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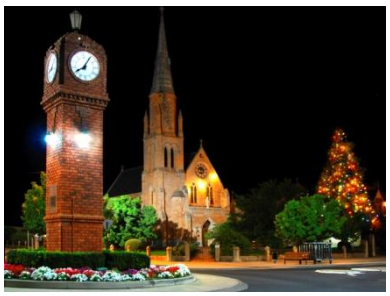
Mid-Western Regional Council

ATTACHMENTS TO BUSINESS PAPER

Wednesday 16 May 2012

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Mid-Western REGIONAL COUNCIL

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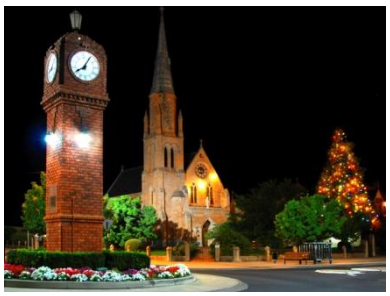

March QBR

Mid-Western Regional Council

March Budget Review – 2011/12 Management Plan

March 2012

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A progressive and prosperous community that we proudly call home

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Executive Introduction

I am pleased to present the March Quarterly Budget Review for the 2011/12 Management Plan. This Quarterly Review has seen the practical completion of a number of large capital works including the Mudgee Showground redevelopment, Glenwillow Sports Complex, Pitts Lane Intersection, Target building and Carwell Creek bridge.

We have recognised savings in a number of areas across Council's budget, providing Council with some additional funds that could be utilised when considering submissions from the Delivery Program/Operational Plan, currently on exhibition.

This quarterly budget review encompasses several proposed variations for projects that will likely carry over to the 2012/13 financial year, and seeks that funding be carried forward. For example, the swimming pool renewals, Mudgee Town Hall upgrade, Mudgee Sewer Augmentation and Gulgong Raw Water Scheme to name a few.

Warwick Bennett
General Manager

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Financial Commentary

This is the third quarterly budget review for the 2011/12 Management Plan. A commentary is provided on the financial position as at 31 March 2012 and projected financial position out to 30 June 2012.

FUNDS

General Fund

Council finished the 2011 financial year with an unrestricted cash balance of $3.738 million, lower than anticipated due to an increased receivables balance. The Original Budget for 2012 estimated a decrease of $80k to the unrestricted cash balance by 30 June. Since then Council has approved $270k of cash-funded revotes; and positive variations on the renovation works at Mortimer St Precinct of $48k. A $27k positive variation was approved for the September Quarterly Review, and a further $82k of positive variations were endorsed as part of the December Quarterly Review.

An additional positive movement of $128k is being recommended as part of this review.

A summary of budget movements in unrestricted cash across the financial year is presented in the following table:

Budgeted Movement in General Fund Unrestricted Cash	Amount	Impact
Original Budget	(81)	Deterioration
Revotes	(270)	Deterioration
Council Resolutions	48	Improvement
Quarterly Budget Reporting – September	27	Improvement
Quarterly Budget Reporting – December	82	Improvement
Quarterly Budget Reporting – March	128	Improvement
Estimated Movement at 30 June 2012	**(66)**	**Deterioration**

The variations recommended to Council as part of the March Quarterly Review have a favourable impact on the projected result at 30 June 2012. However, as a result of revotes from 2010/11 ($270k), the projected movement in unrestricted cash to 30 June 2012 is a $66k deterioration. Ignoring movements in trade debtors and creditors, Council should finish the year with approximately $3.672 million in unrestricted cash. This represents about 7%, or 4 weeks, of Council's budgeted operating expenditure as per the 2012 Original Budget.

It is strongly recommended to Council that a balanced budget be maintained, and no further reductions in unrestricted cash be endorsed. This is to ensure that Council has sufficient unrestricted cash available to meet its debts and obligations, such as payroll and accounts payable, when they fall due, as well as giving Council the opportunity to respond to submissions that will likely be received as part of the Operational Plan/Delivery Program currently on exhibition.

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A number of roads resealing and rehabilitation projects have come in under budget. The positive variations to be realised on these projects has been offset by proposed budget variations on roads projects where final costs exceeded initial estimates.

Significant variations proposed as part of the March Quarterly Review are: *Favourable (F), Unfavourable (U), Contra (C)*

- Increased revenue from Town Planning & Building Regulatory functions $205k F
- Savings on reseal/rehab projects $75k F
- Additional expenditure on roads reseal/rehab and resheeting works $97k U
- Additional interest on investments for General Fund $50k F
- Reduced revenue at swimming pools and increased running costs $81k U
- Reduced revenue from VPA contributions due to timing of payment triggers $1,755k C
- Transfer drainage Catchment A expenditure to 2012/13 $348k C
- Delays in delivery/sale of major plant items, to be transferred to 2012/13 $625k
- Non-cash recognition of scrapped infrastructure $1,189k C
- Mudgee Town Hall (library) refurbishment works to carry over to 2012/13 $2,411k C
- Swimming Pool renewal works to carry over to 2012/13 $1,100k C

Organisational Support Expenditure	***YTD***	***Budget***
Consultants	$ 0	$ 40,000

A comprehensive list of all proposed budget variations is included later in this Quarterly Review document. Please refer to page 13.

Water Fund

Council finished the 2011 financial year with a Water Fund cash balance of $3.461 million, which includes $1.657 million of developer contributions, $11k of unspent grants and $2.941 million of reserves. This leaves an unrestricted Water Fund cash balance of ($1.149M).

The Original Budget for 2012 estimates an increase of $1,422k to unrestricted cash; a reduction in Water Reserves of $897k; and a reduction of S64 holdings of $360k. Council has since approved $205k of revotes funded from Reserves (nil impact on unrestricted cash); and have approved a negative variation for concept designs on upgrade works at Gulgong and Mudgee water treatment plants of $60k. September Quarterly Review increased S64 reserves by $80k. December Quarterly Review variations had no impact on unrestricted cash but did increase S64 reserves by $150k.

The March quarter included the February 2012 water billing run. This is generally the peak revenue generating period in Water Fund. Water consumption levels, and thus revenue, were substantially lower than our modelled average consumption, due to another very wet and mild summer season. As a result, water usage charges have been revised downwards by some $570k. This, combined with the impact of the lightning strike on the Gulgong Water Network, has resulted in an overall deterioration of $615k for the quarter.

Budgeted Movement in Water Fund Unrestricted Cash	Amount	Impact
Original Budget	1,422	Improvement
Revotes	-	Nil
Council Resolutions	60	Deterioration
Quarterly Budget Reporting – September	-	Nil
Quarterly Budget Reporting – December	-	Nil
Quarterly Budget Reporting – March	615	Deterioration
Estimated Movement at 30 June 2012	**748**	**Improvement**

Increased development activity has seen a continuation of higher than expected S64 contributions for this financial year. A variation of $120k has been proposed in the March Quarterly Budget Review.

Other significant variations proposed as part of the March QBR are: *Favourable (F), Unfavourable (U), Contra (C)*

- Increased S64 developer contributions and interest $120k C
- Gulgong raw water scheme works to carry into 2012/13 $320k C
- Decreased residential water consumption $240k U
- Decreased non residential water consumption $330k U

A comprehensive list of all proposed budget variations is included later in this Quarterly Review document. Please refer to page 13.

Sewer Fund

Council finished the 2011 financial year with a Sewer Fund cash balance of $5.508 million, which includes $273k of developer contributions and $3.300 million of reserves. This leaves unrestricted Sewer Fund cash of $1.935 million.

The Original Budget for 2012 estimates an increase of $268k in unrestricted cash. Also provided for in the Original Budget are an increase in developer contributions of $208k, and a decrease in Sewer Reserves of $1.043 million. Council has since approved $191k of revotes, funded from Sewer Reserves. September Quarterly Review variations had a positive impact of $59k on unrestricted cash. December Quarterly Review variations had no impact on unrestricted Sewer funds. For the March Quarterly Review, an improvement of $574k to the projected unrestricted cash position at 30 June is being recognised.

Budgeted Movement in Sewer Fund Unrestricted Cash	Amount	Impact
Original Budget	268	Improvement
Revotes	-	Nil
Quarterly Budget Reporting – September	59	Improvement
Quarterly Budget Reporting – December	-	Nil
Quarterly Budget Reporting – March	574	Improvement
Estimated Movement at 30 June 2012	**901**	**Improvement**

The positive result is primarily attributable to changes in the estimated draw down of the loan (and thus interest charged) for the Mudgee Sewer Augmentation Scheme.

Significant variations proposed as part of the March Quarterly Review are: *Favourable (F), Unfavourable (U), Contra (C)*

- Reduced interest and principal repayments to 30 June $522k C
- An increase in interest earned on investments $50k F
- Reduced expenditure on the Mudgee Sewer Augmentation scheme to 30 June $2,131k C

A comprehensive list of all proposed budget variations is included later in this Quarterly Review document. Please refer to page 13.

Waste Fund

Council finished the 2011 financial year with a Waste Fund cash balance of $1.542 million, which includes $1.434 million of restricted reserves and $68k of unexpended contributions. This leaves unrestricted Waste Fund cash of ($42k).

The Original Budget for 2012 estimated an increase of $184k* to unrestricted cash. Also provided for in the Original Budget was an increase in Waste Reserves of $260k. Council has since approved $68k of revotes funded from unexpended contributions, and $173k of revotes funded from Waste Reserves. Neither of these variations had an impact on projected unrestricted cash balances. September Quarterly variations had a positive impact on unrestricted cash of $4k; and December Quarterly Review variations had a positive impact of $50k on unrestricted cash.

Variations proposed as part of this Quarterly Review will have a positive impact of $133k on projected levels of unrestricted cash at 30 June.

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Budgeted Movement in Waste Fund Unrestricted Cash	Amount	Impact
Original Budget	184*	Improvement
Revotes	-	Nil
Quarterly Budget Reporting – September	4	Improvement
Quarterly Budget Reporting – December	50	Improvement
Quarterly Budget Reporting – March	133	Improvement
Estimated Movement at 30 June 2012	**371**	**Improvement**

*Corrected from $226k improvement, to recognise loan principal repayments (-$86k) and non-cash expenditure (+$44k).

Significant variations proposed as part of the March Quarterly Review are: *Favourable (F), Unfavourable (U), Contra (C)*

- Increase in general waste tipping fees and recycling income $115k F
- Increased interest earned on Waste Fund cash $100k F
- Increased employee costs across waste depots, recycling, and street /park litter bin collections $82k U

A comprehensive list of all proposed budget variations is included later in this Quarterly Review document. Please refer to page 13.

Other Funds

Other funds maintained by Council are:

- Mudgee Showgrounds
- Mudgee Sports Council
- Private Works
- Gulgong Sports Council
- Saleyards
- Rylstone Sports Council

A deterioration is recognised in this Quarterly Review for the Saleyards of $48k. This is primarily a decrease in revenue of $58k offset by small savings of $10k. The decline in income is due to a substantial drop of some 20% in cattle numbers passing through the saleyards facility.

RESERVES

During the quarter ended March 31, the anticipated closing balance of Reserves has increased by $3.145 million compared to Original Budget, bringing the total estimated movement for the year to $2.106 million decrease. The carry over of a number of major projects to the 2012/13 financial year, combined with better than estimated property sales has contributed to that projected result. Current reserves balances are higher than estimated closing balances as capital works funded from Reserves are only partially complete and will continue throughout the year. Council must be continue to be mindful of the impact on Reserves, and the ability to undertake future years' projects, when considering any further expenditure proposals. Current and projected end of year Reserve balances are set out below.

$'000	Opening Balance 1 July 2011	Budgeted Transfers To	Budgeted Transfers From	Estimated Closing Balance 30 June 2012	Current Balance
Internal Reserves					
Employee Leave Entitlements	2,015	170	0	2,185	2,143
Emergency	200	0	0	200	200
Land Development	(610)	1,608	(485)	513	440
Airport Development	(327)	265	(292)	(354)	(323)
Elections	93	60	0	153	138
Plant Replacement	1,004	1,846	(1,858)	992	1,138
Asset Replacement	1,505	1,100	(2,212)	393	705
Capital Program	1,084	913	(1,910)	87	312
Livestock Exchange	91	15	(40)	66	100
State Roads Warranty	400	0	(146)	254	400
Rylstone Community Services	6	0	0	6	6
Kandos Museum	12	0	0	12	12
Total Internal Reserves	5,473	5,977	(6,943)	4,507	5,271
External Reserves					
Waste Fund	1,434	500	(413)	1,521	1,583
Sewer Fund	3,300	500	(794)	3,006	3,287
Water Fund	2,941	0	(909)	2,032	2,694
Community Services	77	0	0	77	77
Community Tenancy Scheme	139	0	(24)	115	137
Family Day Care	38	0	0	38	38
Section 355 Committees Crown Land	61	0	0	61	61
Bequest - Simpkins Park	88	0	0	88	88
Bequest - Kandos Museum	29	0	0	29	29
Total External Reserves	8,107	1,000	(2,140)	6,967	7,994
Total Reserves	**13,580**	**6,977**	**(9,083)**	**11,474**	**13,265**

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DEVELOPER CONTRIBUTIONS

During the period to the end of March Quarter, the anticipated closing balance of Developer Contributions has increased by $2.119 million compared to Original Budget, with the total movement for the year being a decrease of $198k, to $6.111 million. Again, the major contributing factor is the carry over of works, such as the Mudgee Town Hall renovations, to the 2012/13 financial year.

Current developer contributions balance of $7.071 million reflects the position of capital works in the start of the financial year with a number of developer funded works yet to be completed, such as the Mortimer St Carpark and Kandos Grandstand.

$'000	Opening Balance 1 July 2011	Budgeted Transfers To	Budgeted Transfers From	Estimated Closing Balance 30 June 2012	Current Balance
Developer Contributions					
Transport Management	809	139	(241)	707	710
Open Space	48	265	(220)	93	54
Community Facilities	1,408	204	(1,056)	556	954
Civic Improvements	(67)	61	0	(6)	(9)
Carparking	436	343	(700)	79	584
Administration	105	32	(20)	117	135
Total S94 Under Plans	2,739	1,044	(2,237)	1,546	2,428
S94A Levies Under Plans	262	20	0	282	285
S93F Planning Agreements	1,377	2,305	(1,800)	1,882	2,046
S64 Sewer	273	320	0	593	550
S64 Water	1,658	510	(360)	1,808	1,762
Total Developer Contributions	**6,309**	**4,199**	**(4,397)**	**6,111**	**7,071**

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BORROWING PROGRAM

The 2012 Original budget included $15.7 million in borrowings including $10 million for Sewer fund and $5.7 million for General fund. The September Quarterly Review included a reduction to the General fund borrowings of $2.3 million. This is made up of $700k for the Kandos Grandstand $1,600k for the swimming pool. Council has also approved additional loan funding of $25k for the Rylstone Showground; and a reduction in loan funded works for the Mortimer St property improvement works, making a total reduction in loan funding of $2.430 million to date.

As part of the March Quarterly Review, it is proposed to carry over the loan funding associated with capital works at the swimming pools and on the Mudgee Sewer Augmentation to 2012/13.

Summary of Proposed Borrowings

'$'000	Fund	Original Budget	Approved Variations	Revised Budget	Proposed Variations	Proposed Budget	Actual YTD
Swimming Pools	General	3,000	(1,600)	1,400	(1,100)	300	0
Kandos Sports Ground	General	700	(700)	0	0	0	0
Mortimer Street Precinct	General	2,000	(155)	1,845	0	1,845	1,845
Rylstone Showground Cattle Yards	General	0	25	25	0	25	0
Sewer Augmentation - Mudgee	Sewer	10,000	0	10,000	(3,202)	6,798	0
Total Borrowings		**15,700**	**(2,430)**	**13,270**	**(4,302)**	**8,968**	**1,845**

CERTIFICATION

The following statement is made in accordance with Clause 203(2) of the Local Government (General) Regulations 2005.

As the responsible accounting officer, it is my opinion that the March Quarterly Review for Mid-Western Regional Council indicates that Council's projected financial position as at 30 June 2012 will be satisfactory, having regard to the projected estimates of income and expenditure for the 2011/12 financial year.

CLARE PHELAN
GROUP MANAGER FINANCE & ADMINISTRATION

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Proposed Variations			
Management Plan Activity	**Variation**	**Amount**	
GENERAL FUND			
Positive Variations			
Governance	Reduce estimated expenditure for Audit Committee	7,000	F
Administration & Management Services	Savings in estimated RFS expenditure	7,000	F
Administration & Management Services	Savings in State Emergency Services levy 2011/12	7,000	F
Administration & Management Services	Savings in Local Emergency Management Committee expenditure to 30 June	7,000	F
Community Services	Increased rental income from community housing	6,000	F
Development & Environmental Control	Anticipated savings in contract & consultancy expenditure for Strategic Planning	14,000	F
Development & Environmental Control	Increased income from DA, S149 certificates and drainage applications	115,000	F
Development & Environmental Control	Increased income from Construction Certificates and other building regulatory fees	90,000	F
Swimming Pools	Kandos Pool - savings in operating expenditure	5,000	F
Council Roads	Reduce estimated expenditure on REFs for roadworks in 2011/12	63,000	F
Roads & Bridges Capital	Savings realised on Reseal - Inglis Street	14,000	F
Roads & Bridges Capital	Savings realised on Reseal - Spring Road	11,175	F
Roads & Bridges Capital	Savings realised on Reseal - Medley Street	11,000	F
Roads & Bridges Capital	Savings realised on Reseal - Yarrabin Road	16,000	F
Roads & Bridges Capital	Savings realised on Reseal - Spring Ridge Road	12,000	F
Roads & Bridges Capital	Savings realised on Rehab - Henry Lawson Drive	14,000	F
Administration & Management Services	Increase estimated revenue from interest earned on investments	50,000	F
Total Positive Variations		449,175	
Negative Variations			
Administration & Management Services	Increase Councillors Strategic Initiatives estimate - cost of installing/removing town Christmas lights	(10,000)	U
Administration & Management Services	Migration of Council email system to Microsoft Office	(15,000)	U
Corporate & Community Buildings	Mudgee Admin Centre - repair aircon and furniture Council Chambers	(20,000)	U
Administration & Management Services	Increase in annual contribution to NSW Town Fire Brigades	(2,000)	U
Regulatory Services Capital	Increase budget for Weeds Education Shed	(4,000)	U
Community Services	Additional maintenance required on community housing	(1,000)	U
Carparking, Cycleways & Streetscaping	Additional expenditure for street litter collection	(31,000)	U
Parks & Reserves	Additional costs of maintaining Rylstone public toilet	(15,000)	U

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Management Plan Activity	Variation	Amount	
Swimming Pools	Reduction in pools revenue as a result of decreased attendance across swimming season	(15,000)	U
Swimming Pools	Mudgee Pool - increased staff costs due to utilisation of casuals during periods of permanent vacancies	(21,000)	U
Swimming Pools	Gulgong Pool - increased staff costs due to utilisation of casuals during periods of permanent vacancies	(10,000)	U
Swimming Pools	Gulgong Pool - water charges	(35,000)	U
Roads & Bridges Capital	Seal extension - Stuart Street Kandos	(18,000)	U
Roads & Bridges Capital	Increase expenditure estimates for local road resheeting	(45,000)	U
Council Roads	Increased cost of street lighting	(27,000)	U
Roads & Bridges Capital	Reduce VPA funding allocated to roadworks. Not permitted for use outside of Ulan Road	(13,000)	U
Roads & Bridges Capital	Over expenditure on Lewis Street rehabilitation	(12,000)	U
Roads & Bridges Capital	Over expenditure on Lue Road reseal (Pyangle)	(8,500)	U
Roads & Bridges Capital	Over expenditure on Beryl Road reseal - partial rehab works were undertaken	(14,000)	U
Mudgee Airport	Additional maintenance required at airport	(5,000)	U
Total Negative Variations		(321,500)	
Contra Variations			
Parks & Reserves	Transfer from unspent grants - Mudgee Racecourse water bore	45,000	C
Parks & Reserves	Allocate budget for water bore reimbursement	(45,000)	C
Community Services	Amend 2011/12 Healthy Communities budget to align with programmed works	(4,108)	C
Community Services	Reduce end of year Transfer to Unspent Grants	4,108	C
Developer Contributions	VPA contributions - revised timing of anticipated receipt of funds - Moolarben Stage 2	(1,365,000)	C
Developer Contributions	Transfer to VPA - Moolarben Stage 2	1,365,000	C
Developer Contributions	VPA contributions - revised timing of anticipated receipt of funds - Charbon	210,000	C
Developer Contributions	Transfer to VPA - Charbon	(210,000)	C
Developer Contributions	VPA contributions - revised timing of anticipated receipt of funds	(600,000)	C
Developer Contributions	Transfer to VPA	600,000	C
Roads & Bridges Capital	Ulan-Wollar Road works to be undertaken 2012/13	600,000	C
Roads & Bridges Capital	Transfer from VPA	(600,000)	C
Administration & Management Services	Increased grant/subsidy income for existing worker training programs	20,000	C
Administration & Management Services	Corresponding increase to training expenditure, as funded by external grants/subsidies	(20,000)	C
Stormwater & Drainage	Catchment A drainage to continue in 2012/13 pending negotiations with landowners and developers	348,000	C
Stormwater & Drainage	Transfer from Reserves - Asset Replacement	(348,000)	C

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Management Plan Activity	Variation	Amount	
Administration & Management Services	OHS/storage improvements at MWRC Works Depot - chemical storage, signage, shelving	(36,800)	C
Administration & Management Services Capital	Allocate corporate projects vote to specific works - OHS improvements at Mudgee MWRC Depot	36,800	C
Administration & Management Services Capital	Purchase of replacement heavy plant items will not occur prior to 30 June - Dozer & Compactor	885,000	C
Administration & Management Services Capital	Sale of heavy plant items will not occur prior to 30 June - Dozer & Compactor	(250,000)	C
Administration & Management Services Capital	Transfer from Reserves - Plant Replacement	(625,000)	C
Administration & Management Services Capital	Light Fleet Replacement - amend plant replacement budget projected sale/purchase prior to 30 June	(10,000)	C
Administration & Management Services Capital	RFS Grant Income - additional funding received for completion of RFS Station Upgrades	7,900	C
Administration & Management Services Capital	RFS Station Upgrades capital expenditure - grant funding received	(7,900)	C
Regulatory Control	Increased revenue from fines and penalties in relation to animal control regulatory function	14,000	C
Regulatory Control	Increased expenditure in Animal Control operations - overtime and travel	(14,000)	C
Regulatory Control Capital	Transfer majority of Regional Pound Facilities budget to 2012/13 pending DA for new location	137,000	C
Regulatory Control Capital	Transfer from Reserves - Asset Replacement	(137,000)	C
Development & Environmental Control	Commence Recreation Strategy formulation this financial year. Reduce allocation in 2012/13	(20,000)	C
Development & Environmental Control	Transfer from S94	20,000	C
Administration & Management Services	Non cash - book value of scrapped infrastructure (buildings) - RFS	(100,000)	C
Administration & Management Services	Carrying value of Infrastructure - Buildings	100,000	C
Parks & Reserves	Non cash - book value of scrapped infrastructure (buildings) - Glenwillow,	(1,089,000)	C
Parks & Reserves	Carrying value of Infrastructure - Buildings	1,089,000	C
Community Services	Family Day Care Income - increased income as a result of higher numbers utilising the service	30,000	C
Community Services	Family Day Care Expenditure - increased costs of running FDC service due to an increase in numbers	(30,000)	C
Community Services	Additional income received for Youth Week	6,000	C
Community Services	Additional expenditure for Youth Week funded by contributions	(6,000)	C
Community Services	Additional grant/subsidy funding received for Ironed Out - offset by reduction in sales	20,000	C
Community Services	Reduce sales incomes estimates for Ironed Out	(20,000)	C
Development & Environmental Control	Increased materials & contracts in Building Regulatory function	(4,000)	C

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Management Plan Activity	Variation	Amount	
Development & Environmental Control	Savings in Building Regulatory staff costs due to vacancies	4,000	C
Development & Environmental Control	Additional grant income received for Roadside Vegetation Improvement Project	22,484	C
Development & Environmental Control	Expenditure of Roadside Vegetation Improvement Project estimated to be spent in 2011/12	(9,500)	C
Development & Environmental Control	Transfer to Unspent Grants - portion of grant funding expected to be spent in 2012/13	(12,984)	C
Development & Environmental Control	Reduce anticipated expenditure on roadside vegetation, funded from unspent grants	18,984	C
Development & Environmental Control	Reduced transfer from Unspent Grants. Roll to 2012/13.	(18,984)	C
Development & Environmental Control	Reduce expenditure on Rylstone/Kandos Flood Study this financial year. Incorporate in to 2012/13 estimates.	15,000	C
Development & Environmental Control	Reduce transfer from Reserves. Balance of project to occur in 2012/13.	(15,000)	C
Library Capital	Library upgrade to carry into 2012/13 financial year - reduce 2011/12 estimates	2,411,000	C
Library Capital	Reduced transfer from VPA, to be carried into 2012/13.	(2,136,000)	C
Library Capital	Reduced transfer from S94, to be carried into 2012/13.	(257,500)	C
Library Capital	Reduced transfer from Grants, to be carried into 2012/13.	(17,500)	C
Library	Reduce library cleaning and maintenance costs whilst building is undergoing refurbishment	12,000	C
Corporate & Community Buildings	Increased cleaning and maintenance costs at The Stables with temporary library	(12,000)	C
Corporate & Community Buildings	Additional grant income received for touring exhibition at Kandos Museum	11,900	C
Corporate & Community Buildings	Additional expenditure at Kandos Museum supported by grant funding	(11,900)	C
Swimming Pools Capital	Contracted works to span two financial years. Estimated amount to be rolled into 2012/13.	1,100,000	C
Swimming Pools Capital	Proceeds from loan borrowings deferred to 2012/13 in line with capital expenditure	(1,100,000)	C
Parks & Reserves	Glenwillow natural disaster repair works to occur in 2012/13 at end of winter season	240,108	C
Parks & Reserves	Grant funding for natural disaster repair works at Glenwillow to be received in 2012/13	(240,108)	C
State Roads	Expenditure on warranty works on State Roads	(50,000)	C
State Roads	Transfer from Reserves - State Roads Warranty	50,000	C
Parks & Reserves Capital	Acoustics at Mudgee Showgrounds	(39,000)	C
Parks & Reserves Capital	Transfer from Reserves - Capital Program, to fund acoustics at Mudgee Showground	39,000	C
Parks & Reserves	Savings in Parks Maintenance expenditure to fund overspend on Anzac Park RLCIP project	4,000	C
Parks & Reserves Capital	Additional expenditure at Anzac Park on RLCIP project	(4,000)	C
Carparking, Cycleways & Streetscaping	Additional expenditure on town approaches maintenance funded from savings in general maintenance allocations	(35,000)	C
Carparking, Cycleways & Streetscaping	Savings in general streetscaping maintenance to fund additional resource allocations to town approaches maintenance	35,000	C
Regional Roads	Transfer part erosion & sediment control project expenditure to 2012/13	25,200	C

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Management Plan Activity	Variation	Amount	
Regional Roads	Transfer to Unspent Grants. Funds to be utilised in 2012/13.	(25,200)	C
State Roads	Additional contract Ordered Works to be undertaken on heavy patching	(161,600)	C
State Roads	Reduce estimates for contracted Ordered Works in the area of shoulder widening	161,600	C
Roads & Bridges Capital	Transfer Roads Land Matter capital allocations to relevant Roads function - Urban Roads	13,135	C
Roads & Bridges Capital	Transfer Roads Land Matter capital allocations to relevant Roads function - Rural Unsealed Roads	(9,700)	C
Roads & Bridges Capital	Transfer Roads Land Matter capital allocations to relevant Roads function - Unsealed Rural Roads	(3,435)	C
Roads & Bridges Capital	Reduce 2011/12 roads land matter capital allocations (Urban, Rural Unsealed & Rural Sealed) to recognise matters that will carry over to 2012/13.	12,834	C
Roads & Bridges Capital	Transfer from Reserves - Capital Program, roads land matters deferred to 2012/13	(12,834)	C
Carparking, Cycleways & Streetscaping Capital	Transfer part Bellevue cycleway budget expenditure to 2012/13	40,000	C
Carparking, Cycleways & Streetscaping Capital	Transfer from Reserves - Capital Program, supporting funding for Bellevue cycleway to 2012/13	(40,000)	C
Mudgee Airport	Air Service Provider contractor reimbursement income	15,000	C
Mudgee Airport	Air Service Provider contractor expenses	(15,000)	C
Economic Development Capital	Recognise commission expenses on sale of land in Council subdivisions	(36,000)	C
Economic Development Capital	Transfer from Reserves - Land Development	36,000	C
Developer Contributions	Increase estimated income to be received from interest on S94 funds	75,000	C
Developer Contributions	Transfer to S94	(75,000)	C
Total Contra Variations		0	
TOTAL GENERAL FUND		**127,675**	
WATER FUND			
Positive Variations			
Water Supply	Increase estimated income from raw water and parks/facilities water usage	60,000	F
Total Positive Variations		60,000	
Negative Variations			
Water Supply	Reduce estimated income from residential water usage due to continued wet weather	(240,000)	U
Water Supply	Reduce estimated income from non residential water usage due to continued wet weather	(330,000)	U

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Management Plan Activity	Variation	Amount	
Water Supply	Hydraulic analysis study required to cater for anticipated growth across region	(15,000)	U
Water Supply	Increased expenditure at Gulgong water reservoir - major maintenance expenditure required as a result of telemetry/SCADA failure	(10,000)	U
Water Supply	Increased expenditure at Gulgong water treatment plant - major maintenance expenditure and increased electricity costs required as a result of telemetry/SCADA failure	(80,000)	U
Total Negative Variations		(675,000)	
Contra Variations			
Water Supply	Increase estimated income received from new water connection fees	10,000	C
Water Supply Capital	Additional expenditure on new water connections	(10,000)	C
Water Supply Capital	Defer water chlorine dosing plant at Rylstone/Kandos to 2012/13 budget - further investigation is required	11,560	C
Water Supply Capital	Transfer from Reserves - Water	(11,560)	C
Water Supply Capital	Water Mains Capital Program Budget Only - allocate estimates (expenditure & reserve funding) to specific works	30,000	C
Water Supply Capital	Water Mains - Mortimer Street	(30,000)	C
Water Supply Capital	Water Mains - Market Street, project completed under budget	5,000	C
Water Supply Capital	Transfer from Reserves - Water	(5,000)	C
Water Supply Capital	Water Mains - Lewis Street	(20,000)	C
Water Supply Capital	Transfer from Reserves - Water	20,000	C
Water Supply Capital	Transfer Water Asset Decommissioning budget to specific works, with corresponding Reserve funding.	11,000	C
Water Supply Capital	Allocate estimate for decommissioning of Ulan Road water pump station	(11,000)	C
Water Supply Capital	Raw water mains extension to Mudgee Golf Club completed under budget	30,000	C
Water Supply Capital	Reduce Transfer from Reserves - Water	(30,000)	C
Water Supply Capital	Water Pump Station - Court Street - project completed under budget. Reduce expenditure estimate.	7,000	C
Water Supply Capital	Reduce Transfer from Reserves - Water	(7,000)	C
Water Supply Capital	Transfer part of the Gulgong Raw Water Scheme project budgets to 2012/13 for carryover works.	320,000	C
Water Supply Capital	Reduce grant funding income expected to be received in 2011/12 for Gulgong Raw Water Scheme	(160,000)	C
Water Supply Capital	Reduce Transfer from Reserves - Water	(160,000)	C

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Management Plan Activity	Variation	Amount	
Developer Contributions	Increase estimated income to be received from interest on developer contributions	40,000	C
Developer Contributions	Increase estimated income to be received from developer contributions	80,000	C
Developer Contributions	Transfer to S64	(120,000)	C
Total Contra Variations		0	
TOTAL WATER FUND		**(615,000)**	
SEWER FUND			
Positive Variations			
Sewerage Services	Increase estimated revenue to be received from interest on investments	50,000	F
Sewerage Services	Reduction in estimated borrowings costs due to delays in Mudgee Augmentation project	425,000	F
Sewerage Services	Defer Sewer CCTV inspections to 2012/13	35,000	F
Sewerage Services	Defer smoke testing to 2012/13. Insufficient budget to undertake works this financial year.	10,000	F
Sewerage Services	Reduction in principal repayments, due to delay in Mudgee Augmentation project and corresponding drawdown of loan funding.	97,384	F
Total Positive Variations		617,384	
Negative Variations			
Sewerage Services	Training expenditure required to ensure Sewer Treatment Plant operators comply with qualification requirements	(8,000)	U
Sewer Capital	Additional expenditure required to finalise Industrial Pump Station	(35,000)	U
Total Negative Variations		(43,000)	
Contra Variations			
Sewer Capital	Mudgee Sewer Augmentation - increase grant funding to be received in 2011/12. Amend 2012/13 budget.	2,002,000	C
Sewer Capital	Mudgee Sewer Augmentation - reduction in contractor expenditure 2011/12. Amend 2012/13 budget.	2,131,378	C
Sewer Capital	Mudgee Sewer Augmentation - reduce transfer from Sewer Reserve. Amend 2012/13 budget.	(931,378)	C
Sewer Capital	Mudgee Sewer Augmentation - reduction in loan draw down 2011/12. Transfer to 2012/13	(3,202,000)	C
Sewer Capital	Decrease estimated expenditure required for new sewer connections	20,000	C
Sewerage Services	Decrease in anticipated revenue being realised from new sewer connections	(20,000)	C

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Management Plan Activity	Variation	Amount	
Sewer Capital	Allocate Sewer Mains Budget Only to specific works, and transfer corresponding Reserve funding.	33,000	C
Sewer Capital	Burrundulla Rd sewer main - construction of retic main from Industrial Pump Station, and transfer corresponding Reserve funding.	(33,000)	C
Sewer Capital	Allocate Sewer Pump Station Budget Only to specific works, along with corresponding Reserve funding	20,000	C
Sewer Capital	Allocate expenditure estimate to Gulgong hospital sewer pump station, along with corresponding Reserve funding	(20,000)	C
Developer Contributions	Increase estimated income from interest on S64 funds	12,000	C
Developer Contributions	Transfer to S64	(12,000)	C
Total Contra Variations		0	
TOTAL SEWER FUND		**574,384**	
WASTE FUND			
Positive Variations			
Solid Waste Management	Increase estimated income to be received from tipping fees	50,000	F
Solid Waste Management	Increase estimated income to be received from interest on investments	100,000	F
Solid Waste Management	Increase estimated income to be received from general waste fund sales	5,000	F
Solid Waste Management	Increase estimated income to be recieved from recycling sales	60,000	F
Total Positive Variations		215,000	
Negative Variations			
Solid Waste Management	Increased expenditure on collection of street and park litter bins	(22,000)	U
Solid Waste Management	Additional staff costs in Domestic Waste Management due to worker injuries	(30,000)	U
Solid Waste Management	Additional staff costs at Recycling to cope with increased volumes	(30,000)	U
Total Negative Variations		(82,000)	
Contra Variations			
Nil			C
Total Contra Variations		0	
TOTAL WASTE FUND		**133,000**	

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Management Plan Activity	Variation	Amount	
SALEYARDS FUND			
Positive Variations			
Economic Development	Reduce estimated expenditure for Saleyards operations and administration	10,000	F
Total Positive Variations		10,000	
Negative Variations			
Economic Development	Reduce estimated income from Saleyards. Reduction in volume of livestock going through facility.	(58,000)	U
Total Negative Variations		(58,000)	
Contra Variations			
Economic Development Capital	Reduce proposed capital expenditure for Saleyards in 2011/12	38,000	
Economic Development Capital	Transfer from Reserves - Livestock Exchange	(38,000)	
Total Contra Variations		0	
TOTAL SALEYARDS FUND		**(48,000)**	
Code			
F - Favourable			
U - Unfavourable			
C - Contra			

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$'ooo	Actual YTD	Original Annual Budget	Revised Annual Budget	% Revised Budget	Proposed Variations	Proposed Annual Budget	% Proposed Annual Budget	Comment
Capital Works Program - Roads & Bridges								
Income	(1,016)	(1,417)	(1,567)	65%	0	(1,567)	65%	
Capital Works								
URBAN RESEALS - BUDGET ONLY	0	301	0	0%	0	0	0%	Budget only
URBAN RESEALS - INGLIS STREET	14	28	28	48%	(14)	14	97%	Complete
URBAN RESEALS - LEWIS STREET	0	18	0	0%	0	0	0%	Complete
URBAN RESEALS - LYONS LANE	3	0	6	56%	0	6	56%	Complete
URBAN RESEALS - SECOND STREET	3	0	5	66%	0	5	66%	Complete
URBAN RESEALS - DENISON STREET	12	21	21	59%	0	21	59%	Complete
URBAN RESEALS - COURT ST	5	0	11	50%	0	11	50%	Complete
URBAN RESEALS - SPRING ROAD	28	0	39	71%	(11)	28	100%	Complete
URBAN RESEALS - GAWTHORNE PLACE	8	12	12	68%	0	12	68%	Complete
URBAN RESEALS - HONEY LANE	3	0	12	24%	0	12	24%	Complete
URBAN RESEALS - SMITH STREET	12	15	15	81%	0	15	81%	Complete
URBAN RESEALS - DAWSON STREET	3	0	10	34%	0	10	34%	Complete
URBAN RESEALS - MELLON ST	6	0	9	67%	0	9	67%	Complete
URBAN RESEALS - MEDLEY STREET	12	0	23	52%	(11)	12	100%	Complete
URBAN RESEALS - LOFTUS STREET	4	12	12	30%	0	12	30%	Complete
URBAN RESEALS - LYNNE STREET	8	0	15	56%	0	15	56%	Complete
URBAN RESEALS - HERBERT ST	6	0	14	40%	0	14	40%	Complete
URBAN ROAD REHABS - BUDGET ONLY	0	209	0	0%	0	0	0%	Budget only
URBAN ROADS KERB & GUTTER CAPITAL	12	15	15	78%	0	15	78%	Ongoing
REHAB - DEPOT ROAD	0	0	10	0%	0	10	0%	Complete
REHAB - MAYNE STREET	0	0	29	0%	0	29	0%	Planned to commence in April 2012
REHAB - LEWIS STREET	29	0	18	167%	12	30	99%	Complete
REHAB - LEWIS/HORATIO INTERSCTN	3	96	156	2%	0	156	2%	Works planned to commence late April
REHAB - MARKET ST (PERRY TO DOURO)	251	0	258	97%	0	258	97%	Complete
RESHEETING - URBAN ROADS	0	12	12	0%	0	12	0%	Will commence late April
URBAN ROADS LAND MATTERS CAPITAL	1	20	20	6%	(13)	7	19%	Matters progressing as prioritised
REHAB - LOUEE ST	6	0	200	3%	0	200	3%	Some kerb and gutter works undertaken. Geotechnical testing completed and awaiting pavement design.
RURAL SEALED ROADS RESEALS BUDGET	0	875	0	0%	0	0	0%	Budget only
RURAL RESEAL - LUE RD-PYANGLE	42	0	33	126%	9	42	100%	Complete
RURAL RESEAL - LUE RD-ROCKY WATERHOLE INTERSCTN	1	9	9	6%	0	9	6%	Complete awaiting invoices
RURAL RESEAL - KAINS FLAT RD	37	60	37	100%	0	37	100%	Complete
RURAL RESEAL - LUE RD-HAYES GAP TO WEST	1	62	0	0%	0	0	0%	Road programmed for realignment prior to 30 June.

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RURAL RESEAL - GLEN ALICE RD-RLWY TO C/WAY	6	0	6	99%	0	6	99%	Complete
RURAL RESEAL - MT VINCENT RD	5	58	58	8%	0	58	8%	Complete awaiting invoices
RURAL RESEAL - YARRAWONGA RD	0	41	0	0%	0	0	0%	Budget required for bridge maintenance.
RURAL RESEAL - WINDEYER RD	21	55	55	39%	0	55	39%	Complete
RURAL RESEAL - YARRABIN RD	21	37	37	56%	(16)	21	98%	Complete
RURAL RESEAL - SPRING RIDGE RD	6	18	18	32%	(12)	6	93%	Complete
RURAL RESEAL - GLEN ALICE RD-SEG 30-40	23	0	23	100%	0	23	100%	Complete
RURAL RESEAL - NARRANGO RD-SEG 30	23	45	23	100%	0	23	100%	Complete
RURAL RESEAL - OLD MILL RD	19	26	26	75%	0	26	75%	Complete awaiting invoices
RURAL RESEAL - NARRANGO RD-SEG 50	6	0	6	100%	0	6	100%	Complete
RURAL RESEAL - BOTOBOLAR RD	24	0	24	100%	0	24	100%	Complete
RURAL RESEAL - BERYL RD	56	0	42	133%	14	56	100%	Complete awaiting invoices
RURAL RESEAL - CANARY RAIL CROSSING	3	0	3	100%	0	3	100%	Complete
RURAL SEALED ROAD REHAB & WIDENING	0	286	0	0%	0	0	0%	Budget only
RURAL REHAB - LUE RD (HAVILAH NTH)	22	0	30	75%	0	30	75%	Complete awaiting invoices
RURAL REHAB - HENRY LAWSON DVE	45	0	60	76%	(14)	46	99%	Complete
REHAB/RESEAL - SPRING CREEK ROAD	72	0	80	91%	0	80	91%	Complete
REHAB/RESEAL - LUE RD HAVILAH MISSING LINK	8	0	686	1%	0	686	1%	Design is complete. Works planned to commence April 2012.
REHAB/RESEAL - HENRY LAWSON DRV S BENDS	126	0	200	63%	0	200	63%	Pavement and shoulder works complete. Seal planned for mid April 2012.
CUDGEGONG ROAD GUARDRAIL REPLACEMENT	92	0	150	62%	0	150	62%	To be completed April 2012.
FUTURE YRS REFS - BUDGET ONLY	1	40	40	3%	(38)	2	66%	No REFS needed to be contracted out at this stage
RURAL SEALED ROAD LAND MATTERS	2	0	0	0%	3	3	57%	Realignment of road reserve on Henry Lawson Drive & Dabee Rd opening & closing.
RURAL SEALED REGIONAL ROAD RESEALS	0	586	0	0%	0	0	0%	Budget only
RURAL SEALED REGIONAL ROAD REPAIR PROGRAM	0	800	0	0%	0	0	0%	Budget only
MR598 COPE ROAD WIDENING	0	0	80	0%	0	80	0%	Budget for road widening on Cope Rd to facilitate new Ulan waste transfer station. Construction commenced. Due for completion end May.
REPAIR - GOLLAN RD MR7512	248	0	400	62%	0	400	62%	Complete awaiting invoices
REPAIR - ULAN RD MR214	408	0	406	101%	0	406	101%	Complete
ULAN ROAD FLOOD REPAIRS	46	0	45	103%	0	45	103%	Complete
PITTS LANE/ULAN RD INTERSECTION	816	892	892	92%	0	892	92%	Works practically complete. Linemarking and sign installation outstanding. To be completed early April 2012.
ULAN & COPE ROAD UPGRADES	60	70	246	24%	0	246	24%	Headwall works on culvert completed. Pavement construction commence early April.
REHAB - BYLONG VALLEY WAY DABEE TO BRIDGE	48	0	60	80%	0	60	80%	Complete awaiting invoices
BYLONG VALLEY WAY HEAVY PATCHING PROGRAM	155	0	150	103%	0	150	103%	Complete
REG RESEAL - FARRELLY ST	28	0	57	49%	0	57	49%	Complete awaiting invoices

RURAL SEALED REGIONAL ROAD LAND MATTERS CAPITAL	2	17	17	14%	(4)	13	19%	Bylong Valley Way Rylstone realignment - progressing as prioritised
SEAL EXTENSION - ULAN-WOLLAR RD	0	600	600	0%	(600)	0	0%	Awaiting scope of works
SEAL EXTENSION - STUART STREET KANDOS	0	0	0	0%	18	18	0%	Works to be completed in April, with seal applied in June.
RESHEETING - BUDGET ONLY	1,381	942	1,342	103%	45	1,387	100%	Complete
UNSEALED ROADS LAND MATTERS CAPITAL	2	6	6	32%	1	7	26%	Matters progressing as prioritised
REPAIR - HILL END ROAD	41	0	55	74%	0	55	74%	Complete
SEAL EXTENSION - HILL END ROAD	192	0	225	85%	0	225	85%	Complete
SEAL EXTENSION - WOLLAR ROAD	0	290	0	0%	0	0	0%	Project deferred
CARWELL CREEK BRIDGE	786	850	850	92%	0	850	92%	Complete awaiting invoices
BRIDGE GUARDRAIL REPLACEMENT HILL END RD	22	0	25	87%	0	25	87%	Complete
BRIDGE GUARDRAIL REPLACEMENT GOULBURN RIVER XING	26	0	25	102%	0	25	102%	Complete, however since replacement of guardrail in July 2011 the guardrail has been hit by a truck.
Total Capital Works	5,354	7,422	8,070	66%	(632)	7,438	72%	
Net Result	4,338	6,005	6,503	67%	(632)	5,871	74%	

Capital Works Program - Carparking, Cycleways, Streetscaping & Footpaths

Income	0	0	0	0%	0	0	0%	
Capital Works								
STREET SCAPE CAPITAL IMPROVEMENTS	2	15	15	12%	0	15	12%	Trees in Perry street to be removed 19th April.
STREETSCAPE IMPROVEMENTS - BELLEVUE ESTATE	11	16	16	71%	0	16	71%	Ongoing maintenance throughout the year
STREETSCAPE - BIN REPLACEMENT PROGRAM	15	15	15	103%	0	15	103%	Completed
FOOTWAYS - CAPITAL BUDGET ONLY	19	65	65	29%	0	65	29%	Ongoing
FOOTWAYS - BUS SHELTERS	0	0	35	1%	0	35	1%	New bus shelter for Ilford rest stop ordered.
PEDESTRIAN - KANDOS TO CLANDULLA	0	40	40	0%	0	40	0%	On hold awaiting ARTC
PEDESTRIAN - CHARBON PEDESTRIAN BRIDGE	0	100	0	0%	0	0	0%	Project deferred
PEDESTRIAN - GLEN WILLOW WALKWAY	0	50	0	0%	0	0	0%	Budget combined with Lawson Park Walkway
CYCLEWAY BELLEVUE	1	0	233	1%	(40)	193	1%	Works planned to commence in April 2012.
CARPARKING CAPITAL - CNR SHORT/PERRY STREETS	8	0	25	32%	0	25	32%	Complete awaiting invoices
CARPARKING CAPITAL - MORTIMER ST	192	700	700	27%	0	700	27%	Works have commenced and the pavement construction is nearing completion. Kerb works will commence following Easter and Asphalt is booked for early May. Target will have access late April and completion of the full car park construction in late May
CARPARKING CAPITAL - MEMORIAL HALL	2	0	4	55%	0	4	55%	Complete awaiting invoices
CARPARKING CAPITAL - PRINCE OF WALES	4	0	4	97%	0	4	97%	Complete awaiting invoices
Total Capital Works	255	1,001	1,151	22%	(40)	1,111	23%	
Net Result	255	1,001	1,151	22%	(40)	1,111	23%	

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Capital Works Program - Water Supply

Income	0	0	0	0%	0	0	0%	
Capital Works								
WATER NEW CONNECTIONS	109	121	121	90%	10	131	83%	Provision of new connections to subdivisions and other new development types as and when required.
WATER AUGMENTATION - RYLSTONE & KANDOS	22	0	150	14%	0	150	14%	Electricity supply upgrade to the new river pumping station, Powdered Activated Carbon Dosing Unit replacement and Telemetry System upgrade programmed for February to June 2012.
WATER CHLORINE DOSING PLANT RYL & CHARBON	0	12	12	0%	(12)	0	0%	Installation of chlorination plant at the Charbon to Clandulla water pumping station programmed for February to June 2012.
WATER METERS - REPLACEMENTS INCLUD. PARKS	3	0	15	18%	0	15	18%	Lawson and Redbank Parks meters remain to be installed this year.
WATER TELEMETRY - BUDGET ONLY	0	20	0	0%	0	0	0%	Minor upgrades of water supply telemetry systems, including phasing in updated hardware. Budget allocated for purchase of hardware for Rylstone area.
WATER TELEMETRY - RYLSTONE LINK	0	0	20	0%	0	20	0%	Telemetry hardware received. Invoice not yet received.
WATER LOSS MANAGEMENT WORKS	11	25	25	43%	0	25	43%	Provision of magnetic flow meters to reservoirs in Rylstone and Kandos. One meter pit complete. Installation of 2 more meter pits to be completed by June 2012.
WATER RESERVOIR HIGH ZONE	0	0	20	0%	0	20	0%	Installation of concrete pit to house magnetic flow meter assembly. Construction 90% complete.
WATER MAINS - CAPITAL BUDGET ONLY	0	240	31	0%	(30)	1	0%	Budget only. Original budget allocated to individual projects.
WATER MAINS - MARKET STREET	4	0	10	42%	(5)	5	84%	Works complete.
WATER MAINS - MORTIMER STREET	0	0	0	0%	30	30	0%	Required for hydrant spacing/fire fighting requirements for new Target building.
WATER MAINS - LEWIS STREET	79	0	75	106%	20	95	83%	Mains replacement works 90% complete. Final works delayed due to inadequate resources during March.
WATER MAINS - DISCONNECTIONS	0	0	25	2%	0	25	2%	Disconnection of potable water system from the parks system. Delayed due to inclement weather. Rescheduled to complete in April School Holiday period.
WATER MAINS - DECOMMISSION	1	0	15	4%	(11)	4	17%	Decommissioning of old mains following mains replacement. Ongoing program.
RAW MAINS EXTENSION - GOLF CLUB	18	0	51	36%	(30)	21	87%	Works complete.
WATER PUMP STATION - CAPITAL BUDGET ONLY	0	40	0	0%	0	0	0%	Budget only. Original budget allocated to individual projects.

