis.

[†] Acid Sulfate Soils Management Advisory Committee.

SGS

Laboratory Report No: 45871

RESULTS III

SGS Reference	Your Reference	Manganese (Mn) mg/kg
45871-01	WP09: 1.6-2.0	59
	Limit of Reporting	0.05
	SGS Method	CEI-200

Results determined on a dry basis.

SGS

Laboratory Report No: 45871

RESULTS IV

Our Reference	Your Reference	Moisture‡ % H_2O	pH $_{KCl}$	TAA (pH 5.5) kg H_2SO_4/tonne	pH $_{OX}$	TPA (pH 5.5) kg H_2SO_4/tonne	TSA (pH 5.5) kg H_2SO_4/tonne
Blank		-	5.8	-	5.9	-	-
45871-1	WP9: 1.6-2.0	20	5.0	<0.5	4.7	<0.5	<0.5
R45871-1	*Repeat* WP9: 1.6-2.0	-	5.0	<0.5	4.8	<0.5	<0.5
	Limit of Reporting	1	0.1	0.5	0.1	0.5	0.5
	ASSMAC§ method	2B1	21A	21F	21B	21G	21H

Our Reference	Your Reference	S_{KCl}‡ % w/w	S_P‡ % w/w	S_{POS}‡ % w/w	Ca_{KCl}‡ % w/w	Ca_P‡ % w/w	Ca_A‡ % w/w	Mg_{KCl}‡ % w/w	Mg_P‡ % w/w	Mg_A‡ % w/w	Na_{KCl}‡ % w/w	Na_P‡ % w/w	Na_A‡ % w/w
Blank		-	-	-	-	-	-	-	-	-	-	-	-
45871-1	WP9: 1.6-2.0	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
R45871-1	*Repeat* WP9: 1.6-2.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Limit of Reporting	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	ASSMAC Method	21Ce	21De	21Ee	21Vh	21Wh	21Xh	21Sm	21Tm	21Um	21Ms	21Ns	21Ps

Results determined on a dry basis.

‡ NATA accreditation does not cover the performance of this analysis.
§ ASSMAC - Acid Sulfate Soils Management Advisory Committee - Acid Sulfate Soil Manual, August 1998

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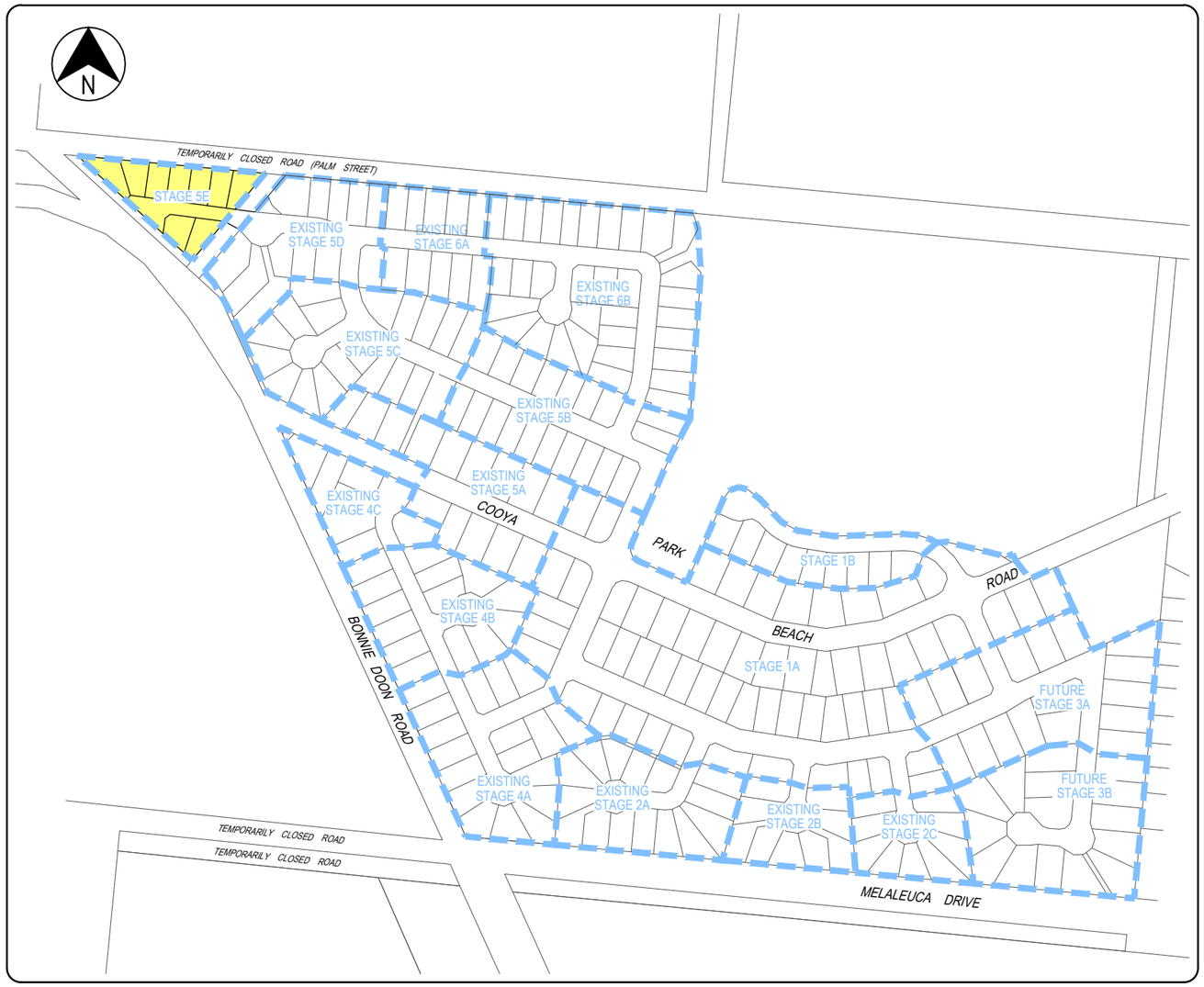
Item 8

OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E



LOCALITY PLAN
N.T.S.

DRAWING INDEX

DRAWING No.	DRAWING TITLE
IH132900-5E-CI-DRG-0501	LOCALITY PLAN AND DRAWING INDEX
IH132900-5E-CI-DRG-0502	GENERAL NOTES
IH132900-5E-CI-DRG-0503	GENERAL ARRANGEMENT
IH132900-5E-CI-DRG-0504	EARTHWORKS
IH132900-5E-CI-DRG-0505	MISCELLANEOUS SECTIONS AND DETAILS
IH132900-5E-CI-DRG-0506	ROAD LONGITUDINAL SECTION
IH132900-5E-CI-DRG-0507	ROAD CROSS SECTIONS
IH132900-5E-CI-DRG-0508	INTERSECTION DETAILS
IH132900-5E-CI-DRG-0509	STORMWATER DRAINAGE
IH132900-5E-CI-DRG-0510	STORMWATER DRAINAGE PIT DETAILS
IH132900-5E-CI-DRG-0511	STORMWATER DRAINAGE CROSS DRAINAGE DETAILS
IH132900-5E-CI-DRG-0512	STORMWATER DRAINAGE DRAIN 01 PLAN AND LONGITUDINAL SECTION
IH132900-5E-CI-DRG-0513	STORMWATER DRAINAGE DRAIN 01 TYPICAL SECTIONS AND DETAILS
IH132900-5E-CI-DRG-0514	STORMWATER DRAINAGE LONGITUDINAL SECTIONS
IH132900-5E-CI-DRG-0515	SEWERAGE
IH132900-5E-CI-DRG-0516	SEWERAGE LONGITUDINAL SECTIONS
IH132900-5E-CI-DRG-0517	WATER RETICULATION
IH132900-5E-CI-DRG-0518	EROSION AND SEDIMENT CONTROL STRATEGY PHASE 1 - TOPSOIL STRIPPING
IH132900-5E-CI-DRG-0519	EROSION AND SEDIMENT CONTROL STRATEGY PHASE 2 - EARTHWORKS
IH132900-5E-CI-DRG-0520	EROSION AND SEDIMENT CONTROL STRATEGY PHASE 3 - ROADWORKS
IH132900-5E-CI-DRG-0521	MASTER SERVICES PLAN

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA STANDARD DRAWINGS

DRAWING No.	DRAWING TITLE
D-0040	SEDIMENT CONTROL DEVICES - SEDIMENT FENCE, ENTRY/EXIT SEDIMENT TRAP
D-0041	SEDIMENT CONTROL DEVICES - KERB AND FIELD INLETS, CHECK DAMS & STRAW BALE BANKS

FNQROC STANDARD DRAWINGS

DRAWING No.	DRAWING TITLE
S1000 - S1110	ROADWORKS AND DRAINAGE
S2000 - S2025	WATER
S3000 - S3035	SEWERAGE

REV	DATE	DRAWN	REV'D	APP'D	REVISION
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE

DRAWING NUMBER | REFERENCE DRAWING TITLE

OCEAN BREEZE estate

Jacobs
ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
2 James Street
CAIRNS, QLD 4870
AUSTRALIA
Tel: +61 7 4031 4599
Fax: +61 7 4031 3967
Web: www.jacobs.com

CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: LOCALITY PLAN AND DRAWING INDEX

SCALE	DRAWING No	REV
N.T.S.	IH132900-5E-CI-DRG-0501	A

GENERAL ARRANGEMENT

GENERAL

1. FOR EARTHWORKS DETAILS REFER DRG-0504.
2. FOR TYPICAL CROSS SECTIONS AND CONTROL LINE SETOUT DETAILS REFER DRG-0505.
3. FOR ROAD LONGITUDINAL SECTIONS REFER DRG-0506.
4. FOR KERB PROFILE DETAILS REFER FNQROC STD DRG S1000.
5. FOR STREET NAME POST DETAILS REFER FNQROC STD DRG S1040.
6. CONTRACTOR TO PROVIDE PUBLIC NOTIFICATION/SIGNS (REFER FNQROC DEVELOPMENT MANUAL CP1.11).
7. CLEARED VEGETATION SHALL BE MULCHED ON SITE BY THE CONTRACTOR.
8. FOR TYPICAL JOIN TO EXISTING ROAD DETAIL REFER DRG-0505.

EXISTING SERVICES

1. EXISTING SERVICES ARE PLOTTED FROM THE BEST INFORMATION AVAILABLE. NO RESPONSIBILITY IS TAKEN BY THE PRINCIPAL OR SUPERINTENDENT FOR THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN.
2. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION THE CONTRACTOR IS TO ESTABLISH ON SITE THE EXACT POSITION OF ALL UNDERGROUND SERVICES IN THE PROPOSED WORKS AREA. METHODS FOR ACHIEVING THIS WILL INCLUDE BUT NOT BE LIMITED TO:-
   - ●CAREFUL EXAMINATION OF THE CONTRACT DRAWINGS.
   - ●CONSULTATION WITH THE RELEVANT SERVICE AUTHORITIES.
   - ●COMPREHENSIVELY SCANNING THE AFFECTED AREAS WITH A CABLE DETECTOR AND MARKING ON THE GROUND THE POSITION OF ALL SERVICES.
   - ●HAND EXCAVATING TO EXPOSE ALL SUCH SERVICES WHICH MAY BE AFFECTED BY THE PROPOSED WORKS UNDER THE DIRECTION OF THE RELEVANT SERVICE AUTHORITY.
3. THE CONTRACTOR IS TO BRING TO THE SUPERINTENDENT'S ATTENTION ANY DISCREPANCIES BETWEEN THE EXISTING SERVICES THUS IDENTIFIED AND DOCUMENTED SERVICES WHICH MIGHT AFFECT THE PROPOSED WORKS. APPROPRIATE MEASURES TO RESOLVE ANY CONFLICTS WILL BE DOCUMENTED BY THE SUPERINTENDENT.

EARTHWORKS

1. ALL BATTERS TO ROAD FRONTAGES OF LOTS ARE 1 ON 4 OR FLATTER. ALL OTHER BATTERS ARE 1 0N 2 U.N.O.
2. BATTERS TO BE ADJUSTED LOCALLY AROUND SEWER MANHOLES. REFER DRG-0515 FOR DETAILS.
3. UPON COMPLETION ALL BATTERS STEEPER THAN 1 IN 2 AND HIGHER THAN 1.5m SHALL REQUIRE CERTIFICATION AS TO THE STABILITY BY A GEOTECHNICAL ENGINEER.

INTERSECTION DETAILS

1. ALL KERB SETOUT DETAILS REFER TO THE LIP OF KERB AND CHANNEL OR FACE OF KERB AS APPLICABLE.
2. FOR KERB PROFILE DETAILS REFER FNQROC STD. DRG. S1000.

STORMWATER DRAINAGE

1. FOR STANDARD STORMWATER DRAINAGE DETAILS REFER FNQROC STD. DRGS. S1045-S1100 INCLUSIVE.
2. THE CONTRACTOR IS TO LOCATE ALL EXISTING SERVICES IN THE WORKS AREA PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. SUBSURFACE DRAINS TO BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATION, FLUSHING POINTS IN ACCORDANCE WITH FNQROC STD. DRG. S1095.
4. WHERE ANY PART OF THE STORMWATER PIT IS BELOW RL 1.80 THE CONCRETE GRADE AND COVER TO REINFORCEMENT SHALL BE IN ACCORDANCE WITH FNQROC STD DRGS S1050 & S1055.
5. FOR BEDDING DIMENSIONS TO BLACKMAX/ STORMPRO PIPES REFER DRG-0505.
6. PRIOR TO COMMENCEMENT OF PIPEWORK, THE CONTRACTOR IS TO CONFIRM THE INVERT LEVEL OF DOWNSTREAM DRAINAGE TO ENSURE THE STORMWATER SYSTEM CAN DRAIN SATISFACTORILY. REFER ANY DISCREPANCY TO THE SUPERINTENDENT.
7. CCTV INSPECTIONS ARE TO BE CONDUCTED FOR ALL NEW STORMWATER PIPES FOR COUNCIL ASSESSMENT.
8. ALL UNDERGROUND STORMWATER PIPEWORK SHALL BE POLYPROPYLENE (PP), BLACKMAX/STORMPRO OR APPROVED EQUIVALENT UNLESS NOTED OTHERWISE.

