

SIMTA

Flood Study and Stormwater Management



SYDNEY INTERMODAL TERMINAL ALLIANCE

Transitional Part 3A Concept Plan Application

This page has been left blank intentionally

Hyder Consulting Pty Ltd ABN 76 104 485 289 Level 5, 141 Walker Street Locked Bag 6503 North Sydney NSW 2060 Australia Tel: +61 2 8907 9000 Fax: +61 2 8907 9001 www.hyderconsulting.com



SIMTA

Moorebank Intermodal Terminal Facility

Flood Study and Stormwater Management

Author	Bruce Caldwell	Truce Caldwell
Checker	Greg lves	Cre Dra
Approver	Neil McMillan	Neit M Mill

This report has been prepared for SIMTA in accordance with the terms and conditions of appointment dated 17 August 2010. Hyder Consulting Pty Ltd (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

This page has been left blank intentionally



CONTENTS

Execu	utive s	ummary	1
1	Introd	luction	2
2	Datab	base	5
3	Existi	ng catchments and drainage patterns	6
4	Flood	ling and stormwater assessment process	. 11
	4.1	Current civil design	12
	4.2	Anzac Creek floodplain modelling	21
	4.3	Civil design options	24
5	Anza	c Creek	27
	5.1	Railway Culvert Over Anzac Creek	27
6	Georg	ges River	29
	6.1	Georges River Railway Bridge	31
	6.2	Proposed Railway Floodplain Crossing	39
7	Evacu	uation and refuge	44

Tables

	Table 1	Land parcels of the SIMTA proposal	2
	Table 2: Com	parison of peak flow estimates (m ³ /s)1	5
	Table 3: Sum	mary of detention storage parameters and performance1	5
	Table 4: Exte	rnal catchment and flows potentially impacting on the site1	6
	Table 5: Prop	osed stormwater quality treatment measures for the site1	9
	Table 6: MUS	SIC model land use for the site1	9
	Table 7: Trea	tment performance summary for the site2	0
	Table 8 – Comp	arison of HEC-RAS and Mike 11 results; Year 2000 scenario	3
	Table 9 - HEC-F comparison	AS results; Year 2000 scenario and East Hills Railway Bridge 34	
		ges River 100 year ARI flood levels (mAHD); pre and post Georges River development	
Figu	ires		
	Figure 1: Mod	prebank intermodal terminal site location plan	4
	Figure 2: Exis	ting site conditions (indicating external site flow locations)	6

Figure 3: Existing stormwater discharge points and approximate catchments10

Figure 4: Post development catchment boundaries (including local external catchments) 14

Figure 5: Typical channel section for increased NE site detention22

Figure 6 - Proposed rail link alignment (overlaying Liverpool City Council Regional Flood Planning Areas) 30

Figure 8 –Indicative bridge layout adopted for flood modelling......37

Figure 9 – Proposed rail link alignment on western floodplain of the Georges River40

Figure 10 - Liverpool City Council Flood Planning Areas for existing catchment conditions 42

Appendices

Appendix A

Initial DRAINS model input and output -

existing and proposed conditions

Appendix B

HEC-RAS model input and output data -

existing and proposed conditions

Appendix C

Music model layout and parameters

Appendix D

Anzac Creek RAFTS model inputs and outputs -

existing and proposed conditions

Appendix E

Anzac Creek TUFLOW model inputs and results -

existing and proposed conditions

Appendix F

'Site only' DRAINS model inputs and results -

existing and proposed conditions

Appendix G

'Site only' TUFLOW model inputs and results -

existing and proposed conditions

Drawings

(As Listed in Attachment)

Executive summary

The purpose of this report is to provide the outcomes of a flooding and stormwater assessment for the Sydney Intermodal Terminal Alliance (SIMTA) proposal. This report has been prepared to inform the Concept Plan for the SIMTA proposal, which will be assessed under the provisions for transitional Part 3A projects of the *Environmental Planning and Assessment Act 1979*.

The assessment was undertaken adopting general principals of broader civil engineering design. The assessment was broken into two distinct areas of the development, the initial study covering:

- Current civil design
- Anzac Creek floodplain modelling
- Civil design options

Current civil design

This first stage of the flooding and stormwater assessment has involved an initial quantifying of site runoff, on-site detention requirements and identifying locations of potential flooding impacts on neighbouring land holders, based on the current civil design.

The initial on-site detention (OSD) volume estimate (discussed in Section 4.1 of this report) has been subject to revision as discussed in the 'Anzac Creek Floodplain Modelling' and 'Civil Design Options' Sections (4.2 and 4.3) of this report.

Anzac Creek floodplain modelling

Following the initial OSD assessment, two dimensional waterways modelling of potential impacts extending along Anzac Creek was carried out. This broader catchment assessment identified the need to increase the initial OSD requirements in the north-eastern portion of the site. It is anticipated that this would be achieved by reconfiguring the concept channel and pond, and raising the north-eastern area ground levels.

Flood flow regime figures for Anzac Creek (which include the additional OSD) are included in Appendix E. These figures indicate that on Anzac Creek, the SIMTA proposal would result in little if any impact on 100 year ARI flooding.

Civil design options

This assessment was carried out to indicate 100 year ARI flood levels along the proposed trunk drainage or OSD channels within the site, and provide civil design options for the purpose of mitigating potential adverse flooding and stormwater impacts on the neighbouring land holders.

Additional flood modelling

Following on from the above, more detailed flood modelling was undertaken to specifically investigate the impact of the development on the two waterways, Anzac Creek and Georges River. These are discussed in more detail in Sections 5 and 6 of this report

1 Introduction

The Sydney Intermodal Terminal Alliance (SIMTA) is a consortium of Qube Logistics and QR National. The SIMTA Moorebank Intermodal Terminal Facility (SIMTA proposal) is proposed to be located on the land parcel currently occupied by the Defence National Storage and Distribution Centre (DNSDC) on Moorebank Avenue, Moorebank, south west of Sydney. SIMTA proposes to develop the DNSDC occupied site into an intermodal terminal facility and warehouse/distribution facility, which will offer container storage and warehousing solutions with direct rail access to Port Botany. Construction of the rail connection from the SIMTA site to the Southern Sydney Freight Line (**SSFL**) will be undertaken as part of the first stage of works for the SIMTA proposal.

The SIMTA site is located in the Liverpool Local Government Area. It is 27 kilometres west of the Sydney CBD, 17 kilometres south of the Parramatta CBD, 5 kilometres east of the M5/M7 Interchange, 2 kilometres from the main north-south rail line and future Southern Sydney Freight Line, and 0.6 kilometres from the M5 motorway.

The **SIMTA site**, approximately 83 hectares in area, is currently operating as a Defence storage and distribution centre. The SIMTA site is legally identified as Lot 1 in DP1048263 and zoned as General Industrial under Liverpool City Council LEP 2008. The parcels of land to the south and south west that would be utilised for the proposed rail link are referred to as the **rail corridor**. The proposed rail corridor covers approximately 75 hectares and adjoins the Main Southern Railway to the north. The rail line is approximately 3.5 kilometres in length, 20 metres in width (variable width) and includes two connections to the SSFL, one south and one north.

The proposed rail corridor is owned by third parties, including the Commonwealth of Australia, RailCorp, private owners and Crown Land held by the Department of Primary Industries, and would link the SIMTA site with the Southern Sydney Freight Line. Existing uses include vacant land, existing rail corridors (East Hills Railway and Main Southern Railway), extractive industries, and a waste disposal facility. The rail corridor is intersected by Moorebank Ave, Georges River and Anzac Creek. Native vegetation cover includes woodland, forest and wetland communities in varying condition. The proposed rail corridor is zoned partly 'SP2 Infrastructure (Defence and Railway)' and partly 'RE1 - Public Recreation'. The surrounding Commonwealth lands are zoned 'SP2 Infrastructure (Defence)'.

Table 1 shows the lot and deposited plan number of the land parcels that will be impacted by the SIMTA proposal.

Lot	Deposited Plan	Property Address/Description
1	1048263	Moorebank Avenue, Moorebank (SIMTA Site)
3001	1125930	Moorebank Avenue, Moorebank (land immediately south and south-west of SIMTA Site, including School of Military Engineering)
1	825352	Railway land and to the north of East Hills Railway Line
2	825348	
1	1061150	
2	1061150	

Table 1 Land parcels of the SIMTA proposal

Lot	Deposited Plan	Property Address/Description
1	712701	
5	833516	Privately owned land north of East Hills Railway Line,
7	833516	east of Cumberland & South Passenger Line and Southern Sydney Freight line and west of Georges River
51	515696	
52	517310	
104	1143827	
103	1143827	
91	1155962	
4	1130937	Land west of the Georges River, north of the above privately owned land
5	833516	Railway land along shared railway line – Cumberland &
101	1143827	South Passenger Line and Southern Sydney Freight Line
102	1143827	
Conveyance Book 76	Number 361	Main Southern Rail Corridor
NA	NA	Georges River (Crown Land)

The SIMTA proposal will be undertaken as a staged development. An annual operating capacity of 1,000,000 TEU throughput is anticipated in the ultimate stage, when fully developed.

This report comprises a concept stormwater management plan and flood study assessment completed as part of the civil engineering concept designs developed for the proposed intermodal terminal facility. The report is intended to accompany the submission documents for Concept Plan approval of the SIMTA proposal under the transitional Part 3A project provisions of the *Environmental Planning and Assessment Act* 1979 (EP&A Act).



Figure 1: Moorebank intermodal terminal site location plan

2 Database

The following information has formed the database for this flood assessment and stormwater management plan:

- Australian Rainfall and Runoff by the Institute of Engineers Australia (2001).
- NSW Floodplain Management Manual by DIPNR (2005).
- Bureau of Meteorology Rainfall Intensities for the Liverpool City Council Area.
- The Estimation of Probable Maximum Precipitation in Australia: Generalised Short-Duration Method by Commonwealth Bureau of Meteorology (June 2003).
- Services and Flood Investigation Report for Defence National Storage and Distribution Centre, Moorebank by Cardno Willing (December 2002).
- Anzac Creek Floodplain Risk Management Study and Plan by BMT WBM Pty Ltd (30 May 2008) for Liverpool City Council.
- Georges River Floodplain Risk Management Study & Plan by Bewsher Consulting (May 2004) for Liverpool City Council.
- Practical Consideration of Climate Change Floodplain Risk Management Guideline by DECC (25 October 2007).
- Aerial laser survey provided by AAM Hatch Pty Ltd (May 2008, LiDAR Data Base).
- Ground survey for the site prepared by Hard and Forester (dated 3 August 2010).
- Liverpool City Council documents:
 - Liverpool Development Control Plan 2008.
 - Liverpool Development Control Plan 2008, Flood planning area map sheet FLD-013, cadastre 31 July 2009.

3 Existing catchments and drainage patterns

The aerial photo in Figure 2, shows that the site currently contains a number of warehouse style facilities connected by internal roads, interspersed with grass and trees. The site fronts onto Moorebank Avenue on its western boundary and Greenhills Road reservation on its eastern boundary. Moorebank Avenue is a formalised two lane road with grassed swales. Greenhills Road is an unformed road reservation that is predominantly used as a utility services corridor.



Figure 2: Existing site conditions (indicating external site flow locations)

The site is relatively flat, particularly along the Moorebank Avenue frontage. The levels along Moorebank Avenue range from RL 14 metres to 16 metres. Along the Greenhills Road frontage, the land rises from about RL 14 metres at each end to a localised peak of RL 22 metres about midway along the length.

The site has bushland located to its eastern and southern boundaries with Anzac Creek running from south to north within relatively close proximity to the site. Anzac Creek is predominantly in its natural state within the bush area, however, as it flows north towards Anzac Road, the creek passes through an area of highly disturbed ground owned by Department of Defence. North of Anzac Road the creek runs through the residential area of Wattle Grove.

There are three existing formal stormwater discharge outlets from the site. Two points discharge eastward into Anzac Creek and cross under the Greenhills Road formation via pipes and headwalls. Stormwater from the site is carried through the site via formal open grass lined channels to pipes and headwalls under Greenhills Road. From Greenhills Road to Anzac Creek, the channels are less formalised.



Photos show channelled approaches and piped crossing under Greenhills Avenue from the northern outlet point

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289

f:\aa003760\r-reports\variation 14 - concept plan reports\changes highlighted\dn00256-simta **Stormwater** management and flood study-final_nm.docx



Photo shows concrete trapezoidal channel leading into heavily vegetated open channel which then drains to existing outlet on south-eastern corner

There is one discharge westward into the Georges River. Water from the site is collected in a formal concrete lined trapezoidal channel running within the site parallel to Moorebank Avenue. Water is led to a formalised pipe crossing of Moorebank Avenue into a concrete rectangular channel which leads to Georges River.



Photos show the concrete trapezoid within the site and the approach to the pipes crossing under Moorebank Avenue.



Concrete Channel downstream of pipes crossing Moorebank Ave leading to Georges River

There is also a small local external catchment area which discharges into the site midway along the western site boundary from the eastern side of Moorebank Avenue.

Figure 3 indicates the external catchments which enter the site, and the existing catchments within the site that discharge to the three existing culvert outlets. The majority of the external catchments have been identified from aerial laser survey contours and consist of small open areas which fall towards the site boundary.

One catchment is a sealed carpark within the School of Military Engineering on the western side of Moorebank Avenue. Stormwater runoff from the sealed carpark is captured and piped under Moorebank Avenue into the concrete trapezoidal open channel which runs inside the SIMTA site.



Figure 3: Existing stormwater discharge points and approximate catchments

4 Flooding and stormwater assessment process

The flooding and stormwater assessment process has been carried out in three stages.

The three stages investigated are:

- Current civil design This first stage of the flooding and stormwater assessment (using DRAINS, HEC-RAS and MUSIC software) involved an initial quantifying of site runoff, on-site detention requirements and identifying locations of potential flooding impacts on neighbouring landholders, based on the current civil design. Current concept design drawings that relate to aspects of flooding and stormwater accompany this report.
- Anzac Creek floodplain modelling Following the initial OSD assessment, two dimensional (TUFLOW) waterway modelling of potential impacts extending along Anzac Creek was carried out. This broader catchment assessment identifies the need to increase the initial OSD requirements (determined by the DRAINS site modelling) in the north-eastern portion of the site.
- **Civil design options** This subsequent assessment was carried out to indicate 100 year ARI flood levels along the proposed trunk drainage/OSD channels within the site, and provide civil design options for the purpose of mitigating potential adverse flooding and stormwater impacts on the neighbouring landholders

4.1 Current civil design

The initial civil design (provided in the accompanying Drawings) has attempted to maximise the developable site area through an site layout and nominated site platform levels. In conjunction with the initial design site, stormwater runoff was assessed using:

- DRAINS software for quantifying site runoff and estimating on-site detention (OSD) requirements for the mitigation of potential adverse flow impacts on Anzac Creek and the Georges River.
- MUSIC software for developing appropriate water quality controls.

These stormwater management assessments and findings are discussed as follows.

4.1.1 Water quantity

4.1.1.1 Existing conditions

Assessment methodology

DRAINS software has been used to develop a rainfall runoff model to assess the performance of the proposed site drainage channels with respect to mitigating potential flow impacts on neighbouring downstream areas.

DRAINS models have been developed to represent existing site conditions and post development site conditions to enable a comparison of discharges under the two development conditions.

For existing conditions the model catchments and impervious areas have been based on aerial photography, aerial laser survey for areas external to the site boundary, and ground survey for the site and for specific areas such as details downstream of the site discharge points. A site inspection to verify certain surveyed features was undertaken during the course of this study. However, due to the very flat terrain surrounding the site, as shown in the ALS data, it is recommended that further detailed survey be obtained during the tender design/detailed design stages of the SIMTA proposal to better define external catchment boundaries and levels along Greenhills Road and Moorebank Avenue

A sub-catchment plan that represents the layout adopted for the existing conditions DRAINS model is included in Appendix A.

The model parameters include:

- Paved area and Supplementary area depression storage is one millimetre, and pervious area depression storage is five millimetres.
- Soil type is 3.0.
- Antecedent moisture condition is 3.0 (rather wet).
- Stage/discharge for the three site outlets (two eastward under Greenhills Road, and one westward under Moorebank Avenue) defined by HEC-RAS modelling of the culvert outlets and associated downstream channels. Model inputs and outputs are included in Appendix B.

The DRAINS model has been run for storm durations of five minute to 24 hours for the two year, five year, 10 year, 20 year, 50 year and 100 year ARIs, and 15 minute to six hours for probable

maximum precipitation (PMP) events. A summary of the model input data is included in Appendix A.

Results

A summary of peak flows discharging from the three site sub-areas is presented in Table 1. A summary of model outputs are included in Appendix A. Sub-catchment flows leaving the site are included in Appendix A for a range of storm durations.

4.1.1.2 Post development conditions

Stormwater management objectives

The overall stormwater design of the proposed intermodal development seeks to:

- Adopt recognised standards reflecting current practices adopted for similar facilities around the world.
- Comply with recognised Australian Standards and Liverpool City Council's Development Control Plan 2008.
- Assist with achieving a balance between cut and fill earthworks to negate import or export of earth to/from the site.
- Provide site levels which are above localised flood levels but do not impact upon capacity of existing floodplains.
- Provide adequate grades for surface drainage which do not impact on the operational requirements of the facility.
- Provide drainage facilities which minimise requirements for in-ground pipework and provide facilities for stormwater detention and Water Sensitive Urban Design (WSUD).

Assessment methodology

The existing conditions DRAINS model was adjusted to represent the post development site conditions as outlined in the concept plan included in the accompanying drawings. In particular the adjustments have included:

- Changes to sub-catchment boundaries. A sub-catchment plan that represents the layout adopted for the proposed conditions DRAINS model is included in the accompanying drawings.
- Adopting a 100 per cent impervious percentage within the site (to be reviewed at future design stages).
- Reduced flow travel times representative of the SIMTA proposal.
- Detention storages to mitigate potential flow increases. Detention storage details are included in the accompanying design drawings.

DRAINS model input data is included in Appendix A.

Figure 4 shows the post development catchment areas. Note that the existing catchments which are external to the site and identified as currently flowing into the site have been included within the post development catchments.

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289



Figure 4: Post development catchment boundaries (including local external catchments)

SIMTA Moorebank Intermodal Terminal Facility

Hyder Consulting Pty Ltd-ABN 76 104 485 289

f:\aa003760\r-reports\variation 14 - concept plan reports\changes highlighted\dn00256-simta stormwater management and flood study-final_nm.docx

Results

Table 1 provides a summary of peak flows just downstream of the site for a range of recurrence intervals. Flow results for a fuller range of storm durations range of durations is provided in Appendix A. Table 2 provides a summary of key detention storage parameters and their performance. Storage details are provided in the accompanying design drawings. Table 3 summaries peak flows on catchments neighbouring the site, and that will require management through the site as discussed in the following comments section of this report. DRAINS model output data is included in Appendix A.

Discharge Location	Site Condition	Catchment Area	DRAINS Model	Flow at Downstream of Greenhills Rd / Moorebank Ave				
		(ha)	Label	2yr	20yr	100yr	PMF	
Outlet A NE Corner of Site	Existing	27.45	OF17	2.42	6.24	8.33	50	
(Greenhills Road)	Develope d	38.08	OF64	1.72	2.93	3.54	56	
Outlet B SE Corner of Site (Greenhills Road)	Existing	27.13	OF9	0.40	1.11	2.63	31	
	Develope d	18.64	OF51	0.39	0.86	2.01	27	
Outlet C NW Corner of Site	Existing	42.33	OF30	5.74	10.20	12.70	62	
(Moorebank Avenue)	Develope d	40.22	OF102	3.43	8.35	7.82	104	

Table 2: Comparison of peak flow estimates (m3/s)

Table 3: Summary of detention storage parameters and performance

	Parameters			Performance							
Basin [Invert mAHD]	Catch Area	Ou Diam	tlet neter	Outlet Weir	ARI	Peak Inflow (m ³ /s)	Peak outflo w (m ³ /s)	Water Level (mAHD)	Volum e (m³)		
	(ha)	Low Level (mm)	Level Level	Level (mAHD)							
А		250 &	400	14.40	2yr	8.53	0.71	14.96	12300		
(in NE Cnr) [14.00]	30.68	475	490	490	490	& 15.75	100yr	4.95	1.95	15.91	27000
В	17.02	250	670	15.85	2yr	4.66	0.18	15.12	10000		
(in SE Cnr) [14.00]	17.02	200	070	070	070	070 10.00	100yr	2.73	1.85	15.91	17060
D	38.15	730	760	15.45	2yr	10.9#	2.89	15.27	6930		
(in NW Cnr) [14.00]	30.15	730	780	15.45	100yr	20.2#	7.82	15.90	10230		

Indicates inflow into lower portion of storage (Basin D) only (not inflows to model Basins C1 to C6)

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289

 Table 4: External catchment and flows potentially impacting on the site

	Catchment	DRAINS	Flow (m ³ /s)			
Catchment Location	Area (ha)	Model Label	20yr	100yr	PMF	
Northern Boundary and NE Corner of Site	6.61	OF60	2.34	2.81	13	
Northern Boundary and NW Corner of Site	2.43	OF131	1.03	1.23	6	
Southern Boundary and SE Corner of Site	0.55	OF47	0.13	0.17	0.9	
Southern Boundary and SW Corner of Site	2.32	OF104	0.51	0.66	3.5	
Mid-Eastern Site Boundary	2.09	OF487	0.99	1.23	5.2	

Comments

Site detention storage

This initial assessment of peak flows leaving the site (summarised in Table 1) and the comparison graphs in Appendix A indicate that the proposed detention storages should adequately mitigate potential site runoff flow increases for a range of storm durations. However, in addition to the DRAINS modelling, a regional catchment wide analysis has been carried out to assess potential impacts on flow regimes on the broader Anzac Creek waterway as discuss in the Anzac Creek flood assessment section of this report (Section 6).

Management of external catchments

In general, maximising the developable site area would potentially impact on local neighbouring property, this includes:

- Impeding and diverting flows that currently enter the site along its northern and southern boundaries, and on its western boundary from a local carpark area (identified in Figures 3 and 4).
- Increasing flows along Moorebank Avenue.
- Increasing flooding across Greenhills.Road.

While these local adverse impacts may be open to negotiation with the various stakeholders, civil design options to avoid impacting on neighbouring property are discussed in Section 7 of this report.

Potential climate change sensitivity assessment

The DRAINS model which represents the post development site was re-run with a 20 per cent increase in 100 year ARI rainfall intensities to represent potential climate change sensitivity with respect to site discharges. The modelling results indicate that in a 100 year ARI event:

• Site water levels may increase by around 0.2 metres.

Maximum site discharges from the two eastern outlets would not exceed existing condition maximum 100 year ARI discharges. For the single western outlet, the model indicates an increase in site discharge (compared to the existing condition) of 14.7-cubicmetres per second compared with 12.7-cubic-metres per second, however, additional survey information along Moorebank Avenue (to allow more accurately spill levels and length), may alter this result.

DRAINS model inputs and outputs are included in Appendix A.

4.1.2 Water quality

4.1.2.1 Stormwater quality objectives and treatment targets

The stormwater runoff quality objectives and treatment targets for the SIMTA proposal have been determined according to the Liverpool Development Control Plan 2008 (general controls and controls applicable to Moorebank Defence Lands). These include the following.

Objectives

- To prevent adverse impact on receiving environments which may be caused by the flow from the SIMTA site.
- Prevent bed and bank erosion and instability of waterways.
- Provide sufficient flows to support aquatic environments and ecological processes.
- To make certain that Water Sensitive Urban Design principles are appropriately applied to the SIMTA site.

Performance targets

- Ninety per cent reduction in the post development average annual gross pollutant load.
- Eighty per cent reduction in the post development average annual load of Total Suspended Solids load.
- Forty-five per cent reduction in the post development average annual load of Total Phosphorus load.
- Forty-five per cent reduction in the post development average annual load of Total Nitrogen load.
- Maximise water conservation through the use of water efficient devices and re-use of rainwater for non-potable water demands.

4.1.2.2 Proposed stormwater quality measures

A number of stormwater quality measures are proposed to be implemented as part of the SIMTA proposal to meet the set treatment targets. These include the following.

Rainwater tanks

Rainwater tanks are required to meet the water conservation controls set by Liverpool City Council's Liverpool Development Control Plan (2008) for development in Moorebank Defence Lands and also to satisfy sustainability building requirements.

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289 Rainwater tanks will be used to collect roof water from the site's warehouses to be used for nonpotable water demands for toilet flushing and for outdoor use. All rainwater tanks are assumed to have a first-flush device to capture gross pollutants and sediments which may have accumulated on the roof. Rainwater tanks also provide stormwater treatment through settling and harvesting in addition to their main purpose of providing alternative source of water for nonpotable water uses.

Initial sizing for the proposed rainwater tanks is based on providing the estimated non-potable water demands for a period of 20 days. The non-potable water demands for the proposed warehouses were about 60 per cent of the total water use of these buildings. The population for each warehouse was around one person per 20-squared-metres using an average of 20 litres per person per day (VIC EPA Code of Practice for Small Wastewater Treatment Plants (1997). The proposed rainwater tank sizes for the various catchments of the site are presented in Table 4.

Pre-treatment

Buffer strips

Buffer strips are source control measures used to pre-treat stormwater runoff before it reaches the main treatment measures such as rain gardens and bio-swales. Buffer strips are vegetated areas adjacent to drainage lines that intercept diffused stormwater runoff from impervious areas before it reaches the treatment measures, thus removing coarse to medium sized suspended solids and associated nutrients. Buffered areas for the various catchments of the site are presented in Table 4.

Gross pollutant traps

A gross pollutant trap is a treatment device designed to capture coarse sediment, trash and vegetation matter carried in the stormwater. No removal of suspended solids and nutrients has been assumed to be associated with GPTs.

Bio-retention systems

Rain gardens

Rain gardens are bio-retention systems that comprise a combination of vegetation and filter substrate, which provide treatment of stormwater through filtration, extended detention and some biological uptake. They are very effective in stormwater pollutant removal, especially when associated with a submerged zone, which provides a permanent pool of water at the bottom of the system that helps to maintain a healthy plant community. Rain gardens are proposed to treat runoff from the majority of the site in an integrated structure that provides for OSD storage in addition to water quality treatment.

Bio-swales

Bio-swales are bio-retention systems that perform similarly to rain gardens but are generally associated with a longitudinal gradient. Thus they provide runoff conveyance in addition to the water quality treatment through filtration, extended detention and biological uptake. The proposed bio-swales for the Moorebank site have fairly flat gradient. Thus they provide extended detention during their normal operation, with excess runoff discharging to overflow pits. No OSD storage will be provided as part of the proposed bio-swales.

