

**DEVELOPMENT APPLICATION REPORT – Development Application Approval for Reconfiguration of a Lot (1 lot into 33, open space and new roads), Lot 3 on RP720296, Junction Road, Mossman**

Douglas Shire Planning Scheme, Cairns Regional Council

**November 2013**

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## **1. EXECUTIVE SUMMARY**

MiCorp Property Pty Ltd as applicant on behalf of Shane and Priscilla Quaid, owners of Lot 3 on RP720296, Junction Road Mossman, seek Development Application Approval for a Reconfiguration of a Lot (1 lot into 33, open space and new roads).

The proposed Development Application complies with Codes, Policies and overlays of the Douglas Shire Planning Scheme and the relevant State Government Planning policies relevant to this region and location of Far North Queensland.

The proposed land use and activities are deemed assessable under the Douglas Shire Planning Scheme.

The proposed development is compliant with the relevant Codes; Policies and Conditions under the Douglas Shire Planning Scheme and Cairns Regional Council and should be supported for approval.

## **2. REQUIRED IDAS FORMS + DETAILS OF APPENDICES**

All required IDAS forms that are required to be completed to support this Development Application as per SPA are completed and lodged via the SMART EDA system online.

IDAS forms completed supporting this Development Application include:

- IDAS Form 1- Application Details
- IDAS Form 7 - Reconfiguring a Lot

The following plans and drawings supporting this Development Application are attached in Appendix C:

- Earthworks, Roadworks and Stormwater Drainage – DW 1303NCE-C1B
- Allotment Layout and Stage Plan – DW 1303NCE-C1B

### 3. Site Characteristics

#### 3.1 Summary of Proposal

MiCorp Property Pty Ltd as applicant on behalf of Shane and Priscilla Quaid, owners of Lot 3 on RP720296, Junction Road Mossman, seek Development Application Approval for a Reconfiguration of a Lot (1 lot into 33, open space and new roads).

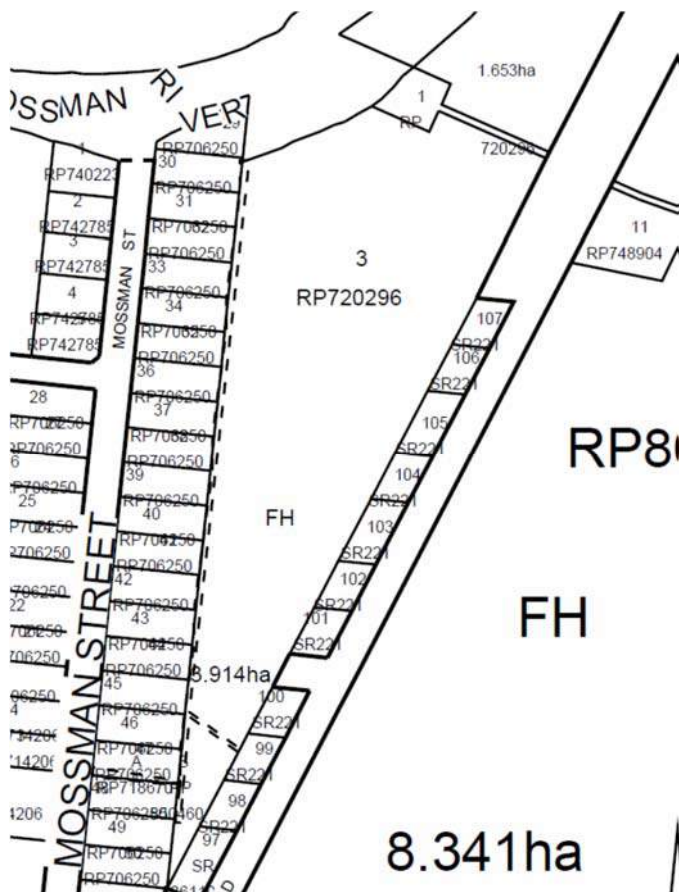
#### Address and Property Description

Lot 3 on RP720296

Total land area – 3.914ha

An excerpt from the Queensland government SmartMap of the location is below.

Figure 1 Smart Map Excerpt



Source: Queensland Globe, accessed 06/07/2013.

## **Local Planning Consent Authority**

Cairns Regional Council  
Douglas Shire Planning Scheme

### **3.2 Site Tenure and History**

The subject site is freehold land that has been previously utilised for sugar cane production and has one dwelling house on the land.

A title search has confirmed that Shane and Priscilla Quaid are the registered owners of the property. The title search is attached in Appendix B.

#### **3.2.1 Previous Approvals**

In 2007 the previous owners of the land submitted a development application to reconfigure the property from 1 lot into 29 (DA ref ROL 002/07). This was approved subject to conditions on 25<sup>th</sup> October 2007 by Douglas Shire Council. One of the conditions (number 14) outlined the requirement of the independent flood study to be submitted to Council prior to operational works approval. This study was completed but never given to Council as the approval lapsed and the property was then sold to the current owners. It has been determined through pre-lodgement discussions with Cairns Regional Council that this study may be used for this development.

A Noise Impact Assessment accompanied the development application completed by VIPAC Engineers and Scientists Ltd. Noise was assessed to Lots 15,16,17,18,19,20 and 21 of the proposed (former) reconfiguration. The report recommended specifications for the wall and roof of houses on those lots. These noise attenuation measures are going to be implemented for this development. This report has been attached in Appendix E.

A Flood Impact Study was completed by Maunsell/AECOM and accompanied the development application also. The study determined that there was a 0.01 metre or less difference in the 1 in 100 year flood level event pre and post development. Pre-lodgement discussions with CRC officers for the current proposed reconfiguration suggested re-submitting this study to accompany the DA. It has been attached in Appendix F.

#### **3.2.2 Easements and Encumbrances**

The following easements are present on the property as displayed on the title search in Appendix B:

- Easement in gross NO 700680142 01/06/1995  
burdening the land to  
Council of the Shire of Douglas  
over  
Easement B on RP 850460

This easement is located near the southern boundary of the property and is marked on the subdivision plan in Appendix C.

### **3.3 Physical Characteristics and Surrounding Land Uses**

The site is located on Junction Road Mossman which is a local government controlled road. The site is flat and cleared and predominantly surrounded by residential on the west and south-east boundaries, cane fields adjacent to the property to the east and adjoins the Mossman River on the north-west boundary. The Mossman

Sugar Mill is located approximately 300 metres from the subject site. Figure 2 below shows an aerial view of the subject site.

**Figure 2 Aerial of Subject Site**



Source: Google earth/Queensland Globe, accessed 06/07/13

## **4. Development Proposal**

### **4.1 Summary**

This Development Application is for:

- Reconfiguration of a Lot (1 lot into 33, open space and new roads)

An assessment against the codes and policies of the Douglas Shire Planning Scheme is provided in Appendix D.

### **4.2 Proposal**

#### **Staging**

The proposal will be staged:

- Stage 1 – 13 residential lots
- Stage 2 – 11 residential lots
- Stage 3 – 9 residential lots

This proposal is to reconfigure the subject site into 33 lots, parkland and new road. Pre-lodgement discussions with Cairns Regional Council officers led to the final reconfiguration design that complies with all Council requirements.

#### **Residential Lots**

All lots comply by the minimum lot size and minimum dimensions for road frontage have been provided as per CRC development standards.

#### **Open Space/Parkland**

Parkland (2482m<sup>2</sup>) has been provided along the boundary with the Mossman River and the Mossman Mill pump site. Three (3) carparks have been provided for the parkland and sufficient vehicle turnaround has been provided via the T head cul-de-sac for Road B (on Allotment Layout and Stage Plan Appendix C). Stormwater is piped through the park for Q2 flows with all greater flows crossing the park as surface flows. A swale drain with 1 in 4 sides will be required in approximate location of existing stormwater flow path. Existing trees can be avoided. The proposed park to be filled to 6.77m AHD (Q50 flood level).

#### **Southern Easement**

Lot 27 has an easement across it for council stormwater and sewerage infrastructure. The existing sewerage pump station is on current road reserve so this cannot be included on a freehold lot. A larger easement (1137m<sup>2</sup>) has been provided to CRC as outlined in the Allotment Layout and Stage Plan in Appendix C

#### **Drainage and Engineering**

There are two existing stormwater pipes owned by Council in the subject land without any easement along the western boundary which discharges to the Mossman River. The attached stormwater plans show the



direction of surface stormwater flow along the western boundary. The development will reduce the stormwater flow that discharges to these pipelines as stormwater is intercepted by the new road stormwater system.

The land between lot 22 and 23 is a drainage reserve and will contain the Q2 stormwater pipeline and overland flow path for secondary stormwater flows. The invert will be concreted and batter slopes will be 1 in 4. Stormwater pipeline have locations rationalised to minimise road crossings. Stormwater gross pollutant trap to be installed at the drainage reserve between lots 22 and 23, marked on stormwater plan. Batters will be implemented as per the FNQROC development manual. Final batter heights will be determined during the Operational Works Plans and geotechnical report supplied if required.

The site design and earthworks drawings are attached in Appendix C.

### **4.3 Site works**

Site works required for this development will include the placement of fill on the land. A Development Application for Operational Works (associated with the reconfiguration of a lot) will be submitted upon the approval of this application.

## 5. PLANNING ASSESSMENT

### 5.1 Introduction

This proposed Reconfiguration of a Lot is required to be assessed in accordance with the relevant policies of the Douglas Shire Planning Scheme and any other planning documents relevant to the application.

#### 5.1.1 Level of Assessment and Applicable Codes

##### Reconfiguration of a Lot (1 lot into 33)

In accordance with the Douglas Shire Planning Scheme the development assessment needs to address the following local codes/policies as well as the planning schemes DEO's.

- Locality: Mossman and Environs Locality
- Planning Area: Residential 1
- Overlays: Acid Sulfate Soils Code, Natural Areas and Scenic Amenity Code
- General Codes: Reconfiguring a Lot Code

The proposal is code assessable and does not require public notification.

#### 5.1.2 Code Assessment

The proposal is deemed to apply with all codes within the Douglas Shire Planning Scheme. Refer to Appendix D for the full assessment against the relevant codes.

#### 5.1.3 Referrals

As per the Sustainable Planning Regulation 2009, the Department of Transport and Main Roads are a referral agency for this development application as the proposed:

Schedule 7, Table 2, Item 2

*“(iii) abuts a road that intersects with a State-controlled road that is within 100m of the land; and*

*1 or more of the following apply—*

- (i) the total number of lots is increased; “*

Referral will be required through the SARA process. As per the State Development Assessment Provisions, this development is deemed to comply with Module 1, 18 and 19 as the proposal will have no direct connection to the state controlled road and no adverse impacts on the road network.

#### 5.1.6 State Planning Policies

Table 2 provides an overview of the currently State Planning Policies (SPPs) and their applicability to the site.

**Table 1 State Planning Policies**

State Planning Policy	Applicability
Temporary SPP 2/12 Planning for Prosperity	Applicable. This proposal complies with the SPP as it will not impede mining or the extractive resources industry, agricultural or tourism activities.
SPP 1/12 Protection of Queensland's Strategic Cropping Land	Not applicable. The proposal is not on strategic cropping land.
SPP 4/11 Protecting wetlands of high ecological significance in Great Barrier Reef catchments	Not applicable. No wetlands occur on or adjoining the subject site.
SPP 5/10 Air, Noise and Hazardous Materials	Not applicable. The site is not within a management area under this SPP.
SPP 4/10 Healthy Waters	Applicable. The proposal will not have any adverse effects on waterway quality. Further plans for subdivision will be provided at the operational works stage.
SPP 3/10 Acceleration of Compliance Assessment	Not applicable. The proposal does not require compliance assessment.
SPP 2/10 South East Queensland Koala Conservation.	Not applicable, project is not in SEQ.
SPP 2/07 Protection of Extractive Resources	Not applicable. The subject site is not within a Key Resource Area.
SPP 1/07 <a href="#">Housing and Residential Development including Guideline 1.0</a>	Not applicable. Only applicable to local governments making or amending a planning scheme.
SPP 1/03 <a href="#">Mitigating the Adverse Impacts of Flood, Bushfire and Landslide 1.0</a>	Expired 1 September 2013.
SPP 2/02 <a href="#">Planning and Managing Development Involving Acid Sulfate Soils 1.0 Guideline for SPP 2/02: Planning and Managing Development Involving Acid Sulfate Soils 2.0</a>	Applicable. The development and construction will follow the guideline if needed. No acid sulfate soils are currently identified.

**5.1.4 Far North Queensland Regional Plan 2009-2031**

The Far North Queensland Region Plan is the overarching plan for the region. It provides a strategic vision for the region and provisions to achieve these outcomes. The subject site is located within the urban footprint mapping of the regional plan and complies with the objectives and outcomes of the plan.

## **6. CONCLUSION**

MiCorp Property Pty Ltd as applicant on behalf of Shane and Priscilla Quaid, owner of Lot 3 on RP720296, Bruce Highway, El Arish, seek Development Application Approval for Reconfiguration of a Lot (1 lot into 33).

Pre-lodgements consultation has occurred with Cairns Regional Council officers that results in a Development Application that complies with the Codes, Policies and overlays of the Douglas Shire Planning Scheme and the relevant State Government Planning policies relevant to Far North Queensland. There will be no adverse environmental or amenity impacts on the subject area and no adverse flood impacts as indicated in the flood study. This proposal should therefore be supported for approval.

# APPENDICIES

**APPENDIX A: Owners Consent + IDAS Forms**

**Individual owner's consent to the making of a  
development application under the *Sustainable Planning Act 2009***

We, Shane and Priscilla Quaid

as owners of premises identified as follows

Lot 3 on RP 720296, Junction Road Mossman.

consent to the making of a development application under the *Sustainable Planning Act 2009* by

Sarah Mort – MiCorp Town Planning

on the premises described above for the purposes of:

Reconfiguration of a Lot (1 lot into 34, new roads and parkland)

  [signature of owner]

signed on the nineteenth day of November 20 13

**APPENDIX B: Title Search**



# CURRENT TITLE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 16891768

Search Date: 04/09/2013 10:15

Title Reference: 20688187

Date Created: 03/09/1965

Previous Title: 20136111

## REGISTERED OWNER

Dealing No: 714216171 14/12/2011

SHANE WILLIAM QUAID

PRISCILLA QUAID

JOINT TENANTS

## ESTATE AND LAND

Estate in Fee Simple

LOT 3

REGISTERED PLAN 720296

County of SOLANDER

Parish of VICTORY

Local Government: CAIRNS

## EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by  
Deed of Grant No. 10562121 (POR 72)
2. EASEMENT IN GROSS No 700680142 01/06/1995 at 15:55  
burdening the land to  
COUNCIL OF THE SHIRE OF DOUGLAS  
over  
EASEMENT B ON RP 850460
3. MORTGAGE No 714216177 14/12/2011 at 11:08  
BENDIGO AND ADELAIDE BANK LIMITED A.B.N. 11 068 049 178

ADMINISTRATIVE ADVICES - NIL

UNREGISTERED DEALINGS - NIL

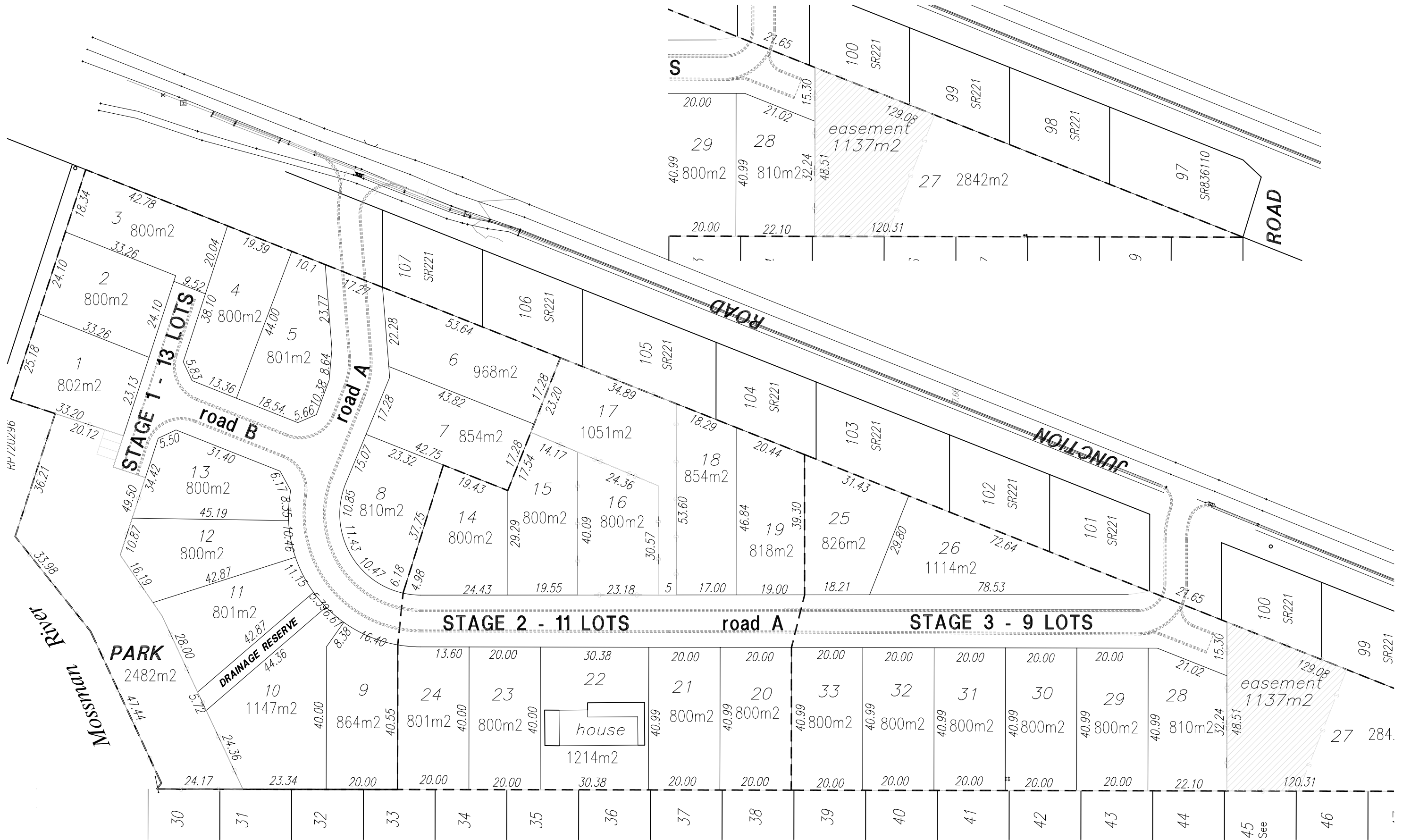
## CERTIFICATE OF TITLE ISSUED - No

Caution - Charges do not necessarily appear in order of priority

\*\* End of Current Title Search \*\*

COPYRIGHT THE STATE OF QUEENSLAND (DEPT OF NATURAL RESOURCES AND MINES) [2013]  
Requested By: D APPLICATIONS CITEC CONFIRM

**APPENDIX C: Site Plans**



REVISIONS			
A	ROL APPLICATION	16/11/13	M.V.
REVISION	DETAILS	DATE	APPROVED
CAD FILE:			

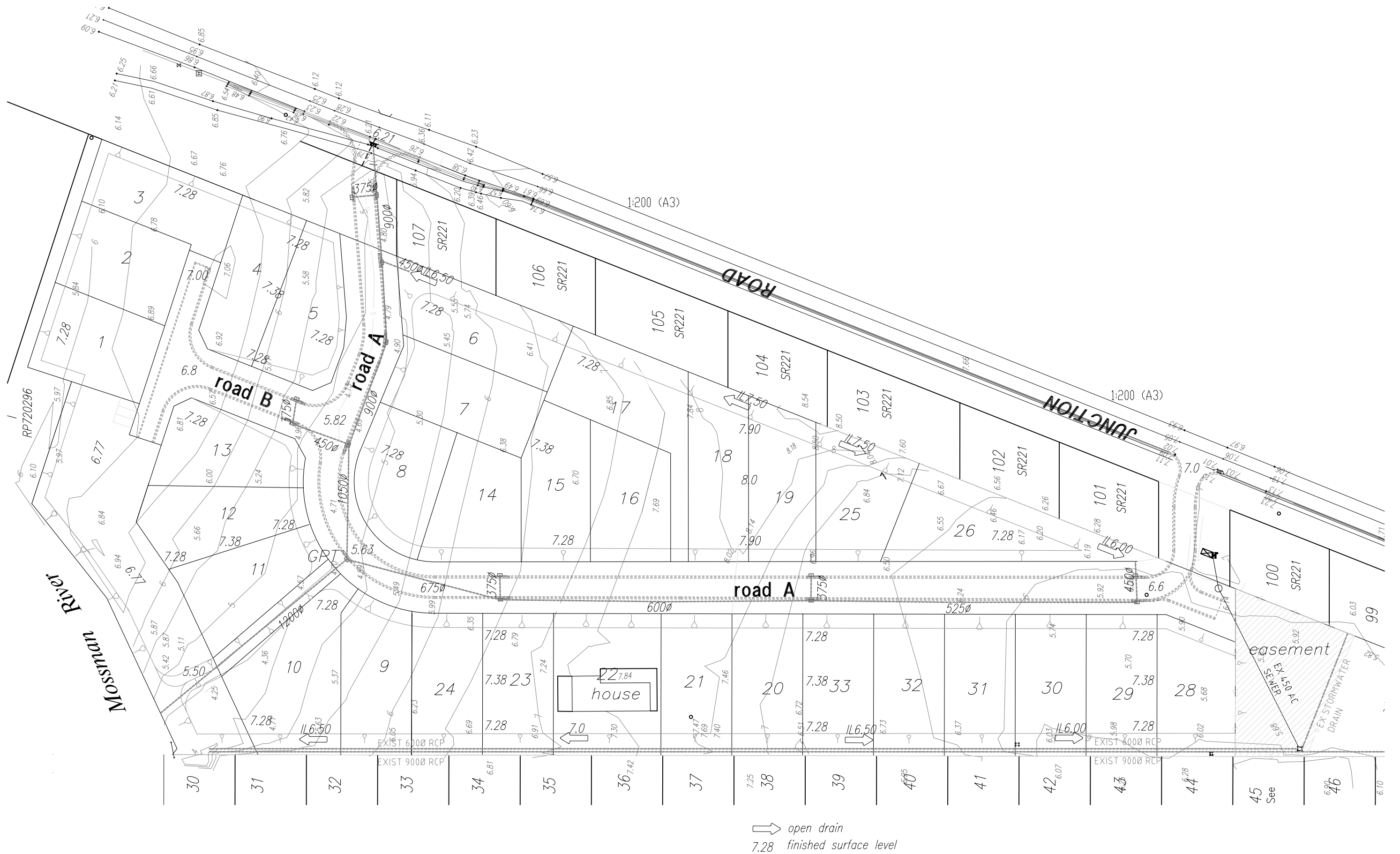
MOODIE REF	
DESIGNED	M.V.
DRAWN	M.V.
CHECKED	
REVISION	

**Moodie Infrastructure P/L**  
Engineers, Planners and Project Managers  
ABN 21 124 870 211

PO Box 487 Smithfield 4878  
Tel: Mobile 0407 674909  
Email: vdc3@bigpond.com

**P. and S.W.QUAID**  
**RECONFIGURATION OF A LOT**  
LOT 3 ON RP 720296, JUNCTION ST, MOSSMAN  
**ALLOTMENT LAYOUT AND STAGE PLAN**