SEWERAGE

1. ALL SEWER PIPES SHALL BE uPVC CLASS 'S.N.8.' (U.N.O.).
2. FOR STANDARD DETAILS OF SEWER MAINS, ETC. REFER FNQROC STD. DRGS. S3000 TO S3015 INCLUSIVE.
3. MANHOLES ADJACENT ROAD BOUNDARIES SHALL BE ON A 1.5m ALIGNMENT U.N.O. MANHOLES ADJACENT SIDE AND REAR BOUNDARIES SHALL BE ON A 0.8m ALIGNMENT U.N.O.
4. SEWER MANHOLES SHALL BE FINISHED 50mm MAX ABOVE FINISHED SURFACE LEVEL IN ALLOTMENTS AND FLUSH IN ROAD RESERVES.
5. HOUSE DRAINS ARE TO EXTEND 1.5m CLEAR OF ANY EARTHWORKS BATTER THAT IS STEEPER THAN 1 ON 2. AN INSPECTION OPENING IS TO BE PROVIDED AT THE DOWNSTREAM END OF THE HOUSE DRAIN.
6. THE CONTRACTOR IS TO LOCATE ALL EXISTING SERVICES IN THE WORKS AREA PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
7. EXISTING LOTS TO BE REINSTATED AFTER CONSTRUCTION OF THE SEWER.
8. ALL HOUSE CONNECTION BRANCHES ARE REQUIRED TO BE BROUGHT TO WITHIN A MAXIMUM OF 300mm OF THE FINISHED SURFACE LEVEL AND A GLUED CAP INSTALLED. THE RISER MUST BE CONNECTED TO A MARKER PEG WITH PLASTIC COATED WIRE. THE MARKER PEG IS TO BE OF HARDWOOD MATERIAL, PROTRUDING 20mm ABOVE THE GROUND AND SHALL BE INSTALLED IMMEDIATELY ADJACENT TO THE RISER IN ACCORDANCE WITH FNQROC DRAWING S3005.
9. ALL VERTICAL DROPS SHALL BE CONSTRUCTED USING FIBREGLASS HEAVY DUTY DEEP SEWER DROPS.
10. CONNECTIONS TO EXISTING COUNCIL MAINS TO BE MADE BY DOUGLAS SHIRE COUNCIL.
11. CCTV INSPECTIONS ARE TO BE CONDUCTED FOR ALL NEW SEWERS FOR COUNCIL ASSESSMENT.
12. ALL WORKS ARE TO BE IN ACCORDANCE WITH FNQROC DEVELOPMENT MANUAL SPECIFICATION S6.
13. PROVIDE A COMPRESSIBLE LAYER BETWEEN ALL PROPOSED MANHOLES WITHIN AREAS OF CONCRETE.

WATER

1. ALL WATER MAINS ARE ON 1.6m ALIGNMENTS FROM BOUNDARY U.N.O.
2. FOR STANDARD DETAILS REFER FNQROC. STD. DRGS. S2000 TO S2035 INCLUSIVE.
3. CONNECTIONS TO EXISTING COUNCIL MAINS TO BE MADE BY DOUGLAS SHIRE COUNCIL.
4. THE CONTRACTOR IS TO LOCATE ALL EXISTING SERVICES IN THE WORKS AREA PRIOR TO COMMENCEMENT OF CONSTRUCTION.
5. PROVIDE A COMPRESSIBLE LAYER BETWEEN ALL EXISTING AND PROPOSED HYDRANT OR VALVE SURROUNDS WITHIN AREAS OF CONCRETE.
6. ALL WORKS ARE TO BE IN ACCORDANCE WITH FNQROC DEVELOPMENT MANUAL SPECIFICATION S5.

EROSION AND SEDIMENT CONTROL STRATEGY

1. SEQUENCING OF CONTROL MEASURES
   a) INSTALL STABLE POINT OF ENTRY
   b) INSTALL SILT FENCES
   c) PROTECT TOPSOIL STOCKPILES
   d) CONSTRUCT TEMPORARY SEDIMENT BASINS
   e) INSTALL STORMWATER PIPES
   f) IMPLEMENT PROTECTION MEASURES TO STORMWATER PITS
   g) REVEGETATE BARE AREAS UPON COMPLETION OF EARTHWORKS
   h) THE SEDIMENT CONTROL STRUCTURES ARE TO BE CLEANED & MAINTAINED AFTER EVERY STORM EVENT. ERODED SOILS SHALL BE STOCKPILED AS DIRECTED.
2. THE AMOUNT OF DISTURBANCE TO EXISTING VEGETATION BE KEPT TO A MINIMUM.
3. EXACT LOCATION OF SEDIMENT CONTROL STRUCTURES TO BE DETERMINED ON SITE BY COUNCIL & SUPERINTENDENT.
4. STOCKPILE LOCATIONS TO BE AGREED WITH COUNCIL & THE SUPERINTENDENT. STOCKPILES TO BE PROTECTED VIA DIVERSION DRAIN ON THE UPSLOPE & SILT FENCE ON THE DOWNSLOPE.
5. RETURNS IN SILT FENCE TO BE AT 20m INTERVALS WHEN INSTALLED ALONG THE CONTOUR. SPACING IS TO DECREASE TO 5-10m DEPENDING ON SLOPE IF THE SILT FENCE IS INSTALLED AT AN ANGLE TO THE CONTOUR. THE RETURN SHALL CONSIST OF EITHER:
   - V-SHAPED SECTION EXTENDING AT LEAST 1.5m UP THE SLOPE; OR
   - SANDBAG OR ROCK/AGGREGATE CHECK DAM A MINIMUM OF 1/3 AND MAXIMUM OF 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5m UP THE SLOPE.
6. STORMWATER PIPES TO HAVE PIT PROTECTION MEASURES AS DETAILED IN FNQROC DEVELOPMENT MANUAL.
7. ALL SEDIMENT CONTROL MEASURES TO BE IN ACCORDANCE WITH THE CONTRACTORS ESC PLAN.
8. THE FOLLOWING REVEGETATION MEASURES ARE TO BE UNDERTAKEN IMMEDIATELY UPON COMPLETION OF EARTHWORKS.
   a) CUT & FILL BATTERS 1 ON 4 OR STEEPER TO BE HYDROMULCHED.
   b) VERGES & ALLOTMENTS TO BE GRASS SEEDED.
   c) PLACE TURF STRIPS BEHIND ALL KERB LINES.
9. REVEGETATION IS TO BE WATERED & MAINTAINED UNTIL GROWTH IS ESTABLISHED.
10. CONTRACTOR TO PROVIDE DUST SUPPRESSION MEASURES AS REQUIRED.
11. DESIGN CRITERIA FOR CONTRACTOR'S EROSION & SEDIMENT CONTROL PLAN TO BE IN ACCORDANCE WITH SECTION CP1.05 OF THE FNQROC DEVELOPMENT MANUAL.

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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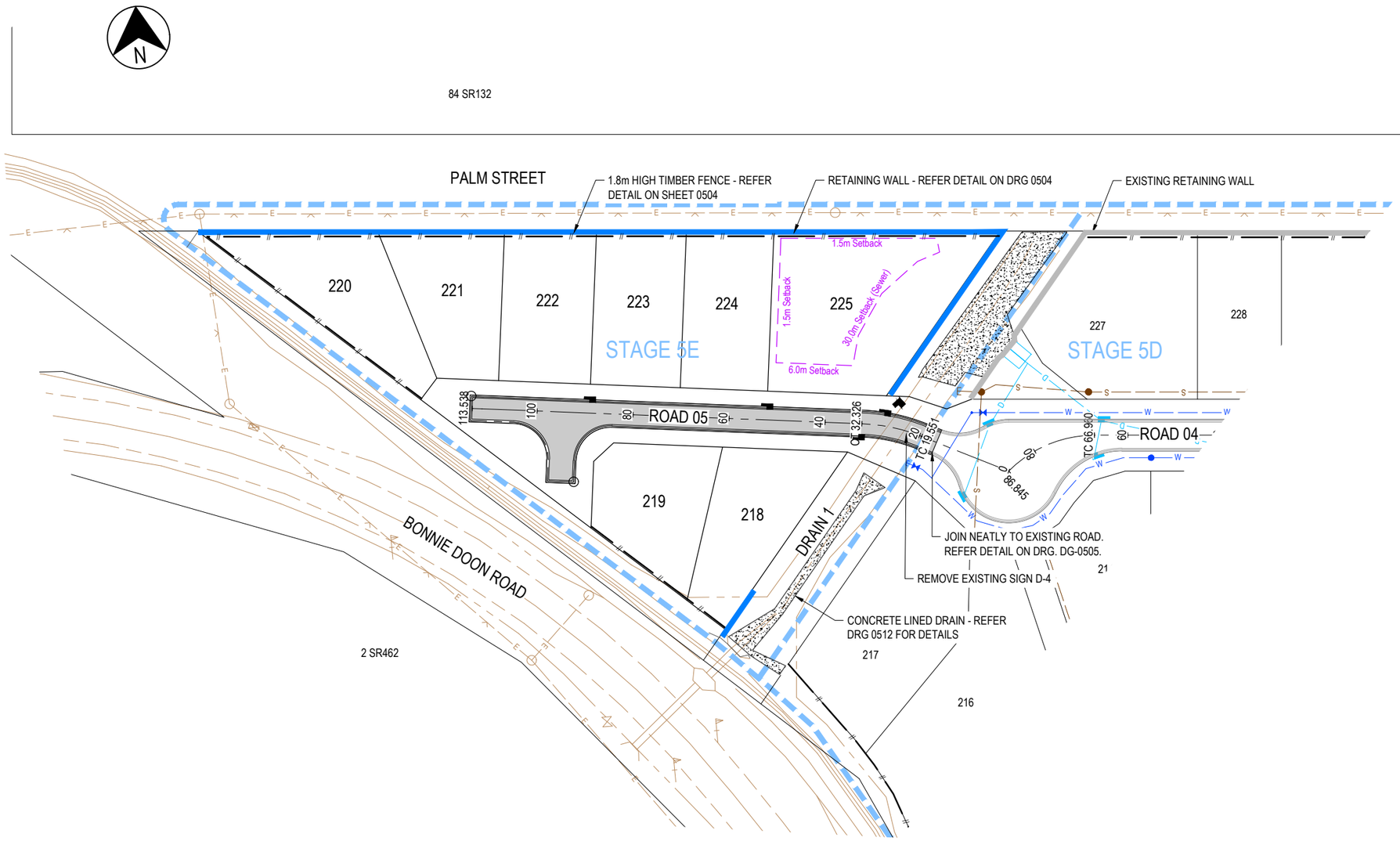
DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: GENERAL NOTES

SCALE	DRAWING No	REV
N.T.S.	IH132900-5E-CI-DRG-0502	A



LEGEND

- ASPHALT SEALED PAVEMENT
- CONCRETE LINED DRAIN
- STAGE BOUNDARY
- RETAINING WALL
- 1.8m HIGH TIMBER FENCE
- BUILDING LOCATION ENVELOPE
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER
- EXISTING OVERHEAD ELECTRICAL

NOTE

FOR NOTES REFER DRG-0502.

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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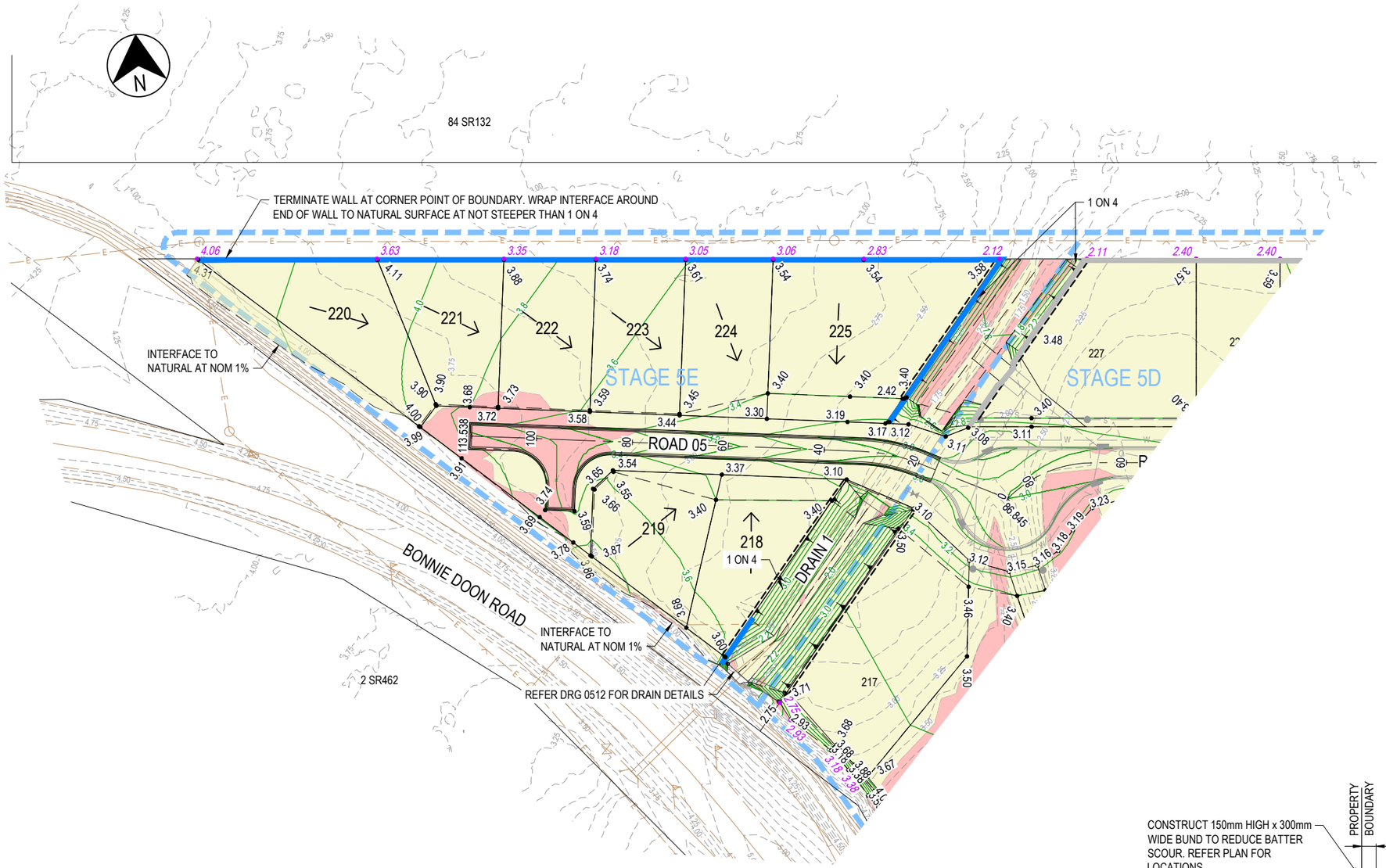
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: GENERAL ARRANGEMENT

SCALE	DRAWING No	REV
1:500 (A1)	IH132900-5E-CI-DRG-0503	A

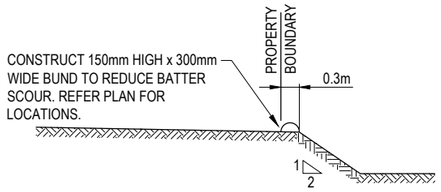


LEGEND

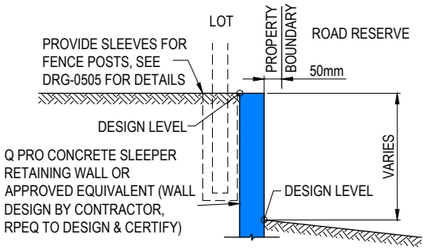
- AREAS OF FILL
- AREAS OF CUT
- 3.70 — FINISHED SURFACE LEVEL
- 2.68 — NATURAL SURFACE LEVEL
- FALL OF LOTS
- BATTER
- STAGE BOUNDARY
- 57.0 — DESIGN SURFACE CONTOURS (0.2m INTERVAL)
- 57.0 — EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- RETAINING WALL
- BATTER BUND
- D — EXISTING STORMWATER
- S — EXISTING SEWER
- W — EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.