Lining

In general, bio-retention systems are lined either to protect adjacent structures or if the site has known salinity hazards. There are no known risk associated with salinity on the Moorebank site as indicated by the salinity hazard risk map of NSW produced by the Department of Environment and Climate Change. However, as the site's soils are predominantly clays and sandy clays associated with shrinkage and differential settlement, lining of the bio-retention systems may be required when they located next to footings of structures such as retaining walls and buildings.

The proposed rain garden and bio-swale areas for the various catchments of the site are presented in Table 4. Typical details are presented in the drawings associated with this report.

Catchment	Rainwater Tank (kL)	Buffer Area (m²)	Rain Garden/ filter area (m ²)	Bio-swale/ filter area (m ²)
A1 (27.178 ha)	2083	1963	6960/4640	
A2 (3.506 ha)	0	525		1656/1035
B1 (13.477 ha)	1132	808	3200/4800	
B2 (3.059 ha)	0	459		1152/720
C (35.714 ha)	857	1714	5000/5000	

 Table 5: Proposed stormwater quality treatment measures for the site

Rain garden and bio-swale areas are "average", the area is measured at half of the extended detention depth. Refer to Drawing CP022 for WSUD catchment plan.

4.1.2.3 Assessment methodology

Assessment of the performance of the proposed stormwater quality measures has been undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC V4.0). A MUSIC model for the SIMTA site has been developed assuming that the site has industrial land use with imperviousness shown in Table 5. The MUSIC model layout and key modelling parameters are included in Appendix C.

Catchment	Land use	Land Use area (ha)	Land use imperviousness
A1	Roof	17.359	100%
(27.178 ha)	Pavement to buffer	3.930	100%
	Pavement to GPT	5.892	100%
A2	Roof	0	
(3.506 ha)	Pavement to buffer	3.506	100%
	Pavement to GPT	0	
B1	Roof	9.434	100%
(13.477 ha)	Pavement to buffer	1.617	100%
	Pavement to GPT	2.426	100%

 Table 6: MUSIC model land use for the site

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289

f:\aa003760\r-reports\variation 14 - concept plan reports\changes highlighted\dn00256-simta Stormwater management and flood study-final_nm.docx

Catchment	Land use	Land Use area (ha)	Land use imperviousness
B2	Roof	0	
(3.059 ha)	Pavement to buffer	3.059	100%
	Pavement to GPT	0	
С	Roof	7.143	100%
(35.714 ha)	Pavement to buffer	11.428	100%
	Pavement to GPT	17.143	100%

4.1.2.4 Results and comments

Based on the proposed stormwater quality measures the treatment performance for each catchment and the whole site is presented in Table 6.

In summary, the water quality assessment methodology and treatment performance of the proposed WSUD measures is understood to comply with the treatment targets according to the Liverpool Development Control Plan (2008).

Catchment	Pollutant reduction					
	Gross pollutants (%)	TSS (%)	TP (%)	TN (%)		
Α	100	91.7	76.8	61		
В	100	94.0	80.8	67.8		
С	100	86.6	71.6	46.4		
Total site	100	89.1	74.7	55.9		
Treatment targets	90	80	45	45		

 Table 7: Treatment performance summary for the site

4.2 Anzac Creek floodplain modelling

Following the initial DRAINS modelling of on-site detention (OSD) the Post Development site flow hydrographs were used as inputs into a TUFLOW model of Anzac Creek to identify potential impacts extending along Anzac Creek, and if necessary revised OSD requirements. This assessment process and findings are discussed as follows.

4.2.1 Background

Existing condition flow regimes along Anzac Creek have been previously determined by Liverpool City Council in the process of conducting their Anzac Creek Floodplain Risk Management Study and Plan (by BMT WBM Pty Ltd, 30 May 2008), and the Georges River Floodplain Risk Management Study & Plan (by Bewsher Consulting, May 2004). The council modelling indicates that only the 100 year ARI and larger events along Anzac Creek impact on the subject site, as such only the 100 year ARI and PMF events have been assessed, although this has also included examining potential Climate Change flow regimes.

The RAFTS catchment rainfall runoff model files developed for the abovementioned studies were obtained from council. The provided files were re-run by Hyder and the hydrographs for both the 100 year ARI nine-hour event and PMF nine hour event used in the studies were replicated.

Council also provided to Hyder the 100 year ARI nine hour event and PMF one hour event TUFLOW model files. The provided files were re-run by Hyder and the council's 100-year nine hour results were reproduced. PMF TUFLOW results were not provided by council, nonetheless the provided files were used in developing an adjusted 'existing conditions' Anzac Creek model, as described in Section 6.2.

Council provided a number of TUFLOW run files incorporating various degrees of blockage for structural elements across the system. For the purposes of this regional assessment, the 25 per cent scenario was adopted as a base and amended for this study as described following. The modelling process and results are described as follows.

4.2.2 Existing conditions

4.2.2.1 Hydrology

Council's RAFTS model catchments were adjusted to exclude the subject site, which has been more accurately defined in the site drainage assessment DRAINS software (as discussed in the earlier sections of this report). Hence hydrographs generated from the RAFTS and DRAINS models have been used as flow inputs for TUFLOW modelling to define flow regimes as discussed below. RAFTS model input data and output are included in Appendix D.

4.2.2.2 Flow regimes

The 100 year ARI nine hour duration hydrographs from the DRAINS and adjusted RAFTS models have been used to assess flow regimes along Anzac Creek, in accordance with the files provided by council, in TUFLOW. Similarly, an adjusted existing conditions PMF one hour event model has also been assessed in TUFLOW using DRAINS and adjusted RAFTS hydrograph inputs.

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289 The adjusted existing condition TUFLOW model flow regime figures (for 100 year and PMF conditions) are included in Appendix E. The 100 year results were compared with that of Council's and flood level variations found to generally vary by less than 0.025 metres.

The adjusted existing conditions model has been adopted as a base for comparing potential impacts in Anzac Creek due to the SIMTA site development.

4.2.3 Post development conditions

4.2.3.1 Hydrology

Hydrographs generated from the SIMTA site development conditions DRAINS model of the site have been used as input into the TUFLOW modelling, in conjunction with existing conditions RAFTS model hydrographs which represent the Anzac Creek catchment areas external to the subject site.

4.2.3.2 Flow regimes

Using the 100 year ARI nine hour event hydrographs from the initial proposed conditions DRAINS modelling, TUFLOW modelling indicated potential water level increases of up to around 0.05 metres. As such on-site storage in the north-eastern portion of the site was increased from 28,500-cubic-metres to 35,000-cubic-metres in the DRAINS modelling, and the TUFLOW model re-run and the potential flood level increases were seen to be reduced.

The TUFLOW model was then also re-run for the PMF one hour event. The modelling results for these assessments are included in Appendix E.

With respect to potential flood impacts on the Anzac Creek floodplain the results indicate that:

- Flood level increases would be limited to less than five millimetres in the100 year ARI nine hour event. (Management of local catchment flows directly neighbouring the site are discussed in the 'Civil Design Options', Section 7, of this report.)
- For the PMF one hour event, the proposed site raising would result in flood level increases of up to 0.25 metres immediately south of the site. Since this area to the south is largely undeveloped there is little current implication for this neighbouring area. Further downstream, to the north of the southern site boundary, flood level increases are limited to no more than five millimetres.

It is anticipated that the OSD storage increase could be achieved by reconfiguring the concept channel as outlined in Figure 5, reconfiguring the pond (located in the northern area of the site), and raising the north-eastern area ground levels by around 0.2 metres (as indicated in the design option drawings).



Figure 5: Typical channel section for increased NE site detention

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289

4.3 Civil design options

This assessment was carried out to indicate civil design options for the purpose of mitigating potential adverse flooding and stormwater impacts on the local land holders that immediately neighbour the site. In particular, modelling of existing and post development site conditions (and the immediately surrounding areas):

- Quantifies within site flood levels along the SIMTA site development main trunk drainage channels.
- Flow regimes in the vicinity of the north-eastern corner of the site.

For this assessment the lumped catchments adopted in the initial DRAINS model were further subdivided into smaller local catchment areas. The DRAINS model discharges were then incorporated into a TUFLOW model of the site and its immediate surrounds. These 'site only' DRAINS and TUFLOW models firstly represented existing development conditions, and were then adjusted to represent the 'alternative post development' developable area conditions.

Sketches of the areas where the initial civil design are to be modified to limit flood impacts on the local neighbouring properties are included in the accompanying Drawings, and are intended as a guide for future design decisions and detailing.

While the accompanying Drawings indicate options to mitigate adverse flood impacts on the neighbouring properties in events up to 100 year ARI, the design options would not, however, offset potential flood increases in all larger events, as indicated in the probable maximum flood results figures included in Appendix G.

4.3.1 Existing and proposed conditions modelling

4.3.1.1 DRAINS

Details of the further catchment subdividing of the initial DRAINS model is provided in Appendix F and the 100 year ARI hydrographs then served as inputs for the site-based TUFLOW model.

4.3.1.2 TUFLOW

A TUFLOW model was developed to represent the site itself, first for existing conditions then for a representation of the proposed site development. Sufficient model detail has been provided to specifically represent flow regimes:

- In the north-eastern corner of the site where the neighbouring property and Greenhills Road flows enter the site via an open channel before discharging under Greenhills Road via culvert "Outlet A".
- Within the site itself along the proposed main channel systems.

The TUFLOW model input data and result figures are included in Appendix G. The 100 year ARI results figures indicate that:

- In the north-eastern corner of the site (where the neighbouring property and Greenhills Road flows enter the site via an open channel before discharging under Greenhills Road via culvert "Outlet A") the existing open channel is to be retained to avoid potential adverse flood impacts on Greenhills Road the neighbouring areas to the north and east.
- Adopting bridge crossings that span the main channels, there is less than a 0.1 metres water surface gradient along the proposed main channels in the site.
- To accommodate minor internal site drainage systems for up to 100 year capacity consideration further consideration of site levels will be necessary.

 Platform levels in the south-eastern portion of the site are likely to require raising by around 0.4 metres (due to the 100 year ARI flood levels of up to 16.3 metres AHD in the channel/OSD, and the outlet to the Greenhills Road system, 'Outlet B', being partially submerged under 100 year ARI conditions).

4.3.2 Management of external catchments

In general, maximising the developable site area (represented by the accompanying concept civil drawings, and discussed previously in Section 5 of this report) would potentially impact on neighbouring property flooding and require negotiation with neighbouring landholders (with respect to obtaining drainage easements).

The specific locations of potential impact are discussed below, and indicative 'civil design options' sketches of the areas where the current concept civil design may be modified to limit flood impacts on the local neighbouring properties are included in the accompanying Drawings.

4.3.2.1 Southern site boundary

Along the southern boundary of the site the concept civil design provides for a buffer about two metres wide at existing ground levels between the raised development platform and the site boundary. This southern buffer width requires widening as indicated in the accompanying Drawings. Such widening is to allow for the following.

- Under existing conditions the external south-western catchment discharges into the site. The proposed site filling requires a flow path to be provided that would convey flows westward to a Moorebank Avenue southbound carriageway drainage system.
- Under existing conditions the external south eastern catchment discharges into the site. The proposed site filling requires a flow path to be provided that would convey flows eastward to the existing Greenhills Road ('Outlet B') culvert.

4.3.2.2 Western site boundary

The existing drainage system serves the western portion of the site also several external catchment areas (the southern external catchment discussed above, a local carpark area to the west of Moorebank, and Moorebank Avenue itself). This existing channel is to be replaced under the current concept civil design by internal site drainage systems. In addition, it is likely that a new channel/culvert system (located within the site) will be necessary to convey runoff from the neighbouring areas along the western site boundary to the existing twin box culverts at "Outlet C" near the north-western corner of the site. Indicative sketches are included in the accompanying Drawings.

4.3.2.3 Northern site boundary

Along the northern boundary of the site, areas of neighbouring land discharge into the site and are to be conveyed within the site via channel or culvert systems to the existing north-western and north-eastern outlets ("Outlets C" and "Outlet A" respectively). Indicative sketches are included in the accompanying Drawings.

4.3.2.4 Eastern site boundary

In the north-east corner of the site, current civil design builds over an existing open channel (replacing it with a culvert) that conveys flows to the existing Greenhills Road culvert ("Outlet A"). To avoid adverse flood impacts on neighbouring property it will be necessary to retain the exiting open channel. Indicative sketches are included in the accompanying Drawings.

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289

The accompanying Drawings also include sketches which indicate the management of neighbouring property flows that discharge to the south-eastern culvert ("Outlet B"), and a two metre wide stormwater corridor along the eastern boundary to allow the capture of Greenhills Road runoff.

The next two sections within this report contain the modelling assumptions made, and conclusions reached in undertaking a detailed assessment of the two main watercourses affected by the proposed SIMTA development, Anzac Creek and Georges River.

5 Anzac Creek

Anzac Creek is within the larger Georges River catchment and a sub-catchment of the Liverpool District catchment. The creek is 4 kilometres long, forming in the Royal Australian Engineers Golf Course, owned by the Department of Defence, and flowing northward past the suburb of Wattle Grove and underneath the M5 at the intersection with Heathcote Road. From there the creek continues northwards through Ernie Smith Recreation Reserve, flanked by the Moorebank Industrial Area to the west and the suburb of Moorebank to the east, under Newbridge Road, through McMillan Park, and into Lake Moore at Chipping Norton.

5.1 Railway Culvert Over Anzac Creek

While the Concept Plan report included an assessment of the impacts of site runoff on Anzac Creek there was no assessment of the potential flooding impact of the rail alignment and associated embankment. A concept rail design has now been developed along with a preliminary analysis of potential flooding impacts of the embankment for the 100 year ARI and PMF events.

Existing condition flow regimes along Anzac Creek have been previously determined by Liverpool City Council (Council) in the process of conducting their Anzac Creek Floodplain Risk Management Study and Plan (by BMT WBM Pty Ltd, 30 May 2008), and the Georges River Floodplain Risk Management Study and Plan (by Bewsher Consulting, May 2004). The Council modelling of the existing conditions indicates that the SIMTA site would not be impacted by ANZAC Creek flooding up to the 100 year ARI event but the SIMTA site would be impacted along its southern boundary by the extreme PMF. The Council's RAFTS catchment rainfall runoff model files developed for these studies were reviewed by Hyder. The provided files were re-run by Hyder and the hydrographs for both the 100 year ARI nine-hour event and PMF ninehour used in the Council studies were replicated.

Council also provided Hyder with the 100 year ARI nine-hour event and PMF one-hour event TUFLOW model files. The provided files were re-run by Hyder and the Council's 100 year nine-hour results were reproduced. The PMF TUFLOW modelling results were not provided by Council, nonetheless the provided files were used in developing an adjusted 'existing conditions' Anzac Creek model (see Section 2.1.1).

Council provided a number of TUFLOW run files incorporating various degrees of blockage for the structural elements across the stormwater infrastructure system. For the purposes of this railway culvert assessment, the 25 percent blockage scenario was adopted and was amended to create a base model suitable for the purposes of this assessment.

5.1.1 Assessment Methodology

DRAINS modelling of flows

Council's RAFTS model catchments were adjusted to:

 Exclude the subject site, which has been more accurately defined in the site drainage DRAINS software.

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289 Provide additional sub-catchment areas upstream of Greenhills Road to facilitate assessment of the upstream flow regimes.

Catchment plans are provided in Appendix A. The adjusted RAFTS model was used to generate 100 year ARI hydrographs which served as inputs in the TUFLOW modelling of Anzac Creek for existing and post-development conditions.

TUFLOW Modelling of Flow Regimes

Council's ANZAC Creek TUFLOW model was adjusted to include ground information sourced from Aerial Laser Survey data collected in August 2010 by AAMHatch. In the vicinity of the subject site, levels were updated to include the detailed survey data of Hard and Forester Pty Ltd (July 2012). The Hard and Forester survey represents the latest available survey information for the part of the Anzac Creek floodplain to the south of SIMTA site area which the crossing of the rail link is currently proposed.

The model adopts a 5 m grid using TUFLOW Build: 2006-06-DB. The Council inflow boundary setup was modified to define local catchments to the south of the SIMTA site, taking into account the proposed railway embankment intersecting the floodplain. In addition, outflows from the SIMTA site area were incorporated into the TUFLOW model, and the lag times for RAFTS and DRAINS in relation to the Georges River inflow were adjusted to be consistent with the original setup of the Council model.

To assess the post-development conditions of the area, the railway alignment was included in the TUFLOW digital elevation model along with the proposed Anzac Creek culvert crossing (3, 4.0m x1.5m reinforced concrete box culverts (**RCBC**)) which has been modelled with 50 per cent blockage. A concept design figure of railway alignment and culvert sizing is included in the design drawings (**Attachment A**).

5.1.2 Results and Comments

RAFTS model output summaries are included in Appendix A.

Existing and post-development condition TUFLOW figures of flood extents and levels are included in Appendix B and indicate the Anzac Creek:

- Under existing conditions the 100 year ARI flood level to the south of the SIMTA site is 15 m Australian height datum (AHD). When modelled with the proposed rail link culverts and allowing for 50 per cent blockage of those culverts the flood levels to the south of the SIMTA site rise up to 20 mm, upstream of the proposed railway. The post-development condition model was also run with the proposed railway culvert fully unblocked, with the result that the 100 year flood level increase (as a result of the proposed railway crossing) reduced to less than 5 mm.
- Under existing conditions the PMF level to the south of the site is approximately 15.6 mAHD. Downstream of the proposed railway culvert crossing there is no anticipated increase to PMF flood levels, however upstream of the proposed rail link culvert crossing flood levels would increase by between 0.1 m and 0.2 m upstream and across Moorebank Avenue under a 50 per cent blockage scenario.

A rainfall increase sensitivity assessment was carried out with the results indicating that a 20% increase in rainfall intensities would increase 100 year ARI flood levels by up to approximately 0.06 m under a 50 per cent blockage scenario.

5.1.3 Conclusion

The TUFLOW model results indicate that the impact of the proposed railway and associated culvert would result in negligible flood impacts within the Anzac Creek catchment area.

6 Georges River

The SIMTA site is located entirely within the catchment area of the Georges River, which lies approximately 750 m to the west of the site. The rail corridor is located within the mid-Georges River catchment and is a Liverpool District sub-catchment. The Georges River enters the Liverpool LGA from the south on the western side of the Defence Lands at Holsworthy and flows to the north, meeting with Glenfield Creek at Casula. The river then continues to flow north past the Liverpool City Centre, under Newbridge Road, past Lighthorse Park and over the Liverpool Weir. Downstream of the Liverpool Weir, the Georges River becomes brackish and is subject to tidal influences.

Figure 6 shows the proposed rail link alignment. The proposed rail link has the potential to directly impact the Georges River and its immediate floodplain at two locations:

- 1 Georges River railway bridge.
- 2 Rail link crossing of the Georges River floodplain.

Potential for flooding impacts at these two locations are discussed in the following sections of this report.



Figure 6 - Proposed rail link alignment (overlaying Liverpool City Council Regional Flood Planning Areas)
6.1 Georges River Railway Bridge

A flood assessment has been undertaken to analyse potential flooding impacts of the proposed railway bridge crossing of the Georges River for the 100 year ARI flood event. The assessment was based on assumed pier and abutment locations and bridge superstructure with the aim of minimising potential flooding increases. Design mitigation measures are discussed further in Section 4.1.5 of this report.

6.1.1 Assessment Methodology

The potential flood impact assessment of the proposed Georges River railway bridge was assessed through development of a HEC-RAS model of the Georges River. HEC-RAS was determined to be the most appropriate software to assess flooding impacts associated with the proposed Georges River railway bridge as the software better represents hydraulic impacts than MIKE 11 when structures are introduced within the river profile and therefore provides more reliable results when assessing headloss. The model was built using information provided in the 'Upper Georges River Flood Study' prepared by Department of Land and Water Conservation in conjunction with Liverpool City Council (December 2000). Information from the December 2000 study was provided by FloodMit Pty Ltd, and included:

- River section geometry, location and roughness.
- Flow hydrographs.
- Hydraulic boundary conditions.
- Flood levels (generated by MIKE-11 software).

The location of the MIKE 11 and corresponding HEC-RAS sections modelled as part of this assessment are shown in Figure 7.



Figure 7- Location of HEC-RAS sections modelled

6.1.2 Existing Conditions

An initial HEC-RAS model was built to reproduce the MIKE-11 flood levels, generated by the December 2000 model. Modelling undertaken in December 2000 excluded the existing East Hills Railway line bridge as it had not been constructed at this time. The 100 year ARI peak flow adopted from the December 2000 study was 1877 m³/s and the water levels generated by the initial HEC-RAS model were compared to the December 2000 reported MIKE-11 levels, as shown in Table 8.

Mike-11 Section Label	HEC-RAS Section Label	Year 2000 [No Railwa	
		MIKE-11	HEC-RAS
100.000 (P1)	40	13.2	13.11
100.225 (P2)	39	13.0	12.83
100.450 (P3)	38	12.9	12.77
100.630 (P4)	37	12.7	12.59
100.835 (P5)	36	12.6	12.48
101.005 (P6)	35	12.5	12.35
101.057 (P6.4)	34	12.5	12.09
Cambridge Ave culvert	33.5	-	-
101.072 (P6.6)	33	12.1	11.87
101.120 (P7)	32	12.0	11.93
101.270 (P8)	31	12.0	11.86
101.440 (P9)	30	11.7	11.82
New Section	29.3	-	11.72
Existing. Rail Bridge	29.15	-	-
101.650 (P10)	28.7	11.6	11.70
Proposed Rail Bridge	28.85	-	-
New section	28.7	-	11.67
101.795 (P11)	28	11.5	11.50
101.990 (P12)	27	11.4	11.35
102.185 (P13)	26	11.3	11.35
102.390 (P14)	25	11.2	11.20

Table 8 – Comparison of HEC-RAS and Mike 11 results; Year 2000 scenario

As can be seen, there is a high level of correlation between the two results and it was determined that the HEC-RAS model developed adequately reflected the flooding regime of the George's River.

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289 Subsequently, the HEC-RAS model was adjusted to include the existing East Hills Railway bridge crossing. The existing railway bridge details have been based upon 'WAE' drawing information included in Appendix C. The results of this modelling are presented in Table 9.

Table 9 - HEC-RAS results; Year 2000 scenario and East Hills Railway Bridge comparison
--

HEC-RAS Section Label	Year 2000 Scenario [No Railway Bridges]	East Hills Railway Bridge flood level	Flood Level Change* (m)
40	13.11	13.13	0.02
39	12.83	12.85	0.02
38	12.77	12.79	0.02
37	12.59	12.62	0.03
36	12.48	12.50	0.02
35	12.35	12.37	0.02
34	12.09	12.12	0.03
33.5	-	-	-
33	11.87	11.90	0.03
32	11.93	11.95	0.02
31	11.86	11.88	0.02
30	11.82	11.85	0.03
29.3	11.72	11.75	0.03
29.15	-	-	-
28.7	11.70	11.70	0
28.85	-	-	-
28.7	11.67	11.67	0
28	11.50	11.50	0
27	11.35	11.35	0
26	11.35	11.35	0
25	11.20	11.20	0

As can be seen, installation of the East Hills Railway bridge, resulted in a modelled rise in the 100 year ARI flood level within the immediate vicinity of the bridge of approximately 30 mm. This result is ameliorated between 1 km and 600 m from the bridge structure.

6.1.3 Post-Development Conditions

The HEC-RAS model was further adjusted to include a concept of the proposed Georges River railway bridge, to be located on the downstream side of the existing bridge, as proposed for the Stage 1A works. The proposed bridge incorporated into the model assumed that the abutments, piers, bridge decking and noise barriers are favourably aligned hydraulically, as described in Section 4.1.5 of this report. Further modelling will be undertaken once detailed design of the bridge is complete to verify results presented in this report.

6.1.4 Results

Table 10 provides a summary of the HEC-RAS results for 100 year ARI water levels on the Georges River. These results indicate that upstream of the proposed Georges River railway bridge is likely to result in a minimum increase in the 100 year ARI flood levels of:

Up to 30 mm for a distance of approximately 600 m upstream of the proposed railway bridge.

Up to a 10 mm increase for a distance of approximately 1 km upstream.

HEC-RAS model details and results are included in Appendix C.

HEC-RAS Section Label	Existing Railway Bridge only	Inclusive of Proposed Railway Bridge	Flood Level Change* (m)
40	13.13	13.14	0.01m
39	12.85	12.85	0.00m
38	12.79	12.79	0.00m
37	12.62	12.62	0.00m
36	12.50	12.51	0.01m
35	12.37	12.39	0.02m
34	12.12	12.14	0.02m
33.5	-	-	-
33	11.90	11.92	0.02m
32	11.95	11.98	0.03m
31	11.88	11.91	0.03m
30	11.85	11.87	0.02m
29.3	11.75	11.78	0.03m
29.15	-	-	-
28.7	11.70	11.72	0.02m
28.85	-	-	-
28.7	11.67	11.67	0.00m
28	11.50	11.50	0.00m
27	11.35	11.35	0.00m
26	11.35	11.35	0.00m
25	11.20	11.20	0.00m

Table 10 - Georges River 100 year ARI flood levels (mAHD); pre and post Georges River railway bridge development

* Due to proposed railway bridge

6.1.5 Flood Mitigation Measures

The following design principles were incorporated into the HEC-RAS flood modelling and are to be adopted during future design stages of the proposed Georges River railway bridge so as to minimise flooding impacts.

- The bridge abutments are not to encroach on the existing Georges River waterway area.
- The piers of the Georges River bridge structure are to be streamlined in shape, and aligned and oriented to the existing rail bridge, to minimise afflux and to avoid the formation of large-scale turbulence or the erosion of the bed and banks of the waterway.
- The bridge deck structure, including noise/guard rails, is to be no lower and no higher than that of the existing railway bridge.



Figure 8 –Indicative bridge layout adopted for flood modelling

6.1.6 Cumulative Impacts

The SIMTA site is located adjacent to the Moorebank Intermodal Company Limited (MICL) Site, which is currently being investigated as a potential intermodal facility serving both interstate and intrastate freight.

Based on the information currently available it appears that the MICL development is proposing to provide a railway access point north of the SIMTA development. This connection also connects to the South Sydney Freight Line (SSFL) and crosses the Georges River. No details of the proposed bridge are available. It is likely that the proposed bridge would have an impact upon existing flood levels. These impacts must be quantified and presented to the appropriate authorities (e.g. Liverpool City Council and the Floodplain Risk Management Committee) for

SIMTA Moorebank Intermodal Terminal Facility—Flood Study and Stormwater Management Hyder Consulting Pty Ltd-ABN 76 104 485 289

f:\aa003760\r-reports\variation 14 - concept plan reports\changes highlighted\dn00256-simta Stormwater management and flood study-final_nm.docx

approval. At this stage we can only assume that similar design considerations and statutory processes have been taken into account in developing their scheme.