SCALE	AS SHOWN 1:1000 (A3)
SHEET	1 OF 3
DRAWING NO.	1303NCE-C1B



REVISIONS			
A	ROL APPLICATION	16/11/13	MV
REVISION	DETAILS	DATE	APPROVED
CAD FILE:			

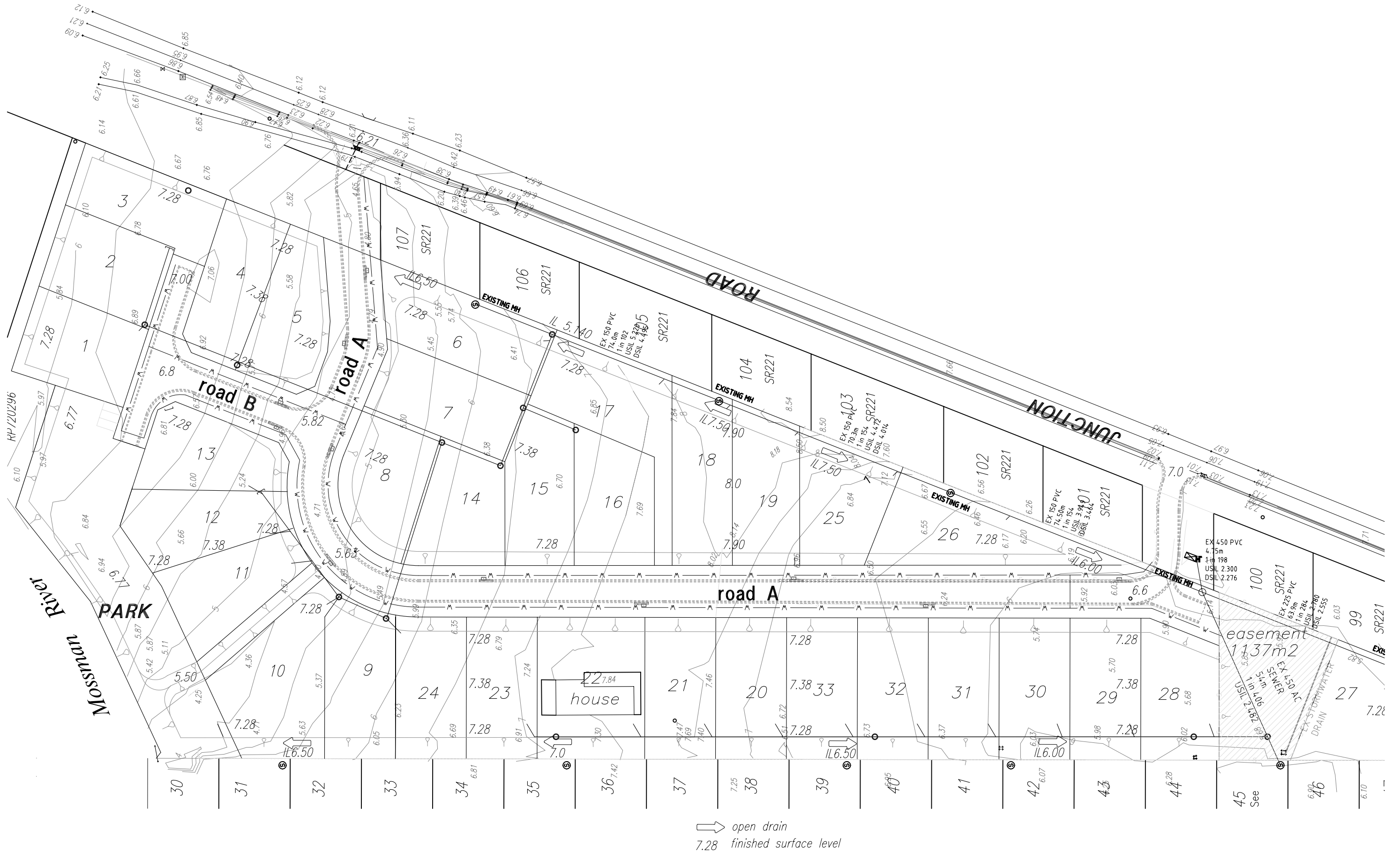
VALMADRE REF	
DESIGNED	M.V.
DRAWN	M.V.
CHECKED	
REVISION	

**Moodie Infrastructure P/L**  
Engineers, Planners and Project Managers  
ABN 21 124 870 211

PO Box 487 Smithfield 4878  
Tel: Mobile 0407 674909  
Email: vdc3@bigpond.com

**P. and S.W.QUAID**  
**RECONFIGURATION OF A LOT**  
LOT 3 ON RP 720296, JUNCTION ST, MOSSMAN  
**EARTHWORKS, ROADWORKS AND STORMWATER DRAINAGE**

SCALE	AS SHOWN 1:1000 (A3)
SHEET	2 OF 3
DRAWING NO.	1303NCE-C1B



REVISIONS			
A	ROL APPLICATION	23/9/13	MV
REVISION	DETAILS	DATE	APPROVED
CAD FILE:			

VALMADRE REF	
DESIGNED	M.V.
DRAWN	M.V.
CHECKED	
REVISION	

**Moodie Infrastructure P/L**  
Engineers, Planners and Project Managers  
ABN 21 124 870 211  
  
PO Box 487 Smithfield 4878  
Tel: Mobile 0407 674909  
Email: vdc3@bigpond.com

**P. and S.W.QUAID**  
**RECONFIGURATION OF A LOT**  
LOT 3 ON RP 720296, JUNCTION ST, MOSSMAN  
**SEWERAGE RETICULATION AND WATER SUPPLY**

SCALE	1:1000 (A3)
SHEET	3 OF 3
DRAWING NO.	1303NCE-C1B

**Appendix D: Town Planning Assessment – Douglas Shire Planning Scheme**

## Douglas Shire Planning Scheme Assessment

<b>Mossman and Environs Locality Code</b>		
<b>General Requirements</b>		
<b>Performance Criteria</b>	<b>Acceptable Solution</b>	<b>Comment</b>
Buildings and structures complement the Height of surrounding development and buildings are limited to two Storeys.	A1.1 In this Locality the maximum Height of Buildings/structures is 6.5 metres. In addition, the roof (including any ancillary roof features) does not exceed a maximum Height of 3.5 metres above the intersection of the pitching part of the roof and the wall of the Building.	Not applicable. This proposal is for a RoL.
Development is connected to all urban services.	A2.1 Development is connected to available urban services by underground connections, wherever possible.  AND/OR  Contributions are paid when applicable in accordance with the requirements of Planning Scheme Policy No 11 – Water Supply and Sewerage Headworks and Works External Contributions	Complies. All urban services will be provided either directly or via headworks contributions.
Landscaping of development Sites complement the existing character of the Mossman Locality.	A3.1 Landscaping incorporates the requirements of Planning Scheme Policy No 7 – Landscaping with particular emphasis on appropriate species for this Locality	Not applicable for this development.

Development Sites are provided with efficient and safe vehicle access and manoeuvring areas on Site and to the Site, to an acceptable standard for the Locality.	A4.1 All Roads, driveways and manoeuvring areas on Site and adjacent to the Site are designed and maintained to comply with the specifications set out in the Planning Scheme Policy No 6 – FNQROC Development Manual.	Complies. All roads will comply by FNQROC standards.
<b><i>Other Development</i></b>		
a) Good quality agricultural land, particularly sugar cane land, within the environs of the locality is protected from urban or incompatible development.	<p>A13.1 No urban development encroaches into the Rural Planning Area located within the Locality boundary.</p> <p>UNLESS</p> <p>A buffer is provided in accordance with the requirements of State Planning Policy 1/92 and Planning Guidelines – Separating Agricultural and Residential Land Uses (DNR 1997).</p>	Complies. No part of the development encroaches into the Rural Planning Area and is completely within the Residential 1 area.
b) Industrial development is located in existing or identified industrial areas to facilitate efficient use of industrial land and to effectively service the needs of the Shire.	<p>A14.1 Class A Industry uses are located in the Industry Planning Area at the southern end of Mossman around Sawmill Road to effectively service the Shire, particularly Port Douglas.</p> <p>A14.2 Class B Industry uses are located in the Industry Planning Area at the northern end of Mossman around the Mill to service the needs of the Mill and to consolidate allied industrial uses.</p>	Not applicable. This development is not for industrial use.
c) Industrial land and uses are protected from incompatible urban development.	<p>A15.1 No residential development encroaches into the Industry Planning Area.</p> <p>A15.2 Buffers are provided between Industry uses and incompatible urban uses of 40 metres and include Landscaping for screening or incorporate land use activities which are compatible to interface with the adjacent Industry</p>	Complies. This proposal does not encroach in to the Industry Planning Area.



	uses.	
<b><i>Community Facilities</i></b>		
d) Community facilities are provided to service the local community in convenient and accessible locations.	<p>A16.1 Community facilities are conveniently located within or near the Town Centre and in close proximity to existing community facilities to service the needs of local residents.</p> <p>A16.2 Public car parking areas are provided within or in close proximity to the Town Centre, existing community facilities, sporting/recreation grounds.</p>	Not applicable. This proposal is not for community facilities.
<b><i>Flood Immunity for Residential Development</i></b>		
e) Residential development does not occur on flood prone land.	<p>A17.1 Residential development occurs on land on or above Q100 flood level.</p> <p>A17.2 Development of Lot 3 on RP 720296, Junction Road is undertaken in accordance with the recommendations of a Drainage/Flood Study which outlines the necessary improvements to be undertaken on the Site to make it suitable for residential development and avoid impacts on adjoining land.</p> <p>AND Council may enter into a partnership to investigate/address the drainage and flooding issues which affect the general area.</p>	Complies. A Flood Study will accompany this development application to outline the fill measures and other necessary improvements required for the land.
<b><i>Scenic Amenity and Conservation Areas</i></b>		
f) Development does not adversely impact on Scenic Amenity, natural vegetation or Watercourses, in particular the Mossman River, the South Mossman River, Parker Creek and Marrs Creek <sup>15,16</sup> .	No Acceptable Solution. (Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and	Complies. The proposal will not adversely affect the Mossman River. Public space has been set aside along the foreshore of the river to allow a buffer. No vegetation will be affected by this development along the river.

	impact assessable development).	
<b>Residential 1 Code</b>		
<b><i>Consistent and Inconsistent Uses</i></b>		
P1 The establishment of uses is consistent with the outcomes sought for the Residential 1 Planning Area.	A1.1 Uses identified as inconsistent uses in the Assessment Table are not established in the Residential 1 Planning Area.	Complies. The proposal is a consistent use.
<b><i>Site Coverage – Other than a House</i></b>		
P2 The Site Coverage of all Buildings does not result in a built form that is bulky or visually obtrusive <sup>27</sup> .	A2.1 Any form of development, other than a House, has a Site Coverage which does not exceed the Site Coverage specified for Multi-Unit Housing outlined below in this Code.	Not applicable.
<b><i>Building Setbacks – Other than a House</i></b>		
P3 All Buildings are Setback to: <input type="checkbox"/> maintain the character of residential neighbourhoods; and <input type="checkbox"/> achieve separation from neighbouring Buildings and from Road Frontages	A3.1 Any form of development, other than a House, satisfies the same Setback requirements as specified for Multi- Unit Housing outlined below in this Code.	Not applicable.
<b><i>Fencing</i></b>		
P4 Any perimeter fencing to the Frontage of a Site in the Residential 1 Planning Area is not visually obtrusive and does not detract from the residential character of the area.	A4.1 Any fencing provided to the Main Street Frontage of the Site is a maximum of 1.2 metres in Height and does not present a blank facade to the street.  AND Fencing at the side and the rear boundaries of the Site is a maximum of 1.8 metres in Height.	Complies. Any fencing erected will comply by A4.1
<b><i>Landscaping – Other than a House</i></b>		
P5 A Site which is developed for any purpose, other than a House, has Landscaping which is functional,	A5.1 Within the Site Frontage Setback area	Not applicable. This proposal is for a RoL.

provides visual interest and form, incorporates native vegetation and provides privacy to adjacent residential uses.	<p>a minimum width of 2 metres of Landscaping including 60% Dense Planting is provided.</p> <p>AND</p> <p>Within the side and rear Setback areas a minimum width of 1.5 metres of Landscaping including 60% Dense Planting is provided in accordance with the Landscaping Code.</p> <p>A5.2 Where the proposed use incorporates or requires the provision of a public open space recreation/landscape area, that area is connected and integrated with the development.</p>	
<b>Multi-Unit Housing</b>		
This aspect of the code is not applicable to this development.		
<b>Buffering Incompatible Land Uses</b>		
<p>P8</p> <p>A buffer is provided to separate agricultural activities that create odour, excessive noise or use agricultural chemicals, (including Aquaculture and Intensive Animal Husbandry), from residential development.</p>	<p>A8.1</p> <p>Any reconfiguration of Residential 1 land which shares a boundary with land in the Rural Planning Area provides a buffer in accordance with the requirements of State Planning Policy 1/92 and Planning Guidelines – Separating Agricultural and Residential Land Uses (DNR 1997).</p> <p>OR</p> <p>No Acceptable Solution.</p> <p>(Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and</p>	<p>Complies. This proposal adjoin the Mossman Mill pump station to the north of the property. A previous Noise Investigation Study accompanies this development application and outlines the measures to be implemented for residential development on the land to minimise noise impacts.</p>

	impact assessable development).	
<b><i>Sloping Sites</i></b>		
<p>P9 Building/structures are designed and sited to be responsive to the constraints of sloping Sites.</p>	<p>A9. Building/structures are erected on land with a maximum slope not exceeding 15%.</p> <p>OR</p> <p>Development proposed to be erected on land with a maximum slope between 15% and 33% is accompanied by a Geotechnical Report prepared by a qualified engineer at development application stage.</p> <p>OR</p> <p>Development proposed to be erected on land with a maximum slope above 33% is accompanied by a Specialist Geotechnical Report prepared by a qualified engineer at development application stage which includes signoff that the Site can be stabilised.</p> <p>AND</p> <p>Any Building/structures proposed to be Erected on land with a maximum slope above 15% are accompanied by an additional Geotechnical Report prepared by a qualified engineer at building application stage. (Information that the Council may request as part of the Geotechnical Report are outlined in Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and impact assessable development.</p>	<p>Not applicable the site does not have a significant slope.</p>

P10 The building style and construction methods used for development on sloping Sites are responsive to the Site constraints.	<p>A10.1 A split level building form is utilised.</p> <p>A10.2 A single plane concrete slab is not utilised.</p> <p>A10.3 Any voids between the floor of the building and Ground Level, or between outdoor decks and Ground Level, are screened from view by using lattice/batten screening and/or landscaping.</p>	Not applicable the site does not have a significant slope.
P11 Development on sloping land minimises any impact on the landscape character of the surrounding area.	A11.1 Buildings/structures are sited below any ridgelines and are sited to avoid protruding above the surrounding tree level.	Not applicable the site does not have a significant slope.
P12 Development on sloping land ensures that the quality and quantity of stormwater traversing the Site does not cause any detrimental impact to the natural environment or to any other Sites.	A12.1 All stormwater drainage discharges to a lawful point of discharge and does not adversely affect downstream, upstream, underground stream or adjacent properties.	Not applicable the site does not have a significant slope.
<b><i>Sustainable Siting and Design of Houses on Sloping Sites</i></b>		
Not applicable. This development does not occur on a hillside.		
<b>Acid Sulfate Soils Code</b>		
<b><i>Disturbance of Acid Sulfate Soils</i></b>		
<p>P1 The release of acid and associated metal contaminants into the environment are avoided either by:</p> <ul style="list-style-type: none"> <li>not disturbing Acid Sulfate Soils; or by</li> <li>preventing the potential impacts of any disturbance through appropriate Site planning, treatment and ongoing management.</li> </ul>	<p>A1.1 The disturbance of Acid Sulfate Soils is avoided by:</p> <ul style="list-style-type: none"> <li>not excavating or removing more than 100 m3 of material identified as containing or potentially containing Acid Sulfate Soils;</li> <li>not permanently or temporarily extracting groundwater that results in the aeration</li> </ul>	Complies. No Acid Sulfate Soils have been identified on the site however measures will be incorporated at the construction stage to prevent disturbance of Acid Sulfate Soils.

	<p>of previously saturated Acid Sulfate Soils; and</p> <ul style="list-style-type: none"> <li>demonstrating that any filling in excess of 500 m3 of material to depths greater than an average depth of 0.5 metres will not result in ground water extrusion from Acid Sulfate Soils and the aeration of previously saturated Acid Sulfate Soils from the compaction or movement of those soils.</li> </ul> <p>A1.2 Site planning, treatment and ongoing management are undertaken so that:</p> <ul style="list-style-type: none"> <li>acid and metal contaminants are not generated and acidity is neutralised;</li> <li>untreated Acid Sulfate Soils are not taken off-Site unless this is to an alternative location for treatment; and</li> <li>surface and groundwater flows from areas containing Acid Sulfate Soils do not release leachate containing acid or metal contaminants into the environment.</li> </ul>	
P2 The location and extent of Acid Sulfate Soils are identified on the development site and appropriately management so as to avoid the release of acid and associated metal contaminants into the environment.	A2.1 No Acceptable Solution (Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 9 – Reports and Information the Council May Request, for code and impact assessable development).	Complies. No Acid Sulfate Soils have been identified on the site.
<b>Natural Areas and Scenic Amenity Code</b>		
<b><i>Development in Areas of Natural and Scenic Amenity Value</i></b>		
P1 Where a development within a DDA triggers this Code, the natural and environmental values of the areas of Remnant Vegetation and/or Watercourse/s are protected from inappropriate development.	A1.1 Buildings/structures Access Roads/car parking, infrastructure and landscape/recreation facilities are constructed within the DDA identified on a	Complies. A site plan has been provided with the development application. This proposal will have no impact on remnant

	<p>Site Plan drawn to scale.</p> <p>A1.2 Where internal Roads are required to service the development, the Roads are located within a DDA identified on a Site Plan drawn to scale. (Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 8 – Natural Areas and Scenic Amenity and Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and impact assessable development).</p>	<p>vegetation or environmental values of the subject area.</p>
<p>P2 Development does not adversely impact on the natural and environmental values and Scenic Amenity of areas identified as Remnant Vegetation and/or Watercourse/s.</p>	<p>A2.1 Where development occurs, it is located on that part of the Site which poses the least threat to the natural and environmental values and Scenic Amenity, for example:</p> <ul style="list-style-type: none"> <li>• adjacent to existing development;</li> <li>• within an existing cleared area;</li> <li>• within a disturbed area with little potential for rehabilitation;</li> <li>• within an area close to an Access Road;</li> <li>• removed from an identified area of important habitat.</li> </ul> <p>A2.2 Development within the DDA is sited to minimise visual intrusion on the Site and the surrounding landscape.</p> <p>A2.3 No continuous boundary fence lines or barriers are Erected on an approved development Site within a DDA identified on a Site Plan drawn to scale.</p> <p>A2.4 Infrastructure, such as water mains, sewers, electricity and telecommunication services, is sited underground, wherever</p>	<p>Complies. The development will have a setback from the Mossman River and no development will occur in this area. No significant vegetation occurs on the site and no further environmental values have been identified.</p>

	<p>reasonable, to protect Scenic Amenity, and is located within a DDA on a Site Plan drawn to scale.</p> <p>A2.5 Internal Roads associated with the development are designed and constructed to achieve a low speed environment.</p> <p>A2.6 Roads and infrastructure services do not cross the Setback area/riparian corridor; or if this is not possible, the number of crossings is minimised.</p> <p>A2.7 Setback areas/riparian corridors are provided in accordance with A4.1, A4.2, A4.3 and A4.4 below;</p> <p>AND</p> <p>The lowest intensity of development occurs adjacent to any Setback area/riparian corridor, and in the case of reconfiguration, larger lots are located adjacent to any Setback area/riparian corridor.</p> <p>A2.8 There is no fragmentation or alienation of any Remnant Vegetation.</p> <p>A2.9 Any natural, environmental or Scenic Amenity value of any balance area outside the DDA is protected.</p>	
P3 Any development involving filling and excavation minimises detrimental impacts on any aquatic environment.	<p>No Acceptable Solution.</p> <p>(Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 8 – Natural Areas and Scenic Amenity and Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and impact assessable</p>	Complies. Acceptable measures will be incorporated into the Environmental Management Plan for filling for the site.



	development).	
P4 Setback areas/riparian corridors adjacent to Watercourses are provided/maintained or reestablished and revegetated with species endemic to the local area.	<p>A4.1 For residential reconfiguration (Residential 1, Residential 2 or Rural Settlement Planning Area), Aquaculture, Tourist Activities, Industrial Activities and other large scale developments or development likely to have an impact on water quality of adjacent Watercourse/s any degraded sections of the Setback area/riparian corridor are revegetated with endemic species typical of the riparian corridor in the area.</p> <p>A4.2 Revegetation occurs in accordance with a Landscape Plan prepared by a suitably qualified professional in compliance with the requirements of Planning Scheme Policy No 8 – Natural Areas and Scenic Amenity, Landscaping Code and Planning Scheme Policy No 7 – Landscaping.</p> <p>A4.3 The minimum width of the Setback area/riparian corridor, measured out from the shoulder of each high bank, for the respective categories of Watercourses, where a riparian corridor of vegetation already exists is:</p> <ul style="list-style-type: none"> <li>• Category 1 – Major Perennial Watercourse – 30 metres</li> <li>• Category 2 –Perennial Watercourse – 20 metres</li> <li>• Category 3 –Minor Perennial – 10 metres,</li> </ul> <p>AND</p> <p>buildings are sited clear of the Setback area/riparian corridor, in accordance with the relevant Setbacks outlined above.</p> <p>OR</p>	Complies. No development is to occur along the riparian/ setback area along the Mossman River and it is to become CRC's responsibility as parkland.