TYPICAL SIDE AND REAR BATTER SET BACK
N.T.S.



TYPICAL RETAINING WALL DETAIL - LOTS 220-225
N.T.S.

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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DRAWN: RC	DRAWING CHECK: RJB	REVIEWED: N. LEE LONG DATE 27.10.21	APPROVED: DATE 27.10.21
DESIGNED: RC	DESIGN REVIEW: RJC		

TITLE: EARTHWORKS

SCALE	DRAWING No	REV.
1:500 (A1)	IH132900-5E-CI-DRG-0504	A

CONTROL LINE ROAD 05 SETOUT

CHAINAGE	COORDINATES		BEARING DEG MIN SEC	RADIUS OF CURVATURE	TANGENT LENGTH	ARC LENGTH
	EASTING	NORTHING				
0.000	8747.431	80663.447	297° 4' 28"	STRAIGHT		
19.551	8730.022	80672.346	297° 4' 28"	-37.500		
IP 25.939	8724.279	80675.282	-	-37.500	6.450	12.775
32.326	8717.885	80676.130	277° 33' 21"	STRAIGHT		
113.538	8637.378	80686.808	277° 33' 21"	STRAIGHT		

CONTROL LINE DRAIN 1 SETOUT

CHAINAGE	COORDINATES		BEARING DEG MIN SEC	RADIUS OF CURVATURE	TANGENT LENGTH	ARC LENGTH
	EASTING	NORTHING				
0.000	8688.098	80632.531	54° 37' 59"	STRAIGHT		
10.942	8697.021	80638.864	39° 53' 35"	STRAIGHT		
44.734	8718.694	80664.791	39° 42' 15"	STRAIGHT		
69.118	8734.271	80683.551	41° 9' 48"	STRAIGHT		
82.032	8742.771	80693.273	41° 11' 29"	STRAIGHT		
107.374	8759.460	80712.343	41° 11' 29"	STRAIGHT		

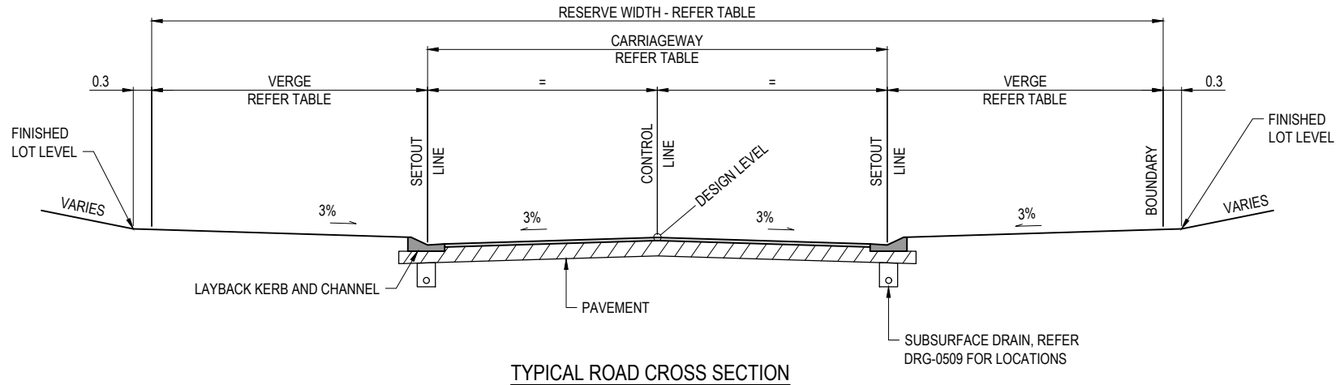
TABLE OF WIDTHS

ROAD	CARRIAGEWAY WIDTH (m)	VERGE WIDTH (m)		RESERVE WIDTH (m)
		LHS	RHS	
ROAD 05	5.00	3.50	3.50	12.0

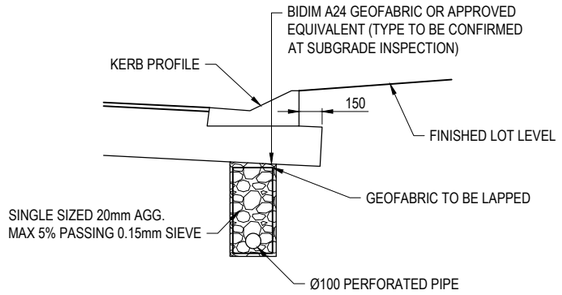
PROVISIONAL PAVEMENT DETAILS

ROAD	SURFACING	SUBBASE CBR 45 (mm)	BASE CBR 60 (mm)
ROAD 05	30mm ASPHALT	100	100

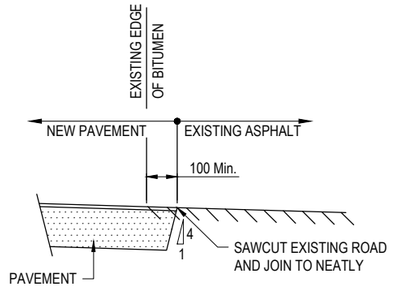
NOTES
PROVISIONAL PAVEMENT DESIGN IS BASED ON AN ASSUMED SUBGRADE SOAKED CBR OF 10. THE CONTRACTOR IS TO CONFIRM SUBGRADE CBR DURING CONSTRUCTION AND THE PAVEMENT DESIGN MAY BE AMENDED ACCORDINGLY BY THE DOUGLAS SHIRE COUNCIL.



TYPICAL ROAD CROSS SECTION
N.T.S.



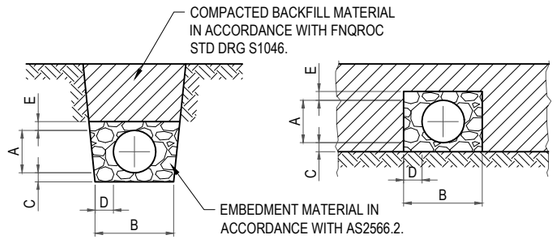
SUB SURFACE DRAINAGE DETAIL
N.T.S.



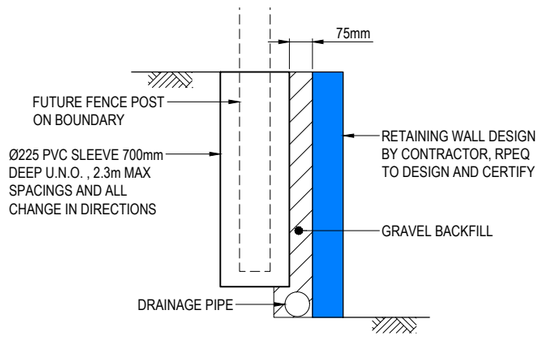
TYPICAL JOIN TO EXISTING ROAD
N.T.S.

BLACKMAX/STORMPRO PIPE BEDDING DIMENSIONS

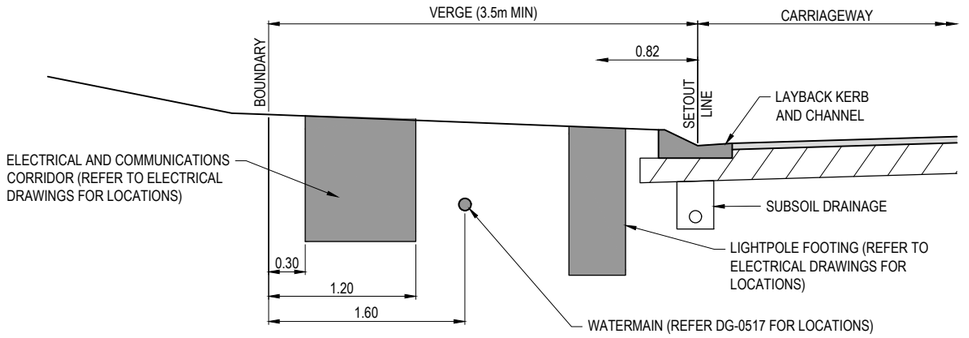
DN	DIMENSIONS (mm)				
	A	B	C	D	E
225	259	560	100	150	150
300	344	645	100	150	150
375	428	830	100	200	150
450	514	915	100	200	150
525	600	1200	150	300	150
600	682	1285	150	300	150



BLACKMAX/STORMPRO PIPE BEDDING DETAILS
N.T.S.



TYPICAL FENCE POST SLEEVES TO RETAINING WALLS
N.T.S.



TYPICAL SERVICE LOCATIONS WITHIN VERGE
N.T.S.

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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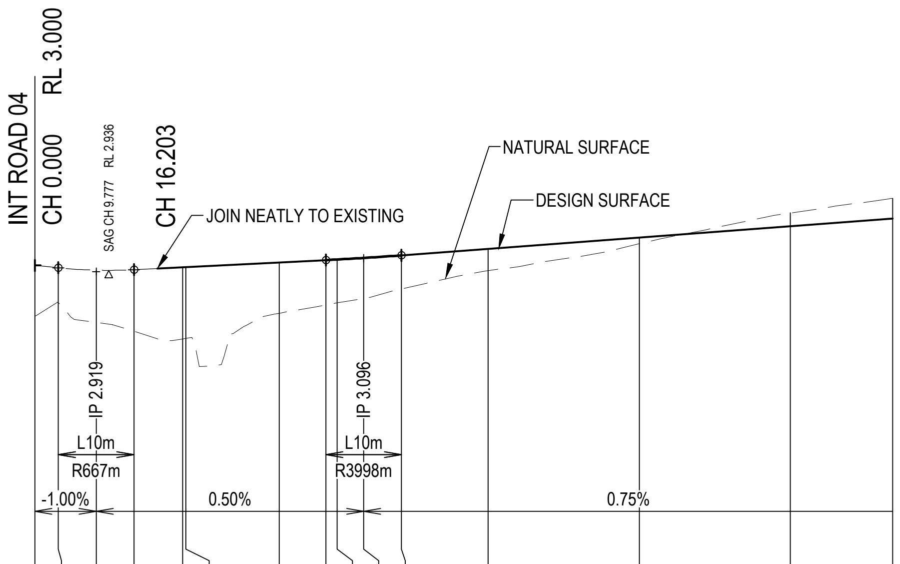
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: MISCELLANEOUS SECTIONS AND DETAILS

SCALE	DRAWING No	REV
N.T.S.	IH132900-5E-CI-DRG-0505	A

DATE: 26/10/2021 5:40:07 PM NAME: COWLING, ROBERT
LOCATION: C:\Users\cowlinr\AppData\Local\projectwise\jacobs_anz_ie\d0542229\IH132900-5E-CI-DRG-0506_Road LS.dwg



CUT - FILL +	0.671	0.462	0.691	0.814	0.947	0.942	0.672	0.592	0.573	0.534	0.443	0.287	0.081	-0.174	-0.266
DESIGN SURFACE LEVEL	3.000	2.969	2.938	2.944	2.976	2.978	3.040	3.071	3.079	3.099	3.133	3.220	3.370	3.520	3.621
EXISTING SURFACE LEVEL	2.329	2.507	2.247	2.129	2.029	2.036	2.368	2.478	2.505	2.565	2.690	2.933	3.289	3.694	3.887
CHAINAGE	0.000	3.109	8.109	13.109	19.551	20.000	32.326	38.517	40.000	43.517	48.517	60.000	80.000	100.000	113.538
HORIZONTAL DATA	R-37.5m														

LONGITUDINAL SECTION ROAD 05

SCALE 1:500H
1:50V

VERTICAL SCALE 1:50 (A1) 0 1 2 3 4 5m
1:100 (A3) 1 0.5

HORIZONTAL SCALE 1:500 (A1) 0 10 20 30 40 50m
1:1000 (A3) 10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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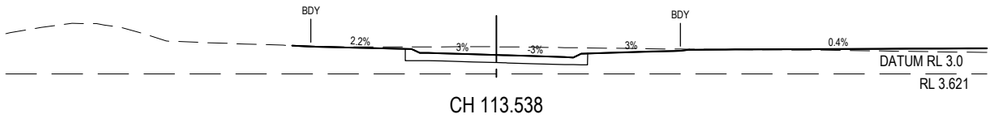
CLIENT JONPA PTY LTD
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

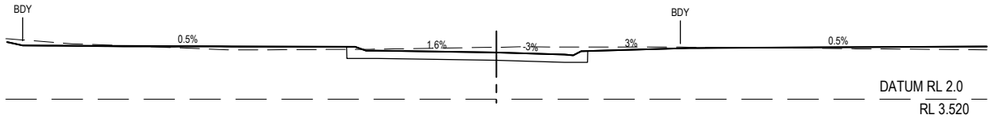
DRAWN RC | DRAWING CHECK RJB | REVIEWED N. LEE LONG | APPROVED
DESIGNED RC | DESIGN REVIEW RJC | DATE 27.10.21 | DATE 27.10.21