6.1.7 Conclusion

With the implementation of the above noted design principles, impacts of the SIMTA proposal upon flooding of Georges River would be minimised but not negated.

6.2 Proposed Railway Floodplain Crossing

Figure 9 indicates a section of the proposed rail link alignment to be located within the western floodplain of the Georges River.



Figure 9 – Proposed rail link alignment on western floodplain of the Georges River

Figure 10 shows the George's River floodplain 'flood planning' and flood prone' areas as defined by Liverpool City Council. The flood planning and flood prone areas extend westward, across the overbank of the Georges River and through the existing Glenfield Waste Disposal Facility and quarry.

Ground surveys undertaken by Hard and Forester Pty Ltd in August 2010 and July 2012 have confirmed that the Georges River western top of bank levels are no lower than 11.8 mAHD. This is at least 0.3 m above the Georges River 100 year ARI flood levels in this vicinity, which range from 11.5 mAHD at Mike-11 Section 101.795 (HEC-RAS section 28) to 11.2 mAHD at Mike 11 Section 102.390 (HEC-RAS section 25)(see Figure 7 and Appendix C). As such the Georges River 100 year ARI mainstream flood flows would not extend overbank to the Glenfield Waste Disposal Facility, nor as far west as the proposed rail link alignment.

In terms of the Georges River PMF, the Mike-11 flood level is 13.9 mAHD at Section 101.795 to 13.3 mAHD at Mike 11 section 102.390. It is noted that the proposed top of rail level in this area would be at approximately 16.0 mAHD. Therefore to avoid adverse flood impacts along the Georges River floodplain (in extreme events larger than the 100 year ARI) as a result of the proposed rail link, sections of the rail embankment would require waterway structures to allow for extreme event flood flows to spread westward across the floodplain, as is currently the case. The necessity for, and sizing of, these structures will be investigated during detailed design.

Also, it appears that under existing conditions, there is little if any catchment runoff impacting on the western side of the proposed railway alignment due to the quarry excavation within the Glenfield Waste Disposal Facility. Larger catchment areas to the west of the quarry are cut-off and directed northward to Georges River as indicated in Figure 9.



Figure 10 - Liverpool City Council Flood Planning Areas for existing catchment conditions

The status of approval for the filling of the Glenfield Waste Disposal Facility is not currently known. The waste disposal facility is proposing to fill up to a level of 21 mAHD, and if approved this would likely fill in some of the storage currently available in a PMF event.

6.2.1 Conclusion

The proposed link alignment along the western floodplain of the Georges River does not impact on the 100 year ARI Georges River flooding levels.

7 Evacuation and refuge

A flood emergency response plan for the site will be necessary.

The TUFLOW site model results for Anzac Creek (see Appendix E, SIMTA site development) indicates that filling will raise the site above the regional PMF flood levels.

The site is located within upper catchment areas and, as recognised in the NSW Floodplain Management Manual (April 2005, Section L6.2), there would be little if any available warning time for people to undertake action. As such, in developing an evacuation and refuge plan it should include a refuge within the proposed buildings until hazardous flows have subsided and safe evacuation is possible.

This page has been left blank intentionally

Appendix A

Initial DRAINS model input and output – existing and proposed conditions

This page has been left blank intentionally



DRAINS Model Name and File Path: DRAINS Version:		F:\AA003210	D-Calculations/C-Civil ⁴	Slormwater/DRA	INS Mooreban	usim													-		
Rodeler's Name Description		Chris McClel Moorebank C	end																Ľ)AT	IA
PIT / NODE DETAILS	n na si		Version 9	-			·····		<u> </u>	r						······		·····			
Name	Туре	Family	Size	Ponding	Pressure		Max Pond	Base	Blocking	×	У	Bolt-down	id	Part Full							
			-	Volume	Change	Elev (m)	Depth (m)	Inflow	Factor			lid		Shock Loss							
NA	Node			(cu.m)	Coeff. Ku	16		(cu,m/s)	0	755 938	215.845		33								
N4 N5	Node	1							al.	500	150		34								
NB	Node			-	-				0	1000	150		37								
OutBEx	Node	1		-		13			0	861.978	209.629		1051047								
N40 OutAEx	Node					14			0	280.588	228,088		4370447								
OutCEX	Node								0	1568.098	160.549		5647966			1					
N57 N62 N63 N64	Node	1							0	519.483	217.78	1	12060722								
N62	Node								0	372,322 375.778			13086144 13086145								
NBJ	Node Node	-		+	+				0	505.378	-451 163		13086146					·····			
N65	Node				1	-			0	\$03.65	-511,643	1	13086147					*			
N65 N69	Node	1			1				0	845 794	-401.051		13086153								
OutB_Prop N75	Node		1					-	0	937,378	-528,923		13086154								ىيى
N/5	Node Node	-	1					+	0	-353.438	-210.971		14111581								-
N76 N77	Node	+	+					1	0	-189.278	-442.523		14111583								
N78	Node	1	1	1	1			1	0	-192.734	-532.379		14111584	-							
N79	Node								0	111,394	-354.395		14111585								
OutA Prop N92	Node		-		-				0	242.722	-480.539		14111586 15137076								
N92	Node Node	1	-		-	16		+	0	1591.586	-38/,112		15137076								
OutC_Prop	Node	1	+	+ .	-			1	0	1331.362			15137077						+		
N95 N96 N97	Node	1	1	-	1			-	0	1503.471	-136.322		15137090						t		
N97	Node	1			1			and the second s	0	1591.588	-533.112		15137091								
N169	Node								0	-296.422			46653709				-				
N177	Node	-							0	990.6 1425.586	397.15		51463360 56906726					-			-
N224 N232	Node	+	+	-					D	507.444			73934574								
HW2	Headwall	-	1		0.5	14.2			0	1164.783	240.386		83086008								
N50	Node	1				18			0	1414.308	162.277		5647965								
N294	Node								0	1705.992	-214.147		84070742								
DETENTION BASIN DETAILS			1									-									
Name	Elev	Volume	Init Vol. (cu.m)	Outlet Type	K	Dia(mm)	Centre RL	Pa Family	Pit Type	x	Y	HED	Crest RL	Crest Longth(m)	ld		1				
DetBEx	13,2	4	3	0 None				-		514,018	288.421	No			48						
1	13.	0.01 0.1	51		-																
and a second	13.																				
	13. 13.	29.20	<u></u>	1	+				······									1			
	13																				
		70.5	2																		
	13,	3 162.3	9)																		
	13.	3 162,3 9 326,23	9) 5																		
	13. 13. 1.	8 162.3 9 326.23 4 598.96	9) 5 5																	+	
	13. 13: 14. 14. 14.	3 162,3 9 326,23 4 598,96 1 1061,1 2 1822,4	9 5 7 8																	=	
	13, 13: 14. 14. 14. 14. 14.	3 162.3 9 326.23 4 598.96 1 1061.1 2 1822.4 3 2998.5	9 5 7 7 3																		
	13. 13. 14. 14. 14. 14.	3 162.3 9 326.23 4 598.96 1 1061.1 2 1822.4 3 2998.5 4 4603.5	9 5 7 7 3 3																		
	13, 13, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14	3 162.3 9 326.23 4 598.98 1 1061.1 2 1822.4 3 2998.5 4 4603.5 5 6635.6	9 5 7 3 3 5 5																		
	13, 13, 14, 14, 14, 14, 14, 14, 14, 14, 14, 14	3 162.3 3 326.23 4 598.96 1 1061.1 2 1822.4 3 2998.5 4 4603.5 5 6635.6 5 9172.4 7 12192	9 5 7 7 3 3 5 5 5 7																		
	13. 13. 14. 14. 14. 14. 14. 14. 14. 14. 14. 14	8 162,3 9 326,23 4 598,96 1 1061,1 2 1822,4 3 2998,5 6 603,5 5 6635,6 9 172,4 7 12192 1 15734	9 5 5 7 5 3 3 3 5 5 5 7 7																		
	13. 13: 14: 14. 14. 14. 14. 14. 14. 14. 14. 14.	3 162.3 3 326.23 4 598.96 1 1061.1 1 1822.4 3 2998.5 4 4603.5 5 6635.6 9 172.4 7 12192 1 15734 2 15734	9 5 5 7 7 3 3 5 5 5 7 7 7 6 8												407040						
DerAEx	13. 13. 13. 14. 14. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3 3 326.23 4 598.98 1 1061.1 2 1822.4 3 2998.5 4 4603.5 5 6635.6 9 172.4 7 12192 8 15734 2 16517 3 1	9 5 5 7 7 5 8 8 5 7 7 5 5 7 7 8 8 8 8 8 9 7 7 9 9 9 9 9 9 9 9 9 9	D None						10.018	295.909	No			4370434						
DorAEx	13.3 13. 13. 14. 14. 14. 14. 14. 14. 14. 14. 14. 14	8 162.3 9 326.23 598.96 598.96 1 3061.1 2 1822.4 3 2998.5 4 4603.5 5 6636.6 5 9172.4 7 12192 1 15734.2 1 0.455 2 7.1	9 5 5 7 5 3 3 5 5 5 5 5 5 5 5 5 5 5 7 7 7	D None						10,018	295.909	No			4370434						
DorAEx	13.3 13.3 13.3 14.3 14.4 14.4 14.4 14.4 14.4 14.4 14.8 1 13.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 13.3 14.3 13.3 14.3 13.3 14.3 13.3 14.3 13.3 14.3 13.3 14.3 13.	3 162.3 9 326.23 1061.1 1061.1 12 1822.4 3 2998.5 4 4603.5 5 6635.6 9 1272.4 12 1922.4 3 2998.5 4 4603.5 5 6635.6 9 172.4 12 12192.4 15 15734.5 2 16517.3 3 26.64	9 5 5 7 5 3 3 3 3 3 5 5 7 7 5 5 7 7 7 7 7	D None						10.018	295,909	No			4370434						
DerAEx	13. 13. 14. 14. 14. 14. 14. 14. 14. 14. 14. 14	8 162.3 9 326.23 9 326.23 9 326.23 1 1061.1 1 1822.4 3 2998.5 4 4603.5 5 6635.6 9 9172.4 9 15734 1 0.45 2 7.1 3 26.64 4 71.2192 3 26.64 4 71.29	9 5 5 5 5 3 3 5 5 5 7 7 7 2 8 2 7 7 2 8 2 7 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	D None						10,018	295,909	No			4370434						
DeraEx	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	8 162.3 9 326.23 9 326.23 1 598.64 1 3061.1 2 1822.4 2 998.5 4 603.5 5 6635.6 9 1573.4 2 16517 3 25.664 2 7.1 3 25.644 7 1298.5 5 153.042	9 5 5 7 7 5 5 5 7 7 5 5 7 7 7 7 7 7 7 7	D None						10.018	293.905	NS			4370434						
DotAEX	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3 326.23 326.23 4 598.69 1 1061.1 2 1822.4 3 2988.5 4 4603.5 5 6635.6 9 9172.4 7 12192 5 15734 1 0.4517 2 7.7 3 26.64 1 0.452 2 7.7 3 26.64 4 71.252 1 153.84 3 26.56 1 153.84 2 153.84	9 5 5 5 5 5 5 3 3 3 5 5 7 7 5 5 7 7 5 5 7 7 5 5 5 5	D None						10.018	295.909	Nő.			4370434						
DetAEx	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3 9 326.23 4 596.69 1 3061.1 2 982.5 4 596.69 1 3081.1 2 982.5 4 6503.9 5 6635.65 9 172.4 2 16517. 3 1.5734.4 2 2.664 4 71.22 5 153.94 2 2.7.7 3 2.664 7 153.94 5 153.94 2 2.53.94	9 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7 7 7	0 None						10.018	295.905	No			4370434						
DotAEx	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3 3 162.3 3 262.23 3 262.23 3 262.24 3 2985.5 4 2985.5 4 2985.5 5 6635.6 9172.4 2985.5 15734.4 216517 3 1637.5 2 7.1 3 26645.6 3 26645.6 4 71.29 5 153.94 5 292.2 7 516.48 8 880.55 3 4309	9 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7 7 7	J None						10.018	293.909	No			4370434						
DerAEX	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3 3 162.3 3 262.32 4 596.96 1 1061.1 2 1822.4 3 2982.5 4 2988.5 5 6635.6 5 1573.4 1 12.162.4 2 7.1 2 7.1 2 7.1 2 7.1 2 7.1 2 7.5 3 26.64 4 7.129 2 7.5 3 26.64 4 7.129 2 7.5 3 2.66,35 3 2.66,48 3 2.66,48 3 2.66,48 3 2.66,48 3 2.66,48 3 2.66,48 3 3.66,053 3 3.66,053 3 3.66,053	9 5 5 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7	D None						10.018	293.909	No			4370434						
DetAEx	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3.3 3 162.3.4 596.96 396.23.4 596.96 1901.1 1922.4 2982.5 4 2988.5 5 6635.6 9172.4 15734 1 1242.2 1 15734 2 7.7 3 25.64 1 0.45 2 7.7 3 26.64 1 0.45 2 7.7 3 26.54 1 515.34 2 26.55 1 153.94 2 22.516.48 860.95 1439.9 3 343.3 3 343.3	9 5 5 5 5 5 5 5 5 5 7 5 7 7 7 7 7 7 7 7	D None						10.015	293.909	NC			4370434						
	13. 13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3.9 162.3.9 162.3.9 9 328.23.9 9 328.23.9 9 328.23.9 162.4 1622.4 152.5 6635.6 9 172.4 1 12102.2 1 1212.2 1 1245.2 2 76517.3 2 2.7.7 3 26.664 2 7516.44 3 280.95 1 153.94 2 7516.44 3 4269.2 1 53.94 2 247.3 3 3439.9 1 2241.3 3 3433.3 2 3471.7	9 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 7 7 7 7																		
	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3. 3 162.3. 4 598.98 1 1961.1 1 1961.1 1 1926.23 3 2989.5 4 603.5.6 5 5 6 9172.4 7 12192. 1 5.5.4 7 1.5.9.4 7 1.2.9.2 1 5.15.4 3 2.5.16.4 4.603.5.10.4 7.1.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 4.7.1.2.9 1.5.9.4 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 1.4.2.9 3 <td>9 5 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7 7</td> <td>D None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>609.058</td> <td>-288,731</td> <td>No</td> <td></td> <td></td> <td>13086138</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	9 5 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7 7	D None						609.058	-288,731	No			13086138						
Delà Prop	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	1 162.3 1 162.3 1 206.23 1 1061.1 1 1061.1 1 1061.1 1 1061.1 1 1061.1 1 1021.1	9 5 5 5 5 5 5 5 5 5 5 5 7 7 7 7 7 7 7 7								-288,731	No									
Det3 Prop	13. 13. 13. 14. 14. 14. 14. 14. 14. 14. 14	162.3 162.3 126.23 126.23 126.12 126.12 127.12 1282.4 1298.5 1298.5 12192.4 12192.5 12192.4 12192.7 <td>9 9 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>D None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>609.058</td> <td>-288,731</td> <td>No</td> <td></td> <td></td> <td>13086138</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	9 9 5 5 5 5 5 5 5 5 5 5 5 5 5	D None						609.058	-288,731	No			13086138						
Det3 Prop	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3. 3 162.3. 3 262.22. 4 599.96 1 1061.1. 1 1061.1. 2982.4 599.96 4 663.5. 5 6635.6 5 6635.6 7 1257.4 8 17.23 1 0.45 7 125.94 7 153.94 7 256.64 8 800.55 7 516.48 8 800.53 2 2241.3 2 2451.7 3 2451.7 3 7451.7 4 71722 2 244.3 2 3443.3 2 3443.3 4 71744 9 77.94.2 2 2048.8	9 9 5 5 5 5 5 5 5 5 5 5 5 5 5	D None						609.058	-288,731	No			13086138						
	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	3 162.3 3 162.3 3 262.32 4 598.96 1 7061.1 2 7081.1 2 1982.4 3 2988.5 4 4603.5 5 6635.6 5 1753.4 5 15734 2 16517.3 3 266.4 7 72.90 5 153.94 7 2.26 5 156.48 880.05 2 2 4751.7 4 71.29 3 2.343.3 3 3243.3 3 3243.3 3 3243.3 3 1744 977.94 977.94 3 2204.3 3 3209.0	9 9 5 5 5 5 5 5 5 5 5 5 5 5 5	D None						609.058	-288,731	No			13086138						
Det3 Prop	13. 13. 14. 14. 14. 14. 14. 14. 14. 14	1 162.3. 3 162.3. 3 262.224 3 262.224 3 162.3. 3 162.4. 3 162.4. 3 162.4. 3 163.5.6 5 163.5.6 5 157.3.4 4 16517. 3 27.1 5 153.9.4 7 125.4 8 10.45 7 153.9.4 7 153.9.4 8 160.95 10 254.4 11 326.64 12 17.4 12 26.44 13 236.43 14 254.3 12 343.3 13 343.3 14 343.3 14 3204.3 15 344.3 16 324.3 17.2 324.3 17.2 324.3 <td>9 9 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>D None</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>609.058</td> <td>-288,731</td> <td>No</td> <td></td> <td></td> <td>13086138</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	9 9 5 5 5 5 5 5 5 5 5 5 5 5 5	D None						609.058	-288,731	No			13086138						