	<p>The minimum width of the Setback area/riparian corridor, measured out from the shoulder of each high bank, for the respective categories of Watercourses, where no riparian corridor of vegetation already exists is:</p> <ul style="list-style-type: none"> <li>• Category 1 – Major Perennial Watercourse – 10 metres</li> <li>• P1 Category 2 – Perennial Watercourse – 5 Metres</li> <li>• Category 3 – Minor Perennial – 2.5 metres, AND</li> </ul> <p>buildings are sited clear of the Setback area/riparian corridor, in accordance with the relevant Setbacks above.</p> <p>A4.4 Native vegetation within the Setback area/riparian corridor, other than identified noxious and environmental weeds, is retained.</p>	
<b><i>Use of Setback Areas/Riparian Corridors</i></b>		
P5 Any use of a Setback area/riparian corridor does not adversely affect the integrity of the Setback area/riparian corridor.	<p>A5.1 Only low key, passive, low impact recreational facilities, including pedestrian and cycle paths or boardwalks, are located within the setback area/riparian corridor.</p> <p>A5.2 The location of low key, passive, low impact recreational facilities, including pedestrian and cycle paths or boardwalks within the Setback area/riparian corridor, does not affect the connectivity function and landscape/environmental or Scenic Amenity values of the Setback area/riparian corridor.</p>	Complies. No development is to occur within the setback area from the Mossman River.
<b><i>Retaining and Protecting Highly Visible Areas</i></b>		
P6 Any development sited wholly or partially on land with a slope greater than 15% protects the Scenic	A6.1 Land with a slope greater than 15% and including Remnant Vegetation remains	Not applicable. No development to be located on slopes above 15%.

Amenity values of the land from inappropriate and visually prominent development.	undeveloped and in its natural state.  A6.2 Any development remains unobtrusive and sited below the tree line and ridge line. (Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 8– Natural Areas and Scenic Amenity and Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and impact assessable development).	
<b>Reconfiguring a Lot Code</b>		
<b>Area and Dimensions of Lots</b>		
P1 Lots are of sufficient area and dimensions to meet the requirements of the users and accommodate the form of development likely to be constructed in the respective Planning Areas, together with the open space, Landscaping, Access and car parking associated with the particular form of development.	A1.1 Lots comply with the area and dimensions identified for lots in the respective Planning Areas in Table 1.	Complies. Lots meet the minimum size (800m <sup>2</sup> ).
<b>Residential 1 Planning Area</b>		
P4 The layout for a residential reconfiguration greater than 10 lots, gives the neighbourhood a positive identity by: <ul style="list-style-type: none"> <li>protecting natural features, areas of environmental value and watercourses;</li> <li>incorporating Site characteristics, views and landmarks;</li> <li>providing a legible, connected and safe street, bicycle and pedestrian network that links to existing external networks;</li> <li>providing community or necessary facilities at convenient focal points;</li> <li>orientating the street and lots to ensure the siting and design of residential development maximises energy efficiency;</li> </ul>	No Acceptable Solution. (Information that the Council may request to demonstrate compliance with the Performance Criteria is outlined in Planning Scheme Policy No 10 – Reports and Information the Council May Request, for code and impact assessable development).	Complies. The layout protects natural features (providing a setback from the Mossman River) and has an efficient and logical lot layout.

P5 Multi-Unit Housing is limited to a small proportion of the total number of lots in a new residential area and is dispersed to ensure conventional residential detached Houses dominate the streetscape.	A5.1 In new residential areas, not more than 15% of the total number of new lots are nominated on an approved Plan of Reconfiguration for Multi-Unit Housing, with corner lots being preferred.	Complies. No lots will be for multi-unit housing.
<b>Infrastructure for Local Communities</b>		
<p>P7 Provision is made for open space that: meets the recreational needs of residents and visitors to the Shire;</p> <ul style="list-style-type: none"> <li>• provides a diverse range of settings;</li> <li>• creates effective linkages with other areas of open space and natural areas; and</li> <li>• contributes to the visual and Scenic Amenity of the Shire.</li> </ul>	<p>A7.1 An area of 10% of the land to be reconfigured is provided as open space in accordance with Planning Scheme Policy No 9 – Open Space Contributions.</p> <p>OR</p> <p>A contribution is paid in lieu of an area being designated for open space in accordance with Planning Scheme Policy No 9 – Open Space Contributions</p> <p>OR</p> <p>A combination of the above, as agreed to by Council.</p>	Complies. Open space has been provided along the Mossman River as per advice from CRC officers.
P8 Informal Parks and Sporting Parks are provided and sited to meet the needs of local residents in the Shire.	<p>A8.1 Informal Parks are provided at the ratio of 2 hectares per 1000 persons with a minimum size of Informal Parks being 0.5 – 1 hectare (Local Parks) and 3 – 5hectares (District Parks).AND</p> <p>Sporting Parks are provided at the ratio of 2 hectares per 1000 persons with aminimum size of Sporting Parks being1.2 – 2 hectares (Local Parks) and 5hectares (District Parks).</p>	Not applicable to this development.
<b>Road Network</b>		
<p>P9 The Road network:</p> <ul style="list-style-type: none"> <li>• is integrated and consistent with the existing and proposed local road network;</li> </ul>	A9.1 Roads are designed and constructed in accordance with the specifications set out in Planning Scheme Policy No 6 – FNQROC	Compiles. A safe and legible road network has been provided for the development.

<ul style="list-style-type: none"> <li>• is legible and retains existing features, views, topography and vegetation;</li> <li>• is convenient and safe for local residents;</li> <li>• facilitates walking and cycling within the neighbourhood; and</li> <li>• is compatible with the intended role of the State-Controlled Road and does not prejudice traffic safety or efficiency.</li> </ul>	<p>Development Manual.</p> <p>A9.2 The Road network takes into consideration the natural and cultural features of the Site, existing vegetation, Watercourses and contours.</p> <p>A9.3 The road network is designed to reduce traffic speeds and volumes on local streets in residential areas to facilitate parking and manoeuvring and to integrate with the existing and proposed pedestrian and bicycle paths network.</p> <p>A9.4 Direct Access is not provided to a State-Controlled Road where legal and practical access from another road is possible.</p> <p>A9.5 Where the created allotments have frontage to more than one road, access to the individual allotments is from the lower order road.</p>	<p>There will be no access directly to a state controlled road.</p>
<p>P10 The Road network for industrial/commercial reconfigurations ensures convenient movement and Access for vehicles, particularly heavy vehicles, without affecting the amenity of residential neighbourhoods.</p>	<p>A10.1 Roads are designed and constructed in accordance with the specifications set out in Planning Scheme Policy No 6 – FNQROC Development Manual.</p> <p>A10.2 Industrial/commercial traffic is able to Access a major Road without intruding into a residential neighbourhood.</p>	<p>Not applicable. Not for an industrial/commercial reconfiguration.</p>
<p><b><i>Pedestrian and Bicycle Network</i></b></p>		
<p>P11 Networks of pedestrian and bicycle paths are provided in safe and convenient locations.</p>	<p>A11.1 Safe and convenient walking and cycling networks are provided to link residential areas to schools, community facilities, parks and public transport, tourist Attractions, commercial and industrial areas.</p> <p>A11.2 The pedestrian and bicycle path network is constructed in accordance with the specifications set out in Planning Scheme Policy</p>	<p>Complies. Sufficient road space will cater for bicycles and pedestrian facilities will be applied where applicable.</p>

	No 6 – FNQROC Development Manual.  A11.3 Lighting for bicycle paths is provided in accordance with the relevant Australian Standards.	
<b>Stormwater Drainage</b>		
P12 Stormwater runoff is contained and managed so that it does not adversely affect: <ul style="list-style-type: none"> <li>• natural Watercourses;</li> <li>• surface or underground water quality; or</li> <li>• the built environment either upstream or downstream of the Site.</li> </ul>	A12.1 Stormwater drainage is designed and constructed in accordance with the specifications set out in Planning Scheme Policy No 6 – FNQROC Development Manual.	Complies. Storm water drainage will comply by FNQROC standards. Appendix C displays the earthworks and stormwater design plans.
<b>Water Supply</b>		
P13 An adequate, safe and reliable supply of Potable water is provided.	A13.1 Where in a water supply area, each new lot is connected to Council's reticulated water supply system.  AND  The extension of and connection to the reticulated water supply system is designed and constructed in accordance with the specifications set out in Planning Scheme Policy No 6 – FNQROC Development Manual.  A13.2 A contribution is paid in accordance with Planning Scheme Policy No 11 – Water Supply and Sewerage Headworks and Works External Contributions.	Complies. Each new lot will have connection to water and sewerage systems. There will be no adverse environmental impacts as a result of this.
<b>Treatment and Supply of Effluent</b>		
P14 Provision is made for the treatment and disposal of effluent to ensure that there are no adverse impacts on water quality and no adverse ecological impacts as	A14.1 Each new lot is connected to Council's sewerage system.	Complies. Each new lot will have connection to water and sewerage systems.

a result of the system or as a result of increasing the cumulative effect of systems in the locality.	<p>AND</p> <p>The extension of and connection to the sewerage system is designed and constructed in accordance with the specifications set out in Planning Scheme Policy No 6 – FNQROC Development Manual.</p> <p>OR</p> <p>Where the Site is not in a sewerage scheme area, the proposed disposal system meets the requirements of relevant sections of the Environmental Protection Policy (Water) 1997.</p> <p>AND</p> <p>The proposed on Site effluent disposal system is located on and contained within the lot in accordance with the Standard Sewage Law.</p> <p>A14.2 A contribution is paid in accordance with Planning Scheme Policy No 11 – Water Supply and Sewerage Headworks and Works External Contributions</p>	There will be no adverse environmental impacts as a result of this.
<b><i>Residential Development – Standard Format Plan with Common Property</i></b>		
P15 Lots have an appropriate area and dimension to protect residential amenity.	A15.1 The lot configuration under a Standard Format Plan with Common Property satisfies the minimum area and frontage provisions of the Residential 1 Planning Area Code, as set out in Table 1, above.	Complies. Lot sizes comply with the minimum area.
P16 The Setback of Residential Uses from the Access driveways makes efficient use of the Site and provides for the amenity and privacy of residents.	A16.1 A minimum separation distance of 15 metres is provided between Residential Uses with Frontage to the Access driveway.	Complies. Minimum setback distances will comply where necessary.
P17 Internal Access driveways are designed to provide acceptable levels of safety, amenity and convenience for users, in addition to providing for visitor car parking.	A17.1 Access driveways serving more than 3 lots and a maximum of 20 lots are a minimum of	Will comply where necessary.

	4 metres in width and provide designated areas for visitor parking at the rate of 1 car space for every 3 Houses/or other Residential Uses.	
P18 Communal/public open space is provided to service the residents of the development and to contribute to the available public open space in the local community.	A18.1 The proportion of public open space and communal open space provided by the development is dependant upon the characteristics of the individual development and its proximity to nearby public open space, existing or planned. A split of 6% public open space and 4% communal open space is preferred, but will be determined on a Site/development specific basis.	Complies. Public open space has been provided along the Mossman River inline with discussions with CRC.
P19 Boundary fencing does not have a significant impact on the visual amenity of the local area.	A19.1 The side and rear boundary fence is a maximum of 1.8 metres in Height and incorporates decorative panels which incorporate railings, pickets and/or vegetation screening to reduce the bulk and scale of the fence or wall.	Complies. Fencing constructed will comply with the acceptable solution.
P20 The installation of Fire Hydrants ensures that they are easy to locate and use in times of emergency and are of a standard consistent with service needs.	A20.1 Fire Hydrant installation for the development is provided in accordance with the requirements of the relevant Australian Standard.	Complies. Fire hydrants will be installed to the requirement of AS where necessary.
<b>Boundary Realignment</b>		
Not applicable.		
<b>Energy Efficiency</b>		
P22 The road and lot layout facilitates the siting and design of buildings to conserve non-renewable energy sources and assists in orientation and design appropriate for the local tropical conditions.	No Acceptable Solution	Complies. The lot layout has been revised in line with CRC comments.
P23 The road and lot layout minimises fossil fuel use by: reducing the need for and length of local vehicle trips, maximising public transport effectiveness, encouraging walking and cycling, and provision of appropriate street landscaping	No Acceptable Solution	Complies. The lot layout includes an additional connection to Junction Road to improve circulation and trip times.



**Appendix E: Noise Impact Investigation**

**Curragh Designs**

**Barry Santry**

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# **Mossman Pump Noise Investigation**



**Document No. 70Q-07-0149-TRP-245437-0-  
22 August 2007**

**VIPAC**



## Mossman Pump Noise Investigation

**DOCUMENT NO:**

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**DISTRIBUTION**

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## EXECUTIVE SUMMARY

Vipac Engineers & Scientists Ltd (VIPAC) was commissioned by Curragh Designs to provide a noise impact assessment of the Mossman Central Mill Water Intake Pump. Noise was assessed to Lots 15, 16, 17, 18, 19, 20 and 21 of the proposed residential development on Lot 1 on RP720296.

This report presents an assessment of existing noise emissions from the pumping station. The purpose of this report is to assess the noise environment in accordance with the Douglas Shire Council criteria and the Queensland Government's EPP (Noise) 1997.

Noise emissions from the pumping station were found to exceed the residential noise criteria at locations close to the pump. The largest contributor to overall noise levels were the electric motors used to drive the pumps. Noise from the drive shaft was also noted. Refer to Appendix D for photographs. The sound pressure level of the existing motors is approximately 90dB(A) at 1m. To control noise impact to the proposed residential development, an acoustic enclosure is proposed as described below:

- Walls – the walls should be constructed using one of the following alternative constructions:
  - Precast concrete panel 150mm thick; or
  - Core filled 140mm thick masonry block; or
  - Light-weight construction consisting of 1 layer of 9mm CFC to one side of 92mm steel studs and 2 layers of 9mm CFC to the other side with cavity infill of 50mm, 32kg/m<sup>3</sup> polyester.

We recommend the walls and the roof be extended as much as practical to the water to provide additional shielding to the sides of the motors.

- Roof – profiled metal sheet with R2.0 insulation blanket over 125mm purlins and 2 layers of 9mm CFC fixed to the underside of the purlins.

By following one of the above recommendations it is expected that noise emissions from the Central Mill Water Intake Pump will be acceptable at the proposed adjacent residential lots.



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## 1. INTRODUCTION

Vipac Engineers & Scientists Ltd (VIPAC) was commissioned by Curragh Designs to provide a noise impact assessment of the of the Mossman Central Mill Water Intake Pump onto Lots 15, 16, 17, 18, 19, 20 and 21 of the proposed residential development on Lot 1 on RP720296.

This report presents an assessment of existing noise emissions from the pumping station. The purpose of this report is to assess noise impact in accordance with the Douglas Shire Council criteria and the Queensland Government's EPP (Noise) 1997, and to recommend appropriate noise control measures.

## 2. SITE LOCATION

The proposed residential development is located on Lot 1 on RP720296. The Mill Water Intake Pump is located in the north-west corner of this lot, directly adjacent the Mossman River. The approximate location of the pump is shown in Figure 2-1 below.

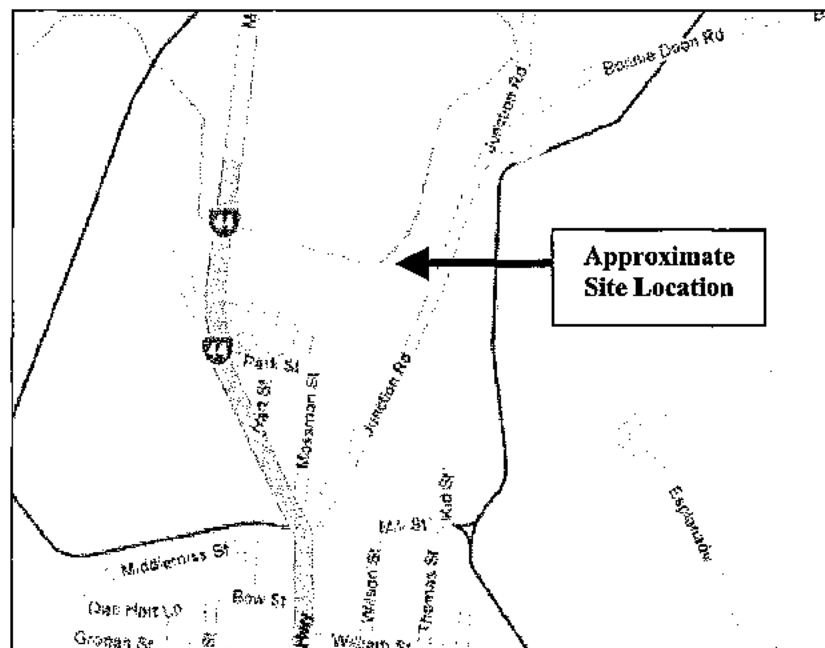


Figure 2-1: Location of the Water Intake Pump

The noise impact of the pump onto the proposed residential development will be assessed. The nearest proposed residential lot is located approximately 12m from the water intake pump, this is the closest noise sensitive receiver.



### 3. EXISTING NOISE LEVELS

Noise monitoring was conducted to quantify the existing ambient noise environment.

Both attended and unattended noise monitoring was conducted during July 2007. Noise monitoring was conducted in accordance with Australian Standard AS1055-1997 '*Acoustics – Description and Measurement of Environmental Noise*'.

Table 4-1 below presents the average background noise levels at the noise monitoring location with and without the Water Intake Pump operating.

Table 3-1: Noise Monitoring Locations

Loc	Pump Condition	Logging Period		Average Background, A weighted sound Pressure Level, dB(A)		
		Start Date	End Date	Daytime 0700-1800	Evening 1800-2200	Night-time 2200-0700
L1	Pump OFF	21 <sup>st</sup> July 2007	22 <sup>nd</sup> July 2007	40	42	41
	Pump ON	20 <sup>th</sup> July 2007	21 <sup>st</sup> July 2007	54	52	53

Site visits determined that the existing ambient noise environment was due to traffic noise, wildlife noise and the Water Intake Pump. Pump noise was audible around the site during operational periods. A detailed summary of measured noise levels is presented in Appendix C.

The average background noise levels recorded during periods when the pump was off will be used to determine appropriate limits.



## 4. NOISE CRITERIA

Noise impact from the pumping station must be controlled to acceptable levels as measured at the proposed development. The following sections contain noise criteria review.

### 4.1 'Background +3/+5' Criteria

To reduce the likelihood of noise complaints, the Environmental Protection Agency (EPA) will issue an Environmental Noise License to Environmentally Relevant Activities (ERA's). The license makes use of noise criteria from a previous Queensland noise policy, as follows:-

Table 4-1: Environmental Noise Limits for an Environmentally Relevant Activity

Noise Limits at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level $L_{Amax,adj}$	Period
Background noise level plus 5 dB(A)	7am - 6pm
Background noise level plus 5 dB(A)	6pm - 10pm
Background noise level plus 3 dB(A)	10pm - 7am
Noise Limits at a Commercial Place Measured as the Adjusted Maximum Sound Pressure Level $L_{Amax,adj}$	Period
Background noise level plus 10 dB(A)	7am - 6pm
Background noise level plus 10 dB(A)	6pm - 10pm
Background noise level plus 8 dB(A)	10pm - 7am

The noise limits in Table 4-1, although not contained as part of the EPP (Noise), are still regularly used by the EPA and local councils when specifying noise criteria or assessing noise complaints. They are widely accepted as being appropriate noise limits for non-time-varying noises, such as mechanical plant, and for minimising the risk of noise complaint. Table 4-2 below lists 'Background +3/+5' criteria applicable to this project.

Table 4-2: Background +3/+5 Noise Limits

Time Period	Average Background, A weighted Sound Pressure Level, dB(A)	B/G +3/+5 Criteria Limit, dB(A)
Day	40	45
Evening	42	47
Night	41	44

### 4.2 EPP (Noise)

According to the EPP (Noise), the acoustic environmental values to be enhanced or protected includes the wellbeing of an individual, including the individual's opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise. Thus the noise emissions should be reduced to minimise the risk of complaint, and noise criteria should be developed with risk minimisation as the principle concern, irrespective of alternative noise criteria.

### 4.3 EPA's EPR limits

Using the EPA's EPR limits in Appendix B1.2, the following noise limits are applicable for air-conditioning/mechanical plant:-

Night time (10pm to 7am)	40dB(A).
Day time & evening (7am to 10pm)	50dB(A).





#### 4.4 Background Noise Creep

Background creep is assessed in terms of  $L_{A90}$  background noise levels. The objective of this methodology and the stated limits is to prevent a progressive increase in background noise levels due to new noise generating activities locating in an area (background creep).

Based on the development sites proximity to the Mossman Central Mill the noise environment was categorised as the following.

- (R3) – Areas with medium density transportation or some commerce or industry

Table 4-3 below presents background noise creep limits specific to this development during daytime, evening and night-time based on Australian Standard AS1055:1997, *Acoustics – Description and measurement of environmental noise*.