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WATER PUMP STATION - BURUNDULLA	0	0	8	0%	0	8	0%	Upgrade of Burrundulla well field. Start date yet to be finalised.
WATER PUMP STATION - MUDGEE RIVER INTAKE	5	0	5	98%	0	5	98%	Pump motor replacement complete.
WATER PUMP STATION - COURT STREET	2	0	10	21%	(7)	3	71%	Works complete.
WATER PUMP STATION - GULGONG RIVER	1	0	15	5%	0	15	5%	Finalisation of land matters. This should be completed in March 2012.
WATER PUMP STATION - CHARBON	6	0	7	87%	0	7	87%	Works complete.
WATER PUMP STATION - GULGONG CLEARWATER	0	0	10	0%	0	10	0%	Refurbishment of Clearwater pump programmed for April 2012.
WATER PUMP STATION - ULAN RD DECOMMISSION	11	0	0	0%	11	11	98%	Works complete.
WATER RESERVOIR - FLIRTATION HILL MUDGEE	5	0	15	32%	0	15	32%	Pump motor replaced.
RAW WATER SCHEME GULGONG	628	1,700	1,700	37%	(320)	1,380	46%	Contractor has completed approximately 70% of pipelines contract. Fletchers bore has been drilled and pump test has been completed. Irrigation control system has been ordered an will be installed during April 2012. Other works include upgrading the Elcom pumping station, installation of pump at Fletchers bore, and reservoir pipe work.
WATER TREATMENT WORKS - MUDGEE	24	30	60	41%	0	60	41%	Remedial works around pond two to stop stormwater infiltration complete. Contract for concept design for treatment plant upgrade scheduled for completion in May 2012.
STANDPIPES INSTALLATION	2	0	14	15%	0	14	15%	Standpipe installation scheduled for April-June 2012, as standpipe assemblies fabrication is progressively completed.
WATER TREATMENT PLANT - GULGONG	0	0	30	0%	0	30	0%	Contract for concept design for treatment plant upgrade scheduled for completion in May 2012.
WATER METERS - BULK	68	90	90	76%	0	90	76%	Ongoing program to replace water meters greater than 15 years old.
VALVE REPLACEMENT PROGRAM	2	0	10	15%	0	10	15%	Replacement of damaged and aging valves in reticulation system. Ongoing program to be completed by June 2012.
Total Capital Works	1,001	2,278	2,543	39%	(344)	2,199	46%	
Net Result	1,001	2,278	2,543	39%	(344)	2,199	46%	

Capital Works Program - Sewerage Services

Income	0	0	0	0%	0	0	0%	
Capital Works								
SEWER NEW CONNECTIONS	18	45	45	40%	(20)	25	72%	Provision of new connections associated with new development.
SEWER AUGMENTATION - RYLSTONE & KANDOS	181	240	270	67%	0	270	67%	Design is 90% complete.

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SEWER AUGMENTATION - MUDGEE	1,610	11,000	10,931	15%	(2,131)	8,800	18%	Major concrete works for STP construction scheduled for April - June 2012. Tenders are being assessed for the Putta Bucca Pump Station Construction and the Power Supply Construction.
SEWER MAINS - CAPITAL BUDGET ONLY	0	278	33	0%	(33)	0	0%	Budget only. Original budget allocated to individual projects.
SEWER MAINS - MORTIMER STREET	29	0	30	97%	0	30	97%	Work complete
SEWER MAINS - BURRUNDULLA RD	0	0	40	0%	33	73	0%	Mains replacement works programmed to commence March 2012.
SEWER MAINS - GULGONG S/GROUND EXT	18	0	35	51%	0	35	51%	Works complete.
SEWER MAINS RELINING	0	0	140	0%	0	140	0%	Works scheduled for completion in May -June 2012.
SEWER PUMP STATION - CAPITAL BUDGET ONLY	0	40	40	0%	(20)	20	0%	Budget only. Original budget will be allocated to individual projects.
SEWER PUMP STATION - INDUSTRIAL	131	0	161	82%	35	196	67%	Prefabricated pumping station programmed to be installed April 2012.
SEWER PUMP STATION - GULGONG HOSPITAL	0	0	0	0%	20	20	0%	New pump or significant refurbishment of existing SPS required.
SEWER TREATMENT WORKS - MUDGEE	28	45	45	63%	0	45	63%	Reserved for urgent works.
Total Capital Works	2,016	11,648	11,771	17%	(2,116)	9,655	21%	
Net Result	2,016	11,648	11,771	17%	(2,116)	9,655	21%	

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Capital Works Program - Waste Management

Income	0	0	0	0%	0	0	0%	
Capital Works								
GULGONG WASTE DEPOT UPGRADES	1	0	0	0%	0	0	0%	
RURAL WASTE DEPOT UPGRADES	1	30	0	0%	0	0	0%	Budget only
MUDGEE WASTE DEPOT UPGRADES	84	100	120	70%	0	120	70%	New amenities for supported staff 90% complete.
WASTE - LAND MATTERS	0	2	2	0%	0	2	0%	Nearing completion - land classified as operational 7/3
KANDOS & ILFORD WASTE DEPOT UPGRADES	17	20	45	38%	0	45	38%	Fencing to complete and installation of security camera. Camera ordered.
NEW RECYCLING BINS	8	0	18	43%	0	18	43%	Completed.
REMOTE SECURITY CAMERAS AT WTS	8	40	40	21%	0	40	21%	Cameras ordered for Bylong, Ulan and Ilford and finalisation of Queens Pinch.
KANDOS WASTE DEPOT LANDFILL CLOSURE PLAN	3	50	25	12%	0	25	12%	Completed. No further works planned for this year.
RELOCATE ULAN WTS	27	0	126	22%	0	126	22%	Works commenced. Initial clearing and earth works commenced. Road formation and site shaping after Easter.
RWTS COLLECTION FACILITIES UPGRADE	101	0	100	101%	0	100	101%	Completed.
MUDGEE RECYCLING - NEW LIFT	35	0	37	95%	0	37	95%	Completed
MOBILE GLASS CRUSHER	5	0	6	83%	0	6	83%	Completed.
Total Capital Works	289	243	519	56%	0	519	56%	
Net Result	289	243	519	56%	0	519	56%	

Capital Works Program - Stormwater & Drainage

Income	0	0	0	0%	0	0	0%	
Capital Works								
DRAINAGE CAPITAL IMPROVEMENTS	5	475	475	1%	(348)	127	4%	Catchment A drainage works approved at Dec 11 Council meeting. Contractor engaged for channel works however delays due to wet weather; property matters proceeding for basin works - potential for issues with landholder. Negotiations with developers recommenced. Likely project will continue into 2012/13 FY, with proposed budget variation for consideration in this QBR
CULVERT INSTALLATIONS	35	70	70	50%	0	70	50%	Ongoing
CAUSEWAY IMPROVEMENTS	0	60	0	0%	0	0	0%	Budget only
CAUSEWAY IMPROVEMENT - WHYALDRA	0	0	10	0%	0	10	0%	Completed 2010/2011
CAUSEWAY - AARONS PASS	0	0	2	0%	0	2	0%	Completed 2010/2011
CAUSEWAY - BUCKAROO LANE	16	0	30	52%	0	30	52%	50% of the causeway has been replaced, the remaining half will be poured early April

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CAUSEWAY - ULAN WOLLAR RD	5	0	30	16%	0	30	16%	Side track constructed, causeway to be replaced in April. Delayed due to weather.
Total Capital Works	61	605	617	10%	(348)	269	23%	
Net Result	61	605	617	10%	(348)	269	23%	

Capital Works Program - Mudgee Airport

Income	0	0	0	0%	0	0	0%	
Capital Works								
MUDGEE AIRPORT FENCING	21	50	59	36%	0	59	36%	Awaiting quote for final completion of fencing at the end of the main runway
MUDGEE AIRPORT - FUEL PUMP SEAL	0	0	20	0%	0	20	0%	Work to be completed by contractor by end of year
Total Capital Works	21	50	79	27%	0	79	27%	
Net Result	21	50	79	27%	0	79	27%	

Capital Works Program - Corporate & Community Buildings

Income	0	0	0	0%	0	0	0%	
Capital Works								
CORPORATE BUILDINGS UPGRADE BUDGET ONLY	0	100	4	0%	0	4	0%	Budget only
MUDGEE ADMINISTRATION BUILDING UPGRADE	46	0	58	80%	0	58	80%	Completed waiting on final invoices.
OLD POLICE STATION UPGRADE	0	0	20	0%	0	20	0%	Investigation of rising damp in building. Sourcing suitably qualified contractor to advise Council.
GULGONG ADMIN BUILDING	6	0	12	55%	0	12	55%	Completed waiting on invoices.
KANDOS MUSEUM	52	14	90	58%	0	90	58%	Upgrade of Museum exhibitions and entrance room area continue to the end of the financial year.
UPGRADE DEPOT AMENITIES BUILDING	4	0	5	87%	0	5	87%	Completed
KANDOS LIBRARY BUILDING IMPROVEMENTS	4	0	4	122%	0	4	122%	Completed
STABLES COMPLEX - CAPITAL	40	0	40	101%	0	40	101%	Completed
CAPITAL UPGRADE - KANDOS HALL	10	0	43	23%	0	43	23%	New seal to placed on entry road and minor concrete works to upgrade path to complete.
CAP UPGRD-CLANDULLA FACILITIES	4	5	5	80%	0	5	80%	Completed
CAPITAL UPGRADE - WINDEYER TOWN HALL	4	0	10	39%	0	10	39%	Completed waiting on final invoices.
CAPITAL UPGRADE - BUNGABA TOWN HALL	5	0	5	95%	0	5	95%	Completed waiting on final invoices.
CAP UPGRD-COMMUNITY BLD-BUDGET ONLY	2	100	1	118%	0	1	118%	Budget only item
Total Capital Works	177	219	295	60%	0	295	60%	
Net Result	177	219	295	60%	0	295	60%	

Capital Works Program - Swimming Pools

Income	0	0	0	0%	0	0	0%	
Capital Works								
POOL RENEWAL	128	3,000	1,400	9%	(1,100)	300	43%	Tenders let and report to Council on plant room/filtration upgrades. Canteen/amenities design at draft stage for all three pools.
Total Capital Works	128	3,000	1,400	9%	(1,100)	300	43%	
Net Result	128	3,000	1,400	9%	(1,100)	300	43%	

Capital Works Program - Parks & Reserves

Income	0	0	0	0%	0	0	0%	
Capital Works								
PUBLIC TOILETS - CAPITAL UPGRADES	0	80	14	3%	0	14	3%	Budget only
PUBLIC TOILETS - ILFORD REST STOP	75	0	65	115%	0	65	115%	Completed.
PUBLIC TOILETS - BABY CHANGE ROOM	17	0	15	115%	0	15	115%	Completed
MUDGEE SHOWGROUNDS - REDEVELOPMENT	355	0	333	107%	39	372	95%	Proposed budget variation for acoustics
GLENWILLOW SPORTS GROUND UPGRADES	1,626	0	1,664	98%	0	1,664	98%	Refer to monthly Council report
WESTEND COMPLEX UPGRADE	90	0	89	101%	0	89	101%	Completed
KANDOS SPORTS OVAL	447	750	750	60%	0	750	60%	See separate report to Council. Due for completion 1 June 2012. However contractor believes it will be sooner.
BILLY DUNN OVAL UPGRADE	11	15	15	72%	0	15	72%	Completed
RYLSTONE SHOWGROUND UPGRADE	0	0	40	0%	0	40	0%	Grant funding for cattle yards. Yards installed payment now to be made.
KANDOS NETBALL COURTS	35	0	60	59%	0	60	59%	Awaiting quotes
MUDGEE SKATE PARK	0	20	20	0%	0	20	0%	Awaiting designs
GULGONG SKATE PARK	0	35	35	0%	55	90	0%	Gulgong skate design to be confirmed on site 17 April then quote finalised for completion prior to 20 June 2012.
VICTORIA PARK - FENCING	0	0	4	9%	0	4	9%	To meet with cricket club about additional works.
VICTORIA PARK - DEMOLISH CANTEEN	0	0	4	0%	0	4	0%	To be completed prior to 30 June 2012
PASSIVE PARKS - LANDSCAPING IMPROVEMENTS	5	30	30	16%	0	30	16%	Additional paths and gardens to be done April
HARGRAVES PLAYGROUND FACILITIES	0	0	0	0%	0	0	0%	Completed
APEX PARK - CAPITAL UPGRADE	15	0	15	99%	0	15	99%	Completed
PLAYGROUND EQUIPMENT UPGRADE	31	80	80	39%	0	80	39%	Equipment to be installed end of April
CHARBON PLAYGROUND - CAPITAL UPGRADE	43	0	40	108%	0	40	108%	Completed
ANZAC RESERVE PLAYGROUND - CAPITAL UPGRADE	29	0	25	115%	4	29	99%	Completed

LAWSON PARK PATHWAY FITNESS PROJECT	197	0	209	94%	0	209	94%	Pathways 80% complete and landscaping around static equipment to be undertaken in May.
LAWSON PARK LANDSCAPING	133	300	300	44%	0	300	44%	Irrigation work to be completed in April and plantings in May.
Total Capital Works	3,109	1,310	3,806	82%	98	3,904	80%	
Net Result	3,109	1,310	3,806	82%	98	3,904	80%	

Capital Works Program - Libraries

Income	0	0	0	0%	0	0	0%	
Capital Works								
LIBRARY BOOKS	51	76	76	68%	0	76	68%	Ongoing program of book purchases continues throughout the financial year
MUDGEE LIBRARY BUILDING IMPROVEMENTS	595	3,675	3,811	16%	(2,411)	1,400	43%	Renovation of Mudgee Town Hall continues. Construction works due to be completed at end of October to be followed by library fit out.
Total Capital Works	646	3,751	3,887	17%	(2,411)	1,476	44%	
Net Result	646	3,751	3,887	17%	(2,411)	1,476	44%	

Capital Works Program - Regulatory Control

Income	0	0	0	0%	0	0	0%	
Capital Works								
REGIONAL POUND FACILITIES	8	150	150	5%	(137)	13	63%	Due to the noise issues associated with the saleyards site this DA has been withdrawn and a location at the Mudgee waste facility is being considered. New DA to be lodged as soon as suitable site is determined. Recommended that bulk of the budget allocation be transferred to 2012/13
WEED CONTROL - EDUCATION SHED	17	0	15	116%	4	19	91%	Construction commenced. To be completed mid April.
Total Capital Works	26	150	165	16%	(133)	32	80%	
Net Result	26	150	165	16%	(133)	32	80%	

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Capital Works Program - Cultural & Community Services

Income	0	0	0	0%	0	0	0%	
Capital Works								
MEALS ON WHEELS CAPITAL	0	0	4	0%	0	4	0%	Unspent grant funds will contribute to a minor kitchen refurbishment at Carmel Croan House
HM&M CAPITAL	1	0	6	16%	0	6	16%	Unspent grant funds will contribute to minor kitchen refurbishment at Carmel Croan House
COMM. TRANSPORT- VEHICLE PURCHASE	81	125	185	43%	0	185	43%	Ongoing vehicle purchase throughout year
AGED CARE UNITS - CAP -COOYAL/ANDERSON ST GULGONG	7	0	10	72%	0	10	72%	Hard wired smoke detectors to be installed.
AGED CARE UNITS - CAP -MUDGEE ST RYL	5	7	7	73%	0	7	73%	Hard wired smoke detectors to be installed.
LG HOUSING - CAP -DENISON STREET UNITS	0	0	6	1%	0	6	1%	Hard wired smoke detectors to be installed.
LG HOUSING - CAP - WALTER STREET UNITS	2	0	18	10%	0	18	10%	Hard wired smoke detectors to be installed.
Total Capital Works	96	132	236	41%	0	236	41%	
Net Result	96	132	236	41%	0	236	41%	

Capital Works Program - Administrative Services

Income	0	0	0	0%	0	0	0%	
Capital Works								
GULGONG PRE SCHOOL	14	0	15	92%	0	15	92%	Complete
IT NETWORK UPGRADES	25	38	38	66%	0	38	66%	Connection to library to be undertaken in May.
IT CORPORATE SOFTWARE	47	30	66	71%	0	66	71%	Complete, awaiting final invoices.
IT WEBSITE DEVELOPMENT	20	0	45	44%	0	45	44%	Upgrade of website due to go live in May.
PLANT PURCHASES - LIGHT COMMERCIAL	66	300	300	22%	10	310	21%	All orders have been placed and awaiting delivery
PLANT PURCHASES - HEAVY PLANT	1,205	2,725	2,725	44%	(885)	1,840	66%	Most items ordered, further items for Glen Willow currently being evaluated
PLANT PURCHASES - MINOR PLANT	18	35	35	52%	0	35	52%	Completed
WORKS DEPOT - OHS CAPITAL WORKS	0	0	0	0%	37	37	0%	Works to be undertaken May & June
RYLSTONE DEPOT CAPITAL WORKS	2	0	2	100%	0	2	100%	Completed
RURAL FIRE SERVICE - STATION UPGRADES	7	0	0	0%	8	8	92%	This work is funded by the RFS
RURAL FIRE SERVICE - BYLONG STATION UPGRADE	17	0	70	25%	0	70	25%	Order placed for new shed to be completed this year and is funded by the RFS
Total Capital Works	1,423	3,128	3,296	43%	(830)	2,466	58%	
Net Result	1,423	3,128	3,296	43%	(830)	2,466	58%	

Capital Works Program - Economic Development

Income	0	0	0	0%	0	0	0%	
Capital Works								
CUDGEGONG WATERS TOILETS	0	0	0	0%	0	0	0%	Complete
ILFORD TOURIST INFO BAY SIGNAGE	13	0	8	149%	0	8	149%	Complete
LUE RD TOURIST INFO BAY SIGNAGE	10	0	10	101%	0	10	101%	Complete
BYLONG TOURIST INFO BAY SIGNAGE	2	0	2	98%	0	2	98%	Complete
GOOLMA TOURIST INFO BAY SIGNAGE	2	0	4	45%	0	4	45%	Complete
SALEYARDS - CAPITAL BUDGET ONLY	2	78	78	2%	(38)	40	4%	Works to be completed on the truck parking area road surface
PROPERTY - MUDGEE AIRPORT SUBDIVISION	624	292	707	88%	0	707	88%	Works completed with exception of the sewer pump station. Delays have occurred due to the ground being too wet for excavation works to be undertaken
PROPERTY - KANDOS SURPLUS LAND BLOCKS	4	3	3	109%	0	3	109%	Lot 17 Sec 21 Dunn Street - taken off market pending finalisation of Flood Study results
PROPERTY - LIONS DRIVE SUBDIVISION	15	6	23	65%	0	23	65%	Project completed - all allotments now settled
PROPERTY - FURNITURE ONE REDEVELOPMENT	1,724	1,700	1,813	95%	0	1,813	95%	CCA final fit out is nearing completion with hand over to Target at the end of April. Car park has started ready for completion in mid May.
COMMERCIAL PROP - EX SES BUILDING	0	7	7	4%	0	7	4%	Completed. No works pending on this building due to potential sale of land.
Total Capital Works	2,395	2,087	2,657	90%	(38)	2,619	91%	
Net Result	2,395	2,087	2,657	90%	(38)	2,619	91%	

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Capital Budget - Council Consolidated

Capital Expenditure							
Roads & Bridges	5,354	7,422	8,070	66%	(632)	7,438	72%
Carparking, Cycleways, Streetscaping	255	1,001	1,151	22%	(40)	1,111	23%
Water Supply	1,001	2,278	2,543	39%	(344)	2,199	46%
Sewerage Services	2,016	11,648	11,771	17%	(2,116)	9,655	21%
Waste Management	289	243	519	56%	0	519	56%
Stormwater & Drainage	61	605	617	10%	(348)	269	23%
Mudgee Airport	21	50	79	27%	0	79	27%
Cemeteries	0	0	0	0%	0	0	700%
Corporate & Community Buildings	177	219	295	60%	0	295	60%
Swimming Pools	128	3,000	1,400	9%	(1,100)	300	43%
Parks & Reserves	3,109	1,310	3,806	82%	98	3,904	80%
Libraries	646	3,751	3,887	17%	(2,411)	1,476	44%
Regulatory Control	26	150	165	16%	(133)	32	80%
Cultural & Community Services	96	132	236	41%	0	236	41%
Administrative Services	1,423	3,128	3,296	43%	(830)	2,466	58%
Economic Development & Tourism	2,395	2,087	2,657	90%	(38)	2,619	91%
Total Capital Expenditure	16,997	37,023	40,492	42%	(7,894)	32,599	50%

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Capital Funding							
Capital Grants & Contributions	(2,228)	(2,412)	(3,097)	72%	(1,865)	(4,962)	45%
Loans	(1,845)	(15,700)	(13,270)	14%	4,302	(8,968)	21%
External Restrictions							
S94 Developer Contributions - General	(1,277)	(1,955)	(2,255)	57%	258	(1,997)	64%
S64 Developer Contributions - Water Fund	(360)	(360)	(360)	100%	0	(360)	100%
S64 Developer Contributions - Sewer Fund	0	0	0	0%	0	0	0%
S93F Developer Contributions	(1,160)	(3,451)	(4,549)	26%	2,749	(1,800)	64%
Specific Purpose Unexpended Grants	(621)	(200)	(1,003)	62%	(8)	(1,011)	61%
Specific Purpose Unexpended Grants - Waste	(9)	0	(66)	14%	0	(66)	14%
Reserves - Water	(247)	(897)	(1,102)	22%	194	(908)	27%
Reserves - Sewerage Services	(388)	(1,543)	(1,725)	22%	932	(793)	49%
Reserves - Waste Management	(226)	(240)	(413)	55%	0	(413)	55%
Other - Water	(129)	(121)	(180)	72%	(10)	(190)	68%
Other - Sewerage Services	(19)	(105)	(45)	42%	(15)	(60)	32%
Other - Waste Management	0	(3)	(3)	0%	0	(3)	0%
Internal Restrictions							
Reserves - Plant & Vehicle Replacement	(1,290)	(1,906)	(1,906)	68%	625	(1,281)	101%
Reserves - Asset Replacement	(1,635)	(2,272)	(2,677)	61%	485	(2,192)	75%
Reserves - Capital Program	(1,446)	(1,000)	(1,860)	78%	1	(1,859)	78%
Reserves - Land Development	(380)	0	(432)	88%	0	(432)	88%
Reserves - Airport Development	(261)	(292)	(292)	89%	0	(292)	89%
Reserves - Saleyards	(2)	(78)	(78)	3%	38	(40)	5%
Income from Sale of Assets							
Plant & Equipment	(51)	(642)	(642)	8%	250	(392)	13%
Revenue	(3,423)	(3,846)	(4,537)	75%	(43)	(4,580)	75%
Total Capital Funding	(16,997)	(37,023)	(40,492)	42%	7,894	(32,599)	52%

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Income Statement - Consolidated

$'000	Actual YTD	Original Annual Budget	Approved Variations	Revised Annual Budget	% Revised Budget	Proposed Variations	Projected Annual Budget	% Projected Annual Budget
Income								
Rates & Annual Charges	(21,240)	(21,007)	0	(21,007)	101%	0	(21,007)	101%
User Charges & Fees	(6,654)	(9,582)	(151)	(9,733)	68%	342	(9,391)	71%
Interest & Investment Revenue	(1,221)	(1,070)	0	(1,070)	114%	(327)	(1,397)	87%
Other Revenues	(1,424)	(1,434)	(65)	(1,499)	95%	(75)	(1,574)	90%
Grants & Contributions Operating	(10,109)	(11,809)	(1,595)	(13,404)	75%	237	(13,167)	77%
Grants & Contributions Capital	(5,491)	(5,607)	(3,034)	(8,641)	64%	(207)	(8,848)	62%
Gain (Loss) on Disposal of Assets	(582)	(862)	(1,158)	(2,020)	29%	1,439	(581)	100%
Total Income	(46,721)	(51,371)	(6,003)	(57,374)	81%	1,409	(55,965)	83%
Expenditure								
Employee Benefits & Oncosts	14,975	18,258	191	18,449	81%	207	18,656	80%
Borrowing Costs	160	1,192	(140)	1,052	15%	(425)	627	26%
Materials & Contracts	9,959	10,809	2,645	13,454	74%	(232)	13,222	75%
Depreciation & Amortisation	11,568	15,779	0	15,779	73%	0	15,779	73%
Other Expenses	3,531	3,882	156	4,038	87%	85	4,123	86%
Total Expenditure	40,193	49,920	2,852	52,772	76%	(365)	52,407	77%
Net Result	(6,528)	(1,451)	(3,151)	(4,602)		1,044	(3,558)	
Net Result before Capital Items	(1,037)	4,156	(117)	4,039		1,251	5,290	

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Balance Sheet

$'000	Actual as at 30/06/11	Actual YTD	Original Budget 2012
Assets			
Current Assets			
Cash & Cash Equivalents	25,354	26,077	16,657
Investments	1,000	1,000	1,000
Receivables	6,073	5,808	4,444
Inventories	2,866	1,170	1,626
Other	13	0	0
Total Current Assets	35,306	34,055	23,727
Non-Current Assets			
Investments	2,331	2,500	2,268
Inventories	254	1,947	1,924
Infrastructure, Property, Plant & Equipment	520,964	525,470	547,417
Intangible Assets	438	347	257
Total Non-Current Assets	523,987	530,264	551,866
Total Assets	**559,293**	**564,319**	**575,593**
Liabilities			
Current Liabilities			
Payables	5,144	1,909	5,353
Borrowings	550	257	999
Provisions	4,596	4,742	4,565
Total Current Liabilities	10,290	6,908	10,917
Non-Current Liabilities			
Borrowings	6,732	8,577	21,388
Provisions	1,070	937	842
Total Non-Current Liabilities	7,802	9,514	22,230
Total Liabilities	**18,092**	**16,422**	**33,147**
Net Assets	**541,201**	**547,897**	**542,446**
Equity			
Retained Earnings	284,741	291,267	287,280
Revaluation Reserves	256,460	256,630	255,166
Total Equity	**541,201**	**547,897**	**542,446**

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Employee Costs Schedule

$'000	Actual YTD	Original Annual Budget	Approved Variations	Revised Annual Budget	% Revised Budget	Proposed Variations	Projected Annual Budget	% Projected Annual Budget
Employee Costs by Type								
Salaries & Wages	11,449	13,767	110	13,877	83%	163	14,040	82%
Travelling	20	21	0	21	95%	1	22	91%
Employee Leave Entitlements	2,366	3,211	0	3,211	74%	0	3,211	74%
Superannuation	1,360	1,701	0	1,701	80%	0	1,701	80%
Workers Compensation	589	725	0	725	81%	0	725	81%
Fringe Benefits Tax	62	53	0	53	117%	0	53	117%
Payroll Tax	69	70	0	70	99%	0	70	99%
Training	252	290	(18)	272	93%	28	300	84%
Uniforms & Protective Clothing	74	68	0	68	109%	0	68	109%
Recruitment	17	15	0	15	113%	0	15	113%
Other	6	16	0	16	38%	1	17	35%
Total Employee Costs	16,264	19,937	92	20,029	81%	193	20,222	80%
Less: Capitalised Costs	(1,292)	(1,680)	99	(1,581)	82%	14	(1,567)	82%
Total Employee Costs Expensed	14,972	18,257	191	18,448	81%	207	18,655	80%

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$'000	Actual YTD	Original Annual Budget	Approved Variations	Revised Annual Budget	% Revised Budget	Proposed Variations	Projected Annual Budget	% Projected Annual Budget
Employee Costs by Activity								
Roads & Bridges	3,308	3,769	2	3,771	88%	(29)	3,742	88%
Carparking, Cycleways, Streetscaping	314	281	3	284	111%	31	315	100%
Water Supply	892	1,063	0	1,063	84%	1	1,064	84%
Sewerage Services	710	982	0	982	72%	8	990	72%
Waste Management	1,582	1,718	0	1,718	92%	82	1,800	88%
Stormwater & Drainage	203	154	126	280	73%	0	280	73%
Mudgee Airport	90	88	0	88	102%	0	88	102%
Cemeteries	164	200	0	200	82%	0	200	82%
Corporate & Community Buildings	15	19	0	19	79%	9	28	54%
Swimming Pools	380	358	0	358	106%	38	396	96%
Parks & Reserves	587	810	(50)	760	77%	0	760	77%
Planning & Development	1,359	1,805	53	1,858	73%	(4)	1,854	73%
Libraries	384	500	0	500	77%	(9)	491	78%
Regulatory Control	497	586	59	645	77%	14	659	75%
Cultural & Community Services	875	998	73	1,071	82%	32	1,103	79%
Administrative Services	4,642	6,323	(174)	6,149	75%	20	6,169	75%
Governance	5	15	0	15	33%	0	15	33%
Economic Development & Tourism	257	268	0	268	96%	0	268	96%
Total Employee Costs	16,264	19,937	92	20,029	81%	193	20,222	80%
Less: Capitalised Costs	(1,292)	(1,680)	99	(1,581)	1	14	(1,567)	82%
Total Employee Costs Expensed	14,972	18,257	191	18,448	81%	207	18,655	80%

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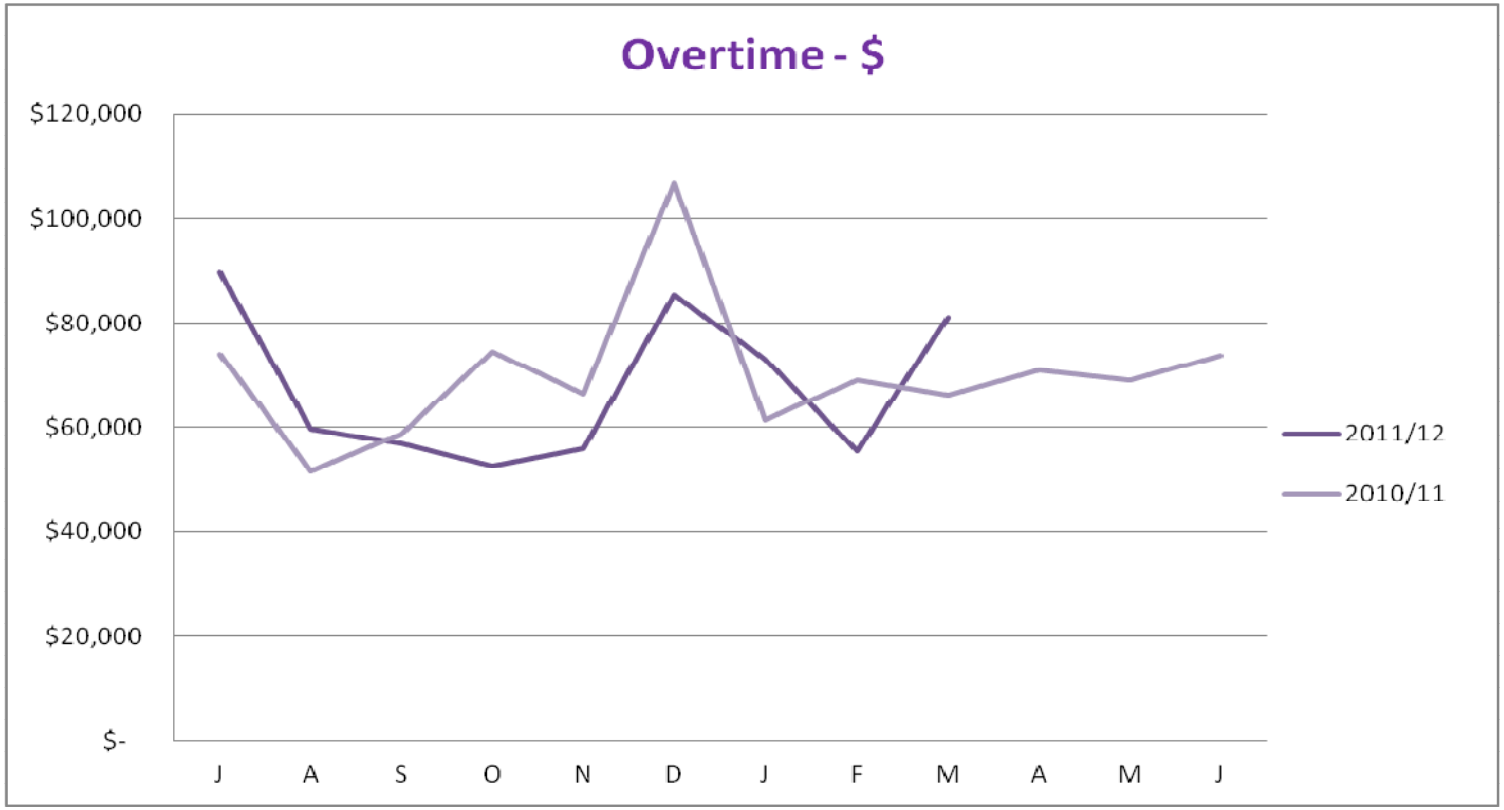
$'000	OT Actual YTD	2010/11 OT Actual	Total Salaries YTD	2011/12 Salaries Budget	% change OT YTD	Target %	Variance from Target
Salaries & Wages - Overtime	610	842	11,449	14,040	-7.29%	< 3.5%	-10.79%



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March Quarterly Business Review
Contracts ($50,000 and over)

Contractor	Contract Detail/Purpose	Contract Value ($)	Commencement Date	Duration (months)	Budgeted (Y/N)
G&L Murkins	Catchment A drainage works: railway to Gladstone St	115,000	1/01/2012	2	Y
ITS Trenchless	Rehabilitation of Culvert - Culvert 248768 HW18	159,000	13/03/2012	2	Y
Komatsu Australia P/L	Supply of 20t and 5t excavator and wheel loader	589,537	16/02/2012	2	Y
Conplant P/L	Supply of two rollers	328,821	16/02/2012	2	Y
Iveco Trucks Australia Ltd	Supply of side loading garbage truck	365,189	16/02/2012	5	Y
Krone Cranes Australia	Major refit of workshop overhead crane	52,489	20/02/2012	1	Y
Sewer Equipment Company	Supply of sewer drain cleaner	63,570	24/02/2012	2	Y
Liebherr Australia Pty Ltd	Supply of dozer	709,170	9/03/2012	6	Y
Liebherr Australia Pty Ltd	Sale of dozer	(242,000)	9/03/2012	6	Y
Sustainable Turf	Refurbishment of playing fields at Glenwillow	242,400	1/02/2012	6	Y

Consultancy & Legal Expenses

Expense	Actual YTD ($)	Budgeted (Y/N)
Consultancies	364,702	Y
Legal Fees	181,896	Y

Definition of Consultant:

A consultant is a person or organisation engaged under contract on a temporary basis to provide recommendations or high level specialist or professional advise to assist decision making by management. Generally, it is the advisory nature of the work that differentiates a consultant from other contracts.

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Financial Indicators

Actual Result 2010/11	Ratio			Quarter 1	Quarter 2	Quarter 3	Quarter 4
	Current Ratio	> 2	x				
3.45 : 1	*Current assets*	1 - 2		5.97	5.56	4.93	
	Current liabilities	< 1					
	Debt Service Ratio	< 10%	x				
2.56%	*Net debt service cost*	10% - 15%		0.03%	1.50%	1.19%	
	Operating revenue excl. Capital & Specific Purpose Grants	> 15%					
	Rates & Annual Charges Coverage Ratio						
37%	*Rates & Annual Charges*			73.88%	57.22%	45.46%	
	Revenue from Continuing Operations						
	Rates Outstanding Ratio	< 5%	x				
3.73%	*Rates, annual charges & extra charges outstanding*	5% - 9%		65.44%	43.47%	20.26%	
	Rates, annual charges & extra charges collectible	> 9%					
		Target		< 75%	< 50%	< 25%	< 5%

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Key Statistics

	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	YTD
ROADS & BRIDGES													
Kilometres of road graded (Target 900km pa)	82	69	61	126	21	68	69	52.3	84				631
2010/11	160	81	167	92	106	43	41	17	45	62	36	35	884
Kilometres of roads resealed (Target 31km pa)	-	-	-	-	6	2	11	-	8				26
2010/11	-	-	-	-	-	-	-	3	-	-	-	2	5
Kilometres of roads resheeted (Target 45km pa)	10	11	22	6	11	15	10	9	1				94
2010/11	12	2	29	3	1.8	-	-	3	8	6	10	7	81
WATER SUPPLY													
Broken main incidents (Target 0)	3	10	2	4	6	6	7	3	8				49
2010/11	19	11	9	24	11	7	2	12	11	9	16	16	147
Days achieved water quality targets (Target all days)	31	31	30	31	30	31	31	28	31				274
2010/11	31	31	30	31	30	31	31	28	31	30	31	30	365
Water consumption - trimester (000's kL)	-	-	-	404	-	-	-	789	-				1,193
2010/11	-	-	-	378	-	-	-	528	-	-	-	586	1,492
Days of interrupted service more than 4hrs (Target 0)	-	-	-	-	-	-	-	-	-				-
2010/11	-	-	-	1	1	-	-	-	-	1	-	-	3
SEWERAGE													
Number of blocked main incidents	36	38	33	21	27	14	16	12	20				217
2010/11	34	45	24	17	35	35	10	14	19	16	20	13	282
SOLID WASTE MANAGEMENT													
Tonnage of waste to landfill	1,509	4,187	1,526	1,728	1,556	*	*	*	*				10,506
2010/11	1,714	832	1,570	1,450	1,591	1,508	1,435	1,254	1,731	1,242	1,386	1,255	16,968
Number of missed bins (Target 0)	-	-	-	2	4	-	-	60	2				68
2010/11	-	-	2	1	-	-	2	-	2	1	1	-	9
Tonnage of recycling collected	290	270	228	240	480	*	*	*	*				1,508
2010/11	292	214	312	349	439	347	285	235	305	268	306	289	3,641
	* No Statistics available for December due to systems issues at the time of print												

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	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	YTD
MUDGEE AIRPORT													
Landings	385	438	312	323	337	335	491	415	545				3,581
2010/11	441	413	376	406	372	404	378	449	386	401	486	495	5,007
CEMETERIES													
Burials/interments	6	19	14	14	8	7	10	9	9				96
2010/11	17	10	18	13	10	12	19	5	18	20	10	9	161
SWIMMING POOLS													
Gulgong	-	-	39	1,108	2,881	3,719	4,138	4,026	1,534				17,445
2010/11	-	-	170	1,175	2,975	1,814	5,040	4,614	1,110	482	-	-	17,380
Mudgee	-	-	396	3,835	9,777	4,458	13,021	6,285	3,304				41,076
2010/11	-	-	816	4,897	9,449	4,328	16,100	9,541	3,311	1,124	-	-	49,566
Kandos	-	-	134	1,151	2,532	1,779	3,004	1,395	709				10,704
2010/11	-	-	105	876	2,068	1,420	4,958	2,971	935	219	-	-	13,552
PARKS & RESERVES													
Vandalism incidents	2	21	8	6	5	2	2	3	6				55
2010/11	8	3	2	2	2	5	4	2	6	6			40
Related expenditure	$ 2,000	$ 92,500	$ 2,000	$ 8,000	$ 2,100	$ 700	$ 820	$ 800	$ 2,249				111,169
2010/11	$ 800	$ 6,000	$ 1,000	$ 1,000	$ 1,000	$ 120,000	$ 200	$ 100	$ 600	$ 600			$ 131,300
	Note: Westend Complex repairs are included in the August expenditure reporting												
LIBRARIES													
Borrowings	9,845	10,302	9,912	9,162	9,076	8,223	6,349	8,610	9,097				80,576
2010/11	12,503	11,479	11,337	10,004	10,420	8,441	10,257	9,957	11,176	9,481	10,250	10,413	125,718
Borrowings - Mobile Library	247	551	389	471	399	322	106	441	461				3,387
2010/11	355	471	489	345	430	3	126	364	546	259	489	581	4,458
New resources purchased	350	535	370	359	354	572	116	376	342				3,374
2010/11	346	414	340	444	602	237	386	249	382	353	604	350	4,707

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	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	YTD
REGULATORY CONTROL													
Weeds													
Properties inspected	112	64	77	125	89	23	41	17	71				619
2010/11	101	41	126	78	81	-	-	-	5	11	34	172	649
Target													750
Properties reinspected	3	15	23	2	3	21	53	156	87				363
2010/11	-	-	-	13	4	-	-	-	103	20	2	5	147
Target													150
Infringement notices issued	-	-	-	-	-	-	-	-	-				-
2010/11	-	-	-	-	-	-	-	-	-	-	-	-	-
Kilometres sprayed	-	213	168	-	1,220	639	1,357	-					3,597
2010/11	-	337	-	156	103	131	170	287	-	-	-	-	1,184
Target													2,200
Parking Control													
Patrols conducted	6	15	16	11	10	8	-	11	14				91
2010/11	7	10	14	13	12	10	1	14	18	11	13	4	127
Animal Control													
Animals impounded	35	32	31	44	42	40	59	36	41				360
2010/11	49	47	46	43	45	43	45	39	64	39	25	33	518
Companion animals registered	12	7	18	17	10	15	28	19	20				146
2010/11	16	9	22	13	16	19	19	20	24	18	8	10	194
Food Control													
Inspections	5	1	1	26	16	7	-	-	-				56
2010/11	6	1	1	-	-	2	2	3	2	9	26	91	143
ADMINISTRATIVE SERVICES													
Records													
Correspondence items in	2,627	3,088	2,829	3,801	3,389	2,431	3,308	3,249	3,744				28,466
2010/11	2,363	2,463	2,555	2,657	2,900	2,535	3,149	5,369	3,082	2,191	2,716	2,761	34,741
Answered within 14 days (Target 100%)	95%	95%	97%	92%	99%	97%	93%	96%	97%				23.9%
2010/11	97%	95%	97%	93%	97%	95%	94%	97%	97%	93%	96%	98%	95.8%
Phone calls received	4,077	4,434	4,368	4,861	5,017	4,996	3,931	4,439	5,021				41,144
2010/11	4,383	4,171	4,207	4,639	5,136	4,797	3,647	4,045	4,859	3,759	4,293	4,637	52,573
Customer Service													
Works requests	269	398	350	293	363	262	447	424	537				3,343
2010/11	459	366	362	416	516	659	471	363	359	321	300	296	4,888
Finance													Monthly Average
Accounts Receivable Balance	$ 679,960	$ 621,955	$ 551,505	$ 513,681	$ 466,470	$ 939,668	$ 2,046,424	$ 1,985,893	$ 485,120				$ 921,186
Accounts Payable Turnover	$ 7,494,535	$ 5,547,571	$ 6,933,578	$ 3,439,934	$ 6,891,995	$ 5,690,134	$ 5,133,433	$ 6,476,476	$ 5,109,084				$ 5,857,416

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	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	YTD
ECONOMIC DEVELOPMENT													
Caravan Parks													
2010-2011	12	6	51	57	61	151	33	18					389
2010/11	12	15	22	133	35	96	21	15	25	98	8	5	485
Saleyards													
Stock sold - sheep	274	179	201	194	231	237	189	179	266				1,950
2010/11	297	228	221	**137**	251	164	107	235	82	190	207	146	2,265
Stock sold - cattle	1,643	1,481	2,052	2,217	3,096	1,670	2,384	3,204	3,112				20,859
2010/11	2,600	1,856	3,473	2,911	2,589	1,574	2,511	5,131	3,303	3,091	4,405	2,141	35,585

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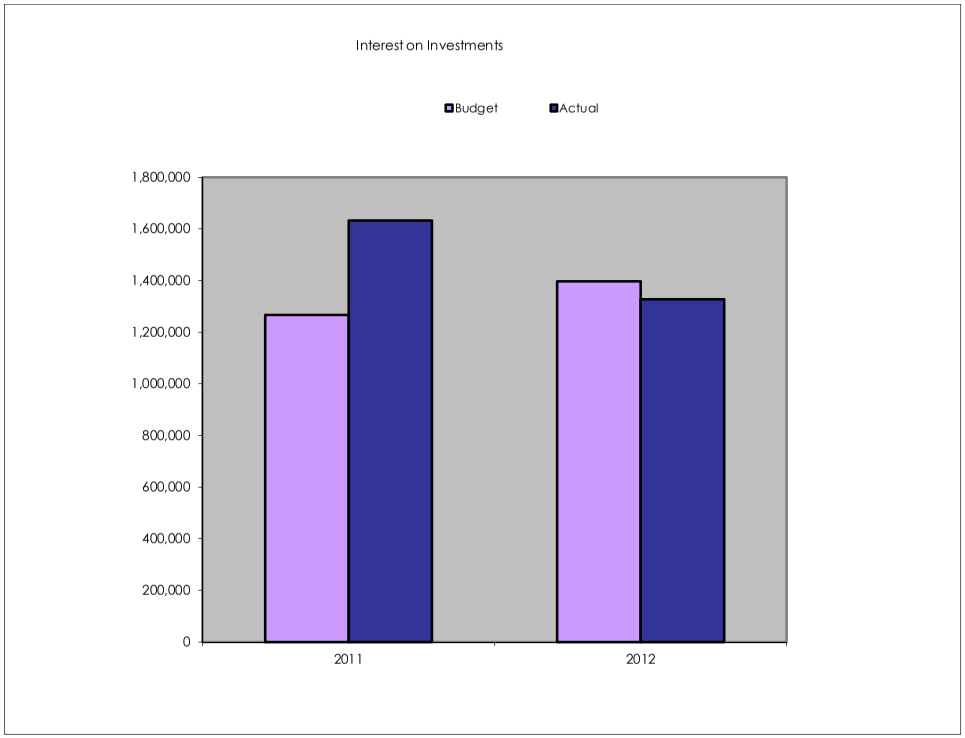
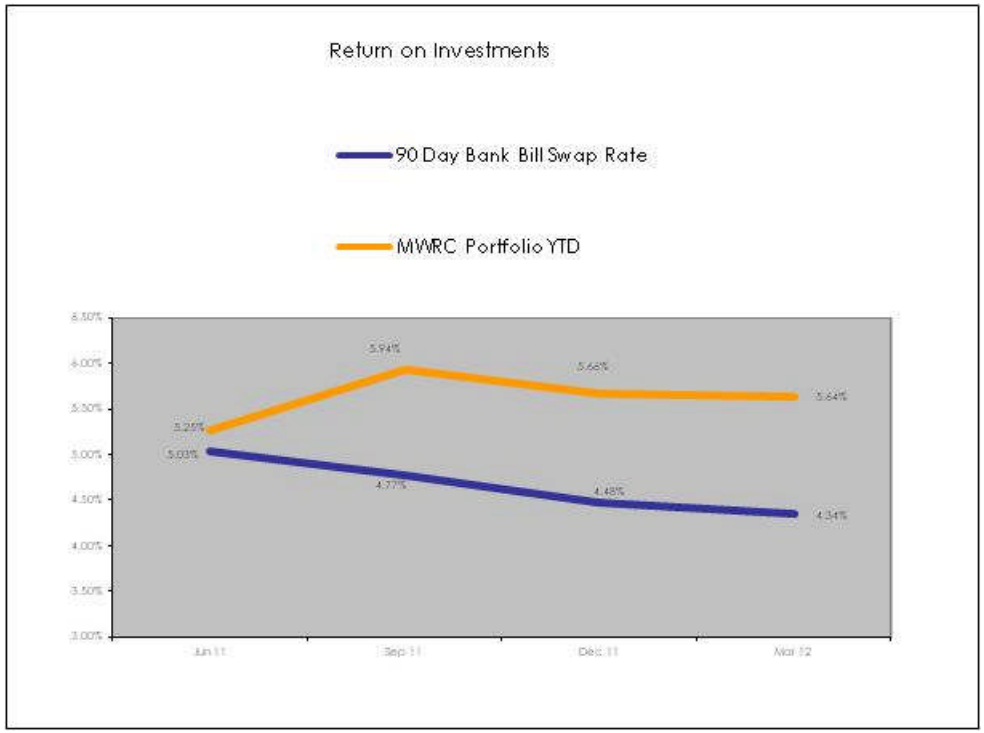
Investment Portfolio Commentary

Benchmarking

For the quarter ended 31 March 2012, Council's return on investment portfolio of 5.64% exceeded the benchmark rate of 4.34% (90 Day Bank Bill Swap Rate). Performance of the portfolio has been steady when compared with the December 2011 quarter. Deposits are currently being targeted at the 90-180 day term, which at present is offering the best interest rates whilst meeting Councils continual cash commitments. Council is on target to meet annual budgeted interest revenue.