TITLE ROAD LONGITUDINAL SECTION

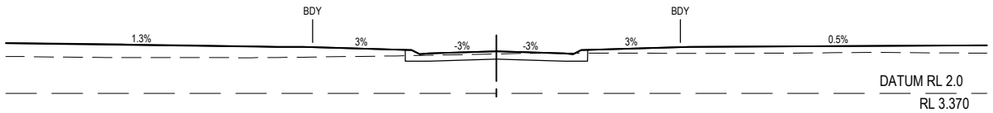
SCALE 1:500H, 1:50V (A1) | DRAWING No IH132900-5E-CI-DRG-0506 | REV A



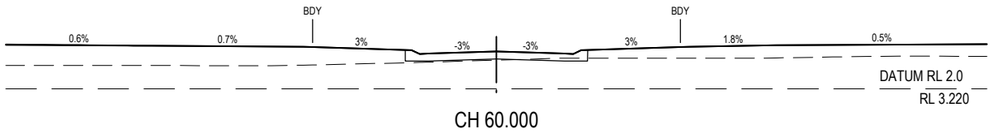
CH 113.538



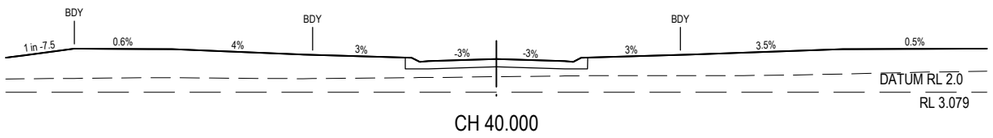
CH 100.000



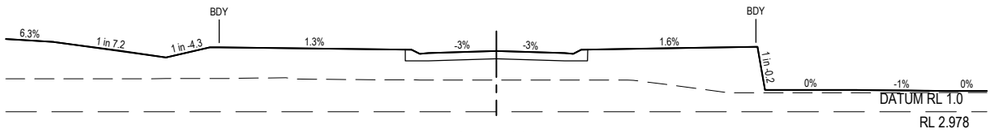
CH 80.000



CH 60.000



CH 40.000



CH 20.000

ROAD 05

SCALE 1:100 (A1)
1:200 (A3)

0 2 4 6 8 10m
2 1

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

OCEAN BREEZE estate

Jacobs
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Jacobs Group (Australia) Pty Ltd
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Tel: +61 7 4031 4599
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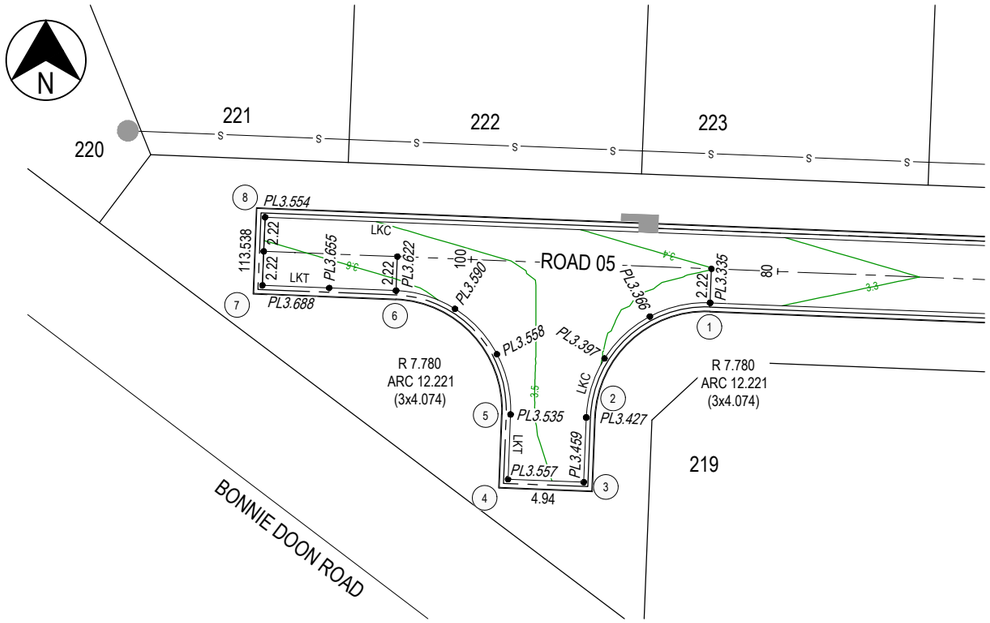
Web: www.jacobs.com

CLIENT: JONPA PTY LTD			
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E			
DRAWN: RC	DRAWING CHECK: RJB	REVIEWED: N. LEE LONG, DATE 27.10.21	APPROVED: DATE 27.10.21
DESIGNED: RC	DESIGN REVIEW: RJC		

TITLE: ROAD CROSS SECTIONS

SCALE	DRAWING No	REV
1:100 (A1)	IH132900-5E-CI-DRG-0507	A



CUL-DE-SAC TEE ROAD 5

LEGEND

• *PL3.256*	PAVEMENT LEVEL OF KERB LIP
• (1)	SETOUT POINT
LKC	LAYBACK KERB AND CHANNEL
LKT	LAYBACK KERB AND TRAY
OR	KERB INLET PIT
	PROPOSED STORMWATER
S	PROPOSED SEWER
57.0	DESIGN SURFACE CONTOURS (0.1m INTERVAL)

NOTE

FOR NOTES REFER DRG-0502.

SETOUT TABLE		
PT NO	X	Y
1	8666.053	80680.766
2	8657.317	80674.076
3	8656.762	80669.893
4	8651.865	80670.542
5	8652.420	80674.726
6	8645.731	80683.461
7	8637.088	80684.608
8	8637.670	80689.009

SCALE 1:200 (A1)
1:400 (A3)
0 4 8 12 16 20m
4 2

REV	DATE	DRAWN	REVD	APPD	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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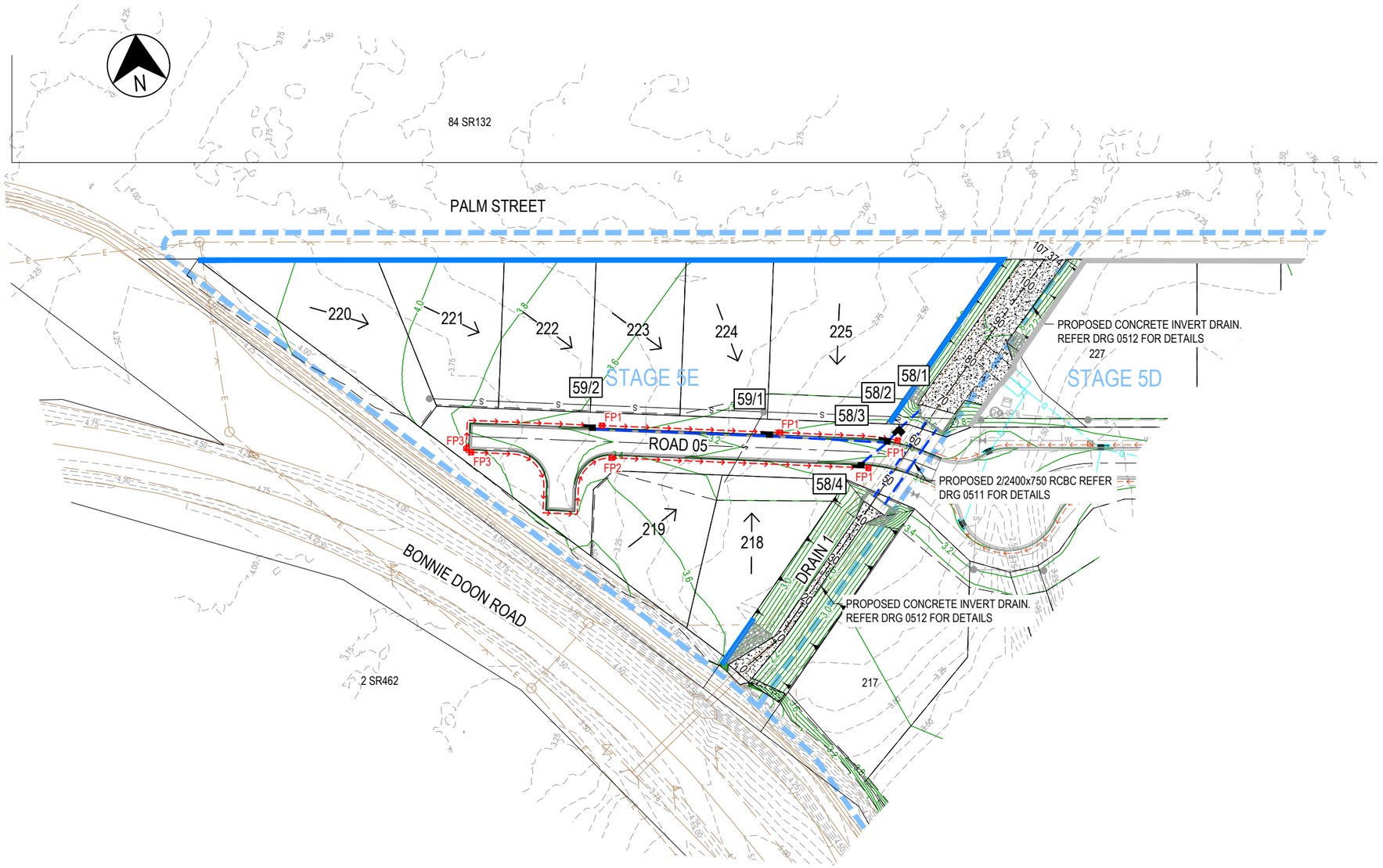
CLIENT JONPA PTY LTD
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE
INTERSECTION DETAILS

SCALE	DRAWING No	REV
1:200 (A1)	IH132900-5E-CI-DRG-0508	A



LEGEND

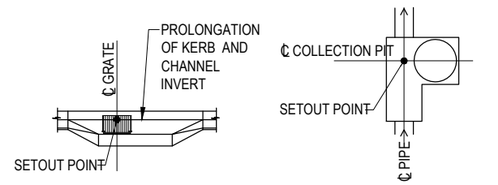
- 2/1 — LINE NUMBER / STRUCTURE No.
- STORMWATER DRAINAGE PIPE & MANHOLE
- SUBSURFACE DRAINAGE
- PROPOSED SEWER
- KERB INLET PIT
- HEADWALL
- GROSS POLLUTANT TRAP
- FALL OF LOTS
- BATTER
- STAGE BOUNDARY
- DESIGN SURFACE CONTOURS (0.2m INTERVAL)
- EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- RETAINING WALL
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.

FLUSHING POINT LEGEND

FP1	FLUSHING POINT IN PIT
FP2	FLUSHING POINT IN LINE
FP3	FLUSHING POINT HEAD



KERB INLET PIT — GROSS POLLUTANT TRAP

STRUCTURE SETOUT POINTS

N.T.S.

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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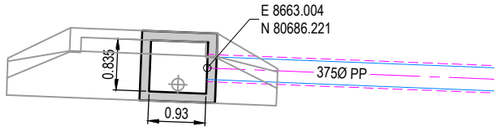
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

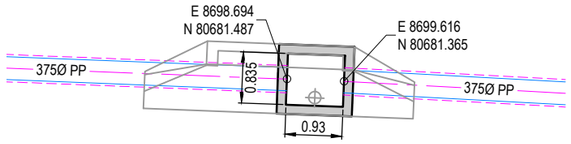
DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: STORMWATER DRAINAGE

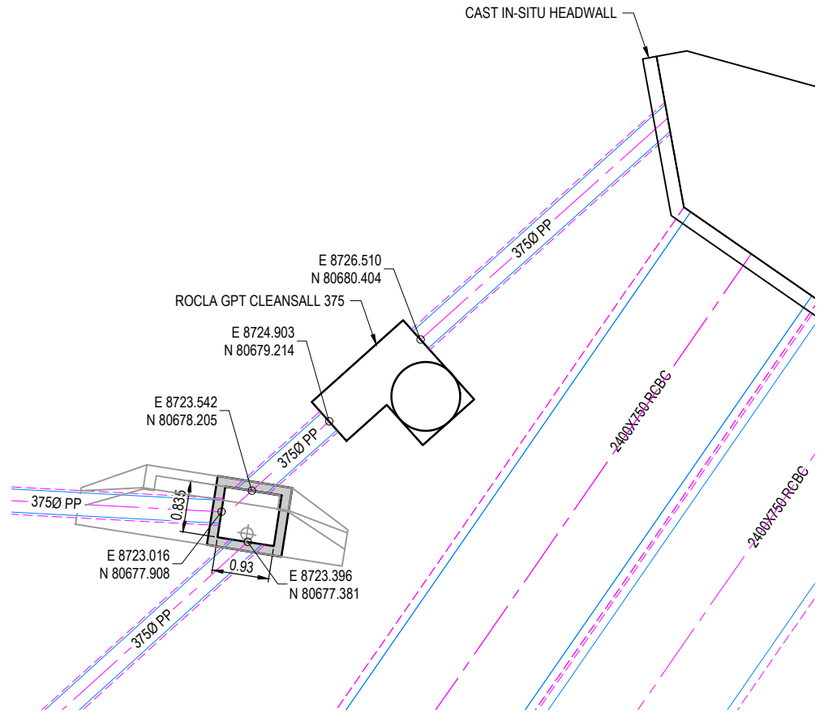
SCALE	DRAWING No	REV
1:500 (A1)	IH132900-5E-CI-DRG-0509	A