Table 4-3: Site Specific AS1055 Background Noise Creep Limits

Time Period	Average Background, A weighted sound Pressure Level, dB(A)	Creep Levels for Neighbourhood, dB(A)	Creep Limits, dB(A)
Day	40	50 (R3)	50
Evening	42	45 (R3)	45
Night	41	40 (R3)	40

#### 4.5 Proposed Noise Limits

The water intake pump is expected to operate during both day-time and night-time periods. The proposed noise limits for time period are determined by the most conservative criteria listed in the above Sections 4.1 to 4.4.

Table 4-4: Noise Criteria for site

Criteria Limits, dB(A)		
Daytime 0700-1800	Evening 1800-2200	Night-time 2200-0700
45	45	40

The above noise limits will provide guidelines for acceptable noise intrusion from the Mossman Central Mill Water Intake Pump to the proposed development.



## 5. PUMP NOISE SOURCES

Noise from the Water Intake Pump includes fan noise from the electric motors, shaft whirl, and noise from cooling water hitting the Mossman River. The actual pumps are submerged below the water line of the Mossman River and make little noise. Refer to Appendix D for photographs. The pumping station supplies water to the nearby Mossman Central Sugar Mill via underground pipe work. Pumps generally operate 24hours a day during the Crush Season, June to December. The pump may be switched off on Sundays.

The results of the noise survey indicated sound pressure levels of 90dB(A) (A-Weighted Equivalent Continuous Noise Level,  $L_{Aeq}$ ) measured at 1m from the electric motors. This resulted in a sound pressure level of 67dBA ( $L_{Aeq}$ ) at the nearest property (approximately 12m away from the pump station). This sound pressure level is used to design the acoustic treatment of the pump station.

## 6. PREDICTED NOISE LEVELS

Noise emissions from the pumps have potential to affect the future residential sites. Noise impact calculations have been performed for the closest residential lot on the proposed development. If noise intrusion complies at the closest receiver then it is expected to comply at all receivers. Calculations include noise attenuation due to distance, no shielding is provided from intervening objects, eg solid structures. Refer to the table below.

Table 6-1: Noise Impact at nearest noise sensitive receiver

Location	Measured Sound Pressure Level of Plant, dB(A) @ 1m	Distance, Source to nearest Noise Sensitive Receiver, m	Distance attenuation, dB(A)	Directivity, dB(A)	Barrier attenuation, dB(A)	Predicted Sound Pressure Level at nearest Noise Sensitive Receiver, dB(A)	Criteria limit, dB(A)	Comments
1	90	10	10	3	0	67dBA @ 12m,	40	Exceeds criteria by 27dB(A)

Pump noise impact at potential noise sensitive receivers is predicted to exceed the criteria. Recommendations will be made to reduce emissions to acceptable levels.



## 7. RECOMMENDATIONS

Noise measurements and predictions indicate that noise sensitive receivers adjacent the pumping station may exceed the external  $L_{Aeq}$  40dB(A) noise criteria by up to 27dB(A). To control noise impact to the proposed residential development, an acoustic enclosure constructed as described below is proposed:

- Walls – the walls should be constructed using one of the following alternative constructions:
  - Precast concrete panel 150mm thick; or
  - Core filled 140mm thick masonry block; or
  - Light-weight construction consisting of 1 layer of 9mm CFC to one side of 92mm steel studs and 2 layers of 9mm CFC to the other side with cavity infill of 50mm, 32kg/m<sup>3</sup> polyester.

We recommend the walls and the roof be extended as much as practical to the water to provide additional shielding to the sides of the motors.

- Roof – profiled metal sheet with R2.0 insulation blanket over 125mm purlins and 2 layers of 9mm CFC fixed to the underside of the purlins.

All gaps around the junction between the walls and the roof should be blocked off using 50mm, 60kg/m<sup>3</sup> glasswool and sealed. Internally the walls and the roof should be lined with 100mm, 48kg/m<sup>3</sup> foil faced glasswool (20% open area).

If access door is required, it should be located as far as possible from the residential allotments (i.e., on the side of the enclosure and close to the water). The door should be minimum 55mm thick solid core door or other construction rated at not less than  $R_w$  36 based on laboratory test and fitted with acoustic seals (eg., Raven RP8, RP10 and RP16).

## 8. CONCLUSIONS

A noise investigation has been conducted of the Mossman Central Mill Water Intake Pump. The assessment involved measurement of noise levels on site during typical pump operations. It is understood that the pumps generally operate 24hours a day during the Crush season June to December to supply water the nearby Mossman Central Sugar Mill.

To control noise impact to the proposed residential development an acoustic enclosure is recommended. Construction details have been listed in Section 7 of this report.

By following the recommendations in this report it is expected that noise intrusion from the Water Intake Pump will be acceptable at the adjacent proposed residential lots.



## **APPENDIX A: ACOUSTIC TERMINOLOGY**



**Sound Pressure Level ( $L_p$ )** – Sound or noise is the sensation produced at the ear by very small fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range (from 20 microPascals to 60 Pascals). A scale that compresses this range to a more manageable size and that is best matched to subjective response is the logarithmic scale, rather than a linear scale.

Sound Pressure Level ( $L_p$ ) is defined as:

$$L_p = 10 \log_{10} \left( \frac{p^2}{p_{ref}^2} \right) dB$$

In the above equation,  $p$  is the sound pressure fluctuation (above or below atmospheric pressure), and  $p_{ref}$  is 20 microPascals ( $2 \times 10^{-5}$  Pa), the approximate threshold of hearing. To avoid a scale which is too compressed, a factor of 10 is included, giving rise to the decibel, or dB for short.

**A-Weighted Decibel (dB(A)) & Loudness** – The overall level of a sound is usually expressed as dB(A), instead of dB. The sound is measured using an A-weighted filter, which is incorporated into the sound level meter. The filter is used to approximate the response of the human ear. It reduces the significance of lower frequencies and very high frequencies, thereby increasing the importance of mid-frequencies (500Hz to 4kHz), and being a good measure of the “loudness” of a sound.

A change of 1 to 2dB(A) is difficult to detect, whilst a change of 3 to 5dB(A) corresponds to a small but noticeable change. A 10dB(A) change corresponds to a doubling or halving in apparent loudness.

$L_{Aeq}$  is the time averaged A-weighted sound pressure level for the interval, as defined in AS1055.1. It is generally described as the equivalent continuous A-weighted sound pressure level that has the same mean square pressure level as a sound that varies over time. It can be considered as the average sound pressure level over the measurement period.

$L_{A90,T}$  is the A-weighted sound pressure level that for a specified time level, T, is equalled or exceeded for 90 % of the period.

$L_{A10,T}$  is the A-weighted sound pressure level that for a specified time level, T, is equalled or exceeded for 10 % of the period.

**Tonality.** Several definitions exist. A noise which is ‘tonal’ has a particular frequency which is clearly discernable. This is typically defined by a difference of 5 dB or greater between the third octave band of interest and adjacent third octave bands, when considering the noise spectrum.

$L_{Amax,adj,T}$  is the adjusted average maximum sound pressure level for a time period, T. ‘Penalties’ are applied to the  $L_{Amax,T}$  to account for tonality and impulsiveness in the noise measured.

**Octave frequency bands** allow a representation of the spectrum associated with a particular noise. They are an octave wide, meaning that the highest frequency in the band is just twice the lowest frequency, with all intermediate frequencies included and all other frequencies excluded. Each octave band is described by its centre frequency.

**Third (1/3) octave frequency bands** provide a little more information. Third octave bands are bands of frequency approximately one third of the width of an octave band.

**Peak Particle Velocity (PPV)** is the maximum instantaneous velocity of a particle at a point during a given time interval. This is a typical measure of ground vibration.



## **APPENDIX B: NOISE CRITERIA**



## B1 QUEENSLAND GOVERNMENT

### B1.1 Queensland EPA EPP (Noise)

In respect of the acoustic environment, the object of the Act is achieved by the Environmental Protection (Noise) Policy 1997<sup>1</sup> (EPP (Noise)). This policy identifies environmental values to be protected, specifies an acoustic quality objective, and provides a framework for managing and assessing noise emissions.

The "acoustic quality objective" is the objective of achieving an ambient level of 55dB(A)  $L_{Aeq,24hrs}$  or less for most of Queensland's population living in residential areas. This is to be progressively achieved over the long term. Aside from this objective and planning levels for airports, public roads and railways, there are no noise criteria in the EPP (Noise).

It is not intended that, in achieving the acoustic quality objective, any part of the existing acoustic environment be allowed to significantly deteriorate. Therefore any noise criteria should include consideration for the existing ambient (or background) noise levels.

The acoustic environmental values to be enhanced or protected are as follows:-

- the wellbeing of the community or a part of the community.
- the wellbeing of an individual, including the individual's opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise.

Noise emissions should be reduced to minimise the risk of complaint, and noise criteria should be developed with risk minimisation as the principle concern, irrespective of alternative noise criteria.

### B1.2 Queensland EPA EPR

The Environmental Protection Regulation 1998<sup>2</sup> (EPR) is enforced under the Act, and its object is to help protect Queensland's environment from environmental nuisance by providing offences for specific types of noise and nuisance abatement notices. The noise criteria in this document are considered to specifically deal with resolution of complaints, rather than setting planning criteria.

The criteria for plant noise are taken from the Environmental Protection Regulation (EPR) (refer Part 2A, Division 4, Subdivision 1-Offences, Parts 6Y, 6Z and 6ZA).

#### *"Spa blowers and pool pumps"*

*6Y.(1) An occupier of premises at or for which there is a spa blower or a pump for a swimming pool or spa pool must not use or allow the use of the spa blower or the pump –*

- (a) before 7am or after 10pm on any day if it makes audible noise or causes audible noise to be made; or*
- (b) from 7am to 7pm on any day if it makes noise or causes noise to be made of more than 50dB(A); or*
- (c) from 7pm to 10pm on any day if it makes noise or causes noise to be made of more than 5dB(A) above the background noise level.*

*(2) However, subsection (1)(a) does not apply if-*

- (a) the audible noise is made or caused to be made at an educational institution;*
- and*

<sup>1</sup> Refer to Reprint No. 1B, in force on 2<sup>nd</sup> December 1999

<sup>2</sup> Refer to Reprint No. 3C, in force on 28<sup>th</sup> June 2002



- (b) the noise is no more than 5dB(A) above the background noise level.

#### **Airconditioning equipment**

6Z. An occupier of premises at or for which there is airconditioning equipment must not use or allow the use of the equipment-

- (a) from 7am to 10pm on any day if it makes noise or causes noise to be made of more than 50dB(A); or  
(b) before 7am or after 10pm on any day if it makes noise or causes noise to be made of more than the higher of the following:-  
(i) 40dB(A);  
(ii) 5dB(A) above the background noise level.

#### **Refrigeration equipment**

6ZA.(1) This section applies to a person who is-

- (a) an occupier of premises at or for which there is plant or equipment for refrigeration ("refrigeration equipment"); or  
(b) an owner of refrigeration equipment that is on or in a vehicle, other than a vehicle used or to be used on a railway.  
(2) The person must not use or allow the use of the refrigeration equipment -  
(a) before 7am or after 10pm on any day if it makes noise or causes noise to be made of more than the higher of the following:-  
(i) 40dB(A);  
(ii) 5dB(A) above the background noise level.  
(b) from 7am to 10pm on any day if it makes noise or causes noise to be made of more than 50dB(A)."

## **B2 Background Creep**

One of the aims of the policy is to prevent background creep, i.e. the progressive increase in background noise levels as new noise emitting activities are located in the area. Maximum background levels are set based on noise area categories provided in AS1055. Where background noise levels have been measured, the noise area categories should be chosen such that the AS1055 background levels match the measured levels, irrespective of area category description.

The combined noise level emissions from the development, measured as  $L_{A90,T}$ , should not exceed the levels specified in Table B-4.

**Table B-4: Limits on Background Noise Levels in Different Noise Areas**

Noise area category AS1055.2 Appendix B	Permissible level of exceedance of $L_{A90,T}$ for the appropriate time of day		
	Where there is residential development	Where there is no residential development	Where the background levels already exceed the stated levels in AS1055.2 (i.e. without the proposed development)
R1	By 5 dB(A)	N/A	The development's noise contribution must still comply with the stated levels in AS1055.2
R2	By 5 dB(A)	N/A	
R3	By 0 dB(A)	By 10 dB(A)	
R4			
R5			
R6			

The background creep noise limits will be the lower of:

- The category noise levels from Table B-4 above; or
- The area category noise levels that match the measured background levels.





## APPENDIX C: SITE MEASUREMENTS



## C1 Unattended Noise Monitoring

Unattended noise monitoring was conducted during July 2007 in order to quantify the existing ambient environment around the Mossman site. Noise monitoring was conducted in accordance with Australian Standard AS1055-1997 '*Acoustics – Description and Measurement of Environmental Noise*'.

Table A-1 below present methodology and parameters for unattended noise monitoring.

**Table D-1: Logging Details**

Detail	Information
Sound Level Meter (SLM)	Larson Davis LD812 Type 1 Serial No. 711 Lab Calibration Date: 12/02/2009 Field Calibration: 94dB(A) before & after
Acoustic Calibrator	ONO SOKKI SC-2120 Serial No. 35100925 Lab Calibration Due: 30/04/2008
Microphone Height	1.5m
Microphone Orientation	Pointing vertically upwards
SLM Time Weighting	Fast
SLM Frequency Weighting	A
Free field measurement	Yes
Measurement Interval Period	15 minutes intervals
Date of measurement	Friday 20 <sup>th</sup> to Sunday 22 <sup>nd</sup> July 2007
Logger location	L1: 55m east of the Water Intake Pump. Approximately half way between pumping station and Junction Road.
Weather conditions	Fine weather with a temperature range of 15 to 25 deg C, relatively mild wind conditions and no rain. Weather conditions would not have adversely affected noise results during the monitoring period.
Graphical Monitoring Results	Refer to Figure C-1
Results	Refer to Table C-2

Figure C-1 presents a graph of the Logger L1 results over 20<sup>th</sup> to 22<sup>nd</sup> July 2007. The logger was set to 15-minute intervals. The interval setting was expected to capture both periods where the pump was operating and periods where the pump was not being used. The fluctuating noise levels recorded confirm this behaviour. A comparison can be made between the on and off periods noted on the graph.



Table A-2: Noise Logging Results

Noise Descriptor	Period	Representative Noise Levels, dB(A)	
		Pump OFF	Pump ON
$L_{Aeq,24hrs}$	24 hours	46	55
$L_{Aeq,1hr}$	maximum 1 hour, 24 hours	48	59
$L_{Aeq}$	average day time – 7am to 6pm	49	55
$L_{Aeq}$	average evening time - 6pm to 10pm	45	54
$L_{Aeq}$	average night time - 10pm to 7am	44	54
$L_{A90}$	average day time – 7am to 6pm	40	54
$L_{A90}$	average evening - 6pm to 10pm	42	52
$L_{A90}$	average night time - 10pm to 7am	41	53
$L_{A90}$	average day time – 7am to 6pm	36	51
$L_{A90}$	average evening - 6pm to 10pm	36	52
$L_{A90}$	Minimum night time - 10pm to 7am	38	52
$L_{Amax}$	average day time – 7am to 6pm	64	63
$L_{Amax}$	average evening - 6pm to 10pm	54	58
$L_{Amax}$	average night time - 10pm to 7am	56	59

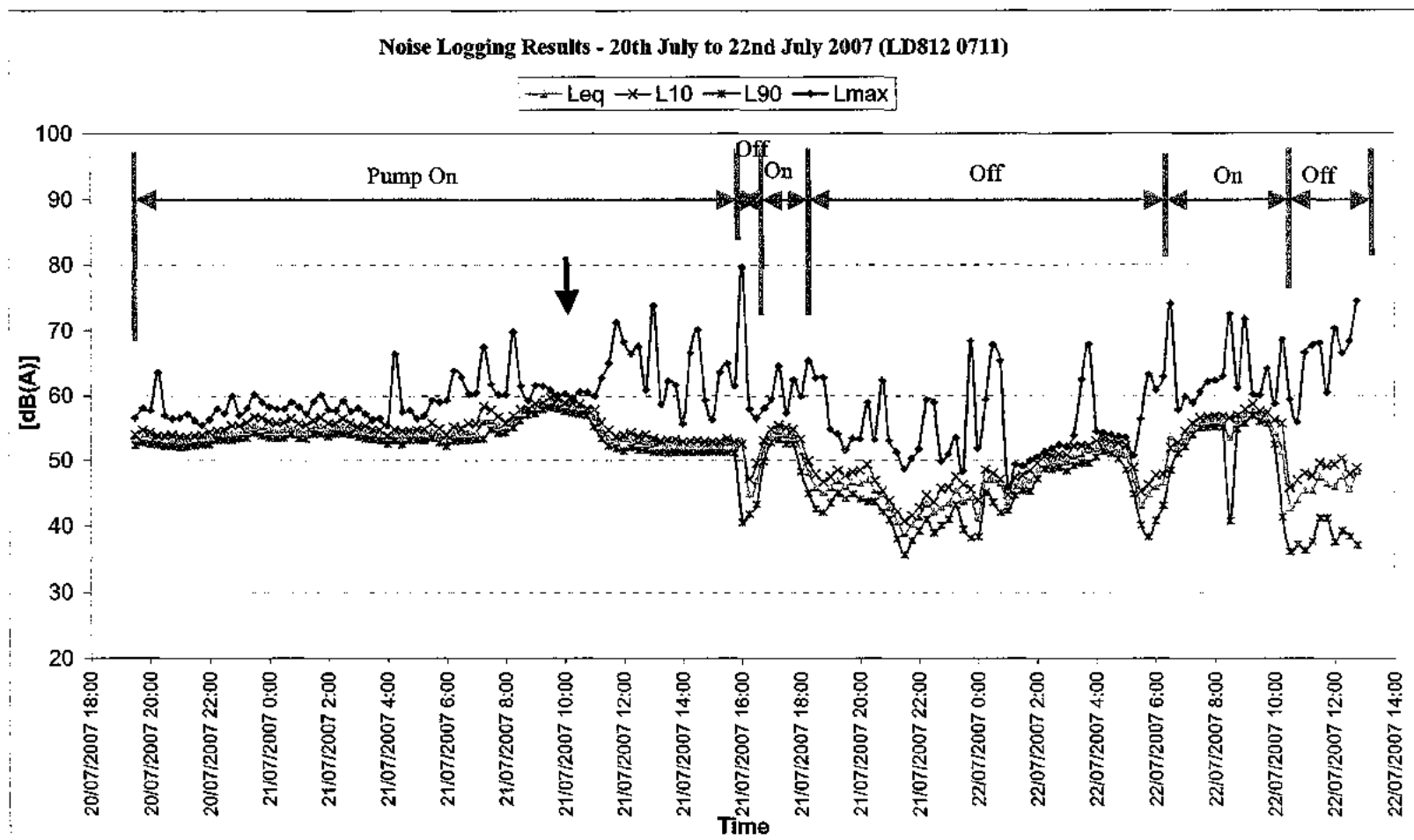


Figure C-1: Graph of noise monitoring results



## C2 Attended Noise Monitoring

Attended noise monitoring (spot measurements) was conducted during July 2007 in order to quantify the noise environment around the pump site. Noise monitoring was conducted in accordance with Australian Standard AS1055-1997 '*Acoustics – Description and Measurement of Environmental Noise*'.

Table A-3 below present methodology and parameters for attended noise monitoring.