The two graphs presented below demonstrate the performance of Council's portfolio for the year to date against the benchmarks of budgeted interest income and the 90 Day Bank Bill Swap Rate (BBSW).





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Commentary

At its most recent meeting in early April the Reserve Bank board decided to leave its cash rate unchanged at 4.25%, following rate cuts of 50 basis points at the end of last year. Australian economic growth has been at a slower than expected pace during the December quarter, with conditions still varying significantly across sectors. Ongoing caution by consumers and business are causing a number of sectors to struggle under the weight of the high Australian dollar, especially in areas such as retail spending on non-essential items. The trade balance also posted two consecutive deficits in January and February of this year, with both exports and imports down.

In its latest media release on 3 April, the RBA stated essentially the same position regarding inflation: "In underlying terms, inflation was around 2½ per cent in 2011. CPI inflation was higher than that but will fall over the next quarter or two. It is currently expected that inflation will be in the 2–3 per cent range over the coming one to two years."

The Australian dollar (AUD) has stabilised somewhat over the last quarter, supported by relatively high interest rates and high commodity prices. Overall, the AUD rose as high as USD $1.0856 on February 29, a near six-month high, and ended the March quarter 1.3% higher against the US dollar.

The latest available data shows that the housing market is still one of the weaker areas of the Australian economy. The number of home loans dropped by 2.5% in February and in NSW the percentage of first home buyers has fallen to its lowest level since 2005 (although this can be partly attributed to the January abolishment of stamp duty exemption for first home buyers when purchasing an established property). However, the RBA's decision to reduce interest rates in both November and December of last year, and the possibility of further rate cuts being announced after the RBA's next meeting in May, should provide some support for housing prices.

While the country experienced a surprising upsurge in the creation of new positions during March, the employment rate remained relatively steady at 5.2% in the first quarter of 2012 (5.3% at the end of 2011). Of the new positions created, about 2/3 were part-time position, with full-time positions still lagging quite a way behind, indicating that there is still some reticence by employers in hiring permanent staff.

The Reserve Bank has stated, with regard to future development in its monetary policy, that: "The Board eased monetary policy late in 2011. Since then, its judgement has been that, with growth expected to be close to trend, inflation close to target and lending rates close to average, the setting of monetary policy was appropriate. The Board's view was also that, were demand conditions to weaken materially, the inflation outlook would provide scope for easier monetary policy. At today's meeting, the Board judged the pace of output growth to be somewhat lower than earlier estimated, but also thought it prudent to see forthcoming key data on prices to reassess its outlook for inflation, before considering a further step to ease monetary policy."

Sources: *Reserve Bank of Australia Media Release 2012-09, St George Bank Monthly Economic Outlook Reports, Bureau of Statistics for CPI & historical data.*

Council's portfolio as at 31 March 2012, excluding the CBA operating account:

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Investments	Type	Amount	Yield %	Maturity Date	Term	Rating	Govt Rating	NAV	% of Portfolio
Commonwealth Bank	At Call	$ 745,000	4.25%	N/A	At Call	A-1+	2		2.3%
National Australia Bank	Term Deposit	$ 1,200,000	5.81%	18/04/2012	91	A-1+	1		3.7%
National Australia Bank	Term Deposit	$ 1,900,000	5.87%	23/05/2012	119	A-1+	3		5.8%
National Australia Bank	Term Deposit	$ 1,000,000	5.89%	23/05/2012	125	A-1+	3		3.1%
National Australia Bank	Term Deposit	$ 2,000,000	6.10%	18/05/2012	130	A-1+	3		6.1%
Westpac Bank	Term Deposit	$ 2,600,000	5.68%	27/06/2012	112	A-1+	3		8.0%
Westpac Bank	Term Deposit	$ 1,200,000	5.76%	20/06/2012	98	A-1+	3		3.7%
Westpac Bank	Term Deposit	$ 1,500,000	5.90%	2/05/2012	147	A-1+	1		4.6%
Westpac Bank	Term Deposit	$ 1,000,000	5.76%	27/06/2012	105	A-1+	3		3.1%
St George Bank	Term Deposit	$ 1,500,000	5.46%	25/04/2012	77	A-1+	3		4.6%
St George Bank	Term Deposit	$ 1,000,000	5.73%	27/06/2012	119	A-1+	3		3.1%
St George Bank	Term Deposit	$ 1,500,000	5.75%	4/04/2012	91	A-1+	1		4.6%
Bankwest	Term Deposit	$ 1,000,000	5.80%	20/06/2012	119	A-1+	3		3.1%
Bankwest	Term Deposit	$ 1,500,000	6.00%	11/04/2012	91	A-1+	1		4.6%
Bankwest	Term Deposit	$ 1,500,000	5.80%	13/06/2012	91	A-1+	3		4.6%
Bankwest	Term Deposit	$ 1,000,000	6.00%	16/05/2012	98	A-1+	3		3.1%
Bankwest	Term Deposit	$ 1,000,000	5.85%	26/06/2012	90	A-1+	3		3.1%
ING Australia Bank	Term Deposit	$ 1,000,000	5.63%	22/06/2012	93	A-1	2		3.1%
AMP	Term Deposit	$ 1,000,000	5.80%	30/05/2012	104	A-1	2		3.1%
Suncorp Metway Ltd	Term Deposit	$ 1,000,000	5.77%	6/06/2012	91	A-1	2		3.1%
IMB Ltd	Term Deposit	$ 1,000,000	5.75%	30/05/2012	91	A-2	2		3.1%
Newcastle Permanent	Term Deposit	$ 1,000,000	5.86%	6/06/2012	91	A-2	2		3.1%
Bank of Queensland	Term Deposit	$ 1,000,000	5.80%	23/05/2012	105	A-2	2		3.1%
Members Equity Bank	Term Deposit	$ 1,000,000	5.85%	9/05/2012	96	A-2	2		3.1%
Deutsche Bank Series 5	Floating Rate Note	$ 1,000,000	5.40%	23/11/2012	4yrs 9mths	A+	-		3.1%
ANZ ASPRIT III	Sustainable Equity Linked Note	$ 500,000	50% of +tve NAV	19/07/2013	6 yrs	AA	-		1.5%
Longreach Series 26	Property Linked Note	$ 1,000,000		7/06/2014	7 yrs	A+	-	$ 910,000	3.1%
Total Investments		**$32,645,000**							100.0%

Government Guarantee Codes	
1	Deposit is covered by Financial Claims Scheme
2	Deposit is covered up to $1,000,000
3	Deposit is not covered by Financial Claims Scheme

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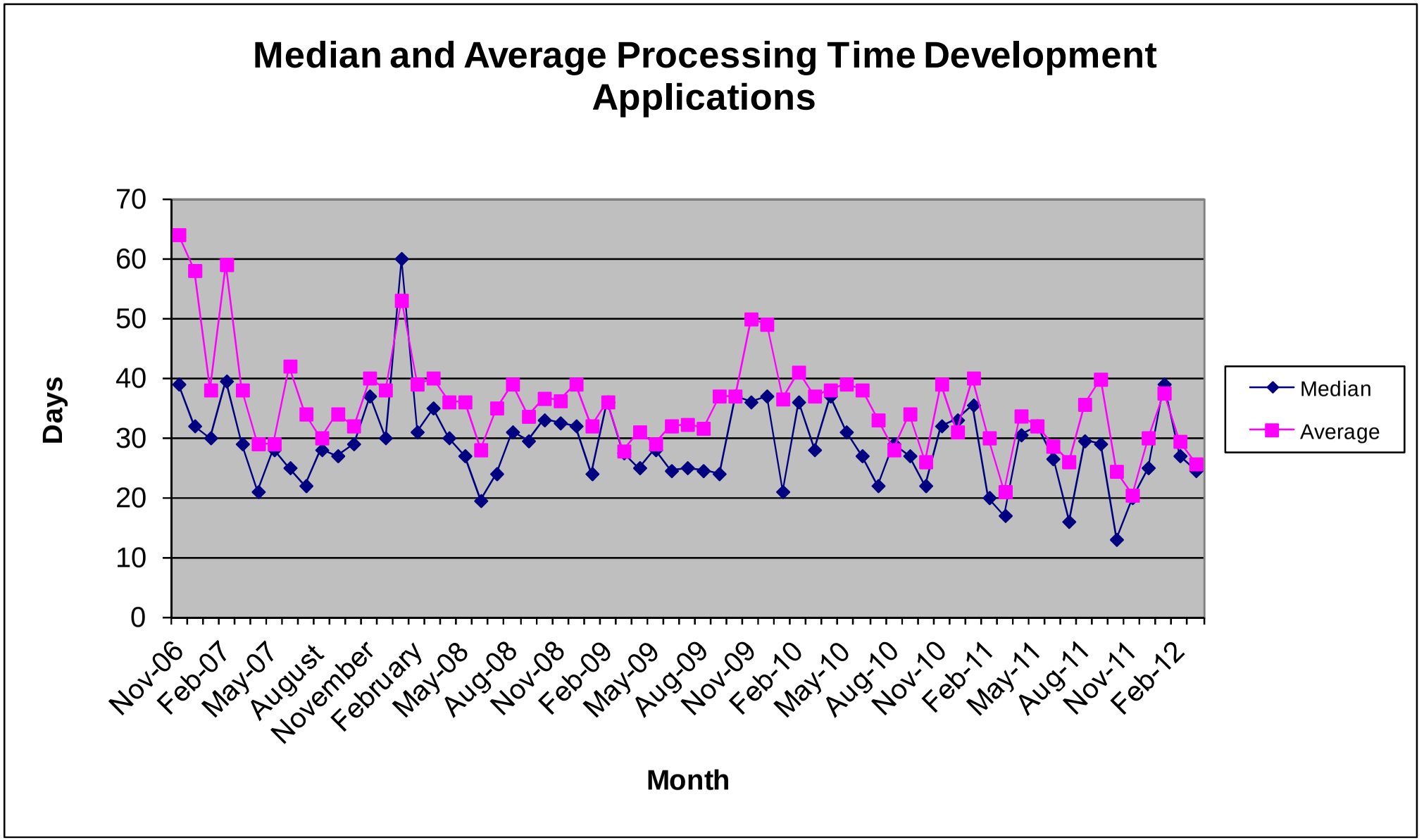
Councillor Fees Paid & Expenses Paid or Reimbursed as at 31 March 2012

	General	Holden	Kennedy	Lang	Martens	Shelley	Thompson	Walker	Weatherley	Webb	TOTAL
Councillor Fees		$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 7,477.51	$ 67,297.59
Mayoral Fees			$ 16,327.52								$ 16,327.52
Council Meeting Expenses (inc. accommodation, travel & meals)	$ 7,406.62		$ 1,457.80		$ 3,692.73	$ 1,660.56	$ 1,678.32			$ 1,533.28	$ 17,429.31
Councillor Representational/Lobbying Expenses (inc. accommodation, travel, meals & out-of-pocket)		$ 1,010.84	$ 2,193.72		$ 780.98	$ 401.08	$ 217.64			$ 865.80	$ 5,470.06
Miscellaneous expenses (meals, sundries, stationery, etc) but not associated with Conferences, Seminars & Training	$ 1,754.57		$ 55.80								$ 1,810.37
Provision of office equipment, such as laptop computers, mobile telephones, landline telephones and facsimile machines installed in Councillors homes (including equipment and line rental costs and internet access costs but not including call costs)	$ 3,569.82	$ 1,663.81	$ 1,304.51		$ 862.96	$ 1,585.83	$ 1,476.74	$ 104.26		$ 900.78	$ 11,468.71
Telephone calls made by councillors, including calls made from mobile telephones provided by the Council and from landline telephones and facsimile services installed in Councillors homes					$ 16.81	$ 200.00	$ 269.31			$ 905.17	$ 1,391.29
Attendance of Councillors at conferences and seminars	$ 3,150.00	$ 81.82	$ 948.17		$ 466.82						$ 4,646.81
Training and provision of skill development for Councillors											$ -
Interstate visits undertaken by Councillors while representing the Council, including the cost of transport, accommodation and other out-of-pocket travelling expenses											
Overseas visits undertaken by Councillors while representing the Council, including the cost of transport, accommodation and other out-of-pocket travelling expenses											
The expenses of any spouse, partner (whether of the same or opposite sex) or other person who accompanyied a Councillor in the performance of his or her civic functions being expenses payable in accordance with *Guidelines* of the DLG											
Expenses involved in the provision of care for a child or, or an immediate family member of, a Councillor, to allow the Councillor to undertake his or her civic functions											
Total expenses (excl. Fees)		$ 2,756.47	$ 5,960.00	$ -	$ 5,820.30	$ 3,847.47	$ 3,642.01	$ 104.26	$ -	$ 4,205.03	$ 26,335.54

Monthly Development Application Processing Report –March 2012

This report covers the period for the month of March 2012.

Graph 1 indicates the processing times up to 31 March 2012, with the month of March having an average of 25.65 days and a median time of 24.5 days.



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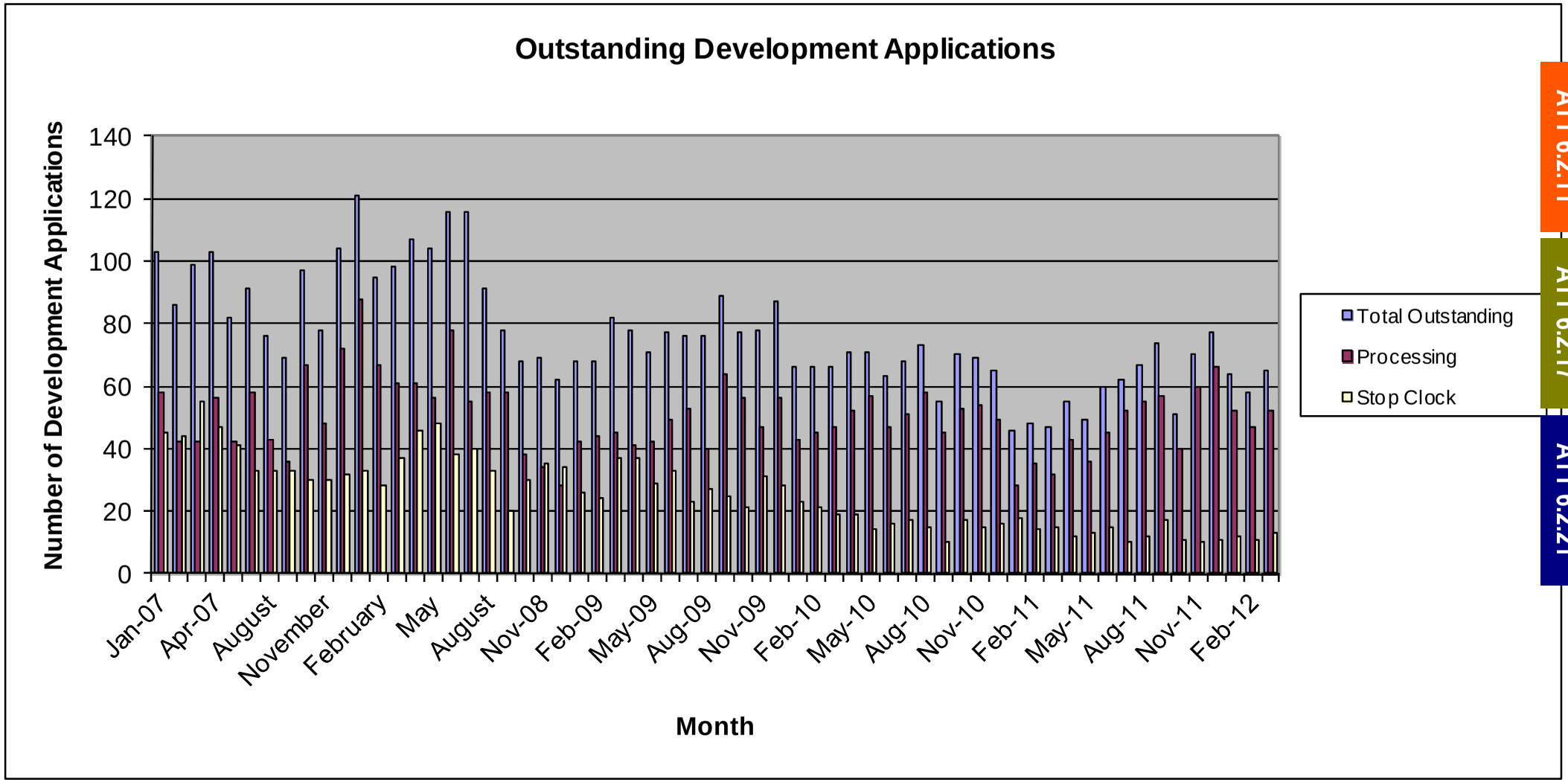
Graph 2 indicates the total number of outstanding applications (excluding dwelling entitlements), the number currently being processed and the number on "stop clock".



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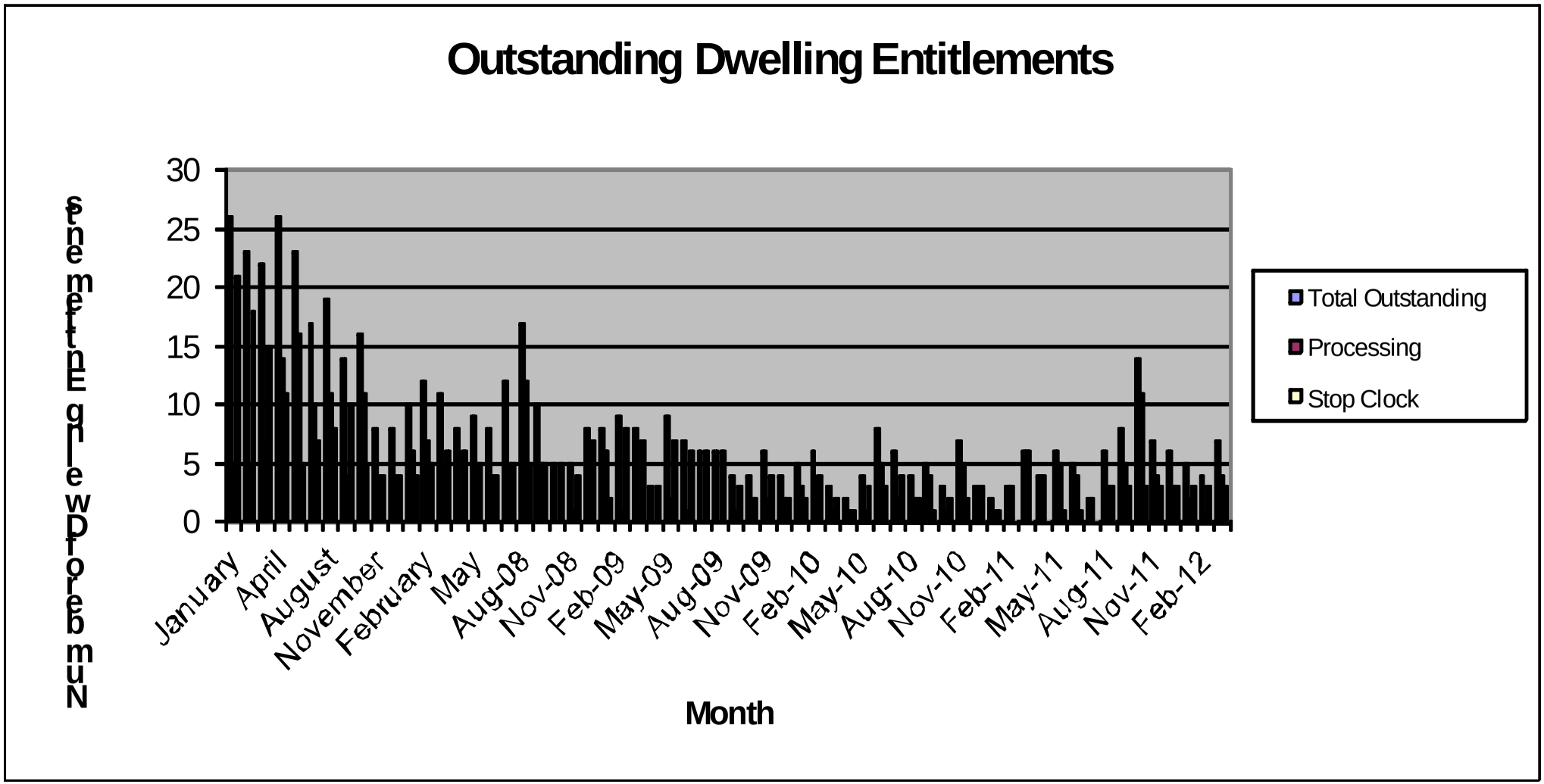
Graph 3 relates solely to dwelling entitlements and indicates the number of outstanding dwelling entitlement applications, the number on stop clock and the number being processed.



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Monthly Development Application Processing Report –March 2012

The Planning and Development Department determined 20 Development Applications either by Council or under delegation during March 2012

Development Applications Determined – March 2012

Appl/Proc ID	Description	House No	Street Name	Locality
DA0223/2012	Alterations & Additions	46	Nicholson Street	MUDGEE
DA0240/2012	Alterations & Additions	207	Mortimer Street	MUDGEE
DA0254/2012	Alterations & Additions	Lot 233	Homer Street	GULGONG
DA0226/2012	Carport	14	Cainbil Street	GULGONG
DA0285/2012	Carport	6	Banjo Paterson Avenue	MUDGEE
DA0241/2012	Commercial Alterations/Additions	3	Fisher Street	GULGONG
DA0251/2012	Commercial Alterations/Additions	71	Angus Avenue	KANDOS
DA0264/2012	Commercial Alterations/Additions	38	Perry Street	MUDGEE
DA0246/2012	Commercial Alterations/Additions	31	Sydney Road	MUDGEE
DA0267/2012	Commercial Alterations/Additions	1637	Blue Springs Road	BUNGABA
DA0255/2012	Dual Occupancy	6	Spring Road	MUDGEE
DA0253/2012	Dwelling House	3	Imber Court	MUDGEE
DA0268/2012	Dwelling House	51	Maiala Road	COOKS GAP
DA0274/2012	Dwelling House	36	Dowling Street	LUE
DA0278/2012	Dwelling House	10	Tebbutt Court	MUDGEE
DA0259/2012	Shed >150m2	1653	Coricudgy Road	KELGOOLA
DA0199/2012	Subdivision - Torrens Title	94	Robertson Street	MUDGEE
DA0214/2012	Subdivision - Torrens Title	374	Coxs Creek Road	RYLSTONE
DA0252/2012	Subdivision - Torrens Title	16	Tennant Close	MUDGEE
DA0257/2012	Subdivision - Torrens Title	12	Rifle Range Road	MUDGEE

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Monthly Development Application Processing Report –March 2012

- **Development Applications currently being processed**

Appl/Proc ID	Description	Street Name	Locality	Decision
DA0205/2012	AltAdd	Blue Springs Road	BUNGABA	Processing
DA0151/2012	AnimalEst	Abattoirs Road	MENAH	Processing
DA0299/2012	Aqua	Carara Road	ERUDGERE	Processing
DA0217/2012	BoardHouse	Blacklead Lane	GULGONG	FurthInf
DA0179/2012	BoundAdj	Wollar Road	COOYAL	FurthInf
DA0294/2012	BoundAdj	Ulan Road	ULAN	Processing
DA0256/2012	CaravanPk	Lions Drive	MUDGEE	Processing
DA0043/2012	Carport	Trefusis Avenue	MUDGEE	Processing
DA0300/2012	Carport	Davies Road	KANDOS	Processing
DA0304/2012	Carport	Dunphy Crescent	MUDGEE	DCU
DA0220/2012	ChangeUse	Henry Lawson Drive	BOMBIRA	Processing
DA0369/2011	ChangeUse	Spring Flat Road	SPRING FLAT	FurthInf
DA0272/2012	CommAltAdd	Sydney Road	MUDGEE	DCU
DA0266/2012	CommPrem	Sydney Road	MUDGEE	FurthInf
DA0269/2012	CommPrem	Upper Bylong Road	UPPER BYLONG	DCU
DA0157/2011	DualOcc	Lower Piambong Road	MENAH	FurthInf
DA0276/2012	DualOcc	Willem Place	MUDGEE	Processing
DA0277/2012	DualOcc	Kellett Drive	MUDGEE	Processing
DA0290/2012	DualOcc	Tebbutt Court	MUDGEE	Processing
DA0296/2012	DualOcc	Lions Drive	MUDGEE	DCU
DA0003/2012	Dwelling	Avisford Court	MUDGEE	Processing
DA0214/2011	Dwelling	Castlereagh Highway	BURRUNDULLA	Processing
DA0273/2012	Dwelling	Ulan Road	BUDGEE BUDGEE	Processing
DA0276/2008	Dwelling	Bocoble Road	BOCOBLE	FurthInf
DA0283/2012	Dwelling	John Aarts Court	MUDGEE	Processing
DA0289/2012	Dwelling	Kellett Drive	MUDGEE	DCU
DA0291/2012	Dwelling	White Circle	MUDGEE	Processing
DA0293/2012	Dwelling	Spring Flat Road	SPRING FLAT	Processing
DA0297/2012	Dwelling	Mulgoa Way	MUDGEE	Processing

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Monthly Development Application Processing Report –March 2012

DA0301/2012	Garage	Dunn Street	KANDOS	Processing
DA0106/2012	HomeInd	Market Street	MUDGEE	Processing
DA0057/2012	Mine	Ulan Road	ULAN	FurthInf
DA0176/2012	ResFlatBld	Burrundulla Avenue	MUDGEE	Processing
DA0327/2011	Shed	Horatio Street	MUDGEE	Processing
DA0174/2012	ShedSmall	Rayner Street	MUDGEE	Processing
DA0260/2012	ShedSmall	Depot Road	MUDGEE	Processing
DA0281/2012	ShedSmall	Lions Drive	MUDGEE	Processing
DA0305/2012	Sign	Sydney Road	MUDGEE	DCU
DA0152/2012	SubCT	George Campbell Drive	BOMBIRA	Processing
DA0263/2012	SubCT	Coxs Creek Road	RYLSTONE	Processing
DA0177/2012	SubTorrens	Bellevue Road	MUDGEE	DCU
DA0208/2012	SubTorrens	Robertson Street	MUDGEE	FurthInf
DA0233/2012	SubTorrens	Campbells Creek Road	CARCALGONG	Processing
DA0280/2012	SubTorrens	Leconsfield Drive	BOMBIRA	Processing
DA0282/2012	SubTorrens	Richards Street	MUDGEE	Processing
DA0295/2012	SubTorrens	Rosevale Blue Springs Road	STUBBO	Processing
DA0271/2012	Trst Accom	Buchanan Street	KANDOS	Processing
MA0004/2010	BulkGoods	Sydney Road	MUDGEE	DCU
MA0017/2012	SubTorrens	Banjo Paterson Avenue	GLEN AYR	Processing

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Monthly Development Application Processing Report –March 2012

Heritage Development Applications currently being processed

DA0087/2012	AltAdd	Gladstone Street	MUDGEE	FurthInf
DA0249/2012	AltAdd	Church Street	MUDGEE	Processing
DA0271/2011	AltAdd	Short Street	MUDGEE	FurthInf
DA0303/2012	AltAdd	Belmore Street	GULGONG	DCU
DA0250/2012	Carport	Mayne Street	GULGONG	Processing
DA0292/2012	CommAltAdd	Perry Street	MUDGEE	DCU
DA0151/2009	Depot	Inglis Street	MUDGEE	FurthInf
DA0265/2012	Depot	Douro Street	MUDGEE	FurthInf
DA0150/2012	DualOcc	Belmore Street	GULGONG	Processing
DA0284/2012	DualOcc	Bryant Lane	MUDGEE	Processing
DA0236/2012	Garage	Mealey Street	MUDGEE	Processing
DA0258/2012	Garage	Inglis Street	MUDGEE	Processing
DA0298/2012	ShedSmall	Horatio Street	MUDGEE	Processing
DA0275/2012	Sign	Mortimer Street	MUDGEE	Processing
MA0001/2012	SubTorrens	Medley Street	GULGONG	Processing
DA0144/2006	UnitAgeDis	Perry Street	MUDGEE	FurthInf

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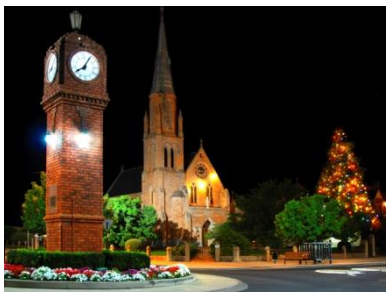
Mid-Western REGIONAL COUNCIL

ATTACHMENT 6.2.17

Kandos & Rylstone Flood Study Report

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SINCLAIR KNIGHT MERZ SKM

Mid-Western Regional Council

Flood Study for Kandos and Rylstone

FLOOD STUDY REPORT

- DRAFT
- 3 May 2012

Flood Study for Kandos and Rylstone

FLOOD STUDY REPORT

- DRAFT
- 3 May 2012

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In preparing this report, SKM has relied upon, and presumed accurate, certain information (or absence thereof) provided by the Client and other sources. Except as otherwise stated in the report, SKM has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

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SINCLAIR KNIGHT MERZ

FOREWORD

The primary objective of the New South Wales Government's Flood Prone Land Policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods, wherever possible. Under the Policy, the management of flood prone land remains the responsibility of local government.

The policy provides for a floodplain management system comprising the following five sequential stages:

1.	**Data Collection**	Involves compilation of existing data and collection of additional data
2.	**Flood Study**	Determines the nature and extent of the flood problem
3.	**Floodplain Risk Management Study**	Evaluates management options in consideration of social, ecological and economic factors relating to flood risk with respect to both existing and future development
4.	**Floodplain Risk Management Plan**	Involves formal adoption by Council of a plan of management for the floodplain
5.	**Implementation of the Plan**	Implementation of flood, response and property modification measures (including mitigation works, planning controls, flood warnings, flood preparedness, environmental rehabilitation, ongoing data collection and monitoring by Council

Mid-Western Regional Council is responsible for local planning and land management in its Local Government Area (LGA), including the management of flood prone areas in the townships of Kandos and Rylstone. Through its Floodplain Risk Management Committee, Council proposes to prepare a comprehensive Floodplain Risk Management Plan for Kandos and Rylstone in accordance with the New South Wales Government's 2005 Floodplain Development Manual.

This report is represents the first and the second stages of the management process and has been prepared for Council by Sinclair Knight Merz. It documents the nature and flooding extents throughout Kandos and Rylstone and is an essential resource for the subsequent stages of the floodplain management process.

Contents

Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
1	26-4-12	John Wall	Johan Wall	26-4-12	Practice and PD Review

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Project manager:	Akhter Hossain
Name of organisation:	Mid-Western Regional Council
Name of project:	Flood Study for Kandos and Rylstone
Name of document:	Flood Study Report
Document version:	DRAFT
Project number:	EN03015

1. Introduction

1.1. Background

Mid-Western Regional Council (MWRC) is responsible for local planning and land management in the towns of Kandos and Rylstone. Council is currently reviewing its Local Environment Plan (LEP) and preparing a Development Control Plan (DCP). Council has no formal floodplain risk management strategies in place to provide an appropriate level of protection for the Kandos and Rylstone communities. Further, Council has no formal emergency management strategies to effectively manage the continuing flood problems for the two towns. Hence, Council proposes to develop floodplain risk management plans for both Kandos and Rylstone in phases, in accordance with the NSW Government's (2005) Floodplain Development Manual. Initial investigations (including data collection and review of all relevant data) and a flood study, will be undertaken in the first phase (Phase 1). For both towns, a Floodplain Risk Management Study (the Study) and Plan (the Plan) will be developed in the second phase (Phase 2), with the Plan being implemented in the third phase (Phase 3).

Sinclair Knight Merz (SKM) was engaged by MWRC in June 2011 to develop a Floodplain Risk Management Plan for Kandos and Rylstone encompassing all activities in Phase 1 and Phase 2. This report details outcomes from Phase 1 of the project.

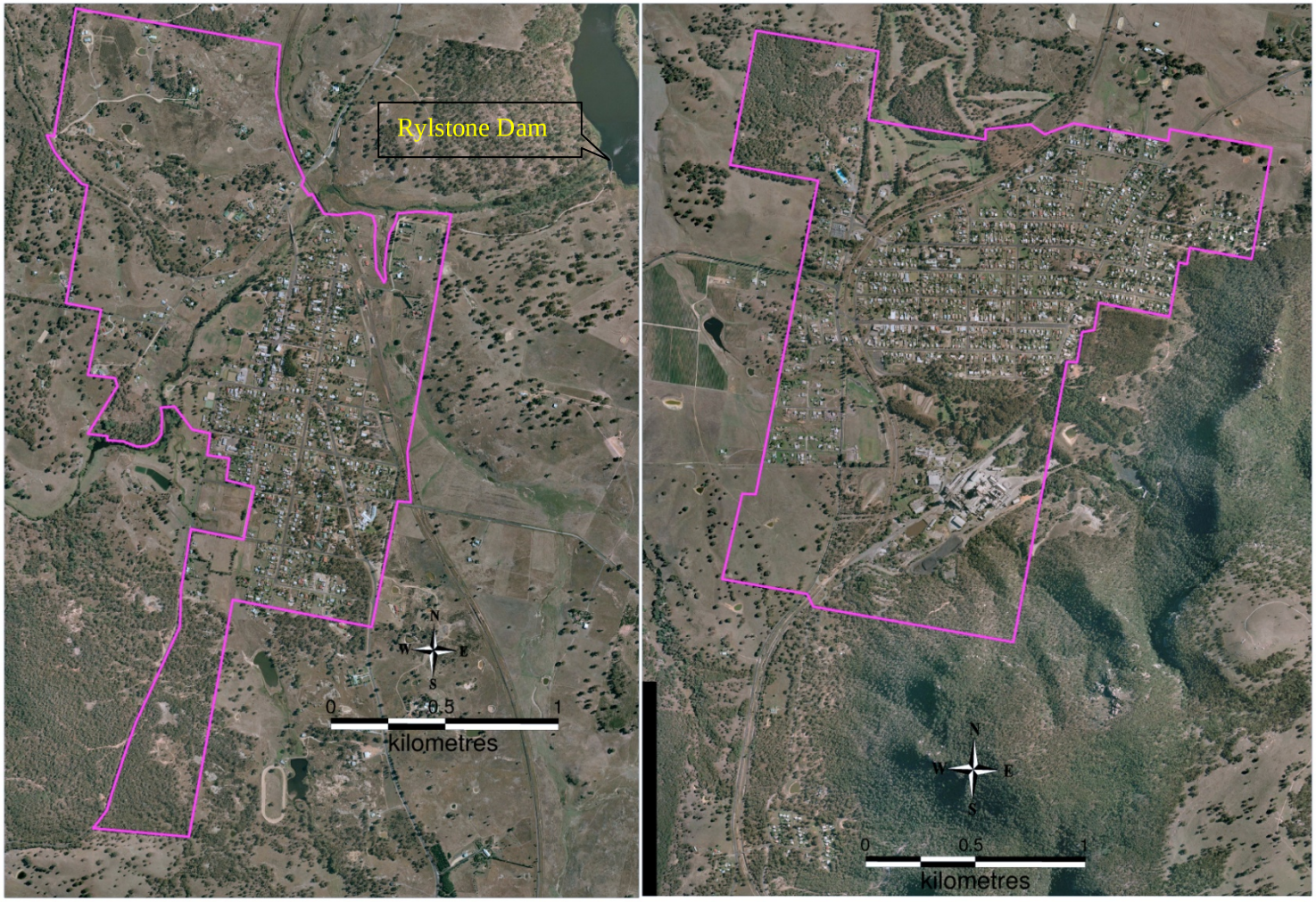
1.2. Study Areas

1.2.1. Kandos

The study area for Kandos is shown in **Figure 1-1** Kandos (population approximately 1,440) is located in the Central Tablelands of NSW. The town is located on the upper catchment area of Cumber Melon Creek, which is a tributary of the Cudgegong River. Kandos has a history of overland flooding and no riverine flooding. Minor development has modified overland flow paths to some extent and future development has the potential to aggravate overland flooding further.

Council is reviewing its LEP and also preparing a DCP, in order to guide the expansion of the township, and Council needs to assess the impact of future urbanisation on the catchment.

- **Figure 1-1 Study Areas**



Rylstone

Kandos

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1.2.2. Rylstone

The study area for Rylstone is shown in **Figure 1-1**. Rylstone (population approximately 730) is located in the upper Cudgegong River catchment and has a history of both overland flooding and, to a much lesser extent, riverine flooding. The town experienced several floods in the 1950s and overland flooding problems were experienced in some parts of the town in 2010.

The Cudgegong River is dammed (Rylstone Dam) approximately 1 km upstream of Rylstone, which provides water supply for Rylstone and Kandos. Failure of Rylstone Dam (catchment area 535 km^2 and a storage capacity of 3,038 ML) has the potential to impact on flooding in Rylstone.

1.3. Overall Objective

Mid-Western Regional Council (MWRC) needs to develop a Floodplain Risk Management Plan (FRMP) for Kandos and Rylstone, to address the existing, future and continuing flood problems, in accordance with the NSW Floodplain Development Manual (2005). To meet the requirements of the Manual, Council needs a FRMP in order to:

- Reduce the flood hazard and risk to people and property in the existing community;
- Protect, maintain and, where possible, enhance the river and floodplain environment, and
- Ensure flood management decisions integrate the social, economic and environmental considerations.

The study is being undertaken in three phases. Major activities undertaken in each phase are provided below:

- **Phase 1**
  - **Initial Investigations**
    - A site inspection;
    - Data collection and review of all relevant documents, data and reports;
    - Consultation with the community and stakeholders; and
    - Identification of additional data needs to undertake the study.
  - **Flood Study**
    - Review of existing hydrologic and hydraulic models for the Cudgegong River catchment at Rylstone and defining flood behaviour for 0.5%, 1%, 2%, 5%, 10%, 20% Annual Exceedance Probability (AEP) events and the Probable Maximum Flood (PMF) event;

- Investigations of overland flooding for both Kandos and Rylstone under the existing catchment and floodplain conditions for the full range of flood events including 0.5%, 1%, 2%, 5%, 10%, 20% AEP events and the PMF event;
- Identification of flooding issues within the catchments and an assessment of the existing stormwater drainage network in both Kandos and Rylstone; and
- Preparation of provisional flood mapping for both Kandos and Rylstone for the PMF, 1% AEP, 1% AEP +0.5m and 20% AEP events.

- **Phase 2 Floodplain Risk Management Study and Draft Plan**
  - An assessment of potential flood management and mitigation measures in order to achieve improvements necessary to meet the required service levels. Such measures may include improved drainage works within both Kandos and Rylstone, levees, bypass floodways, culvert amplification, house floor raising, construction of flood retarding basins, flood warning and public education, zoning and development control, voluntary purchase etc;
  - Estimation of flood damages and annual average damages and their net present worth;
  - An economic assessment of the floodplain management measures based on life cycle cost and benefits;
  - Prioritisation of improved drainage measures and estimate the cost thereof; and
  - Final flood mapping.
- **Phase 3 Floodplain Risk Management Plan Implementation**

1.4. Structure of the Report

This report describes the Data Collection (Stage 1) and Flood Study (Stage 2) aspects as defined in Section 1.3. The outcome of the Floodplain Risk Management Study (Stage 3) will be produced in a separate report. The report has been divided into the following sections:

- **Section 1:** introduces the study
- **Section 2:** provides details on the initial investigations undertaken for the study including review of the available data and community consultation
- **Section 3:** details riverine flooding assessment for the Cudgegong River in Rylstone, including a dambreak assessment for Rylstone Dam
- **Section 4**: details stormwater capacity assessment for both Kandos and Rylstone townships
- **Section 5**: assesses local overland flooding for both Kandos and Rylstone township
- **Section 6**: provides conclusions on the study
- **Appendix A**: Questionnaire sent to residents
- **Appendix B**: Additional topographic data

- **Appendix C**: Flood modelling for Cudgegong River
- **Appendix D**: Input data used and results obtained from the stormwater capacity assessment for both towns
- **Appendix E**: Details on local overland flood assessment for both Kandos and Rylstone

2. Initial Investigations

2.1. Site Inspection

A site inspection was carried out on 7 and 8 June 2011 to:

- Gain an appreciation of the catchment characteristics, Rylstone Dam, potential flooding problem areas and stormwater systems; and
- Estimate Manning's roughness coefficients for floodplains.

2.2. Review of Relevant Reports

Integrated Water Cycle Modelling (August 2002)

Hunter Water Australia (HWA) prepared the report for Rylstone Shire Council to document outcomes from the integrated water cycle modelling. HWA developed the following quantitative models of the various components of the water cycle:

- Catchment modelling using RAFTS-XP;
- Floodplain modelling using MIKE11;
- Water system modelling using PIPES^{++};
- Wastewater system modelling using MOUSE; and
- Effluent modelling as part of a sustainable effluent management plan.

The report details the above models developed by HWA and, where appropriate, provides recommendations for future work, which could be undertaken to improve the models. Both RAFTS-XP and MIKE11 models developed in the 2002 study were available to this study.

Windamere Dam PMP Design Flood and Spillway Adequacy Study (1999)

The report was prepared by SMEC Australia for the NSW Department of Land and Water Conservation. A hydrologic model using RAFTS was developed for the catchment area (1,088km^2) of Windamere Dam. The RAFTS model was calibrated against recorded streamflow data for three storm events (1971, 1973 and 1976) and the model was verified against recorded streamflow data for four storm events (1956, 1986, July 1990 and August 1990). The verified model was used to define inflow and outflow frequency curves for Windamere Dam for storm events between 1 in 20 AEP and 1 in 1,000,000 AEP. Inflows to Windamere Dam for 1 in 20 AEP, 1 in 50 AEP and 1 in 100 AEP were estimated at 430m^3/s, 607m^3/s and 768m^3/s, respectively. The RAFTS model used in the 1999 study was not available to this study.

Rylstone Flood Study Report (June 1987)

This reconnaissance flood study report was prepared by the Department of Water Resources to define flood behaviour for the town of Rylstone under the current conditions. The report details the results of flood investigations based on the historical flood of February 1955, which was

considered as the highest flood recorded in the last century. The elevation of the 1955 flood is equivalent to a gauge height of 4m on the traffic bridge gauge. No residential or industrial properties were affected by 1955 flood and, hence, no flood marks were recorded on buildings or other structures. The Department obtained three flood marks of the 1955 flood, which allowed an estimate of the 1955 profile in the town to be made. Estimated 1955 flood levels at the Filtration Plant, Louee Street Bridge, Dabee Street and Cudgegone Street were 570.5, 570.0, 569.5 and 568.5 mAHD, respectively.

Report on Stormwater Drainage for the Towns of Kandos & Rylstone (July 1975)

The report was prepared by Sinclair Knight & Partners for Rylstone Shire Council as an outcome of a study on the overall drainage systems of Kandos and Rylstone. The following tasks were undertaken as part of the study:

- Delineation of stormwater catchment boundaries;
- Calculation of discharge rates in the in 1 in 5 AEP storm event;
- Comparison of the capacity of the existing structures with calculated discharge rates; and
- Recommendations for various works.

While the calculation methods were not stated in the report, it is likely that the flows and pipe capacities were estimated based on Rational Method flow calculations and Manning's n capacity calculations, respectively.

Studies Relating to Rylstone Dam

MWRC provided over a dozen reports on Rylstone Dam addressing spillway hydrology, dam break study, structural review, geotechnical investigation, dam surveillance, dam safety emergency plan, portfolio risk assessment, review of environmental factors, flood security upgrade, survey of reservoir etc. The following reports of relevance to this study were reviewed and key outcomes from the review are summarised below:

- **Dam Safety Emergency Plan for Rylstone Dam (February 2010) -** A Dam Safety Emergency Plan (DSEP) for Rylstone Dam was prepared by NSW Public Works for MWRC to address preparedness in relation to the occurrence of an emergency condition at Rylstone Dam resulting from flooding, earthquake and other emergency situations. The report provides information necessary for emergency agencies to manage a downstream evacuation in the unlikely event of a potential dam failure. The study used flooding conditions downstream of the Rylstone Dam based on a Base Safety Conditions (BSC) Study undertaken by Public Works Department in 2001 (PWD 2001). Inundation maps were produced as part of the DSEP using 16 surveyed cross sections from the 2001 BSC along Cudgegong River covering a distance of 3.1km downstream of the Dam. Flood inundation maps were used to estimate the number of houses inundated by the various flood cases. The PMF for Rylstone Dam adopted

in the study was approximately 6,100 cumecs (m^3/s). The study recommended updating the BCS Study based on the 2003 PMF Study for Rylstone Dam, which determined the peak inflow to be 14,700 cumecs.

- **Rylstone Dam Survey prepared by GHD Pty Ltd (2009)** – company 'Whelans Insites' undertook a topographic and bathymetric survey over the catchment area of the Rylstone Dam extending to RL 580.5 mAHD on 6 and 13 November 2008. The storage volumes at the Dam were calculated for various depths from 568.0 to 580.5 mAHD.
- **Rylstone Dam Probable Maximum Flood Study (August 2003)** - The report was prepared by NSW Department of Commerce for Rylstone Shire Council to assist in the preparation of a dam safety emergency plan for Rylstone Dam. A hydrological model using RORB was developed for the catchment area of Rylstone Dam. The RORB model parameter values were estimated using recommended regional relationships. The Bureau of Meteorology's Bulletin 53, as amended in December 1996, was used to estimate the probable maximum precipitation for the catchment area of Rylstone Dam. Estimated peak outflows from the Dam for the PMF event varied between 5,455 m^3/s and 13,350 m^3/s depending on the value of k_c (a parameter of the RORB model). Hydrographs based on three values of k_c (14.32, 21.91 and 42.62) are presented in the report. A k_c value of 14.32 provides the upper bound flood estimate while a k_c value of 42.62 provides the lower bound flood estimate for the PMF event. The study estimated the peak inflow to be approximately 14,700 cumecs (m^3/s). Details on the RORB model set up are not available in the report and the RORB model was not available to this study.
- **Rylstone Dam, Dambreak Study for Rylstone Shire Council (January 1993)** - NSW Public Works undertook the dambreak study using the BOSS DAMBRK program. A 3 km reach of the Cudgegong River was modelled in BOSS DAMBRK using 16 cross sections. Cross sections were obtained from Council's on-site physical survey, after confirmation of locations by a combined PWD/Council site inspection. A preliminary estimate on the PMF (peak inflow of 6,077 m^3/s) was derived from the 6 hour Probable Maximum Precipitation (PMP) event. Three hypothetical dambreak scenarios were investigated in the study including a sunny day failure and Imminent Failure Flood (IFF) with and without dam failure. Number of dwellings located within the flood inundation zones for the sunny day failure event, IFF without dam failure and IFF with dam failure were estimated at 2, 3 and 11, respectively.

2.3. Review of Available Data

2.3.1. Rainfall Data

The Bureau of Meteorology's website was searched to locate rainfall stations in the close proximity of both townships. The rain gauge (No. 062026) located at Rylstone (Ilford Road) is the closest rain gauge to both Kandos and Rylstone. The gauge was opened in 1881 and is still in operation.

Twenty (20) highest 1-day (9 AM to 9 AM) rainfall events recorded at the gauge are shown in **Figure 2-1**.