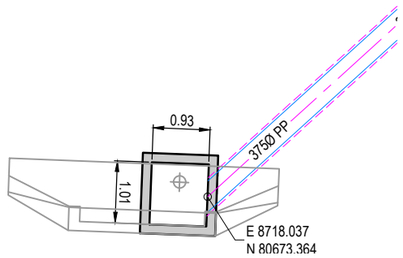
STORMWATER PIT 59/2 DETAIL
SCALE 1:50



STORMWATER PIT 59/1 DETAIL
SCALE 1:50



STORMWATER PIT 58/3 DETAIL
SCALE 1:50



STORMWATER PIT 58/4 DETAIL
SCALE 1:50

SCALE 1:50 (A1)
1:100 (A3)
0 1 2 3 4 5m
1 0.5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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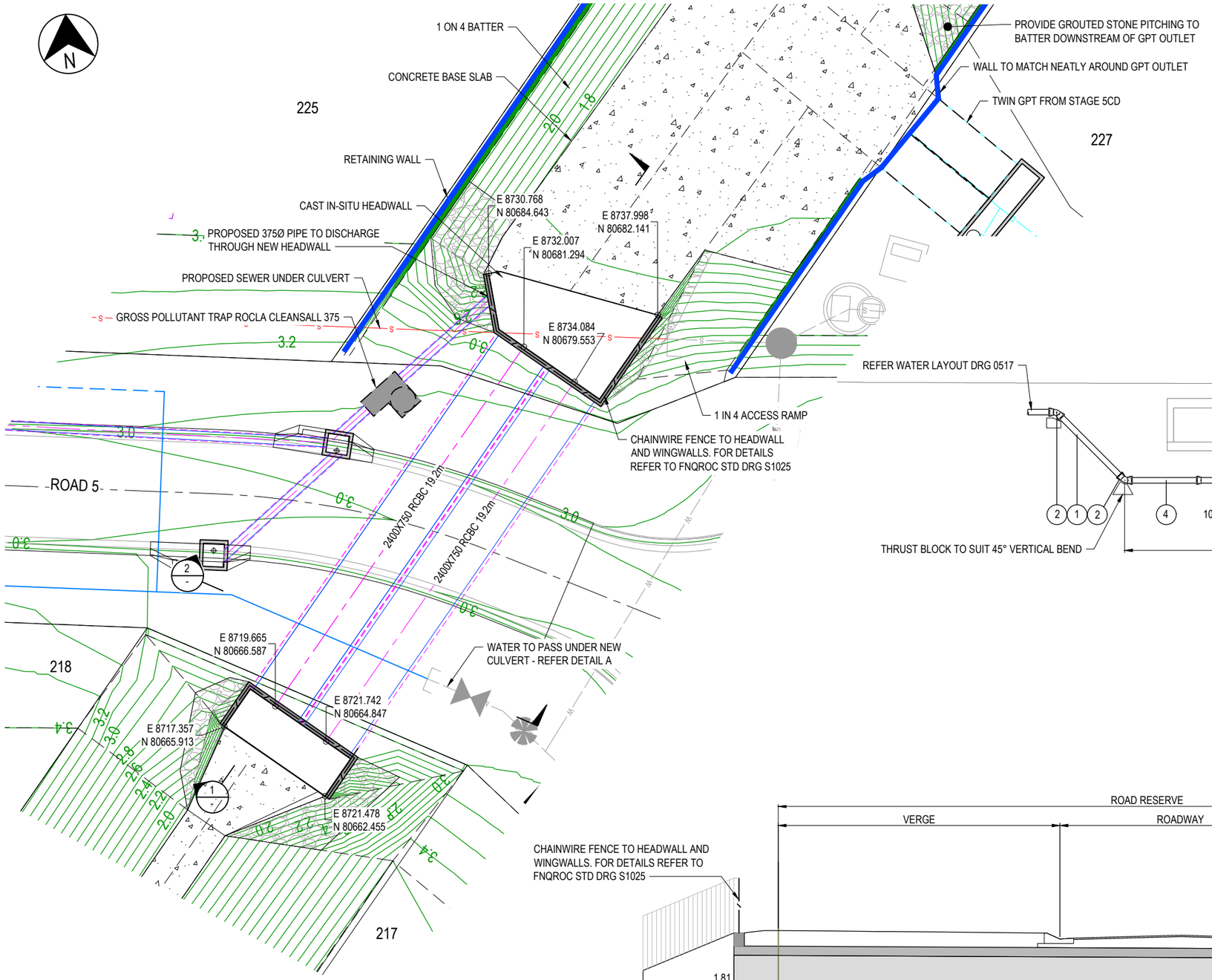
Web: www.jacobs.com

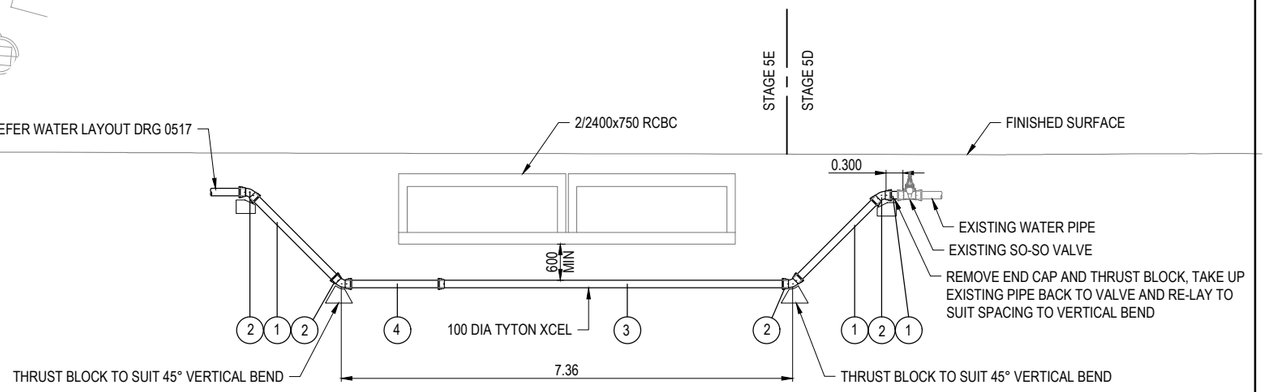
CLIENT: JONPA PTY LTD			
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E			
DRAWN: RC	DRAWING CHECK: RJB	REVIEWED: N. LEE LONG	APPROVED
DESIGNED: RC	DESIGN REVIEW: RJC	DATE: 27.10.21	DATE: 27.10.21

TITLE: STORMWATER DRAINAGE PIT DETAILS

SCALE	DRAWING No	REV
AS SHOWN	IH132900-5E-CI-DRG-0510	A

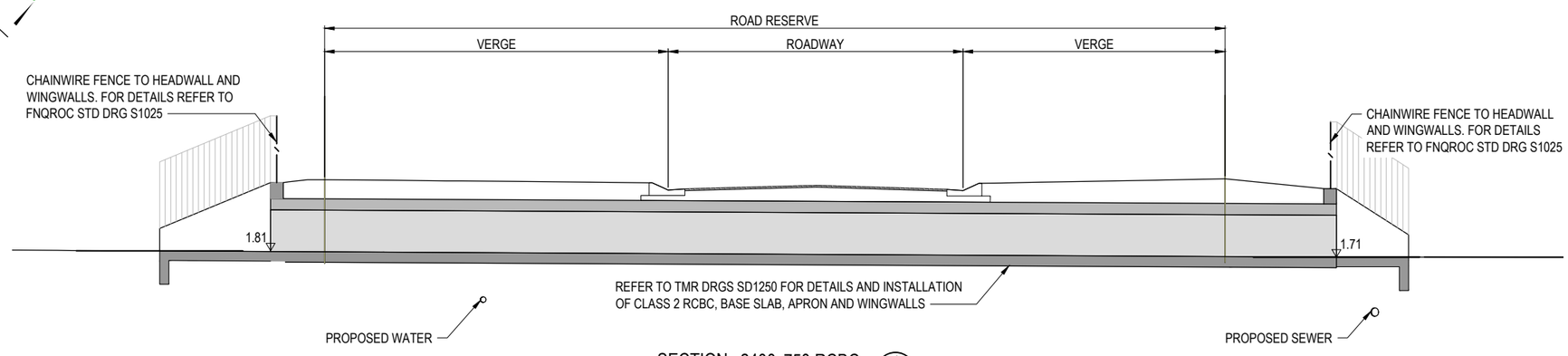


CULVERT DETAILS PLAN
1:100



SECTION 2
SCALE 1:50

FITTINGS SCHEDULE		
ITEM	DESCRIPTION	QTY.
1	DN100 PVC-U PIPE SP-SP	4.1m
2	DN100 DICL BEND 45° SO-SO	4
3	DN100 DIMAX TYTON XCEL SP-SO	1
4	DN100 DIMAX TYTON XCEL SO-SO (1.6m)	1



SECTION 2400x750 RCBC 1
SCALE 1:50

SCALE 1:100 (A1) 1:200 (A3) 0 2 4 6 8 10m
SCALE 1:50 (A1) 1:100 (A3) 0 1 2 3 4 5m

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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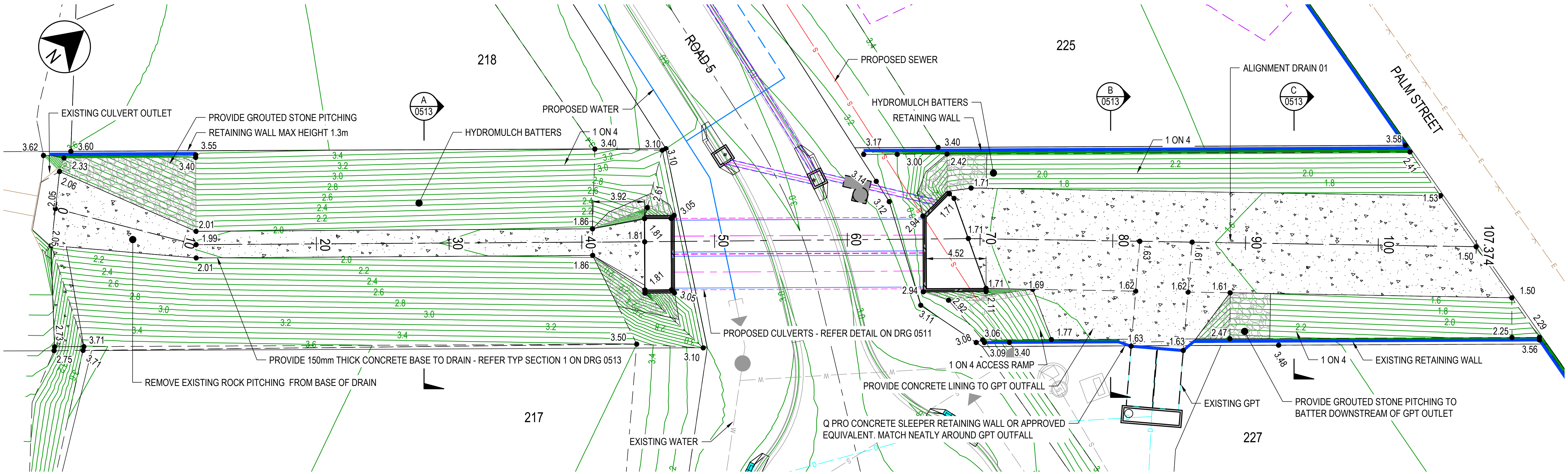
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: STORMWATER DRAINAGE CROSS DRAINAGE DETAILS

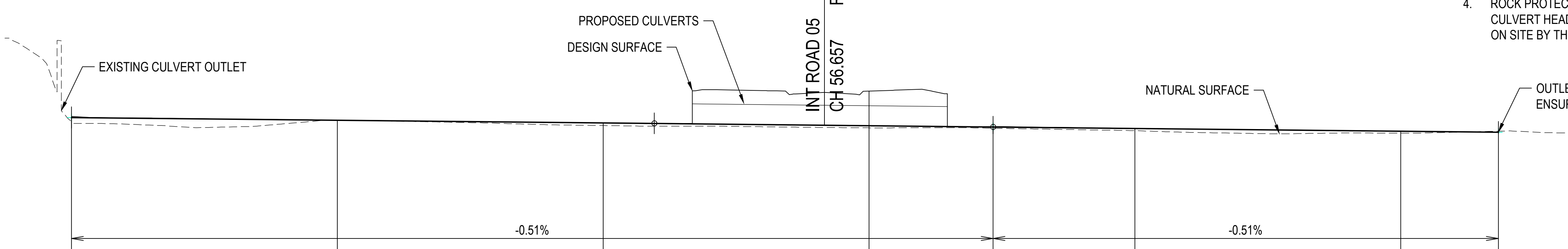
SCALE: AS SHOWN
DRAWING No: IH132900-5E-CI-DRG-0511
REV: A



DRAIN 01 PLAN
1:150

NOTE

1. FOR NOTES REFER DRG-0502.
2. FOR DRAIN CONTROL LINE SETOUT REFER DRG-0505.
3. PROPOSED CONCRETE DRAIN TO TIE INTO EXISTING AND PROPOSED CONCRETE AND APRONS.
4. ROCK PROTECTION SHALL BE PROVIDED AROUND CULVERT HEADWALLS. EXTENT TO BE CONFIRMED ON SITE BY THE SUPERINTENDANT.