**Table C-3: Logging Details**

Detail	Information
Sound Level Meter (SLM)	Larson Davis LD824 Type 1 Serial No. A1766 Lab Calibration Due: 8/02/2009 Field Calibration: 94dB(A) before & after
Acoustic Calibrator	ONO SOKKI SC-2120 Serial No. 35100925 Lab Calibration Due: 30/04/2008
Microphone Height	1.5m
Microphone Orientation	Pointing towards noise source
SLM Time Weighting	Fast
SLM Frequency Weighting	A
Free field measurement	Yes
Measurement Interval Period	1 minute intervals
Date of measurement	Friday 20 <sup>th</sup> July 2007 Sunday 22 <sup>nd</sup> July 2007
Logger location	Refer to Table C-4
Weather conditions	20/07/07 - Fine 22/07/07 - Fine
Results	Refer to Table C-4
Graphical Monitoring Results	Measurements 1 to 4: Refer to Figure C-2



Table C-4: Attended Noise Monitoring Results

Measurement	Site Location	Noise Event	Period	Date	Time	L <sub>Amax</sub> , dB(A)	L <sub>A10</sub> , dB(A)	L <sub>Aeq</sub> , dB(A)	L <sub>A90</sub> , dB(A)
1	55m east of pump	Pump ON: 2 electric motors operating	Evening	20-Jul-07	7:24 PM	55	54	53	52
2	12m east of pump	Pump ON: 2 electric motors operating	Evening	20-Jul-07	7:28 PM	69	67	67	66
3	1m from pump	Pump ON: 2 electric motors operating	Evening	20-Jul-07	7:30 PM	91	90	90	89
4	100m east of pump	Pump ON: 2 electric motors operating	Evening	20-Jul-07	7:37 PM	50	49	49	48
5	55m east of pump	Pump OFF: Ambient traffic and wildlife	Day	22-Jul-07	1:06 PM	50	47	43	39
6	12m east of pump	Pump OFF: Ambient traffic and wildlife	Day	22-Jul-07	1:16 PM	48	47	45	43
7	100m east of pump	Pump OFF: Ambient traffic and wildlife	Day	22-Jul-07	1:24 PM	68	60	55	43

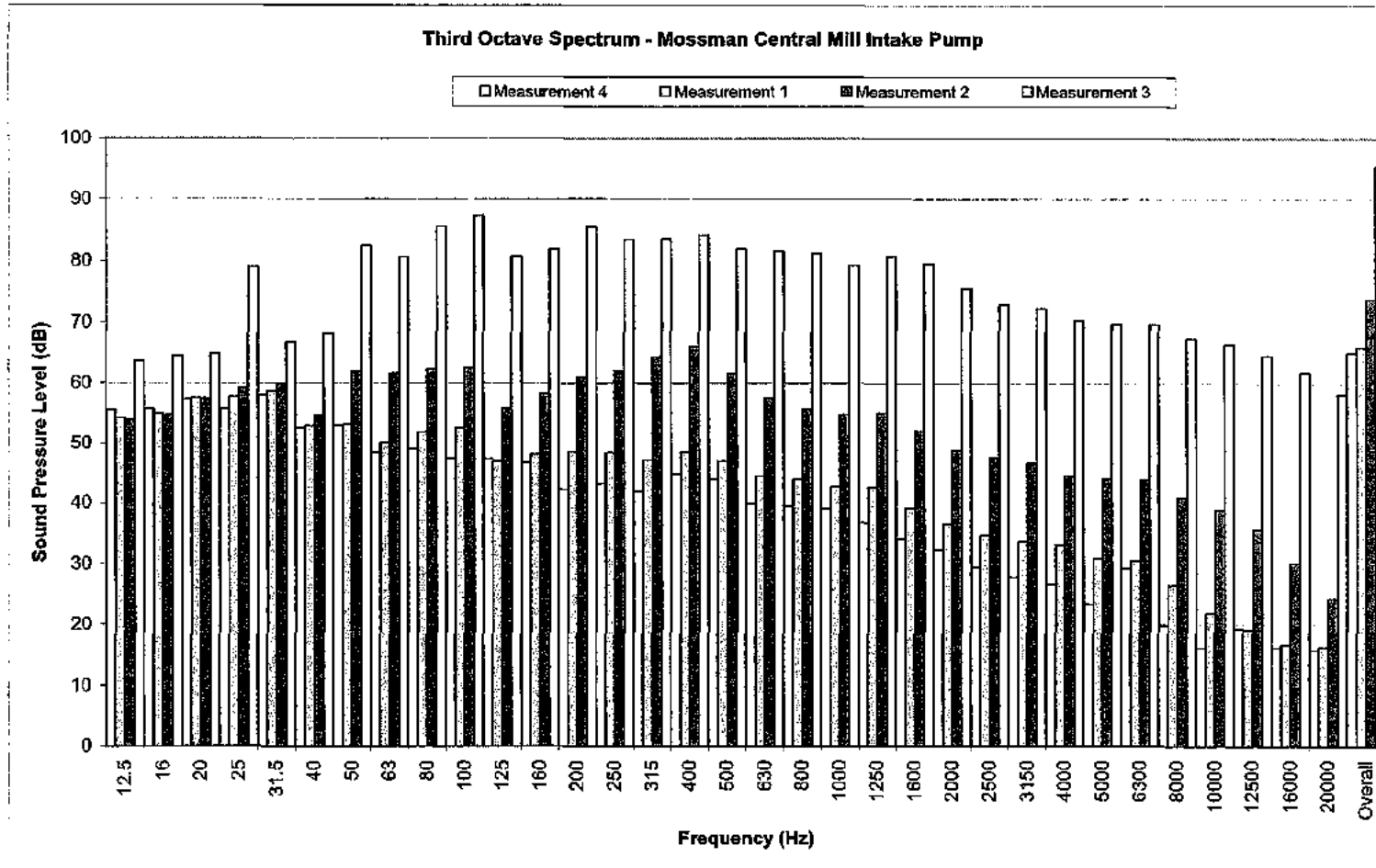


Figure C-2: Noise Spectra of Operating Water Intake Pump, Measurement results 1 to 4



## **APPENDIX D: SITE PHOTOGRAPHS**





Figure D-1: Water Intake Pumping Station

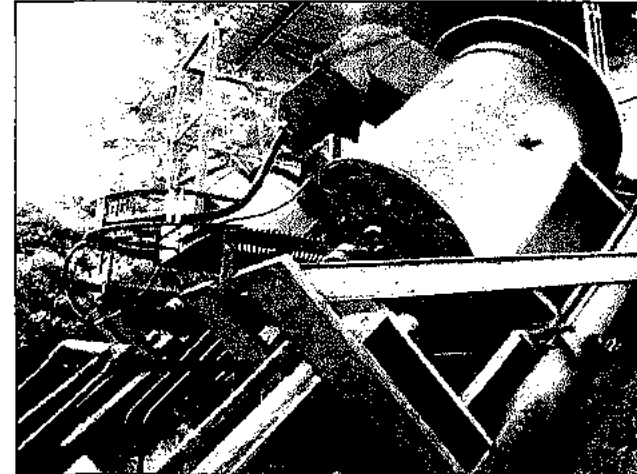


Figure D-2: 200BHP Electric Motors

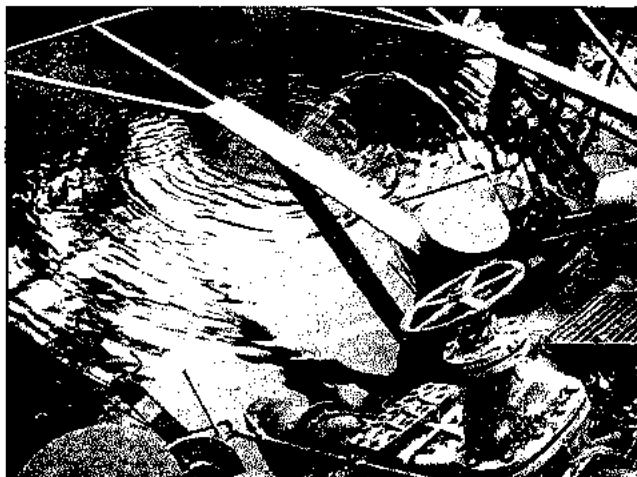


Figure D-3: Leg of pump in Mossman River

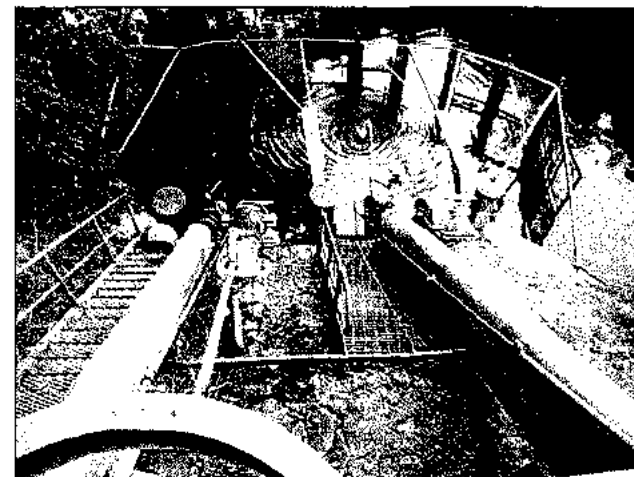
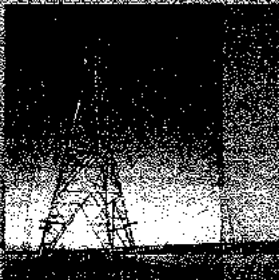


Figure D-4: Drive Shafts from motors to pump legs

- > Specialists engineers, Maunsell Engineers Pty Ltd, from Townsville Qld, were commissioned to investigate and engineer any potential of flooding from the Mossman River. The resulting report of Jan 2007, and a supplementary Addendum report of June 2007 were approved by council, and the findings have been incorporated in the final engineer documents in appendix 8 below.

**Appendix F: Mossman River Flood Study**



# Mossman River Flooding Assessment

Proposed Development at Junction Road, Mossman

Curragh Design Pty Ltd

Job No: 60020619  
January 2007

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# Mossman River Flooding Assessment

Prepared for

**Curragh Design Pty Ltd**

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## Quality Information

Document Mossman River Flooding Assessment

Ref 60020619

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Reviewed by Stephen Downes

### Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	24/01/2007	Final Copy	Stephen Downes Principal Engineer - Water	Original signed by Stephen Downes

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# 1.0 Introduction

## 1.1 Background

Maunsell has been commissioned by Curragh Design Pty Ltd to prepare a flood study to assess the impacts of a proposed development at Lot 3 Junction Road, Mossman on local flood levels. The development site is located adjacent to the Mossman River, 3km downstream from the Mossman River Bridge.

The development at Lot 3 Junction Road involves a subdivision of the lot into 29 new residential lots. All residential lots are to be filled above the 1 in 100 year ARI flood level. The development layout is shown in Valmadre Development Consultants 14th August 2006; Dwg 0607CURRAGH-C1 (Appendix C).

## 1.2 Scope of Works

The Scope of Works for the study, as defined in our proposal dated 22 August 2006, included:

- Review of previous survey data, hydrologic and hydraulic models.
- Completion of a site assessment to confirm the nature of river and drainage corridors, the location of the surveyed cross sections and the general topography.
- Preparation of a survey brief setting out the location and details of the additional cross sections required for the model.
- Extension of the Foxton Avenue hydrological model using XP-RAFTS 2000 to obtain the 100 year ARI runoff flows for each sub-catchment affected by the development.
- Extension of the Foxton Avenue MIKE 11 hydraulic model to obtain peak flood levels for the 100 year ARI event in the area of the Mossman River affected by the development (the study area).
- Alteration of the MIKE 11 cross sections to represent the post-development filled lots and to obtain post development flood levels.
- Design and modelling of any required mitigation measures.
- Preparation of a concise technical report.

## 1.3 Data

The following data was available for the study:

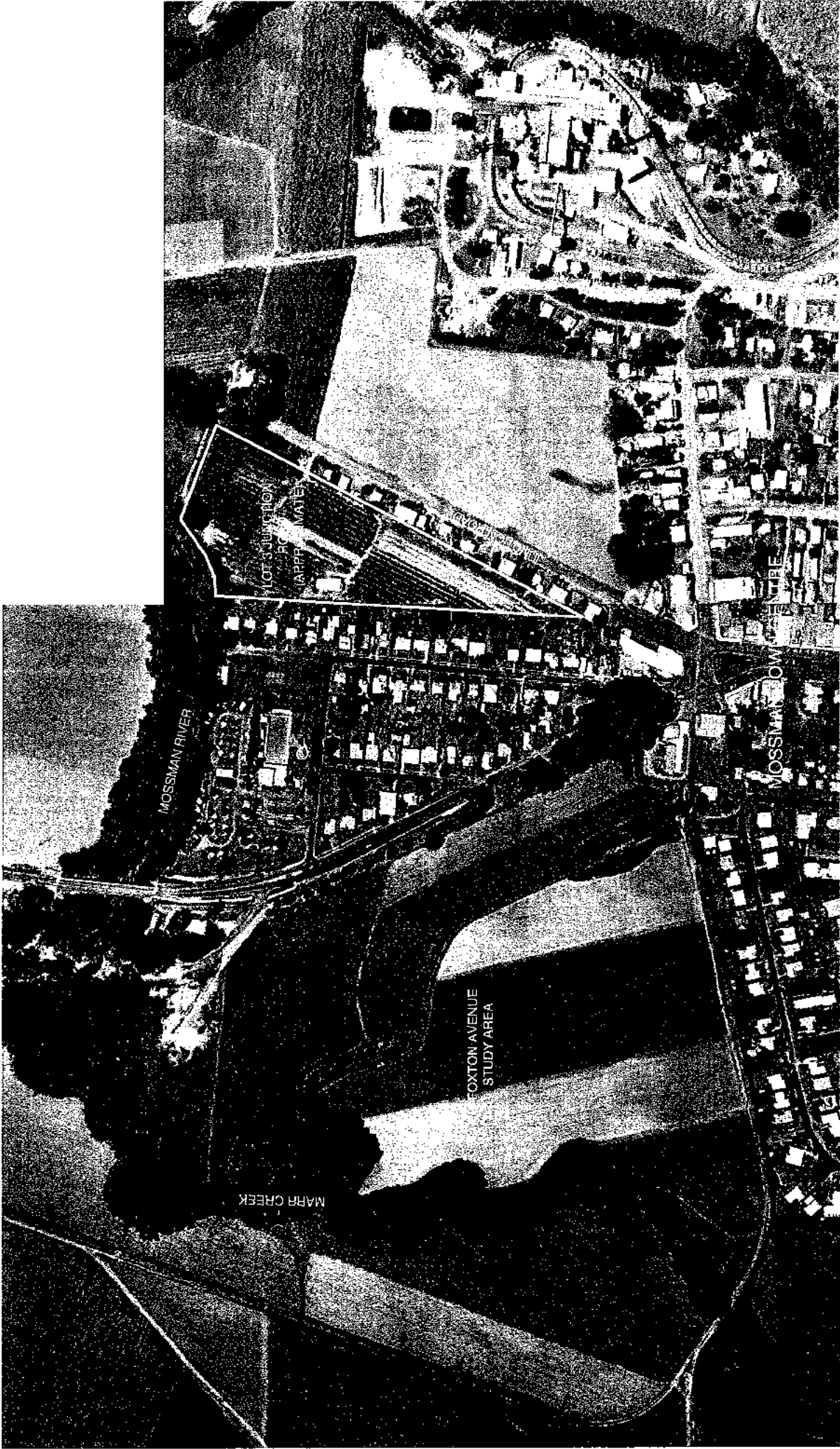
- Rafts hydrological model from the Foxton Avenue Drainage Study, May 2005.
- MIKE 11 hydraulic model from the Foxton Avenue Drainage Study, May 2005.
- Surveyed cross sections from Kerry Eaton Surveyor received 19<sup>th</sup> December 2006.
- Site plans from Valmadre Development Consultants 14<sup>th</sup> August 2006; Dwg 0607CURRAGH-C1 (Appendix C).



- Aerial photography of the Foxton Avenue site from the Foxton Avenue Drainage Study, May 2005 (Figure 1).
- Digital cadastre database of Mossman from the Johnston Shire Council.

#### 1.4 Previous Study

A drainage study has previously been prepared by Maunsell for Greenwich Bay Pty Ltd in May 2005, for a development immediately upstream of the study area at Foxton Avenue, Mossman. The location of the Foxton Site in relation to the current development site is shown in Figure 1. The purpose of the previous drainage study was to assess flood levels for the 100 year ARI event across the site. The drainage study involved the development of an XP-RAPTS hydrological model and a MIKE 11 hydraulic model of the Marr Creek and Mossman River 1.6km upstream of the current study site. The current study involved the extension of the previous hydrologic and hydraulic models.



MOSSMAN FLOOD STUDY LOT 3  
LOCALITY PLAN

FIGURE 1



0 25 50m

## 2.0 Hydrologic Assessment

### 2.1 XP-RAFTS

XP-RAFTS 2000 is a runoff/routing modelling program which converts rainfall into catchment flows based on Laurenson's non-linear reservoir routing method. The model accounts for surface roughness, infiltration and depression storage losses, impervious areas and routing of the flows between nodes (subcatchments).

The RAFTS hydrological model developed for the Foxton Avenue study, was extended in this study to approximate runoff flows from additional downstream subcatchments for input into the extended hydraulic model. Subcatchment parameters were designated for the development site for a post-development scenario. Input data for the model is described below.

### 2.2 Subcatchments

The Mossman River catchment is 108km<sup>2</sup> in area and extends west of the Mossman River Bridge to the Mount Carbine Tableland. Land use is dominated by rainforest with some cane farming and a small urban area. The development subcatchment is approximately 4km<sup>2</sup> and is situated in the lower part of the Mossman River catchment. The site is surrounded by cane farms and some urban areas, including the residential Mossman Street area and the Mill area (refer to Figure 1).

Four additional subcatchments were defined for the current study using the 1:50 000 Topographic Survey Map, Mossman (7965-II), and added to the Foxton Avenue RAFTS hydrological model. Subcatchment parameters, such as surface roughness values (Manning's n) and impervious area, were based on the values adopted for the previous study.

**Table 1: Adopted roughness values.**

Manning's n	Land Use
0.1	rainforest (majority of area)
0.075	sugar cane farm
0.05	urban area

### 2.3 Rainfall Losses

The initial/uniform continuing loss RAFTS model was adopted for the Foxton Avenue study and subsequently for this study (Table 2). Losses were estimated from a Flood Frequency Analysis (FFA) produced from a rating curve obtained from a Mossman River stream gauging station (Department of Natural Resources stream gauge 109001A).

**Table 2: Rainfall losses adopted for the RAFTS hydrological model.**

Landuse	Initial Loss (mm)	Uniform Continuing Loss (mm/h)
Pervious	62	6.2
Impervious	1	1

### 2.4 Design Rainfall

Intensity Frequency Duration (IFD) Rainfall data was obtained for the hydrological model from Australian Rainfall and Runoff (1987 Vol 2) for the Foxton Avenue Study and was adopted by this study.

**Table 3: IFD Input Parameters for Mossman River Catchment sourced from the Foxton Avenue Drainage Study, May 2005.**

<b>Mossman River Catchment Parameter</b>	<b>Value</b>
Latitude (degrees S)	16°27'
Longitude (degrees E)	145°18'
1 hour, 2 year intensity (mm/h)	61
12 hour, 2 year intensity (mm/h)	18
72 hour, 2 year intensity (mm/h)	6.5
1 hour, 50 year intensity (mm/h)	102
12 hour, 50 year intensity (mm/h)	37.5
72 hour, 50 year intensity (mm/h)	17
Average Regional Skewness	0.15
Geographic Factor F2	3.86
Geographic Factor F50	17.1

Design intensities for the Mossman River determined from the hydrologic modelling of the Foxton Avenue study were adopted by this study. For the 100 year ARI the Mossman River was found to have a critical duration of 24 hours (Table 4).

**Table 4: Design Intensities for the Mossman River Catchment sourced from the Foxton Avenue Drainage Study, May 2005.**

<b>Duration</b>	<b>Rainfall Intensity (mm/h)</b>					
	<b>2 Year ARI</b>	<b>5 Year ARI</b>	<b>10 Year ARI</b>	<b>20 Year ARI</b>	<b>50 Year ARI</b>	<b>100 Year ARI</b>
<b>1 hour</b>	60.5	73.4	80.7	91.0	105	115
<b>3 hour</b>	35.4	44.7	50.2	57.7	67.7	75.4
<b>4.5 hour</b>	29.0	37.1	42.0	48.6	57.5	64.40
<b>6 hour</b>	25.1	32.5	37.0	43.1	51.2	57.60
<b>9 hour</b>	20.5	27.0	31.0	36.3	43.5	49.2
<b>12 hour</b>	17.8	23.7	27.4	32.2	38.8	44.0
<b>24 hour</b>	12.3	16.9	19.9	23.7	29.1	33.5
<b>48 hour</b>	8.27	11.8	14.2	17.2	21.5	25.1
<b>72 hour</b>	6.41	9.38	11.4	14.0	17.7	20.8

## 3.0 Hydraulic Assessment

### 3.1 MIKE 11

MIKE 11 is a one dimensional fully dynamic hydraulic model used in this study, to model the major drainage paths of the study area.

The major tasks involved in establishing the MIKE 11 hydraulic model include:

- defining the main drainage flow paths (branches);
- inputting the physical geometry of the model (cross sections, culverts and weirs);
- applying the resistance values to each cross-section or reach; and
- determining suitable boundary conditions (initial conditions and downstream controls) applied to each branch.

For this study the Mossman River branch of the MIKE 11 hydraulic model developed for the Foxton Avenue Drainage Study was extended and defined using new survey data. Two separate MIKE 11 models were created from the extended model to represent the existing case and post-development conditions.

### 3.2 Branch Definition

The extended section of the Mossman River Branch added by this study was defined using the existing aerial photo of the Foxton Avenue study site and the digital cadastre provided by Council and the surveyor.

### 3.3 Model Geometry

The last surveyed cross section for the previous study is 1.6 km upstream of the current study site. Four additional surveyed cross sections were added to the MIKE 11 model to describe geometry.

In order to adequately define the model geometry and minimise model error, the surveyed cross sections were supplemented by interpolated data. Two of the surveyed cross sections were extended across the development site using the levels taken from the site survey.

In the post-development model the portion of land representing the proposed lots was excluded from the cross sections, to represent the loss of flood storage and conveyance as a result of filling of those lots.

### 3.4 Roughness Values

Roughness values were adopted for the river and floodplain consistent with the previous model. The following roughness values (Manning's n) were adopted:

River -	0.025
Vegetated Floodplain -	0.05
Urban Areas -	0.08

Note:- High roughness values in urban areas can be attributed to perturbation of flow caused by built components aligned perpendicularly to major drainage paths.

### **3.5 Boundary Conditions**

A rating curve was applied at the downstream boundary of the MIKE 11 model to allow downstream tailwater levels give a more realistic variation in water level over time. This rating curve was created using MIKE 11, based on the geometry of the most downstream cross section.

### **3.6 Model Inflows**

Inflows were applied to the MIKE 11 hydraulic model to represent catchment runoff for the four new catchments. A total hydrograph representing the total catchment runoff was applied directly upstream of the study site and local hydrographs represented the Marr Creek catchment, and the four catchments included for the current study.

### **3.7 Model Verification**

In the previous study the model adopted the rating curve of the Department of Natural Resources stream gauge 109001A. The flows were then adjusted to ensure the 100 year ARI event discharge, determined by the Flood Frequency Analysis is reached at the gauge site. In the current study the model parameters and boundary conditions were adjusted until a match was achieved with the flood levels predicted in the previous study.

## 4.0 Results

The flood levels for the existing and developed model are displayed in Table 5. Mossman River chainages 11290.00, 11330.00 and 11350.00 traverse the development site.

The results indicate the maximum variation in flood levels between the developed and existing flood levels is 0.01m. This is within the limit of accuracy of the model and is not considered to be an impact associated with the development.

Flood profiles and cross sections are displayed in Appendix B.