- **Figure 2-1 Recorded 1-day Peak Rainfall in Rylstone (Ilford Road) Gauge**

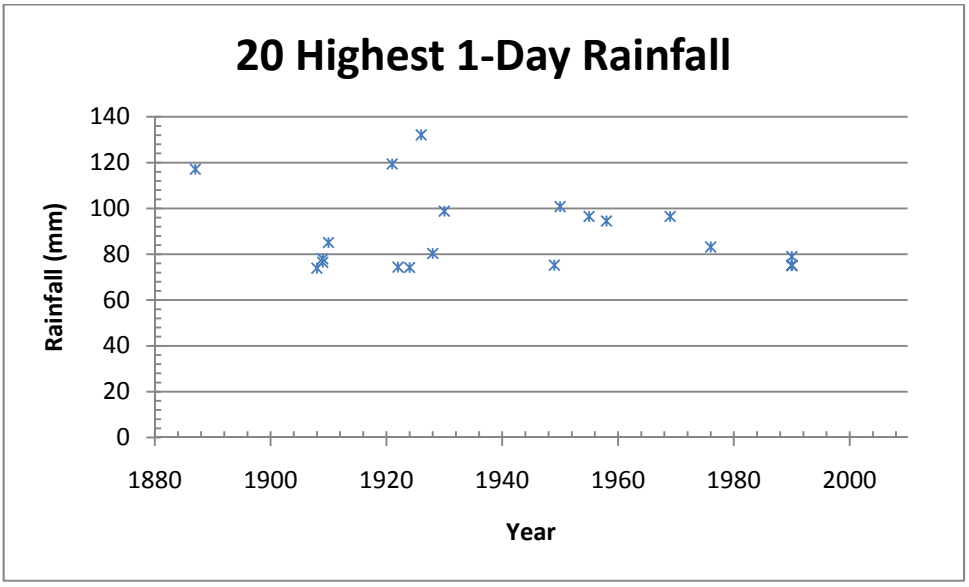


Figure 2-1 shows that the maximum 1-day rainfall recorded at the gauge was 132mm, which occurred in 1926, and since 1980 the recorded 1-day peak rainfall is lower than 80mm.

Significant flooding was experienced in Rylstone and Kandos in December 2010. A review of rainfall data for November and December 2010 indicates that a number of storm events were recorded at the gauge indicating wet catchment conditions during both months. The recorded rainfall for November 2010 was more than double the mean monthly rainfall for November and the rainfall recorded in December 2010, was almost three times the mean monthly rainfall for December. Wet catchment conditions coupled with additional rainfalls from other storm events resulted in flooding in parts on the catchment in December 2010.

2.3.2. Streamflow Data

A review of PINNEENA version 9.3 (a surface water database released by NSW Office of Water) shows that there are two streamflow gauging sites on the Cudgegong River in Rylstone. Details on the gauges are provided below:

- Cudgegong River at Upstream Rylstone (GS 421184) - This site commenced in June 2009 and water level records for two months are available in PINNEENA.
- Cudgegong River at Rylstone Bridge (GS 421038) - This gauge was commissioned in 1957 and was discontinued in 1980. Monthly flow volumes are available in PINNEENA for this site.

2.3.3. Data Provided by Council

MWRC provided the following data including topographic data, aerial photography, GIS layers and modelling data:

- Airborne Laser Survey (ALS) with a vertical accuracy of +/- 0.15m
- 0.5m contours based on ALS data
- Corrected Cadastre accurate to 0.15m
- Layout plan of the existing drainage system in MapInfo
- Imagery for the study areas
- Natural drainage layer in MapInfo
- Zoning maps in MapInfo
- Hydrologic and hydraulic modelling data from the Integrated Water Cycle Modelling Study (August 2002).

2.4. Review of the Available Computer Models

2.4.1. Hydrologic Model

The RAFTS-XP hydrologic model used in the Rylstone Integrated Water Cycle Modelling Study (HWA 2002) was provided by MWRC for use in this study. A review was undertaken on the RAFTS-XP hydrologic model prior to using the model in this study. Outcomes from the review are provided below:

- Catchment Area - The total catchment area of the Cudgegong River represented in the RAFTS-XP model is 862 km^2 , which is 226 km^2 smaller than the catchment area of Windamere Dam. The catchment area represented in the model at Rylstone Dam is 533.4 km^2 , which is almost the same catchment area for Rylstone Dam reported elsewhere.
- Impervious Areas - A 32.7 ha area is included in the RAFTS-XP model to represent impervious areas in Rylstone. This is considered a reasonable estimate.
- Rylstone Dam - The storage capacity of Rylstone Dam at the Full Supply Level (FSL) of 580.03 mAHD, is 3,320 ML (DoC 2004). However, a storage volume of 13,012 ML is represented in the RAFTS-XP model at FSL, which is almost four times the storage capacity of Rylstone Dam at FSL. The spillway discharge is calculated in the model using a 140m long broad crested weir (crest at FSL) with a coefficient of discharge value of 2.1. A 260 m long fuse plug at dam crest is also defined in the model. The report (HWA 2002) does not clarify why a stage-discharge table was not used to define the capacity of the spillway.
- Model calibration and verification - The report (HWA 2002) does not indicate that the model was calibrated or validated.

- Although the catchment area is located in “Zone 2” as defined in Australian Rainfall Runoff, rainfall temporal patterns for "Zone 1" were adopted in the HWA 2002 study.
- Rainfall losses - An initial rainfall loss of 20mm and a continuing rainfall loss of 2.3mm/hour were used for both pervious and impervious areas for all storm events up to and including the 1% AEP event. The adopted rainfall losses for pervious areas are considered reasonable, however, it is considered appropriate to use 1mm initial loss and zero continuing loss for impervious areas.
- Comparison of design peak discharge - The RAFTS-XP model was used to simulate design discharges for 100%, 50%, 20%, 10%, 5%, 2% and 1% AEP event. A comparison of estimated peak discharges for 5%, 2% and 1% AEP events for the Cudgegong River is shown in **Table 2-1**, which shows that design discharges estimated in the HWA 2002 study are significantly higher than that estimated in the SMEC 1999 study. It is to be noted that the hydrologic model used by SMEC was calibrated and verified against recorded streamflow data, and hence, design discharges estimated in the SMEC study are considered more robust than that estimated by HWA.

- **Table 2-1 Comparison of Peak Design Discharges (cumecs)**

Flood Event (AEP)	Cudgegong River and Carwell Creek Junction (Catchment area = 862 km^2)[1]	Inflow to Windamere Dam (Catchment area = 1,070 km^2)[2]
5%	492	430
2%	662	607
1%	832	768

[1] HWA 2002; [2] SMEC 1999

Given the wide discrepancy between HWA (2002) estimated peak discharge and SMEC (1999) estimates, it was recommended to update the RAFTS-XP model for the Cudgegong River as part of this study.

2.4.2. Hydraulic Model

The hydraulic model used in the Rylstone Integrated Water Cycle Modelling Study (HWA 2002) was provided by MWRC for use in this study. A review was undertaken on the MIKE11 hydraulic model prior to using the model in this study. Outcomes from the review are provided below:

- Model extent – The following flow paths were represented in the MIKE11model:
  - Cudgegong River (70.9 km) including a 51.6 km reach of Cudgegong River upstream of Rylstone Dam
  - Cumber Melon Creek (10.6 km) which is located outside the area of interest to this study

- Carwell Creek (29.4 km) which is located outside the study area for this study
- Coxs Creek (14.7 km) which is located upstream of Rylstone Dam
- Tong Bong Creek (4.44 km) of Tong Bong Creek

- Channel network - The Cudgegong River and its associated floodplain is represented as a single flowpath within the study area for Rylstone. The model includes additional flow paths that are located outside the study area for this study, which could be excluded from the model configuration.
- Cross Sections - The report (HWA 2001) shows that 18 cross sections used in the MIKE11 model are surveyed cross sections. Insufficient information was available on location of cross sections and generally cross sections were extrapolated to represent the floodplain in the model. Cross sections for Cudgegong River used in the model further downstream of Rylstone Sewage Treatment Works were possibly sourced from the available topographic mapping. A comparison of three surveyed cross sections with the corresponding cross sections extracted from the ALS data showed a reasonable agreement between the two sets of data. Hence, additional cross sections need to be extracted from the ALS data for a better representation of the terrain in the MIKE11 model.
- Waterway Crossing - Bridges, weirs etc. represented in the model, need to be updated using work as executed drawings and field survey.
- Manning's n values - Manning's n values used in the model are generally considered reasonable estimates.
- Downstream boundary condition - The model uses a fixed water level at Lake Windamere. It is considered appropriate to use a stage-discharge rating curve as the downstream boundary of the model. A stage-discharge rating curve will be developed for use in the model.

2.5. Community Consultation

2.5.1. Flood Questionnaire

A community consultation process was initiated to obtain flood information for past events. This involved sending a newsletter and a questionnaire (included in **Appendix A**) to residents/landowners within the study areas in Kandos and Rylstone. The newsletter introduced the floodplain management process to the residents of the areas, described the purpose of the questionnaire and provided the residents with contacts for their responses. The questionnaire was prepared in consultation Council to help identify flood and drainage issues in the study areas and to provide reliable flood information to assist in the validation of the hydrologic and hydraulic computer models. An electronic copy of the newsletter and questionnaire was provided to Council and Council distributed printed copies of the newsletter and questionnaire to residents in July 2011.

The flood information that was requested included:

- General information such as:
  - Residents from the Study Area
  - Ownership of the residence
  - How long residents lived at the property
- Specific flood information such as:
  - Experience on flooding in residence and/or at work
  - Location and depth of flood water in the worst flood experienced
  - Duration of flooding
  - Flood damages to residence and business
  - Disruption to vehicular access to residence during flooding
  - Identify information (eg. flood photographs, newspaper clippings, flood marks etc) that can be provided to Consultants
  - Flooding to residence made worse by works on other properties or by construction of roads or other structures
  - Any comments on any other issues associated with this study.

The responses to community survey were thoroughly reviewed for information of major flooding effects that could be useful for validation of the hydrologic and hydraulic computer models.

2.5.2. Summary of Responses to Flood Questionnaire

In total of six (6) responses were received from the community to the questionnaire. Three (3) respondents are residents of Rylstone; one respondent is a resident of Kandos; one respondent lives in Clandulla (which is located outside the study area) who identified a flooding problem area in Rylstone, which is also located outside the study area; and one respondent intends to live in Rylstone and identified benefits of flooding on the re-vegetation of the riparian area of the Cudgegong River through Rylstone. A summary of information provided by respondents is provided below.

Kandos

The owner has been living in the dwelling on 15 George Street, Kandos for the last 30 years. A storm event in 2010 resulted in a 0.4m depth of flooding in the garage and washed out the driveway. Photographs (refer to **Figure 2-2** to **Figure 2-4**) provided by the owner indicate that stormwater from Darton Park (located at the corner of George and Mason Street) runs along both George Street and Mason Street, which is obstructed by the culvert under the driveway of the property on 15 George Street. The obstruction at the driveway culvert caused stormwater to run along the driveway in a northerly direction.

- **Figure 2-2 Stormwater from Darton Park moving along George Street**

- **Figure 2-3 Stormwater impeded by culvert under the Driveway of 15 George Street**

- **Figure 2-4 Stormwater running along the Driveway of 15 George Street**

Rylstone

Information provided by respondents relating to flooding issues in Rylstone is discussed below:

- Blockage of pipe culvert under driveway of 42 Carwell Street, Rylstone - A pipe culvert (approximately 900mm diameter) under the driveway is approximately 75% blocked with silt, gravel and rocks. Stormwater from the adjoining Council yard and Piper Street is drained through the pipe culvert under the driveway, and hence, clearing this culvert is desirable.
- Flooding on 2571 Bylong Valley Way, Rylstone - Two respondents identified flooding on this property. Following further discussion with the owner of the property it is understood that the backyard was flooded during a storm event about ten (10) years ago.
- Re-vegetation and Rylstone Weir - The respondent (who lives outside the study area) highlighted the importance of re- vegetation along the Cudgegong River in mitigating bank erosion. The respondent was involved in re-vegetation of a 450m reach along the Cudgegong River upstream of Rylstone. The respondent believes that removal of the weir will have a positive impact on flooding in Rylstone and movement of fish and platypus.
- Access to Rylstone Cemetery cut-off - The respondent (who lives outside the study area) identified flooded sections of Glen Alice Road, Brown Lane and Narrango Road, which cut off access to the cemetery. In 2010, Narrango Road was impassable for a week due to one storm event.

2.6. Additional Topographic Survey

Collection of stormwater details by MWRC was included as part of the study. Survey of additional waterway crossings (eg. bridges, culverts, weirs etc) was included in the scope of the additional topographic survey. MWRC engaged Whelans Insites to undertake the additional survey. Topographic data provided by Whelans Insites to MWRC are included in **Appendix B**.

3. Cudgegong River Catchment Flooding

3.1. Background

Cudgegong River drains a catchment area of approximately 590 square kilometres at the southern boundary of Rylstone, near the Sewage Treatment Works (STW). Rylstone Dam (catchment area 535 square kilometres) is located on Cudgegong River approximately 1.5 kilometres north-east of Rylstone. The dam (15m high, a crest length of 143m and a storage capacity of 3,320 ML at full supply level) comprises of a concrete arch section with earthfill embankments on both ends.

Cudgegong River flows in a westerly direction through a well defined valley for approximately 1 kilometre downstream of Rylstone Dam. An unnamed creek joins the river from the south beside the Water Treatment Plant (WTP). Tongbong Creek joins the River from the north approximately 200 metres downstream of the WTP. The Wallerawang-Gwabegar Railway line crosses Cudgegong River downstream of its junction with Tongbong Creek. Bylong Valley Way crosses the River downstream of the Railway crossing. The River then flows along the western edge of the township into open undulating country before flowing into Windamere Dam reservoir located 15 kilometres downstream.

Except for the urban area of the township, the dominant land use within the catchment is forest and there are significant rural areas within the catchment. Urban development in Rylstone extends to the edge of the narrow floodplain of the Cudgegong River and only developments on the floodplain are playing fields and associated buildings.

The flood event February 1955 is considered as a major event Rylstone, which is equivalent to a gauge height of 4m on the traffic bridge gauge. No residential or industrial properties were affected by 1955 flood, and hence, no flood marks were recorded on buildings or other structures (DWR 1987).

3.1.1. Updating of the Hydrologic Model

The hydrologic model used in the Integrated Water Cycle Modelling (HWA 2002) was updated to reconcile estimates of design discharges with SMEC 1999 study. The following updates were made to the RAFTS-XP hydrologic model:

- The storage capacity of Rylstone Dam was based on the November 2008 Rylstone Dam Survey and the spillway rating curve presented in DoC 2004 study was adopted ;
- An initial rainfall loss of 1mm and a continuing rainfall loss rate of 0 mm/hour were assigned to represent losses for the impervious area; and

- Rainfall temporal pattern were set to "Zone 2" instead of "Zone 1" defined in the HWA 2002 study.

The updated RAFTS-XP model was run for the 36 hour storm (which produced peak discharges in Rylstone) for all design flood events. A comparison of peak discharge between the updated RAFTS-XP model and SMEC 1999 study, are shown in **Table 3-1**, which shows that discharges estimated for Windamere Dam catchment (area 1070 km^2) are consistently higher than the corresponding discharges estimated in this study.

- **Table 3-1 Comparison of Peak Design Discharges (cumecs)**

Flood Event (AEP)	Cudgegong River and Carwell Creek Junction (Catchment area = 862 km^2)[1]	Inflow to Windamere Dam (Catchment area = 1,070 km^2)[2]
5%	337	430
2%	451	607
1%	575	768

[1] this study; [2] SMEC 1999

Peak discharges estimated for the full range of flood events between 20% AEP and 0.5% AEP events are shown in **Table 3-2**. **Table 3-2** also shows peak inflows and outflows for Rylstone Dam, which indicates almost no attenuation of peak discharge due to Rylstone Dam.

Table 3-2 Estimated Peak Design Discharges (cumecs) for 36 Hour Storm

Flood Event (AEP)	Rylstone Dam		Tong Bong Creek	Town Catchment	Tong Bong/ Cudgegong River
	Inflow	Outflow			
20%	169	167	26	19	172
10%	231	230	34	24	238
5%	327	325	46	32	337
2%	435	432	57	39	451
1%	548	546	69	48	575
0.5%	668	665	83	57	702

The inflow hydrograph for the PMF event adopted in this study was sourced from the DoC's 2003 report, which produced a peak inflow of 14,700 m^3/s from Rylstone Dam for the 4 hour PMP event.

3.1.2. Updating of the Hydraulic Model

A review of the MIKE11 hydraulic model developed in the Integrated Water Cycle Modelling (HWA 2002) project was undertaken as part of the study. Outcomes from the review are provided in Section 2.4.2. The following updates were made to the MIKE11 model:

- All flow paths located outside Rylstone were removed from the model set up which represented Cumber Melon Creek, Carwell Creek and Cox's Creek;
- Reduced lengths of Cudgegong River (between Chainage 51630m to 56140m) and Tong Bong Creek (between 3400m to 4440m) were included in the model due to the availability of ALS data for the study area within Rylstone;
- An additional flow path was included in the MIKE11 model to represent the elevation-lake area relationship and spillway capacity for Rylstone Dam;
- In total twenty eight (28) cross sections were used in the MIKE11 model to represent Cudgegong River of which 9 cross sections were sourced from the HWA 2002 study and the remaining 19 cross sections were extracted from the ALS data;
- All nine (9) cross sections used to represent Tong Bong Creek were extracted from the ALS data;
- Manning's n values assigned to cross section were based on site reconnaissance and aerial imagery;
- A tailwater rating curve was used to define the downstream boundary of the model in the Cudgegong River; and
- The foot bridge over Cudgegong River was included in the model. However, Rylstone Weir could not be included in the model as the weir crest was located above invert of cross sections extracted from the ALS data.

3.2. Flood Behaviour for the Existing Condition

3.2.1. Flood Behaviour

The updated MIKE11 model was run for 0.5%, 1%, 2%, 5%, 10%, 20% AEP events and the PMF event. Peak water levels, discharge, velocities and times to reach peak water levels for all modelled events are presented in **Appendix C**. Peak water level profiles and peak velocity profiles in Cudgegong River downstream of Rylstone Dam are shown in **Figure 3-1** and **Figure 3-3**. Following observations can be made from **Figure 3-1**:

- Variation in peak water level profiles for all flood events between 0.5% AEP and 20% AEP is consistent;
- Peak water levels in Cudgegong River for the 0.5% AEP and 20% AEP vary between 2m to 3.5m. The range of variation for the two events is the smallest in the vicinity of the foot bridge and the range of variation is the largest downstream of the weir; and
- The flood profile for the PMF event is, at least, 10m above the flood profile for the 0.5% AEP event and afflux at the railway bridge and the traffic bridge are very significant.

Peak velocities in Cudgegong River for the 20% AEP to 0.5% AEP events vary between 0.5m/s to 2.5m/s as shown in **Figure 3-3**. However, velocities can be as high as 6m/s in the case of the PMF event.

3.2.2. Comparison of Peak Water Level Profiles

Peak water levels in Cudgegong River for the 1% AEP event estimated in the HWA 2002 study were provided by MWRC. A comparison of peak water level profiles between this study and the HWA 2002 study is shown in **Figure 3-1**.

- **Figure 3-1 Comparison of 1% AEP Peak Water Levels in Cudgegong River**

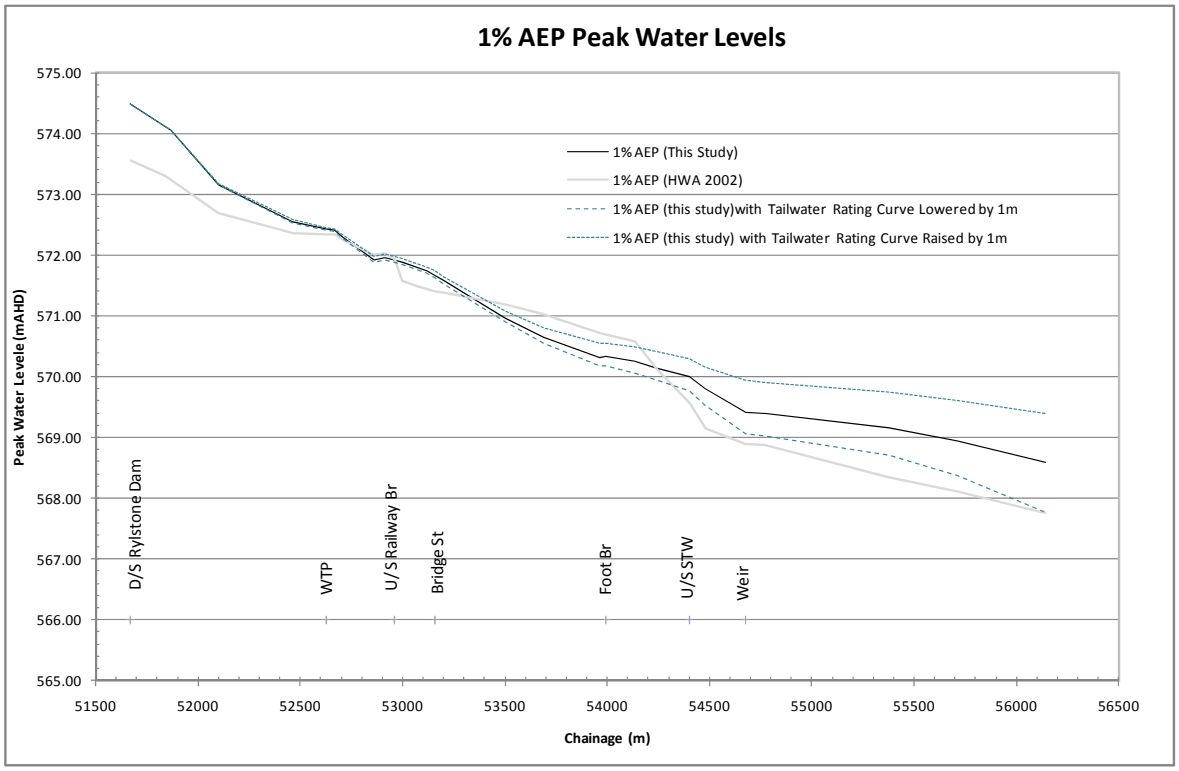
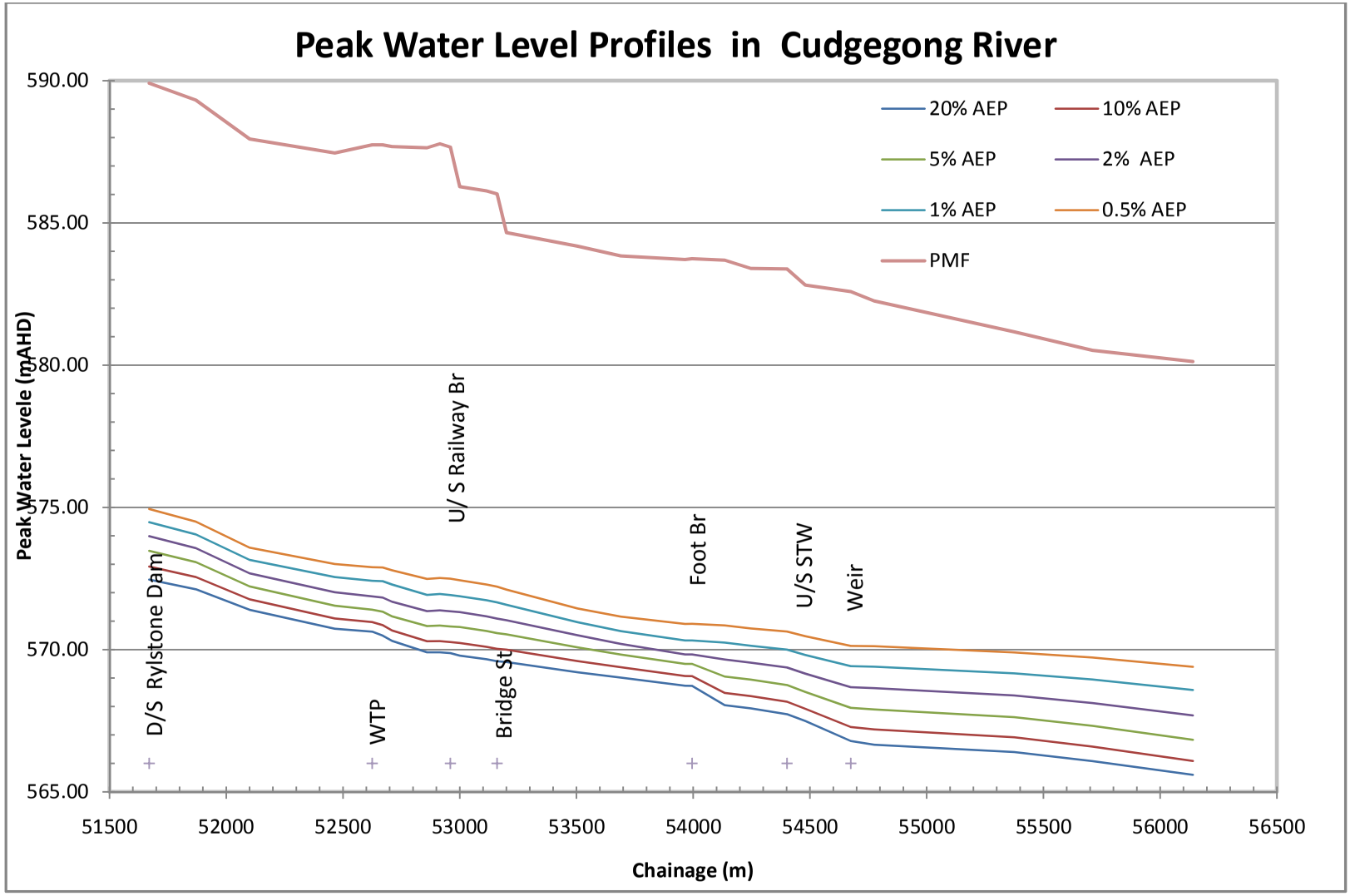


Figure 3-1 shows that upstream of the WTP, 1% AEP peak water levels estimated in this study are higher than HWA 2002 study. However, peak water levels estimated in the 2002 study between Bridge Street and the Foot Bridge are up to 0.5m higher than this study. Downstream of the Foot Bridge, peak water levels estimated in this study are up to 0.8m higher than those adopted in the 2002 study.

- **Figure 3-2 Peak Water Level Profiles in Cudgegong River**



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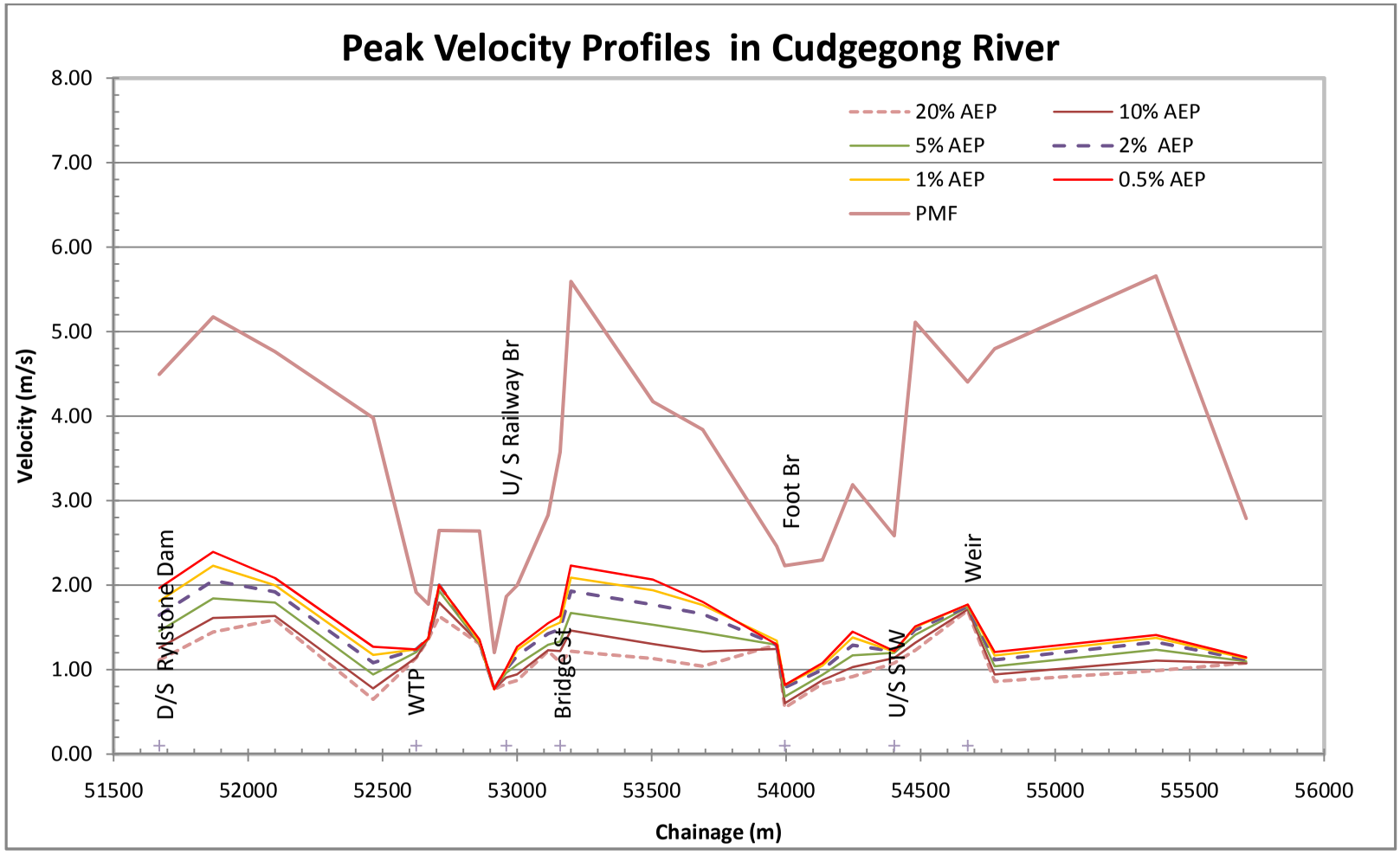
- **Figure 3-3 Peak Velocity Profiles in Cudgegong River**



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The sensitivity of the 1% AEP peak water level profile on the adopted downstream boundary condition was assessed by lowering and raising the downstream boundary condition by 1m. The resulting 1% AEP peak water level profiles are also shown in **Figure 3-1**, which indicates that peak water levels upstream of Bridge Street are almost insensitive to the adopted tailwater boundary condition. In the vicinity of the STW, 1% AEP peak water level is lowered by 0.2m and raised by 0.3m due to changes in tailwater boundary condition by 1m indicating robust boundary condition. Downstream of the STW, the 1% AEP peak water level profile with 1m lowered tailwater boundary condition results in higher water levels than the HWA 2002 study.

The topographic data available to this study are more detailed than that available to the HWA 2002 study and consequently flood levels estimated in this study are expected to be more reliable than the previous study.

3.2.3. Flood Mapping

Modelled peak water levels for the following events were used in ArcMap to delineate flood extents which are shown in **Figure 3-4**.

- 20% AEP;
- 1% AEP;
- 1% AEP + 0.5m (ie. the Flood Planning Level(FPL)); and
- PMF.

Figure 3-4 shows that the flood extent for the 20% AEP event is limited within the bank of Cudgegong River and flood extents for the 1% AEP event and 1% AEP event plus 0.5m freeboard are very similar. The PMF event causes extensive inundation in Rylstone and the majority areas within the township are inundated by the PMF event.

A flood hazard map was prepared for the Flood Planning Level (FPL) using flood extent for the FPL event and peak velocities for the 1% AEP event. High hazard and low hazard areas were identified for the FPL using the criteria adopted in the NSW Government's Floodplain Development Manual (2005), and are shown in **Figure 3-5**.

The delineation of hydraulic categories is important with the adoption of merit based flood policy. This is because the NSW Government's Floodplain Development Manual (2005) recognises three hydraulic categories of flood prone land (floodway, flood fringe and flood storage). Definition of floodways, flood storage and flood fringe, as given in the Manual, are presented below:

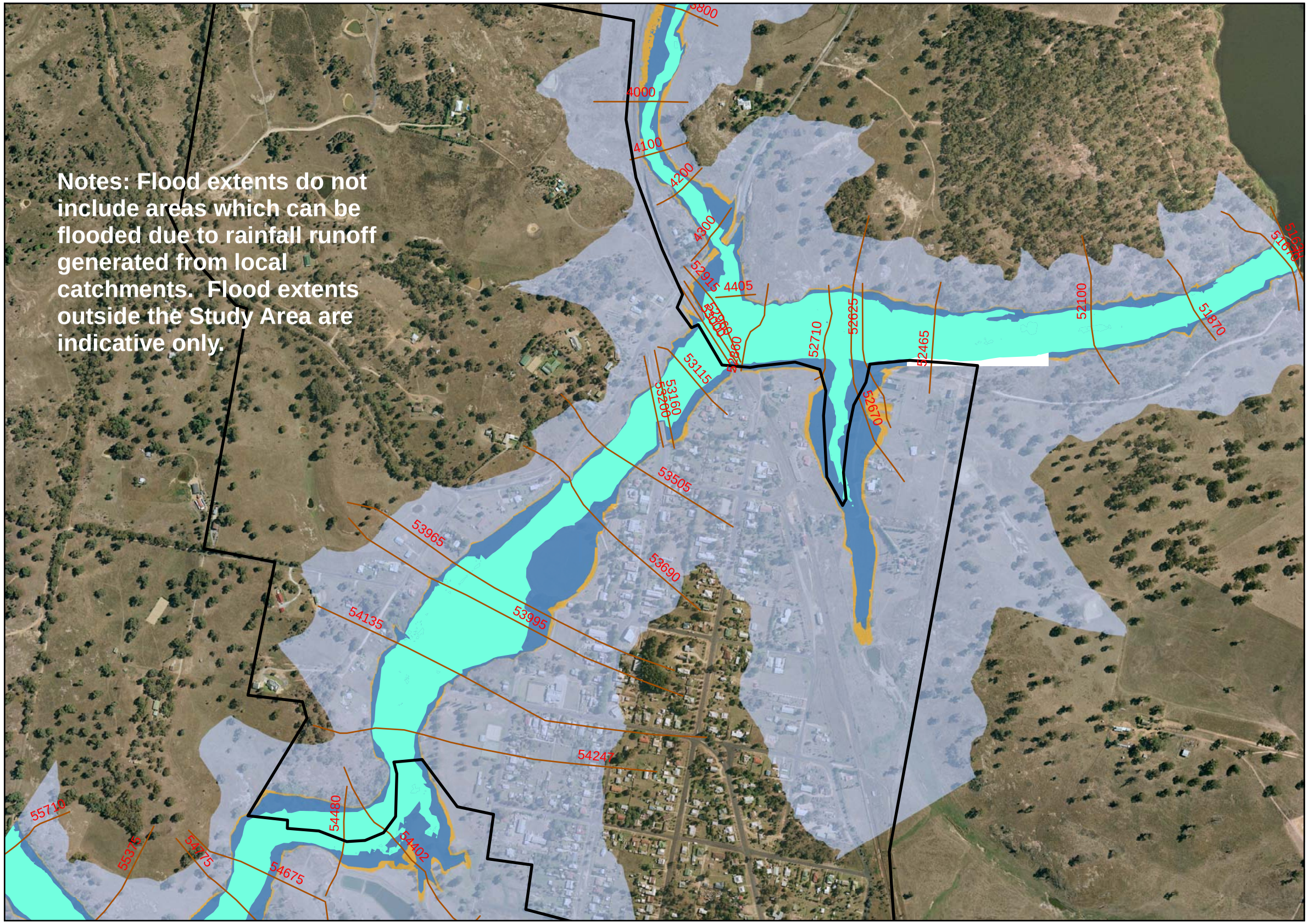
- Floodways are those areas where a significant volume of water flows during floods and are often aligned with obvious natural channels. They are areas that, even if only partially blocked, would cause a significant increase in flood levels and/or a significant redistribution of

flood flow, which may in turn adversely affect other areas. They are often, but not necessarily, areas with deeper flows or areas where higher velocities occur.

- Flood Storage areas are those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood.
- Flood fringe is the remaining area of land affected by flooding, after floodway and flood storage areas have been defined. Development in flood fringe areas would not have any significant effect on the pattern of flood flows and/or flood levels.

After reviewing the nature of riverine flooding in Rylstone and considering the fact that the low flow channel of the Cudgegong River is poorly represented in the ALS data, it is recommended that the flood extent for the 20% AEP event be classified provisionally as floodway and the remaining areas would be classified as flood fringe. It is further recommended that the provisional hazard categories be based on hazard categories shown in **Figure 3-5**.

Figure 3-4 Extent of Flood Inundation in Rylstone due to Flooding in Cudgegong River under the Existing Conditions



LEGEND

- MIKE11 Cross Sections
- Study Area
- 20% AEP Flood Extent
- 1% AEP Flood Exent
- Provisional Flood Planning Level
- PMF Extent

The flood inundation map is based on the available data and the assumptions made in the flood study. Hence, the flood study report must be read to draw any conclusion on the basis of the flood inundation map.

Sinclair Knight Merz does not warrant that this document is definitive nor free of error and does not accept liability for any loss caused or arising from reliance upon information provided herein.

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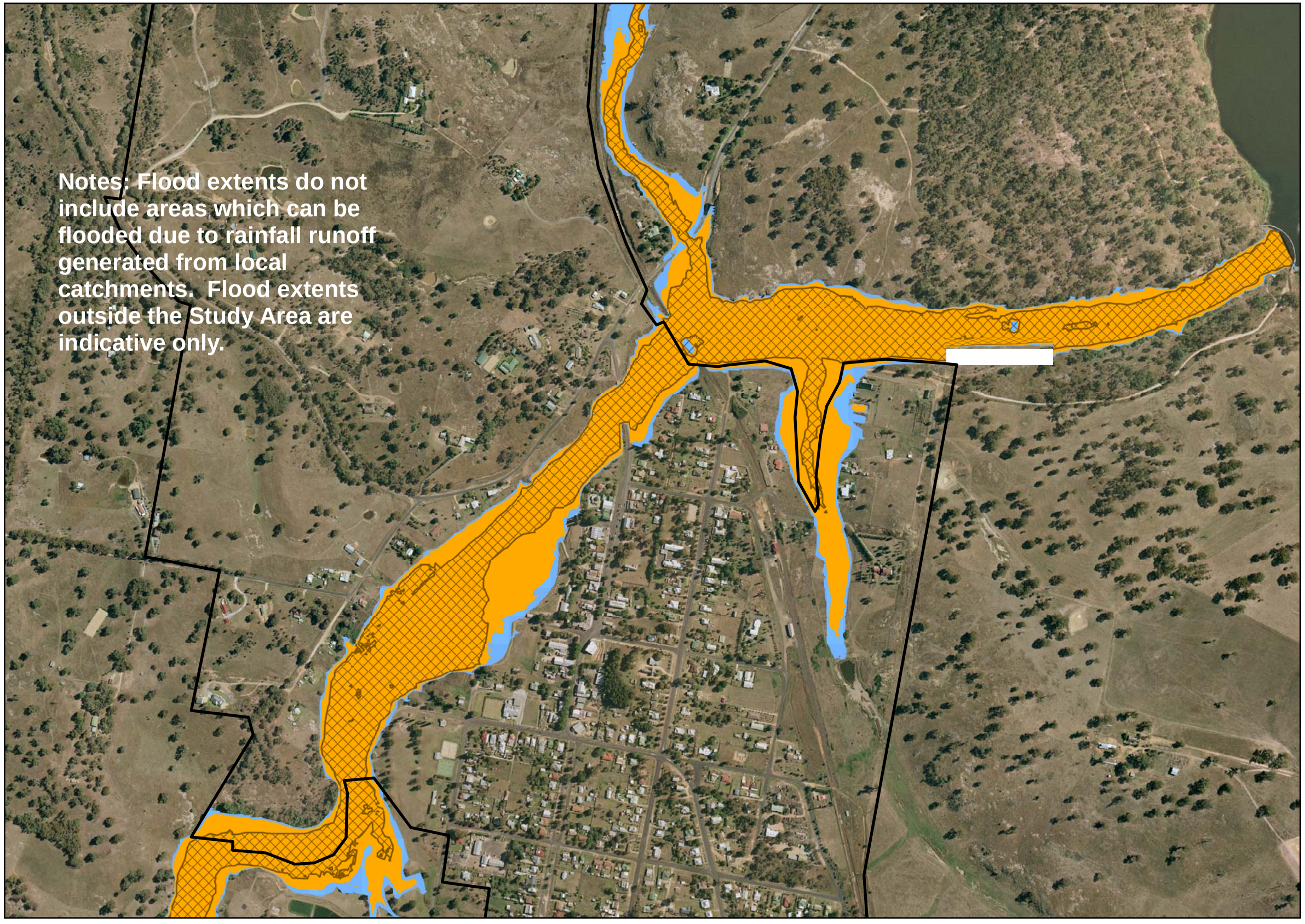
Sydney Spatial Team - Prepared by : [INITIALS]
Checked by : [INITIALS]

Figure 3-5 Provisional Flood Categorisation for Rylstone due to Flooding in Cudgegong River



LEGEND

- Study Area
- Hazard Category:
- Low Hazard
- High Hazard
- 20% AEP Flood Extent

The flood inundation map is based on the available data and the assumptions made in the flood study. Hence, the flood study report must be read to draw any conclusion on the basis of the flood inundation map.

Sinclair Knight Merz does not warrant that this document is definitive nor free of error and does not accept liability for any loss caused or arising from reliance upon information provided herein.

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3.3. Flood Behaviour with Potential Failure of Rylstone Dam

Failure of Rylstone Dam has the potential to impact on flooding in Rylstone. Hence, an assessment was made to quantify potential impact on flood behaviour in Rylstone.

3.3.1. Dam Break Scenarios

Scenarios investigated in this study included the following:

- A sunny day failure of Rylstone Dam;
- A Dam Crest Flood (DCF) with and without failure of Rylstone Dam; and
- A PMF event with and without failure of Rylstone Dam.

For all scenarios, it was assumed that the reservoir was at Full Supply Level (FSL). This assumption is consistent with the previous dambreak study for Rylstone Dam undertaken by Public Works (PWD 1993). The discharge hydrographs (with a peak inflow of 14,700 cumecs) generated by a 4 hour PMP was sourced from the DPWS 2003. The DCF was estimated to be about 0.37 PMF. A 1% AEP flood was assumed downstream of the Dam for all flood scenarios and a small release was assumed for the Sunny Day Failure scenario.

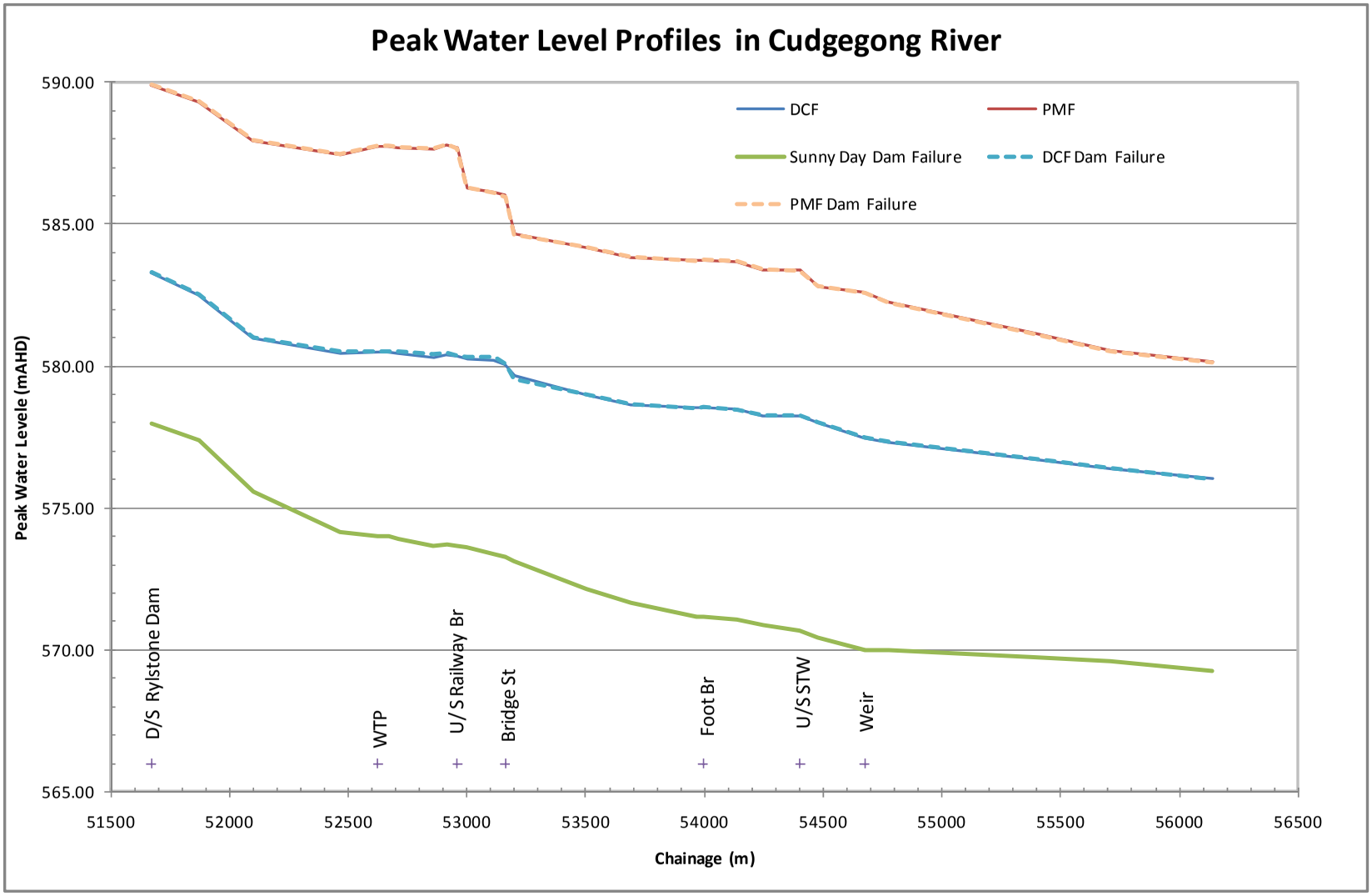
3.3.2. Failure Mechanism

Rylstone Dam consists of a central concrete arch with embankment sections on both ends. The failure mechanism due to overtopping can be rapid due to sudden failure of the concrete section or slow due to erosion failure of the embankment sections. Based on the outcomes from the sensitivity undertaken by PWD (1993), a failure of the concrete section was investigated in this study. A failure time of 5 minutes and vertical side slopes with a breach width of 50m were adopted for the failure of the concrete section for all dam break scenarios. The failure mechanism was represented in the MIKE11 model for the investigated scenarios.

3.3.3. Modelling Results

Modelling results for the dam break scenarios in terms of peak water levels, discharges, velocities and times to peak water levels are presented in **Appendix C**. Peak water level, peak velocity and time to peak water level profiles along Cudgegong River downstream of Rylstone Dam are presented in **Figure 3-6**, **Figure 3-7** and **Figure 3-8**, respectively. **Figure 3-6** and **Figure 3-7** show that both peak water levels and peak velocities in Cudgegong River for the flood scenarios with and without dam failure remain almost unchanged, indicating the capacity of the storage is too small to dominate flooding conditions downstream. However, **Figure 3-8** shows that times to peak water levels are slightly shorter for flood scenarios with dam break.