VERTICAL CURVE

VERTICAL GRADE: -0.51% (0.000 to 69.330); -0.51% (69.330 to 107.342)

DATUM RL -4.0

CUT - FILL +	0.147	-0.002	0.098	0.082	0.047	0.084	0.073	-0.037
DESIGN SURFACE LEVEL	2.050	1.947	1.845	1.742	1.694	1.640	1.537	1.500
EXISTING SURFACE LEVEL	1.903	1.950	1.747	1.660	1.647	1.555	1.464	1.536
CHAINAGE	0.000	20.000	40.000	60.000	69.330	80.000	100.000	107.342
HORIZONTAL DATA								

LONGITUDINAL SECTION DRAIN 01
SCALE 1:200H
1:100V

SCALE 1:200 (A1) 1:400 (A3) — 4 2 0 4 8 12 16 20m

SCALE 1:150 (A1) 1:300 (A3) — 3 1.5 0 3 6 9 12 15m

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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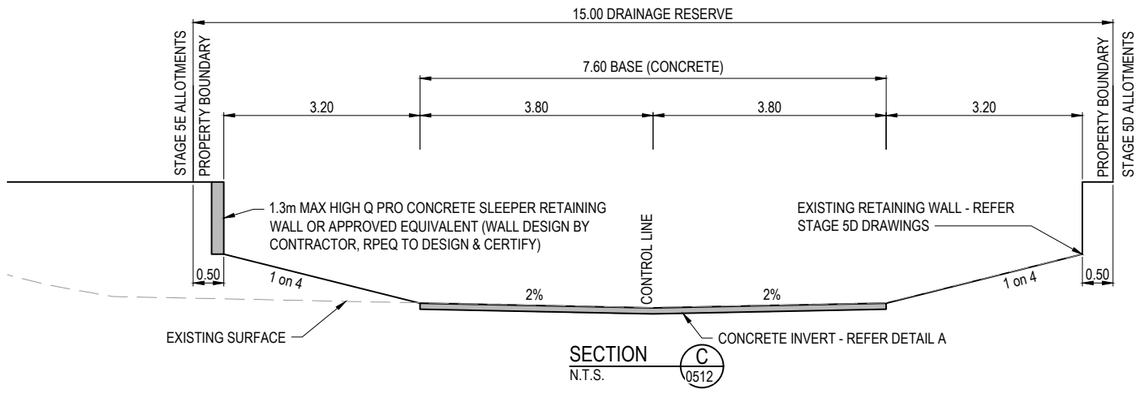
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

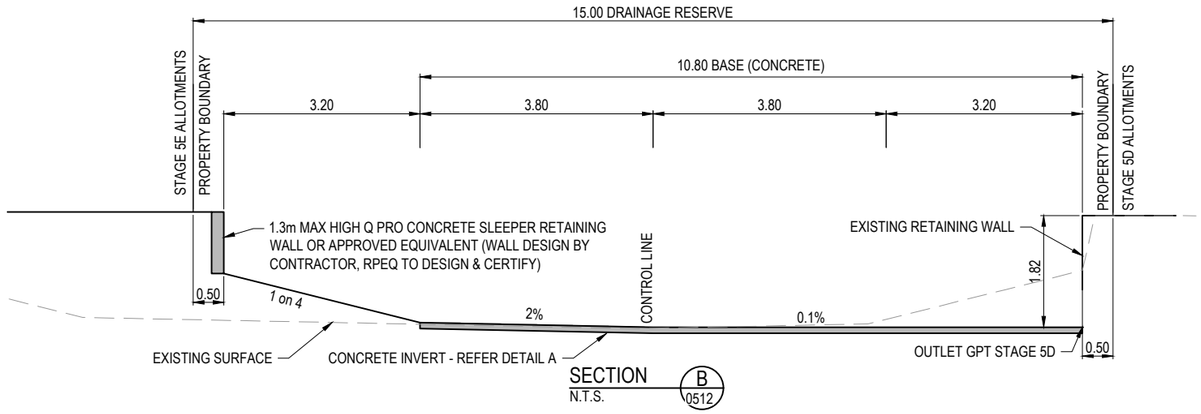
DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	RPEQ No 6641
DESIGNED: RC	DESIGN REVIEW: RJC	DATE 27.10.21	DATE 27.10.21

TITLE: STORMWATER DRAINAGE
DRAIN 01
PLAN AND LONGITUDINAL SECTION

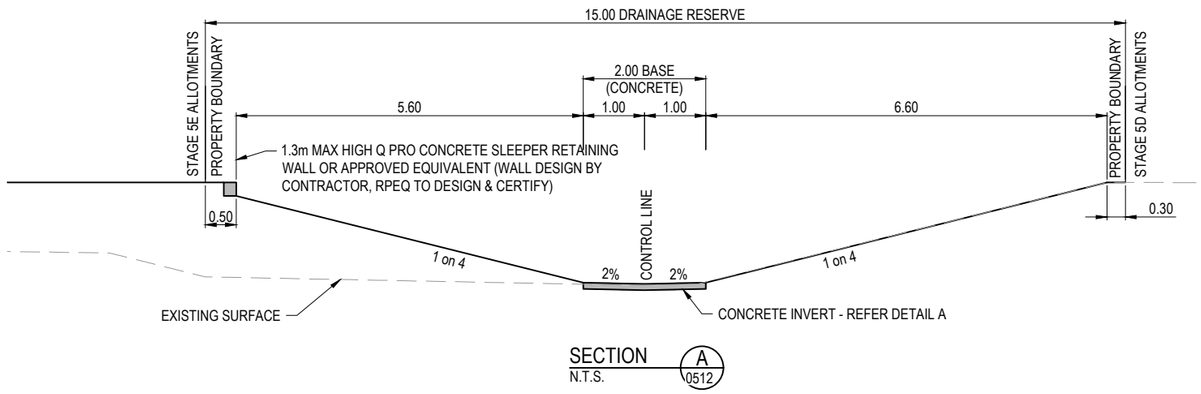
SCALE: AS SHOWN | DRAWING No: IH132900-5E-CI-DRG-0512 | REV: A



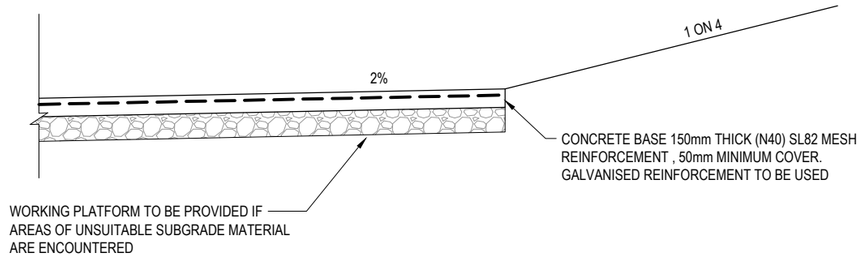
SECTION C
N.T.S. 0512



SECTION B
N.T.S. 0512



SECTION A
N.T.S. 0512



DETAIL A
NTS -

SCALE 1:250 (A1)
1:500 (A3)
0 5 10 15 20 25m
5 2.5

REV	DATE	DRAWN	REVD	APPD	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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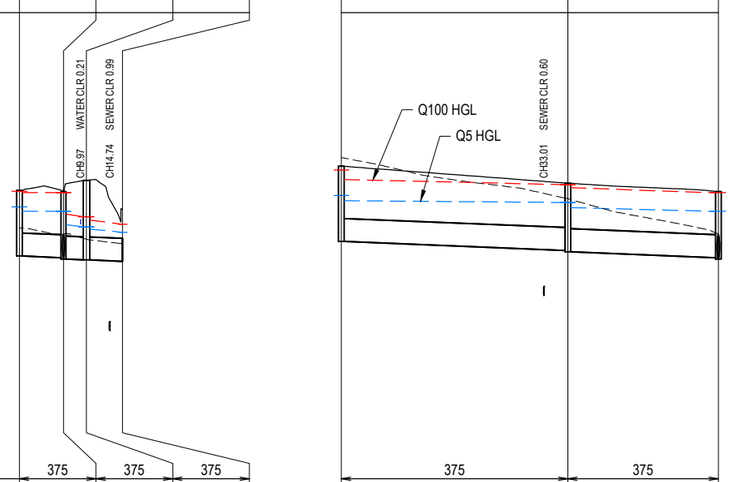
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE
STORMWATER DRAINAGE
DRAIN 01
TYPICAL SECTIONS AND DETAILS

SCALE	DRAWING No	REV
AS SHOWN	IH132900-5E-CI-DRG-0513	A

STRUCTURE NAME	58/4	58/3	58/2	58/1	59/2	59/1	58/3
STRUCTURE DESCRIPTION	ON-GRADE KERB INLET PIT; LINTEL TYPE S	ON-GRADE KERB INLET PIT; LINTEL TYPE S	GROSS POLLUTANT TRAP; CLEANSALL 375	HEADWALL	ON-GRADE KERB INLET PIT; LINTEL TYPE S	ON-GRADE KERB INLET PIT; LINTEL TYPE S	ON-GRADE KERB INLET PIT; LINTEL TYPE S
PIPE SIZE (mm)		375	375	375	375	375	375
PIPE CLASS		PP	PP	PP	PP	PP	PP
PIPE GRADE (%)		0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
PIPE SLOPE (1 in X)		249.91	249.68	250.00	250.00	250.01	
FULL PIPE VELOCITY (m/s)		0.46	1.89	1.89	0.58	1.04	
PART FULL VELOCITY (m/s)		1.19	1.89	1.89	1.27	1.45	
DATUM RL		-4.0			-4.0		
H.G.L IN PIPE & W.S.E IN STRUCTURE	2.682	2.613 2.609 2.609	2.390 2.358 2.358	2.319 2.270 2.270	2.868 2.784 2.754 2.754	2.671 2.609 2.609	2.390
PIPE FLOW (Cumecs) (Q5 PIPE FLOW) (Q100 PIPE FLOW)		0.051 0.034	0.208 0.245	0.208 0.244	0.064 0.109	0.115 0.131	
PIPE CAPACITY AT GRADE (Cumecs)		0.144	0.144	0.144	0.144	0.144	
DEPTH TO INVERT		1.071 1.079	1.099 1.297	1.297 0.838	0.838 1.227 1.098	1.118 1.079	1.099
INVERT LEVEL OF DRAIN		1.882 1.853	1.833 1.818	1.818 1.795	1.795 2.119 1.972	1.952 1.853	1.833
DESIGN SURFACE LEVEL	2.953	2.932	3.115	2.633	3.347 3.070	2.932	
SETOUT COORDINATES	E 8717.605 N 80673.645	E 8723.396 N 80677.515	E 8726.059 N 80680.071	E 8730.871 N 80683.447	E 8662.505 N 80685.997	E 8699.117 N 80681.141	E 8723.396 N 80677.515
CHAINAGE	0.000	7.183 7.183	3.758 10.942	5.878 16.820	0.000 36.933 36.933	24.551 61.484	
LINE		58			59		



VERTICAL SCALE 1:50 (A1) 1:100 (A3) 0 1 2 3 4 5m / 1 0.5

HORIZONTAL SCALE 1:500 (A1) 1:1000 (A3) 0 10 20 30 40 50m / 10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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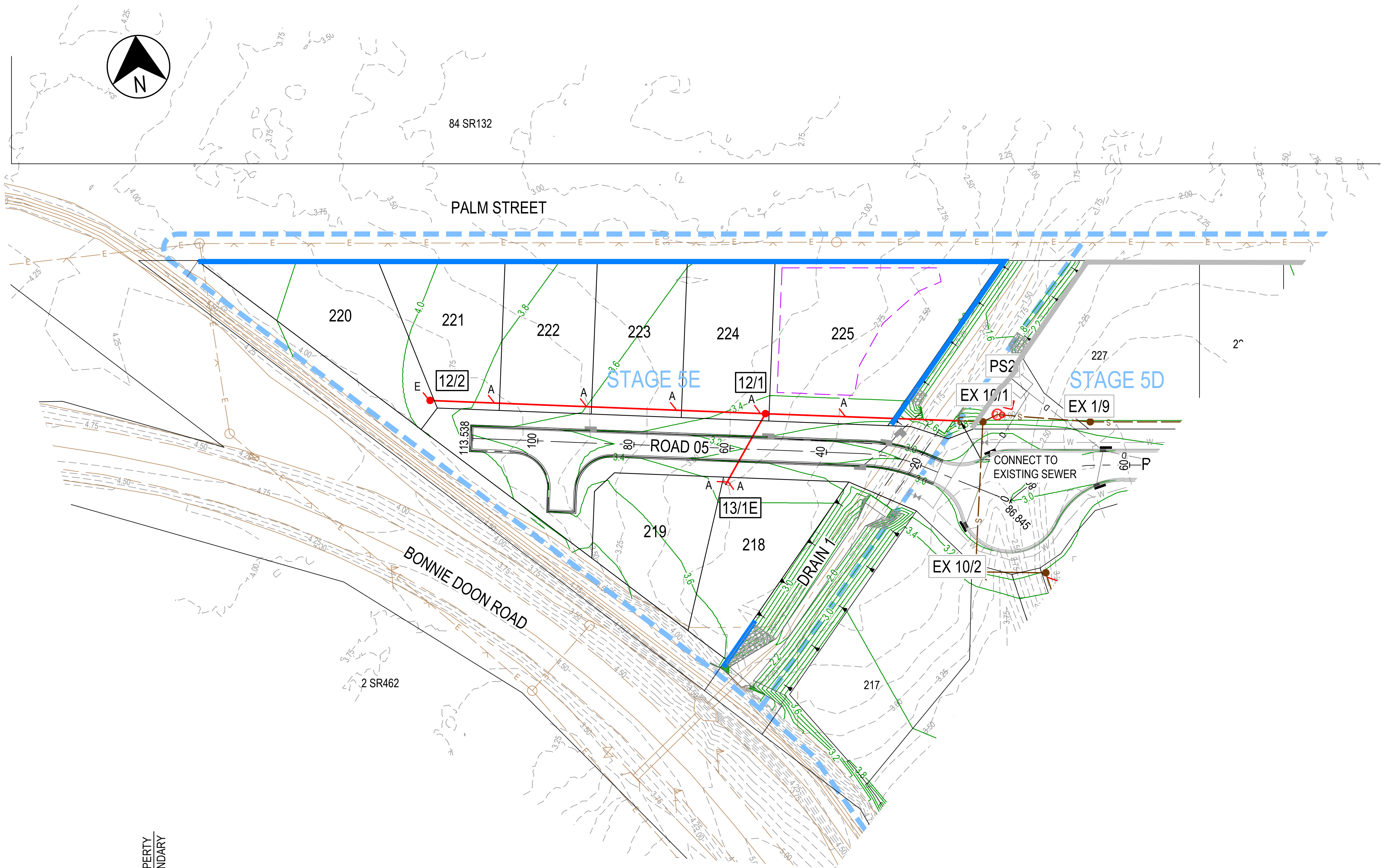
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: STORMWATER DRAINAGE LONGITUDINAL SECTIONS

SCALE: 1:500H, 1:50V (A1) | DRAWING No: IH132900-5E-CI-DRG-0514 | REV: A

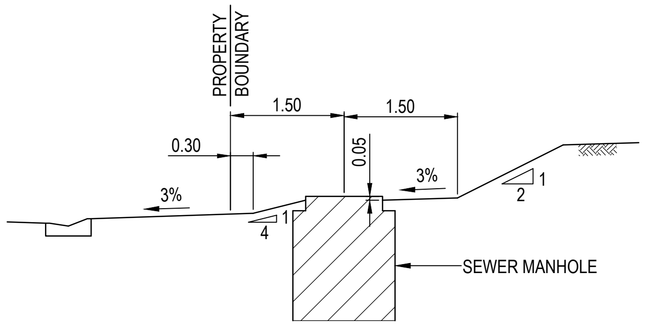


LEGEND

2/1	LINE NUMBER / STRUCTURE No.
	SEWER MAIN, MANHOLE AND ENDCAP
E1	HOUSE CONNECTION BRANCH / TYPE
	PROPOSED STORMWATER
	BATTER
	STAGE BOUNDARY
57.0	DESIGN SURFACE CONTOURS (0.2m INTERVAL)
57.0	EXISTING SURFACE CONTOURS (0.25m INTERVAL)
	RETAINING WALL
D	EXISTING STORMWATER
S	EXISTING SEWER
W	EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.



TYPICAL SEWER MANHOLE IN BATTER ARRANGEMENT

N.T.S.