F:\AA003210\Reports\Stormwater Reports\Appendices\DRAINS\Moorebank_DRAINS

DRAINS Input Data

for an a strange of the state o																					
																	·	·····	· · · · · · · · · · · · · · · · · · ·		
	14 6							1		-											
	14.1					4										-	-	-			
	14,0			-	-	1									in a second second	-	-				
					-																
	15.1	14285																	-		
	15.2	15784.9					angandaria ana angana ang ang ang ang ang ang ang	-													
	15.3									1						-					
	15.4					1											-	1.			
	15.5	20430.3							the second second		himiter		- Contraction			a more a c					
	15.5											·									
	15,0	23649.2								1	ł							1		-	
	15.8	25295.3			+							1							++		
	15.9				+			1		(-		
	10,5	28517.1								-	-	-									
DetC1	15			Culvert	0.5					1100 100	-186.779	NIC			15137024	-		h	+		
100101	15.6			Cabryon		í	s			1160,100	1 -100,773	140			10101024						
	10.0	600			-																
DetD Prop	14			None	+					1491 680	-382.043	NIO			15137030		-				
CBID FID	16			NODO	-		and the section of th			1401,000		140			13137030	1		-		house	
D-100	15	1243/		Bulling	0.1					1444 707	-257.627	IN's			15137025				-		
DetC2				Culvert		2				1 1141,282	1-201.021	IND			1513/025	1					
	15.5	200 5 600			1											-					
DetC3	16			Culvert	0,1	d				1126 000	-344.027	No			15137026	1					
COLOR A	15.5	200		Chingal	- 0.1	1		1	1	1130.038	1-2-1-12/	1.40			10107020		-		1		
	15.0				+											+			1		
DetC4	15	5 500		Culvert	0.1					1195 000	-432 155	No			16137027	+			++		
COLON				Guiven		(j		ŧ		1130.080	-132 100	(and			is is ideal	+					
	15.5						termine to the									+					
Datas	16			Cubiert	0.3	1				11/1 790	-496.091	No			15137028	-	-	ł			
DetC5	15.5	200		Culvert		4		+		1.191,202					1010/020	-					
	15.5			+	-				- dentinitariana -		+	••••••••					+				
DatCE	15			Culvert	0,8					1137 800	-596.315	No			15137029	1		-	2		
DetC6	15.5			GUIVEIT	+	4	- 2- 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -		+	1137,620	1-400,410	(and			13137029		+		++		
	16									-							- marine	-	- in the second	-	
		000								+									-		
SUB-CATCHMENT DETAILS					-	-													-	- unante	
	00	Water	Paved	Grass	Supp	Paved	Grass	Supp	Paved	Grass	Supp	Paved	Grass	Supp	Paved	Croot	Suga	Lag Time	Cutter	Cittar	Cuttor
Name	Pit or Node	Total Area	Aroa	Area	Area		Time	Time	Length	Length	Length		Slope	Slope	Rough	Pauch	Dough	or Eactor	Langth	Sinne II	FlowFactor
	NOCE		P6	We Area	%		(min)	(min)				%	%	%	Rubyn	Rudgi	Kubbu	or Paulor	(m)	Silupo II	riowracior
CHENDIE:	N5	(ha) 1.073		100		ipany 2	(mu) 8		(m)	1000	Tund	1/4	~	14					had	10	
CatchB1Ex CatchC1Ex	NB	2.431	81.8	18.2		7		č									+		1		
CatchBEx		6.431	a 1,6							for a series								in the second second	1		
			20 /																		
	DetBEx	26.052				14.5															
CatchAEx	DetAEx	27.453	50	50		13.75	16	C	1					~				C C			
CatchAEx	DetAEx N62	27.453	50 100	50		13.75	16	C													
CatchAEx CatB1_Prop CatB2(Swale)_Prop	DetAEx N62 N63	27.453 13,477 3,059	50 100 100	50		2 13.75 2 6 3 9.5	16 3 8,5	0 0 0						-14-							
CatehAEx CatB1 Prop CatB2(Swale)_Prop	DetAEx N62 N63 N64	27.453 13,477 3,059 1,073	50 100 100 0	50 0 100		2 13.75 2 6 3 9.5 2 5	15 2 8.5 8														
CatehAEx CatB1 Prop CatB2(Swale)_Prop	DetAEx N62 N63 N64 N65	27.453 13.477 3.059 1.073 0.55	50 100 100 0 0	50 0 100 100		2 13.75 5 6 9.5 5 5 5 8.5	15 3 8.5 8 75.5														
CatehAEx CatB1 Prop CatB2(Swale)_Prop	DetAEx N62 N63 N64 N65 N75	27.453 13.477 3.059 1.073 0.55 24.798	50 100 100 00 00 100	50 0 100 100		2 13.75 5 6 5 9.5 5 5 5 8.5 7 8.5	15 35 85 15,5 15,5														
CatehAEx CatB1 Prop CatB2(Swale)_Prop	DefAEx N62 N63 N64 N65 N75 N76	27.453 13.477 3.059 1.073 0.55 24.798 3.506	50 100 100 00 00 100 100			3 13.75 9 6 9 9.5 9 5 8.5 9 8.5 9 6 12	11 2 3 3 5 5 15 5 15 15 15 11														
CatehAEx CatB1 Prop CatB2(Swale)_Prop	DefAEx N62 N63 N64 N65 N75 N76 N77	27.453 13.477 3.059 1.073 0.55 24.798 3.506 6.611	50 100 100 0 0 0 100 100 100	50 100 100 100 100 54		2 13.75 3 9.5 9 5 9 8.5 9 6 9 6 9 6 9 12 9 13.2	15 3 3 4,5 8 5 15,5 5 3 11 8,3 8,3 8,3 8,3 11 8,3 11 8,3 11 11 11 11 11 11 11 11 11 11 11 11 11														
CatehAEx CatB1 Prop CatB2(Swale)_Prop	DefAEx N62 N63 N64 N65 N75 N76 N77 N78	27.453 13.477 3.059 1.073 0.55 24.798 3.506 6.611 0.785	50 100 00 00 100 100 100 100	50 100 100 00 00 00 00 00 00 00 00 00 00		2 13.75 3 9.5 9 5 9 8.5 9 6 9 6 9 6 9 12 9 13.2	15 3 3 4,5 8 5 15,5 5 3 11 8,3 8,3 8,3 8,3 11 8,3 11 8,3 11 11 11 11 11 11 11 11 11 11 11 11 11														
CatchAEx CatB1 Prop CatB2 Swale1 Prop CatB2 Forp	DefAEx N62 N63 N64 N65 N75 N76 N77 N78 DefC1	27.453 13.477 3.059 1.073 0.55 24.798 3.506 6.611 0.785 3.562	50 100 100 0 0 0 100 100 100 100 100 100			3 13.75 9 6 9 9.5 9 5 8.5 9 8.5 9 6 12	11 2 3 3 3 5 5 5 5 5 5 5 3 3 1 1 8.2 7 6 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7														
CatchAEx CatB1 Prop CatB2 Swale1 Prop CatB2 Forp	DetAEx N62 N63 N64 N65 N75 N76 N77 N78 DetC1 DetC2	27.453 13,477 3,059 1,073 0,55 24,798 3,506 6,611 0,785 3,562 3,362	50 100 00 100 100 100 100 - 46 0 0 0 00 100	50 100 100 100 100 100 100 100 1		13.75 0 6 0 9.5 0 8.5 0 6 0 13.2 0 13.2 0 13.2 0 13.2 0 3 0 3	115 3 3 3 3 3 3 3 3 3 1 1 3 3 3 3 3 4 2 3 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 3 3 4 3 3 4 5 5 3 3 3 5 5 5 3 3 5 5 5 5	3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
CatchAEx CatB1 Prop CatB2 Swale1 Prop CatB2 Forp	DetAEx N52 N53 N54 N55 N75 N76 N77 N78 DetC1 DetC2 DetC3	27.453 13.477 3.059 1.073 0.55 24.798 3.506 6.611 0.785 3.565 3.565 3.377 3.377	50 100 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			2 13.75 3 9.5 5 8.5 3 8.5 5 8.5	115 3 3 3 3 3 3 3 3 3 1 1 3 3 3 3 3 4 2 3 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 3 3 4 3 3 4 5 5 3 3 3 5 5 5 3 3 5 5 5 5														
CatchAEx CatB1 Prop CatB2 Swale1 Prop CatB2 Forp	DetAEx N62 N63 N64 N65 N75 N76 N77 N77 N78 DetC1 DetC2 DetC3 DetC4	27.453 13.477 3.059 1.073 0.55 24.798 3.506 6.611 0.785 3.566 3.565 3.377 3.371 3.371	50 100 100 00 100 100 100 100 100 100 10			13.75 6 9 6 9.55 3 8.5 0 13.75	155 38 38 38 38 38 39 30 30 30 30 30 30 30 30 30 30 30 30 30	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
CatchAEx CatB1 Prop CatB2 Swale1 Prop CatB2 Forp	DetAEx N62 N63 N54 N75 N76 N77 N77 N77 N78 DetC1 DetC2 DetC3 DetC4 DetC5	27.453 13.477 3.059 1.073 0.55 24.798 3.506 6.611 0.785 3.562 3.377 3.377 3.377 3.371 3.513	55 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			13.75 6 9 6 9 5 8.5 1 2 3 3 3 3 3 3 3 3 3 3 3 3 3	115 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3										3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			
CatchAcx CatB1 Prop CatB2 Swale CatB2 Swale Prop CatA2 Prop CatA2 Prop CatC2 Prop	DetAEx N62 N64 N65 N75 N77 N77 N78 DetC1 DetC2 DetC3 DetC4 DetC4 DetC5 DetC6	27.453 13.477 3.055 1.073 0.55 24.798 3.506 6.611 0.785 3.565 3.565 3.565 3.377 3.377 3.377 3.371 3.513 3.232 3.616	55 100 100 100 100 100 100 100 100 100 1			13.75 6 9 6 9 5 8.5 0 12 13.2	115 2 3 4 5 5 5 5 5 11 8 3 11 8 3 11 8 3 11 8 3 11 8 3 11 8 15 11 11 11 11 11 11 11 11 11											23 33 23 23 23 23 23 23 23 23 23 23 23 2	2		
CatchAcx CatB1 Prop CatB2 Swale CatB2 Swale Prop CatA2 Prop CatA2 Prop CatC2 Prop	DetAEx N62 N63 N64 N65 N76 N77 N78 DetC1 DetC2 DetC3 DetC5 DetC6 N95	27.453 13.477 3.055 24.798 3.506 6.611 0.785 3.562 3.562 3.377 3.377 3.377 3.371 3.512 3.610 12.004 2.453	55 100 100 100 100 100 100 100 1			13.75 6 9 5 9 5 1 1 2 3 <td>115 23 33 35 35 35 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 31 31 32 31 31 32 31 31 31 31 31 31 31 31 31 31 31 31 31</td> <td></td> <td>3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3</td> <td>2 </td> <td></td> <td></td>	115 23 33 35 35 35 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 33 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 32 31 31 31 31 32 31 31 32 31 31 31 31 31 31 31 31 31 31 31 31 31											3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2		
Catel-AEx Catel: Prop Catel: ZSwale: Prop Catel: ZEX Prop Cate: ZEX Prop Ca	DetAEx N62 N63 N54 N65 N76 N77 N78 DetC1 DetC2 DetC3 DetC5 DetC8 N95 N95	27.453 13.477 3.055 24.798 3.506 6.611 0.785 3.562 3.562 3.377 3.377 3.377 3.371 3.512 3.610 12.004 2.453	55 100 100 100 100 100 100 100 1			13.75 13.75 1	155 38 38 39 35 30 30 30 30 30 30 30 30 30 30 30 30 30											3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5		
CatchAEx CatB1 Prop CatB2 Swale) Prop CatB2 Ext, Prop CatB2 Ext, Prop CatA2, Swale) Prop CatA2, Prop CatA2, Prop CatA2, Prop CatA2, Prop CatC4, Prop CatC4, Prop CatC5, Prop CatC4, Prop CatC5, Prop CatC4, Prop CatC5, Prop CatC5, Prop	DetAEx N62 N63 N64 N65 N75 N76 N77 N77 N78 DetC1 DetC2 DetC2 DetC3 DetC4 DetC5 DetC6 N95 N95 N95 N95	27453 13.477 3.059 1.073 0.55 24.798 3.506 6.611 0.785 3.562 3.562 3.562 3.377 3.371 3.513 3.232 3.616 12.904 12.904	55 100 100 100 100 100 100 100 1			13.75 13.76 16 9.5 16 16 16 17 18 16 17 18 19 16 17 18 19 10 10 11 11 11 12 13 13 13 14 15 16 17 18 19 10 10		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2										3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5		
CatchAEx CatB1 Prop CatB2 Swale CatA2 Prop CatA3 Prop CatA3 Prop	DetAEx N62 N63 N64 N65 N75 N76 N77 N78 DetC1 DetC3 DetC3 DetC3 N96 N97 N98 N97 N98 N97 N98 N97	27453 13.477 3.055 1.073 0.55 3.506 6.611 0.785 3.562 3.562 3.377 3.377 3.377 3.371 3.3513 3.222 3.616 12.904 2.431 2.318 3.3177 3.3177 3.3177 3.3177 3.31777 3.317777777777	55 100 100 100 100 100 100 100 1	500 000 000 000 000 000 000 000		13.79 13.79 166 9.96 155 166 172 172 172 13.79 13.79 13.79 13.79 13.79 13.79 13.79 13.79 13.79 13.79 13.79 13.79 13.77 13.77 13.77												3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			
CatebuAcx CatB1 Prop CatB2 Swale). Prop CatB2 Ext. Prop CatB2 Ext. Prop CatA2 Swale). Prop CatC2 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC6 Prop CatC6 Prop CatC7 Prop CatC8 Prop CatC9 P	DefAEx N62 N83 N84 N85 N75 N76 N77 N77 N77 N77 DefC1 DefC2 DefC3 DefC4 DefC4 DefC4 DefC4 DefC4 N85 N85 N85 N85 N86 N87 N86 N87	27452 13,477 3,055 1,073 0,55 3,500 6,611 0,785 3,562,	55 100 100 100 100 100 100 100 1			13/7 0 6 0 95 0 6 0 95 0 85 0 6 0 12 0 132 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 7 0 3 0 3		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2										3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			
CatebuAcx CatB1 Prop CatB2 Swale). Prop CatB2 Ext. Prop CatB2 Ext. Prop CatA2 Swale). Prop CatC2 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC5 P	DerAEx N62 N63 N64 N65 N75 N77 N77 DerC1 DerC2 DerC3 DerC2 DerC3 DerC3 DerC3 N85 N85 N85 N85 N85 N85 N85 N85 N85 N85	27452 13,477 3,055 1,073 0,55 3,500 6,611 0,785 3,562,	55 100 100 100 100 100 100 100 1	660 C C C C C C C C C C C C C		13/7 0 6 0 95 0 6 0 95 0 85 0 6 0 122 0 132 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 7 1 21.7 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3													2		
CatebuAcx CatB1 Prop CatB2 Ext Prop CatB2 Ext Prop CatB2 Ext Prop CatB2 Ext Prop CatA2 (Swale) CatA2 (Swale) Prop CatA2 (Swale) CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC1 Prop CatC3 P	DerAEx N62 N83 N84 N85 N75 N76 N77 N77 DefC1 DefC2 DefC3 DefC4 DefC5 DefC5 DefC5 N86 N86 N86 N87 N169 N177 N224 N72	27 453 13,477 13,478 1,073	55 100 100 100 100 100 100 100 1	650 C C C C C C C C C C C C C		13/7 0 6 0 95 0 6 0 95 0 85 0 6 0 122 0 132 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 7 1 21.7 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
CatebuAck CateBu Forp CateBuck	DerAEx N62 N63 N64 N65 N76 N77 N77 DerC1 DerC2 DerC2 DerC3 DerC2 DerC3 DerC4 N55 N55 N55 N55 N55 N77 N77 N77 N77 N77	27.453 3.055 1.073 24.792 24.792 24.792 24.792 3.506 3.506 3.506 3.562 3.377 3.377 3.377 3.377 3.377 3.222 3.616 2.906 2.431 2.386 2.905 2.431 2.376 2.385 2.905 2.195 2.385 2.905 2.195 2.905 2.195 2.905 2	55 100 100 100 100 100 100 100 1	56 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7		13.79 13.79 0 6 9.9 5 5 85 1 72 1 12 1 3 2 3 3 3		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2											2		
CatebuAcx CatB1 Prop CatB2 Ext Prop CatB2 Ext Prop CatB2 Ext Prop CatB2 Ext Prop CatA2 (Swale) CatA2 (Swale) Prop CatA2 (Swale) CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC1 Prop CatC3 P	DerAEx N62 N83 N84 N85 N75 N76 N77 N77 DefC1 DefC2 DefC3 DefC4 DefC5 DefC5 DefC5 N86 N86 N86 N87 N169 N177 N224 N72	27 453 13,477 13,478 1,073	55 100 100 100 100 100 100 100 1	56 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7		13.79 13.79 0 6 9.9 5 5 85 1 72 1 12 1 3 2 3 3 3		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
CatchAck CatB1 Prop CatB2 Swale CatA2 Prop CatA2 Prop CatA2 Prop CatC2 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC5 Prop	DerAEx N62 N63 N64 N65 N76 N77 N77 DerC1 DerC2 DerC3 DerC2 DerC3 DerC4 DerC5 N95 N95 N95 N95 N95 N95 N95 N95 N95 N9	27.453 3.055 1.073 24.792 24.792 24.792 24.792 3.506 3.506 3.506 3.562 3.377 3.377 3.377 3.377 3.377 3.222 3.616 2.906 2.431 2.386 2.905 2.431 2.376 2.385 2.905 2.195 2.385 2.905 2.195 2.905 2.195 2.905 2	55 100 100 100 100 100 100 100 1	56 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7		13.79 13.79 0 6 9.9 5 5 85 1 72 1 12 1 3 2 3 3 3		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
CatelyAEx Cately Frop Cately Swale) Prop Cately Frop Cately Frop Cately Frop Cately Frop Cately For Cately Frop Cately Frop Cately Frop Cately Fro	DorAEx N62 N62 N83 N64 N76 N77 N77 N77 N77 DorC1 DorC2 DorC2 DorC2 DorC2 DorC2 DorC3 DorC2 N76 N77 N77 N77 N78 N77 N78 N77 N78 N77 N78 N77 N78 N77 N78 N78	27.453 3.055 1.073 24.792 24.792 24.792 24.792 3.506 3.506 3.506 3.562 3.377 3.377 3.377 3.377 3.377 3.222 3.616 2.906 2.431 2.386 2.905 2.431 2.376 2.385 2.905 2.195 2.385 2.905 2.195 2.905 2.195 2.905 2	555 100 100 100 100 100 100 100	560 570 570 570 570 570 570 570 57		13.79 13.79 2 3.79 3 5.5 3 6.6 3 3.3		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		Rough	Pipe is	No. Pipes	Chg From	At Chg	Chg		Chg	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			
CatchAck CatB1 Prop CatB2 Swale CatA2 Prop CatA2 Prop CatA2 Prop CatC2 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC5 Prop	DerAEx N62 N63 N64 N65 N76 N77 N77 DerC1 DerC2 DerC3 DerC2 DerC3 DerC4 DerC5 N95 N95 N95 N95 N95 N95 N95 N95 N95 N9	27 453 13 477 3,055 1,073 0,55 24 798 3,500 6,611 0,785 3,562 3,357 3,377 3,377 3,377 3,377 3,377 3,373 3,222 3,616 2,904 2,431 2,376 2,265 2,085 2,085 2,085	55 100 100 0 100 100 100 100 100	550 C C 1000 1000 C C C C 1000 C C 1		13.79 13.79 6 9.6 9.5 5 5 6 9.55 16 172 172 172 172 172 172 172 173 173 174 175		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		Rough	Pipe is	No. Pipes	Chg From	At Chg	Chg (m)	RI	- Chg	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			
CatchAck CatB1 Prop CatB2 Swale CatA2 Prop CatA2 Prop CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop	DorAEx N62 N62 N63 N64 N64 N76 N77 N77 N77 DorC1 DorC2 DorC2 DorC2 DorC2 DorC2 DorC2 DorC2 DorC2 N85 N76 N77 N77 N77 N77 N77 N77 N77 N77 N77	27 453 13,477 3,477 0,55 0,55 0,55 0,55 0,55 0,55 0,55 0,	55 100 100 100 100 100 100 100 1	Second Seco	0 0 0 0	13.79 13.79 0 6.0 9.5 5.5 5 6.6 12 12 13.72 6.0 13.23 3.3 13.33 3.3	туре		1.D. (mn)	0.3	Existing	2	DetC1	At Chg 0	(m)		Chg (m)				
CatchAck CatB1 Prop CatB2 Swale CatA2 Prop CatA2 Prop CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop	DertAEx N62 N62 N64 N65 N75 N76 N77 N77 N77 DertC2 DertC2 DertC2 DertC2 DertC2 DertC2 DertC2 DertC3 DertC3 N85 N85 N85 N85 N85 N85 N85 N85 N85 N85	27 4535 13,477 3,30555 4779 3,506 3,506 3,506 3,506 3,506 3,506 3,506 3,506 3,506 3,506 3,506 3,507 3,377 3,	55 100 100 100 100 100 100 100 1	550 6 0 1000 10	D D D D	13.79 13.79 0 6.0 9.5 5.5 5 6.6 12 12 13.72 6.0 13.23 3.3 13.33 3.3			LD. (0m)	0.3	Pipe is Existing	2	Chg From DetC1 DetC2		(m)	RI (m)	Crog (m)				
CatchAck CatB1 Prop CatB2 Swale CatA1 Prop CatA2 Swale CatA2 Swale<	DertAEx N62 N62 N63 N64 N65 N75 N75 N75 N75 N75 DertC1 DertC3 DertC3 DertC3 DertC3 DertC4 N86 N76 N77 N77 N77 N77 N77 N77 N77 N77 N7	27 453 34.77 3.477 3.55 4.792 3.505 6.51 0.75 3.562 6.51 0.755 3.562 3.562 3.562 3.562 3.562 3.562 3.562 3.562 3.562 2.032 2.045 2.0	55 100 100 00 100 100 100 100 10	550 6 0 1000 1000 0 0 0 0 0 0 0 0 0 0	0 0 0 0	13.79 0 6.5 0 6.5 0 6.5 0 6.5 0 6.5 0 6.5 0 6.5 0 6.5 0 7.2 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 3.3 0 2.5 0 2.0 0 2.0 0 2.5 Silope (%) (%) 0.633	115 38 39 39 30 30 30 31 31 31 31 31 31 31 31 31 31	C C C C C C C C C C C C C C C C C C C	1.D. (000)	0.3	Existing Existing	222	DetC1 DetC2 DetC3	0	(m)	RI (m)	Chg (m)				
CatebuAck CateBuCk <	DertAEx N62 N62 N63 N64 N65 N75 N76 N77 N77 N77 N77 DertC1 DertC2 DertC2 DertC2 DertC2 DertC2 DertC3 DertC3 DertC3 N86 N86 N169 N177 N76 N169 N176 N169 N176 N169 N176 DertC3 DertC3 DertC3 DertC3 DertC3 DertC4 DertC5 Der	27 453 13,477 3,055 47,52 47,52 3,500 3,500 3,500 3,500 3,500 3,500 3,500 3,500 3,377 3,37	55 100 100 100 100 100 100 100 1	550 6 0 1000 10	0 1 0 1	13.75 13.75 16.75 16.75 17.75 </td <td>11 3 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 17 18 17 18 17 18 19 10 10 11 13 14 15 16 17 17 18 19 11 11 12 13 14 15 15 16 17 17 17 17 17 17 17 17</td> <td>C C C C C C C C C C C C C C C C C C C</td> <td>LD. (mn)</td> <td>0.3 0.3 0.3</td> <td>Existing Existing Existing</td> <td>222</td> <td>DetC1 DetC2 DetC3</td> <td>0</td> <td>(m)</td> <td>RI (m)</td> <td>Chg (m)</td> <td></td> <td></td> <td></td> <td></td>	11 3 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 17 18 17 18 17 18 19 10 10 11 13 14 15 16 17 17 18 19 11 11 12 13 14 15 15 16 17 17 17 17 17 17 17 17	C C C C C C C C C C C C C C C C C C C	LD. (mn)	0.3 0.3 0.3	Existing Existing Existing	222	DetC1 DetC2 DetC3	0	(m)	RI (m)	Chg (m)				
CatchAck CatchAck Cattle Yerop Catte Yerop <	DertAEx N62 N62 N63 N64 N65 N75 N75 N75 DertC1 DertC3 DertC3 DertC4 N86 N77 DertC1 DertC4 DertC5 DertC3 DertC4 N76 N76 N77 DertC1 DertC1 DertC2 DertC3 Dertc	27 453 34.77 3.477 3.55 4.792 3.505 6.51 0.75 3.562 6.51 0.755 3.562 3.562 3.562 3.562 3.562 3.562 3.562 3.562 2.337 3.377 3.377 3.377 3.377 3.377 3.377 3.372 3.512 3.522 3.552 2.0555 2.055 2.055 2.055 2.055 2.0555 2.0555 2.0555 2.0555 2.05	55 100 100 00 100 100 100 100 10	550 6 0 1000 1000 0 0 0 0 0 0 0 0 0 0	0 1 0 1	13.79 13.79 0 6 9 5 1 6 1 6 1 6 1 7 1 3 3	11 32 33 34 35 31 31 31 31 31 31 32 31 32 32 32 32 32 32 33 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 36 37 38 39 30 30 30 30 30 30 30 30 30 30 30	C C C C C C C C C C C C C C C C C C C	1.D. (000)	0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing	222	DetC1 DetC2 DetC3	0 0 0	(m)	RI	Chg (m)				
CatchAck CatB1 Prop CatB2 Swale CatC2 Prop CatC3 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop	DertAEx N62 N62 N63 N64 N65 N75 N76 N77 N77 N77 N77 DertC1 DertC2 DertC2 DertC2 DertC2 DertC2 DertC3 DertC3 DertC3 N86 N86 N169 N177 N76 N169 N176 N169 N176 N169 N176 DertC3 DertC3 DertC3 DertC3 DertC3 DertC4 DertC5 Der	27 453 13,477 3,3055 3,078 3,075 3,077 3,0	55 100 100 100 100 100 100 100 1	550 6 0 1000 10	2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 3 1 0 1 1 1 5 1 5 1 5 1 5 1 5 1	13.7 13.7 16.7 16.7 16.7 17.7	11 3 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 17 18 17 18 17 18 19 10 10 11 13 14 15 16 17 17 18 19 11 11 12 13 14 15 15 16 17 17 17 17 17 17 17 17	C C C C C C C C C C C C C C C C C C C	1.D. (mn)	0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5	0 0 0 0 0	(m)	RI (m)	Chg (m)				
CatchAck CatB1 Prop CatB2 Swale CatA2 Swale CatC Prop CatC Trop CatC	DorAEx N62 N62 N84 N85 N75 N76 N77 N77 N77 DefC2 DefC3 DefC4 DefC5 DefC5 DefC4 N77 N78 N77 N78 N79 N77 N86 N87 N77 N86 N87 N77 N224 N224 PW2 PW2 DWC1 DefC2 DefC3 DefC4 DefC4 DefC5	27 453 34.77 3.477 3.50 55 3.50 6.51 0.75 3.50 6.51 0.75 3.50 3.50 3.50 3.3777 3.3777 3.3777 3.3777 3.3777 3.3777 3.3777 3.37777 3.377777 3.377777777	55 100 100 100 100 100 100 100 1	550 6 0 1000 1000 1000 0 0 0 0 0 0 0 0	2	13.70 13.70 16.70 16.70 16.70 17.70 </td <td>11 32 33 34 35 31 31 32 31 32 31 32 31 32 32 32 32 32 32 32 32 32 32 33 33 33 33 33 33 34 35 36 37 36 37 38 39 30 30 30 30 31 32 33 33 33 33 33 33 33 33 33</td> <td>C C C C C C C C C C C C C C C C C C C</td> <td>1.D. (mn)</td> <td>0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3</td> <td>Existing Existing Existing Existing Existing Existing</td> <td>2 2 2 2 2 2 2 2 2 2</td> <td>DetC1 DetC2 DetC3 DetC4 DetC5 DetC6</td> <td>0 0 0 0 0 0 0</td> <td>(m)</td> <td>RI</td> <td>Chg (m)</td> <td></td> <td></td> <td></td> <td></td>	11 32 33 34 35 31 31 32 31 32 31 32 31 32 32 32 32 32 32 32 32 32 32 33 33 33 33 33 33 34 35 36 37 36 37 38 39 30 30 30 30 31 32 33 33 33 33 33 33 33 33 33	C C C C C C C C C C C C C C C C C C C	1.D. (mn)	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5 DetC6	0 0 0 0 0 0 0	(m)	RI	Chg (m)				
CatchAck CatB1 Prop CatB2 Swale CatC2 Prop CatC3 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop	DertAEx N62 N62 N63 N64 N65 N75 N76 N77 N77 N77 DertC2 DertC2 DertC2 DertC3 DertC3 DertC3 N86 N77 N77 N77 N77 N77 N77 N77 N77 N77 N7	27 453 13,477 3,3055 3,078 3,075 3,077 3,0	55 100 100 100 100 100 100 100 1	550 6 0 1000 1000 1000 0 0 0 0 0 0 0 0	2	13.70 13.70 16.70 16.70 16.70 17.70 </td <td>11 3 15 15 15 15 15 15 15 15 11 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 15 16 17 17 18 19 10 11 11 12 13 14 15 15 15 16 17 17</td> <td>C C C C C C C C C C C C C C C C C C C</td> <td>1.D. (mn)</td> <td>0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3</td> <td>Existing Existing Existing Existing Existing</td> <td>2 2 2 2 2 2 2 2 2 2</td> <td>DetC1 DetC2 DetC3 DetC4 DetC5</td> <td>0 0 0 0 0 0 0</td> <td>(m)</td> <td>RI (M)</td> <td>Chg</td> <td></td> <td></td> <td></td> <td></td>	11 3 15 15 15 15 15 15 15 15 11 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 15 16 17 17 18 19 10 11 11 12 13 14 15 15 15 16 17 17	C C C C C C C C C C C C C C C C C C C	1.D. (mn)	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5	0 0 0 0 0 0 0	(m)	RI (M)	Chg				
CatchAck CatB1 Prop CatB2 Swale CatA2 Prop CatA2 Prop CatA2 Prop CatA2 Prop CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC5 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop	DotAEx N62 N62 N84 N85 N75 N76 N77 N77 N77 DefC2 DefC3 DefC4 DefC5 DefC5 DefC4 N77 N78 N77 N78 N79 N77 N86 N87 N77 N86 N87 N77 N224 N224 PW22 PW21 DefC2 DefC3 DefC4 DefC4 DefC5	27 453 34.77 3.477 3.50 55 3.50 6.51 0.75 3.50 6.51 0.75 3.50 3.50 3.50 3.3777 3.3777 3.3777 3.3777 3.3777 3.3777 3.3777 3.37777 3.377777 3.377777777	55 100 100 100 100 100 100 100 1	550 6 0 1000 1000 1000 0 0 0 0 0 0 0 0	2	13.70 13.70 16.70 16.70 16.70 17.70 </td <td>11 32 33 34 35 31 31 32 31 32 31 32 31 32 32 32 32 32 32 32 32 32 33 33 33 33 33 33 34 35 36 37 38 39 30 30 32 33 33 34 35 36 37 38 39 300 300 311 311 311 311 311 3</td> <td>C C C C C C C C C C C C C C C C C C C</td> <td>I.D. (000)</td> <td>0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3</td> <td>Existing Existing Existing Existing Existing Existing</td> <td>2 2 2 2 2 2 2 2 2 2</td> <td>DetC1 DetC2 DetC3 DetC4 DetC5 DetC6</td> <td>0 0 0 0 0 0 0</td> <td>(m)</td> <td>RE (M)</td> <td>Cng</td> <td></td> <td></td> <td></td> <td></td>	11 32 33 34 35 31 31 32 31 32 31 32 31 32 32 32 32 32 32 32 32 32 33 33 33 33 33 33 34 35 36 37 38 39 30 30 32 33 33 34 35 36 37 38 39 300 300 311 311 311 311 311 3	C C C C C C C C C C C C C C C C C C C	I.D. (000)	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5 DetC6	0 0 0 0 0 0 0	(m)	RE (M)	Cng				
CatchAck CatB1 Prop CatB2 Swale CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC5 Prop CatC5 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop	DertAEx N82 N82 N83 N84 N85 N75 N77 N77 N77 N77 DertC1 DertC2 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC4 DertC4 N85 N75 DertC1 DertC1 DertC1 DertC1 DertC2 DertC2 DertC2 DertC4 N85 N85 N75 DertC1 DertC1 DertC2 DertC2 DertC2 DertC4 DertC1 DertC2 DertC2 DertC2 DertC4 DertC1 DertC2 DertC2 DertC3 DertC4 DertC1 DertC2 DertC2 DertC3 DertC4 DertC2 DertC3 DertC4 DertC3 DertC4 DertC2 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC5 DertC5 DertC5 DertC5 DertC5 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC5 Dert	27 453 13,477 3,477 3,505 4,787 3,505 6,611 0,785 3,562 3,56	55 100 100 100 100 100 100 100 1	550 6 C C 1000	2]]]]]]]]]]]]]]]]]]]	2 13.75 2 6.75 2 6.75 2 7.75 2 8.55 2 8.55 2 7.72 2 7.72 2 7.72 2 7.72 3 7.75 3 7.75 5 7.75 7 7.7	11 3 15 16 17 18 19 10 10 11 13 14 15 15 16 17 17 18 19 10 10 11 11 11 11 11 11 11 11 11 11 12	C C C C C C C C C C C C C C C C C C C	I.D. (000)	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5 DetC6	0 0 0 0 0 0 0	(m)	RI (M)	Chg (m)				
CatchAck CatB1 Prop CatB2 Swale CatA2 Prop CatA2 Prop CatA2 Prop CatA2 Prop CatC2 Prop CatC3 Prop CatC4 Prop CatC5 Prop CatC5 Prop CatC4 Prop CatC5 Prop CatC4 Prop CatC4 Prop CatC4 Prop CatC5 Prop CatC4 Prop	DertAEx N62 N62 N63 N64 N65 N75 N76 N77 DertC2 DertC3 DertC4 DertC4 DertC5 DertC4 DertC5 DertC4 DertC5 N76 N77 N77 N78 N77 N77 DertC1 DertC2 DertC4 DertC4 DertC5 DertC4 DertC2 DertC4 DertC4 DertC4 DertC4 DertC2 DertC4 DertC4 DertC4 DertC4 DertC2 DertC4 DertC4 DertC4 DertC4 DertC2 DertC4 DertC5 DertC4 DertC5 DertC4 DertC4 DertC5 DertC4 DertC5 DertC4 DertC5 DertC4 DertC5 DertC4 D	27 453 13,477 3,477 3,505 3,505 4,505 4,799 4,799 3,500 4,500 3,500 3,500 3,500 3,377 3,371 3,510 3,327 3,371 3,510 3,327 3,371 3,510 3,327 3,317 3,510 3,327 3,317 3,510 3,222 3,610 12,904 2,433 2,045 2,0	55 100 100 100 100 100 100 100 1	550 6 0 1000 10	2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	13.70 13.70 0 6 9 5 5 5 5 5 6 9.55 142 132 132 0 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 34 3 35 3 36 2 37 3 38 3 39 3 30 7 31 3 32 3 33 3 33 3 33 3 33 3 33 3 34 0.63 4 0.63 4 <td< td=""><td>Type Sex Culverts Sex Culverts</td><td>Circle Circle Ci</td><td>I.D. (mm) Height of Service</td><td>0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3</td><td>Existing Existing Existing Existing Existing Existing</td><td>2 2 2 2 2 2 2 2 2 2</td><td>DetC1 DetC2 DetC3 DetC4 DetC5 DetC6</td><td>0 0 0 0 0 0 0</td><td>(m)</td><td>R1 (m)</td><td>Chg (m)</td><td></td><td></td><td></td><td></td></td<>	Type Sex Culverts	Circle Ci	I.D. (mm) Height of Service	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5 DetC6	0 0 0 0 0 0 0	(m)	R1 (m)	Chg (m)				
CateLAEx CateLAEx CateL2Swale CatC2 CatC3 CatC4 CatC2 CatC2 CatC3 CatC3 CatC4 CatC3 CatC4 CatC4 CatC3 CatC3 CatC4 CatC4 CatC4 CatC4 CatC5 CatC4 CatC5 CatC4 CatC5 CatC5 </td <td>DertAEx N82 N82 N83 N84 N85 N75 N77 N77 N77 N77 DertC1 DertC2 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC4 DertC4 N85 N75 DertC1 DertC1 DertC1 DertC1 DertC2 DertC2 DertC2 DertC4 N85 N85 N75 DertC1 DertC1 DertC2 DertC2 DertC2 DertC4 DertC1 DertC2 DertC2 DertC2 DertC4 DertC1 DertC2 DertC2 DertC3 DertC4 DertC1 DertC2 DertC2 DertC3 DertC4 DertC2 DertC3 DertC4 DertC3 DertC4 DertC2 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC5 DertC5 DertC5 DertC5 DertC5 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC5 Dert</td> <td>27 453 13,477 3,477 3,505 4,787 3,505 6,611 0,785 3,562 3,56</td> <td>55 100 100 100 100 100 100 100 1</td> <td>550 6 C C 1000</td> <td>2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4</td> <td>13.70 13.70 0 6 9 5 5 5 5 5 6 9.55 142 132 132 0 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 34 3 35 3 36 2 37 3 38 3 39 3 30 7 31 3 32 3 33 3 33 3 33 3 33 3 33 3 34 0.63 4 0.63 4 <td< td=""><td>11 3 15 16 17 18 19 10 10 11 13 14 15 15 16 17 17 18 19 10 10 11 11 11 11 11 11 11 11 11 11 12</td><td>C C C C C C C C C C C C C C C C C C C</td><td>I.D. (mm) Height of Service</td><td>0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3</td><td>Existing Existing Existing Existing Existing Existing</td><td>2 2 2 2 2 2 2 2 2 2</td><td>DetC1 DetC2 DetC3 DetC4 DetC5 DetC6</td><td>0 0 0 0 0 0 0</td><td>(m)</td><td>RI (M)</td><td>Chg</td><td></td><td></td><td></td><td></td></td<></td>	DertAEx N82 N82 N83 N84 N85 N75 N77 N77 N77 N77 DertC1 DertC2 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC4 DertC4 N85 N75 DertC1 DertC1 DertC1 DertC1 DertC2 DertC2 DertC2 DertC4 N85 N85 N75 DertC1 DertC1 DertC2 DertC2 DertC2 DertC4 DertC1 DertC2 DertC2 DertC2 DertC4 DertC1 DertC2 DertC2 DertC3 DertC4 DertC1 DertC2 DertC2 DertC3 DertC4 DertC2 DertC3 DertC4 DertC3 DertC4 DertC2 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC2 DertC4 DertC3 DertC4 DertC2 DertC4 DertC2 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC5 DertC5 DertC5 DertC5 DertC5 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC4 DertC5 Dert	27 453 13,477 3,477 3,505 4,787 3,505 6,611 0,785 3,562 3,56	55 100 100 100 100 100 100 100 1	550 6 C C 1000	2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	13.70 13.70 0 6 9 5 5 5 5 5 6 9.55 142 132 132 0 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 33 3 34 3 35 3 36 2 37 3 38 3 39 3 30 7 31 3 32 3 33 3 33 3 33 3 33 3 33 3 34 0.63 4 0.63 4 <td< td=""><td>11 3 15 16 17 18 19 10 10 11 13 14 15 15 16 17 17 18 19 10 10 11 11 11 11 11 11 11 11 11 11 12</td><td>C C C C C C C C C C C C C C C C C C C</td><td>I.D. (mm) Height of Service</td><td>0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3</td><td>Existing Existing Existing Existing Existing Existing</td><td>2 2 2 2 2 2 2 2 2 2</td><td>DetC1 DetC2 DetC3 DetC4 DetC5 DetC6</td><td>0 0 0 0 0 0 0</td><td>(m)</td><td>RI (M)</td><td>Chg</td><td></td><td></td><td></td><td></td></td<>	11 3 15 16 17 18 19 10 10 11 13 14 15 15 16 17 17 18 19 10 10 11 11 11 11 11 11 11 11 11 11 12	C C C C C C C C C C C C C C C C C C C	I.D. (mm) Height of Service	0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3	Existing Existing Existing Existing Existing Existing	2 2 2 2 2 2 2 2 2 2	DetC1 DetC2 DetC3 DetC4 DetC5 DetC6	0 0 0 0 0 0 0	(m)	RI (M)	Chg				