**Table 5: Predicted 100 year ARI flood levels.**

Chainage	Flood Levels (m AHD)		
	Existing (m)	Developed (m)	Discrepancy
MOSSMAN RIVER 10000.00	7.85	7.85	0.00
MOSSMAN RIVER 10125.00	7.88	7.89	0.01
MOSSMAN RIVER 10368.00	7.86	7.87	0.01
MOSSMAN RIVER 10448.00	7.85	7.86	0.01
MOSSMAN RIVER 10461.00	7.85	7.86	0.01
MOSSMAN RIVER 10605.00	7.83	7.84	0.01
MOSSMAN RIVER 10753.00	7.84	7.85	0.01
MOSSMAN RIVER 10817.56	7.83	7.83	0.00
MOSSMAN RIVER 10817.56	7.83	7.83	0.00
MOSSMAN RIVER 10867.00	7.72	7.73	0.01
MOSSMAN RIVER 10921.00	7.59	7.60	0.01
MOSSMAN RIVER 11004.00	7.28	7.29	0.01
MOSSMAN RIVER 11004.00	7.28	7.29	0.01
MOSSMAN RIVER 11054.00	7.29	7.30	0.01
MOSSMAN RIVER 11054.00	7.29	7.30	0.01
MOSSMAN RIVER 11100.00	7.28	7.29	0.01
MOSSMAN RIVER 11100.00	7.28	7.29	0.01
MOSSMAN RIVER 11123.00	7.28	7.29	0.01
MOSSMAN RIVER 11240.00	7.28	7.29	0.01
MOSSMAN RIVER 11290.00	7.28	7.28	0.00
MOSSMAN RIVER 11330.00	7.27	7.28	0.01
MOSSMAN RIVER 11350.00	7.27	7.27	0.00
MOSSMAN RIVER 11545.00	7.16	7.15	-0.01
MOSSMAN RIVER 11697.70	7.11	7.11	0.00
MOSSMAN RIVER 11747.00	7.05	7.05	0.00

Additional Cross Sections

## 5.0 Conclusions

Maunsell Australia Pty Ltd was commissioned by Curragh Design Pty Ltd to investigate the impact on flood levels of raising the ground level at Lot 3 Junction Road Mossman above the 100 year ARI level for a 29 lot subdivision. Hydrologic and hydraulic investigations of the existing case and developed case were conducted to determine the change in 100 year ARI flood levels along the Mossman River

Flood levels obtained by this study for the 100 year ARI event developed case were within 0.01m of the existing case. This difference is within the allowable margin of error of the MIKE 11 hydraulic model. These results indicate there is no effective change in the 100 year ARI flood level caused by the development that could affect surrounding residential premises. In this case no mitigation design options were required for the site layout.

The 100 year ARI flood planning level for the site is RL 7.28m AHD. To ensure that individual lots are flood free in the 100 year flood the lots should be filled to RL 7.28m AHD. A suitable freeboard should be applied to the finished floor level of any dwelling to allow for wave action and debris. It is recommended that a freeboard of 0.5m be applied to lots N-15, N-16, N-17, N-18, N19 which are immediately adjacent to the river, giving a minimum finished floor level of RL 7.78m AHD. It is recommended that all other lots proposed for the subdivision (as per Valmadre Development Consultants Drawing No. 0607CURRAGH-C1, Appendix C) have a freeboard of 0.3m applied (RL 7.58m AHD finished floor level), as these lots will be less affected by wave action and debris than lots immediately adjacent to the river.



## 6.0 References

Danish Hydraulic Institute, (2005) MIKE 11 Reference Manual

Institution of Engineers, Australia (1998) Australian Rainfall and Runoff, Volume 1

Institution of Engineers, Australia (1987) Australian Rainfall and Runoff, Volume 2

Hydrologic and Hydraulic Modelling: Foxton Avenue Drainage Study; Greenwich Bay Pty Ltd, May 2005

XP Expert Software, (2001) Reference Manual *XP XP-RAFTS 2000*

## Appendix A – Mossman River Hydrology Results

#####  
####

Results for period from 0: 0.0 1/ 1/2005  
to 1: 0.0 2/ 1/2005

#####  
####

ROUTING INCREMENT (MINS) = 5.00  
STORM DURATION (MINS) = 1440.  
RETURN PERIOD (YRS) = 100.  
BX = 1.0000  
TOTAL OF FIRST SUB-AREAS (km2) = 10890.95  
TOTAL OF SECOND SUB-AREAS (km2) = 19.15  
TOTAL OF ALL SUB-AREAS (km2) = 10910.10

#### SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. #1	Area #2	Slope #1	% Impervious #2	Pern #1	B #2	Link No.
	(ha)		(%)	(%)			
12	856.00	0.000	12.40	0.000	0.000	0.000	1.000
13	159.25	15.750	1.070	1.070	0.000	100.0	1.001
14	109.10	3.400	.6700	.6700	0.000	100.0	1.002
1	1369.0	0.000	5.290	0.000	0.000	0.000	2.000
2	1544.0	0.000	4.650	0.000	0.000	0.000	3.000
D1	.00001	0.000	5.300	0.000	0.000	0.000	2.001
3	631.00	0.000	16.80	0.000	0.000	0.000	2.002
5	844.00	0.000	21.60	0.000	0.000	0.000	2.003
4	644.00	0.000	19.80	0.000	0.000	0.000	4.000
D2	.00001	0.000	21.60	0.000	0.000	0.000	2.004
6	1600.0	0.000	9.410	0.000	0.000	0.000	5.000
D3	.00001	0.000	2.800	0.000	0.000	0.000	2.005
7	1869.0	0.000	16.70	0.000	0.000	0.000	2.006
8	606.00	0.000	11.89	0.000	0.000	0.000	6.000
9	369.00	0.000	8.660	0.000	0.000	0.000	2.007
10	150.00	0.000	7.140	0.000	0.000	0.000	2.008
11	50.000	0.000	.4400	0.000	0.000	0.000	1.003
MossmanSt	10.200	0.000	.5000	0.000	.0100	0.000	7.000
DevSite	4.000	0.000	.5000	0.000	5.000	0.000	8.000
Mill	28.300	0.000	.7500	0.000	1.000	0.000	9.000
15	20.100	0.000	.4000	0.000	.0750	0.000	1.004
16	28.000	0.000	.4000	0.000	3.000	0.000	1.005

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Cont. Loss #2 (mm/h)	Excess Rain #1 (mm)	Rain #2 (mm)	Inflow to (m <sup>3</sup> /s)	Peak Inflow (m <sup>3</sup> /s)	Time Lag mins	Link
12	33.463	62.00	0.000	6.200	0.000	600.88	0.000	272.64	125.0 20.00
13	33.463	62.00	1.000	6.200	1.000	600.88	778.11	304.62	145.0 14.00
14	33.463	62.00	1.000	6.200	1.000	600.88	778.11	322.26	160.0 2.000
1	33.463	62.00	0.000	6.200	0.000	600.88	0.000	283.05	185.0 1.000
2	33.463	62.00	0.000	6.200	0.000	600.88	0.000	298.80	205.0 1.000
D1	33.463	62.00	0.000	6.200	0.000	600.88	0.000	580.08	195.0 62.00
3	33.463	62.00	0.000	6.200	0.000	600.88	0.000	666.58	245.0 70.00
5	33.463	62.00	0.000	6.200	0.000	600.88	0.000	746.02	310.0 1.000
4	33.463	62.00	0.000	6.200	0.000	600.88	0.000	242.77	120.0 1.000
D2	33.463	62.00	0.000	6.200	0.000	600.88	0.000	808.89	305.0 21.00
6	33.463	62.00	0.000	6.200	0.000	600.88	0.000	391.66	160.0 57.00
D3	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1060.3	275.0 26.00
7	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1274.8	300.0 63.00
8	33.463	62.00	0.000	6.200	0.000	600.88	0.000	215.05	125.0 1.000
9	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1338.8	360.0 18.00
10	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1352.3	255.0 8.000
11	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1544.7	265.0 10.00
MossmanSt	33.463	62.00	0.000	6.200	0.000	600.88	0.000	3.163	130.0 6.000
DevSite	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1.604	120.0 7.000
Mill	33.463	62.00	0.000	6.200	0.000	600.88	0.000	9.025	125.0 8.000
15	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1553.5	275.0 10.00
16	33.463	62.00	0.000	6.200	0.000	600.88	0.000	1557.8	285.0 0.000

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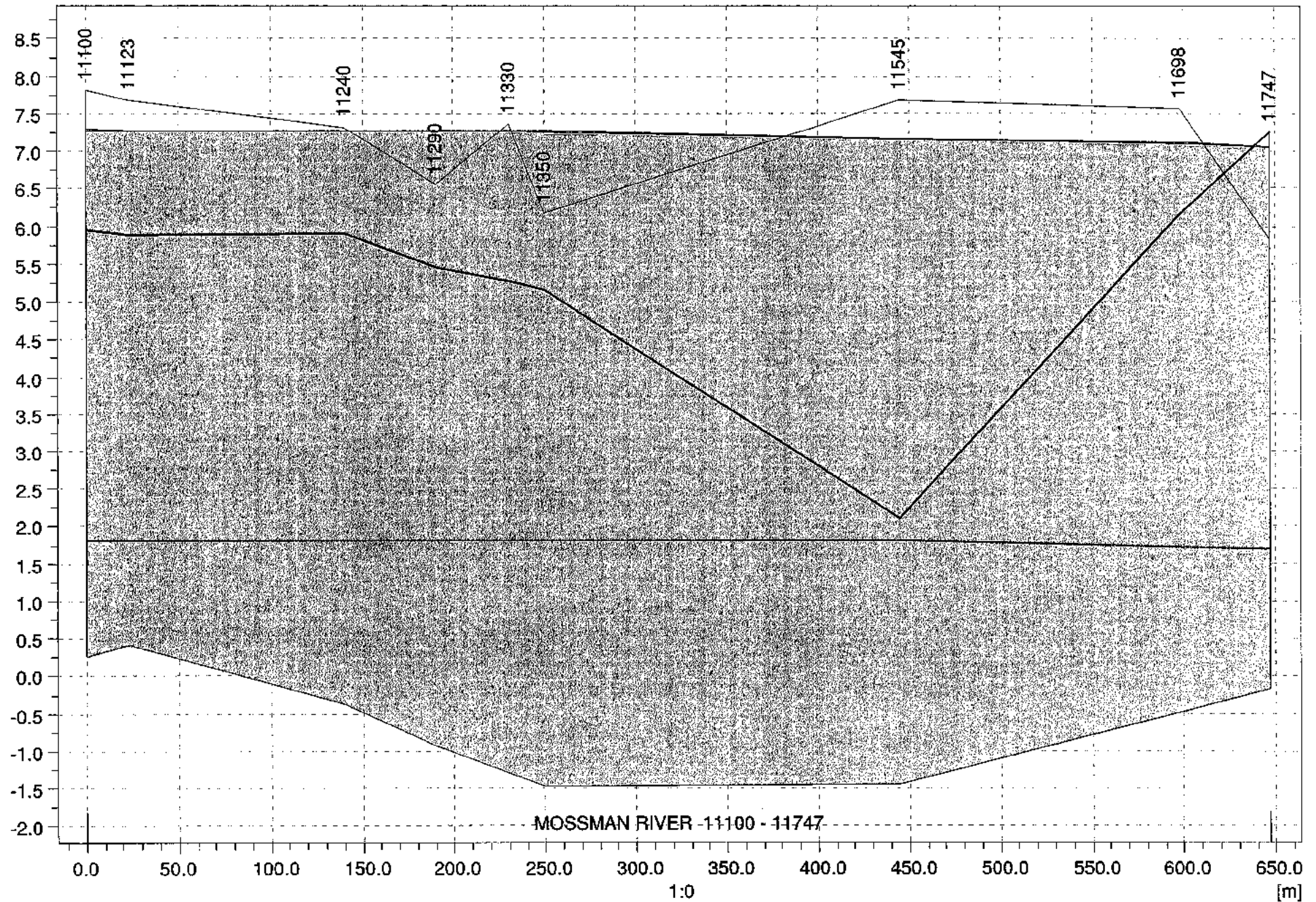


## Appendix B – Mossman River Hydraulic Results

1. General Flood Hazard Analysis  
2. Flood Hazard Study Report  
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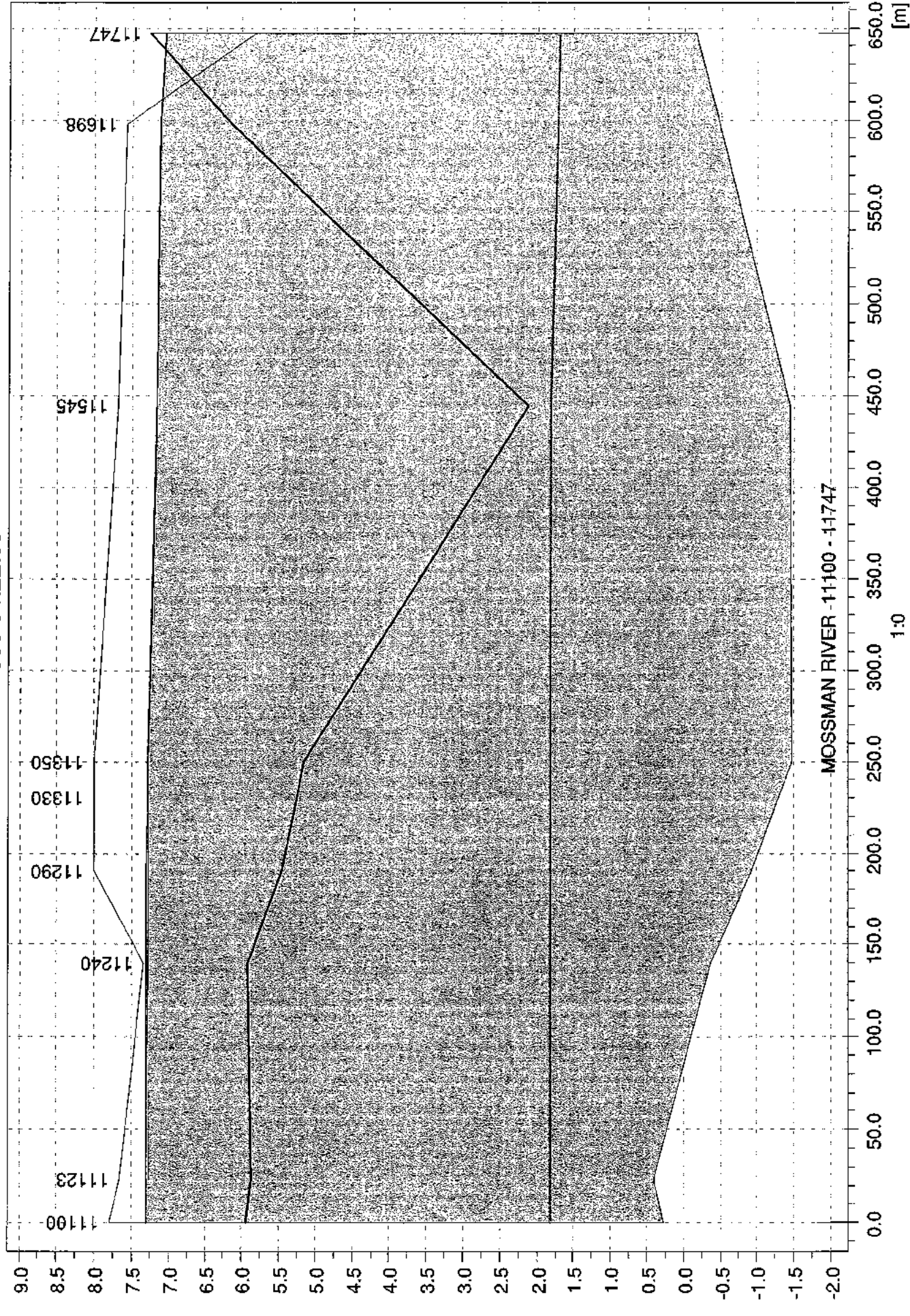
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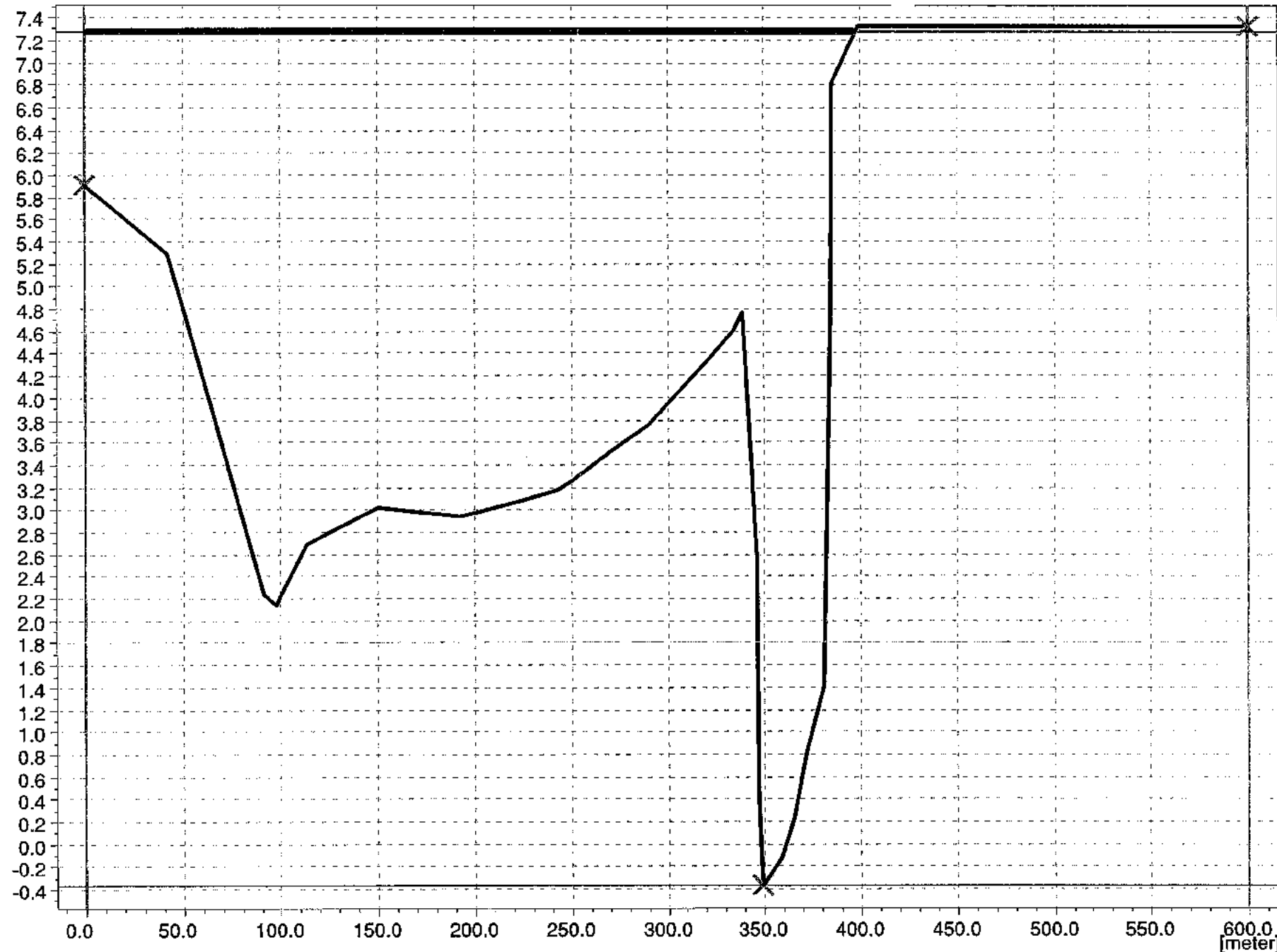
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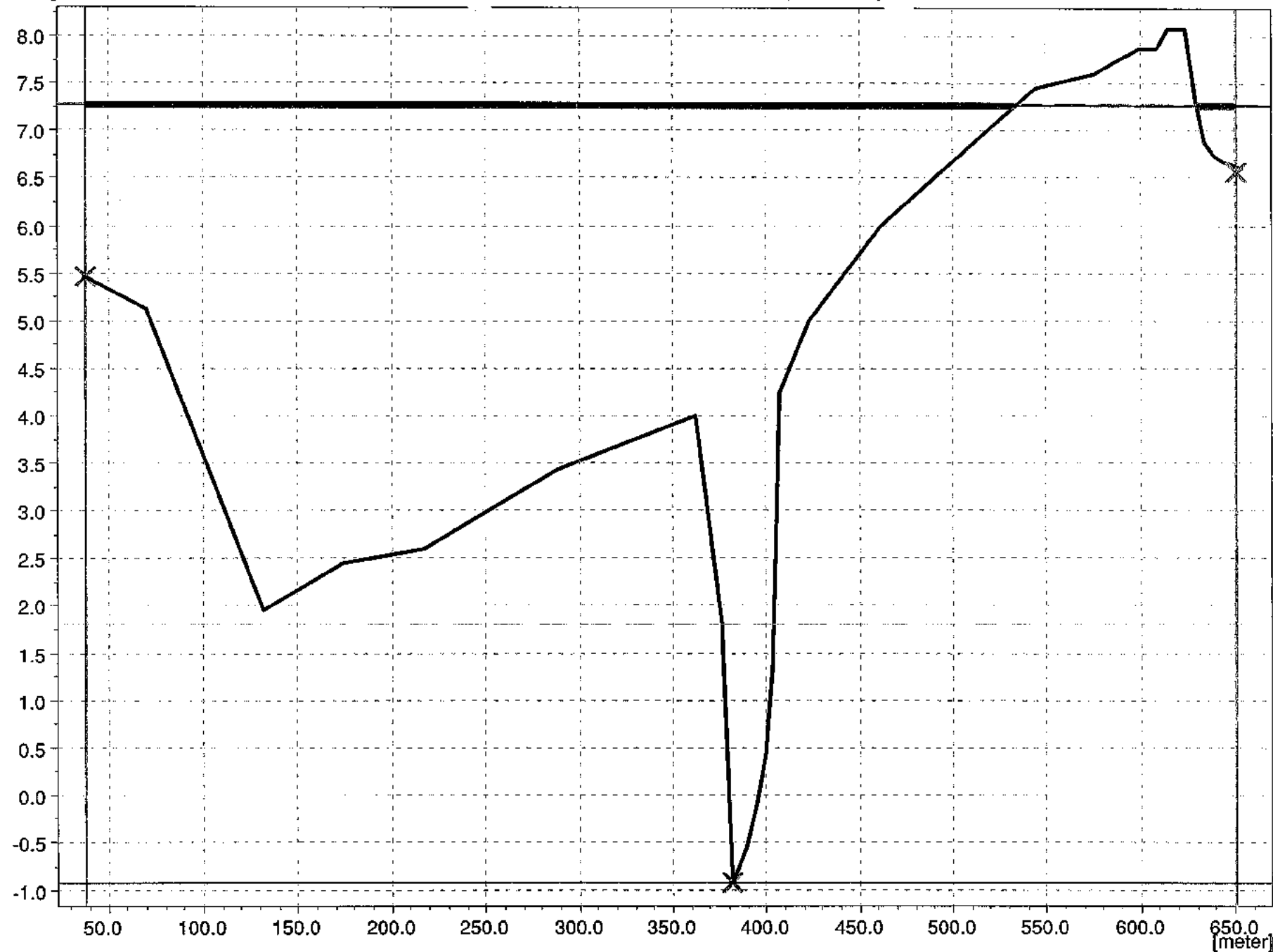
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Existing Cross  
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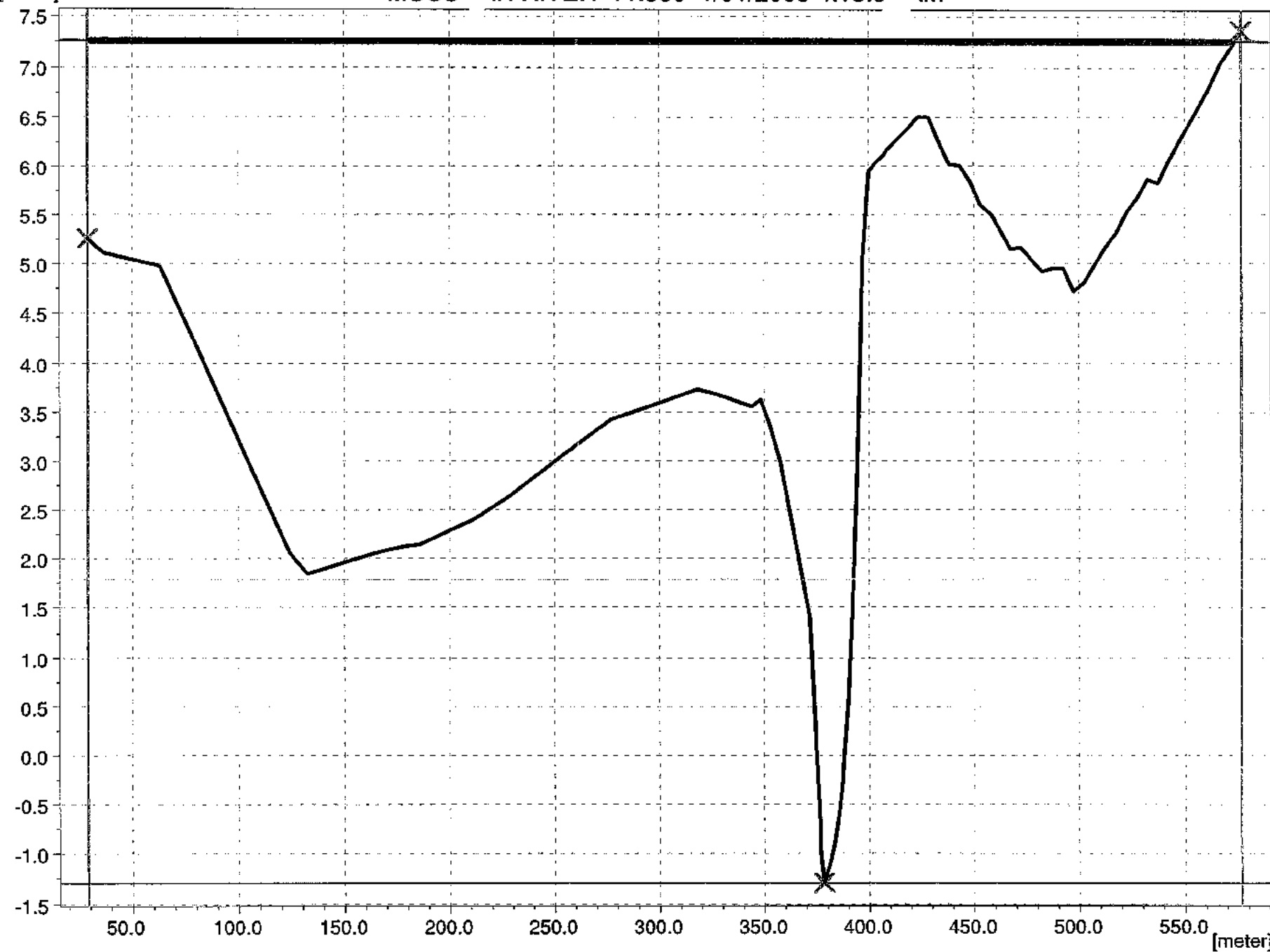