- **Figure 3-6 Peak Water Level Profiles in Cudgegong River for Dam Break Scenarios**



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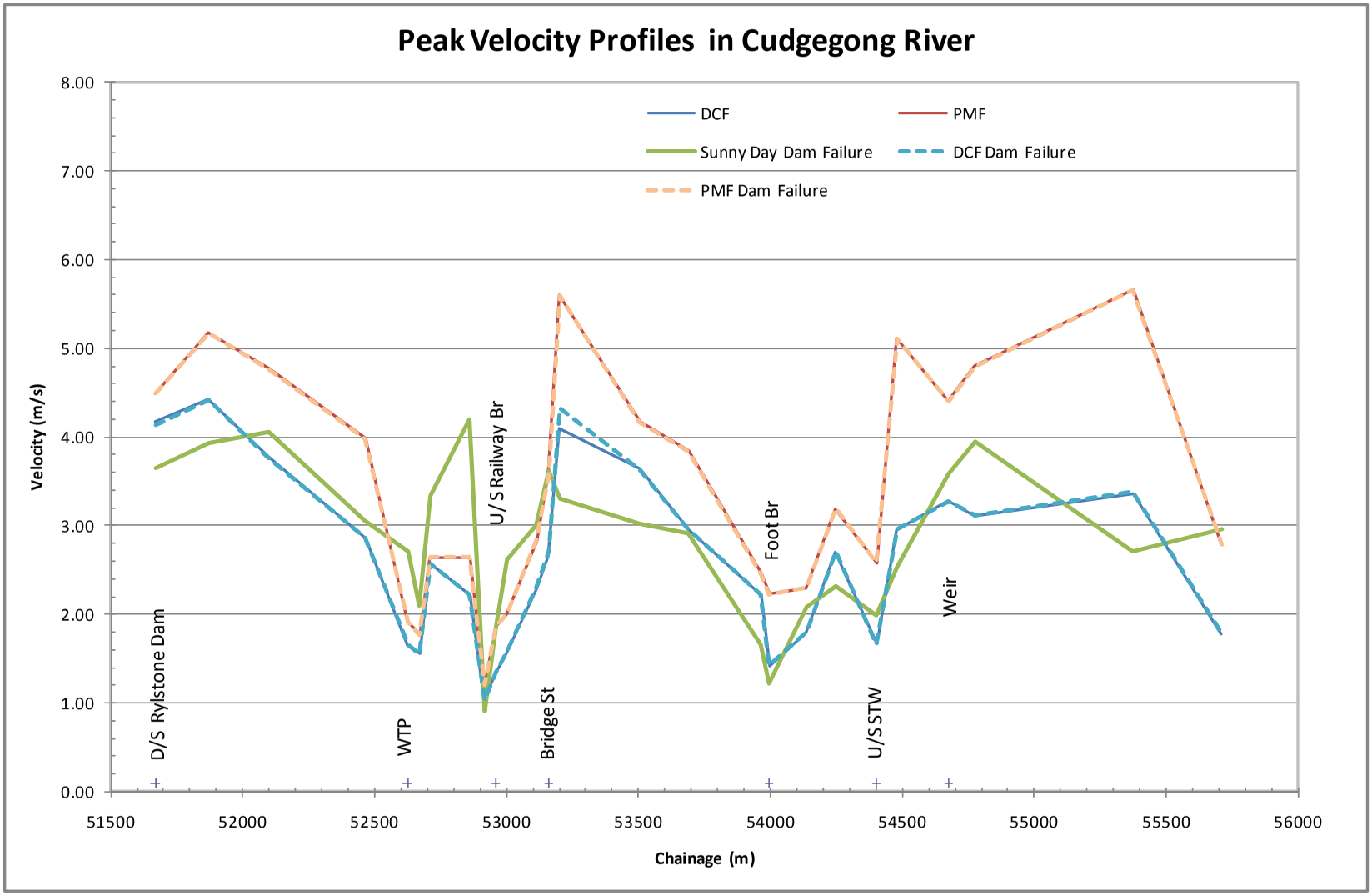
- **Figure 3-7 Peak Velocity Profiles in Cudgegong River for Dam Break Scenarios**



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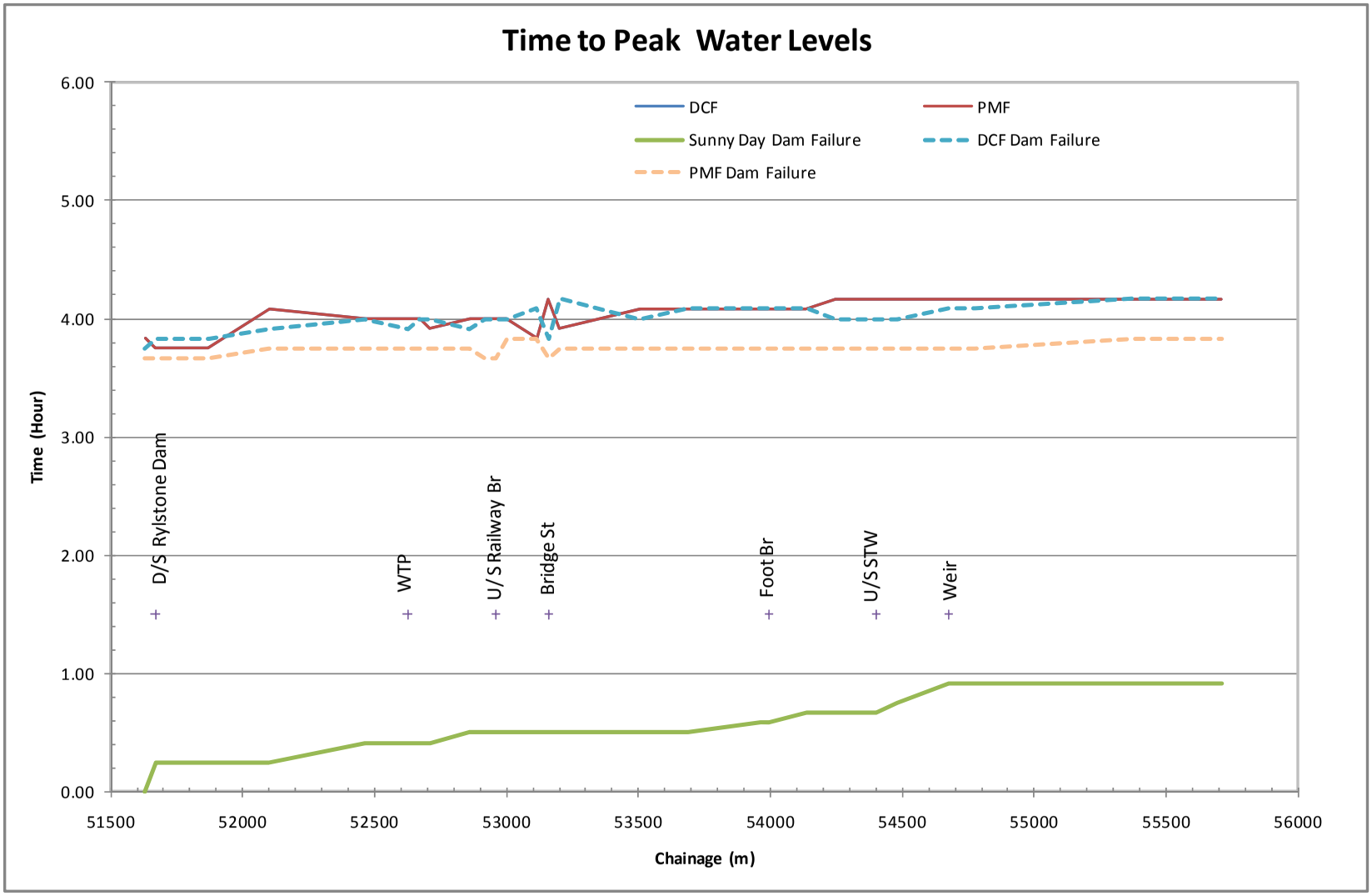
- **Figure 3-8 Time to Peak Water Level Profiles in Cudgegong River for Dam Break Scenarios**



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In the case of the Sunny Day Dam failure, peak water levels in Cudgegong River upstream of the Sewage Treatment Works (STW) are higher than 0.5% AEP event. The difference in peak water level between Sunny Day Dam failure and 0.5% AEP event gradually increases upstream of the STW and the increment is up to a maximum of 3m at the toe of the Dam. Peak velocities in Cudgegong River for the Sunny Day Dam failure vary between 1m/s to 4 m/s. Times to reach peak water levels for the Sunny Day failure scenario vary from 0.25 hour at the toe of the dam to 0.67 hour upstream of the STW.

4. Stormwater Capacity Assessment

4.1. Background

Computer models were set up in the DRAINS program to assess the capacity of the existing drainage systems for both Kandos and Rylstone. DRAINS simulates the rainfall-runoff process on natural and developed catchments, developing flow hydrographs at each entry point in the drainage system and then routing and combining flows through the drainage network. DRAINS is capable of modelling multiple storm patterns, pit bypass flows and overland flows.

4.2. Approach

4.2.1. Modelling Program

The computer program that was selected for use in this study was DRAINS (O'Loughlin and Stack, 2003). DRAINS is a comprehensive program for designing and analysing urban stormwater drainage systems. DRAINS is an updated version of the ILSAX (O'Loughlin, 1993) program. DRAINS includes additional functionality compared to the ILSAX program and allows more detailed and accurate modelling of drainage systems including overland flowpaths.

DRAINS can model drainage systems of all scales, from very large to very small. The program converts rainfall patterns to stormwater runoff hydrographs and routes these through a network of pipes, channels and streams. DRAINS carries out the hydrological modelling using ILSAX, the Rational Method and storage routing models, together with hydraulic modelling of pipes and open channels and automatic design procedures for piped drainage systems.

DRAINS has been used extensively in NSW and has almost become an industry standard for analysing and designing piped stormwater systems. The version of the DRAINS program used in this study was version 2012.04 – 12 March 2012.

4.2.2. Setting Up DRAINS Models

The DRAINS models were configured based on pit and pipe survey collected for Council for this study. The survey data was comprised of an MS Excel spreadsheet with the following details:

- Pits: Easting, Northing, pit inlet type and dimensions, depth of pit, comments.
- Pipes: Conduit type (pipe or box culvert), dimensions, invert levels, Easting and Northing of surveyed point (typically one point per pipe), number of cells, comments.
- Bridges in the study area were also surveyed but not included in the DRAINS models.

The drainage features included in the DRAINS models are pits, pipes and overflow routes. The pit and pipe survey data was plotted in MapInfo as point data, to define their location. Pipe lines were

then digitised manually, based on CAD data accompanying the survey table data and the aerial photography, to link up the pits and headwall inlets and outlets on each stormwater branch.

For the purposes of this study, it was assumed that all pits were of unlimited capacity; hence, the drainage system capacity is defined by pipe capacity.

Overflow routes were then manually digitised to define the surface flow routes between pits, headwall inlets/outlets and for other flow paths. The overflow routes were defined typically as following the surface contours and natural overland flow paths, rather than the street drainage, which is a more realistic representation for overland flow patterns in larger magnitude events. This approach in configuration results in overland flows often bypassing stormwater pits, and hence the drainage network cannot intercept these flows.

Catchment SIM was used to automatically generate a sub-catchment at each pit and to produce a GIS sub-catchment layer. Impervious fractions and travel times were estimated from aerial photography and ALS by overlaying the sub-catchment layer onto land-use GIS layers. An impervious fraction value, visually estimated from the aerial photography, was adopted for each land-use type. The impervious fractions are tabulated in **Table 4-1**.

- **Table 4-1 DRAINS Sub-Catchment Land-Use Impervious Fractions**

Land Use	Fraction Impervious
Open Space	0.05
Commercial	0.50
Railway	0.20
Road	0.70
Rural/Rural Residential	0.10
Urban/Residential	0.30
Quarry	0.80

Overland flowpaths, destinations and travel times were determined from the ALS and aerial photography data. Sub-catchments were typically assigned to a pit or headwall at its outlet where appropriate; otherwise, a simple node was digitised at the sub-catchment outlet and linked to the downstream drainage network with an overflow route.

Significant storages upstream of overland flow paths were modelled as detention basins. Only one significant storage was identified in the study area, that being the storage upstream of the Railway embankment on the flow path to the north of Kandos Quarry, with a storage depth of approximately 6m before it overflows over the railway embankment, and a storage volume of approximately 25,000m^3. Other minor storages were identified upstream of the Railway embankment, to the north of Kandos Railway Station, but were considered to be relatively small

and unlikely to significantly attenuate flood flows, and hence were excluded from the DRAINS model.

Input data used in the DRAINS models for both Kandos and Rylstone are included in **Appendix C**.

4.2.3. Parameter Values Used in DRAINS

The following modelling approach and assumptions have been adopted in the DRAINS modelling:

- Pit inlet blockage factors were assumed to be zero (unblocked), to maintain the unlimited pit inlet capacity assumption;
- A pit hydraulic loss coefficient (K_u) value of 1.5 was adopted for the purposes of this study. For part-full flows, K_u values were set to 35 mm;
- Sag pits were defined with a typical sag storage volume of $10m^3$ and a depth of 0.5m;
- Headwall inlets were assumed to have a K_u value of 0.5;
- It was assumed that all impervious areas are directly connected, i.e. that supplementary areas = 0;
- The pipe roughness was kept at the default Colebrook-White roughness coefficient value of 0.3mm; and
- Travel times for sub-catchments and overflow routes were based on the longest flow path determined in Catchment SIM and flow velocities of 0.7 m/s for paved areas and 0.5 m/s for grassed areas.

4.2.4. Estimation of Design Rainfall and Runoff

An ILSAX hydrological model was adopted for the DRAINS modelling with the following parameters used:

- An Antecedent Moisture Condition "AMC" of 3 ("Rather Wet" soil moisture condition) for storm events up to and including the 1% AEP event. An AMC of 4 ("Totally Saturated" soil moisture condition) was adopted for the 0.5% AEP and PMF events;
- A soil type of 3 (slow infiltration rates which may have layers that impede downward movement of water);
- Paved area depression storage of 1 mm and grassed area depression storage of 5 mm.

Design rainfall intensities for the 20%, 10%, 5%, 2%, 1% and 0.5% AEP events were estimated based on Intensity-Frequency-Duration (IFD) parameter values from the Bureau of Meteorology online IFD calculator for both Kandos and Rylstone. Temporal patterns for AR&R Zone 2 (Murray-Darling Basin) were assumed. The DRAINS models were run for the 10, 15, 20, 25, 30, 45, 60, 90, 120 and 180 minute duration events for these design AEP events.

Intensities for the PMP events were calculated based on the Generalised Short Duration Method (GSDM) (BOM, 2003). Design temporal patterns from GSDM were adopted. A constant rainfall depth across each catchment was assumed. The PMP storm was also run for the 15, 30, 45 and 60 minute storm durations.

4.3. Stormwater Capacities for Rylstone

DRAINS model results for are presented in **Appendix C** and model results for Rylstone were analysed to determine the design capacity for each pipe, which is mapped in **Figure 4-1**. The pipes with a 1% AEP capacity are typically located in the upper sections of the drainage network or on minor branches, where there is typically a number of overflow routes bypassing this section of the network. These overflow routes tend to converge on the lower sections of the drainage network, hence the flows intercepted by the network are relatively larger and the pipe event AEP tends to be smaller.

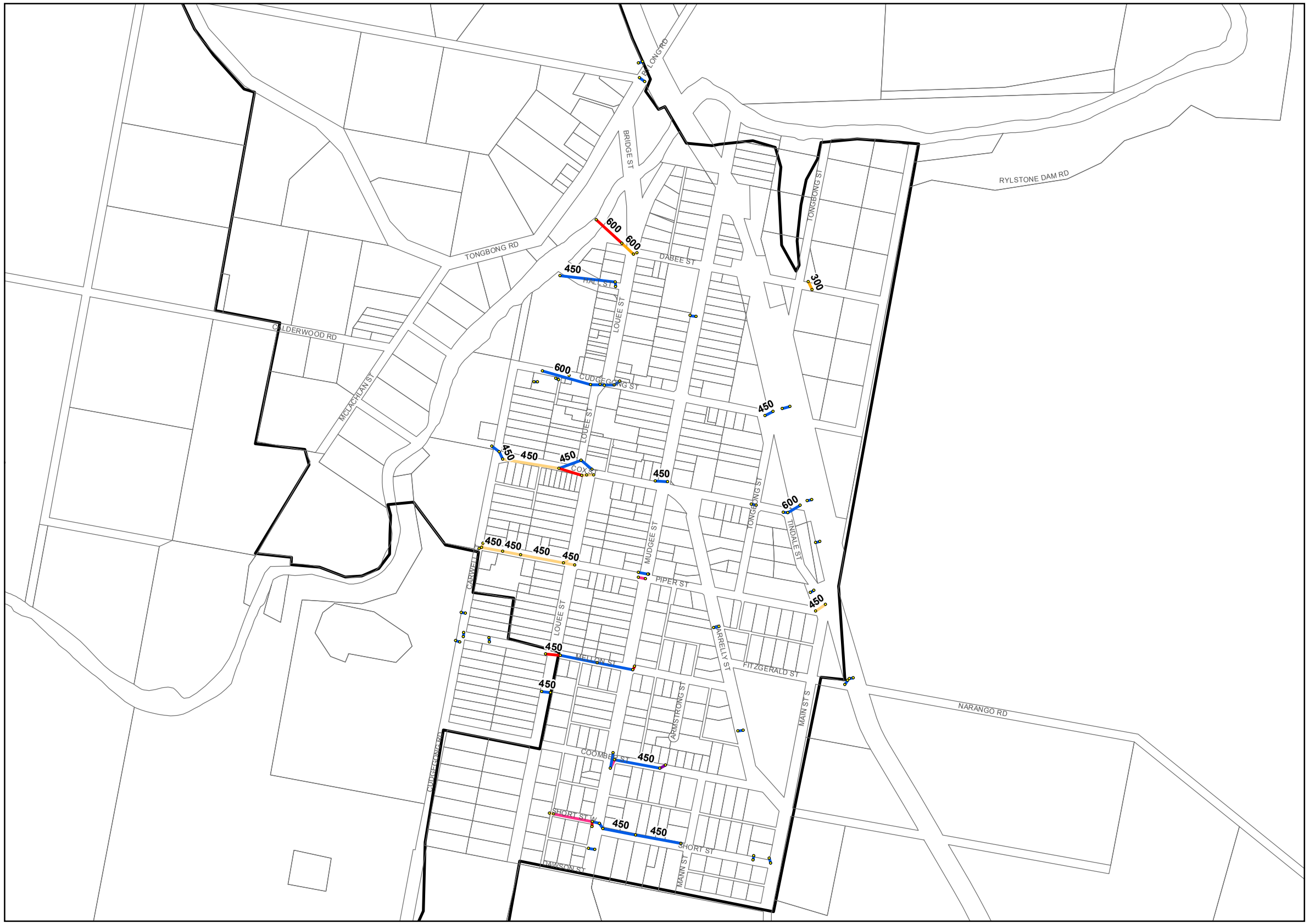
4.4. Stormwater Capacities for Kandos

The DRAINS model results (presented in **Appendix C**) for Kandos were analysed to determine the design AEP capacity event for each pipe, which is mapped in **Figure 4-2**. The estimated pipe capacities range from less than the 20% AEP event to greater than the 1% AEP event. The pipes with a 1% AEP capacity are typically located in the upper sections of the drainage network or on minor branches, where there is typically a number of overflow routes bypassing this section of the network. These overflow routes tend to converge on the lower sections of the drainage network, hence the flows intercepted by the network are relatively larger and the pipe event AEP tends to be smaller.

The majority of pipes in Kandos have adequate capacities for events up to 20% AEP. The main stormwater system starting at Buchanan Street and crossing Angus Avenue, Rodgers Street, Dangar Street, Fleming Street and finally discharging on Dunn Street have capacities less than 20% AEP in the section between Buchanan Street and Fleming Street which run through private properties.

Note that there is uncertainty in the pipe network configuration upstream of pipe ST00520 (corner of George Street and Bent Street, Kandos). It was difficult to determine the exact configuration from the available survey, Council GIS layers, aerial photography and DEM due to incomplete and conflicting information. There is therefore likely to be some inaccuracy in the pipe hydraulic conditions at this location, though overland flows are likely to be estimated satisfactorily

Figure 4-1 Stormwater Pipe Capacity - Rylstone



LEGEND

- Stormwater Pit

Stormwater Pipe Capacity

- Adequate for less than 20% AEP
- Adequate for less than 10% AEP
- Adequate for less than 5% AEP
- Adequate for less than 2% AEP
- Adequate for less than 1% AEP
- Adequate for more than 1% AEP
- Cadastre
- Study Area

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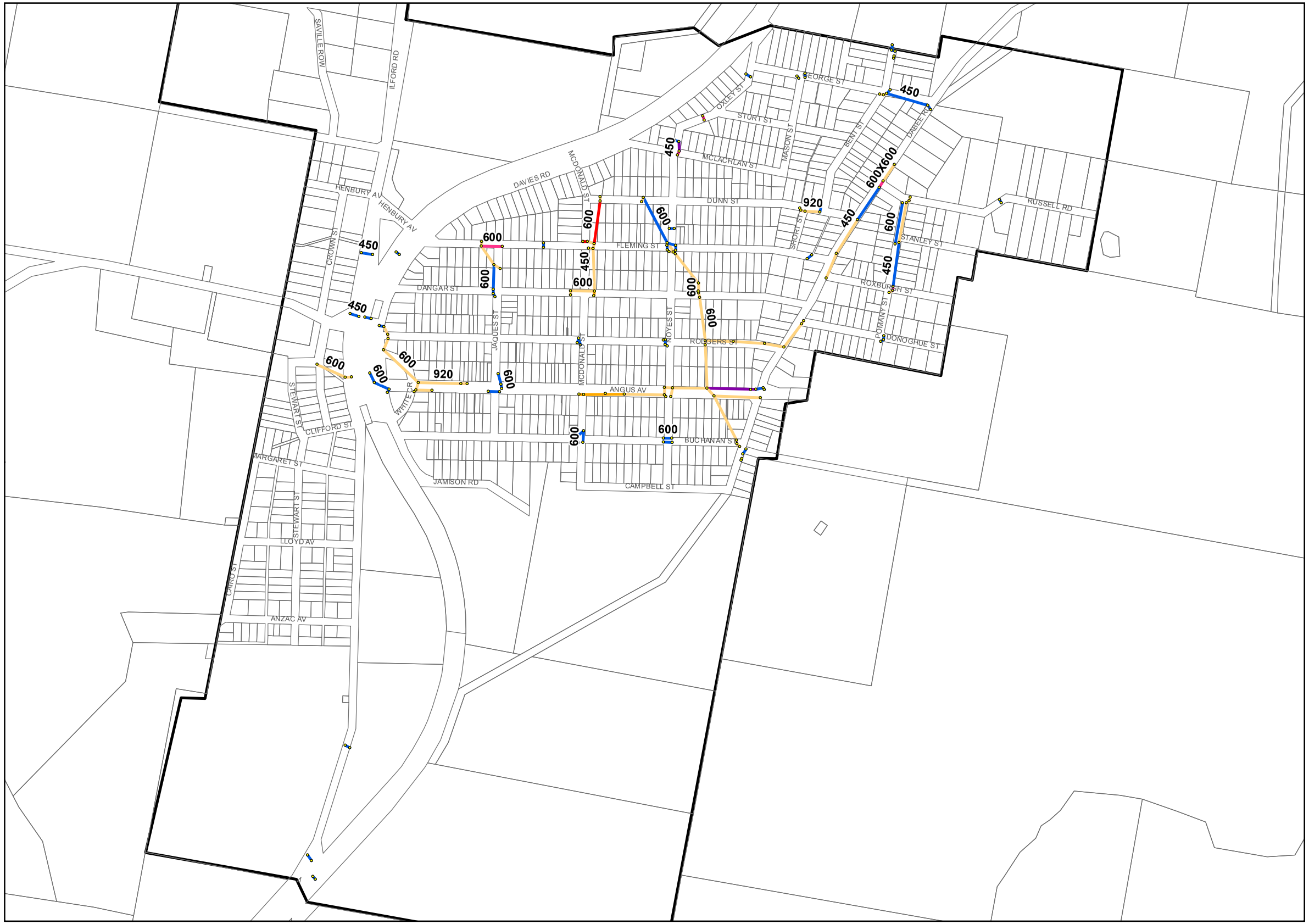
Figure 4-2 Stormwater Pipe Capacity - Kandos



LEGEND

- Stormwater Pit

Stormwater Pipe Capacity

- Adequate for less than 20% AEP
- Adequate for less than 10% AEP
- Adequate for less than 5% AEP
- Adequate for less than 2% AEP
- Adequate for less than 1% AEP
- Adequate for more than 1% AEP
- Cadastre
- Study Area

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5. Local Overland Flooding

5.1. General

Stormwater drainage, which surcharges the piped drainage system, is likely to be conveyed along the street system and natural flow paths in the towns, and/or rural areas bordering the towns. Hydraulic modelling was undertaken to estimate flooding conditions in major overland flow paths including depths, velocities and flood hazard category of flow in the street and other overland flow paths. Hydraulic models for the main flow paths in the two towns were set up using HEC-RAS.

A Digital Elevation Model (DEM) was created using the ALS data for each town. The DEM was used to cut adequate cross sections for the selected overland flow paths to be represented in the HEC-RAS models. Major hydraulic structures and obstructions to flow and bed resistances were defined in the HEC-RAS model. The flows applied to the HEC-RAS models were computed from the DRAINS modelling and represented discharges surcharging or not captured by the existing piped system.

5.2. Approach

5.2.1. HEC-RAS Model Development

HEC-RAS (US Army Corps of Engineers, 2003) program was used to undertake hydraulic modelling of the main overland flow paths in and around both Kandos and Rylstone. Main flow paths modelled using HEC-RAS were selected on the basis of the following considerations:

- Location: flow paths that run through a number of properties; and
- Peak discharge: those flow paths carrying a relatively high discharge are more likely to present a flood risk.

Cross-sections, which were extracted from the ALS data, were used to set up the HEC-RAS models. The ALS data represented the existing topographic conditions. The cross-sections were located at more frequent intervals in potential flooding problem areas, in order to define flood levels and velocities in more detail at these locations. It was assumed in the HEC-RAS model that existing fencing would fail and would allow floodwater to move freely from one property to another without forming a solid obstruction. A high Manning's n value of 0.1 was used in HEC-RAS models to represent friction losses through properties. Recent aerial photography of the area and a site reconnaissance were used to assign Manning's n values to model cross sections.

The HEC-RAS models were set up to include the overland flow paths connected to and including a section of the downstream main waterways. This was done to ensure that realistic tailwater conditions were applied to the local overland flow paths affecting both Kandos and Rylstone townships.

All HEC-RAS models were run for steady-state solutions for the mixed flow regimes, which were considered suitable for the level of detail required in this study. Normal flood depths were used to define both upstream and downstream boundary conditions for running the models for the mixed flow regimes.

All HEC-RAS models were run for 20%, 10%, 5%, 2%, 1%, 0.5% AEP and PMF events under the existing conditions.

5.2.2. Flood Behaviour

A set of flood surfaces was created using the HEC-RAS modelling results for the 20% AEP, 1% AEP, 1% AEP + 0.5m free board (ie. FPL) events and the PMF. The modelling results were imported into the GIS, where each cross-section was attributed with the flood level results. This allowed the creation of flood surface data. The intersection between the DTM (created using ALS data) and the flood surfaces was calculated, which defined the extent of flooding. This allowed flood prone areas to be accurately defined. Flood maps were produced from the GIS, showing inundation extents for each flood event. All analysis and mapping was undertaken using ArcMap.

A flood hazard map was prepared for the Flood Planning Level (FPL) using flood extent for the FPL and peak velocities for the 1% AEP event. High hazard and low hazard areas were identified for the FPL using the criteria adopted in the NSW Government's Floodplain Development Manual (2005).

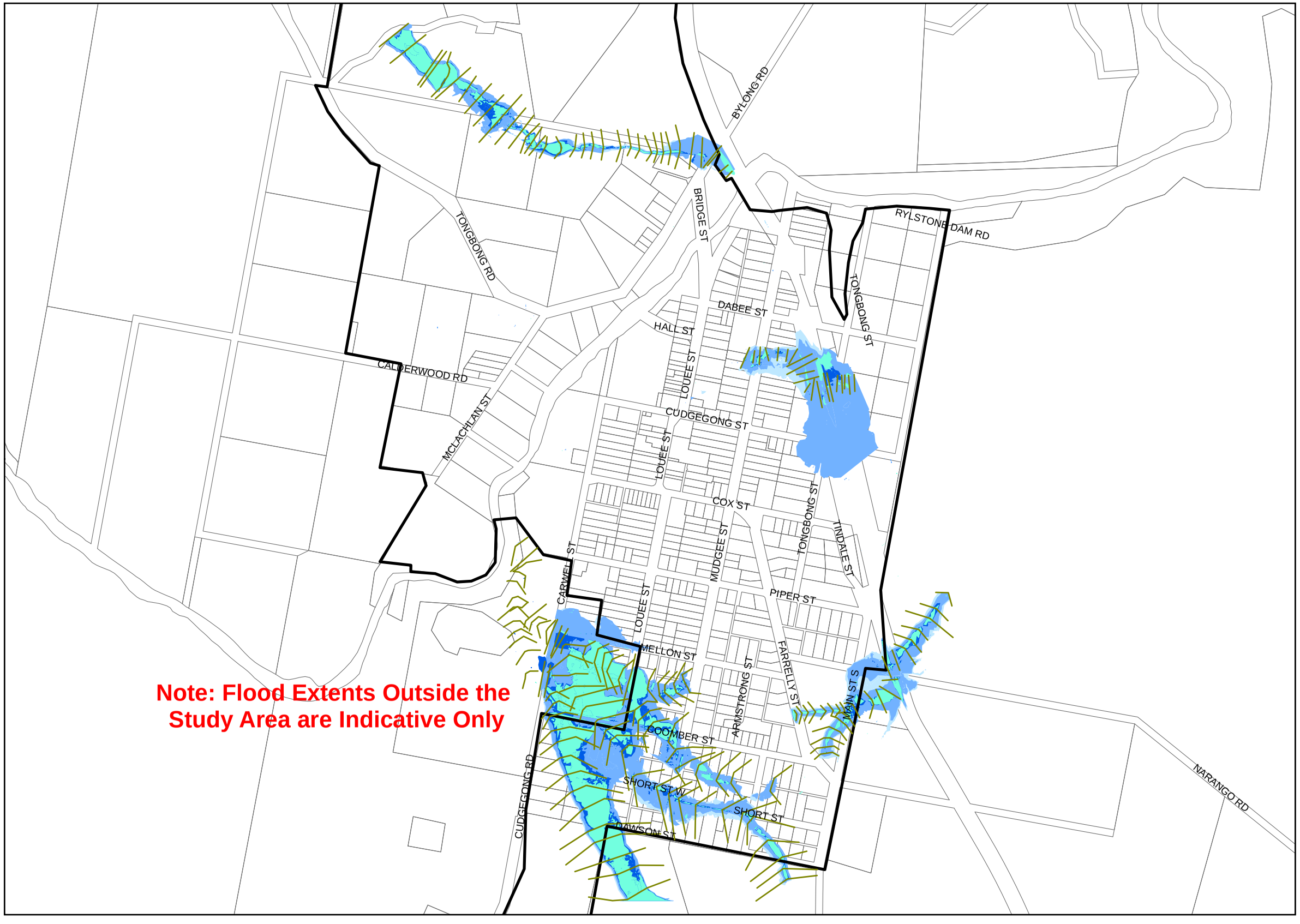
5.3. Local Overland Flood Behaviour for Rylstone

Detailed HEC-RAS modelling results in terms of peak water levels, discharges and velocities for all modelled events are given in **Appendix E**. Flood extents for the four selected flood events for Rylstone are presented in **Figure 5-1** which shows the following:

- A number of properties are impacted by local overland flooding in a 20% AEP events. These properties are located on the southern end of Louee Street between Dawson Street and Melon Street; Cudgegong Road between Dawson Street and Piper Road; Dawson Street; Short Street; and Coombers Street.
- The extent of inundation in a 1% AEP event is slightly more extensive than the 5% AEP extent.
- The FPL covers more areas than the PMF indicating that flood levels in some areas are within 0.5m of the 1% AEP flood levels.

Flood hazards for the FPL are shown in **Figure 5-2** which shows that the flood hazard for majority of the flooded areas have low hazard and high hazard areas are located at isolated locations. Flood hazard on sections of Tongbong Road, Short Street and Main Street are high for the FPL.

Figure 5-1 Extent of Flood Inundation in Rylstone due to Rainfall Runoff Generated from Local Catchments under the Existing Conditions



LEGEND

- Study Area
- 20% AEP Flood Extent
- 1% AEP Flood Exent
- Provisional Flood Planning Level
- PMF Extent

The flood inundation map is based on the available data and the assumptions made in the flood study. Hence, the flood study report must be read to draw any conclusion on the basis of the flood inundation map.

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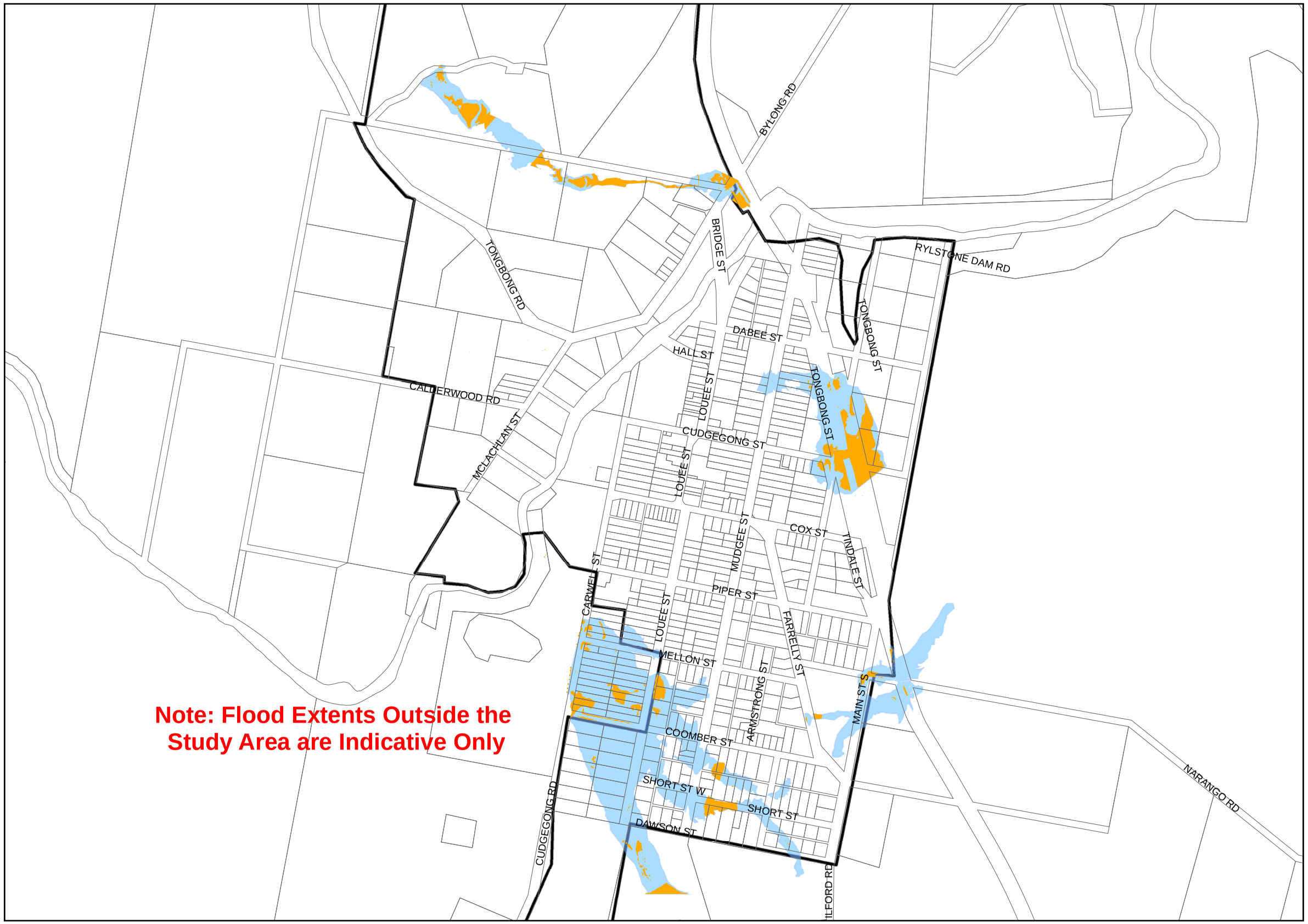
Figure 5-2 Provisional Flood Categorisation for Rylstone due to Rainfall Runoff Generated from Local Catchments



LEGEND

- Study Area
- Hazard Category:
- Low Hazard
- High Hazard

The flood inundation map is based on the available data and the assumptions made in the flood study. Hence, the flood study report must be read to draw any conclusion on the basis of the flood inundation map.

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5.4. Local Overland Flood Behaviour for Kandos

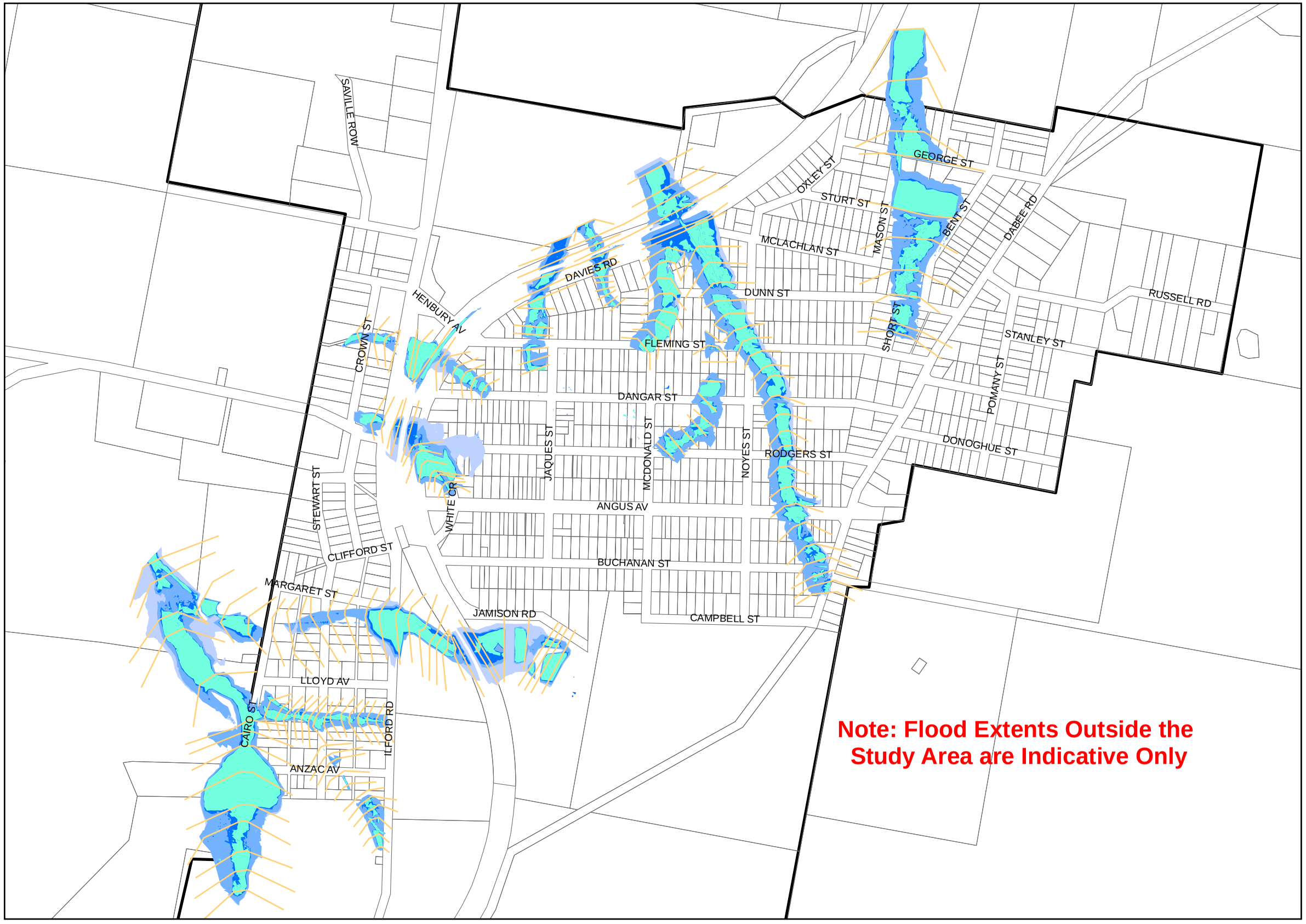
Detailed HEC-RAS modelling results in terms of peak water levels, discharges and velocities for all modelled events are presented in **Appendix E**. Flood extents in Kandos for the selected flood events are presented in **Figure 5-3** which shows significant flooding in Kandos for the 20% AEP event. Overflows associated with the main stormwater system crossing the Railway at the corner of Davies Road and McLachlan Street result in flooding of adjoining properties located along its overland flow paths. Properties along the overland flow path for the stormwater system crossing Georges Street are impacted by overflows in the 20% AEP event. A number of properties on Davies Road are also impacted due to in the 20% AEP event. An overland flow path runs east to west between Lloyd Avenue and Anzac Avenue which impacts of a number of properties in the 20% AEP event.

The flood extent for the 1% AEP event is slightly more extensive than the 20% AEP flood extent. In some areas the PMF is less than 0.5m higher than the 1% AEP event and in some areas the PMF is higher than the FPL.

Flood hazards for the FPL are shown in **Figure 5-4** which indicates the following:

- Flood hazard is generally low in the majority of the flooded areas; and
- Areas with high flood hazard are present on overland flow paths between Dangar Street and Dunn Street; Whites Crescent, Davies Road; Ilford Road; Cario Street and Anzac Avenue.

Figure 5-3 Extent of Flood Inundation in Kandos due to Rainfall Runoff Generated from Local Catchments under the Existing Conditions



LEGEND

- Study Area
- HEC-RAS Cross Sections
- 20% AEP Extent
- 1% AEP Extent
- Provisional Flood Planning Level
- PMF Extent

The flood inundation map is based on the available data and the assumptions made in the flood study. Hence, the flood study report must be read to draw any conclusion on the basis of the flood inundation map.

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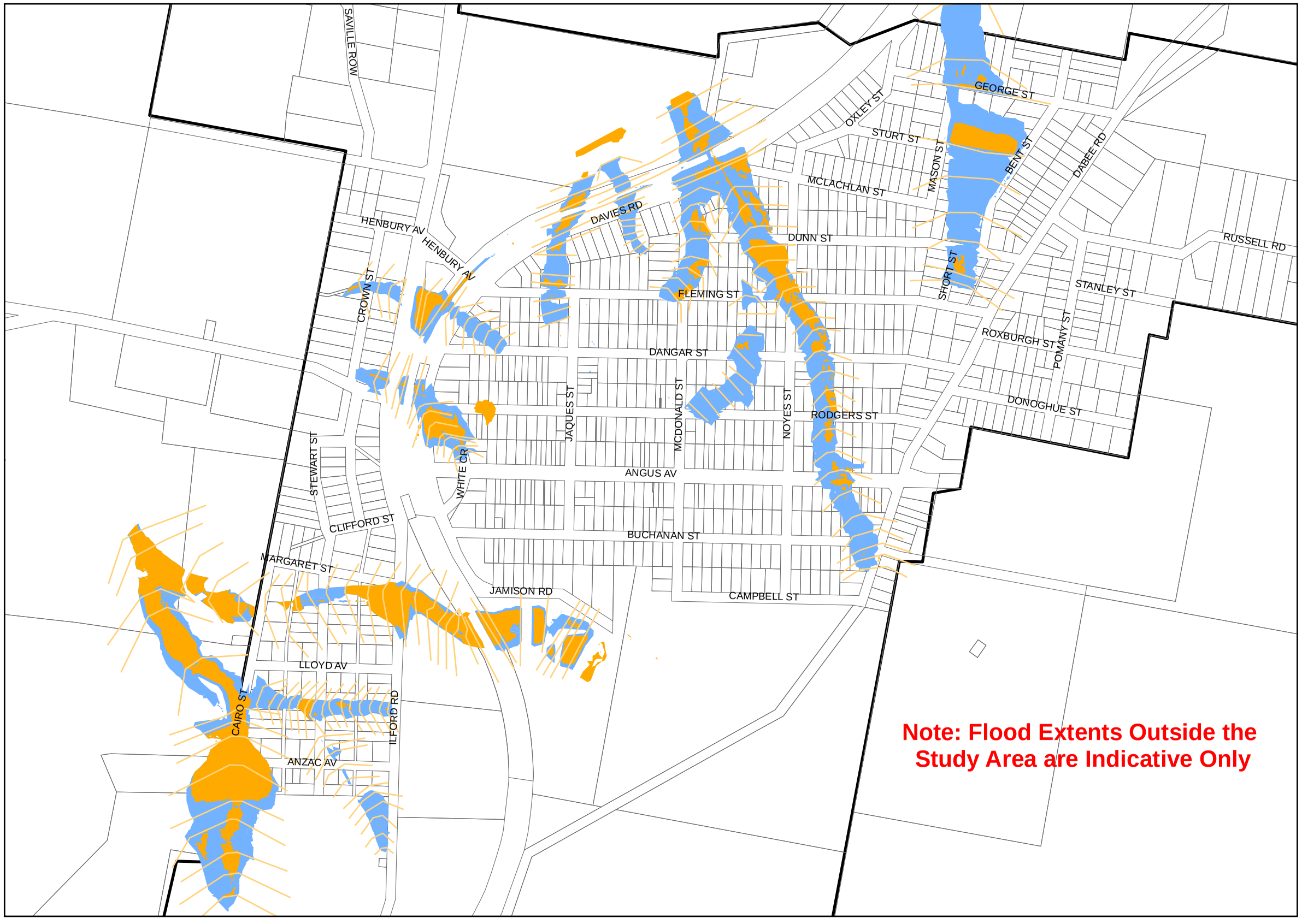
Figure 5-4 Provisional Flood Categorisation for Kandos due to Rainfall Runoff Generated from Local Catchments



LEGEND

- Study Area
- HEC-RAS Cross Sections
- Low Hazard
- High Hazard

The flood inundation map is based on the available data and the assumptions made in the flood study. Hence, the flood study report must be read to draw any conclusion on the basis of the flood inundation map.

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6. Acknowledgements

The study was carried out by Sinclair Knight Merz with funding provided from Mid-Western Regional Council, the Commonwealth and NSW Government through the Office of Environment and Heritage.

A number of organisations and individuals have contributed both time and valuable information to this study. The assistance of the following in providing data and/or guidance to the study is gratefully acknowledged:

- Residents of Kandos and Rylstone;
- Councillors and Council staff in particular, Shireen Murphy, Manager Environment, from Mid-Western Regional Council;
- Office of Environment and Heritage; and
- Roads and Maritime Services.

7. Conclusions

In accordance with NSW Government policy, Mid-Western Regional Council is committed to preparing a Floodplain Risk Management Plan for townships of Kandos and Rylstone. This report documents the first two stages of the process of preparing the Plan – that is, the preparation of a flood study report.

The study area included townships of Kandos and Rylstone. The township of Kandos is located in the upper catchment areas of Cumber Melon Creek and hence not subject to riverine flooding. However, isolated areas within the township have experienced local overland flooding due to limited stormwater capacity. The township of Rylstone is located on the left bank (looking downstream) of Cudgegong River which has a very narrow floodplain consisting of a series of river flats. Rylstone Dam is located 1 kilometre upstream of the town. Rylstone experienced local overland flooding in recent years due to limited stormwater capacity. However, both residential and commercial/industrial properties within the township are yet to be impacted by riverine flooding in recent memory.

A community consultation was undertaken to collect information on flooding from the community. Information provided by the community indicated no major flooding issues in Kandos and Rylstone.

Hydrologic and hydraulic computer models for Cudgegong River used in a previous study were updated to define riverine flood behaviour for Rylstone. A range of flood events between 20% AEP and PMF events was investigated and flood extents and provisional flood hazard mapping were undertaken to define flood behaviour in Rylstone. Flood behaviour due to potential failure of Rylstone Dam was also assessed.

The capacity of the stormwater systems for both Kandos and Rylstone was assessed through the development of computer based hydrologic model DRAINS. Hydraulic modelling was undertaken using HEC-RAS hydraulic models to define local overland flood behaviour for both towns. Results from HEC-RAS models were used to map flood extents and hazards on local overland flow paths.

Detailed hydrologic and hydraulic modelling undertaken in this study provide a sound platform for the flood modelling tasks that will be undertaken during preparation of the Floodplain Risk Management Study and Plan for Kandos and Rylstone.