F\AA003210\Reports\Stormwater Reports\Appendices\DRAINS\Mcorebank_DRAINS

									an and the second of the	
	Name and F			D-Calculations)	C-Civil\Stormv	vater/DRAINS\	Moorebank.dn	n		
DRAINS Version: Modeller's Name:		2010.09 - 5 A Chris McCiell							Ŧ	
Description:		Moorebank O								
	T								1	
ORAINS results pres	pared 02 Sept	ember, 2010 fr	om Version 20	10.09	1				RESUL	те
										10
PIT / NODE DETAIL				Version 8				1	2 YEAR	ARI
lame	Max HGL	Max Pond HGL	Max Surface Flow Arriving	Max Pond Volume	Min Freeboard	Overflow (cu.m/s)	Constraint			/ 31 3 1
		nge	(cu.m/s)	(cu.m)	(m)	(cu nvs)				
łW2	12.34	5.744	(oo.ms)	loosily	1.86	0	None			
150	11.97		0		1					
					1				1	1
SUB-CATCHMENT	and the second se									
Vame	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm			
	Flow Q	Max Q	Max Q	Tc	To	To				
atchBIEx	(cu.m/s) 0.185	(cu.m/s) 0	(cu.m/s) 0.185	(min)	(min) 8	(min)	ARAR D Vear	2 hours storm, average 22	i mm/h Zone 1	10
atchC1Ex	0.617	0.542	0.076		7			25 minutes storm, average		
atchBEx	2.78		1.313		24			2 hours storm, average 22		
atchAEx	4.115	3.019	1.136		15			25 minutes storm, average		1
at81_Prop	3.805	3.805	0		3			, 25 minutas storm, average		
at82(Swale)_Prop		0.785	0	and the second se	8.5			, 25 minutes storm, average		
atB1Ext_Prop	0.185		0.185					, 2 hours storm, average 22		
at82Ext_Prop	0.06	0	0.06	8.5	15,5			2 hours storm, average 22		
atA1_Prop atA2(Swale)_Prop	7,002	7.002	0		3			25 minutes storm, average		-
atA1Ex_Prop	1.185	0.619	0.512	al and a second s	8.3			. 25 minutes storm, average . 25 minutes storm, average		
atA2Ex_Prop	0.076	0.002	0.076					, 1 hour storm, average 33.7		
atCa_Prop	1.078	1.078	0.070	Transferration and and and and and and and and and an				5 minutes storm, average 55.		-
atCb_Prop	1.022	1.022	Ő					5 minutes storm, average		1
atCc_Prop	1.021	1.021	0	3	0	0	AR&R 2 year	, 5 minutes storm, average	109 mm/h, Zona 1	
atCd_Prop	1.064	1.064	0					, 5 minutes storm, average		
atCe_Prop	0.979	0.979	0	and the second se				5 minutes storm, average		
atCf_Prop	1.095	1.095	0					5 minutes storm, average		
atC2_Prop	3,907	3,907	0.076	And a later of the second s	0			5 minutes storm, average		
atCEx1_Prop atCEx2_Prop	0.617	0.542	0.076	21.7	25			, 25 minutes storm, average , 1.5 hours storm, average 2		
at A3 Prop	0.200	0.107	0.007					, 1.5 nours storm, average 2 , 5 minutes storm, average		
al Carpark_Ex	0.618		0					25 minutes storm, average		
atC1_Prop	0.648	0,648	0					5 minutes storm, average		
atB3Ext_Prop	0.083	0	0.083	0	8	Ö	AR&R 2 year	2 hours storm, average 22	mm/h, Zone 1	
atchCEx	4.757	3,863	0.998	25	30			1 hour storm, average 33.7		
at Carpark_Prop	0.618	0.618	0	5	0	0	AR&R 2 year	, 25 minutes storm, average	54.7 mm/h, Zone 1	·
······································				<u> </u>						
outflow Volumes for	Total Catcher	ant (142 impo	daug + 58 3 a		latha)					
itorm				Pervious - 198 to						
aoun	cu.m			cum (Runoff 9					k	
R&R 2 year, 5 min				\$5.59 (1.9%)	, ,					
R&R 2 year, 10 mi				906.00 (11.6%)					
R&R 2 year, 15 mil				2001.13 (20.39			-			
R&R 2 year, 20 mi				2977.62 (25.99						
R&R 2 year, 25 mil				3721.52 (29.09						
R&R 2 year, 30 ml				4146.84 (29.69						
R&R 2 year, 45 mi				5403.45 (32.19						
R&R 2 year, 1 hou R&R 2 year, 1.5 ho				6358.70 (33.59 7245.65 (32.69						
R&R 2 year, 2 hou				7992.91 (32.29						-
R&R 2 year, 3 hou				8945.77 (31.39						
R&R 2 year, 4.5 ho				9159.01 (27.89						
								in the second	have been a	
IPE DETAILS							1			
ame	Max Q	Max V	Max U/S	Max D/S	Due to Storm					-
ine 12	(cu.m/s)	(m/s)	HGL (m)	HGL (m)	ADED	25 minutes a		Ed Zoom/h Zoosed		
ipe13 18	1.018	1.5	15.29					54.7 mm/h, Zone 1 54.7 mm/h, Zone 1	t	-
20	0.962	1.4	15.284					54.7 mm/h, Zone 1		
22	1.004	1.5						54.7 mm/h, Zone 1		
24	0.921	1.4	15.283					54.7 mm/h, Zone 1	· · · · · · · · · · · · · · · · · · ·	
26	1.034	1.5	15.292	15 273	AR&R 2 year	25 minutes st	orm, average	54.7 mm/h, Zone 1		
10	5.744	2.5	12.017	11,967	AR&R 2 year	1.5 hours sto	m, average 2	6.3 mm/h, Zone 1		
				1			1			
HANNEL DETAILS		Man M	Chainson	Um	Due to Storm					
ame	Max Q (cu.m/s)	Max V (m/s)	Chainage (m)	Max HGL (m)	Line to Storm					
	(ou.nes)	funal.	640	nor Mil						
VERFLOW ROUT	E DETAILS									
ame	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm		······
F9	0.4	0.4	0.256	0.06	0.04	15.94			m, average 22 mm/h, Zone 1	
F12	0.185	0,185	0.256	0.044	0.03	12.89	0.59	AR&R 2 year, 2 hours ston	m, average 22 mm/h, Zone 1	-
F26	0.617	0.617	0.256		0.06	18.28		AR&R 2 year, 25 minutes :	storm, average 54.7 mm/h, Zo	one 1
F40	0	0	0.256		0	L				l .
F1	0.279	0.279	0.256		0.03				m, average 16.9 mm/h, Zone	
F19	2,424	2,424	0.256		0.15				orm, average 26.3 mm/h, Zon	
	2.424	2.424	0.256	0.125	0.15				orm, average 26.3 mm/h, Zon	
F17	4 1355	0.155	0.258		0.02	12.17 34.08			orm, average 13 mm/h, Zone	
F17 tageDischarge_B			0.200						storm, average 54.7 mm/h, Zo	
F17 tageDischarge_B F43	3.805		0.956	0.070	0.07	10 22				
F17 tageDischarge_B F43 F44	3.805 0.785	0.785	0.256		0.07	19.72		AR&R 2 year, 25 minutes : AR&R 2 year, 2 hours stor		1
F17 lageDischarge_B F43 F44 F46	3.805		0.256 0.258 0.256	0.044	0.07		0.59	AR&R 2 year, 2 hours stor	m, average 22 mm/b, Zone 1	
F17 lageDischarge_B 0F43 0F44 0F46 0F47	3.805 0.785 0.185	0.765	0.258	0.044	0.03	12.69	0.59 0.42	AR&R 2 year, 2 hours ston AR&R 2 year, 2 hours ston		
11517 113geDischarge_B 19543 19544 19545 19547 19551 19558	3.805 0.785 0.185 0.06	0.765 0.185 0.06 0.3 7.002	0.258 0.256 0.256 0.256	0.044 0.029 0.053 0.193	0.03 0.01	12.69 9.73 14.69 42.53	0.59 0.42 0.68 1.58	AR&R 2 year, 2 hours sion AR&R 2 year, 2 hours sion AR&R 2 year, 2 hours sion	m, averaga 22 mm/h, Zona 1 m, averaga 22 mm/h, Zona 1	

1.1

OF60	1.185	1.185		0.094	0.09	22.77	0.99	AR&R 2 year,	25 minutes st	orm, average :	54.7 mm/h, Zo	one 1
OF61	0.076	0.076	0.256	0.032	0.01	10.38	0.45	AR&R 2 year,	1 hour storm,	average 33.7	mm/h, Zona 1	
OF64	1.72	1.72	0.258	0,109	0.12	25.82	1.1	AR&R 2 year,	2 hours storm	, average 22 r	nm/h, Zone 1	
StageDischarge_A	0.656	0.656		0.073	0.06	18.64		AR&R 2 year,				1
	2.895	2,895		0.135	0.17	31.03		AR&R 2 year,				
StageDischarge_D												
OF 102	3.427	3.427	0.256	0.144	0.19	32.83		AR&R 2 year,				
OF 101	3.907	3,907	0.256	0,152	0.21	34.44		AR&R 2 year,				
OF131	0.617	0.617	0.256	0.071	0.06	18.28		AR&R 2 year,				
OF104	0.268	0.268	0.256	0.051	0.03	14.15	0.67	AR&R 2 year,	1.5 hours stor	rm, average 28	3.3 mm/h. Zon	61
OF205	0,721	0.721	0.256	0.076	0.07	19.18		AR&R 2 year,				
OF485	0.618	0.618		0.070	0.06	18.28		AR&R 2 year,				
OF305	0.648	0.648		0.073	0.06	18.64		AR&R 2 year,				e 1
OF340	0.083	0.083	0.256	0,033	0.02	10.58	0.46	AR&R 2 year,	2 hours storm	n, average 22 r	nm/h, Zona 1	
OF28	0	0	0.256	0	0	0	0			[
OF30	5.744	5.744		0.178	0.27	39.65	1.5	AR&R 2 year,	1.5 hours stor	m averana 26	3 mm/h Zon	1 1
OF487	0.618	0.618	0.256	0.071	0.06	18.28	0.84	AR&R 2 year,	20 minutes st	orm, average	54.7 mm/n, 20	ne i
						-					-	
	1			· · · · · · · · · · · · · · · · · · ·	·	Inc	[1	· · · · · · · · · · · · · · · · · · ·		
DETENTION BASIN	DETAILS		· · · · · · · ·	1		-			1			
Name	Max WL -	MaxVol	Max Q	MaxQ	Max Q							
	inda tre	in a start of	Total	Low Lavel	High Level							
		1000					-		-			
Del8Ex	14.41	4878.2		0						Lummeration		
DetAEx	14.03	2581.4	2.424	0	2.424			1	ji			
Det8_Prop	14.87	7789.8	0.155	0	0,155							
DetA_Prop	14.85	10678.8		0			·		1		-	
DelC1	15.4	158.6		1.018	0			··				
DetD_Prop	15.27	6864.5		0	2.895			1-				
DetC2	15.38	152.9		0.964	0		1	1				
DetC3	15.38	152.7	0.962	0.962	0	1	1					
DetC4	15.39	157.1	1.004	1.004	0							
DetC5	15.37	148.3		0.921	0		-				1-1-0001	
	15.4	140.3		1.034	0							
DelC6	10,4	100.2	1.034	1.034	U U		1					
		L	a series and a series of		1	1		-				
CONTINUITY CHEC	CK for AR&R 2				e 1		1		0			
Node	Inflow	Outflow	Storage Chan				i i	1				
	(cu.m)	(cu.m)	(cu.m)	%			1	1		1		-
N4	2738.29	2738,29		0								
									de la compressioner			
N5	154.26	154.26		0					1			
N8	918.79	918.79		Ó								
DelBEx	6196.01	2587.93	3610.15	0			I					
OutBEx	2734.38	2734.38					-					
DetAEx	7860.27	7860.33								-		
N40	7860.33	7860.33						· · · · · · · · · · · ·				
OutAEx	7860.33	7860.33	0	0		and the second s					-	
OutCEx	14438.72	14438.72	0	0	11		1					
N57	0			0			1					
DetB_Prop	7179.35	1219.52		0		-						
				and the second sec	Same and the second							
N62	5795,11	5795.11										
N63	1315.37	1315.37						1	1			1
N64	154.26	154.28	0	0	1 a							
N65	78.4	.78.4	0	0		Te	· · · · · · · ·	i	1		Barrow	1
N69	1450.19	1450.19		0			- 7					
										free contract of	-	
OutB_Prop	1448,18											
N75	10663.14	10663.14	0	0								
N76	1507.58	1507.58	0	D								
N77	1820.55	1820.55	0	0								
N78	111.59						-			1	-	
	7309.26	111 50	1 0			-						-
N79				0								
OutA_Prop		7309.25	0	0								
DetA_Prop	7301.13	7309.25 7301.13	0	0								
		7309.25 7301.13	0 0 7813	0								
DetC1	7301.13	7309.25 7301.13	0 0 7813	0 0 0								
	7301.13 13194.12 1531.66	7309.25 7301.13 5385.22 1530.95	0 0 7813 0.72	0 0 0 0 0								
DetD_Prop	7301.13 13194.12 1531.66 16271.57	7309.25 7301.13 5385.22 1530.95 15231.24	0 0 7813 0.72 1042.43	0 0 0 0 0 0								
DelD_Prop DelC2	7301.13 13194.12 1531.66 16271.57 1452.11	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4	0 0 7813 0.72 1042.43 0.71	0 0 0 0 0 0								
DetD_Prop DetC2 DetC3	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.82	0 0 7813 0.72 1042.43 0.71 0.71	0 0 0 0 0 0 0 0 0 0								
DelD_Prop DelC2 DelC3 DelC4	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.82 1509.88	0 0 7813 0.72 1042.43 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0								
DetD_Prop DetC2 DetC3	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.82 1509.88	0 0 7813 0.72 1042.43 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0								
DetC_Prop DetC2 DetC3 DetC4 DetC5	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.82 1509.88 + 1389.05	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0								
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC5 DetC6	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.88	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.82 1509.88 * 1389.05 1554.16	0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC5 DetC8 N92	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.88 18785.89	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1389.05 1554.16 16785.68	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.72 0.72 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1369.76 1554.88 18785.89 16781.74	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.68 * 1389.05 1554.16 16785.68 16785.74	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC8 N92 OutC_Prop N95	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 18785.89 16761.74 5548.72	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1389.05 1554.16 16785.68 16781.74 5548.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1369.76 1554.88 18785.89 16781.74	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.02 1509.88 * 1389.05 1554.16 16785.88 16781.74 5548.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC8 N92 OutC_Prop N95	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 18785.89 16761.74 5548.72	7309.25 7301.13 5385.22 15530.95 15231.24 1451.4 1448.62 1509.88 * 1369.05 1554.16 16785.88 16781.74 5546.72 918.79	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N96 N97	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.88 18785.89 16761.74 5548.72 918.79 662.22	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1389.05 1554.16 16785.68 16781.74 5546.72 916.79 916.79	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.88 1878.59 16781.74 5548.72 918.79 662.22 1023.4	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1389.05 1554.16 16785.68 16781.74 5548.72 918.79 966.72 4023.4	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetC_Prop DetC2 DetC3 DetC4 DetC5 DetC6 OutC_Prop N95 N96 N97 N169 N177	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.88 18783.89 18783.89 18784.72 918.79 662.22 1023.4 896.55	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1369.85 1554.16 16785.78 16548.72 918.79 662.22 918.79 662.22 1023.4 896.55	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169 N177 N224	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.80 18785.89 18781.74 5548.72 918.79 662.22 1023.4 896.55 919.77	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1389.05 1554.16 16785.68 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169 N177 N224 N232	7301.13 13194.12 1531.66 16271.57 1452.11 1449.63 1510.59 1389.76 1554.86 18785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 66.87	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.68 1389.05 1554.16 16785.68 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 66.87	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169 N177 N224	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.80 18785.89 18781.74 5548.72 918.79 662.22 1023.4 896.55 919.77	7309.25 7309.15 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.68 1389.05 1554.16 16785.68 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 66.87	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169 N177 N224 N232	7301.13 13194.12 1531.66 16271.57 1452.11 1449.63 1510.59 1389.76 1554.86 18785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 66.87	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.78 1654.79 662.22 1023.4 896.55 919.77 68.87 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N97 N169 N177 N224 N224 HW2 N50	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 18785.89 16781.74 5548.72 918.79 662.22 1023.4 866.55 919.77 68.87 14438.71 14438.72	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1509.88 1554.16 16785.88 16785.74 5546.72 918.79 662.22 910.73 662.2 919.77 68.87 919.77 68.87 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71									
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC4 N92 OutC_Prop N95 N96 N169 N177 N224 N232 HW2	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1359.76 1554.88 16785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.71	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1509.88 1554.16 16785.88 16785.74 5546.72 918.79 662.22 910.73 662.2 919.77 68.87 919.77 68.87 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71									
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169 N177 N224 N232 HW2 N50 N294	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.88 18785.89 16781.74 5548.72 918.79 662.22 910.77 68.87 68.87 68.87 68.87 14438.71 14438.72 896.55	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 • 1309.88 • 1309.88 • 1309.88 1654.16 16785.68 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N97 N169 N177 N224 N222 HWv2 N50 N50 N294 Run Log for Mooreb	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16781.74 5548.72 918.79 662.22 918.79 662.22 1023.4 866.55 919.77 68.87 14438.71 14438.72 896.55	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1509.88 1554.16 16785.88 16785.48 16785.88 16785.47 5548.72 918.79 662.22 919.77 66.87 919.77 68.87 14438.72 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC Prop N95 N96 N97 N169 N177 N1224 N169 N177 N224 N232 N150 N294	7301.13 13194.12 1533.66 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16781.74 5548.72 918.79 662.22 918.79 662.22 1023.4 866.55 919.77 68.87 14438.71 14438.72 896.55	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1509.88 1554.16 16785.88 16785.48 16785.88 16785.47 5548.72 918.79 662.22 919.77 66.87 919.77 68.87 14438.72 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			OF305, OF20:	5, OF131, OF	04, OF 102, O		ischarge_D, O	F64, SlageOis	charge_A, OF80.
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC68 N92 OutG_Prop N95 N96 N97 N169 N177 N224 N232 HW2 N50 N294 Run Log for Mooreb The maximum flow	7301.13 13194.12 1533.06 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16785.89 16785.89 16781.74 6548.72 918.79 662.22 1023.4 866.55 919.77 66.87 662.22 1023.4 866.55 919.77 66.87 14438.71 14438.72 896.55 2014.74 866.55 919.77	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 • 1309.88 • 1309.88 • 1309.88 • 1309.88 1654.16 16785.68 16785.78 918.79 662.22 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14458.72 14458.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		OF305, OF203	5, OF131, OF1	04, OF102, O	F101, StageD	ischarge_D, O	Fê4, StageOis	charge_A, OF80.
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC68 N92 OutG_Prop N95 N96 N97 N169 N177 N224 N232 HW2 N50 N294 Run Log for Mooreb The maximum flow	7301.13 13194.12 1533.06 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16785.89 16785.89 16781.74 6548.72 918.79 662.22 1023.4 866.55 919.77 66.87 662.22 1023.4 866.55 919.77 66.87 14438.71 14438.72 896.55 2014.74 866.55 919.77	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 • 1309.88 • 1309.88 • 1309.88 • 1309.88 1654.16 16785.68 16785.78 918.79 662.22 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14458.72 14458.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		OF305, OF202	5, OF131, OF1	04, OF 102, O	F101, StageD	ischarge_D, O	764, StageOis	chargo_A, CF80,
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N97 N169 N177 N224 N222 HWv2 N50 N50 N294 Run Log for Mooreb	7301.13 13194.12 1533.06 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16785.89 16785.89 16781.74 6548.72 918.79 662.22 1023.4 866.55 919.77 66.87 662.22 1023.4 866.55 919.77 66.87 14438.71 14438.72 896.55 2014.74 866.55 919.77	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 • 1309.88 • 1309.88 • 1309.88 • 1309.88 1654.16 16785.68 16785.78 918.79 662.22 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14458.72 14458.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		OF305, OF20:	5, OF131, OF1	04, OF102, O	F101, StageD	ischarge_D, O	F64, StageOis	charge_A, CF80.
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N85 N96 N97 N169 N177 N224 N232 HW2 N50 N294 Run Log for Mooreb The maximum flow DRAINS results pre	7301.13 13194.12 1531.66 16271.57 1452.11 1449.63 1350.59 1399.76 1554.80 18785.89 18781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.72 14438.72 14438.72 896.55 ank.dm nn al exceeded the s pared 02 Sept-	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 • 1309.88 • 1309.88 • 1309.88 • 1309.88 1654.16 16785.68 16785.78 918.79 662.22 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		OF305, OF20	5, OF131, OF1	04, OF102, O	F101, StageD	ischarge_D, O	F64, StageDis	charge_A, OF60.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N169 N177 N222 HW2 N50 N294 The maximum flow ORAINS results pre PIT / NODE DETAIL	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 16785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.71 14438.72 14438.71 14438.72 14438.74 14438.72 14438.74 14438.74 14438.74 14438.74 14458.	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.02 1509.88 1389.05 1554.16 19785.88 16781.74 5546.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.72 14438.72 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0.7	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5487, OF 485,			04, OF 102, O	F101, StageD	ischarge_D, O	F64, StageDis	charge_A. OF60.
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N85 N97 N177 N224 N232 HW2 N50 N294 Run Log for Mooreb The maximum flow DRAINS results pre	7301.13 13194.12 1531.66 16271.57 1452.11 1449.63 1350.59 1399.76 1554.80 18785.89 18781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.72 14438.72 14438.72 896.55 ank.dm nn al exceeded the s pared 02 Sept-	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1309.88 * 1309.88 * 1309.88 * 1309.88 * 1309.88 * 1309.88 16781.74 * 5548.72 918.79 682.22 918.79 682.22 918.79 68.87 919.77 68.87 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 * 1451.28 * 1551.28 * 1451.28 * 1451.28 * 1451.28 * 1451.28 * 1451.28 * 1451.28 * 1551.28 * 1451.28 * 1451.28 * 1551.28 * 1551.28 * 1551.28 * 1552.28 * 1552	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow	5, OF131, OF1	04, OF 102, O	F101, StageD	ischarge_D, O	F64, StageOis	charge_A, OF80,
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N96 N169 N177 N224 N169 N177 N224 N169 N177 N224 N150 N294 HW2 N50 HW2 N294 HW2 N50 HW2 N50 HW2 HW2 N50 HW2 HW2 HW2 HW2 HW2 HW2 HW2 HW2 HW2 HW2	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 16785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.71 14438.72 14438.71 14438.72 14438.74 14438.72 14438.74 14438.74 14438.74 14438.74 14458.	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.02 1509.88 1389.05 1554.16 19785.88 16781.74 5546.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.72 14438.72 14438.72	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.72 0.7	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5487, OF 485,			04, OF102, O	F101, StageD	ischarge_D, O	P84, SłageDis	charge_A, OF60.
DetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N96 N169 N177 N224 N169 N177 N224 N169 N177 N224 N150 N294 HW2 N50 HW2 N294 HW2 N50 HW2 N50 HW2 HW2 N50 HW2 HW2 HW2 HW2 HW2 HW2 HW2 HW2 HW2 HW2	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 16785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.71 14438.72 14438.71 14438.72 14438.74 14438.72 14438.74 14438.74 14438.74 14438.74 14458.	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 * 1309.88 * 1309.88 * 1309.88 * 1309.88 * 1309.88 * 1309.88 16781.74 * 5548.72 918.79 682.22 918.79 682.22 918.79 68.87 919.77 68.87 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 14438.72 * 1451.28 * 1551.28 * 1451.28 * 1451.28 * 1451.28 * 1451.28 * 1451.28 * 1451.28 * 1551.28 * 1451.28 * 1452.28 * 1451.28 * 1451.28* 1451.28 * 1451.28 * 1451	0 0 7813 0.72 1042,43 0.71 0.71 0.71 0.71 0.71 0.72 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow		04, OF 102, O	F101, StageD	ischarge_D, C	Fê4, StageDis	charge_A, OF80.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC4 N92 OutC_Prop N95 N96 N97 N169 N177 N222 HW2 N50 N294 The maximum flow ORAINS results pre PIT / NODE DETAIL Name	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 18785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.71 14438.72 14438.72 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 14458.72 14458.72 1445	7309.25 7309.15 7301.13 5385.22 1530.95 15231.24 1451.4 1448.02 1509.88 1389.05 1554.16 19785.88 16785.88 16785.88 16785.84 70.23.4 898.55 919.77 68.87 14438.72 14458.72 14458.72 14458.72 14458.72 1445	0 0 7813 0.72 1042.43 0.71 0.70 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow (cu.m/s)	Constraint	04, OF102, O		ischarge_D, O	F64, StageDis	charge_A, OF60.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC66 N92 OutC_Prop N95 N96 N97 N169 N177 N224 N232 HW2 N50 N294 DRAINS results pre DT / NODE DETAIL Name HW2	7301.13 13194.12 1533.06 16271.57 1452.11 1449.53 1510.59 1389.76 1555.86 16785.89 16781.74 5548.72 918.79 662.22 1023.4 886.55 919.77 66.87 919.77 68.87 14438.71 14438.72 14438.72 14438.75 14438.72 886.55 919.77 68.87 14438.71 14438.72 886.55 919.77 68.87 14438.71 14438.72 14458.72 14458.7	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.78 16785.78 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow (cu.m/s)		04, OF102, O	F101, StageD	lischarge_D, O	764, StageOis	chargo_A, CF80.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC4 N92 OutC_Prop N95 N96 N97 N169 N177 N222 HW2 N50 N294 The maximum flow ORAINS results pre PIT / NODE DETAIL Name	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 18785.89 16781.74 5548.72 918.79 662.22 1023.4 896.55 919.77 68.87 14438.71 14438.72 14438.71 14438.72 14438.72 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 14438.72 14438.71 14438.72 14458.72 14458.72 1445	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.78 16785.78 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.7	0 0 7813 0.72 1042.43 0.71 0.70 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow (cu.m/s)	Constraint	04, OF 102, O		ischarge_D, O	F64, StageDis	charge_A, OF60,
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC4 N92 OutC_Prop N95 N96 N97 N169 N177 N222 HW2 N50 N294 Crop for Mooreb The maximum flow ORAINS results pre PIT / NODE DETAIL Name HW2 N50	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 16785.89 16781.74 5548.72 918.79 662.22 919.77 68.87 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14458.72 14458.72 14458.72 14458.72 14458.72 14	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.78 16785.78 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow (cu.m/s)	Constraint	04, OF 102, O		l scharge_D, O	F64, StageDis	chargo_A. OF60.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC66 N92 OutC_Prop N95 N96 N97 N169 N177 N224 N232 HW2 N50 N294 DRAINS results pre DT / NODE DETAIL Name HW2	7301.13 13194.12 1533.06 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16785.89 16785.89 16781.74 5548.72 918.79 662.22 1023.4 866.55 919.77 68.87 14438.71 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 14458.72 14458.72 14458.72 14458.72 14458.72 14458.72 14458.72	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.78 16785.78 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485, Min Freeboard (m) 2.14	Overflow (cu.m/s)	Constraint None			ischarge_D, O	F64, SlageOis	charge_A, OF80.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC4 N92 OutC_Prop N95 N96 N97 N169 N177 N222 HW2 N50 N294 Crop for Mooreb The maximum flow ORAINS results pre PIT / NODE DETAIL Name HW2 N50	7301.13 13194.12 1531.66 16271.57 1452.11 1449.53 1510.59 1399.76 1554.88 16785.89 16781.74 5548.72 918.79 662.22 919.77 68.87 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14438.71 14438.72 14458.72 14458.72 14458.72 14458.72 14458.72 14	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.78 16785.78 918.79 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485,	Overflow (cu.m/s)	Constraint			ischarge_D, O	764, StageOis	chargo_A, OF80.
BetD_Prop DetC2 DetC3 DetC4 DetC5 DetC6 N92 OutC_Prop N95 N96 N97 N169 N177 N224 N232 HW2 N50 N294 ORAINS results pre PT / NODE DETAIL Name HW2 N50 SUB-CATCHMENT	7301.13 13194.12 1533.06 16271.57 1452.11 1449.53 1510.59 1389.76 1554.86 16785.89 16785.89 16781.74 5548.72 918.79 662.22 1023.4 866.55 919.77 68.87 14438.71 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 896.55 919.77 68.87 14438.71 14438.72 14458.72 14458.72 14458.72 14458.72 14458.72 14458.72 14458.72	7309.25 7301.13 5385.22 1530.95 15231.24 1451.4 1448.62 1509.88 1554.16 16785.68 16785.76 916.76 662.22 1023.4 896.55 919.77 68.87 14438.72 14438.7	0 0 7813 0.72 1042.43 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F487, OF485, Min Freeboard (m) 2.14	Overflow (cu.m/s) 0	Constraint None			ischarge_D, O	Fê4, StageOis	charge_A, OF80.