SCALE 1:500 (A1)
1:1000 (A3)
10 5 0 10 20 30 40 50m

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

OCEAN BREEZE estate

Jacobs

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CLIENT JONPA PTY LTD
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE SEWERAGE

SCALE 1:500 (A1) | DRAWING No IH132900-5E-CI-DRG-0515 | REV A

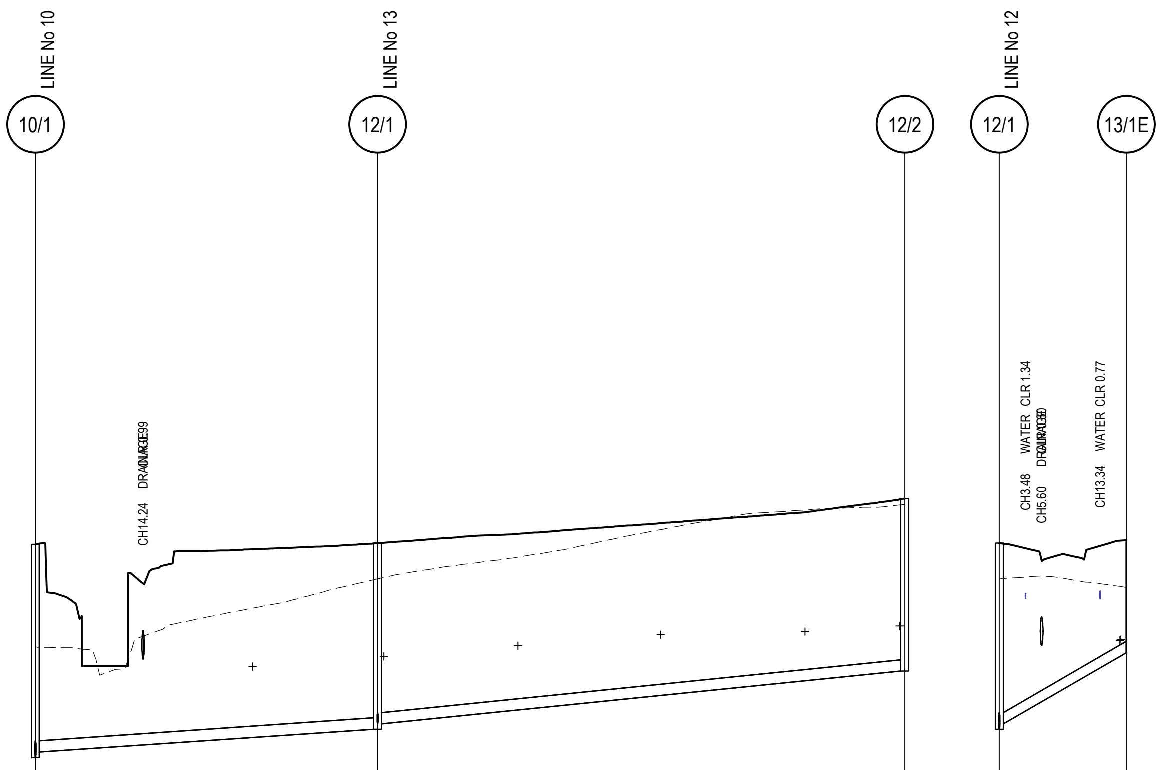
DATE: 26/10/2021 5:41:37 PM NAME: COWLING, ROBERT
LOCATION: C:\Users\cowlinr\AppData\Local\projectwise\jacobs_anz_ie\d0542229\IH132900-5E-CI-DRG-0517-0518_Sewerage LS.dwg

LEGEND

\+ HOUSE CONNECTION BRANCH

NOTES

1. UNLESS NOTED OTHERWISE, ALL MANHOLE DIAMETERS, DROP TYPES AND COVERS TO BE IN ACCORDANCE WITH FNQROC STD. DRG. S3000.
2. ENSURE ENDCAP FINISHED SURFACE IS NO GREATER THAN 1.5m ABOVE INVERT.



LINE 12

	10/1		12/1		12/2
GRADE (1 in "X")		150		100	
PIPE SIZE (mm)		150		150	
DATUM RL	-5.0				
DEPTH TO INVERT	2.82 / 2.75		2.46 / 2.39		2.28
INVERT LEVEL	0.504 / 0.574		0.876 / 0.946		1.643
DESIGN SURFACE LEVEL	3.32		3.34		3.93
EXISTING SURFACE LEVEL	1.97		2.86		3.85
SETOUT COORDINATES	E 8743.288 N 80680.404		E 8698.402 N 80686.280		E 8629.275 N 80695.449
CHAINAGE	0.00	45.27	45.27	69.73	115.00

LINE 13

	12/1		13/1E
GRADE (1 in "X")		17.8	
PIPE SIZE (mm)		150	
DATUM RL	-5.0		
DEPTH TO INVERT	2.46 / 2.39		1.49
INVERT LEVEL	0.876 / 0.946		1.888
DESIGN SURFACE LEVEL	3.34		3.38
EXISTING SURFACE LEVEL	2.86		2.76
SETOUT COORDINATES	E 8698.402 N 80686.280		E 8688.896 N 80672.409
CHAINAGE	0.00	16.81	16.81

VERTICAL SCALE 1:50 (A1) 0 1 2 3 4 5m
1:100 (A3) 1 0.5

HORIZONTAL SCALE 1:500 (A1) 0 10 20 30 40 50m
1:1000 (A3) 10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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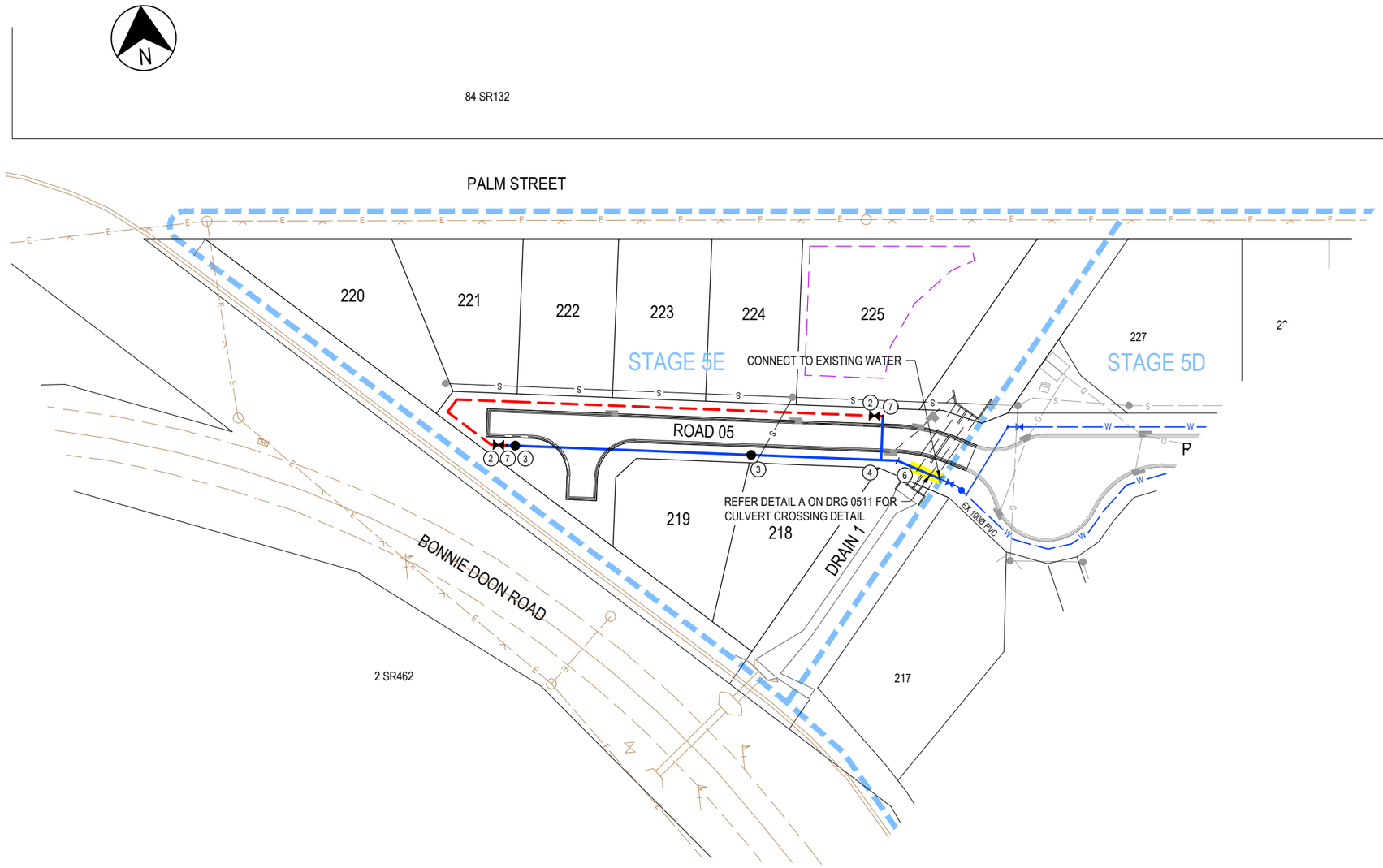
CLIENT JONPA PTY LTD
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED RC	DESIGN REVIEW RJC	DATE 27.10.21	DATE 27.10.21

TITLE
SEWERAGE LONGITUDINAL SECTIONS

SCALE 1:500H, 1:50V (A1) | DRAWING No IH132900-5E-CI-DRG-0516 | REV A



LEGEND

- STAGE BOUNDARY
- PROPOSED STORMWATER
- PROPOSED SEWER
- BUILDING LOCATION ENVELOPE
- EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.

WATER SUPPLY PIPE AND FITTINGS LIST

REF.	CODE	DESCRIPTION
1		SLUICE VALVE CLASS `14' COMPLETE WITH C.I. COVER BOX, CONCRETE MARGIN AND MARKER
2		50 BRONZE GATE VALVE COMPLETE WITH C.I. COVER BOX, CONCRETE MARGIN AND MARKER
3		80 SPRING HYDRANT COMPLETE WITH RISER, TEE, C.I. COVER BOX, CONCRETE MARGIN AND MARKER
4		TEE WITH CONCRETE THRUST BLOCK
6		BEND TO SUIT WITH CONCRETE THRUST BLOCK
7		SERVICE MAIN CONNECTION
		100 uPVC WATER MAIN CLASS '16' RUBBER RING JOINTED
		63 OD PE 100 PN 16
		100 DICL WATER MAIN TYTON XCEL RUBBER RING JOINTED

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
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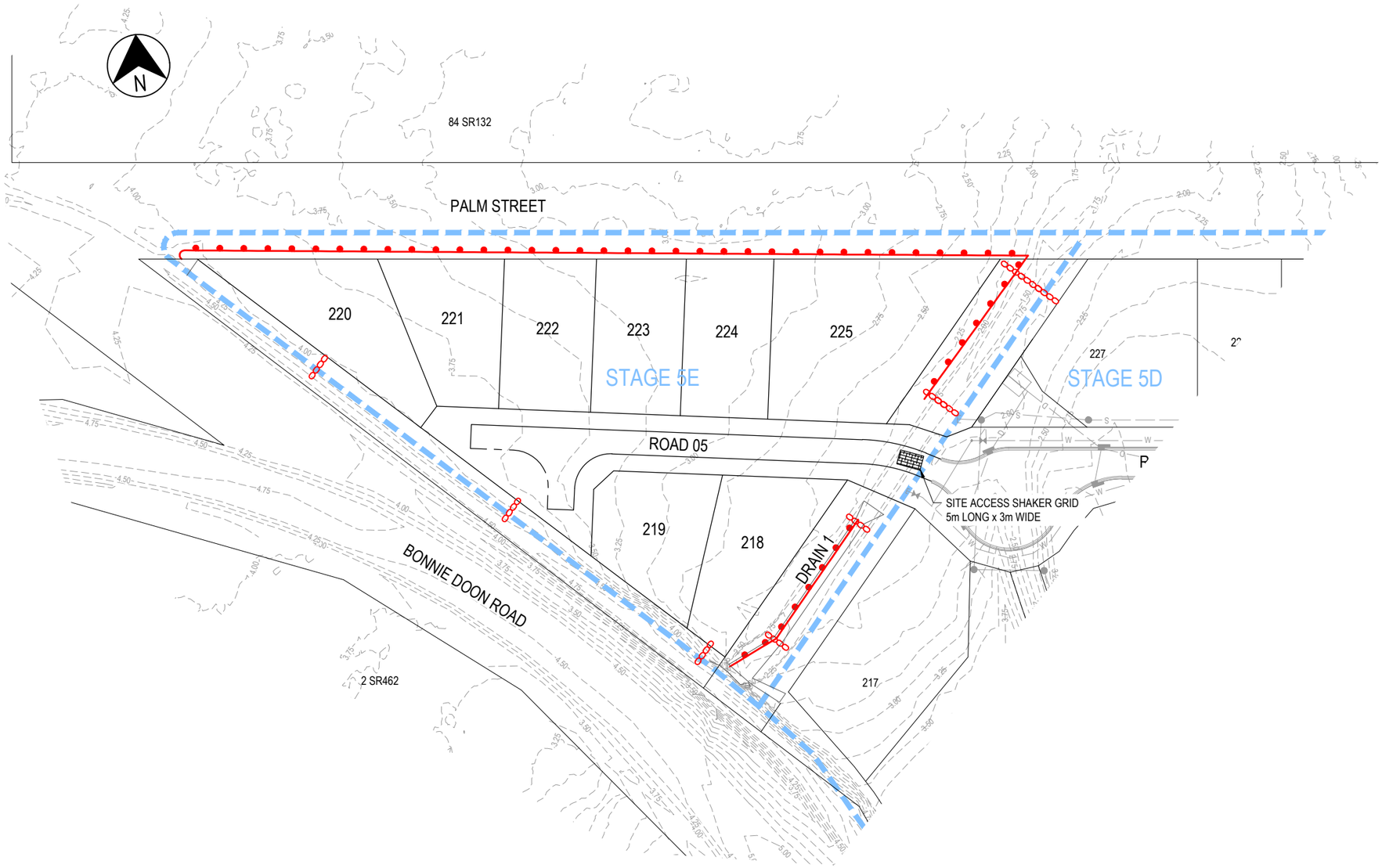
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: WATER RETICULATION