B.3

Existing Cross  
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B.3

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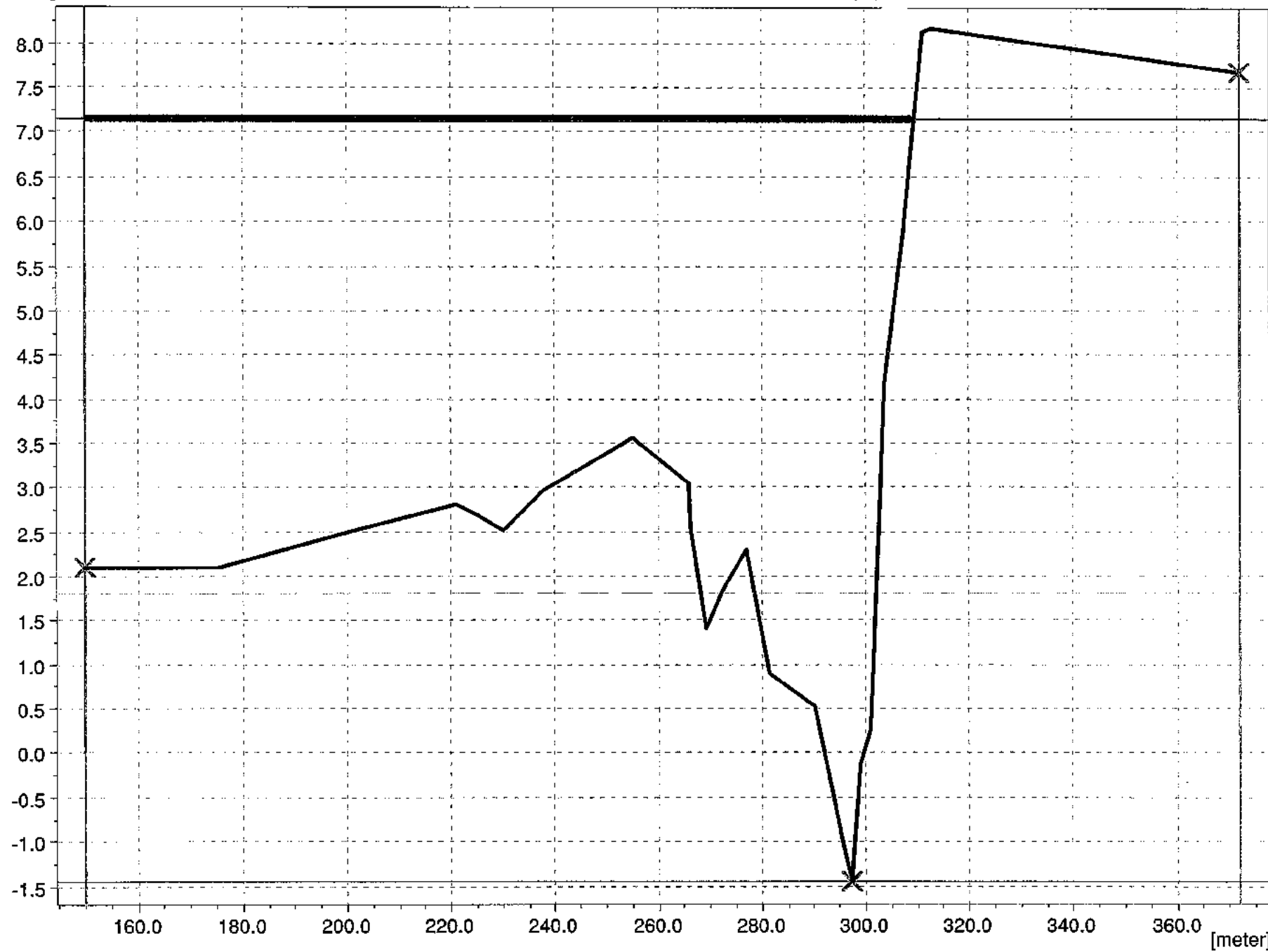
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B.3

Existing Cross  
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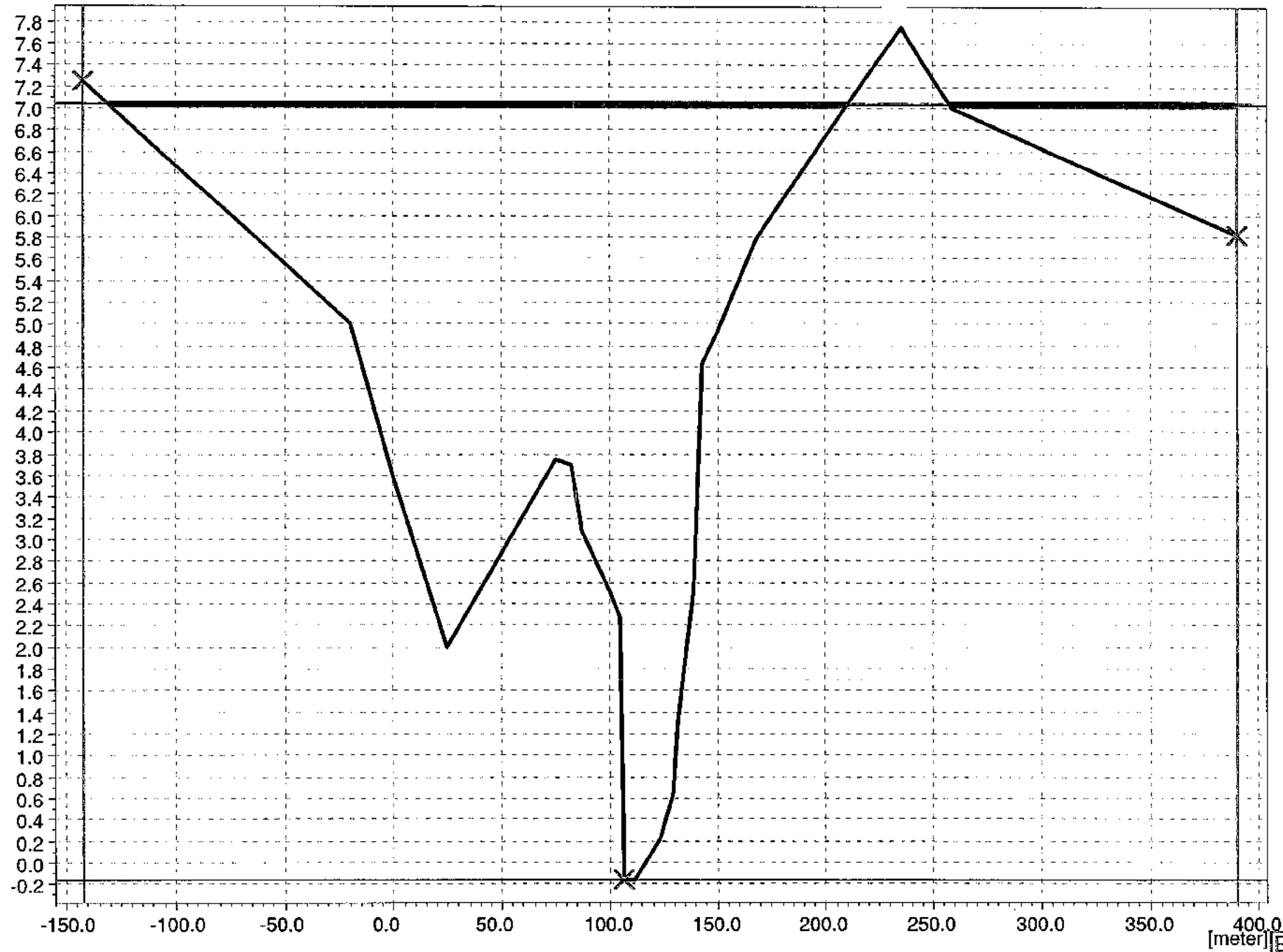


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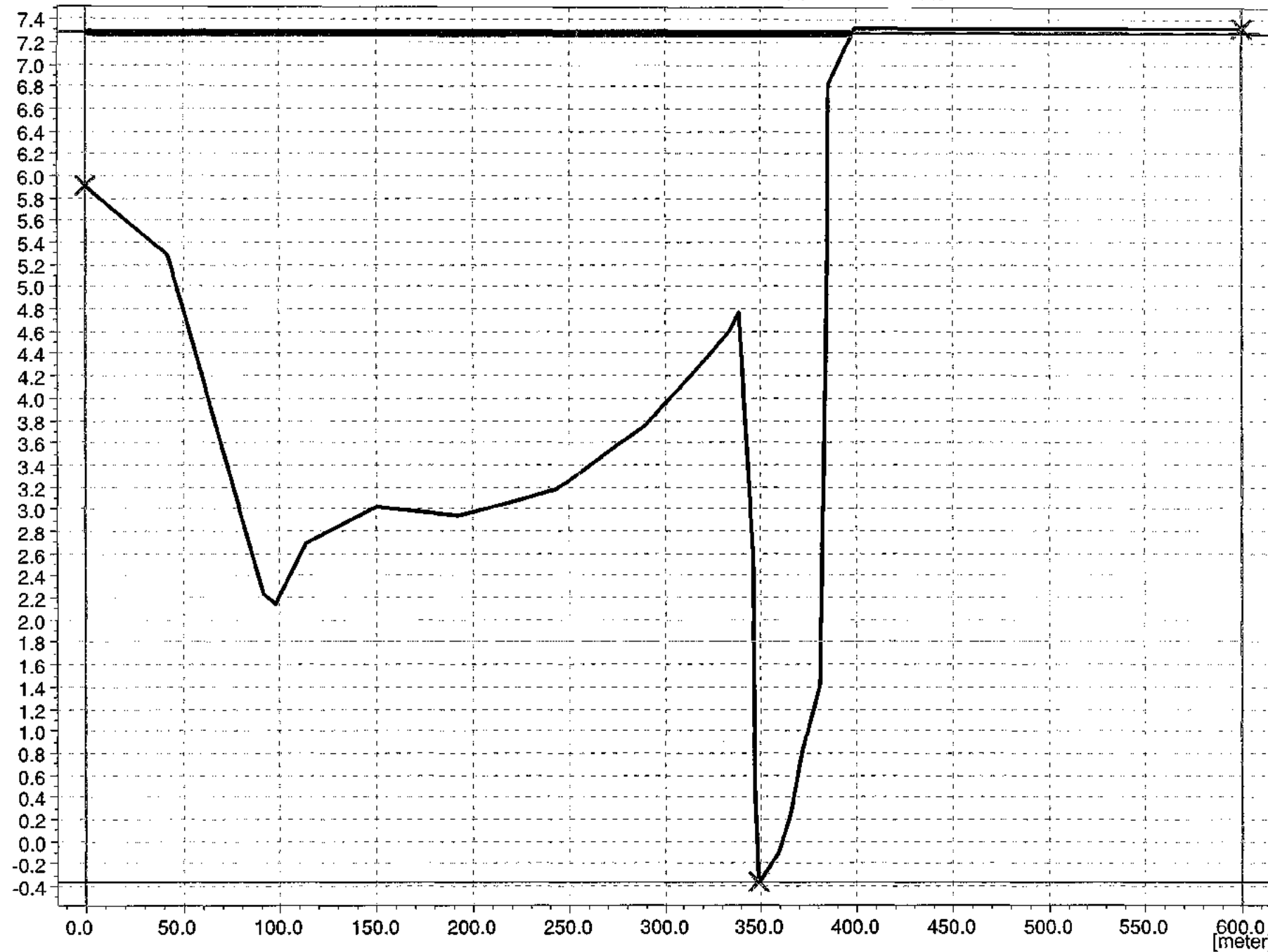


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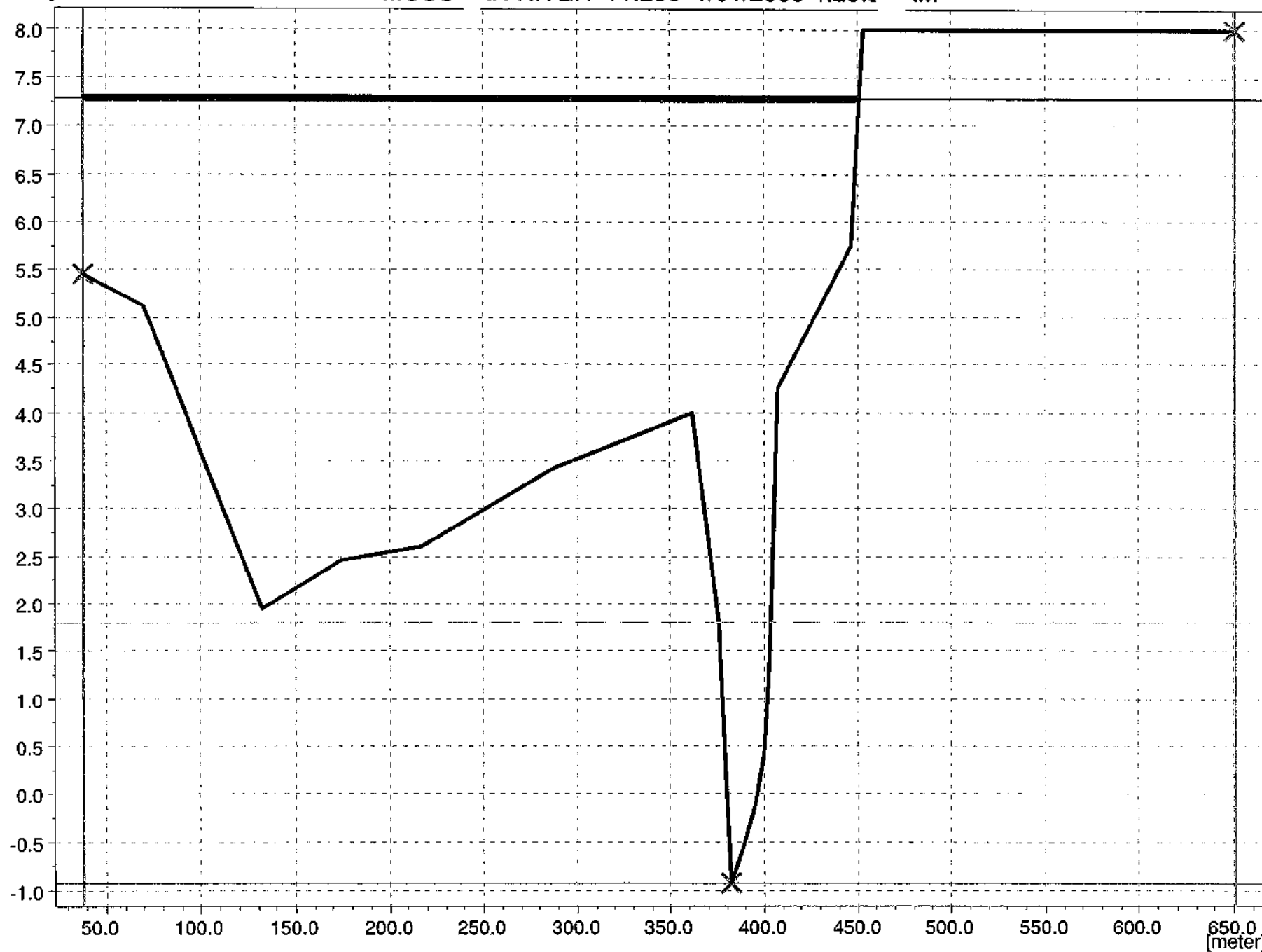
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B.4  
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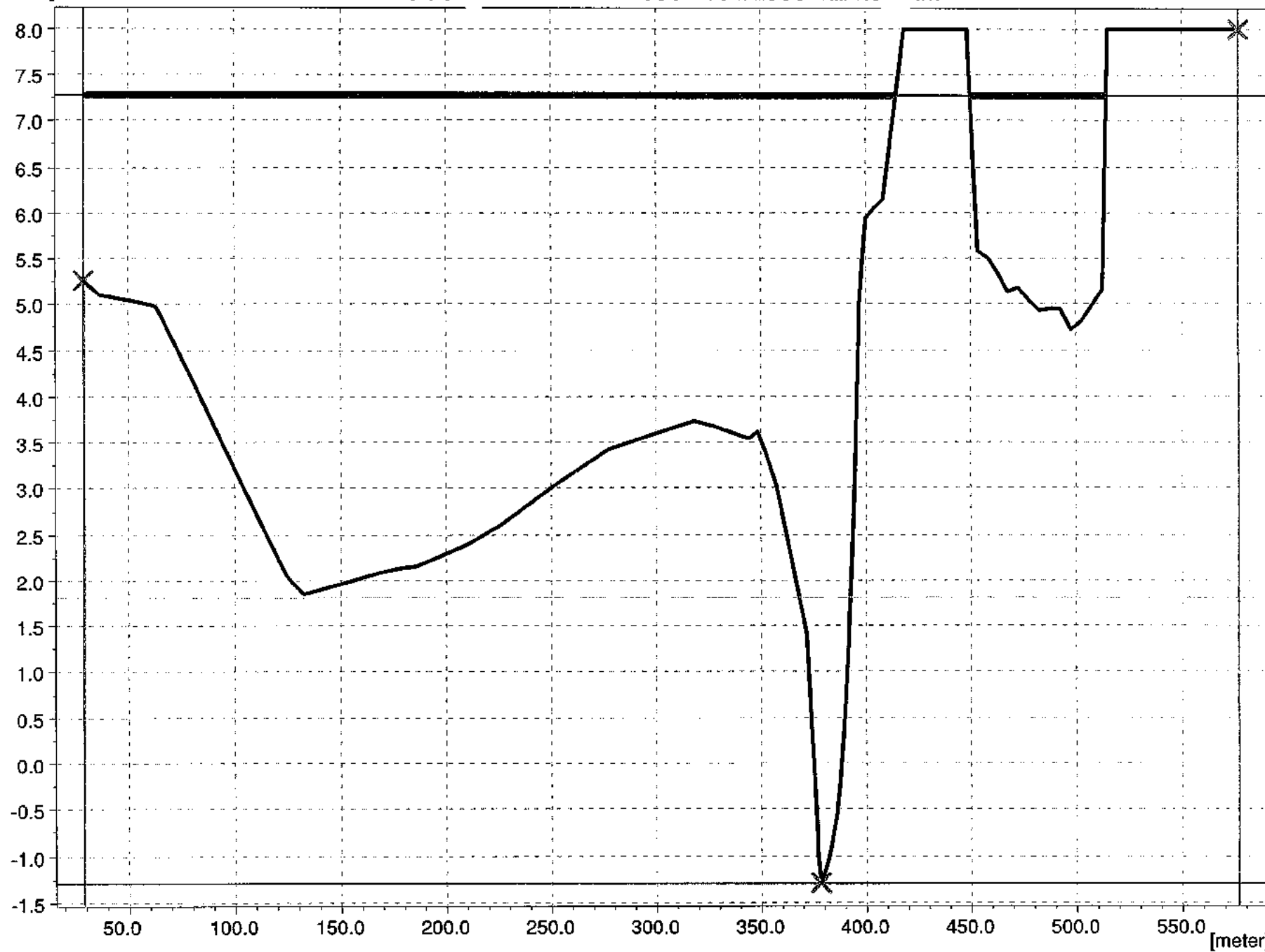
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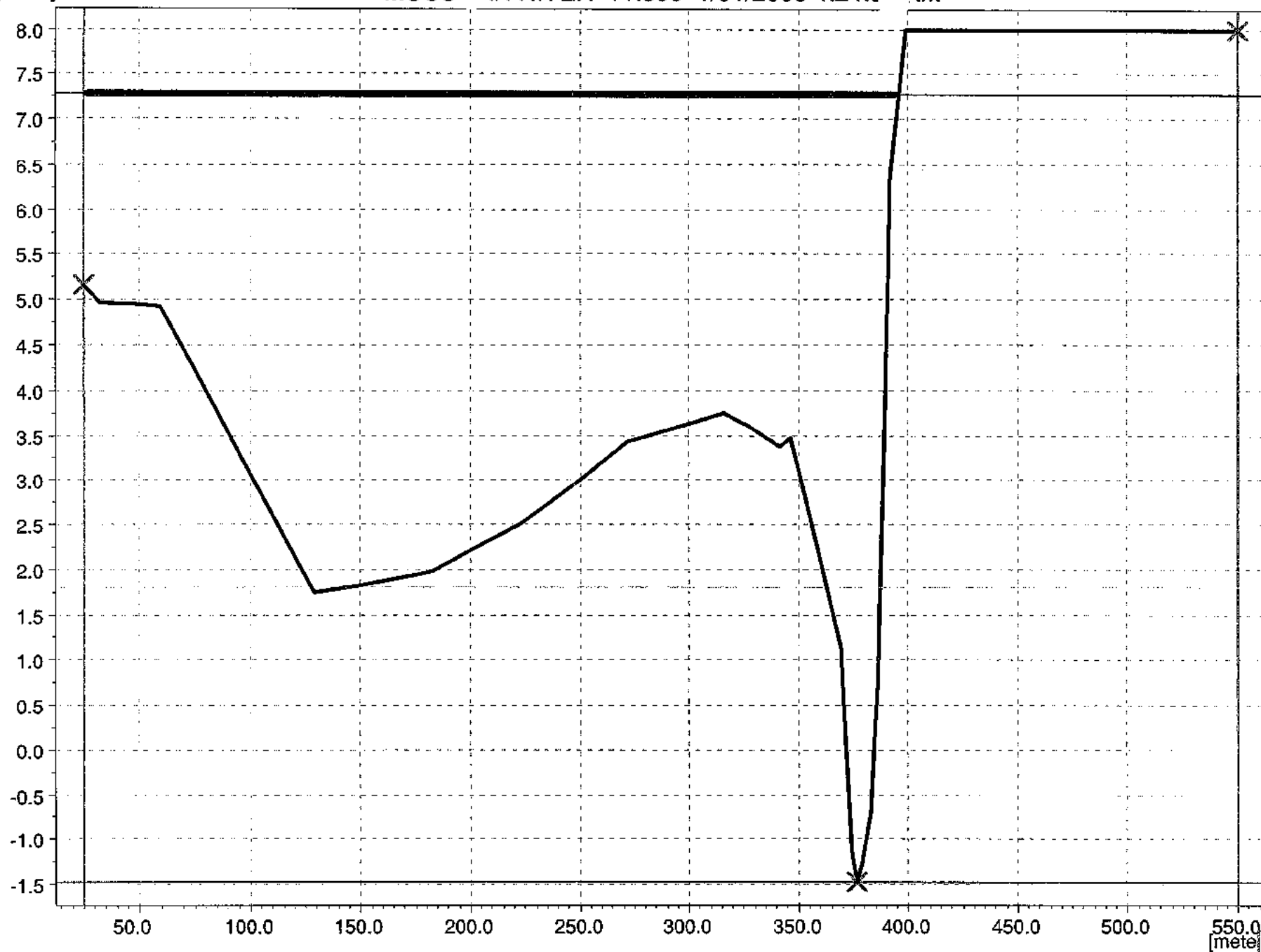