	(cu.m/s)	(cu.m/s)	(cu.m/s)	(mìn)	(min)	(min)	-				1	
Catch81Ex	0.07	0	0.07	3	8		AR&R 2 year,	6 hours storm	, average 10.8	mm/h, Zone	1	
CatchC1Ex	0.208	0.179	0.029	7	7	0	AR&R 2 year,	6 hours storm	, average 10.8	mm/h, Zone	1	I
CatchBEx	1.753	0.684	1.069	14.5	24	0	AR&R 2 year,	9 hours storm	, average 8.32	mm/h, Zone	1	
CalchAEx	2.117	1.235	0,882	13.75	15			6 hours slorm				
Cat81_Prop	1.213	1.213	0	6	3			6 hours slorm				
CatB2(Swale)_Prop	0.275	0.275		9.5	8.5			6 hours storm				
CatB1Ext_Prop CatB2Ext_Prop	0.07	0		- <u>5</u>	8			6 hours storm 6 hours storm				
CatA1_Prop	2.232	2.232	0,033	6.0	10.0			6 hours storm				
CatA2(Swale)_Prop	0.316	0.316	0	12	11			6 hours storm				
CatA1Ex_Prop	0.507	0.274	0.233	13.2	8.3			6 hours storm				
CatA2Ex_Prop	0.048	0	0.048	0	18			9 hours storm				
CalCa_Prop	0.321	0.321	0	3	0			6 hours storm				
CatCb_Prop	0.304	0.304	0	3	0			6 hours storm				
CatCc_Prop	0.303	0,303	0	3	0			6 hours storm				· · · · · ·
CalCd_Prop	0.316	0.316	0	3	0			6 hours storm 6 hours storm				
CatCe_Prop CatCf_Prop	0.291	0.231	0	3	0			6 hours storm				
CalC2_Prop	1.161	1.161	0	3	0			6 hours storm				
CatCEx1_Prop	0.208	0.179	0.029	7	7			6 hours storm				· · · · · · · · · · · · · · · · · · ·
CatCEx2_Prop	0.163	0.091	0.071	21.7	25			9 hours storm				
Cat_A3_Prop	0.214	0.214	Ó	3	0			6 hours storm				
Cal Carpark_Ex	0.188	0.188		5	0			6 hours storm				\
CatC1_Prop	0.193	0.193	0	3	0			8 hours storm				1
CatB3Ext_Prop	0.031	0	0.031	0	8			6 hours storm				
CalchCEx	2.87	1.904	0.966	25	30 0			9 hours storm 6 hours storm				
Cat Carpark_Prop	0.168	0.100		5		0,0	, man z year,	a nours stolli	, areinge iv.	CHINEL KAND		-
							-					
Outflow Volumes for	Total Catchm	ent (142 Imper	vious + 58.3 pt	ervious = 198 to	tal ha)		P					
Storm		Total Runoff	Impervious Ru	Pervious Runo	ft							1 i
	cu.m			cu.m (Runolf %								
AR&R 2 year, 6 hou				10055.67 (27.5		-				-		
AR&R 2 year, 9 hou				12215.03 (29.0 13736.30 (29.4								
AR&R 2 year, 12 ho AR&R 2 year, 18 ho				11416.94 (21.0			-					
AR&R 2 year, 24 ho				10520.06 (17.5								
			COLUMN R				1	-				· · · · · ·
PIPE DETAILS		1		1			S				1	
Name	MaxQ	MaxV	Max U/S	Max D/S	Due to Storm				1			1
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)	1				lc			
Pipe13	0.321	1.5						3 mm/h, Zone				
P18	0.304	1.5						3 mm/h, Zone				
P20 P22	0.305	1.5						3 mm/h, Zone 3 mm/h, Zone				
P24	0.291	1.4	15.084					8 mm/h, Zone				1
P28	0.325	1.5						8 mm/h, Zone				in the second
P10	3.217	2.1	11.831					2 mm/h, Zona				1
			· · · · · · · · · · · · · · · · · · ·	1				1				
CHANNEL DETAILS							1				1	
Name	Max Q	Max V	Chainage	Max UCL (m)	Due to Storm			1.0000000				
	(cu.m/s)	(m/s)	(m)	HGL (m)					- tester	-		
OVERFLOW ROUT	EDETAILS						1					1 and a second second
Name	Max Q U/S	Max Q D/S	Sale Q	Max D	Max DxV	Max Width	Max V	Due to Storm				
OF9	0.32	0.32	7.665	0.054	0.04	14,9		AR&R 2 year,				
OF12	0.07	0.07	7.665	0.031	0.01	10.2		AR&R 2 year,				
OF26	0.208			0.046	0.03	13.3		AR&R 2 year,	6 hours storn	1, average 10.1	s mm/n, zone	1
OF40 OF1	0.286		7,665	0.053	0.04	0.0	0	AR&R 2 year,	9 hours storn	a average 8.3	mm/h Zone	1
OF 19	1.28		7.665	0.097	0.1	23.3		AR&R 2 year,				
OF17	1.28			0.097	0.1	23.3		AR8R 2 year,				
StageDischarge_B	0.18		7.665	0.044	0.03	12.7	0.59	AR&R 2 year,	12 hours stor	m, average 6.	92 mm/h, Zone	1
OF43	1.213	1.213	7.665	0.095	0.09	23.0		AR&R 2 year,				
OF44	0.275			0,052	0.03			AR&R 2 year,				
OF46	0.07	0.07		0.031	0.01	10.2		AR&R 2 year,				
OF47 OF51	0.035			0.024	0.01	7.9		AR&R 2 year, AR&R 2 year,				
OF58	2.232			0.049	0.03			AR&R 2 year,				
OF59	0.316			0.054	0.04	14,9		AR&R 2 year,				
OF60	0.507	0.507	7.665	0.066	0.05	17.2	0.79	AR&R 2 year,	6 hours storm	n, average 10.	8 mm/h, Zone	1
OF61	0.048			0.026	0.01			AR&R 2 year.				
OF64	1.18			0.093	0.09			AR&R 2 year,				
StageDischarge_A	0.712			0.076		19.2		AR&R 2 year				
StageDischarge_D	2.42				0.15			AR&R 2 year, AR&R 2 year,				
OF102 OF101	2.718	2.718	7.665	0.132				AR&R 2 year,				
OF131	0.208				0.03			AR&R 2 year				
OF104	0.163			0.042	0.02		0.58	AR&R 2 year,	9 hours storm	n, average 8.3	2 mm/h, Zone	1
OF205	0.214		7.685	0.046	0.03	13.3	0.63	AR&R 2 year.	6 hours stom	n, average 10.	8 mm/h, Zena	1
OF485	0.188				0.03			AR&R 2 year				
OF305	0.193		7.665		0.03			AR&R 2 year				
OF340	0.031		7.665					AR&R 2 year,	6 nours storn	n, average 10. T	o mm/n, Zona T	
OF28	2 217				0.18		0	AR&R 2 year.	9 hours elere	averana P 3	amp Zoco	1
OF30 OF487	3.217 0.188				0.18			AR&R 2 year				
UF407	0,168	0.168	1.005	0.044	0.03	12.09	0.09	private 2 year,		1	1	
				-								
the second s	DETAILS		1	P. 1. mail. 14	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-							
DETENTION BASIN			-	and calculations								
DETENTION BASIN	Max WL	MaxVol	Max Q	Max Q	Max Q	1				-		
Name	Max WL		Total	Low Level	High Level							
Name DetBEx	Max WL 14,44	5477.2	Total 0.286	Low Level 0	High Level 0.286							
Nama	Max WL	5477.2 1865.5	Total 0.286	Low Level 0 0	High Level 0.288 1.28	· ·						

DetA_Prop	14.96	12294.1	0.712	0	0.712	4	11					-
DetC1	15.18	73.4	0.321	0.321	0							
DetD Prop	15	5388.2	2.42	0	2.42		·		· · · · · · · · · · · · · · · · · · ·	1	1	
DetC2	15.18	70.8	0.304	0.304	0	1.0		1			1	1
DetC3	15.18	70.7	0.303	0.303	0					1	1	1
DetC4	15.18	72.7	0.316	0.316	0				-	-	1	
DetC5	15,17	68.6		0.291	0				+		1	-
DetC6	15.19	74.1	0.325	0.325	0							
00100	10.10	\$17.1	0.320	0.525			-					
0.0100000000000000000000000000000000000	ICOV Co ADAD A			10.0				-	-			
	HECK for AR&R 2				181			<u>.</u>				
Node	inflow	Outflow	Storage Chan	Difference	100					-		1
	(cu.m)	(cu.m)	(cu.m)	%					1			1
N4	5908.5	5908.5	0	0	-		1			-		1
N5	192.6	192.6	0	0			1		1	1	1	1
N8	1348.14	1348.14	0	0				L				
Det8Ex	8645.3	5719.64	2927.67	0				1				
OutBEx	5904.76	5904.76	0	0					1	1	1	1
DetAEx	11214.22	11214.25	0	0				1	1		forester a	1
N40	11214.25	11214.25	0	0			-	1	1	1	1	
OutAEx	11214.25	11214.25		0							1	1
								h	1	-	-	1
DutCEx	20919.38	20919.38	0	0							-	
N57	0			0	-			-	1	1		
DetB_Prop	10635.92	3011.81	7625.3	0				L			1	
N62	8598.28	8598.28	0	0								1
N63	1951,85	1951.65	0	0				1	1.	1		
N64	192.6	192.6	0	0	-						1	1
N65	98,42	98.42	0	o				1				
N69	3300,56	3300.55	0	0	-				1			1
OutB Prop	3298.29	3298.29	o	0				1	1		1	1
N75	15821.16	15821.16	0	0					-			-
N76	2236.83	2236.83	ő	ŏ								
N77	2580.85	2580.85	0	0								
N78	140.32	140.32	0	0								
N79	15038.61	15036,64	0	0								
OutA_Prop	15028.91	15028.91	0	0					1			-
DetA_Prop	19576.53	12323.19	7257.09	0		·						
DetC1	2272.56	2271.95	0.61	0							1	
DetD_Prop	24129.7	23534.2	597.04	0		·	· · · · · · · · · · · · · · · · · · ·			1	1	
DetC2	2154.49	2153.92	0.6	0		1			-			1
DetC3	2150.67	2150.09	0.6	Ő				1	1	1		1
DetC4	2241.27	2240.69	0.61	o	-			1	1			1
DetC5	2062.03	2061.42	0.6	Ő					+		1	1
DetC6	2307.02	2308.4	0.61	0	_			-	1	-	1	-
			0.61		-							
N92	25808.08	25808.09		0				I			1	
OutC_Prop	25805.72	25805.72	0	0				ľ	1	-		
N95	8232.74	8232.74	0	0				1		-	-	
N96	1348.14	1348.14	0	0				1			1	
N97	946.02	948.02	0	0		() (j		1	1	-		
N169	1518.43	1518.43	0	0						1	1	1
N177	1330.24	1330.24	0	0	- Antheres -	-						P
V224	1364.68	1364.68	0	0				1		1	1	1
¥232	85.98	85.98	0	0				1			1	
HW2	20919.38	20919.38	0	0				t .		1	1	
N50	20919.38	20919.38	0	0						+	+	+
					-		1	ł	ł	1	1	
N294	1330.24	1330.24	0	0			l	ł			1	
					1					-		!
Run Log for Moo	rebank.dm run al	17:01:52 on 2	/9/2010					Committee and and a second	-		1	

DRAINS Input Data

CHANNEL DETAILS												1							-
lame	From	To	Туре	Length	U/SIL	D/SIL	Slope		B. Slope	R.B. Slope	Manning	Depth	Rooled						1
				(m)	(m)	(m)	(%)	(m)	(1:7)	(1.7)	n	(m)							
VERFLOW ROUTE DETAILS						-						-						-	-
ame	From	To	Travol	Spill	Creat	Wolr	Cross	Sale Depth	SateDepth	Safe	Bed	D/S Area		kd 🔰				1	-
			Time	Level	Length	Coeff. C	Section		Minor Storms	DXV	Slope	Contributing							-
		-	(min)	(m)	(m)			(m)	(m)	(sq m/sec		1%							(
F9	N4	OutBEx	0.		-		Dummy used to model flow across road low points	0.2				1 0		1051048		-			
F12	NS	N/4	0.		1	¥	Dummy used to model flow across road low points	0.2				1 0		1575195				1	í
F26	N6	HWZ	D.			1	Ournmy used to model flow across road low points	0.2				1 0		5647957		- In the second			i
F40	DetBEx	N57	0,			0	1.7 Dummy used to model flow across read low points	D.;				1 6		12060721			110	1 1	i
F1	DetBEx	N4	0,			1	Dummy used to model flow across road low points	0.2				1 0		70	1			1	1
F19	DetAEx	N4D	0.		13	1	Dummy used to model flow across road low points	0.3				1 9		4370450					1
F17	N40	OutAEx	0.		1		Dummy used to model flow across road low points	D.2				1 0		4370449					-
tageDischarge_8	DetB_Pro		0.	1 -	14		Dummy used to model flow across road low points	0.2				1 0		13086155					i
F43	N62	DetB_Prop	0.	1		in the second	Dummy used to model flow across road low points	D.2				1 0		13086141				T	(
44	N63	DetB_Prop	0,	3			Dummy used to model flow across read low points	0.2				1 0		13086142		1		TI	í I
-46	N64	N69	0.	1			Dummy used to model flow across road low points	0.2				1 0		13086156					
-47	N65	N69	4.7	5			Dummy used to model flow across road low points	0.2				1 0		13086157					í
F51	N69	OutB Prop	0.	1			Dummy used to model flow across road low points	0.2	2 0.0	5 0.	6	1 0		13086163				T	1
P58	N75	DetA Prop	0.	1			Dummy used to model flow across road low points	0,5			6	1 0		14101588				TT	1
F59	N76	DetA Prop	0,	1			Dummy used to model flow across road low points	0.5	2 0.0	5 0.	6	1 0)	14111589				T	,
F60	N77	N79	Ő,	1	-		Dummy used to model flow across road low points	0.2	2 0.0	5 0	6	1 (14111590					
F61	N78	N79	0.	1			Dummy used to model flow across road low points	0.2	2 0.0	5 0.	6	1 0		14111591	-		-	1 1	1
F64	N79	DutA Prop	0.	1			Dummy used to model flow across road low points	0.2	2 0.0	5 0	6	1 0	1	14111594		1000		T	
tadeDischarge A	DetA Pro	0 N79	0	1	14		Dummy used to model flow across road low points	0.2	2 0.0	51 0.	6	1 0)	14111593				1	-
togeDischarge D	DetD Pro		0	1	14		Dummy used to model flow across road low points	0,5	2 0.0	5 0.	6	1 0		15137075				1	
F102	N92	OutC Prop	D.	1	1	- Utertrune	Dummy used to model flow across road low points	D.2	2 D.0	5 D.	6	1 0		15137087				-	
F101	N95	DetD Prop					Dummy used to model flow across road low points	0,2	2 0.0	5 0	6	1 0	1	15137085	1.	Sec. 19	- 1	1	
F131	N95	DetO Prop			1		Dummy used to model flow across road low points	0.3		5 0.	6	1 0		20006340					
F104	N97	N92	0.				Dummy used to model flow across road low points	0.3		5 0	6	1 0		15137089		1		Turning	<u></u>
-205	N169	DetA Prop			1000	1	Durnmy used to model flow across road low points	0.:	2 0.0	5 0.	6	11 0		48653710	1			1	
F485	N177	HW2	0.			-	Dummy used to model flow across road low points	0,2			6	1 0		84070745				T	
F305	N224	DetD Prop			-	1	Dummy used to model flow across road low points	0.3		5 D.	6	1 0)	65906727					
F340	N232	DetB Prop			- uper-comment	-	Dummy used to model flow across road low points	0.5				1 0		73934575				1	
F28	HW2	N50	0		2 2	ol	1.6 Dummy used to model flow across road low points	0.3	0.0	5 0.	6	1 0		5647963				T	<u> </u>
F30	N50	DutCEx	0				Dummy used to model flow across road low points	0,;				1 0		5647967				1 miles	
F487	N294	N92	0,		1		Dummy used to model flow across road low points	0.3			6	1 0	1	84070747				1	