8. References

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Danish Hydraulic Institute (2009) MIKE11 User's Guide

NSW Government (2005) *Floodplain Development Manual*, Department of Infrastructure, Planning and Natural Resources

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Watercom (2012) *DRAINS User Manual*

9. Glossary

Annual Exceedence Probability (AEP)	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.
Australian Height Datum (AHD)	A common national surface level datum approximately corresponding to mean sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time.
Average Recurrence Interval (ARI)	The long-term average number of years between the occurrences of a flood as big as or larger than the selected event. For example, floods with a discharge as great as or greater than the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
Catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
Development	Is defined in Part 4 of the EP&A Act In fill development: refers to the development of vacant blocks of land that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development. New development: refers to development of a completely different nature to that associated with the former land use. Eg. The urban subdivision of an area previously used for rural purposes. New developments involve re-zoning and typically require major extensions of exiting urban services, such as roads, water supply, sewerage and electric power. Redevelopment: refers to rebuilding in an area. Eg. As urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either re-zoning or major extensions to urban services.
Effective Warning Time	The time available after receiving advise of an impending flood and before the floodwaters prevent appropriate flood

	response actions being undertaken. The effective warning time is typically used to move farm equipment, move stock, raise furniture, evacuate people and transport their possessions.
Flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage (refer Section C6) before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
Flood fringe areas	The remaining area of flood prone land after floodway and flood storage areas have been defined.
Flood liable land	Is synonymous with flood prone land (i.e.) land susceptibility to flooding by the PMF event. Note that the term flooding liable land covers the whole floodplain, not just that part below the FPL (see flood planning area)
Floodplain	Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is flood prone land.
Floodplain risk management options	The measures that might be feasible for the management of particular area of the floodplain. Preparation of a floodplain risk management plan requires a detailed evaluation of floodplain risk management options.
Floodplain risk management plan	A management plan developed in accordance with the principles and guidelines in this manual. Usually include both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defines objectives.
Flood plan (local)	A sub-plan of a disaster plan that deals specifically with flooding. They can exist at state, division and local levels. Local flood plans are prepared under the leadership of the SES.
Flood planning levels (FPLs)	Are the combination of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the "designated flood" or the “flood standard” used in earlier

	studies.
Flood proofing	A combination of measures incorporated in the design, construction and alteration of individual buildings and structures subject to flooding, to reduce or eliminate flood damages.
Flood readiness	Readiness is an ability to react within the effective warning time.
Flood risk	Potential danger to personal safety and potential damage to property resulting from flooding. The degree of risk varies with circumstances across the full range of floods. Flood risk in this manual is divided into 3 types, existing, future and continuing risks. They are described below. Existing flood risk: the risk a community is exposed to as a result of its location on the floodplain. Future flood risk: the risk a community may be exposed to as a result of new development on the floodplain. Continuing flood risk: the risk a community is exposed to after floodplain risk management measures have been implemented. For a town protected by levees, the continuing flood risk is the consequences of the levees being overtopped. For an area without any floodplain risk management measures, the continuing flood risk is simply the existence of its flood exposure.
Flood storage areas	Those parts of the floodplain that are important for the temporary storage of floodwaters during passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas
Floodway areas	Those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.
Freeboard	Provides reasonable certainty that the risk exposure selected in deciding on a particular flood chosen as the basis for the FPL is actually provided. It is a factor of safety typically

	used in relation to the setting of floor levels, levee crest levels, etc. (See Section K5). Freeboard is included in the flood planning level.
Hazard	A source of potential harm or situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to the community. Definitions of high and low hazard categories are provided in Appendix L.
Local overland flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.
m AHD	Metres Australian Height Datum (AHD)
m/s	Metres per second. Unit used to describe the velocity of floodwaters.
m^3/s	Cubic metres per second or "cusecs". A unit of measurement of creek or river flows or discharges. It is the rate of flow of water measured in terms of volume per unit time.
Mainstream flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
Modification measures	Measures that modify either the flood, the property or the response to flooding. Examples are provided in Table 2.1 with further discussion in Appendix J.
Overland flowpath	Te path that floodwaters can follow as they are conveyed towards the main flow channel or if they leave the confines of the main flow channel. Overland flowpaths can occur through private property or along roads.
Probable Maximum Flood (PMF)	The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation couplet with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.
Risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the

	environment.
Runoff	The amount of rainfall which actually ends up as a streamflow, also known as rainfall excess.
Stage	The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
SES	State Emergency Service of New South Wales.
Stage hydrograph	A graph that shows how the water level at particular location changes with time during a flood. It must be referenced to a particular datum.

Appendix A Questionnaire

Mid-Western Regional Council

Kandos and Rylstone Flood Study - Questionnaire

Mid-Western Regional Council is overseeing the "Kandos and Rylstone Flood Study". Council has contracted the Consultant, Sinclair Knight Merz (SKM), to undertake the study. The study is aimed at addressing the stormwater flooding issues within Kandos and both stormwater and riverine flooding issues within Rylstone. The Consultant would like to receive feedback from the community on a number of issues and topics already highlighted by the Council with regard to stormwater/ riverine flooding in the townships of Kandos and Rylstone.

If you cannot answer any question, or do not wish to answer a question, then leave it unanswered and proceed to the next question. **Your input to this important study will be greatly appreciated.** If you need additional space, please add sheets.

If you would prefer to provide a letter with your comments or send your response to this questionnaire directly to the consultant, this would also be welcomed. Contact details of the Consultant's Project Manager are provided below:

Akhter Hossain
P O Box 164
St Leonards, NSW 1590
email: ahossain@globalskm.com

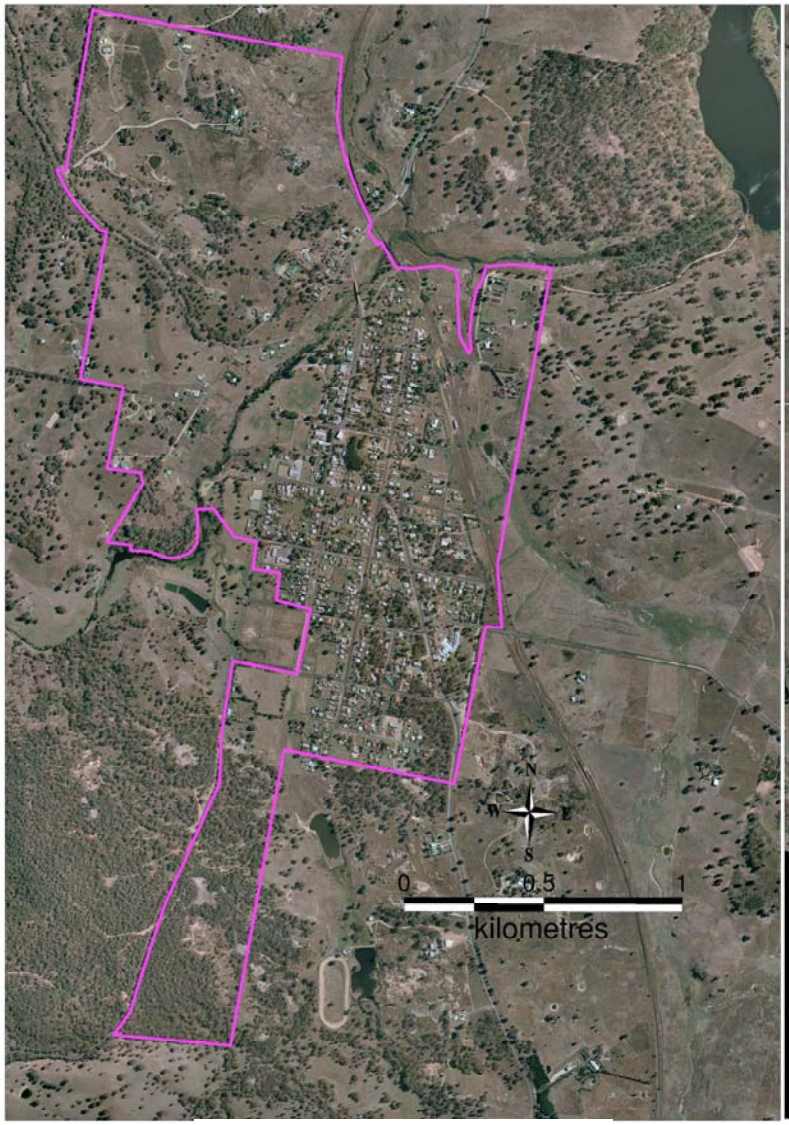
Place a tick or write a number in the relevant box as per instruction or write answers.

Question No.	Question and Answer
1.	**Do you live (reside) or have lived in the study area shown on the attached plan?** ☐ Yes (Please provide your address) .... ☐ No (Go to Question 3)
2.	**Do you own or rent your residence in the study area (Kandos and Rylstone)?** ☐ Own ☐ Rent How long have you lived in the study area? (Please write number of years)…….....
3.	**Do you own or manage a business in the study area?** ☐ Yes, For how many years? …….. ☐ No (go to Question 5)
4.	**What kind of business?** ☐ Home based business ☐ Shop/commercial premises ☐ Light industrial ☐ Heavy industry ☐ Others, please write type of business ……

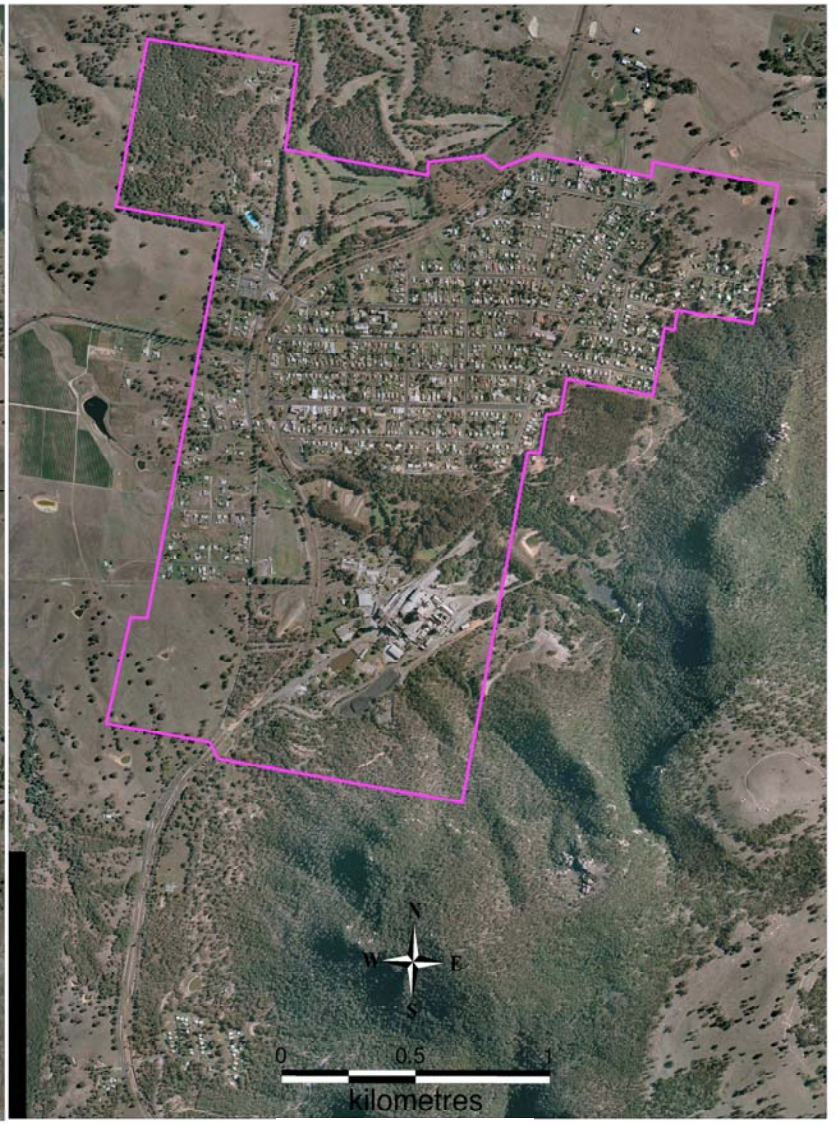
Question No.	
5.	**Have you had any experience of flooding (due to storm events as well) in and around where you live or work?** ☐ Yes ☐ No (Go to Question 14)
6.	**How deep was the floodwater (from storm water as well) in the worst flood/ storm event that you experienced?** Please estimate the depth ……..... What was the year of this flood?…… Where was this flood? ☐ At your house? ☐ At work? ☐ Elsewhere? Please provide the street address for this flood? …….....
7.	**How long did the floodwaters stay up?** ☐ Few minutes ☐ Less than one hour ☐ More than one hour
8.	**What damage resulted from this flood in your residence?** (Please indicate either "none", "minor", "moderate" or "major". ☐ Damage to garden, lawns or backyard ☐ Damage to external house walls ☐ Damage to internal parts of house (floor, doors, walls etc) ☐ Damage to possessions (fridge, television etc) ☐ Damage to car ☐ Damage to garage ☐ Other damage, please list……. ☐ What was the cost of the repairs, if any?…….....
9.	**What damage resulted from this flood in your business?** (Please indicate either "none", "minor", "moderate" or "major".) ☐ Damage to surroundings ☐ Damage to building ☐ Damage to stock ☐ Other damages, please list…….. ☐ What was the cost of the repairs, if any?…….
10.	**Was vehicle access to/from your property disrupted due to floodwaters during the worst flooding/ storm event?** ☐ Not affected ☐ Minor disruption (roads flooded but still driveable) ☐ Access cut off
11.	**What information can you provide on past floods/ storm events that created flooding?** (You can tick more than one box). Please write any descriptions at the end of the questionnaire ☐ No information ☐ Information on extent or depth of floodwater at particular locations, newspaper clippings or other images on the past floods ☐ Any permanent marks indicating maximum flood level for particular floods ☐ Memory of flow directions, depth or velocities

Question No.	
12.	**Do you consider that flooding of your property has been made worse by works on other properties, or by the construction of roads or other structures?** ☐ Yes (please provide further details. Attach extra page if necessary. Provide sketch if possible. ☐ Unsure ☐ No
13.	**Do you have any photographs of past floods that would be useful for the consultant to help him understand the area flooded or other flood effects?** If possible please attach the photographs (with dates and location) which will be copied and returned. ☐ Yes (either attach or the consultant will contact you to arrange for a copy to be made and returned) ☐ No
14.	**Do you wish to comment on any other issues associated with this study? Please add comments at the end of the questionnaire Or please indicate your willingness to answer questions over the phone?.** _____ _____ _____ _____
15.	**Do you wish to remain on the mailing list for further details, Newsletters etc?** ☐ Yes (please provide contact details, see next question) ☐ No
16.	If you would like, please provide details of where you live and how we can contact you if we need to follow up on some details or seek additional comment. **Name:** _____ **Address:** _____ _____ **Telephone: .....** **Fax: .....** **Email:…….....**
	Space for additional comments _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

Study Areas



Rylstone



Kandos

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

Appendix B Additional Topographic Data

Table B.1. Additional Topographic Data

1. *mMGA to be used for Easting and Northings, elevations and invert levels.*
2. *Sizes in mm, lengths in m.*
3. *Digital photographs required for each asset.*
4. *Bridge general arrangement sketches to include: piers (location, size and shape); abutments (shape and elevation); deck (elevation mAHD and thickness); railings (height); and width of the deck.*

Information required
Important note

GENERAL											PITS				PIPES / CULVERTS								BRIDGES	Notes
Asset ID	Type				Coordinate Data				Digital Photos	Location of Additional Assets	Type	Size of Lintel	Grate Size	Depth[1]	Type	Diameter /Size	Length	Material	# Cells	Invert Levels		Angle of Wing Walls	GA Sketch[4] (Yes/No)	
	Pit	Culvert / Pipe	Bridge	Other	Latitude	Longitude	Easting[1]	Northing[1]												U/S	D/S			
1	X						778433.257	6367419.401	1		KIP	1000	900X550	760										
2	X						778433.515	6367419.324	2		KIP	1000	900X550	600										
8	X						778304.648	6367570.682	8		KIP	760X150	0	670										
9	X						778296.451	6367567.471	9		GKIP	1800	800X400	1040										
10	X						778253.300	6367489.363	10		GIP	0	900X600	570										
11	X						778252.852	6367500.194	11		GIP	0	900X600	540										
12	X						778268.455	6367593.673	12	Stormwater Qualtiy Improvement Device	GKIP	1800	800X400	1280										
13	X						778263.676	6367261.318	13		GKIP	2400	900X450	570										
14	X						778249.807	6367252.457	14		GIP	0	900X450	770										
15	X						778170.767	6367233.464	15		GIP	0	580X460	520										
16	X						778192.959	6367252.593	16		GIP	0	450X450	790										
17	X						778171.621	6367239.265	17	NEWPIT LOCATED UPSTREAM	GIP	0	450X450	850										
18	X						778169.781	6367038.914	18		LETTERBOX	450x150	-	500										
19	X						778196.326	6367048.998	19		GKIP	1000	900X450	800										
20	X						778170.812	6367071.214			GKIP	500	450X450	580										
21	X						778200.749	6367035.687	21		GKIP	1800	900x450	900										
22	X						778183.775	6367035.326	22		GIP	0	450X450	460										
23	X						778171.771	6367034.567			GKIP	1000	900x450	460										
24	X						778117.004	6367051.222	24		KERB OUTLET			-										
25	X						777981.478	6367073.017	25		GKIP	1800	900x450	1150										
26	X						777973.460	6367090.971	26		GKIP	1800	900x450	1130										
27	X						778332.655	6366796.733	27		KIP	600	-	420										LETTERBOX PIT
28	X						778331.696	6366796.759	28		GKIP	1000	900X450	520										
29	X						778325.320	6366785.876	29		KIP	600	-	300										
30	X						778160.268	6366828.825	30		GKIP	2000	900X450	1120										
31	X						778156.495	6366833.836	31		GIP	-	900X450	1430										
32	X						778145.752	6366836.115	32		GIP	-	900X450	1000										
33	X						777934.278	6366870.992	33		GIP	-	900x450	760										
34	X						777930.823	6366861.023	34		GKIP	1800	800X400	720										
35	X						778298.994	6366574.764	35		LETTERBOX	400X200	-	750										
36	X						778294.864	6366566.630	36		GKIP	2400	800X400	700										
37	X						778209.632	6366583.503	37		GKIP	2400	800X400	1650										
38	X						778120.035	6366600.545	38		GKIP	2700	800X400	1900										
39	X						778373.238	6366336.618	39		GKIP	900	900X450	1450										
40	X						778359.677	6366328.871	40		GKIP	900	900X450	1260										
41	X						778247.539	6366366.334	41		GKIP	900	900X400	660										
42	X						778232.389	6366366.678	42		GKIP	900	900X450	900										
43	X						778250.622	6366349.579	43		GKIP	850	900X450	1200										
44	X						778240.389	6366329.069	44		GKIP	900	900X4.5	710										
45	X						778410.710	6366147.683	45		GKIP	2400	800X400	1260										
46	X						778301.280	6366168.697			GKIP	2400	800X400	1270										
47	X						778222.958	6366183.691	47		GKIP	2400	800X400	1130										
48	X						778214.824	6366196.035	48		GKIP	1000	900X450	890										
50	X						778127.846	6366823.714	50	New pit on Piper St outside depot	JUNCTION PIT													LEVELS NOT OBTAINED - BURIED PIT
51	X						778196.292	6366188.763	51		CULVERT INLET				Pipe	450		CONCRETE	1			45		
52	X						778197.527	6366200.140	52		JUNCTION PIT													
ST00001		X					778722.505	6366752.991	ST00001						Pipe	450	10	CONCRETE	1	582.538	582.236			
ST00002		X													Pipe	450	5		1					UNABLE TO FIND START OF PIPE NUMBER ST00002
ST00003		X					778735.05	6366707.237	ST00076_A						Pipe	450	15	CONCRETE	1	583.464	583.255			
ST00004		X					778715.502	6366560.854	ST00004						Pipe	375	17	CONCRETE	1	587.603	587.154	NA		PIPE FOUND TO BE 375, NOT 450
ST00005		X					778715.322	6366544.715	ST00005						Pipe	450	17	CONCRETE	1	587.725	587.442	NA		
ST00006		X					778694.198	6366426.691	ST00006						Pipe	450	17	CONCRETE	1	590.970	590.203	30		
ST00007		X					778613.157	6367178.562	ST00007						Pipe	450	12	TIMBER	1	576.581	576.262	0		
ST00008		X					778580.260	6366965.196	ST00008						Pipe	450	12	CONCRETE	1	583.711	583.369	45		
ST00009		X					778489.88	6366668.151	ST00080						Pipe	450	12	CONCRETE	1	596.765	596.018			
ST00010		X					778548.198	6366418.527	ST00081_A						Pipe	450	12	CONCRETE	1	600.405	600.039	45		
ST00011		X					778560.503	6366420.463	ST00081_E						Pipe	450	34	CONCRETE	1	600.039	597.947	45		
ST00012		X					778636.694	6366245.307	ST00012						Pipe	450	12	CONCRETE	1	599.713	599.189	45		
ST00013		X					778587.700	6366285.166	ST00013						Pipe	600	20	CONCRETE	1	599.636	599.512	30		PIPE FOUND TO BE 600, NOT 450
ST00014		X					778433.515	6367419.324	ST00015						Pipe	450	20	CONCRETE	1	581.571	581.428			
ST00015		X					778447.675	6367416.915	ST00015						Pipe	450	95	CONCRETE	1	581.428	579.101			
ST00016		X					778326.056	6367684.996	ST00016	LETTERBOX INLET PIT - START OF PIPE					Pipe	450	8	CONCRETE	1	570.495	570.402	45		
ST00017		X					778097.116	6366511.199	ST00017						Pipe	450	20	CONCRETE	2	575.338	569.455	45		
ST00018		X					778304.648	6367570.682	8						Pipe	375	5	CONCRETE	1	574.753	574.645			
ST00019		X					778296.54	6367568.136	9						Pipe	600	30	CONCRETE	1	574.645	574.126	0		
ST00020		X					778243.312	6367631.737	ST00020	New pipe from ST00020 - Outlet at River					Pipe	600	75	CONCRETE	1	574.126	566.125			
ST00021		X					778253.3	6367489.363	10						Pipe	450	15	CONCRETE	1	576.479	576.154			
ST00022		X					778249.807	6367252.457	13						Pipe	450	15	CONCRETE	1	583.095	582.000			
ST00023		X					778217.238	6367255.45	15						Pipe	600	20	CONCRETE	1	580.141	579.518			
ST00024		X					778077.082	6367285.918	ST00024						Pipe	600	140	CONCRETE	1	579.518	571.522	45		
ST00025		X					778109.835	6367268.007	ST00025						Pipe	220	75	CONCRETE	1	578.878	575.656			
ST00026		X					778348.727	6367020.529	ST00026						Pipe	450	25	CONCRETE	1	594.015	592.160			
ST00027		X					778170.812	6367071.214	20						Pipe	450	22	CONCRETE	1	582.094	581.561			
ST00028		X					778170.812	6367071.214	24						Pipe	450	27	CONCRETE	1	581.561	580.256			
ST00029		X					778200.345	6367035.762	21						Pipe	450	5	CONCRETE	1	582.213	582.229			
ST00030		X					778171.476	6367034.603							Pipe	450	5	CONCRETE	1	582.229	582.032			
ST00031		X					778113.936	6367051.826	24						Pipe	450	20	CONCRETE	1	582.032	580.256			
ST00032		X					778117.004	6367051.222							Pipe	450	137	CONCRETE	1	580.256	576.736			

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ST00033	X			778197.527	636709.181	636709.094	25							Pipe	450	20	CONCRETE	1	575.585							Downstream outlet of ST00033 Unable to be found. Query possible buried junction pit and outlet at ST00034
ST00034	X			777973.014		636709.094	26							Pipe	450	15	CONCRETE	1	575.758	575.497	NONE						
ST00035	X			778554.793		636673.604	ST00116							Pipe	450	10	CONCRETE	1	589.881	589.707							
ST00036	X			778332.781		636679.704	27							Pipe	450	2	CONCRETE	1	588.852	588.826							
ST00037	X			778308.688		636680.021	28							Pipe	450	17	CONCRETE	1	588.826	588.120							
ST00038	X			778308.520		636678.023	29							CULVERT	600X300	17	CONCRETE	1	588.842	588.242							
ST00039	X			778156.495		636668.336	30							Pipe	450	2	CONCRETE	1	583.063	581.875							
ST00040	X			778145.788		636683.845	32							Pipe	600	17	CONCRETE	1	581.875	581.581							
ST00041	X			778145.788		636683.845	50							Pipe	450	15	CONCRETE	1	581.581								ST00041 D/S INVERT UNABLE TO BE OBTAINED PIT NOT LOCATED - BURIED?
ST00042	X			778154.888		636681.235	34							Pipe	450	220	CONCRETE	1		577.677							Unable to obtain upstream invert - buried pit
ST00043	X			779931.18		636681.071	33							Pipe	450	10	CONCRETE	1	577.677	577.596							
ST00044	X			778298.994		636657.476	35							Pipe	450	15	CONCRETE	1	584.131	584.106							
ST00045	X			778294.542		636656.448	37							Pipe	450	90	CONCRETE	1	584.106	579.474							
ST00046	X			778209.632		636658.303	37							Pipe	450	80	CONCRETE	1	579.474	576.742							
ST00047	X			778085.189		636660.487	ST00047							Pipe	450	20	CONCRETE	1	576.742	575.598	45						
ST00048	X			777949.656		636663.460	ST00048							Pipe	450	12	CONCRETE	2	573.864	573.762	45						
ST00049	X			777891.832		636670.263 3								Pipe	450	9	CONCRETE	1	572.425	572.119							
ST00050	X			778687.884		636665.584	ST00050							Pipe	450	13	CONCRETE	1	573.708	573.626	45						
ST00051	X			778278.655		636663.524								Pipe	600	12	CONCRETE	2	572.730	572.512	45						
ST00052	X			778233.252		636636.619	42							Pipe	600	15	CONCRETE	1	580.891	-							Unable to locate outlet to pipe ST00052
ST00053	X			778225.984		636633.366	44.2	NEW PIPE AND CULVERT UPSTREAM						Pipe	600	20	CONCRETE	1	580.695	580.345							
ST00054	X			778250.546		636634.866	43							Pipe	450	110	CONCRETE	1	587.439	580.775							
ST00055	X			778250.622		636634.979	44							Pipe	450	15	CONCRETE	1	580.839	580.541							
ST00056	X			778240.389		636632.906	44							Pipe	450	2	CONCRETE	1	580.775	580.541							
ST00057	X			778373.118		636636.589	39							Pipe	375	15	CONCRETE	1	588.356	587.439							
ST00058	X			778382.163		636643.530	ST00058							Pipe	900	10	CONCRETE	2	574.964	574.782	0						
ST00059	X			778449.974		636646.819	ST00059							CULVERT	1800X1500	9	CONCRETE	2	573.220	573.166	45						
ST00060	X			778626.732		636610.077 3	ST00060							Pipe	450	12	CONCRETE	1	600.285	599.951	30						
ST00061	X			778584.760		636610.283	ST00061							Pipe	450	9	CONCRETE	1	602.164	601.954	30						
ST00062	X			778410.71		636614.683	45							Pipe	450	150	CONCRETE	1	587.412	584.165							
ST00063	X			778223.533		636618.394	47							Pipe	450	60	CONCRETE	1	584.149	581.488							
ST00064	X			778197.527		626620.140	ST00064	INLET PIT LOCATED (UNDER COTTAGE LN) REFER A30						Pipe	-	108	CONCRETE	1	-								INVERTS UNABLE TO BE OBTAINED DUE TO COVERED JUNCTION PITS
ST00065	X			778215.221		636619.986	48							Pipe	450	2	CONCRETE	1	581.488	581.081							
ST00066	X			778197.527		636620.140	52							Pipe	450	22	CONCRETE	1	581.081	-							ST00066 RUNS FROM PIT 48 TO PIT 52
ST00067	X			778203.566		636613.371	ST00067							Pipe	450	20	CONCRETE	2	581.454	581.081							
ST00068	X			778203.566		636613.371	ST00068							CULVERT	600X300	10	CONCRETE	1	581.269	581.262	45						
ST00069	X			777630.340		636722.709	ST00069							Pipe	450	12	CONCRETE	2	574.035	573.868	30						
ST00070	X			777680.157		636730.704	ST00070							Pipe	450	12	CONCRETE	1	573.014	572.587	45						
ST00071	X			777698.260		636733.948	ST00071							Pipe	450	10	CONCRETE	1	574.086	573.815							
ST00072	X			777751.304		636739.153	ST00072							Pipe	600	10	CONCRETE	1	574.423	574.081	20						PIPE FOUND TO BE 600, NOT 450
ST00073	X			777818.458		636749.257	ST00073	EXTRA 600mm PIPE (same location)						Pipe	450 & 600	10	CONCRETE	2	577.264	577.024	20						ONE 450 DIAMETER, ONE 600 DIAMETER
ST00074	X			778062.763		636761.750 1	ST00074							Pipe	450	8	CONCRETE	1	572.830	572.491	10						
ST00075	X			778323.563		636767.552	ST00075							Pipe	450	12	CONCRETE	1	573.201	572.792	30						
ST00076	X			778735.050		636670.237	ST00076		INLET	600X200	-	760														
ST00077	X								INLET			0														PIT not located - nothing found on site
ST00079	X			778489.880		636668.151	ST00079		GRATE	0	900X600	650														
ST00080	X			778502.075		636667.043 4	ST00080		GRATE	0	900X600	1340														
ST00081	X			778548.198		636641.852	ST00081		KERB-INL	1000	900X600	2230														
ST00116	X			778561.228		636674.036	ST00116		KERB-OUTLET	2400	-	0														
ST00125	X			778025.739		636032.988	6							Pipe	450	30	CONCRETE	1	640.273								Unable to find outlet to ST00125 - overgrown and possibly buried - long grass and excess landfill in location
ST00126	X			778098.573		636043.871	0							Pipe	450	40	CONCRETE	1	638.891	638.830							
ST00127	X			778057.074		636043.945	7							Pipe	450	30	CONCRETE	1	638.830	638.582							
ST00128	X			777984.535		636043.311	4							Pipe	450	5	CONCRETE	1	636.055	635.958							
ST00129	X			777988.655		636044.094	2							Pipe	450	35	CONCRETE	1	635.958	633.723							
ST00130	X			777951.518		636045.800	4							Pipe	450	35	CONCRETE	1	633.723	632.793							
ST00132	X			778063.924		636045.852	1							Pipe	450	125	CONCRETE	1	638.019	632.374							
ST00133	X			777975.5		636052.710	8							Pipe	450	25	CONCRETE	1	633.230	632.374							
ST00134	X			777974.997		636054.229	9							Pipe	450	50	CONCRETE	1	632.374	630.388							Note: Culvert C02 exists instead of this pipe - condition of pipe unknown. Inverts obtained by pit at either end
ST00135	X			777975.715		636060.127	1							Pipe	750	15	CONCRETE	1	630.388	630.259							
ST00136	X			777985.91		636057.156	0							Pipe	450	18	CONCRETE	1	630.848	630.827							
ST00137	X			777985.108		636058.149 4								Pipe	450	5	CONCRETE	1	630.827	630.388							
ST00138	X			778041.611		636076.355	0							Pipe	450	14	CONCRETE	1	633.178	632.993							
ST00139	X			778153.086		636087.647 8	ST00320							Pipe	375	10	CONCRETE	1	629.217	629.199							
ST00140	X			778241.475		636092.028 6	ST00321							Pipe	900	10	CONCRETE	1	627.354	626.773	15						
ST00141	X			778382.987		636097.844	ST00141		INLET	1200X300				Pipe	450	10	CONCRETE	1	627.388	627.152							(FOUND LETTERBOX PIT)
ST00142	X			778461.298		636100.134	ST00325							Pipe	450	12	CONCRETE	1	628.560	628.138							
ST00143	X			778259.642		636067.645	ST00313							Pipe	450	5	CONCRETE	1	635.855	635.448							

ST00144		X					778255.438	6360686.361	ST00144		INLET	600	450X450		Pipe	375	20	CONCRETE	1	635.448	635.299			(FOUND TO BE 375 NOT 450) (FOUND TO BE GKIP)
ST00145		X					778255.673	6360697.073	ST00315						Pipe	450	60	CONCRETE	1	635.299	634.161			
ST00146		X					778273.553	6360749.57	ST00529						Pipe	450	17	CONCRETE	1	635.104	633.761			
ST00147		X					778225.312	6360819.157	ST00319						Pipe	450	17	CONCRETE	1	630.978	630.739			
ST00148		X					778279.187	6360806.43	ST00317						Pipe	450	55	CONCRETE	1	632.552	630.978			
ST00149		X					778261.239	6360757.425	ST00530						Pipe	450	60	CONCRETE	1	634.631	632.851			
ST00150		X					778383.675	6360804.226	ST00322						Pipe	450	15	CONCRETE	1	633.536	633.182			
ST00151		X					778383.861	6360815.982	ST00323						Pipe	450	105	CONCRETE	1	633.182				Unable to find outlet for ST00151 - outlet appears to have been buried
ST00152		X					778528.932	6360922.976	ST00327						Pipe	450	15	CONCRETE	1	628.652	628.603			
ST00153		X					778513.449	6360813.525	ST00502						Pipe	450	110	CONCRETE	1	631.760	628.652			
ST00154		X					778496.338	6360819.17	ST00328						Pipe	375	15	CONCRETE	1	632.905	632.855			
ST00155		X					778499.363	6360801.953	ST00329						Pipe	450	10	CONCRETE	1		632.902			No pipe inlet visible for pipe ST00155 - downstream IL given is pit invert of ST00329. CO-ordinates are also from ST00329
ST00156		X													Pipe	450	12							Site inspection in 1998/99 revealed this pipe did not exist - please check. Pipe unable to be found
ST00157		X					778514.396	6360692.095	ST00513						Pipe	450	90	CONCRETE	1	638.179	632.497			
ST00158		X					778512.562	6360680.445	ST00506						Pipe	450	40	CONCRETE	1	638.357	638.179			
ST00159		X					778481.196	6360677.483	ST00159						Pipe	225	20	CLAY	1	639.568				Downstream end of pipe not found - possible buried junction pit at ST00505
ST00160		X					778453.187	6360693.074	ST00409						Pipe	450	23	CONCRETE	1	638.157				Downstream end of pipe not found - possible buried junction pit at ST00505
ST00161		X					778453.075	6360682.33							Pipe	450	12	CONCRETE	1	638.355	638.157			
ST00162		X					778478.841	6360555.528							Pipe	450	15	CONCRETE	1	644.565	644.192			
ST00163		X					778470.737	6360560.441							Pipe	450	13	CONCRETE	1	644.346	644.192			
ST00164		X					778474.044	6360571.807							Pipe	450	5	CONCRETE	1	644.192	643.590			
ST00165		X					778271.585	6360435.369							Pipe	450	35	CONCRETE	1	647.400	645.967			
ST00166		X					778276.667	6360442.956							Pipe	450	20	CONCRETE	1	647.150	646.328			
ST00167		X					778275.236	6360453.926							Pipe	450	22	CONCRETE	1	646.328	646.056			
ST00168		X					778268.912	6360325.089							Pipe	300	35	CONCRETE	1	657.330	655.800			
ST00169		X					778473.897	6360304.204	ST00425						Pipe	450	5	CONCRETE	1	662.716	662.378			
ST00170		X					778470.084	6360308.999	ST00426						Pipe	450	22	CONCRETE	1	662.378	661.248			
ST00171		X					778470.04	6360320.972	ST00427						Pipe	450	16	CONCRETE	1	661.248	660.573			
ST00172		X					778485.168	6360304.926	ST00424						Pipe	450	22	CONCRETE	1	662.298	660.573			
ST00173		X					778475	6360428.216							Pipe	450	15	CONCRETE	1	654.588	654.117			
ST00174		X					778486.976	6360427.332							Pipe	450	100	CONCRETE	1	654.117	648.087			
ST00175		X					778591.489	6360428.972							Pipe	450	100	CONCRETE	1	648.087	646.280			
ST00176		X					778697.682	6360422.449							Pipe	450	10	CONCRETE	1	646.710	646.280			
ST00177		X					778693.337	6360426.997							Pipe	450	20	CONCRETE	1	646.280	645.663			
ST00178		X					778693.687	6360445.586							Pipe	450	25	CONCRETE	1	645.663	645.606			Pit ST00510 unable to be opened (junction pit)
ST00179		X					778709.97	6360422.311							Pipe	450	30	CONCRETE	1	645.680	645.166			Pit ST00510 unable to be opened (junction pit)
ST00180		X					778690.637	6360305.903	ST00408						Pipe	450	30	CONCRETE	1	653.670	653.370			
ST00181		X					778691.291	6360316.268	ST00409						Pipe	450	30	CONCRETE	1	653.433	652.610			
ST00182		X					778701.213	6360551.824							Pipe	450	2	CONCRETE	1	666.122				equipment
ST00183		X					778701.213	6360551.824							Pipe	450	25	CONCRETE	1					
ST00184		X					778691.075	6360567.634							Pipe	450	25	CONCRETE	1	640.753				Unable to find outlet of pipe ST00184
ST00185		X					778697.716	6360676.74							Pipe	450	30	CONCRETE	1	636.743	636.349			
ST00186		X					778697.182	6360688.192							Pipe	450	30	CONCRETE	1	636.668	635.999			
ST00187		X					778705.413	6360793.08	ST00335						Pipe	450	2	CONCRETE	1	630.970	630.954			Inspection in 1998/99 failed to find this pipe.
ST00188		X					778716.495	6360792.397	ST00336						Pipe	450	30	CONCRETE	1	630.970	630.970			Inspection in 1998/99 failed to find this pipe.
ST00189		X					778722.85	6360797.091	ST00337						Pipe	450	2	CONCRETE	1	631.025	630.970			Inspection in 1998/99 failed to find this pipe.
ST00190		X					778635.608	6360920.854							Pipe	600	60	CONCRETE	1		627.293			Unable to fnd pit ST00512
ST00191		X					778722.776	6360809.009							Pipe	450	30	CONCRETE	1	630.663	629.088			
ST00192		X					778709.955	6360852.836							Pipe	450	20	CONCRETE	1	629.824	629.544			
ST00193		X					778706.396	6360852.796							Pipe	450	40	CONCRETE	1	629.544				Unable to fnd pit ST00512
ST00194		X													Pipe	450	30	CONCRETE	1					Unable to find inlet for pipe ST00194 (Pit ST00407 Unable to be found)
ST00195		X					778879.153	6360301.394	ST00405						Pipe	450	30	CONCRETE	1	648.575	648.064			
ST00196		X					778878.276	6360310.913	ST00405						Pipe	600	125	CONCRETE	1	648.061	641.560			
ST00197		X					778820.388	6360424.318	ST00404						Pipe	600	35	CONCRETE	1	641.560	641.166			
ST00198		X					778802.416	6360443.598	ST00403						Pipe	600	105	CONCRETE	1	641.166	636.950			
ST00199		X					778798.337	6360554.67	ST00402						Pipe	600	20	CONCRETE	1	636.950	636.884			
ST00200		X					778797.772	6360565.459	ST00401	Junction and two inlet pits located upstream					Pipe	600	145	CONCRETE	1	636.884	633.335			
ST00201		X					778780.581	6360712.686	ST00513						Pipe	600	100	CONCRETE	1	633.335	631.025			
ST00202		X					778722.85	6360797.091	ST00337						Pipe	600	40	CONCRETE	1	631.138	629.088			
ST00203		X					778700.187	6360809.47							Pipe	600	55	CONCRETE	1	629.088				Unable to fnd pit ST00512
ST00204		X					778635.608	6360920.854							Pipe	600	13	CONCRETE	1	627.293	627.133			
ST00205		X					778641.266	6360950.171							Pipe	600	13	CONCRETE	1	627.133	625.990			
ST00206		X					778925.331	6360414.393							Pipe	450	5	CONCRETE	1	646.548				Downstream invert not obtained as pit ST00514 could not be found
ST00207		X					778939.747	6360420.094							Pipe	450	25	CONCRETE	1	646.612				Downstream invert not obtained as pit ST00514 could not be found
ST00208		X					778949.244	6360440.709							Pipe	450	2	CONCRETE	1	646.836	646.571			

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ST00209		X					778946.661	6360445.059								Pipe	450	18	CONCRETE	1	646.571				Downstream invert not obtained as pit ST00395could not be found	
ST00210		X					778927.934	6360441.117								Pipe	450	152	CONCRETE	1	646.066	641.166				
ST00211		X					778927.934	6360441.117								Pipe	450	2	CONCRETE	1	641.166				Downstream invert not obtained as pit ST00395could not be found	
ST00212		X					779050.311	6360616.842								Pipe	450	18	CONCRETE	1	645.804	645.608				
ST00213		X					779044.740	6360608.640								Pipe	450	76	CONCRETE	1	445.608	644.973				
ST00214		X					778999.809	6360549.031								Pipe	450	65	CONCRETE	1	644.973	643.478				
ST00215		X					778950.039	6360558.301								Pipe	450	45	CONCRETE	1	643.478	640.413				
ST00216		X					778869.994	6360563.902								Pipe	450	109	CONCRETE	1	640.413	636.884				
ST00217		X					778724.791	6360930.733								Pipe	450	25	CONCRETE	1	631.022	629.535				
ST00218		X					778724.534	6360918.026								Pipe	450	25	CONCRETE	1	631.013	629.535				
ST00219		X					778726.772	6361040.994	ST00343							Pipe	450	15	CONCRETE	1	630.025	629.624				
ST00220		X					778731.186	6361050.94	ST00344							Pipe	450	15	CONCRETE	1	629.624	628.852				
ST00221		X					778730.937	6361075.186	ST00345							Pipe	450	20	CONCRETE	1	628.852	628.661				
ST00222		X					778795.35	6361129.311	ST00348							Pipe	450	20	CONCRETE	1	630.035	629.881				
ST00223		X					778791.516	6361140.215	ST00347							Pipe	450	25	CONCRETE	1	629.881				Unable to obtain invert of outlet due to overgrown area	
ST00224		X					778914.101	6361240.21	ST00350							Pipe	450	13	CONCRETE	1	626.511	626.342				
ST00225		X					778914.101	6361240.21	ST00349							Pipe	450	20	CONCRETE	1	626.342	626.266				
ST00226		X					778907.604	6361129.745	ST00226							Pipe	450	13	CONCRETE	1	630.918	630.873				
ST00227		X					779004.660	6361064.542								Pipe	450	20	CONCRETE	1	633.934	633.842				
ST00228		X					779022.293	6361103.336								Pipe	450	20	CONCRETE	1	632.348	630.456				
ST00229		X					779012.003	6361105.690								Pipe	450	20	CONCRETE	1	632.466	630.599				
ST00230		X					779037.313	6361236.378	ST00351							Pipe	450	2	CONCRETE	1	625.043	625.002				
ST00231		X					779032.788	6361242.609	ST00352							Pipe	450	24	CONCRETE	1	625.002	624.162				
ST00232		X					779053.739	6361238.752	ST00354							Pipe	450	12	CONCRETE	1	624.162	624.114				
ST00233		X					779040.092	6360904.803								Pipe	450	2	CONCRETE	1	637.704	637.615				
ST00234		X														Pipe	450	13		1					Inspection in 1998/99 failed to find this pipe.	Pipe unable to be found
ST00235		X														Pipe	450	37		1					Inspection in 1998/99 failed to find this pipe.	Pipe unable to be found
ST00236		X														Pipe	450	13		1					Inspection in 1998/99 failed to find this pipe.	Pipe unable to be found
ST00237		X					779042.868	6360898.874								Pipe	450	13	CONCRETE	1	637.715	637.551				
ST00238		X					779091.62	6360895.147								Pipe	450	15	CONCRETE	1	637.419	637.318				
ST00239		X					779059.059	6360775.352								Pipe	450	13	CONCRETE	1	642.994	642.712				
ST00240		X					779109.293	6360990.167								Pipe	450	110	CONCRETE	1	634.287	631.113				
ST00241		X					779244.314	6361196.469								Pipe	450	33	CONCRETE	1	629.911	626.635				
ST00242		X					779254.773	6361194.253								Pipe	450	5	CONCRETE	1	626.635	626.489				
ST00243		X					779367.681	6361167.791								Pipe	450	105	CONCRETE	1	630.089	626.489				
ST00244		X					779262.85	6361197.708								Pipe	450	20	CONCRETE	1	626.489				Unable to locate downstream pit (ST00519). Pit buried or does not exist	
ST00245		X														Pipe	450	100		1					Unable to find pit ST00519 - No upstream information available.	
ST00246		X					779107.639	6360725.396								Pipe	450	75	CONCRETE	1	644.949	643.470				
ST00247		X					779133.558	6360788.388								Pipe	450	110	CONCRETE	1	643.476	640.272				
ST00248		X					779243.666	6360958.106								Pipe	450	100	CONCRETE	1	640.272	636.770				
ST00249		X					779243.666	6360958.106								Pipe	450	15	CONCRETE	1	636.77	636.744				
ST00250		X					779252.207	6360958.955	ST00363							Pipe	450	70	CONCRETE	1	636.877	632.711				
ST00251		X					779282.544	6361016.672	ST00362							Pipe	450	18	CONCRETE	1	632.711				Unable to obtain downstream invert - pit ST00522 Not Found (Query Buried)	
ST00252		X					779326.778	6361084.092	ST00361							Pipe	450	18	CONCRETE	1	630.768				Unable to obtain downstream invert - pit ST00523 Not Found (Query Buried)	
ST00253		X					779374.626	6361157.056	ST00360							Pipe	450	18	CONCRETE	1	630.413	630.089				
ST00254		X														Pipe	450	80		1					Unable to obtain information - Pits ST00522 and ST00523 Not Found	
ST00255		X					779236.979	6360565.823	ST00389							Pipe	450	18	CONCRETE	1	660.426	660.203				
ST00256		X					779247.014	6360564.034	ST00388							Pipe	450	15	CONCRETE	1	660.534	660.490				
ST00257		X					779262.053	6360689.556	ST00385							Pipe	450	30	CONCRETE	1	653.161					
ST00258		X					779268.626	6360689.051	ST00384							Pipe	450	2	CONCRETE	1	653.879	653.060				
ST00259		X					779277.388	6360694.526	ST00383							Pipe	450	20	CONCRETE	1	653.060	652.800				
ST00260		X					779278.909	6360703.709	ST00382							Pipe	450	20	CONCRETE	1	652.800	645.771			Did not find junction between pipe ST00260 and culvert C08 (assumed that ST00260 runs full length and joins with pipe ST00263	
ST00261		X					779283.665	6360812.583	ST00380							Pipe	450	120	CONCRETE	1	645.912	639.470			Inspection in 1998/99 failed to find this pipe.	Pipe found - pipe ST00262 not found
ST00262		X														Pipe	450	18		1					Pipe Not Found - Does Not Exist	
ST00263		X					779293.654	6360816.506	ST00381							Pipe	450	120	CONCRETE	1	645.771	639.379				
ST00264		X					779313.106	6360918.186	ST00366							Pipe	450	2	CONCRETE	1	639.379	639.179				
ST00265		X					779320.48	6360923.428	ST00365							Pipe	450	18	CONCRETE	1	639.179	639.029				