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MOSSMAN RIVER 11.545 1/01/2005 4:22:00 AM



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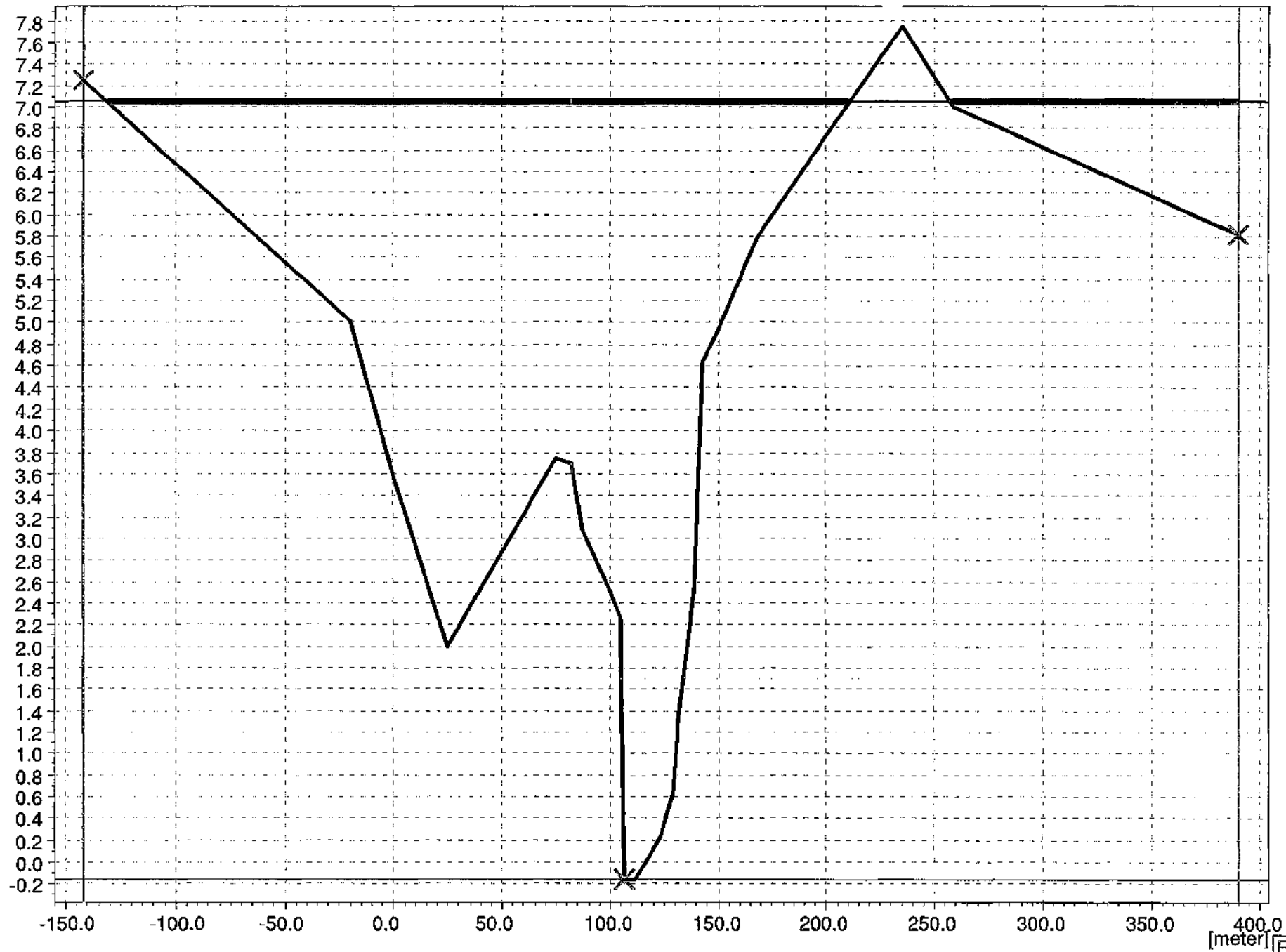
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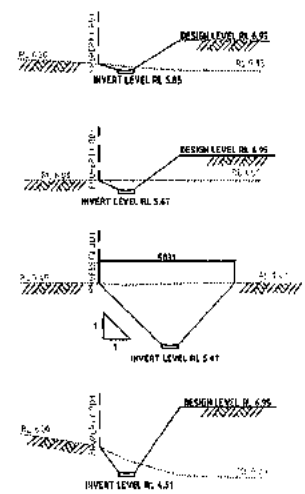
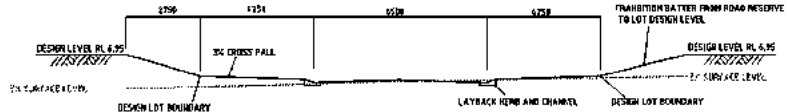
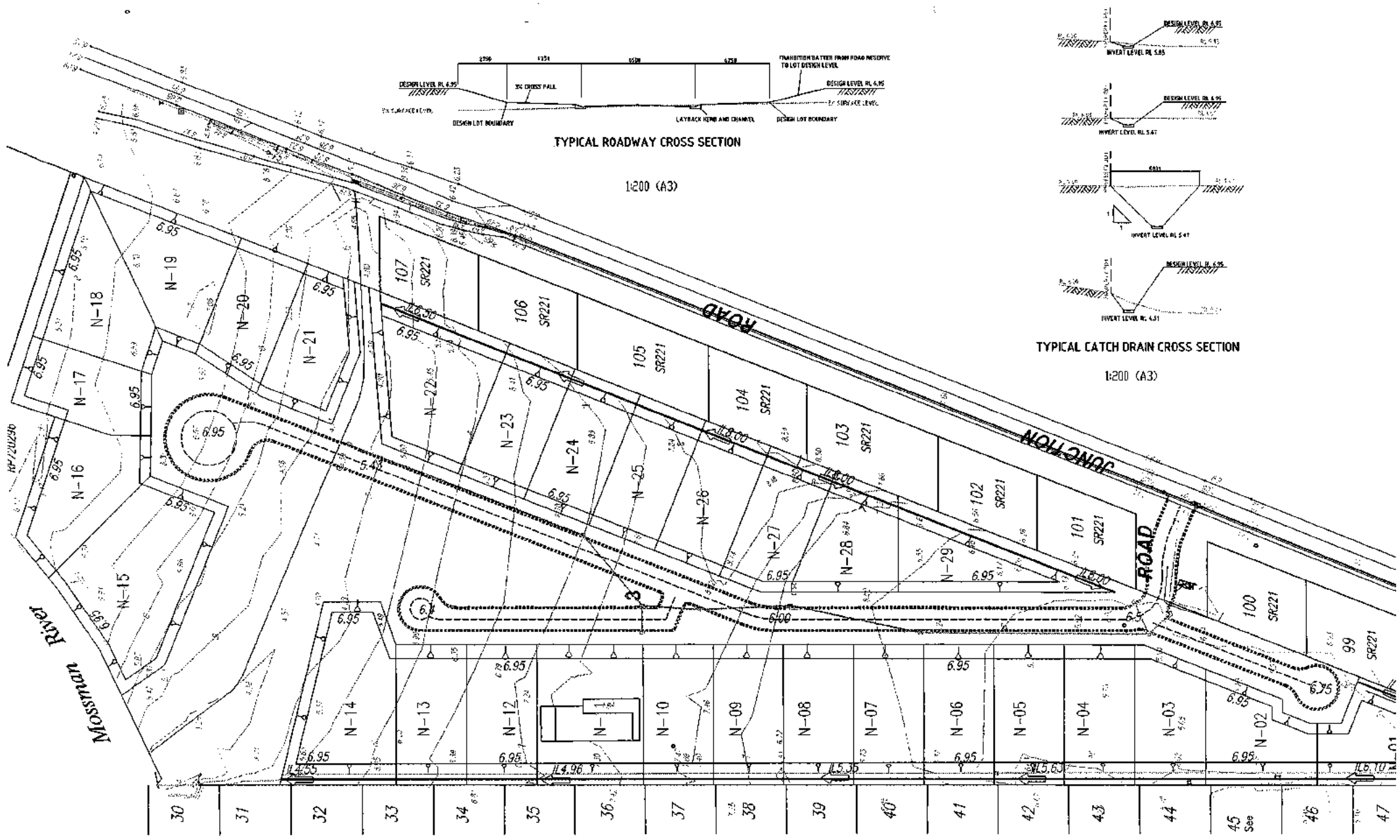


[meter] B.4

Developed  
Cross sections

## Appendix C – Lot Layout

Appendix C – Lot Layout



REVISIONS				VALMADRE REF		<b>Valmadre Development Consultants</b> Conceivo, Approve, Engineer, Manage ADH 00002448353 20/02/2018 PO Box 427 Smithfield 4878 Tel: Mobile 0407 674903, Fax (07) 40382554 Email: valmadre@vfdol.com.au	<b>CURRAGH DESIGNS P/L</b> <b>EARTHWORKS AND STORMWATER</b> <b>JUNCTION STREET, MOSSMAN</b>	AS SHOWN	
REVISION	DATE	APPROVED	BY	DESIGNED	N.V.			SCALE	1:1000 (A3)
COUNCIL SUBMISSION	14/2/2018	BY		DRAWN	A.V.			SHEET	1 OF 3
DETAILS	DATE	APPROVED	BY	CHECKED	N.V.			DRAWING NO.	0607CURRAGH-C1
CAD FILE				REVISION					





**Maunsell Australia Pty Ltd**

21 Stokes Street, Townsville QLD 4810, PO Box 5423, Townsville QLD 4810, Australia  
T +61 7 4729 5500 F +61 7 4729 5599 www.maunsell.com

ABN 20 083 846 925

Ref: 60020619:T400/07:MOS/DC

The Manager  
Curragh Designs  
Level 5  
32-36 Grenfell Street  
ADELAIDE SA 5000

Attention: Mr Barry Santry

4 June 2007

Dear Sir

**Addendum - Mossman River Flood Assessment**

Maunsell Australia Pty Ltd has been commissioned by Curragh Designs to prepare an addendum to the Mossman River Flooding Assessment prepared by Maunsell Australia Pty Ltd in January 2007. This addendum provides flood levels for the 20 year, 5 year and 2 year Average Recurrence Interval floods (Q20, Q5 and Q2) at the study site at Lot 3 Junction Road, Mossman. The extended study was conducted using hydrologic and hydraulic modelling previously developed for the flood study.

**Method:**

The RAFTS model previously used to obtain flow hydrographs from sub-catchments in the study area, was amended to produce hydrographs for the Q20, Q5 and Q2 events for all durations. Peak discharges for all durations were compared to determine the critical duration for each Average Recurrence Interval (ARI). The critical duration discharge hydrographs for each ARI were applied in the MIKE 11 model used in the previous study.

The MIKE 11 hydraulic model was run and peak flood levels determined for the full range of ARIs modelled. This process was undertaken for the developed case, which represented the increase in fill levels associated with development of Lot 3 Junction Road.

**Results:**

Maximum flood levels for the Developed Case for the Q20, Q5 and Q2 are listed in Table 1 (overleaf) and are displayed on Figure 1 at the respective locations.

**Summary:**

The models previously developed for the Mossman River Flooding Assessment were used to determine maximum flood levels for the Q20, Q5 and Q2 floods in the study area as requested. These flood levels are listed in Table 1 and in Figure 1 of this addendum.

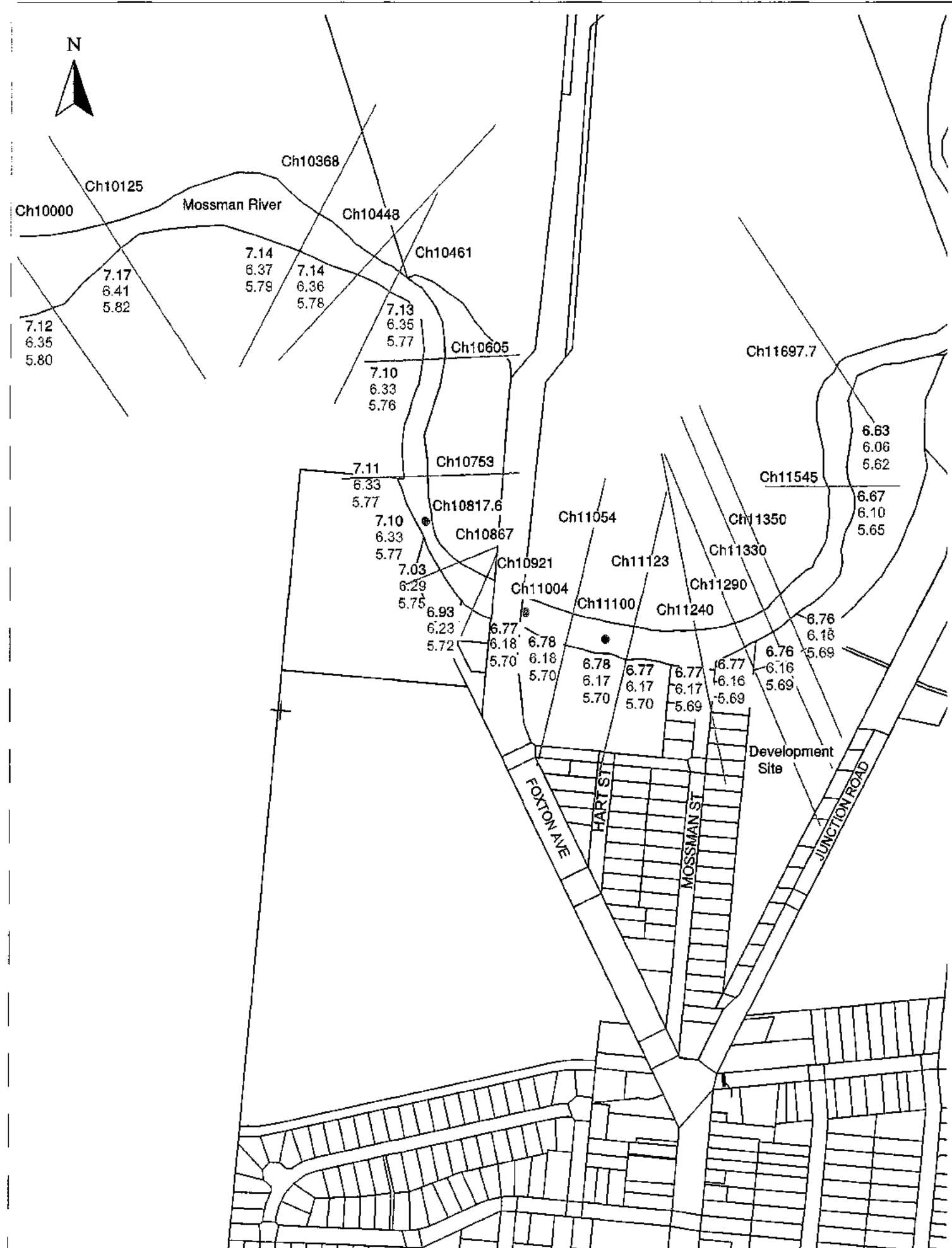
Any questions or comments regarding this addendum should be directed to Stephen Downes or Michelle O'Shea.

Yours faithfully  
for MAUNSELL AUSTRALIA PTY LTD

A handwritten signature in black ink, consisting of a large, stylized 'S' followed by a horizontal line and a small vertical stroke at the end.

Stephen Downes  
Principal Engineer - Water  
[stephen.downes@maunsell.com](mailto:stephen.downes@maunsell.com)

encl: Figure 1 & Table 1



Q20	20 year ARI 24 hour duration event flood levels
Q5	5 year ARI 24hr duration event maximum flood levels
Q2	2 year ARI 24hr duration event maximum flood levels
Cross Sections are represented by red lines	
All levels are in m AHD	

Figure 1 - Maximum Flood Levels for Q20, Q5 & Q2

# Table 1

Maximum Flood Levels for the 20 year, 5 year and 2 year ARI events.

Chainage	Q20 (mAHD)	Q5 (mAHD)	Q2 (mAHD)
10000.00	7.12	6.35	5.80
10125.00	7.17	6.41	5.82
10368.00	7.14	6.37	5.79
10448.00	7.14	6.36	5.78
10461.00	7.13	6.35	5.77
10605.00	7.10	6.33	5.76
10753.00	7.11	6.33	5.77
10817.56	7.10	6.33	5.77
10867.00	7.03	6.29	5.75
10921.00	6.93	6.23	5.72
11004.00	6.77	6.18	5.70
11054.00	6.78	6.18	5.70
11100.00	6.78	6.17	5.70
11123.00	6.77	6.17	5.70
11240.00	6.77	6.17	5.69
11290.00	6.77	6.16	5.69
11330.00	6.76	6.16	5.69
11350.00	6.76	6.16	5.69
11545.00	6.67	6.10	5.65
11697.70	6.63	6.06	5.62
11747.00	6.57	6.02	5.59