DRAINS Mode RAINS Version:		ile Path: 2010.09 - 5 A		D-Calculations)	C-CiviAStormw	atenDRAINSV	Voorebank.drr	1		
Nodeller's Name: Description:		Chris McClella Moorebank O	end			10				
RAINS results pre	pared 02 Sept	ember, 2010 f	rom Version 20	10.09					RESUL	I TS
IT / NODE DETAI				Version 8						
lame	Max HGL	Max Pond HGL	Max Surface Flow Arriving	Max Pond Voluma	Min Freeboard	Overflow (cu.m/s)	Constraint			
W2	12,76	10,168	(cu.m/s)	(cu.m)	(m) 1.44	0	Noné			
150	12.25		0							
UB-CATCHMENT	DETAILS Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm			1
	Flow Q (cu.m/s)	Max Q (cu.m/s)	Max Q (cu.m/s)	Tc (min)	Tc (min)	Tc (min)				1
atch81Ex	0.381	0.87	0.381	3	8	0		r, 25 minutes storm, aver		1
atchC1Ex atch8Ex	1.032 5.832	2.538	3.35	14.5	24	0	AR&R 20 yea	r, 25 minutes storm, aver r, 2 hours storm, average	35.8 mm/h, Zone 1	
atchAEx atB1_Prop	7.717	4.854 6.108	3.112	13.75	15			r, 25 minutes storm, aver r, 25 minutes storm, aver		
atB2(Swale)_Prop	1.26	1.26	0	9,5	8.5	0	AR&R 20 yea	r, 25 minutes storm, aver	age 87.8 mm/h, Zone 1	11
atB1Ext_Prop atB2Ext_Prop	0.381	0		5	8			r, 25 minutes storm, aver r, 2 hours storm, average		
atA1_Prop atA2(Swate) Prop	11.239 1.315	11.239 1.315	0	6	3			r, 25 minutes storm, aver r, 25 minutes storm, aver		
atA1Ex_Prop	2.342	1.094	1.248	13.2	8.3	0	AR&R 20 yes	r, 25 minutes storm, aver	age 87.8 mm/h, Zone 1	
atA2Ex_Prop	0,179	0	0.179	Ú 3	18			r, 2 hours storm, average r, 5 minutes storm, avera		
atCb_Prop atCc Prop	1.642	1.642	0	3	0	0	AR&R 20 yea	r, 5 minutes storm, avera r, 5 minutes storm, avera	ge 175 mm/h, Zone 1	
atCd_Prop	1.708	1.708	0	3	٥	0	AR&R 20 yea	r, 5 minutes storm, avera	ge 175 mm/h, Zone 1	
atCe_Prop	1.571	1.571	0	3	0			ir, 5 minutes storm, avera ir, 5 minutes storm, avera		
atC2_Prop	6.273	6.273	0	3	0	0	AR&R 20 yea	r, 5 minutes storm, avera	ge 175 mm/h, Zone 1	1
atCEx1_Prop	1.032 0.511	0.87	0.163	21.7	7			r, 25 minutes storm, aver r, 1.5 hours storm, avera-		
at_A3_Prop at Carpark_Ex	1.157	1.157	0	3	0			r, 5 minutes storm, avera r, 25 minutes storm, aver		
atC1_Prop	1.04	1.04	0	3	Û	0	AR&R 20 yea	r, 5 minutes storm, avera	ige 175 mm/n, Zone 1	
atB3Ext_Prop atchCEx	0.17	0 6.236	0.17	25	8			r, 25 minutes storm, aver r, 1 hour storm, average		
at Carpark_Prop	0.992	0.992	0	5	0			r, 25 minutes storm, aver		
					1					
outflow Volumes fo				Pervious = 198 I Pervious Rund						
	cu.m	cu.m (Runoff	cu.m (Runoff	cu.m (Runoff 9	(a)					1
R&R 20 year, 5 m R&R 20 year, 10 r				1863, 19 (22.7 5206 26 (41.4		· · · · · · · · · · · · · · · · · · ·				
R&R 20 year, 15 (R&R 20 year, 20 (55512.8	45990.70 (82	38320.65 (96.	7870.05 (48.6) 9681.32 (52.5)	%)				_	1
R&R 20 year, 25 (72530.12	61675.56 (85	50502.84 (97.	11172.72 (54.)	2%)					1
R&R 20 year, 30 (R&R 20 year, 45)				12267.68 (54.)						
R&R 20 year, 1 h	107853.43	93281.42 (86,	75789.75 (98.)	17491.67 (57.	1%)			·		1
R&R 20 year, 1.5 R&R 20 year, 2 h				20642.03 (57.) 22950.57 (56.)			4			
R&R 20 year, 3 h	165348.81	143616.59 (8)	116949.47 (98	26667.13 (56.	3%)					
R&R 20 year, 4.5	191816.53	165548.05 (8)	135896.13 (99	29651.93 (54.4	4%)					
IPE DETAILS	Max Q	Max V	Max U/S	Max D/S	Due to Storm					
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)						1
ipe13 18	1.549	1.4	15.728 15.718					e 112 mm/h, Zone 1 e 112 mm/h, Zone 1		
20	1.497	1.4	15.716	15.649	AR&R 20 yea	r, 15 minutes :	storm, average	e 112 mm/h, Zone 1		
22 24	1.533	1.4	15.724 15.707					a 112 mm/h, Zona 1 a 112 mm/h, Zona 1		
2 5 10	1.567	1.5						9 112 mm/h, Zone 1 42.7 mm/h, Zone 1		-
			12.000	12.200	interio jec					
HANNEL DETAIL	S Max Q	Max V	Chainage	Мах	Due to Storm					
	(cu.m/s)	(m/s)	(m)	HGL (m)						
VERFLOW ROUT						-				
ame F9	Max Q U/S 0.652	Max Q D/S 0.652	Safe Q 0.256	Max D 0.073	Max DxV 0.06	Max Width 18.64	Max V 0.85	Due to Storm	s storm, average 21.5 mm/h, Z	one 1
F12	0.381	0.381	0,256	0.059	0.04	15.76	0.73	AR&R 20 year, 25 minut	tes storm, average 87.8 mm/h,	Zona 1
F26 F40	1,032	1.032		880.0 0	0.08	21.69		AR&R 20 year, 25 minut	tes storm, average 87.8 mm/h,	zona 1
F1	0.632	0.632	0.256	0.072	0.06	18,46	0.84		s storm, average 21.5 mm/h, Z	
F19 F17	6.244 6.244	6.244 6.244		0.185	0.28	40.91 40.91			storm, average 35.8 mm/h, Zor storm, average 35.8 mm/h, Zor	
tageDischarge_8	0.21	0.21	0.256	0.046	0.03	13.25	0.62	AR&R 20 year, 4.5 hour	s storm, average 21.5 mm/h, Z	one 1
F43 F44	6,108 1,28	6.108 1.26	0.256	0.183	Ó.1	40.55 23.13			tes storm, äverage 87.8 mm/h, tes storm, äverage 87.8 mm/h,	
F46 F47	0.381	D.381 0.132	0.258	0.059		15.76			tes storm, average 87.8 mm/h, storm, average 35.8 mm/h, Zor	
F51	0.132	0.132	0.256	0,039		17.74			storm, average 35.8 mm/h, Zor	
F58	11.239	11.239	0.258	0.23	0.42	49.99			les storm, average 87.8 mm/h,	

F:\AA003210\Reports\Stormwater Reports\Appendices\DRAINS\Moorebank_DRAINS

Grad 1 2348 2442 0.556 0.121 0.51 287 1.3 2448.82 by as. 2 borns tess tess, manage 8. Crist 0.516 0.501 0.525 0.641 0.52 0.511 0.524.828 by as. 2 borns tess tess, manage 8. Crist 0.514 0.511 0.524 0.525 0.514 0.516 0.526													
GP41 GP17 DP3 DP44 DP3 DP3 DP44 DP3 DP3 <thdp3< th=""> DP3 DP3 DP3<</thdp3<>	60	2.342	2.342	0.256	0,123	0.15	28.7	1.2	AR&R 20 year	25 minutes	storm, average	87.8 mm/h, 2	Cone 1
GF64 9338 2535 0.95 0.95 0.91 0.100 0.21 0.444 K3 2 yes, 45 modes atom, newsel 27 Cerego Marry, D 7.15 0.256 0.587 0.587 0.444 K3 2 yes, 45 modes atom, newsel 27 Cerego Marry, D 7.15 0.257 0.257 0.258 0.444 1.144 K3 2 yes, 45 modes atom, newsel 27 Cerego Marry, D 1.032 0.256 0.445 0.24													
Singu Contractor, A Oreal 0.061 0.281 ODE Deal													
Signi Galange, D 9713 9713 9713 9713 9713 9713 9713 9713													
OF 102 0.334 0.345 0.507 0.34 0.44 64.64 1551 AREE 30 yeer. 15 how a how, newnige 42.7 OF 101 0.527 0.527 0.527 0.528 0.555 <td></td>													
G*101 6 273 6 234 0.58 0.52 0.64 1.54 0.58 0.56 0.51 0.52 0.58 0.55													
GF131 1022 1032 1028 1028 0.08 111 0.08 <th< td=""><td>102</td><td>8.354</td><td>8.354</td><td>0.256</td><td>0.207</td><td>0.34</td><td>45.4</td><td>1.65</td><td>AR&R 20 year</td><td>, 1.5 hours st</td><td>orm, average</td><td>42.7 mm/h, Zo</td><td>ne 1</td></th<>	102	8.354	8.354	0.256	0.207	0.34	45.4	1.65	AR&R 20 year	, 1.5 hours st	orm, average	42.7 mm/h, Zo	ne 1
GF131 1.002 1.032 1.028 0.048 <th< td=""><td>101</td><td>6.273</td><td>6.273</td><td>0.256</td><td>0.185</td><td>0.28</td><td>40,91</td><td>1.54</td><td>AR&R 20 year</td><td>, 5 minutes s</td><td>torm, average</td><td>175 mm/h, Zo</td><td>ne 1</td></th<>	101	6.273	6.273	0.256	0.185	0.28	40,91	1.54	AR&R 20 year	, 5 minutes s	torm, average	175 mm/h, Zo	ne 1
GF164 C0511 D.286 D.286 D.286 D.287 D.88 D.88 D.99			1.032		0.088	0.08	21.69						
GF263 1.157 1.167 0.268 0.069 20.41 1 (a)													
GF445 6 052 0.587 0.08 1.33 0.08 0.488 20 yet, 25 mitude storm, sevega 27 GF350 0.11 0.12 0.28 0.00 0.20 </td <td></td>													
GF362 104 1.04 6.258 0.058 0.07 0.278 0.07 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.18 0.08 <													
GF36 0.17 0.228 0.038 0.03 0.258 0.038 0.	485	0.992	0.992	0.256	0.087	0.08	21.33	0.96	AR&R 20 yea	r, 25 minutes	storm, average	a 87.8 mm/h, 2	Zone 1
OP28 O O O Image: Control of the Co	305	1,04	1.04	0.258	0.088	0.09	21.69	0.97	AR&R 20 year	, 5 minutes s	torm, average	175 mm/h, Zo	ne 1
OF28 O O O O Image: Constraint of the constraint	340	0.17	0 17	0.256	0.043	0.02	12.53						
OF30 10140 10240 0.281 0.280 0.281								0	1.	100 000000	1	T	
OFAF 0.592 0.290 0.290 0.087 0.08 21.33 0.964 AR&R 20 year, 28 minutes atom, average 87. OFTENTION BASIN DEFAUS View V								4.74	ADED DO USA	16 5 6 100 01	1	197	nn 1
OPETENTION BARN DEPAILS Pace Pa													
Name Max VI. Max Q <	487	0,992	0.992	0.256	0.087	80.0	21.33	0.96	AR&R 20 yea	, 25 minutes	storm, average	a 87.8 mm/h, 4	cone 1
Name Max VI. Max Q <						1		1		Sector Sector			
Name Max VI. Max Q <					· · · · · · · · · · · · · · · · · · ·				1				
Name Max VI. Max Q <	TENTION BASIN	DETAILS									1		· · · · · · · · · · · · · · · · · · ·
consisttowtowtowtowtowtowtowtowtowtowGeAR Prop16321583623406240624000 </td <td></td> <td></td> <td>MaxVol</td> <td>Max O</td> <td>Ltax O</td> <td>Mayo</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>			MaxVol	Max O	Ltax O	Mayo					-		
Density 114 rd 11000 f 0.632 0 0.634 0 0.634 0 0.644 0	110 14	nax we	INIGA VOI	COLORA DE C									
Cond.R. O 6.2.4 O 6.2.4 O C D Dord.Prop 15.52 15384 0.2.1 O 0.001 O O Dord.Prop 15.64 15926 0.601 O													
Data Prop 1542 15884 0.21 0 0.21 0 0.21 DevL Prop 1542 1525 0.20 0 0.901 0 0 0 DevL C1 1575 397.6 1.440 1.440 0 0 0 0 0 DevL C2 1637 388.7 1.440 1.449 0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>1 Mar 1</td><td></td><td></td><td>-</td><td></td><td></td><td></td></t<>							1 Mar 1			-			
Datal, Prop 164.4 191256 0.201 0.001	IAEx	14.14	3976	6.244	0	6.244	1		i				
Datal, Prop 164.4 191256 0.201 0.001	18 Proo	15.52	13588.4	0.21	0	0.21					-		
Decki 15.58 397.8 1.549 0												1	
Diel, Prop. 1568 B8847 7.144 0 7.144 0 0 DelC3 1573 385.7 1.447 1.487 0 </td <td></td> <td>-</td>													-
Date2 16 73 365.7 1.469 0 0 0 DetG3 15 73 335.3 1.449 0 0 0 DetG4 15 74 335.3 1.449 0 0 0 DetG5 15 72 307.9 1.449 1.489 0 0 0 DetG5 15 72 307.9 1.444 1.449 0 0 0 0 DetG5 15 72 307.9 1.444 1.449 0							<u></u>			-		1	1
DetC3 1572 385.3 1.487 0 0 0					A		S			A		1	
DaicA 1574 394.4 1.633 1.533 0						- Constantine Constantinatine Constantine Constantine Constantine Constantine Constantine							
CalcA 15.74 39.44 1.533 0 0 0 0 DeICS 15.72 37.59 1.444 1.449 0	103	15.73	385.3	1.487	1.487	0						1	
DetC6 15.72 37.60 1.449 1.449 0 0 DetC6 15.73 4012 1.567 1.577 0			394.4	1.533	1.533	0			1			1	
DateGe 15.75 4012 1567 0 0 0 0 CONTINUTY CHECK for ARRA 20 year, 2 hours storm, average 35.8 mm/h, Zona 1 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>r i</td><td>1</td><td></td></td<>											r i	1	
Chronity TV-Field Control Contro Control Control											(1	1
Node Inflow Outflow Storage Chan Med Med Med Med N4 4022 52 4022 52 0 0 <		10.70	401.2	1.00/	1.00/	9						1	
Node Inflow Outflow Storage Chan Med Med Med Med N4 4022 52 4022 52 0 0 <	I			L	L	Linger Th		1			-	1	
Image: Network Courning Weight of the second secon	INTINUITY CHECK					Zona 1					1	1	
Image: Network Courning Weight of the second secon									12			1	
NA 4022 52 4022 52 0 0 NS 440.09 0 0 0 0 N8 1685.5 1055.5 0 0 0 0 N8 1685.5 1055.5 0 0 0 0 0 OutBEX 4016.65 15299.78 0					%				1	A	at any		
NB 440.09 440.09 0 0 NB 1982.5 1083.5 0 0 1 1 DellBEx 1320.228 3588.01 9917.16 0 1 1 1 DellBEx 13269.78 0 0 1					1 0	1					1	-	1
N8 1985.5 1985.5 0 0 CullEX 1302.25 3588.01 9917.16 0 1 1 CullEX 16289.76 15299.78 0 0 1 1 1 CullEX 16289.76 15299.78 0 0 1											1		1
DateBerx 13202 29 3388.01 9917.16 0 1 DelVAEx 16289.77 15599.78 0 0 <td></td> <td>1</td> <td>ł</td> <td>ł</td>											1	ł	ł
OutlBEX 4016 695 4016 995 0						· · · · · · · · · · · · · · · · · · ·		است المست			1	1	
DatAsz: 1959977 1559978 0 0 0 N40 1528976 1529978 0	tBEx	13202.29	3588.01	9617.16							1		
DetAEx 1929/7 1959/7 0 0 0 N40 1929/7 1959/7 0 0 0 0 OutAEx 1929/7 1959/7 0 <td>IBEX</td> <td>4016.95</td> <td>4016.95</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td>11</td> <td>C * *</td> <td></td> <td>1</td> <td></td>	IBEX	4016.95	4016.95	0	0				11	C * *		1	
N40 15299.78 15299.78 0 0 0 0 CMCEX 26519.06 16299.78 0										,		i	
OxIAEX 1626978 1626978 0								-					
OxtGEX 26519.06 26519.06 0							-						
NF7 0									A.C. 199				1
DetB Prop 11970.87 1631.8 1020.43 0 Image: Constraint of the set of	rtCEx	26519.06	26519.06	0	0			1	1			-	Provide and the set
DetB. Prop 11870.87 1631.8 10240.45 0 NB2 9514.76 601.00 0 0 N83 2159.85 2159.85 0 0 0 N84 440.09 440.09 0 0 0 0 N84 440.09 440.09 0 0 0 0 0 N85 224.69 0 <td< td=""><td>7</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	7	0	0	0	0	1							
NB2 9514 76 9514 76 0 0 0 NB3 2159 85 2159 85 0			1631.8	10240.45	0						1		
N83 2159.85 2159.85 0 0 0 N84 440.09 0 0 0 0 N85 224.69 224.69 0 0 0 N86 224.69 224.69 0 0 0 0 N86 224.69 224.61 0 0 0 0 0 N75 17507.38 17507.38 0						-		-					
N84 440.09 440.09 0 <													
NR5 224.69 224.69 0 0 N89 2293.66 2293.86 0 0 0 N75 17507.38 17507.38 0 0 0 0 N75 17507.38 17507.38 0 0 0 0 0 N76 2475.24 2475.24 0											l		
NH60 2203.66 2203.88 0 0 OutB_Prop 2291.16 2291.16 0 0 N75 17507.38 0 0 0 0 N76 2475.24 2475.24 0 0 0 0 N77 3610.76 3610.76 0 0 0 0 0 N78 320.31 320.31 0	4	440.09	440.09								1		
Nég 2293.66 2293.86 0 0 OutB_Prop 2281.16 0 0 1 N75 17507.38 17607.38 0 1 1 N76 2475.24 2475.24 0 0 1 1 N77 3610.76 301.76 0 1 1 1 N77 3610.76 0 1 <td>5</td> <td>224.69</td> <td>224.69</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td>	5	224.69	224.69	0	0							-	
OutB_Prop 2291.16 2291.16 0 0 N75 17507.38 17507.38 0	9	2293 86	2293.86	Û	0						· · · · · · · · · · · · · · · · · · ·	-	1
N75 17507.38 17507.38 0									-		1		· · · ·
N76 2475 24 2475 24 0 0 N77 3610.76 3610.76 0 0 N78 320.31 320.31 0 0 0 N78 11412.44 11412.44 0 0 0 N79 11412.44 11412.44 0 0 0 DatA_Prop 11400.89 11400.89 0 0 0 DetC1 2514.77 2514.02 0.75 0 0 0 DetC2 2384.16 2383.42 0.75 0 0 0 0 DetC3 2379.93 2379.16 0.75 0		······································				a start and setting					· · · · · · · · · · · · · · · · · · ·	-	
N77 3610.76 3810.76 0 0 N78 320.31 320.31 0 0 N79 11412.44 11412.44 0 0 0 OutA_Prop 11400.89 0 0 0 0 DetA_Prop 21662.89 7492.21 14175.77 0 0 0 DetC1 2514.02 0.75 0 0 0 0 0 DetC2 2844.16 2334.21 0.75 0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>													
N78 320.31 320.31 0 0 N79 11412.44 11412.44 0 0 OutA_Prop 11400.86 11400.88 0 0 DetA, Prop 11400.86 11400.88 0 0 DetA, Prop 21662.89 7492.92 14175.77 0 0 DetC1 2514.77 2514.02 0.75 0 0 0 DetC2 2384.16 2383.42 0.75 0 0 0 0 DetC2 2384.18 2379.18 0.75 0						1							
N79 11412.44 11412.44 0 0 OutA_Prop 11400.68 11400.68 0 0 DetA_Prop 21662.89 7492.92 14175.77 0 0 DetC1 2514.07 2514.02 0.75 0 0 0 DetC2 2384.18 2383.42 0.75 0 0 0 0 DetC2 2384.18 2383.42 0.75 0 0 0 0 0 DetC2 2384.18 2387.88 0.75 0	7	3610.76	3610.76	0	0	1	1						1
N79 11412.44 11412.44 0 0 OutA_Prop 11400.68 11400.68 0 0 DetA_Prop 21662.89 7492.92 14175.77 0 0 DetC1 2514.07 2514.02 0.75 0 0 0 DetC2 2384.18 2383.42 0.75 0 0 0 0 DetC2 2384.18 2383.42 0.75 0 0 0 0 0 DetC2 2384.18 2387.88 0.75 0	8	320.31	320.31	0	0						A		1
OutA_Prop 11400.89 11400.89 0 0 DetA_Prop 21662.69 7492.92 14175.77 0				0	0				1			1	
DetA_Prop 21662.89 7492.92 14175.77 0						1							
DetC1 2514.77 2514.02 0.75 0 1 <th1< th=""> <th1< th=""></th1<></th1<>							1		L		1	+	+
DetD_Prop 26795.02 25435.83 1357.83 0											1	1	
DetD_Prop 26795.02 26435.83 1357.83 0 1 DetC2 2384.16 2383.42 0.75 0 1 1 DetC3 2379.93 2379.18 0.75 0 1 1 DetC4 2480.18 2479.43 0.75 0 1 1 DetC4 2480.18 2479.43 0.75 0 1 1 DetC5 2281.79 2281.05 0.74 0 1 1 DetC6 2552.15 0.76 0 1 1 1 ObtC6 2552.95 255.15 0.76 0 1 1 Over Prop 28168.63 28192.02 0 0 1 1 Over Prop 28168.63 28192.02 0 0 1 1 N93 1680.28 1680.28 0 0 1 1 1 N177 1472.01 1472.01 0 0 1 1			2514.02		0		1		2		Current and	1	
DefC2 2384.16 2383.42 0.75 0	dD Prop	26795.02	25435,83	1357.83	0	[]					1		
DetC3 2379.93 2379.16 0.75 0 DetC4 2480.18 2479.43 0.75 0		2384 18			0			1				1	1
DetC4 2460.18 2479.43 0.75 0 DetC5 2281.79 2281.05 0.74 0 0 DetC6 2552.95 0.76 0 0 0 N92 28192.02 28192.02 0 0 0 0 OUC_Prop 28166.63 28166.63 0 0 0 0 N95 9110.22 9110.22 0 0 0 0 0 N96 1685.5 1585.5 0							1		-		1	1	1
DetC5 2281.79 2281.05 0.74 0 DetC6 2552.85 2552.15 0.75 0							1		1			·	1
DetC8 2552.89 2552.15 0.75 0 N92 28192.02 28192.02 0 0							1					ł	
N92 28192.02 28192.02 0 0 OutC_Prop 28168.63 28166.63 0 0 N95 9110.22 9110.22 0 0 0 N95 1910.22 9110.22 0 0 0 0 N96 1685.5 1585.5 0 0 0 0 0 N97 1289.56 1289.56 0 0 0 0 0 0 N177 1472.01 1472.01 0 <						and the second se					1	1	l
OutC_Prop 28168.63 28168.63 0 0 N95 9110.22 9110.22 0									1		1		
OutC_Prop 28168.63 28168.63 0 0 N95 9110.22 9110.22 0	12	28192.02	28192.02	0	0								1
N95 9110.22 9110.22 0 0 N95 1685.5 1585.5 0 0 1 N97 1289.66 1289.66 0 0 1 N169 1680.28 1680.28 0 0 1 1 N177 1472.01 1472.01 0 0 1 1 N224 1510.13 1510.13 0 0 1							1			1	L	·	
N96 1685.5 1585.5 0 0 N97 1289.56 1289.56 0 0 0 N189 1680.28 1680.28 0 0 0 0 N177 1472.01 1472.01 0 0 0 0 0 N224 1510.13 1510.13 0											1	1	1
N97 1289.56 1289.56 0 0 N189 1680.28 1680.28 0 0											1	1.	1
N189 1680.28 1680.28 0 0 N177 1472.01 1472.01 0 0 N224 1510.13 1610.13 0 0 N232 196.46 196.48 0 0 HW2 26519.04 26519.06 0 0 N50 26519.06 26519.06 0 0 N284 1472.01 1472.01 0 0 Run Log for Moorebank dm run at 17:00:05 on 2/9/2010 1472.01 0 0 The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 0 ORAINS results prepared 02 September, 2010 from Version 2010.09 0 0 IT / NODE DETAILS Version 8 0 0 Name Max HGL Max Surface Max Pond Min Overflow Constraint									1				1
N177 1472.01 1472.01 0 0 N224 1510.13 1610.13 0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>ć</td><td></td><td>L</td><td></td><td></td><td>1</td><td>1</td></t<>							ć		L			1	1
N224 1510.13 1610.13 0 0 N232 196.48 196.48 0 0 0 HW2 26519.04 26519.05 0 0 0 0 N50 26519.06 26519.06 0 0 0 0 0 N24 1472.01 1472.01 0							4					1	
N224 1510.13 1610.13 0 0 N232 196.48 196.48 0 0 0 HW2 26519.04 26519.05 0 0 0 0 N50 26519.06 26519.06 0 0 0 0 0 N24 1472.01 1472.01 0	77	1472.01	1472.01	0	0								1
N232 196,46 196,46 0 0 HW2 26519,04 26519,06 0 0 N50 26519,06 26519,06 0 0 N264 1472,01 1472,01 0 0 Run Log for Moorebank.dm run at 17:00:05 on 2/9/2010 0 0 0 The maximum flow exceeded the safe value in the following overflow routes: 0F487, 0F485, 0F305, 0F205, 0F131, 0F104, 0F102, 0F101, StageDischarge_D, 0F6 0 ORAINS results prepared 02 September, 2010 from Version 2010.09 0 0 PT / NODE DETAILS Version 8 0 Name Max HGL Max Surface Max Pond							1		I			T	
HW2 26519.04 26519.05 0 0 N50 26519.05 26519.06 0 0 N294 1472.01 1472.01 0 0 Run Log for Moorebank dm run al 17:00.05 on 2/9/2010 0 0 0 The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 0 DRAINS results prepared 02 September, 2010 from Version 2010.09 0 0 PIT / NODE DETAILS Version 8 0 Name Max HGL Max Surface Max Pond													
N50 26519.06 26519.06 0 0 N224 1472.01 1472.01 0 0 Run Log for Mocrebank.dm run at 17.00.05 on 2/9/2010 0 0 0 The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 0 DRAINS results prepared 02 September, 2010 from Version 2010.09 0 0 PIT / NODE DETAILS Version 8 0 Name Max HGL Max Surface Max Pond							ł		1		1	1	
N294 1472.01 1472.01 1472.01 0 0 Run Log for Moorebank.dm run at 17.00:05 on 2/9/2010 0 0 The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 0 ORAINS results prepared 02 September, 2010 from Version 2010.09 0 0 PIT / NODE DETAILS Version 8 0 Name Max HGL Max Surface Max Pond												1	the second
Run Log for Moorebank.dm Aun at 17:00:05 on 2/9/2010 The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 ORAINS results prepared 02 September, 2010 from Version 2010.09 PIT / NODE DETAILS Name Max HGL Max NGL Max Surface												1	
The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 DRAINS results prepared 02 September, 2010 from Version 2010.09 IT / NODE DETAILS Name Max HGL Max Pond Max Surface Max Pond Min Overflow Constraint	.94	1472.01	1472.01	0	0	1	1		1		1		1
The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF205, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 DRAINS results prepared 02 September, 2010 from Version 2010.09 IT / NODE DETAILS Name Max HGL Max Pond Max Surface Max Pond Min Overflow Constraint		11					1		1		1		1
The maximum flow exceeded the safe value in the following overflow routes: OF487, OF485, OF305, OF305, OF131, OF104, OF102, OF101, StageDischarge_D, OF6 DRAINS results prepared 02 September, 2010 from Version 2010.09 IFIT / NODE DETAILS Version 8 Name Max HGL Max Pond Max Surface Max Pond Min Overflow Constraint	In Log for Mooreha	ank.dm nin a	17:00:05 00	2/9/2010	1. State 1.	1	1		1			1	1
DRAINS results prepared 02 September, 2010 from Version 2010.09	e maximum forus	avceeded the	cafa value In t	ha following ou	effort fourtage f	FART OFARE	OF305 DE20	5 OF131 DE	104 OF102 0	FIOL SIANA	Discharge D	OF64 Stanen	ischarge A OFR
PIT / NODE DETAILS Version 8			- and read all I	I Conversion of	I	1	1				T	1	1
PIT / NODE DETAILS Version 8					1				-		1	1	
Name Max HGL Max Pond Max Surface Max Pond Min Overflow Constraint	cains results prep	pared 02 Sept	ember, 2010 f	rom Version 20	90.010			1.18	1				
Name Max HGL Max Pond Max Surface Max Pond Min Overflow Constraint	in the second second					1	1	k	1			1	1
Name Max HGL Max Pond Max Surface Max Pond Min Overflow Constraint	T/NODE DETAIL	S	F		Version 8		I						
			Max Pond	Max Surface		Min	Overflow	Constraint	1			1	1
Inde Triow winning Taxing Trioghouto Tenanos 1	10							1 String String			1	1	1
			INC				(00.1103)		1				+
(cu.m/s) (cu.m) (m)					(cu.m)							1	1
HW2 12.4 6.295 1.8 0 None			6.295			1.8	0	None			1	1	
N50 12 0	j0	12	1	0			1				1	1.	1
					1	1			1	1	1	1.	Pr
SUB-CATCHMENT DETAILS	IB-CATCHMENT I	DETAILS				1	1		1		1	1	1
			Davad	Grassed	Daved	Grassed	Supa	Due to Star	đ	1	1	1	1
								Luce to Stem	4			+	1
Flow Q Max Q Max Q Tc Tc Tc Tc	F	Flow Q	MaxQ	Max Q	110	T¢	To		1		1		1