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ST00266		X					779322.959	6360932.181								Pipe	450	20	CONCRETE	1	630.029				Unable to obtain downstream invert - Pit ST00528 not found. Possibly buried	
ST00267		X					779556.194	6360918.278								Pipe	450	18	CONCRETE	1	651.316	651.218				
ST00268		X					779551.382	6360926.448								Pipe	450	82	CONCRETE	1	651.218				Unable to find outlet to pipe. Outlet possibly buried	
ST00269		X					777859.337	6360961.710	ST00269							Pipe	375	15	CONCRETE	1	628.085	627.926			PIPE MEASURED TO BE 375, NOT 475	
ST00270		X					777876.482	6360942.568	ST00428							Pipe	475	15	CONCRETE	1	629.056	628.759				
ST00271		X					777854.522	6360828.533	ST00271							Pipe	525	20	CONCRETE	1	626.077	625.685			PIPE MEASURED TO BE 525, NOT 450	
ST00272		X					777821.387	6360657.578	ST00272							Pipe	1050	20	CONCRETE	1	624.644	624.396	35 ENTRY , 45 EXIT		PIPE MEASURED TO BE 1050, NOT 900	
ST00273		X					777845.633	6360612.100	ST00273							Pipe	450	16	CONCRETE	1	625.902	625.584			Inspection in 1998/99 failed to find this pipe.	~ PIPE FOUND (LETTER BOX. LINTEL SIZE: 300X250 DEPTH:0.75)
ST00274	X										ENCLOSED			0											Pit not located - only outlet to pipe ST00296 in this location - refer to photo
ST00275		X					777892.907	6360472.332	ST00430							Pipe	450	35	CONCRETE	1	631.824					
ST00276		X					777804.653	6360504.89	ST00431	LETTERBOX PIT LOCATED BEFORE OUTLET ON CROWN STREET						Pipe	450	80	CONCRETE	1	631.084	627.555				
ST00277		X					777946.926	6360800.502	ST00277							Pipe	450	35	CONCRETE	1	629.327	628.836				
ST00278		X					777911.225	6360627.399	ST00278							Pipe	900	28	CONCRETE	1	626.950	626.456	30		Inspection in 1998/99 failed to find this pipe.	
ST00279		X					777841.939	6360347.204	ST00279							Pipe	475	22	CONCRETE	1	631.543	630.706	30			
ST00280		X					777773.258	6360332.939	ST00280							Pipe	475	13	CONCRETE	1	627.461	627.393				
ST00281		X					777756.11	6360310.281	ST00281							Pipe	475	25	CONCRETE	1	627.393	627.003				
ST00282		X					777776.835	6360309.479	ST00500							Pipe	475	2	CONCRETE	1		627.393			FAILED TO FIND UPSTREAM INLETS FOR PIPES 282 AND 283	
ST00283		X					777776.835	6360309.479	ST00500							Pipe	475	2	CONCRETE	1		627.393			FAILED TO FIND UPSTREAM INLETS FOR PIPES 282 AND 284	
ST00284		X					777609.746	6360037.472	ST00284							Pipe	1200	18	CONCRETE	1	643.427	643.287				
ST00285		X					777797.07	6359838.302	ST00285							Pipe	600	22	CONCRETE	1	625.933	625.641				
ST00286		X					777796.066	6359837.892	ST00285							Pipe	600	22	CONCRETE	1	626.012	625.653				
ST00287		X					777742.719	6359843.938	ST00287							Pipe	300	18	CONCRETE	1	627.641	627.424				
ST00288		X					777583.965	6359848.238	ST00288	2 SMALL CULVERTS UNDER DRIVEWAYS EAST OF ST00288 EITHER SIDE OF ANZAC AVE						Pipe	450	22	CONCRETE	1	622.268	621.875				
ST00289		X					777753.707	6359900.683	ST00290							Pipe	450	30	CONCRETE	1	623.997	623.374			pipe 450 not 600	
ST00290		X					777752.381	6359900.238	ST00290							Pipe	600	30	CONCRETE	1	623.929	623.355				
ST00291		X					777915.839	6360178.594								Pipe	1500	15	CONCRETE	1	625.271	625.054				
ST00292		X					777915.615	6360177.063								Pipe	1500	15	CONCRETE	1	625.269	625.054				
ST00293		X					777909.856	6359915.562		extra pit on opposite side of road						Pipe	450	65	CONCRETE	1	628.868	628.720				
ST00294		X					777910.533	6359958.922								Pipe	450	22	CONCRETE	1	628.720	628.203				
ST00295		X					777908.027	6359847.802								Pipe	450	23	CONCRETE	1	629.636	629.329				
ST00296		X					777896.085	6359852.823	ST00296							Pipe	450	2	CONCRETE	1	629.481	629.329				
ST00297	X						778025.739	6360329.886			KERB-INL	2000	900X450	710												
ST00298	X						778098.573	6360438.710			KERB-INL	1800	900X600	730												
ST00299	X						778053.058	6360435.037			GRATE	0	450X450	350												
ST00300	X						777988.655	6360440.942			KERB-INL	0	900X600	920												
ST00301	X						777984.535	6360433.114			GRATE	600X80	0	700												
ST00302	X						777951.518	6360458.004			KERB-INL	2400	800X400	1570												
ST00303	X						778173.010	6360455.936			INLET	-	900x6000	350											New traffic island and kerb blister in main street - gutter bridge	
ST00304	X						778063.924	6360458.521			KERB-INL	900	900X600	650												
ST00305	X						777975.531	6360527.092			GRATE	0	450	600												
ST00306	X						777974.997	6360542.29			KERB-INL	1000	900x600	670												
ST00307	X						777985.91	6360571.156			KERB-INL	1800	900x400	820												
ST00308	X						777985.108	6360581.494			KERB-INL	2100	900x400	900												
ST00309	X						777975.715	6360601.271			KERB-INL	900	900x600	1175												
ST00310	X						778268.999	6360325.054			KERB-INL	1000	800X400	430												
ST00311	X						778276.667	6360442.956			INLET	2800	900X600	600												
ST00312	X						778275.236	6360453.926			KERB-INL	2700	900X600	1000												
ST00313	X						778259.781	6360677.781			KERB-INL	600	450x450	730												
ST00314	X						778259.781	6360677.506	ST00314		KERB-INL	600	450X450	720												
ST00315	X						778255.690	6360696.818	ST00315		KERB-INL	600	450X450	920												
ST00316	X						778041.611	6360763.355			KERB-INL	900	900x600	850												
ST00317	X						778279.187	6360806.430	ST00317		GRATE	600X900		440 TO OBV												
ST00318	X						778224.682	6360807.915	ST00318		KERB-INL	900X600		900												
ST00319	X						778225.312	6360819.157	ST00319		KERB-INL	900X600		900												
ST00320	X						778153.086	6360876.478	ST00320		INLET	600X250		900												
ST00321		X					778241.475	6360920.286	ST00321		INLET			0											PIT ST00321 NOT LOCATED HEADWALL ENTRY NOT PIT AT THIS LOCATION. REFER PIPE ST00140 FOR DETAILS	

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

ST00322	X						778383.675	6360804.226			GRATE	600X80	450X500	1350											
ST00323	X						778383.861	6360815.982			GRATE	-	450x500	1750											
ST00324	X						778382.987	6360978.944			INLET	1200x300	-	950											
ST00325	X						778461.298	6361003.134	ST00325		INLET	600X250		930 (FROM LID)											
ST00326	X						778528.621	6360933.525			INLET	600X350	0	450											
ST00327	X						778528.932	6360922.976			KERB-INL	2400X110	800X400	790											
ST00328	X						778484.691	6360819.221			KERB-INL	1200X220	-	-											Unable to obtain pit depth
ST00329	X						778499.363	6360801.953	ST00329		GRATE	-	900X600	1040											Pipe inlet to ST00329 not found
ST00330	X						778511.187	6360801.395			KERB-INL	1000X200	0	0											
ST00331	X						778639.950	6360931.856			GRATE	0	950X950	790											
ST00332	X						778635.608	6360920.854			KERB-INL	2400X110	800X400	800											
ST00333	X						778700.923	6360815.637			ENCLOSED	0	0	2050											JUNCTION PIT NOT KIP
ST00334	X						778700.649	6360798.021			KERB-INL	1020X150	900X600	350											
ST00335	X						778705.413	6360793.080			KERB-INL	970X150	900X600	420											Inspection in 1998/99 failed to find this pit.
ST00336	X						778716.495	6360792.397			KERB-INL	970X129	900X600	640											Inspection in 1998/99 failed to find this pit.
ST00337	X						778722.850	6360797.091			KERB-INL	1020X150	0	500											
ST00338	X						778722.776	6360809.009			KERB-INL	1100X150	900X600	800											
ST00339	X						778718.533	6360852.832			KERB-INL	870X190	0	830											
ST00340	X						778706.396	6360852.796			KERB-INL	-	1600X960	680											
ST00341	X						778724.534	6360918.026			INLET	700X140	0	600											
ST00342	X						778724.791	6360930.733			INLET	600X200	0	500											
ST00343	X						778726.772	6361040.994			INLET	600X280	0	780											
ST00344	X						778731.186	6361050.940			INLET	600X250	0	880											
ST00345	X						778730.937	6361075.186			INLET	600X260	0	1080											
ST00346	X						778719.841	6361078.168			INLET	600X260	0	1100											
ST00347	X						778791.516	6361140.215			INLET	600X250	0	940											
ST00348	X						778795.350	6361129.311			INLET	600X220	0	860											
ST00349	X						778902.045	6361247.364			INLET	600X290	0	1010											
ST00350	X						778914.101	6361240.210			INLET	600X200	0	1080											
ST00351	X						779037.313	6361236.378			INLET	600X250	0	960											
ST00352	X						779032.788	6361242.609			INLET	600X250	0	1010											
ST00353	X						779053.564	6361249.305			INLET	600X280	0	1050											
ST00354	X						779053.739	6361238.752			INLET	600X250	0	1150											
ST00355	X						779244.314	6361196.469			INLET	620X150	0	620											
ST00356	X						779271.037	6361207.292			INLET	540X130	0	1040											
ST00357	X						779254.773	6361194.253			KERB-INL	1700X100	960X540	1120											
ST00358	X						779262.850	6361197.708			INLET	560X110	0	1000											NOT FOUND
ST00359	X						779367.681	6361167.791			KERB-INL	1890X180	980X580	530											
ST00360	X						779374.626	6361157.056			INLET	1890X180	980X580	2400											
ST00361	X						779326.778	6361084.092			GRATE	0	1000X500	1950											
ST00362	X						779282.544	6361016.672			GRATE	2150	1000X530	2050											
ST00363	X						779253.653	6360973.968			INLET	500X200	0	400											
ST00364	X						779322.959	6360932.181			GRATE	1000X120	900X400	740											
ST00365	X						779320.480	6360923.428			GRATE	1860X110	870X440	920											
ST00366	X						779313.106	6360918.186			GRATE	1200X120	900X400	900											
ST00367	X						779303.359	6360917.867			GRATE	1800X110	900X400	870											
ST00368	X						779243.666	6360958.106			GRATE	920X170	880X500	850											
ST00369	X						779551.662	6360926.315			KERB-INL	2400	800X400	1000											
ST00370	X						779556.194	6360918.278			KERB-INL	2400	800x400	840											
ST00371	X						779088.366	6360906.635			INLET	600x350	-	1050											
ST00372	X						779091.62	6360895.147			INLET	600x300	-	1080											
ST00373	X						779053.757	6360896.886			INLET	600x250	-	920											
ST00374	X						779042.868	6360898.874			INLET	600x250	-	930											
ST00375	X						779040.092	6360904.803			INLET	600x260	-	800											
ST00376	X						779070.722	6360785.371			KERB-INL	1000	900x600	960											
ST00377	X						779059.059	6360775.352			KERB-INL	1000	900x600	820											
ST00378	X										GRATE			0											Pit 378 Unable to be recorded
ST00379	X						779133.558	6360788.388			GRATE	1000	900X600	630											
ST00380	X						779283.665	6360812.583			GRATE	2400x110	900x400	1130											
ST00381	X						779293.654	6360816.506			GRATE	1800X110	900X400	980											
ST00382	X						779278.909	6360703.709			INLET	600x330	-	1500											
ST00383	X						779277.388	6360694.526			KERB-INL	2401	1000x400	470											
ST00384	X						779268.626	6360689.051			KERB-INL	3340	1000x380	1270											
ST00385	X						779262.053	6360689.556			KERB-INL	3341	1000x381	1080											
ST00386	X						779107.639	6360725.396			KERB-INL	800X600	2400	1145											
ST00387	X						779254.183	6360568.411			KERB-INL	2400	870x410	700											
ST00388	X						779247.014	6360564.034			KERB-INL	600x270	-	1350											
ST00389	X						779236.979	6360565.823			INLET	600X260	0	720											
ST00390	X						779050.311	6360616.842			KERB-INL	2450X120	870X410	1180											
ST00391	X						779044.740	6360608.640			KERB-INL	2430X110	870X410	1180											
ST00392	X						778999.809	6360549.031			KERB-INL	2630X100	900X400	1180											
ST00393	X						778950.039	6360558.301			KERB-INL	1250X120	0	840											
ST00394	X						778869.994	6360563.902			KERB-INL	1200X120	0	860											
ST00395	X										GRATE			0											Pit was not located
ST00396	X						778946.661	6360445.059			GRATE	510	450X450	510											
ST00397	X						778949.244	6360440.709			GRATE	0	450X450	540											
ST00398	X						778939.747	6360420.094			KERB-INL	970X180	0	1100											
ST00399	X						778925.331	6360414.393			GRATE	0	900X600	1030											
ST00400	X						778927.934	6360441.117			GRATE	0	450X450	670											
ST00401	X						778797.772	6360565.459			KERB-INL	1230X120	0	1600											
ST00402	X						778798.337	6360554.670			KERB-INL	1100X150	0	1550											
ST00403	X						778802.416	6360443.598			KERB-INL	2400X120	800X400	1800											
ST00404	X						778820.388	6360424.318			KERB-INL	2100X300	900X550	1550											
ST00405	X						778878.276	6360310.913			KERB-INL	1900	900X600	810											
ST00406	X						778879.153	6360301.394			KERB-INL	2420	800X400	900											
ST00407	X										KERB-INL														Unable to locate pit ST00407 (only ST00405 & ST00406 found at this location)
ST00408	X						778713.375	6360305.356			KERB-INL	900	900X450	810											
ST00409	X						778691.291	6360316.268			KERB-INL	900	900X450	680											
ST00410	X						778709.970	6360422.311			KERB-INL	1900	900X600	1360											
ST00411	X						778697.682	6360422.449			KERB-INL	1900	900X600	700											
ST00412	X						778693.337	6360426.997			KERB-INL	2060	900X600	1030											

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ST00413	X						778693.687	6360445.586			GRATE	450	900X600	800										
ST00414	X						778695.611	6360555.905			INLET	760X170	0	1120										
ST00415	X						778691.075	6360567.634			INLET	430X140	0	830										
ST00416	X						778701.213	6360551.824			INLET	440X220	0	340										
ST00417	X						778591.489	6360428.972			KERB-INL	2100	900X600	1600										
ST00418	X						778470.700	6360560.395			INLET	500X150	0	490										
ST00419	X						778478.446	6360555.077			INLET	1000	-	370										
ST00420	X						778478.446	6360555.077			INLET	1000	0	520										
ST00421	X						778475.000	6360428.216			KERB-INL	2200	900X600	800										
ST00422	X						778486.976	6360427.332			KERB-INL	2000	-	1220										
ST00423	X						778486.426	6360335.074			KERB-OUT	3000X160	0	0										
ST00424	X						778485.168	6360304.926			INLET	700X170	0	1000										
ST00425	X						778473.897	6360304.204			KERB-INL	800X140	900X600	570										
ST00426	X						778470.084	6360308.999			KERB-INL	500X230	-	0										
ST00427	X						778470.040	6360320.972			KERB-INL	620X120	0	700										
ST00428	X						777876.482	6360942.568	ST00428		KERB-INL	500X250		0.83										LETTERBOX PIT
ST00429	X						777859.389	6360962.112	ST00429		INLET	1000	1000X450	860										
ST00430	X						777892.907	6360472.332	ST00430		GRATE	850	900X600	850										
ST00431	X						777876.997	6360471.867	ST00431		KERB-INL	950	900X600	1455										
ST00432	X						777910.539	6359958.763			GRATE	900	900X600	560										
ST00433	X						777909.574	6359915.545			GRATE	900	900X600	600										
ST00434	X						777893.464	6359709.375			GRATE	900	900x600	750										
ST00435		X													Pipe	400	17		1					Charbon/Clandulla
ST00436		X													Pipe	600	20		1					Charbon/Clandulla
ST00437		X													Pipe	450	5		1					Charbon/Clandulla
ST00438		X													Pipe	450	20		1					Charbon/Clandulla
ST00439		X													Pipe	450	14		1					Charbon/Clandulla
ST00440		X													Pipe	450	17		1					Charbon/Clandulla
ST00441		X													Pipe	450	25		1					Charbon/Clandulla
ST00442		X													Pipe	450	30		1					Charbon/Clandulla
ST00443		X													Pipe	450	25		1					Charbon/Clandulla
ST00444		X													Pipe	450	20		1					Charbon/Clandulla
ST00444		X													Pipe	450	20		1					Charbon/Clandulla
ST00445		X													Pipe	600	22		1					Charbon/Clandulla
ST00446		X													Pipe	450	25		1					Charbon/Clandulla
ST00447		X													Pipe	450	25		1					Charbon/Clandulla
ST00448		X													Pipe	450	15		1					Charbon/Clandulla
ST00449		X													Pipe	450	15		1					Charbon/Clandulla
ST00450		X													Pipe	450	15		1					Charbon/Clandulla
ST00451		X													Pipe	450	15		1					Charbon/Clandulla
ST00452		X																						Charbon/Clandulla
ST00453		X													Pipe	450	20		1					Charbon/Clandulla
ST00454		X													Pipe	450	23		1					Charbon/Clandulla
ST00455		X													Pipe	450	23		1					Charbon/Clandulla
ST00456		X													Pipe	450	20		1					Charbon/Clandulla
ST00457		X													Pipe	450	20		1					Charbon/Clandulla
ST00458		X													Pipe	450	15		1					Charbon/Clandulla
ST00459		X													Pipe	450	11		1					Charbon/Clandulla
ST00460		X													Pipe	450	11		1					Charbon/Clandulla
ST00461		X													Pipe	450	11		1					Charbon/Clandulla
ST00462		X													Pipe	450	8		1					Charbon/Clandulla
ST00463		X													Pipe	450	8		1					Charbon/Clandulla
ST00464		X													Pipe	450	8		1					Charbon/Clandulla
ST00465		X													Pipe	450	8		1					Charbon/Clandulla
ST00466		X													Pipe	450	8		1					Charbon/Clandulla
ST00467		X													Pipe	450	8		1					Charbon/Clandulla
ST00468		X													Pipe	450	8		1					Charbon/Clandulla
ST00469		X													Pipe	450	12		1					Charbon/Clandulla
ST00470		X													Pipe	450	10		1					Charbon/Clandulla
ST00471		X													Pipe	450	13		1					Charbon/Clandulla
ST00472		X													Pipe	450	13		1					Charbon/Clandulla
ST00473		X													Pipe	450	13		1					Charbon/Clandulla
ST00474		X													Pipe	450	17		1					Charbon/Clandulla
ST00475		X													Pipe	450	17		1					Charbon/Clandulla
ST00476		X													Pipe	450	5		1					Charbon/Clandulla
ST00477		X													Pipe	450	13		1					Charbon/Clandulla
ST00478		X													Pipe	450	10		1					Charbon/Clandulla
ST00479		X													Pipe	450	12		1					Charbon/Clandulla
ST00480	X										INLET			0										Charbon/Clandulla
ST00481	X										INLET			0										Charbon/Clandulla
ST00482	X										INLET			0										Charbon/Clandulla
ST00483	X										INLET			0										Charbon/Clandulla
ST00484	X										INLET			0										Charbon/Clandulla
ST00485	X										INLET			0										Charbon/Clandulla
ST00486	X										INLET			0										Charbon/Clandulla
ST00487	X										KERB-INL			0										Charbon/Clandulla
ST00488	X										KERB-INL			0										Charbon/Clandulla
ST00489		X					778154.888	6366818.235	ST00489						Pipe	450	20	CONCRETE	1	582.881				
ST00490		X					778196.292	6366188.763	51						Pipe	450	22	CONCRETE	1	581.178	-	45		Unable to obtain downstream invert due to buired pit 52 (large concrete cover with no lifting lugs installed
ST00498	X						778453.075	6360682.330			GRATE	1200	800x400	660										
ST00499	X						778453.187	6360693.074			GRATE	1200	800X400	690										
ST00500	X						777776.863	6360309.489			ENCLOSED	470X150	-	790										
ST00501	X						778496.338	6360819.17			KERB-INL	670	450x500	490										Pit found to be grated kerb inlet pit, not enclosed pit
ST00502	X						778513.449	6360813.525			KERB-INL	1000	900x600	1900										
ST00503		X					778496.338	6360819.17	ST00501						Pipe	450	5	CONCRETE	1	632.855	631.760			
ST00504		X					778511.187	6360801.395	ST00330						Pipe	450	15	CONCRETE	1	632.497	631.760			
ST00505	X										ENCLOSED			0										Pit Unable to be located - assumed buried
ST00506	X										ENCLOSED			0										Pit Unable to be located - assumed buried
ST00507		X					778512.562	6360680.445	ST00507						Pipe	450	30	CONCRETE	1	638.357	638.179			

ST00508		X					778512.562	6360680.445	ST00508						Pipe	450	7	CONCRETE	1		638.179			Pit ST00505 unable to be found - unable to get upsream invert level	
ST00509		X													Pipe	450	2		1					pit ST00505 unable to be found - Pipe ST00509 also unable to be found	
ST00510	X						778714.418	6360445.188			ENCLOSED	0	0	1520											
ST00511		X					778802.416	6360443.598							Pipe	450	90	CONCRETE	1	644.486	641.166			UNABLE TO GET D/S INV COVERED LID	
ST00512	X										ENCLOSED			0									Unable to find pit ST00512 - Covered pit in backyard	
ST00513	X						778780.581	6360712.686			ENCLOSED	0	0	1468											
ST00514	X										ENCLOSED			0											
ST00515		X													Pipe	450	120		1					Inspection in 1998/99 failed to find this pipe.	
ST00516	X										ENCLOSED			0									Inspection in 1998/99 failed to find this pit.	Pipe unable to be found
ST00517	X										ENCLOSED			0									Inspection in 1998/99 failed to find this pit.	Pit unable to be found
ST00518		X													Pipe	450	13		1					Inspection in 1998/99 failed to find this pipe.	Pit unable to be found
ST00519	X										ENCLOSED			0									Pit buried - Unable to find any evidence of pit	Pipe unable to be found
ST00520		X					779262.85	6361197.708							Pipe	450	15	CONCRETE	1	626.489	626.264				
ST00521		X																						Inspection in 1998/99 failed to find this pipe.	
ST00522	X										ENCLOSED			0									Unable to locate pit ST00522 on Western side of Dabee Road	Pipe Not Found - Does Not Exist
ST00523	X										ENCLOSED			0									Unable to locate pit ST00523 on Dabee Road.	
ST00524		X													Pipe	450	85		1					No pit located on the Western side of Dabee Road (ST00523)	
ST00525		X					779388.101	6361179.834							Pipe	450	18	CONCRETE	1	630.905	630.676				
ST00526		X					779253.055	6360568.334	ST00387						Pipe	450	10	CONCRETE	1	660.490	659.927				
ST00527		X					779253.653	6360973.968							Pipe	450	55	CONCRETE	1		636.744			Upstream invert unable to be found (ST00528 not found)	
ST00528	X										ENCLOSED			0									Pit ST00528 Unable to be located - Buried junction pit	
ST00529	X						778273.553	6360749.570	ST00529		INLET	570X570	-	670											
ST00530	X						778256.775	6360759.716	ST00530		ENCLOSED	-	-	2510											
ST00533		X																						Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00534	X										KERB-INL			0									Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00535	X										KERB-INL			0									Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00536		X																						Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00537		X																						Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00538		X																						Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00539		X																						Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00540		X																						Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00541	X										KERB-INL			900									Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00542	X										JUNCTION			1000									Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	
ST00543	X										JUNCTION			1000									Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers	

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ST00544	X										KERB-INL			1000										Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers
ST00555	X										KERB-INL			1300										Unable to locate data on MapinfoFiles - Not able to correlate survey with Asset Numbers
A01		X								Access Road on 22/DP872861														NOT FOUND - DOES NOT EXIST
A02		X								North of block 2/DP837670														NOT FOUND - DOES NOT EXIST
A03		X					778229.180	6368345.345		Under railway, 470m north of Bylong Valley Way					CULVERT	1200	7.03	C.IRON	1	572.936	572.645			
A04		X								Access road for 22/DP872861, around 300m north of Panorama Ct														NOT FOUND - DOES NOT EXIST
A05		X					777612.881	6368375.583	A05	Under road at 47 Panorama Ct					CULVERT	450		CONCRETE	1	611.458				Downstream end unable to be accessed due to extremely dense blackberry
A06		X					778241.566	6368528.716		Under railway, 330m north of Bylong Valley Way					CULVERT	600	6.59	C.IRON	1	574.445	574.179			
A07			X							Rail Bridge over Cudgegong River													YES	
A08			X							Rail bridge over access Road north of Louee Street													YES	
A09		X					778503.469	6367741.929	A09	Mudgee Street level rail crossing					CULVERT	450	6.41	C. IRON	2	574.577	574.475	NA		
A10			X							Bylong Valley Way road bridge over Cudgegong River													See notes.	Update datum only - we already have plans for this bridge.
A11		X					778579.028	6367555.836	A11	Under railway at Dabee Street level crossing					CULVERT	300	10.24	CONCRETE	1	577.083	577.041	30		
A12			X				778718.896	6367501.056		Dabee Street footway													YES	Foot bridge - Details on GA Sketch
A13		X					778721.482	6367495.460	A13	Tongbong Street / Dabee Street					CULVERT	300	6.27	CONCRETE	1	570.169	569.999	90		Culvert under concrete causeway. Causeway level 570.653
A14		X					778105.715	6362009.828		Next to A32. Under Bylong Valley Way, south of Sewer Plant.					CULVERT		9.01	CONCRETE	2	598.769	598.711	30		
A15		X								Calderwood Road														Nothing found at this location - crest of hill
A16		X								Under rail, just south of Rylstone Station														NOT FOUND - POSSIBLY FILLED IN/OVER
A17		X					778640.603	6367338.458	A17_1 A17_2	Under rail, east of 17/DP1136979					CULVERT	850	44	BRICK	1	577.014	575.914	NONE		
A18			X							Cudgegong River footbridge, adjacent to cricket oval													YES	See general arrangement sketch for details
A19		X					778654.576	6367195.723	A19_3	Under rail, east of Cudgegong Street					CULVERT	1520	19.14	BRICK	1	575.214	574.958	NONE		
A20		X					778714.992	6366973.400	A20	Under rail, east of Cox Street					CULVERT	600x300	11.24	CONCRETE	2	578.654	578.529	30 APPROX		TIMBER AND STONE HEADWALL - REFER TO PHOTO
A21		X								Under track next to railway, east of A22														A21 IS THE OUTLET OF A22 - LONG 1.1m DIAMETER CORRUGATED IRON CULVERT
A22		X					778740.943	6366879.692	A21_B	Under road adjacent to DP829365					CULVERT	1100	40.22	CORRUGATED IF	2	578.714	577.841	NONE		A22 IS A21 AS WELL
A23		X								Under access track adjacent to rail near A24														A23 DOES NOT EXIST - ONLY A24 UNDER RAILWAY FOUND AT THIS LOCATION
A24		X					778764.829	6366757.854	A23	Under rail adjacent to Piper Street, Tindale Street					CULVERT/BRI	3X	3.13	CONCRETE	3	579.727	579.699	NONE		REFER TO PHOTO A23 FOR ARRANGEMENT - SMALL BRIDGE RATHER THAN DEFINED CULVERTS
A25		X								Under rail access road just north of Narrango Road														NOT LOCATED AT ACCESS TRACK
A26		X					778815.237	6366551.979		Under railway to north of Narrango Road					CULVERT	600X300	3.45	CONCRETE	3	583.432	583.362	NONE		REFER TO NEW ASSETS RYLSTONE12 AND RYLSTONE13
A27		X					778829.360	6366525.602		REFER TO NEW ASSETS RYLSTONE 12					PIPE	450	16.39	CONCRETE	1	584.105	583.808	NONE		
A28		X								Carwell Street, 50m north of Coomber														A28 is acutally pipe ST00059
A29		X								Carwell Street, 140m south of Coomber														NOT FOUND - No drainage structures within 100m each way of this location
A30		X					778094.723	6366222.101	ST0064_2	Short St, Western End					PIPE	600	9.86	CONCRETE	2	578.175	-	NONE		UPSTREAM INVERT UNABLE TO BE OBTAINED DUE TO COVERED JUNC TION PIT
A31		X								Top corner of 7/DP755789														NOTHING OBSERVED AT THIS LOCATION
A32			X							Next to A14. Cycle way bridge on Bylong Valley Way south of Sewer Plant													YES	REFER TO GENERAL ARRANGEMENT SKETCH LABELLED A14
A33		X								Under Bylong Valley Way, opposite # 1863														NOTHING FOUND - Possibly new grated inlet pit located with asset C17 - see Kandos10 in new assets found.
A34		X								Under unnamed Road between #1857 &1863 Bylong Valley Way														Nothing found at this location - no pipe/culvert under Larges Lane
A35		X					778028.483	6361352.893		Under Bylong Valley Way, just north of 1827					PIPE	600	12.94	CONCRETE	1	613.656	613.353	NONE		
A36		X					778895.212	6361343.836		Under trailway, off north end of Oxley Street					CULVERT	900X600	5.14	CONCRETE	2	622.577	622.533			
A37		X					779280.696	6361288.249		Off north end of Bent Street					PIPE	300	5.024	CONCRETE	1	624.819	624.709	NONE		
A38		X					778767.948	6361224.310		Under rail, north of 9 Oxley Street					CULVERT	1800X400	3.71	CONCRETE	2	625.068	625.030			

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A39		X					778496.955	6361717.959		Golf Course, north of A40					CULVERT	600	3.04	CONCRETE	2	620.479	620.407			
A40		X					778520.192	6361125.028		Under golf course track, north of A41					CULVERT	900	3.63	CONCRETE	1	621.700	621.673			
A41		X					778554.914	6361091.665		Under railway north of norhtern end of Davies Road / Mclachlan Street					CULVERT	1800x1100	8.41	CONCRETE	2	623.298	623.103			
A42		X					778245.979	6360972.830	A42	Under rail, north of Henbury Avenue					CULVERT	1520	10.05	BRICK	1	626.455	626.344	0		
A43			X				778100.533	6360869.585	A43	Henbury Avenue bridge over railway													YES	
A44		X					778007.155	6360791.855		Under railway, west of 46 Davies Road					CULVERT	600X600	3.64	CONCRETE	2	630.989	630.877			
A45		X								Under railway, west of 58 Davies Road														Nothing observed at this location
A46		X					777926.708	6360625.580	A46	Under railway, west of 60 Davies Road					CULVERT	920	16.64	BRICK	1	628.069	627.841			
A47			X							Railway overbridge													NA	RAILWAY LEVEL CROSSING, NOT OVERBRIDGE
A48		X								Under Angus Avenue, just east of railway crossing														A48 IS THE OUTLET OF ST00130 - NO OTHER ASSETS FOUND. REFER TO ST00130
A49		X					777993.116	6360270.366		Under railway, east of 45 Ilford Road					CULVERT	500x550	3.42	CONCRETE	2	634.561	634.528			
A50		X								Under driveway west of Margaret Street														No drainage structure found at this location. Possible causeway over driveway but no pipes/culverts under driveway.
A51		X								Ilford Road x Margaret Street														Nothing at this location - only pipe ST00291 within 200m.
A52		X								Under road x Ilford Road														Nothing at this location - only pipe ST00291 within 200m.
A53		X								Between Ilford Road and Railway														A53 IS A GROUP OF NEW PITS AND PIPES. SEE KANDOS 12 - KANDOS 20
A54		X					778092.764	6360116.987		Under railway, east of 49 Ilford Road					CULVERT	2000	17.25	BRICK	1	630.027	629.854			
A55		X								53 Ilford Road														Nothing at this location. Only pipe St00291 and ST00294 - nothing inbetween
A56		X								Jamison Street, south of loop intersection - GIS info shows a challe crossing the St.														Nothing at this location. Only culvert C20 exists in this area
A57		X								Cairo St x Lloyd Avenue														A57 is actually pipe ST00284
A58		X								Dabee Road, 190m south of Cambell Street														Nothing observed at this location
A59		X								Cairo St x Lloyd Avenue														A59 is either pipe ST00288 or C24 - nothing else exists at this location
A60		X								Private access off west end of Anzac Avenue.														No drainage found - driveway appears to fall all the way down to Cairo Street with no pipes or culverts under.
A61		X								Possible pipe/culvert over natural drainage on private property west of Cooper Drive and south of OH conveyor														Not found - Natural channel appears to continue from A65 to ST00286 without pipes in between.
A65		X					777905.310	6359706.438		Under Cooper Drive 130m south of Anzac Avenue					PIPE	750	12.2	CONC	2	632.555	632.276	45		
A66		X					777886.309	6359527.713		Cooper Drive 190m from Anzac Avenue					PIPE	450	8.726	CONC	1	641.481	641.316	NONE		
A67		X					778136.366	6359642.921		Under railway, west of cement works, 130m south of OH conveyor					CULVERT	900	11.17	BRICK	1	641.945	641.350			
A68		X					778093.565	6359539.523		Under railway, west of cement works, 250m south of OH conveyor					CULVERT	0.74X0.57	11.25	CONCRETE	1	644.953	644.464			
A69		X								Internal cement works road, immediately south of buildings														NO ASSESTS OBSERVED AT THIS LOCATION
A70		X								Internal cement works road, south west of A69														NO ASSESTS OBSERVED AT THIS LOCATION
A71		X					777786.986	6359235.854		Crossing on Clandulla Road, south of Charbon Road intersection					PIPE	600	9.91	CONC	1	651.324	651.095	45		
A72		X					777794.025	6359194.458		Rail crossing, Charbon Road					PIPE	1600	9.12	C. IRON	1	653.853	653.853	NONE		Culvert details (expected to be the same culvert as for A71)
C01		X					778499.363	6360801.953		Flemming Street close to McDonald Street (from Pit ST00329 to ST00330)					PIPE	450	11.84	CONCRETE	1	632.902	632.497			Inspection in 1998/99 revealed that this pipe existed instead of pipe ST00156.
C02		X					777974.997	6360542.290		Davies Road from White Circle to Rogers Street					PIPE		30.79	CONCRETE	1	632.374	630.848			Inspection in 1998/99 revealed that this pipe existed instead of pipe ST00134.
C03		X					778057.074	6360439.457		Crossing Angus Avenue, east of White Circle					CULVERT	450	20.25	CONCRETE	1	638.830	638.019			Inspection in 1998/99 revealed that this pipe existed.
C04	X						778053.058	6360435.037		On Angus Avenue east of White Circle	GIP	-	450x450	0.35										Pit located just South of Angus Ave/White Crescent intersection on Eastern side
C05		X					778724.534	6360918.026		Dunn Street, across Noyes Street					PIPE	450	32.58	CONCRETE	1	631.013	629.222			Inspection in 1998/99 revealed that this pipe existed instead of pipe ST00218.
C06		X					778700.649	6360798.021		Across Flemming Street, west of Noyes Street								CONCRETE	1	630.954	629.088			Inspection in 1998/99 revealed that this pipe existed instead of pipe ST00187, 188, 189 and pits ST00335, 336.

C07		X					779053.757	6360896.886		Dunn Street, east of Short Street								CONCRETE		637.551	637.419			Inspection in 1998/99 revealed that this pipe existed instead of pipe ST00234, 518, 235, 238, 236 and pits ST00516, 517, 371.
C08		X								Pomany Street, south of Stanley Street														Could not find juntion between ST00260 and C08. Assumed that pipe ST00260 runs full length and connects with Pipe ST00263
C09		X					779274.658	6361308.566		Bent Street, north end					CULVERT	900	14.22	CONCRETE	1	623.439	623.228	NONE		
C10		X					779284.130	6361306.084		Across Bent street, north end					PIPE	750	9.79	CONCRETE	1	623.878	623.228	NONE		
C11		X								George Street, east of Bent Street														Pipe does not exist
C12		X								Across Rogers Streeet, east of Noyes Street														Pipe appears to head east towards pit ST00402 instead of across Rogers Stree
C13		X					778925.331	6360414.393		Across Angus Avenue, west of Dabee Road					CULVERT			CONCRETE		645.545				Upstream invert taken from pit level. Pipe size unable to be otained. Downstream invert unable to be obtained due to pit ST00514 not located (buried)
C14		X					778886.162	6360294.484	ST00405	Dabee Road (western side) at Buchanan Street					CULVERT	450X300	11	CONCRETE	1	649.612	648.575			Inspection in 1998/99 revealed that this pipe existed. Please include any inlet/outlet details.
C15		X					778894.8	6360275.396	C15	Dabee Road (eastern side) at Buchanan Street					CULVERT	600X300	30	CONCRETE	1	650.632	649.412			Inspection in 1998/99 revealed that this pipe existed. Please include any inlet/outlet details.
C16		X								Across Campbell Street, west of Noyes Street														Unable to find asset.
C17		X					778078.220	6361831.050		Bylong Valley Way, 280m south of Sewer Plant					CULVERT	600	10.34	CONCRETE	1	602.110	601.724	-		GRATED PIT INLET TO PIPE - SEE "KANDOS 10" IN NEW ASSETS
C18		X					778056.131	6361584.909		1857 Bylong Valley Way					PIPE	450	11.47	CONCRETE	1	607.781	607.242	NONE		
C19		X					778143.239	6360916.232							CULVERT	900	10.49	BRICK	1	626.971	626.895			
C20		X					778351.883	6360129.128		Jamison Street, just north of access loop					CULVERT	1400X600	8.89	CONCRETE	2	639.520	639.320			
C21		X					777593.665	6359952.141	C21	18/20 Cairo St east side					PIPE	300	5.01	CONCRETE	1	619.328	619.236			
C22		X					777582.135	6359946.134	C22	18/20 Cairo St west side					PIPE	375	5.13	CONCRETE	1	619.091	619.046	45		
C23		X					777591.804	6359939.807	C23	22 Cairo Street east side					PIPE	200	4.47	CONCRETE	1	619.419	619.341			
C24		X					777566.376	6359864.778	C24	Cairo Street west side, north of Anzac Avenue					PIPE	300	4.98	CONCRETE	1	621.540	621.213			
C25		X								Cairo Street west side, south of Anzac Avenue														C25 unable to be found - Only C24 exists

Appendix C Cudgegong River Flood Modelling

Table C-1 Modelled Peak Water Levels (mAHD)

Flowpath	Chainage	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	DCF	PMF	Sunny Day DB	DCF DB	PMF DB	Remarks
CUDGEGONG	51630	580.23	580.28	580.35	580.43	580.53	580.64	583.42	589.95	580.11	583.42	589.96	U/S Rylstone Dam
CUDGEGONG	51670	572.46	572.92	573.47	573.99	574.48	574.94	583.27	589.91	578.00	583.31	589.92	Rylstone Dam Toe
CUDGEGONG	51870	572.12	572.55	573.07	573.57	574.05	574.50	582.48	589.32	577.40	582.53	589.33	
CUDGEGONG	52100	571.40	571.77	572.22	572.68	573.15	573.59	580.97	587.95	575.58	581.02	587.97	
CUDGEGONG	52465	570.73	571.09	571.55	572.02	572.55	573.01	580.43	587.46	574.15	580.50	587.47	
CUDGEGONG	52625	570.63	570.97	571.40	571.87	572.42	572.89	580.49	587.74	574.03	580.53	587.77	WTP
CUDGEGONG	52670	570.49	570.86	571.33	571.83	572.40	572.89	580.48	587.75	574.03	580.54	587.77	
CUDGEGONG	52710	570.31	570.67	571.17	571.68	572.29	572.79	580.43	587.68	573.92	580.49	587.72	
CUDGEGONG	52860	569.91	570.29	570.83	571.35	571.92	572.48	580.32	587.64	573.65	580.42	587.67	
CUDGEGONG	52915	569.91	570.30	570.85	571.38	571.95	572.52	580.40	587.78	573.71	580.45	587.80	
CUDGEGONG	52960	569.88	570.27	570.81	571.35	571.92	572.49	580.34	587.67	573.67	580.38	587.68	U/S Railway Br
CUDGEGONG	53000	569.79	570.23	570.79	571.32	571.87	572.44	580.26	586.28	573.59	580.30	586.31	
CUDGEGONG	53115	569.66	570.10	570.65	571.17	571.74	572.29	580.20	586.12	573.38	580.33	586.12	
CUDGEGONG	53160	569.59	570.02	570.58	571.09	571.66	572.21	580.05	586.02	573.28	580.06	585.96	U/S Bridge St
CUDGEGONG	53200	569.56	570.00	570.54	571.03	571.58	572.11	579.64	584.66	573.15	579.54	584.64	
CUDGEGONG	53505	569.20	569.60	570.08	570.50	570.96	571.45	578.97	584.18	572.16	578.99	584.18	
CUDGEGONG	53690	569.02	569.38	569.82	570.20	570.65	571.16	578.64	583.84	571.65	578.67	583.84	
CUDGEGONG	53965	568.73	569.07	569.50	569.83	570.32	570.90	578.52	583.72	571.14	578.53	583.71	
CUDGEGONG	53995	568.73	569.07	569.50	569.83	570.32	570.91	578.54	583.74	571.15	578.56	583.75	Foot Bridge
CUDGEGONG	54135	568.05	568.48	569.05	569.65	570.24	570.85	578.47	583.69	571.05	578.48	583.69	
CUDGEGONG	54247	567.93	568.37	568.94	569.54	570.14	570.74	578.23	583.40	570.87	578.25	583.40	
CUDGEGONG	54402	567.73	568.17	568.75	569.37	570.00	570.64	578.24	583.38	570.67	578.27	583.38	U/S STW
CUDGEGONG	54480	567.49	567.92	568.51	569.15	569.81	570.47	577.99	582.82	570.41	578.02	582.81	
CUDGEGONG	54675	566.78	567.28	567.95	568.68	569.42	570.13	577.45	582.59	569.97	577.48	582.58	Weir
CUDGEGONG	54775	566.65	567.19	567.90	568.64	569.40	570.12	577.31	582.26	569.97	577.33	582.25	
CUDGEGONG	55375	566.40	566.92	567.63	568.39	569.16	569.90	576.72	581.17	569.77	576.74	581.17	
CUDGEGONG	55710	566.08	566.59	567.32	568.12	568.95	569.72	576.38	580.52	569.60	576.40	580.52	
CUDGEGONG	56140	565.60	566.08	566.83	567.69	568.58	569.39	576.02	580.13	569.28	576.03	580.13	
TONG_BONG	3400	575.37	575.60	575.90	576.13	576.38	576.61	580.42	587.78	573.86	580.47	587.80	
TONG_BONG	3600	574.37	574.59	574.87	575.08	575.32	575.54	580.42	587.78	573.83	580.47	587.80	
TONG_BONG	3800	573.07	573.29	573.52	573.69	573.84	573.98	580.40	587.77	573.79	580.46	587.80	
TONG_BONG	4000	571.96	572.20	572.43	572.56	572.69	572.81	580.42	587.78	573.73	580.50	587.80	
TONG_BONG	4100	571.36	571.55	571.76	571.92	572.07	572.54	580.41	587.78	573.71	580.46	587.80	
TONG_BONG	4200	571.07	571.23	571.42	571.57	571.97	572.53	580.42	587.79	573.72	580.46	587.81	
TONG_BONG	4300	570.23	570.40	570.85	571.38	571.96	572.52	580.42	587.79	573.72	580.47	587.80	
TONG_BONG	4405	569.91	570.30	570.85	571.38	571.95	572.52	580.41	587.78	573.72	580.47	587.80	
TONG_BONG	4440	569.91	570.30	570.85	571.38	571.95	572.52	580.40	587.78	573.71	580.45	587.80	Cudgegong River
DB - Dambreak													

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

Table C-2 Modelled Peak Discharges (cumecs)

Flowpath	Chainage (m)	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	DCF	PMF	Sunny Day DB	DCF DB	PMF DB	Remarks
CUDGEGONG	51650	169	231	327	435	548	667	5,711	14,505	1,984	7,486	15,515	Rylstone Dam
CUDGEGONG	51770	169	231	327	435	548	667	5,290	14,488	2,013	5,314	14,514	
CUDGEGONG	51985	169	231	327	435	548	667	5,278	14,479	2,047	5,315	14,505	
CUDGEGONG	52282.5	169	231	327	435	548	667	5,278	14,460	2,034	5,312	14,495	
CUDGEGONG	52545	169	231	327	435	548	667	5,267	14,474	1,913	5,395	14,474	
CUDGEGONG	52647.5	169	231	327	435	548	667	5,266	14,432	1,782	5,315	14,464	
CUDGEGONG	52690	169	231	327	435	548	667	5,279	14,420	1,704	5,363	14,460	WTP
CUDGEGONG	52785	169	231	328	435	549	669	5,337	14,419	1,585	5,443	14,455	
CUDGEGONG	52887.5	169	232	328	436	551	672	5,364	14,482	1,533	5,538	14,448	
CUDGEGONG	52937.5	173	238	338	451	570	702	5,480	14,553	1,228	5,383	14,484	
CUDGEGONG	52980	173	238	345	457	582	746	5,471	14,536	1,310	5,461	14,484	U/S Railway Bridge
CUDGEGONG	53057.5	173	238	338	451	570	696	5,478	14,490	1,195	5,609	14,502	
CUDGEGONG	53137.5	173	238	338	452	570	696	5,741	14,606	1,176	5,955	14,475	
CUDGEGONG	53180	180	244	338	452	571	705	6,239	14,896	1,244	6,171	15,268	Bridge Street
CUDGEGONG	53352.5	174	238	338	452	571	698	5,293	14,507	1,162	5,345	14,491	
CUDGEGONG	53597.5	174	239	339	453	572	699	5,286	14,479	1,159	5,299	14,480	
CUDGEGONG	53827.5	174	239	339	454	574	701	5,288	14,490	1,154	5,272	14,467	
CUDGEGONG	53980	174	239	340	454	574	702	5,283	14,403	1,138	5,265	14,491	Foot Bridge
CUDGEGONG	54005	174	239	340	454	574	702	5,361	14,557	1,135	5,391	14,664	
CUDGEGONG	54191	174	240	340	455	575	703	5,267	14,484	1,075	5,287	14,459	
CUDGEGONG	54324.5	174	240	340	455	575	704	5,258	14,483	1,057	5,296	14,465	
CUDGEGONG	54441	175	240	340	456	576	704	5,252	14,479	1,043	5,292	14,470	STW
CUDGEGONG	54577.5	175	240	341	456	577	705	5,251	14,476	1,030	5,290	14,474	
CUDGEGONG	54725	175	240	341	456	577	706	5,246	14,481	1,002	5,287	14,476	D/S Weir
CUDGEGONG	55075	175	240	341	456	577	706	5,246	14,485	906	5,285	14,481	
CUDGEGONG	55542.5	175	240	341	456	576	706	5,247	14,482	814	5,278	14,488	
CUDGEGONG	55925	175	240	341	456	576	705	5,246	14,475	677	5,276	14,481	
TONG_BONG	3500	26	34	46	57	69	83	69	84	1	73	79	
TONG_BONG	3700	26	34	46	57	69	83	101	146	3	94	131	
TONG_BONG	3900	26	34	46	57	69	83	154	236	10	120	194	
TONG_BONG	4050	26	34	46	57	69	83	186	291	21	135	239	
TONG_BONG	4150	26	34	46	57	69	83	198	313	27	141	259	
TONG_BONG	4250	26	34	46	57	69	83	205	333	33	148	281	
TONG_BONG	4352.5	26	34	46	57	69	83	215	352	46	156	299	
TONG_BONG	4422.5	26	34	46	56	69	82	221	358	52	160	313	Cudgegong River
DAM	30									1,984	2,174	2,765	Dambreak Outflows

DB - Dambreak

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ATT 6.2.17

ATT 6.2.21

Table C-3 Modelled Peak Velocities (m/s)