SCALE	DRAWING No	REV.
1:500 (A1)	IH132900-5E-CI-DRG-0517	A



LEGEND

- SILT FENCE
- STAGE BOUNDARY
- 57.0 EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- ROCK CHECK DAM
- D EXISTING STORMWATER
- S EXISTING SEWER
- W EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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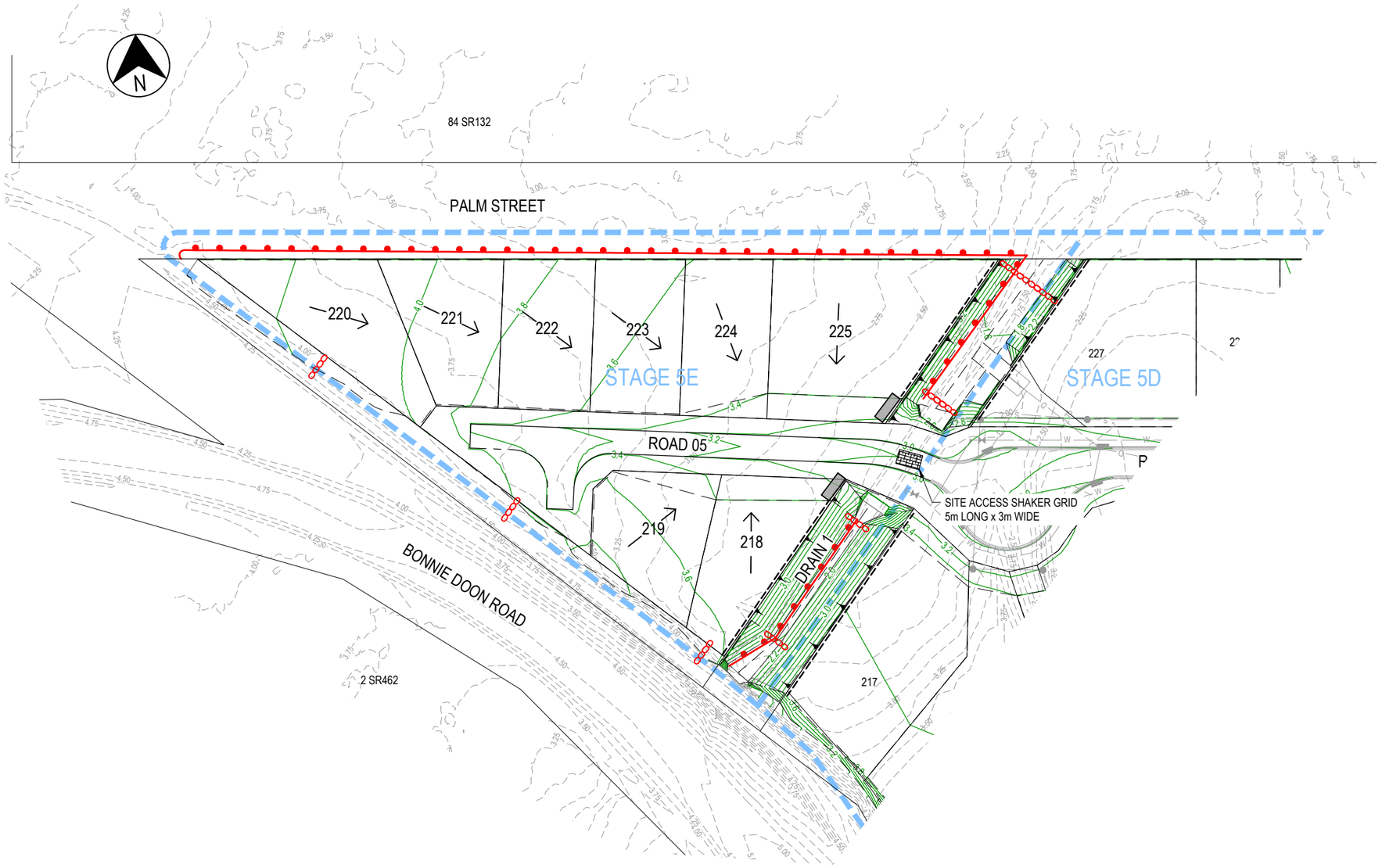
CLIENT JONPA PTY LTD
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE
EROSION AND SEDIMENT CONTROL STRATEGY PHASE 1 - TOPSOIL STRIPPING

SCALE	DRAWING No	REV
1:500 (A1)	IH132900-5E-CI-DRG-0518	A



LEGEND

- SILT FENCE
- FALL OF LOTS
- BATTER
- STAGE BOUNDARY
- DESIGN SURFACE CONTOURS (0.2m INTERVAL)
- EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- ROCK CHECK DAM
- BATTER BUND
- VISQUEEN LINED BATTER CHUTE
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.

SCALE 1:500 (A1)
1:1000 (A3)

0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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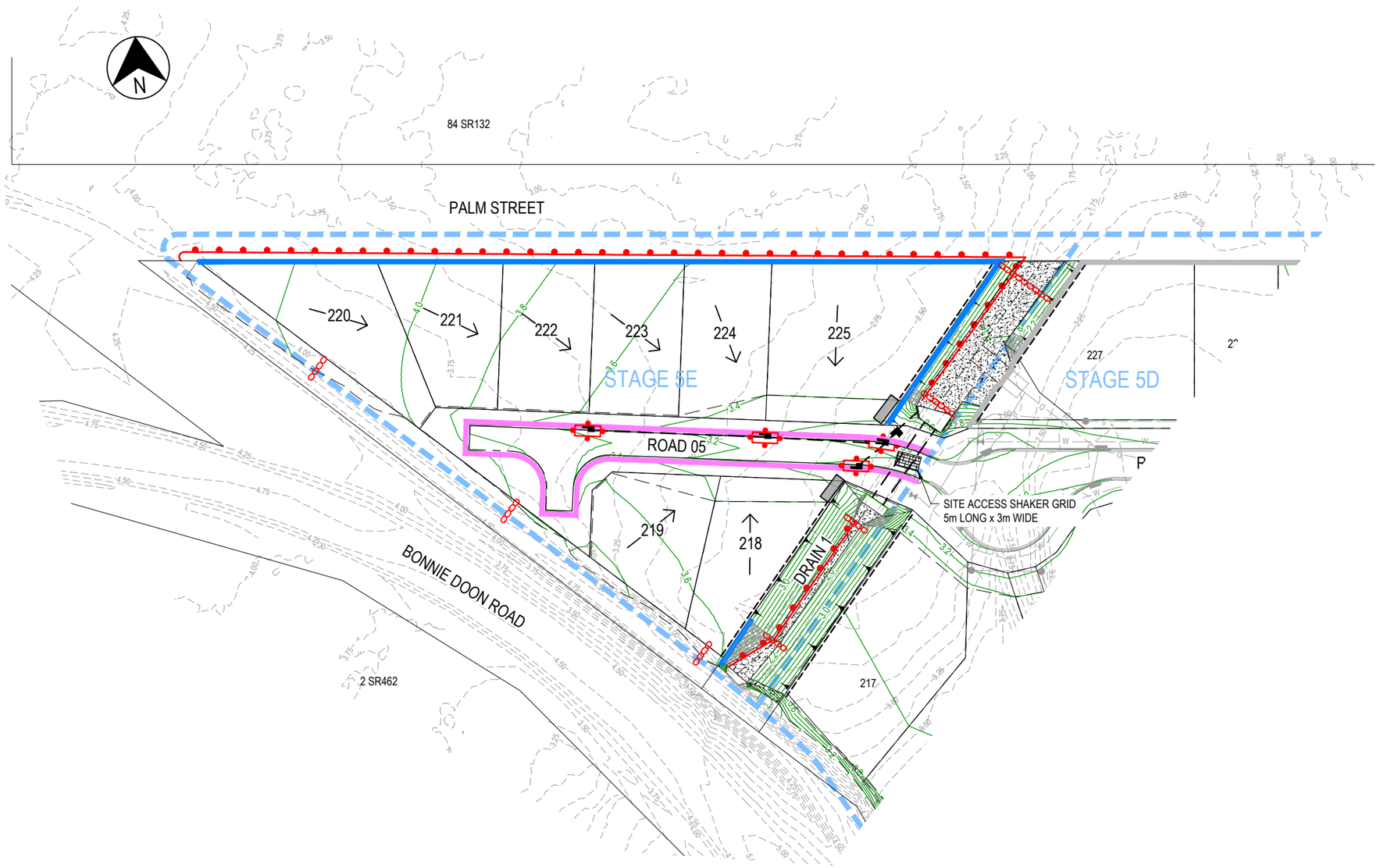
CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: EROSION AND SEDIMENT CONTROL STRATEGY
PHASE 2 - EARTHWORKS

SCALE	DRAWING No	REV
1:500 (A1)	IH132900-5E-CI-DRG-0519	A



LEGEND

- SILT FENCE
- PIT PROTECTION MEASURES
- STORMWATER DRAINAGE PIPE
- KERB INLET PIT OR
- HEADWALL
- FALL OF LOTS
- BATTER
- STAGE BOUNDARY
- 57.0 DESIGN SURFACE CONTOURS (0.2m INTERVAL)
- 57.0 EXISTING SURFACE CONTOURS (0.25m INTERVAL)
- GROUTED STONE PITCHING SCOUR PROTECTION ($10m^2$ NOMINAL)
- ROCK CHECK DAM
- BATTER BUND
- VISQUEEN LINED BATTER CHUTE
- TURF STRIPS
- D EXISTING STORMWATER
- S EXISTING SEWER
- W EXISTING WATER

NOTE

FOR NOTES REFER DRG-0502.

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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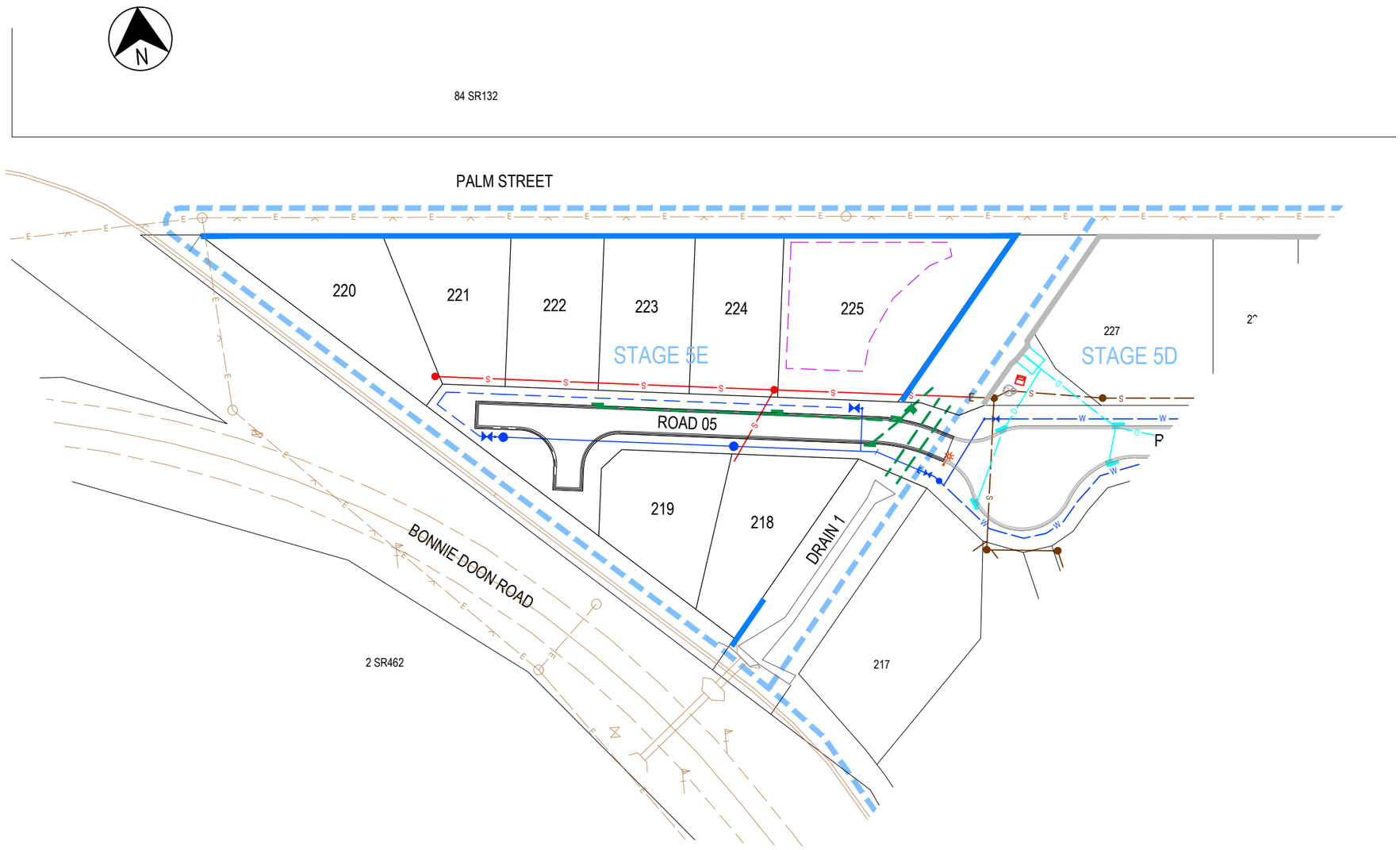
CLIENT JONPA PTY LTD
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N. LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE
EROSION AND SEDIMENT CONTROL STRATEGY
PHASE 3 - ROADWORKS

SCALE	DRAWING No	REV
1:500 (A1)	IH132900-5E-CI-DRG-0520	A



LEGEND

- STAGE BOUNDARY
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWER
- PROPOSED WATER MAIN
- PROPOSED ELECTRICAL
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- BUILDING LOCATION ENVELOPE

SCALE 1:500 (A1)
1:1000 (A3)
0 10 20 30 40 50m
10 5

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	27.10.21	RC	RJB	RJC	INITIAL ISSUE		

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CLIENT: JONPA PTY LTD
PROJECT: OCEAN BREEZE ESTATE - COOYA BEACH - STAGE 5E

DRAWN	DRAWING CHECK	REVIEWED	APPROVED
RC	RJB	N.LEE LONG	
DESIGNED	DESIGN REVIEW	DATE 27.10.21	DATE 27.10.21
RC	RJC		

TITLE: MASTER SERVICES PLAN

SCALE	DRAWING No	REV
1:500 (A1)	IH132900-5E-CI-DRG-0521	A