F:VA003210\Reports\Stormwater Reports\Appendices\DRAINS\Moorebank_DRAINS

1	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)	-		1 1	
CatchB1Ex	0.139	0		3	8		ARAR 20 VAS	r, 6 hours storm, average	18 mm/h Zona 1	
CatchC1Ex	0.355	0.298	0.057	7	7			r, 6 hours storm, average		
CatchBEx	3,523	1.305	2.218	14.5	24			r, 6 hours storm, average		
CatchAEx	3.825	2.059	1.768	13.75	15			, 6 hours storm, average		
Cat81_Prop	2.022	2.022	0	6 9.5	3 8.5			r, 6 hours storm, average r, 6 hours storm, average		
Cat82(Swate)_Prop	0.459									
CatB1Ext_Prop	0.139	0		5	8			r, 6 hours storm, average		
CatB2Ext_Prop	0.071	0 272		8,5	15.5			r, 6 hours storm, average		
CatA1_Prop	3.72	3.72	0	6	3			r, 6 hours storm, average		
CatA2(Swale)_Prop	0.526	0.526	0	12	11			r, 6 hours storm, average		
CatA1Ex_Prop	0.917	0.456	0.481	13.2	8.3			r, 6 hours storm, average		
CatA2Ex_Prop	0.101	Ó		0	18			r, 6 hours storm, average		
CatCa_Prop	0.534	0.534	0	3	0			r, 6 hours storm, average		
GatCb_Prop	0.507	0.507	¢	3	0			r, 6 hours storm, average		
CatCc_Prop	0.506	0.506	G	3	0			r, 6 hours storm, average		
CatCd_Prop	0.527	0.527	0	3	0			r, 6 hours storm, average		
CatCe_Prop	0.485	0.485	0	3	0			r, 6 hours storm, average		
CatCI_Prop	0.542	0.542	0	3	0			r, 6 hours storm, average		
CatC2_Prop	1.936	1.936	0	3	0			r, 6 hours storm, average		1
CalCEx1_Prop	0.355	0.298	0,057	7	7			r, 6 hours storm, average		
GatCEx2_Prop	0.322	0.174	0.148	21.7	25			r, 6 hours storm, average		
Cal_A3_Prop	0.357	0.357	0	3	0			r, 6 hours storm, average		
Cat Carpark_Ex	0.313	0.313	0	5	0	0	AR&R 20 year	r, 6 hours storm, average	18 mm/h, Zone 1	
CatC1_Prop	0.321	0.321	0	3	0	0	AR&R 20 year	r, 6 hours storm, average	18 mm/h, Zone 1	
CatB3Ext_Prop	0.062	0	0.062	0	8	0	AR&R 20 year	r, 6 hours slorm, average	18 mm/h, Zone 1	
CatchCEx	5,627	3.633	1.994	25	30			r, 6 hours slorm, average		
Cat Carpark_Prop	0.313	0.313	0	5	Ó			r, 6 hours storm, average		
		11								
	Sec. 3.44	P	1.502.07			1.5	1			
Outflow Volumes fo	r Total Catchr	nent (142 impe	ervious + 58.3 p	ervious = 198 t	otal ha)		1			
Storm			Impervious Ru			1	4	2 V		
	cu.m		cum (Runoff				1			
AR&R 20 year, 6 h			151881.70 (99							
AR&R 20 year, 9 h			177413.33 (99				1		1 1	
AR&R 20 year, 12 1			197848.50 (99			*******	1		-	
AR&R 20 year, 181			233369.67 (99				Contract of Contract on Contract			
AR8R 20 year, 24 l			262250.53 (99							
VUOL TO AGUIT SA 2	000201.01	001002.22 (0	202200.00 (00	22001.02 (01.0	74)					
PIPE DETAILS										
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm					
Rania		(m/s)	HGL (m)	HGL (m)	Due to atom					
Dia-40	(cu.m/s)	0.5	15.518		A080 00 00	A Chause stee	m, average 18	marth That I		
Pipe13	0.534									
P18	0.508	0.5	15.514				m, average 18			
P20	0.505	0,5					m, average 18		_	
P22	0.526	0.5	15.517				m, average 18			
P24	0.484	0.4	15.512				m, average 18			
P26	0.542	0.5	15.519				m, average 18			
P10	6.295	2.8	12.055	12.005	AR&R 20 yes	ir, 6 hours stor	m, average 18	mm/h, Zone 1		1
			1							
CHANNEL DETAIL	S	E - 4								
Name	Max Q	Max V	Chainage	Max	Dua to Storm					
	(cu.m/s)	(m/s)	(m)	HGL (m)		1				
							1			
OVERFLOW ROUT	TE DETAILS									1
Name	Max Q U/S	Max Q D/S	Sale Q	Max D	Max DxV	Max Width	Max V	Due to Storm		
OF9	1.108	1.108	7,685	0.091	0.09	22.23		AR&R 20 year, 12 hours		
OF12	0.139	0.139		0.039	0.02	11.81	0.58	AR&R 20 year, 6 hours s	torm, average 16 mm/r	n, Zone 1
OF26	0.355	0.355	7.685	0.057	0.04	15.41	0.72	AR&R 20 year, 6 hours s	torm, average 18 mm/r	n, Zone i
OF40	0	0	7.665	0	C	0	0		The second s	
OF1	1.075	1.075	7.665	0.089	0.09	21.87	0.98	AR&R 20 year, 12 hours	storm, average 11.7 m	m/h, Zone 1
OF19	3,48	3.46	7,685	0.145	0,19			AR&R 20 year, 6 hours s		
OF17	3.46	3.46	7.665	0.145	0.19	33.01	1.32	AR&R 20 year, 6 hours s	torm, average 18 mm/h	n, Zone 1
StageDischarge_8	0.805	0.805	7.665	0.079	0.07	19.9		AR&R 20 year, 18 hours		
OF43	2.022	2.022		0.116	0.13			AR&R 20 year, 6 hours s		
OF44	0.459	0.459		0.063	0.05			AR&R 20 year, 6 hours s		
OF46	0.139	0.139		0.039	0.02	11.81		AR&R 20 year, 6 hours s		
OF47	0.071	0.071	7,665	0,031	0.01	10.2	0.44	AR&R 20 year, 6 hours s	torm, average 18 mm/!	n, Zone 1
OF51	0.855	0.855	7.665	0.081	0.08			AR&R 20 year, 18 hours		
OF58	3.72	3.72	7.665	0,15	0.2	33.9		AR&R 20 year, 6 hours s		
OF59	0.526	0.526		0.067	0.05			AR&R 20 year, 6 hours s		
OF60	0.917	0.917	7.665	0.084	0.08			AR&R 20 year, 6 hours s		
OF61	0.101	0.101	7.665	0.035	0.02			AR&R 20 year, 6 hours s		
				0.11	0.12			AR&R 20 year, 12 hours		
OF64	1.776	1.778			0.08			AR&R 20 year, 12 hours		
				0.088						
StageDischarge_A	0.973	0.973	7.665	0.088	0.25	3814		ANAR 20 year a nours s	torm, average 18 mm/	
StageDischarge_A StageDischarge_D	0.973 5.301	0.973 5.301	7,665 7,665	0.172	0.25				torm, average 18 mm/r	h, Zone 1
StageDischarge_A StageDischarge_D OF 102	0.973 5.301 5.916	0.973 5.301 5.916	7.665 7.665 7.685	0.172 0.18	0.27	40.01	1.52	AR&R 20 year, 8 hours s	lorm, average 18 mm/l	n, Zone 1 n, Zone 1
SlageDischarge_A SlageDischarge_D OF102 OF101	0.973 5.301 5.916 1.938	0.973 5.301 5.916 1.938	7.665 7.665 7.665 7.665	0.172 0.18 0.115	0.27 0.13	40.01 26.9	1.52	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	lorm, average 18 mm/h lorm, average 18 mm/h	h, Zone 1 h, Zone 1 h, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131	0.973 5.301 5.916 1.938 0.355	0.973 5.301 5.916 1.938 0.355	7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057	0.27 0.13 0.04	40.01 26.9 15.41	1.52 1.13 0.72	AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s	itorm, average 18 mm/l itorm, average 18 mm/l itorm, average 18 mm/l	h, Zone 1 h, Zone 1 h, Zone 1 h, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF104	0.973 5.301 5.916 1.938 0.355 0.322	0.973 5.301 5.916 1.936 0.355 0.322	7,665 7,665 7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057 0.055	0.27 0.13 0.04 0.04	40.01 26.9 16.41 15.05	1.52 1.13 0.72 0.69	AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s	ilorm, sverage 18 mm/l ilorm, average 18 mm/l ilorm, sverage 18 mm/l ilorm, sverage 18 mm/l	h, Zone 1 n, Zone 1 n, Zone 1 n, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF104 OF205	0.973 5.301 5.916 1.938 0.355 0.322 0.357	0.973 5.301 5.916 1.936 0.355 0.322 0.357	7.665 7.665 7.865 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.055	0.27 0.13 0.04 0.04 0.04	40.01 26.9 15.41 15.05 15.41	1.52 1.13 0.72 0.69 0.72	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	ilorm, average 18 mm/l ilorm, average 18 mm/l ilorm, average 18 mm/l ilorm, average 18 mm/l ilorm, average 18 mm/l	h, Zone 1 n, Zone 1 n, Zone 1 n, Zone 1 n, Zone 1 n, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF 102 OF 101 OF 131 OF 131 OF 104 OF 205 OF 485	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313	0.973 5.301 5.916 1.938 0.355 0.322 0.357 0.313	7.665 7.685 7.685 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054	0.27 0.13 0.04 0.04 0.04 0.04	40.01 26.9 15.41 15.05 15.41 15.41 14.87	1.52 1.13 0.72 0.69 0.72 0.69	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s	itorm, average 18 mm/h itorm, average 18 mm/h	h, Zone 1 h, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF104 OF205 OF205 OF485 OF305	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321	7.665 7.685 7.685 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04	40.01 26.9 15.41 15.05 15.41 14.87 14.87	1.52 1.13 0.72 0.69 0.72 0.69 0.72 0.69 0.71	AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s	torm, average 18 mm/h torm, average 18 mm/h	n, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF104 OF205 OF485 OF305 OF305	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062	7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.04	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	torm, average 18 mm/h torm, average 18 mm/h	n, Zone 1 n, Zone 1
StageDischarge_A StageOischarge_D OF102 OF101 OF131 OF104 OF205 OF485 OF305 OF340 OF285	0.873 5.301 5.916 1.936 0.355 0.322 0.357 0.373 0.371 0.371 0.321 0.062 0	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.313 0.321 0.062 0.062	7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.054 0.029 0	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.01 0.01	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0	AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/h Itom, average 18 mm/h	h, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF104 OF205 OF305 OF305 OF305 OF340 OF28 OF30 OF30	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0 0 6.295	0.973 5.301 5.916 0.355 0.322 0.357 0.313 0.321 0.321 0.022 0.021 0.062 0 0	7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.059 0.059 0.059 0.059	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.01 0 0.28	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageOischarge_D OF102 OF101 OF131 OF104 OF205 OF485 OF305 OF340 OF285	0.873 5.301 5.916 1.936 0.355 0.322 0.357 0.373 0.371 0.371 0.321 0.062 0	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.313 0.321 0.062 0.062	7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.054 0.029 0	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.01 0.01	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 6 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF205 OF485 OF305 OF340 OF236	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0 0 6.295	0.973 5.301 5.916 0.355 0.322 0.357 0.313 0.321 0.321 0.022 0.021 0.062 0 0	7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.059 0.059 0.059 0.059	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.01 0 0.28	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF104 OF205 OF485 OF305 OF340 OF285 OF340 OF28 OF30 OF28 OF30 OF487	0.873 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.629 0.0313	0.973 5.301 5.916 0.355 0.322 0.357 0.313 0.321 0.321 0.022 0.021 0.062 0 0 6 295	7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665 7,665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.059 0.059 0.059 0.059	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.01 0 0.28	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF205 OF485 OF305 OF340 OF236	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.321 0.357 0.321 0.353 0.321 0.052 0.313 0.06295 0.313	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0.62 0.62 0.313	7.665 7.665 7.685 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.028 0.04	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF131 OF104 OF205 OF485 OF305 OF340 OF285 OF340 OF28 OF30 OF28 OF30 OF487	0.873 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.629 0.0313	0.973 5.301 5.916 0.355 0.322 0.357 0.313 0.321 0.321 0.022 0.021 0.062 0 0 6 295	7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.029 0 0.185 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.01 0 0.28	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageOischarge_D OF102 OF101 OF131 OF205 OF485 OF340 OF28 OF300 OF487	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.321 0.357 0.321 0.353 0.321 0.052 0.313 0.06295 0.313	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0.62 0.62 0.313	7.665 7.665 7.685 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.054 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.028 0.04	40.01 26.9 15.41 15.05 15.41 14.87 14.87 9.73 0 40.91	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageOischarge_D OF102 OF101 OF131 OF205 OF485 OF340 OF23 OF340 OF23 OF487	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.321 0.357 0.321 0.353 0.321 0.052 0.313 0.06295 0.313	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0.62 0.62 0.313	7.665 7.665 7.685 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.18 0.115 0.057 0.055 0.057 0.054 0.029 0 0.185 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.02 0.04 0.02 0.04 Max Q High Level	40.01 26.9 15.41 15.05 15.41 14.87 9.73 0 40.91 14.87	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageOischarge_D OF102 OF101 OF101 OF104 OF205 OF404 OF205 OF305 OF305 OF340 OF305 OF340 OF30 OF30 OF30 OF487 DETENTION BASII Name DetBEx	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.6295 0.313 N DETAILS Max WL 14,72	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0 0 6.295 0.313 0.313 MaxVol	7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665 7.665	0.172 0.13 0.115 0.057 0.055 0.057 0.054 0.054 0.054 0.054 0.054 0.054 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	40.01 26.9 15.41 15.05 15.41 14.87 9.73 0 40.91 14.87	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1
StageDischarge_A StageDischarge_D OF102 OF101 OF101 OF101 OF101 OF101 OF101 OF102 OF101 OF101 OF104 OF205 OF485 OF304 OF28 OF30 OF487 DETENTION BASI Name	0.973 5.301 5.916 1.936 0.355 0.322 0.357 0.313 0.321 0.062 0.0 6.295 0.313 N. DETAILS Max WL	0.973 5.301 5.916 1.938 0.355 0.322 0.357 0.313 0.322 0.062 0.062 0.062 0.062 0.062 0.062 0.0313 0.313	7,665 7,665	0.172 0.18 0.115 0.057 0.055 0.054 0.054 0.059 0 0.185 0.054 0.054 0.054 0.054 0.054 0.054	0.27 0.13 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	40.01 26.9 16.41 15.05 15.41 14.87 9.73 0 40.91 14.87	1.52 1.13 0.72 0.69 0.72 0.69 0.71 0.44 0 1.54	AR&R 20 year, 8 hours s AR&R 20 year, 6 hours s	Itom, average 18 mm/t tom, average 18 mm/t 1 1 tom, average 18 mm/t	h, Zone 1 n, Zone 1

F:\AA003210\Reports\Stormwater Reports\Appendices\DRAINS\Moorebank_DRAINS

15.53	220.8										
	220.0	0.534	0.534	6							
15.48	7982.5	5.301	0	5,301	0				· · · · · · · · · · · · · · · · · · ·	·	i i
15.52	217.3	0.506	0.506	0							
15.52	217.2	0.505	0.505	0		Acres 1	-			1.	
15.52	219.9	0.528	0.526	G		tel leiter i i			T deleter and the second		
15.52	214.7	0.484	0.484					1. Carlos (1. Carlos (· · · ·	
									1		
		Contra Contra									
CK for ARAR	o year 6 hou	s storm avera	aa 18 mm/h. Zo	na 1	-					and the second	
								1			
										(-1	
				And and a second second	Commission and						
						-				-	
					1		10	1		+	
					-			1.1		-	
				1						1	
0							1	1			
	4176.21	13793.81							1	1	
14420.32	14420.32	0	0		,i i						
3273.11	3273.11	0	0		1			1			
615.82	615.82	0	0				· · · · · · · · · · · · · · · · · · ·		1	. U.	
							And the second sec		1.1		
		0	0				· · · · · · · ·				in along he
							1		-		
									-		
					-						
									-		
					1						
							desident of	1			
					1					and the second second	
								-			
					1 L				1		
										1	
43967.65	43987.85							1			
13807.34	13807.34									2t1 1	
2381.69	2381.69	0	0	1					-	, T	
1905.04	1905.04	0	0					1		h	
2548.6	2546.6	Ô	0						1	1	
							-				and to see 1 of the
					1			1	1		
					1				1		
					1	-		1	1		
					<u>+</u>				1		
							-	1	1		
2230.93	2230,95	0	- ·								
	17.00.07	1010040									
bank.om run a	11/:00:37 ON	219/2010									
	L			L.,	1			1	L	1	
tion basins ha	ve little effect (less than 2%)	in reducing pea	k olscharge:	DetC6, DetC5	, DetC4, Det	C3, DetC2, 1	JetO1 You n	light consider u	psizing these,	or removing the
	15.52 15.52 15.52 15.53 15.52 15.53 16.52 15.53 16.52 15.53 16.52 15.53 16.52 15.52 15.52 15.52 15.52 15.52 15.52 15.52 15.52 15.52 16.53 100079.95 22564.03 2257.13 32653.87 3751.43 3502.04 23459.25 23457.63 33613.43 3605.96 3755.09 3455.23 33605.96 13807.34 22564.53 2288.74 23459.25 13807.34 22564.53 2288.74 23459.25 13807.34 22564.53 2288.74 2230.95 2288.74 2230.95 2288.74 2230.95 2288.74 2230.95 2288.74 2230.95 2288.74 274.01 39522.06 39522.07 2230.95 2288.74 274.01 39522.06 39522.07 2230.95 2288.74 274.01 39522.06 39522.07	15.52 217.3 15.52 217.2 15.52 217.2 15.52 217.2 15.52 217.3 15.52 217.3 15.52 217.3 15.52 214.7 15.52 214.7 15.53 221.9 16.52 214.7 15.53 221.9 CK for AR&R 20 year, 6 hour 10685.39 10685.4 10679.95 10679.95 10679.95 10679.95 22564 22564 22564 22564 22564 22564 22564 22564 22564 22564 22564 22564 22564 22564 23615 5104.3 3952.07 0 0 0 11420.32 1420.32 3273.11 3273.11 615.82 5104.43 5101.43 3751.43 3502.78 5302.78	16.52 217.3 0.506 15.52 217.2 0.505 15.52 219.9 0.528 15.52 214.7 0.484 15.52 214.7 0.484 15.52 214.7 0.484 15.52 214.7 0.484 15.53 221.9 0.542 CK for AR&R 20 year, 6 hours storm, avera infow Outfow 10685.39 10685.4 0 615.82 615.82 0 2381.69 2381.69 0 22564.03 22564 0 22564.03 22564 0 22564.03 22564 0 22564.03 22564 0 22564.2147.20 0 0 0 0 0 0 14420.32 1470.32 0 3273.11 3273.11 0 615.82 0 3156.5 3104.48 0 5104.5 5104.48 0 0	15.52 217.3 0.508 0.506 15.52 217.9 0.505 0.605 15.52 214.9 0.528 0.526 15.52 214.7 0.484 0.484 15.52 214.7 0.484 0.484 15.52 214.7 0.484 0.484 15.53 221.9 0.542 0.542 CK for AR&R 20 year, 6 hours storm, average 18 mm/h, Zc 10685.39 10685.4 0 0 10685.39 10688.4 0 0 0 131669 0 0 2381.69 2381.69 0 0 0 13264.64 10075.01 9192.28 0 0 0 22564.0 0 0 22684 0 0 22684 22564 0 0 0 0 0 0 1642032 0 0 0 0 0 0 0 22684 22564 0 0 0 0	15.52 217.3 0.508 0.605 15.52 217.2 0.505 0.605 0.605 15.52 214.7 0.484 0.484 0.626 15.52 214.7 0.484 0.484 0.626 15.52 214.7 0.484 0.484 0.626 15.52 214.7 0.484 0.484 0.626 15.52 214.7 0.484 0.484 0.626 15.52 214.7 0.484 0.484 0.642 (cum) Cuffor AR8R 20 year, 6 hours storm, average 18 mm/h, Zone 1 1 Infow Outfow Storage Chan Difference 0 (cum) (cum) (cum) 6 0 19264.64 10075.01 9192.28 0 0 22564.03 22564 0 0 0 22564.22564 0 0 0 0 22564.22564 0 0 0 0 22564.22564 0 0 0	15.52 217.3 0.506 0 15.52 219.9 0.526 0.505 0 15.52 214.7 0.484 0.484 0 15.52 214.7 0.484 0.484 0 15.53 221.9 0.542 0.542 0 CK for AR&R 20 year, 6 hours storm, average 18 mm/h, Zone 1 1 1 Inflow Cutflow Storage Chan Difference 1 (cu m) (cu m) % 1 1 10685.39 10685.4 0 0 1 1 10685.39 10685.4 0 0 1 1 19264.64 10075.01 9192.28 0 1 1 22564.0 22564 0 0 1 2 2 1 1 3 1 1 1 3 2 1 1 3 1 1 1 1 1 1 3 1 1 1 1 3 <td>16.52 217.3 0.506 0 15.52 217.9 0.505 0 15.52 214.7 0.484 0.484 0 15.52 214.7 0.484 0.484 0 16.53 221.9 0.542 0 526 0 CK for AR6R 20 year, 6 hours storm, sverage 18 mm/h, zone 1 1 1 1 Inflow Outflow Storage Chan Difference 1 1 (cum) (cum) Ye 0 1 1 10685.39 10686.4 0 0 1 1 1106w Outflow Storage Chan Difference 1 1 1 1106w 1087.95 0 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2</td> <td>16.52 217.2 0.506 0 15.52 217.2 0.505 0 16.52 216.9 0.526 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.7 0.543 0.542 0 0 15.82 291.6 0.0 1 1 16087.9.9 2381.69 0 0 1 10879.9.5 10879.9.5 0 0 1 22564 22564 0 0 1 22564 22564 0 0 1 22564 1 1 1 1 22564 22564 0 0 1</td> <td>16.52 217.3 0.508 0.505 0 15.52 216.9 0.526 0 </td> <td>16.52 2173 0.506 0.505 0 15.52 2172 0.505 0.505 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 10.075.01 10.075.01 10.075.01 10.075.01 10635.33 10.085.4 0 0 10.075.01 10.075.01 102264.61 10.075.01 9.02.28 0 10.075.01 10.075.01 10279.52 10.075.01 9.02.20 0 1.02.225.01 1.02.225.01 22564 0 0 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01</td> <td>15.52 217.2 0.566 0 15.52 219.9 0.526 0.666 0 15.52 219.9 0.526 0 0 15.52 219.9 0.526 0 0 15.53 221.9 0.542 0 0 15.53 221.9 0.542 0 0 15.52 10.70% 0.542 0.542 0 11.66w 1.00% 0.563 0 0 0 11.66w 1.00% 0.563 0 0 0 0 11.66w 1.00% 0.9 0 0 0 0 11.66w 1.00% 0.9 0 0 0 0 12.846.41 1007.95 1.992.28 0 0 0 0 12.826.42 22.854 0 0 0 0 0 0 22.846.12 22.854 0 0 0 0 0 0</td>	16.52 217.3 0.506 0 15.52 217.9 0.505 0 15.52 214.7 0.484 0.484 0 15.52 214.7 0.484 0.484 0 16.53 221.9 0.542 0 526 0 CK for AR6R 20 year, 6 hours storm, sverage 18 mm/h, zone 1 1 1 1 Inflow Outflow Storage Chan Difference 1 1 (cum) (cum) Ye 0 1 1 10685.39 10686.4 0 0 1 1 1106w Outflow Storage Chan Difference 1 1 1 1106w 1087.95 0 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2 2 0 1 2	16.52 217.2 0.506 0 15.52 217.2 0.505 0 16.52 216.9 0.526 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.53 221.9 0.542 0.542 0 15.7 0.543 0.542 0 0 15.82 291.6 0.0 1 1 16087.9.9 2381.69 0 0 1 10879.9.5 10879.9.5 0 0 1 22564 22564 0 0 1 22564 22564 0 0 1 22564 1 1 1 1 22564 22564 0 0 1	16.52 217.3 0.508 0.505 0 15.52 216.9 0.526 0	16.52 2173 0.506 0.505 0 15.52 2172 0.505 0.505 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 2147 0.484 0.484 0 15.52 10.075.01 10.075.01 10.075.01 10.075.01 10635.33 10.085.4 0 0 10.075.01 10.075.01 102264.61 10.075.01 9.02.28 0 10.075.01 10.075.01 10279.52 10.075.01 9.02.20 0 1.02.225.01 1.02.225.01 22564 0 0 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01 1.02.225.01	15.52 217.2 0.566 0 15.52 219.9 0.526 0.666 0 15.52 219.9 0.526 0 0 15.52 219.9 0.526 0 0 15.53 221.9 0.542 0 0 15.53 221.9 0.542 0 0 15.52 10.70% 0.542 0.542 0 11.66w 1.00% 0.563 0 0 0 11.66w 1.00% 0.563 0 0 0 0 11.66w 1.00% 0.9 0 0 0 0 11.66w 1.00% 0.9 0 0 0 0 12.846.41 1007.95 1.992.28 0 0 0 0 12.826.42 22.854 0 0 0 0 0 0 22.846.12 22.854 0 0 0 0 0 0