Flowpath	Chainage	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	DCF	PMF	Sunny Day DB	DCF DB	PMF DB	Remarks
CUDGEGONG	51630	0.20	0.27	0.38	0.50	0.62	0.75	4.19	0.48	0.00	4.04	0.48	U/S Rylstone Dam
CUDGEGONG	51670	1.11	1.26	1.46	1.64	1.81	1.97	4.18	4.49	3.65	4.13	4.49	Rylstone Dam Toe
CUDGEGONG	51870	1.45	1.61	1.84	2.05	2.23	2.39	4.43	5.18	3.93	4.42	5.18	
CUDGEGONG	52100	1.59	1.63	1.79	1.92	2.00	2.08	3.77	4.76	4.06	3.76	4.76	
CUDGEGONG	52465	0.65	0.78	0.94	1.08	1.17	1.27	2.86	3.98	3.06	2.87	3.98	
CUDGEGONG	52625	1.14	1.14	1.21	1.24	1.24	1.24	1.66	1.92	2.71	1.66	1.92	WTP
CUDGEGONG	52670	1.36	1.37	1.37	1.37	1.37	1.37	1.56	1.78	2.11	1.56	1.78	
CUDGEGONG	52710	1.63	1.79	1.93	2.00	2.00	2.00	2.57	2.65	3.34	2.57	2.65	
CUDGEGONG	52860	1.31	1.31	1.31	1.32	1.33	1.36	2.21	2.64	4.20	2.23	2.64	
CUDGEGONG	52915	0.77	0.77	0.77	0.77	0.77	0.77	1.04	1.20	0.90	1.04	1.20	
CUDGEGONG	52960	0.84	0.91	0.96	1.00	1.01	1.02	1.36	1.87	1.84	1.34	1.87	U/S Railway Br
CUDGEGONG	53000	0.87	0.94	1.06	1.17	1.23	1.27	1.56	2.00	2.61	1.58	2.00	
CUDGEGONG	53115	1.22	1.23	1.29	1.43	1.49	1.55	2.29	2.83	3.02	2.30	2.83	
CUDGEGONG	53160	1.09	1.22	1.33	1.48	1.56	1.63	2.65	3.58	3.62	2.71	3.58	U/S Bridge St
CUDGEGONG	53200	1.22	1.46	1.67	1.93	2.09	2.23	4.09	5.59	3.31	4.33	5.59	
CUDGEGONG	53505	1.13	1.30	1.53	1.77	1.94	2.07	3.64	4.17	3.02	3.63	4.17	
CUDGEGONG	53690	1.04	1.22	1.44	1.66	1.76	1.80	2.96	3.84	2.92	2.96	3.84	
CUDGEGONG	53965	1.30	1.25	1.29	1.29	1.34	1.30	2.22	2.46	1.66	2.22	2.46	
CUDGEGONG	53995	0.55	0.60	0.68	0.79	0.82	0.82	1.42	2.23	1.22	1.43	2.23	Foot Bridge
CUDGEGONG	54135	0.83	0.88	0.94	1.00	1.05	1.08	1.80	2.30	2.08	1.80	2.30	
CUDGEGONG	54247	0.92	1.03	1.17	1.29	1.38	1.45	2.71	3.19	2.31	2.71	3.19	
CUDGEGONG	54402	1.08	1.14	1.20	1.22	1.21	1.22	1.66	2.58	1.99	1.66	2.58	U/S STW
CUDGEGONG	54480	1.23	1.32	1.41	1.47	1.50	1.51	2.96	5.11	2.54	2.97	5.11	
CUDGEGONG	54675	1.70	1.71	1.74	1.75	1.77	1.77	3.28	4.41	3.59	3.28	4.41	Weir
CUDGEGONG	54775	0.86	0.94	1.04	1.12	1.17	1.21	3.11	4.80	3.95	3.12	4.80	
CUDGEGONG	55375	0.99	1.11	1.24	1.33	1.38	1.41	3.37	5.66	2.71	3.38	5.66	
CUDGEGONG	55710	1.08	1.08	1.10	1.12	1.13	1.15	1.78	2.79	2.96	1.78	2.79	
CUDGEGONG	56140	12.29	12.29	12.29	12.30	12.29	12.29	12.30	12.29	12.30	12.30	12.29	
TONG_BONG	3400	1.19	1.29	1.41	1.50	1.58	1.67	1.58	1.50	0.44	1.57	1.50	
TONG_BONG	3600	1.32	1.44	1.59	1.71	1.82	1.84	1.81	1.70	0.67	1.81	1.70	
TONG_BONG	3800	1.03	1.10	1.22	1.31	1.37	1.42	1.36	1.29	0.41	1.36	1.29	
TONG_BONG	4000	1.59	1.61	1.60	1.60	1.62	1.67	1.61	1.60	0.80	1.61	1.60	
TONG_BONG	4100	0.90	0.98	1.07	1.15	1.22	1.29	1.12	1.04	0.45	1.12	1.04	
TONG_BONG	4200	0.91	0.99	1.09	1.17	1.26	1.35	1.13	1.04	0.47	1.13	1.04	
TONG_BONG	4300	1.32	1.32	1.35	1.38	1.44	1.49	1.33	1.34	0.61	1.33	1.34	
TONG_BONG	4405	1.72	1.76	1.85	1.90	1.95	1.98	1.66	1.40	0.50	1.67	1.40	
TONG_BONG	4440	2.94	2.95	2.92	2.96	3.00	3.01	3.41	2.60	1.19	3.42	2.60	Cudgegong River
DB - Dambreak													

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Table C-4 Modelled Time to Peak Water Level (Hour)

Flowpath	Chainage	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	DCF	PMF	Sunny Day DB	DCF DB	PMF DB	Remarks
CUDGEGONG	51630	22.25	21.00	19.50	19.00	18.25	17.50	3.83	3.83	0.00	3.75	3.67	U/S Rylstone Dam
CUDGEGONG	51670	22.50	21.00	19.50	19.00	18.25	17.50	3.75	3.75	0.25	3.83	3.67	Rylstone Dam Toe
CUDGEGONG	51870	22.50	21.00	19.50	19.00	18.25	17.50	3.75	3.75	0.25	3.83	3.67	
CUDGEGONG	52100	22.50	21.00	19.50	19.00	18.25	17.50	4.08	4.08	0.25	3.92	3.75	
CUDGEGONG	52465	22.75	21.00	19.50	19.00	18.25	17.50	4.00	4.00	0.42	4.00	3.75	
CUDGEGONG	52625	22.75	21.00	19.50	19.00	18.25	17.50	4.00	4.00	0.42	3.92	3.75	WTP
CUDGEGONG	52670	22.50	21.00	19.50	19.00	18.25	17.50	4.00	4.00	0.42	4.00	3.75	
CUDGEGONG	52710	22.50	21.00	19.50	19.00	18.25	17.50	3.92	3.92	0.42	4.00	3.75	
CUDGEGONG	52860	22.50	21.00	19.25	18.75	18.25	17.50	4.00	4.00	0.50	3.92	3.75	
CUDGEGONG	52915	22.50	21.00	19.50	19.00	18.25	17.50	4.00	4.00	0.50	4.00	3.67	
CUDGEGONG	52960	22.50	21.00	19.50	19.00	18.25	17.50	4.00	4.00	0.50	4.00	3.67	U/S Railway Br
CUDGEGONG	53000	22.50	21.00	19.50	19.00	18.25	17.25	4.00	4.00	0.50	4.00	3.83	
CUDGEGONG	53115	22.50	21.00	19.50	19.00	18.25	17.25	3.83	3.83	0.50	4.08	3.83	
CUDGEGONG	53160	22.50	21.50	19.50	19.00	18.25	18.00	4.17	4.17	0.50	3.83	3.67	U/S Bridge St
CUDGEGONG	53200	22.50	21.00	19.50	19.00	18.25	17.25	3.92	3.92	0.50	4.17	3.75	
CUDGEGONG	53505	22.50	21.00	19.50	19.00	18.50	17.75	4.08	4.08	0.50	4.00	3.75	
CUDGEGONG	53690	22.50	21.00	19.50	19.00	18.50	17.75	4.08	4.08	0.50	4.08	3.75	
CUDGEGONG	53965	22.75	21.25	19.50	19.00	18.50	17.75	4.08	4.08	0.58	4.08	3.75	
CUDGEGONG	53995	22.75	21.25	19.50	19.00	18.50	17.75	4.08	4.08	0.58	4.08	3.75	Foot Bridge
CUDGEGONG	54135	22.75	21.25	19.75	19.25	18.50	17.75	4.08	4.08	0.67	4.08	3.75	
CUDGEGONG	54247	22.75	21.25	19.75	19.25	18.75	17.75	4.17	4.17	0.67	4.00	3.75	
CUDGEGONG	54402	22.75	21.25	19.75	19.25	18.75	17.75	4.17	4.17	0.67	4.00	3.75	U/S STW
CUDGEGONG	54480	22.75	21.25	19.75	19.25	18.75	17.75	4.17	4.17	0.75	4.00	3.75	
CUDGEGONG	54675	23.00	21.50	19.75	19.25	18.75	17.75	4.17	4.17	0.92	4.08	3.75	Weir
CUDGEGONG	54775	23.00	21.50	19.75	19.25	18.75	17.75	4.17	4.17	0.92	4.08	3.75	
CUDGEGONG	55375	23.00	21.50	20.00	19.25	18.75	17.75	4.17	4.17	0.92	4.17	3.83	
CUDGEGONG	55710	23.00	21.50	20.00	19.25	18.75	17.75	4.17	4.17	0.92	4.17	3.83	
CUDGEGONG	56140	23.00	21.50	20.00	19.25	18.75	17.75	4.17	4.17	0.92	4.17	3.83	
TONG_BONG	3400	8.50	8.00	8.00	8.00	7.75	7.50	4.00	4.00	0.50	3.92	3.75	
TONG_BONG	3600	8.50	8.00	8.00	8.00	7.75	7.50	4.08	4.08	0.42	4.08	3.75	
TONG_BONG	3800	8.50	8.25	8.00	8.00	8.00	7.75	4.17	4.17	0.42	4.08	3.75	
TONG_BONG	4000	8.50	8.25	8.00	8.00	8.00	7.75	4.00	4.00	0.42	3.92	3.75	
TONG_BONG	4100	8.50	8.25	8.25	8.00	8.00	17.50	4.00	4.00	0.42	3.92	3.75	
TONG_BONG	4200	8.75	8.50	8.25	8.25	18.25	17.50	4.17	4.17	0.50	4.17	3.75	
TONG_BONG	4300	9.00	8.50	19.50	18.75	18.25	17.50	4.17	4.17	0.50	4.08	3.75	
TONG_BONG	4405	22.50	21.00	19.50	18.75	18.25	17.50	4.08	4.08	0.50	4.00	3.67	
TONG_BONG	4440	22.50	21.00	19.50	19.00	18.25	17.50	4.00	4.00	0.50	4.00	3.67	Cudgegong River
DB - Dambreak													

ATT 6.2.11

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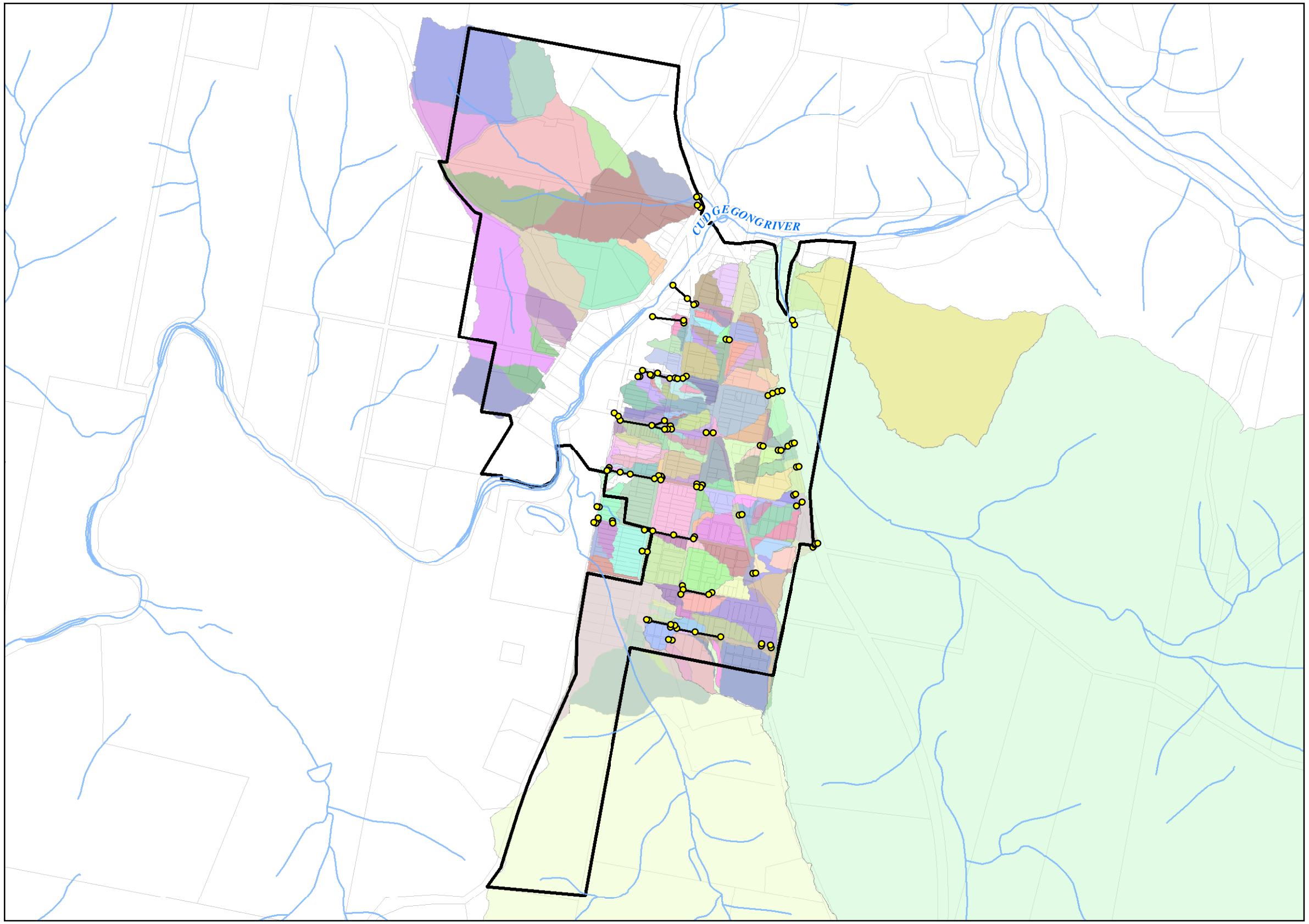
Appendix D DRAINS Modelling Input and Output

Figure D1-1 Rylstone Subcatchments



LEGEND

- Catchment based on LiDAR
- Stormwater Pit
- Stormwater Network
- 0.5m Contours
- Cadastre
- Study Area

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Sydney Spatial Team - Prepared by : [INITIALS]
Checked by : [INITIALS]

ATT 6.2.11
ATT 6.2.17
ATT 6.2.21

Table D1-1:Rylstone subcatchments data

Catchment draining to pit	Total area (ha)	Paved area (%)	Grass area (%)
N_HW2	0.37	45.4	54.6
N_R024	1.83	41.6	58.4
Pit01	0.17	0.1	99.9
34	0.09	60.8	39.2
RYLSTONE6	0.15	36.4	63.6
RYLSTONE1	0.58	31.1	68.9
ST00081	0.4	49.1	50.9
ST00079	0.41	54.2	45.8
ST00080	0.07	70	30
Pit3	1.3	41.9	58.1
41	2.89	38.7	61.3
39	0.98	36.2	63.8
40	0.06	69.9	30.1
43	0.13	64.4	35.6
35	2.1716	38	62
36	1.86	42.2	57.8
38	0.59	43.6	56.4
30	0.38	48.4	51.6
29	1.04	39.1	60.9
N_R010	0.49	45.9	54.1
27	0.47	71.5	28.5
N_R009	1.53	40	60
21	0.48	54.4	45.6
22	0.13	38.1	61.9
23	0.89	41.7	58.3
24	0.43	51.1	48.9
19	0.86	35.2	64.8
20	0.18	45.2	54.8
13	0.14	63.9	36.1
14	0.73	43.8	56.2
10	0.29	55.6	44.4
11	0.39	41.6	58.4
8	0.48	47.8	52.2
9	0.44	51.8	48.2
1	0.3	26.5	73.5
N_R027	0.74	56.6	43.4
N_R185	2.01	33.8	66.2
N_R183	0.32	60.4	39.6
N_R180	0.39	17.5	82.5
N_R179	0.73	21.9	78.1
N_R178	0.73	16.7	83.3
N_R176	0.25	53.9	46.1
N_R173	0.54	51.8	48.2
N_R172	4.92	18.8	81.2
N_R171	0.38	23.4	76.6
N_R170	0.31	17.9	82.1
N_R169	0.22	25.3	74.7

N_R168	0.6	37.3	62.7
N_R167	0.24	52.4	47.6
N_R165	3.65	26.2	73.8
N_R162	0.39	36.9	63.1
N_R161	0.25	45.1	54.9
N_R160	1.08	31.7	68.3
N_R159	0.27	45.2	54.8
N_R158	1.63	35.4	64.6
N_R157	1.4	20.2	79.8
N_R156	0.33	50.8	49.2
N_R155	0.43	28.8	71.2
N_R151	10.75	7.7	92.3
N_R150	2.82	15.6	84.4
N_R147	0.79	50.6	49.4
N_R145	0.27	50.1	49.9
N_R144	0.27	46.2	53.8
N_R143	0.25	59.6	40.4
N_R142	3.07	33.4	66.6
N_R141	3.62	36.5	63.5
N_R140	1.12	43.1	56.9
N_R136	1.6	39.4	60.6
N_R133	0.24	50.8	49.2
N_R132	0.16	34.2	65.8
N_R131	0.23	33.2	66.8
N_R130	0.46	45.5	54.5
N_R128	1.51	32.9	67.1
N_R127	0.14	70	30
N_R125	0.67	41.9	58.1
N_R124	0.07	31.1	68.9
N_R123	0.79	35.8	64.2
N_R122	0.55	21.2	78.8
N_R121	0.95	35.6	64.4
N_R120	1.05	57.8	42.2
N_R119	2.15	37.8	62.2
N_R118	0.64	35.7	64.3
N_R116	0.13	50.6	49.4
N_R114	0.12	32.7	67.3
N_R113	0.35	49.8	50.2
N_R112	1.12	31.2	68.8
N_R111	0.47	37.3	62.7
N_R110	0.24	45.9	54.1
N_R109	0.93	37.7	62.3
N_R107	0.18	38.4	61.6
N_R106	0.71	33.7	66.3
N_R105	0.44	49	51
N_R103	0.27	4.3	95.7
N_R102	1.07	25	75
N_R101	0.98	32.8	67.2
N_R100	3.76	27.1	72.9
N_R099	1.03	19.1	80.9
R_18_out	1.28	24.7	75.3

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N_R095	0.24	30.3	69.7
N_R094	0.54	34.9	65.1
N_R092	0.18	33.5	66.5
N_R090	0.23	51.3	48.7
N_R089	0.54	17.5	82.5
N_R088	0.51	14.1	85.9
N_R087	0.71	18.5	81.5
N_R086	0.91	24.4	75.6
N_R084	0.72	31.5	68.5
N_R083	0.92	31.2	68.8
N_R081	1.03	33.9	66.1
N_R080	0.71	25.9	74.1
N_R079	0.31	30.1	69.9
N_R078	0.55	40.3	59.7
N_R077	0.46	30.1	69.9
N_R076	0.26	30	70
N_R075	0.28	33.9	66.1
R17_out	1.13	24.1	75.9
N_R074	2.84	40.7	59.3
N_R070	2.61	5.4	94.6
N_R069	6.81	11.7	88.3
N_R068	16.12	13.3	86.7
N_R065	5.34	6.4	93.6
N_R064	14.87	6	94
N_R063	4.71	17.5	82.5
R16_out	4.72	7.4	92.6
R15_out	2.47	6.2	93.8
R14_out	1.35	20.3	79.7
N_R049	1.28	21.5	78.5
N_R050	0.05	63.7	36.3
N_R051	0.81	47.4	52.6
N_R061	0.04	53.4	46.6
N_R060	0.15	66.6	33.4
R8_out	1.57	12.6	87.4
R7_out	14.96	10.4	89.6
R6_out	0.76	16	84
R5_out	0.96	9.3	90.7
R4_out	6.26	22.6	77.4
R3_out	8.31	10.7	89.3
N_R018	0.2	63.4	36.6
N_R020	0.85	27.1	72.9
N_R019	10.63	16.4	83.6
N_R012	0.04	39.5	60.5
ST00116	0.4	49	51
N_R146	3.26	30.6	69.4
N_R072	11.58	10.1	89.9
N_R071	3.31	10.4	89.6
N_R046	0.4	42.3	57.7
N_R043	1.05	23.8	76.2
N_R034	325.68	8.1	91.9
N_R054	1.41	28.2	71.8

N_R040A	0.27	38.4	61.6
N_R038	0.16	20.3	79.7
N_R036	0.18	55.9	44.1
N_R021	0.28	70	30
HW7	2.47	17.2	82.8
HW6	0.48	31.9	68.1
HW3	1.24	20.8	79.2
HW8	0.18	57.9	42.1
HW1	0.74	19.7	80.3
15	0.27	42.5	57.5
51	0.13	69	31

Table D1-2: Rylstone peak pipe flow results

	Peak pipe flows (m^3/s)						
Pipe ID	**20% AEP**	**10% AEP**	**5% AEP**	**2% AEP**	**1% AEP**	**0.5% AEP**	**PMF**
ST00489	0.252	0.25	0.251	0.25	0.246	0.25	0.233
P_50	0.474	0.474	0.474	0.474	0.474	0.474	0.474
P_RYLSTONE9	0.349	0.349	0.349	0.349	0.35	0.35	0.35
P_RYLSTONE10	0.335	0.338	0.331	0.33	0.33	0.331	0.336
P_34	0.43	0.43	0.43	0.43	0.43	0.43	0.432
Rylstone5	0.037	0.044	0.053	0.061	0.071	0.09	0.267
RYLSTONE3	0.338	0.431	0.52	0.55	0.571	0.59	0.602
RYLSTONE4	0.339	0.431	0.542	0.626	0.732	0.816	0.828
ST00010	0.101	0.121	0.145	0.166	0.193	0.239	0.425
ST00009	0.099	0.122	0.146	0.168	0.195	0.241	0.444
ST00003	0.318	0.319	0.319	0.319	0.319	0.319	0.319
ST00062	0.066	0.081	0.099	0.11	0.128	0.159	0.522
ST00063	0.066	0.081	0.099	0.11	0.129	0.16	0.53
ST00065	0.066	0.081	0.096	0.109	0.129	0.158	0.406
ST00066	0.067	0.081	0.097	0.109	0.129	0.158	0.287
P_52	0.408	0.436	0.464	0.49	0.495	0.502	0.497
A30	0.759	0.76	0.761	0.761	0.762	0.764	0.767
ST00056	0.268	0.269	0.269	0.269	0.269	0.269	0.269
ST00057	0.2	0.264	0.324	0.36	0.407	0.419	0.427
ST00054	0.217	0.284	0.345	0.387	0.449	0.578	0.585
ST00055	0.246	0.32	0.39	0.418	0.423	0.464	0.47
ST00044	0.265	0.266	0.269	0.269	0.27	0.27	0.284
ST00045	0.385	0.386	0.386	0.387	0.387	0.387	0.387
ST00046	0.4	0.407	0.43	0.416	0.43	0.484	0.499
ST00047	0.437	0.438	0.44	0.44	0.447	0.45	0.451
ST00043	0.162	0.197	0.221	0.23	0.225	0.226	0.251
ST00039	0.447	0.51	0.513	0.517	0.519	0.52	0.516
ST00040	0.405	0.405	0.407	0.408	0.409	0.405	0.458
ST00041	0.307	0.308	0.305	0.301	0.298	0.326	0.324
ST00038	0.218	0.287	0.348	0.39	0.467	0.496	0.504
ST00036	0.118	0.145	0.173	0.197	0.229	0.271	0.27
ST00037	0.119	0.146	0.173	0.197	0.23	0.277	0.36
ST00029	0.304	0.305	0.305	0.305	0.305	0.305	0.308
ST00030	0.265	0.271	0.267	0.266	0.268	0.267	0.267
ST00031	0.322	0.323	0.341	0.343	0.343	0.342	0.343
ST00032	0.439	0.466	0.474	0.485	0.487	0.489	0.49
ST00033	0.461	0.462	0.463	0.464	0.465	0.466	0.473
ST00034	0.472	0.472	0.472	0.472	0.472	0.472	0.474
ST00027	0.169	0.228	0.281	0.313	0.36	0.361	0.362
ST00028	0.24	0.308	0.328	0.329	0.332	0.333	0.334
ST00022	0.037	0.044	0.052	0.06	0.069	0.084	0.387
ST00023	0.169	0.212	0.265	0.309	0.36	0.459	0.89
ST00024	0.17	0.215	0.268	0.313	0.364	0.462	0.807
ST00021	0.074	0.088	0.105	0.121	0.141	0.173	0.283
ST00021B	0.17	0.204	0.244	0.281	0.325	0.374	0.381
ST00018	0.162	0.188	0.197	0.209	0.217	0.216	0.222

	ATT 6.2.11		ATT 6.2.17		ATT 6.2.21	
ST00019	0.697	0.704	0.729	0.736	0.738	0.737	0.757
ST00020	0.807	0.81	0.81	0.81	0.81	0.81	0.81
ST00014	0.072	0.086	0.104	0.12	0.14	0.179	0.366
ST00017	0.959	0.998	1.037	1.07	1.102	1.164	0.614
ST00075	0.344	0.355	0.369	0.383	0.394	0.424	1.729
RYLSTONE14	0.32	0.428	0.563	0.707	0.853	1.209	1.473
A26	0.814	1.076	1.187	1.235	1.283	1.357	0.959
ST00001	0.425	0.47	0.478	0.485	0.491	0.5	1.091
A22	0.117	0.15	0.182	0.209	0.244	0.316	0.419
A20	0.339	0.431	0.543	0.626	0.655	0.692	9.802
A13	0.178	0.194	0.212	0.232	0.247	0.288	2.009
RYLSTONE 12	0.305	0.317	0.328	0.337	0.348	0.365	0.14
ST00008	0.067	0.08	0.096	0.11	0.128	0.161	0.577
A19	1.442	1.934	2.485	2.933	3.486	4.974	0.404
ST00007	0.481	0.491	0.502	0.512	0.522	0.539	0.896
A17	0.703	0.939	1.199	1.428	1.502	1.562	0.41
ST00061	0	0	0	0	0	0	0.329
ST00060	0.066	0.081	0.099	0.109	0.128	0.159	0.286
P_HW7	0.277	0.3	0.308	0.316	0.323	0.338	0.365
ST00051	1.587	1.66	1.735	1.803	1.858	1.979	0.515
ST00050	0	0	0	0	0	0	0.591
ST00048	0.515	0.554	0.588	0.617	0.656	0.725	0.374
ST00049	0.35	0.365	0.381	0.396	0.41	0.44	0.562
ST00026	0.251	0.259	0.268	0.275	0.281	0.293	0.562
P_HW1	0.268	0.273	0.277	0.28	0.283	0.289	0.602
ST00490	0.344	0.358	0.372	0.384	0.397	0.422	0.395

Table D1-3: Rylstone peak overland flow results

			Peak overland flows (m^3/s)						
Overland flowpath ID	**from**	**to**	**20% AEP**	**10% AEP**	**5% AEP**	**2% AEP**	**1% AEP**	**0.5% AEP**	**PMF**
O_8	8	9	0.014	0.038	0.085	0.116	0.169	0.261	1.785
O_9	9	12	0.199	0.477	0.754	0.965	1.237	1.825	10.633
O_12	12	R1_out	0.089	0.341	0.619	0.83	1.103	1.692	10.501
O_10	10	11	0	0	0	0	0	0	0.509
O_11	1	N_R002	0	0	0	0	0	0.032	1.476
O_RYLSTONE6	RYLSTONE6	N_R004	0	0	0	0	0	0	0.148
O_HW1	HW1	N_R005	0.027	0.109	0.197	0.264	0.35	0.542	2.391
O_21	21	22	0.153	0.278	0.433	0.581	0.74	1.065	6.148
O_22	22	23	0.224	0.351	0.508	0.662	0.823	1.155	6.352
O_25	25	26	0.842	1.171	1.556	1.907	2.298	3.081	14.596
O_26	26	N_R007	1.045	1.415	1.909	2.351	2.843	3.911	19.74
O_N_R007	N_R007	N_R008	1.516	1.886	2.38	2.822	3.313	4.382	20.21
O_28	28	N_R009	0	0	0	0	0	0	0.917
O_N_R009	N_R009	30	0.402	0.513	0.644	0.732	0.841	1.074	5.059
O_N_R010	N_R010	Pit01	0.336	0.429	0.521	0.587	0.697	0.867	3.971
O_30	30	31	0	0.058	0.2	0.312	0.439	0.717	5.253
O_31	31	32	0.043	0.163	0.306	0.408	0.538	0.816	5.352
O_50	50	RYLSTONE9	0	0	0	0	0	0	0
O_RYLSTONE9	RYLSTONE9	RYLSTONE10	0.125	0.125	0.125	0.125	0.125	0.125	0.125
O_RYLSTONE10	RYLSTONE10	34	0.152	0.152	0.152	0.152	0.152	0.152	0.152
O_33	33	34	0.381	0.566	0.776	1.05	1.304	1.818	9.933
O_34	34	N_R011	0.531	0.732	0.939	1.233	1.489	2.006	10.138
O_N_R011	N_R011	HW2	0.961	1.162	1.369	1.663	1.919	2.436	10.569
O_N_R012	N_R012	HW3	0.965	1.175	1.387	1.665	1.925	2.461	10.596
O_HW3	HW3	N_R013	1.871	2.402	2.998	3.627	4.279	5.829	26.78
O_N_R015	N_R015	HW3	0	0	0	0	0	0	0.404
O_HW4	HW4	HW5	0	0	0	0	0	0	1.099
O_37	37	38	0	0	0	0	0	0	0
O_38	38	N_R017	0.078	0.116	0.15	0.179	0.218	0.288	1.557
O_N_R017	N_R017	HW4	0.515	0.554	0.588	0.616	0.656	0.726	1.995
O_HW8	HW8	N_R006	0.155	0.264	0.398	0.516	0.638	0.897	5.205
O_29	29	N_R010	0	0	0	0	0	0.093	2.221
O_45	45	46	0	0	0	0	0	0	0.194
O_46	46	47	0	0	0	0	0	0	0.19
O_47	47	52	0	0	0	0	0	0	0.314
O_48	48	52	0	0	0	0	0	0	0.166
O_39	39	40	0	0	0	0	0.047	0.241	2.236
O_40	40	43	0	0	0	0	0	0.012	2.106
O_41	41	42	0.229	0.375	0.553	0.709	0.876	1.217	6.753
O_52	52	Pit3	0	0	0	0.003	0.031	0.072	0.432
O_43	43	42	0	0	0	0.016	0.08	0.192	2.499
O_44	44	pit1	0.688	0.819	0.961	1.051	1.114	1.276	3.379
O_27	27	28	0	0	0	0	0	0.009	1.145
O_N_R019	N_R019	N_R020	2.822	3.696	4.847	6.113	7.285	10.971	50.164
O_N_R021	N_R021	N_R022	0	0	0	0	0	0	0.14
O_N_R023	N_R023	N_R186	0.066	0.081	0.099	0.109	0.128	0.159	0.577
O_N_R186	N_R186	45	0.066	0.081	0.099	0.109	0.128	0.159	0.717
O_51	51	Pit3	0.72	1.079	1.505	1.915	2.343	3.416	5.191
O_HW7	HW7	N_R025	0	0.077	0.189	0.314	0.447	0.758	4.893
O_1	1	N_R027	0	0	0	0	0	0	0.499
O_N_R036	N_R036	N_R037	0.426	0.703	1.046	1.38	1.767	2.525	13.988
O_N_R037	N_R037	N_R038	0.906	1.194	1.547	1.891	2.288	3.063	14.488
O_N_R038	N_R038	N_R039	0	0	0	0	0	0	18.857
O_N_R039	N_R039	R18_out	1.927	2.559	3.31	4.053	4.902	6.516	30.654
O_N_R029	N_R029	N_R039	0.703	0.939	1.199	1.428	1.502	1.562	2.009
O_HW6	HW6	N_R016	0.746	1.439	2.318	3.256	4.102	6.222	38.246
O_N_R061	N_R061	N_R054	0.535	0.705	0.873	0.978	1.161	1.501	7.198
O_ST00081	ST00081	N_R059	0	0	0	0	0	0	0.727

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O_N_R040A	N_R040A	N_R040B	0	0	0	0	0	0	0.32
O_RYLSTONE1	RYLSTONE1	RYLSTONE2	0	0	0.023	0.076	0.169	0.505	4.03
O_RYLSTONE2	RYLSTONE2	N_R041	0	0	0	0	0	0.144	3.67
O_N_R041	N_R041	N_R042	0.339	0.431	0.542	0.626	0.732	0.959	4.486
O_N_R042	N_R042	N_R043	0	0	0	0	0.077	0.267	3.527
O_N_R044	N_R044	N_R045	0	0	0	0	0	0	0
O_N_R046	N_R046	N_R047	0	0.067	0.185	0.324	0.466	0.722	5.17
O_N_R047	N_R047	N_R048	0.425	0.537	0.663	0.808	0.956	1.222	5.67
O_N_R062	N_R062	N_R048	0.444	0.566	0.714	0.844	1.011	1.335	6.187
O_N_R051	N_R051	N_R054	0.158	0.201	0.255	0.292	0.335	0.428	2.022
O_N_R054	N_R054	N_R053	0.509	0.767	1.017	1.271	1.583	2.172	11.847
O_N_R057	N_R057	N_R058	0	0	0.158	0.373	0.648	1.18	11.713
O_N_R034	N_R034	N_R035	3.816	5.454	7.668	10.464	12.867	20.797	102.01
O_N_R063	N_R063	N_R066	0.453	0.611	0.805	1.009	1.202	1.758	8.242
O_N_R064	N_R064	N_R066	0.989	1.383	1.912	2.524	3.039	4.695	22.226
O_N_R066	N_R066	N_R067	1.414	1.924	2.57	3.318	3.986	6.186	28.976
O_N_R065	N_R065	N_R067	0.528	0.695	0.912	1.16	1.406	2.087	9.818
O_N_R067	N_R067	N_R068	1.879	2.515	3.334	4.227	5.043	7.803	36.252
O_N_R074	N_R074	N_R026	0.406	0.514	0.646	0.789	0.942	1.248	5.765
O_N_R027	N_R027	N_R083	0.241	0.3	0.364	0.41	0.483	0.605	2.685
O_N_R084	N_R084	N_R085	0.128	0.17	0.221	0.251	0.29	0.381	1.813
O_N_R083	N_R083	N_R085	0.379	0.475	0.585	0.692	0.816	1.058	4.929
O_N_R086	N_R086	N_R028	0.129	0.173	0.226	0.278	0.339	0.451	2.146
O_N_R085	N_R085	N_R087	0.496	0.643	0.805	0.926	1.102	1.431	6.742
O_N_R087	N_R087	N_R028	0.586	0.773	0.977	1.149	1.371	1.786	8.437
O_N_R028	N_R028	N_R088	0	0	0	0	0.205	0.673	11.219
O_N_R088	N_R088	N_R089	0.107	0.137	0.167	0.191	0.339	0.859	11.219
O_16	16	N_R090	0	0	0	0	0	0	0.086
O_15	15	N_R090	0.067	0.08	0.096	0.111	0.129	0.161	0.75
O_N_R092	N_R092	N_R093	0.344	0.43	0.528	0.597	0.695	0.894	5.06
O_14	14	N_R095	0	0	0	0	0	0	1.268
O_N_R094	N_R094	N_R090	0.152	0.194	0.245	0.279	0.322	0.424	3.096
O_N_R095	N_R095	N_R094	0.058	0.069	0.084	0.096	0.112	0.143	1.778
O_N_R100	N_R100	N_R036	0.531	0.704	0.915	1.118	1.359	1.838	8.634
O_N_R101	N_R101	R_17_out	0.166	0.219	0.283	0.336	0.389	0.506	2.418
O_N_R102	N_R102	N_R104	0.355	0.456	0.564	0.698	0.823	1.067	5.005
O_N_R103	N_R103	N_R104	0.06	0.073	0.089	0.103	0.121	0.159	0.741
O_N_R104	N_R104	N_R036	0.381	0.493	0.63	0.77	0.909	1.184	5.591
O_N_R107	N_R107	N_R108	0.044	0.053	0.064	0.073	0.085	0.107	0.496
O_20	20	N_R108	0	0	0.06	0.1	0.168	0.307	2.607
O_N_R108	N_R108	N_R105	0.044	0.053	0.123	0.17	0.253	0.408	3.04
O_N_R106	N_R106	N_R105	0.107	0.139	0.179	0.215	0.26	0.348	1.62
O_N_R105	N_R105	26	0.216	0.284	0.362	0.488	0.643	0.922	5.464
O_N_R110	N_R110	25	0.298	0.39	0.5	0.59	0.69	0.912	4.282
O_N_R109	N_R109	25	0.173	0.226	0.291	0.33	0.38	0.496	2.342
O_19	19	N_R115	0	0	0	0	0.008	0.119	1.858
O_N_R114	N_R114	N_R115	0.029	0.035	0.042	0.048	0.056	0.071	0.336
O_N_R115	N_R115	20	0.029	0.035	0.042	0.048	0.06	0.184	2.149
O_N_R111	N_R111	N_R110	0.272	0.359	0.461	0.541	0.63	0.823	3.854
O_23	23	18	0.262	0.412	0.603	0.798	1.009	1.439	7.86
O_18	18	24	0.262	0.412	0.603	0.798	1.009	1.439	7.86
O_N_R116	N_R116	N_R117	0.033	0.039	0.047	0.054	0.063	0.078	0.361
O_N_R006	N_R006	N_R117	0.404	0.521	0.664	0.788	0.916	1.187	5.612
O_N_R117	N_R117	21	0.416	0.536	0.682	0.812	0.947	1.231	5.825
O_N_R118	N_R118	24	0.117	0.154	0.199	0.226	0.26	0.34	1.612
O_N_R119	N_R119	HW8	0.371	0.482	0.617	0.735	0.854	1.108	5.249
O_N_R120	N_R120	N_R102	0.212	0.264	0.327	0.378	0.437	0.551	2.551
O_N_121	N_R121	RYLSTONE1	0.192	0.253	0.313	0.348	0.415	0.533	2.464
O_32	32	N_R126	0.399	0.58	0.784	1.02	1.264	1.726	8.948
O_N_R128	N_R128	32	0.243	0.319	0.412	0.495	0.59	0.769	3.655
O_N_R127	N_R127	N_R126	0.037	0.044	0.053	0.06	0.07	0.084	0.399
O_N_R126	N_R126	N_R125	0.405	0.589	0.796	1.06	1.311	1.784	9.187
O_N_R125	N_R125	34	0.444	0.646	0.865	1.16	1.434	1.948	10.064

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O_N_R124	N_R124	N_R129	0.017	0.02	0.024	0.028	0.033	0.042	0.198
O_N_R123	N_R123	N_R129	0.122	0.158	0.202	0.241	0.291	0.387	1.801
O_N_R129	N_R129	N_R113	0.139	0.178	0.226	0.267	0.316	0.427	1.943
O_HW2	HW2	N_R012	0.965	1.174	1.386	1.665	1.925	2.461	10.596
O_N_R130	N_R130	N_R139	0.203	0.254	0.312	0.35	0.407	0.518	2.387
O_N_R131	N_R131	N_R135	0.056	0.067	0.081	0.093	0.108	0.137	0.636
O_N_R132	N_R132	N_R134	0.039	0.047	0.056	0.065	0.075	0.095	0.445
O_N_R136	N_R136	ST00076	0.241	0.308	0.389	0.47	0.563	0.754	3.434
O_ST00073	ST00076	N_R062	0.126	0.247	0.395	0.525	0.693	1.017	5.869
O_ST00116	ST00116	N_R139	0.101	0.121	0.144	0.166	0.193	0.239	1.1
O_N_R139	N_R139	N_R135	0.304	0.374	0.457	0.512	0.599	0.757	3.374
O_N_R135	N_R135	N_R134	0.349	0.428	0.522	0.592	0.692	0.876	3.944
O_N_R134	N_R134	N_R133	0.376	0.464	0.565	0.642	0.751	0.952	4.331
O_N_R133	N_R133	N_R046	0.406	0.507	0.618	0.708	0.828	1.048	4.872
O_N_R050	N_R050	N_R140	0.013	0.016	0.019	0.021	0.025	0.03	0.147
O_N_R040	N_R140	ST00076	0.204	0.26	0.327	0.385	0.453	0.593	2.753
O_Pit01	Pit01	N_R141	0.124	0.225	0.329	0.404	0.521	0.71	4.125
O_N_R141	N_R141	N_R142	0.588	0.76	0.971	1.286	1.592	2.192	11.145
O_N_R142	N_R142	N_R148	0.973	1.28	1.615	1.93	2.308	3.241	15.007
O_N_R014	N_R014	N_R148	0.515	0.554	0.588	0.617	0.656	0.725	0.896
O_N_R148	N_R148	HW3	1.481	1.825	2.197	2.529	2.949	3.948	15.883
O_N_R145	N_R145	N_R146	0.453	0.694	0.969	1.155	1.408	1.955	10.346
O_HW5	HW5	N_R149	0	0	0	0	0	0	0.693
O_N_R146B	N_R146B	N_R150	2.268	3.058	3.98	4.85	5.769	7.763	37.556
O_N_R150	N_R150	HW6	2.315	3.097	4.05	5.041	5.946	8.163	38.748
O_pit1	pit1	N_R147	0.688	0.819	0.961	1.051	1.114	1.276	3.379
O_N_R147	N_R147	N_R146	1.564	2.037	2.588	3.087	3.623	4.829	22.063
O_Pit3_out	Pit3_out	N_R152	1.291	1.693	2.189	2.712	3.228	4.487	21.203
O_N_R151	N_R151	N_R152	0.809	1.089	1.468	1.904	2.294	3.683	17.394
O_ST00080	ST00080	N_R153	0.117	0.144	0.172	0.198	0.229	0.282	1.279
O_N_R153	N_R153	N_R130	0.117	0.144	0.172	0.198	0.229	0.282	1.279
O_N_R143	N_R143	N_R141	0.062	0.076	0.09	0.104	0.12	0.148	0.674
O_N_R144	N_R144	N_R154	0.065	0.08	0.096	0.11	0.128	0.159	0.73
O_35	35	N_R154	0.169	0.304	0.446	0.528	0.666	0.944	5.326
O_36	36	N_R054	0.182	0.265	0.371	0.46	0.573	0.799	4.077
O_N_R154	N_R154	N_R145	0.414	0.646	0.911	1.087	1.327	1.849	9.782
O_N_R059	N_R059	N_R156	0.101	0.121	0.145	0.166	0.193	0.239	1.151
O_N_R156	N_R156	N_R155	0.185	0.22	0.264	0.303	0.352	0.437	2.058
O_N_R155	N_R155	N_R061	0.269	0.33	0.396	0.456	0.531	0.669	3.197
O_N_R157	N_R157	N_R061	0.268	0.368	0.472	0.532	0.633	0.828	3.995
O_N_R159	N_R159	N_R147	0.702	0.906	1.156	1.438	1.736	2.375	11.167
O_N_R160	N_R160	44	0.178	0.234	0.304	0.365	0.426	0.554	2.646
O_N_R161	N_R161	N_R164	0.063	0.075	0.09	0.103	0.12	0.149	0.689
O_N_R163	N_R163	N_R164	2.196	2.863	3.737	4.659	5.543	8.24	37.903
O_N_R152	N_R152	N_R163	2.17	2.831	3.697	4.609	5.51	8.155	37.424
O_N_R162	N_R162	N_R163	0.085	0.11	0.132	0.152	0.177	0.224	1.03
O_N_R164	N_R164	N_R019	2.214	2.885	3.764	4.693	5.583	8.294	38.209
O_N_R165	N_R165	N_R166	0.468	0.608	0.771	0.977	1.181	1.622	7.562
O_N_R158	N_R158	N_R166	0.235	0.303	0.385	0.469	0.564	0.763	3.479
O_N_R166	N_R166	N_R159	0.668	0.865	1.111	1.41	1.707	2.321	10.94
O_N_R060	N_R060	N_R157	0.04	0.047	0.056	0.064	0.074	0.09	0.42
O_N_168	N_R168	N_R167	0.132	0.169	0.204	0.234	0.273	0.345	1.589
O_N_R022	N_R022	N_R173	0	0	0	0	0	0	0
O_N_R172	N_R172	N_R173	0.542	0.731	0.961	1.217	1.485	2.095	9.86
O_N_R173	N_R173	N_R174	0.646	0.862	1.126	1.387	1.683	2.344	10.795
O_N_R171	N_R171	N_R174	0.065	0.089	0.117	0.131	0.153	0.205	0.965
O_N_R174	N_R174	N_R175	0.708	0.947	1.23	1.486	1.799	2.5	11.488
O_N_R170	N_R170	N_R175	0.046	0.064	0.085	0.102	0.121	0.16	0.77
O_N_R175	N_R175	N_R176	0.752	1.009	1.308	1.571	1.891	2.641	12.054
O_N_R176	N_R176	N_R177	0.771	1.032	1.337	1.61	1.927	2.702	12.315
O_N_R169	N_R169	N_R177	0.035	0.048	0.063	0.074	0.087	0.113	0.546
O_N_R177	N_R177	51	0.8	1.069	1.382	1.665	1.976	2.787	12.669
O_N_R187	N_R025	N_R182	0.277	0.375	0.497	0.63	0.77	1.095	5.178

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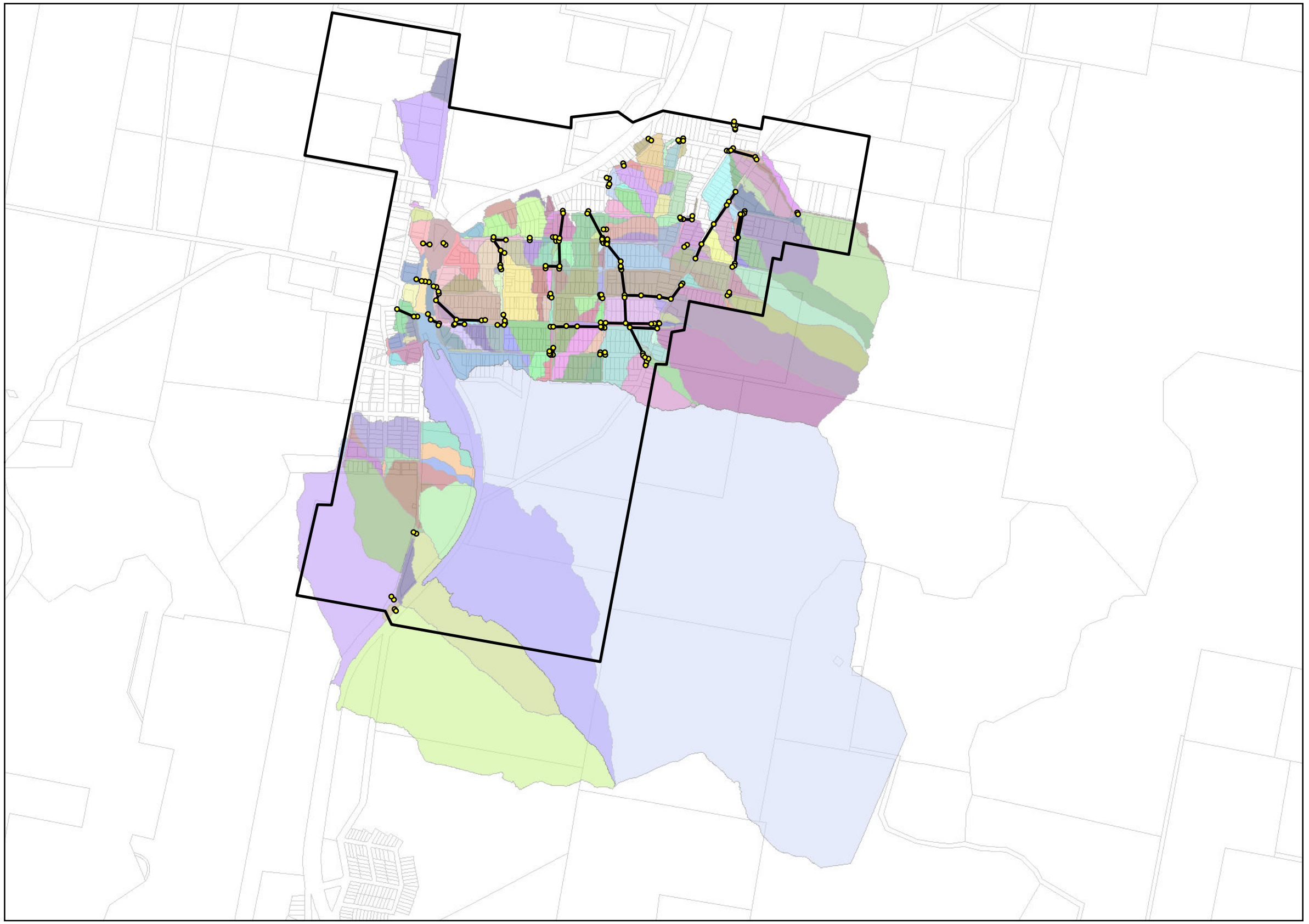
O_N_R178	N_R178	N_R182	0.128	0.178	0.225	0.253	0.299	0.398	1.883
O_N_R182	N_R182	Pit3	0.128	0.178	0.225	0.253	0.299	0.398	1.883
O_N_R179	N_R179	N_R181	0.104	0.141	0.186	0.228	0.28	0.367	1.762
O_N_R180	N_R180	N_R181	0.068	0.094	0.12	0.135	0.159	0.212	1.003
O_N_R181	N_R181	N_R151	0.169	0.232	0.303	0.36	0.427	0.567	2.731
O_N_R018	N_R018	N_R184	0.053	0.062	0.074	0.085	0.099	0.12	0.562
O_N_R183	N_R183	N_R184	0.065	0.08	0.098	0.113	0.132	0.166	0.769
O_N_R184	N_R184	N_R165	0.109	0.133	0.161	0.183	0.212	0.27	1.196
O_ST00079	ST00079	ST00080	0	0	0	0	0	0	0.657
O_N_R167	N_R167	N_R152	0.156	0.203	0.251	0.292	0.349	0.449	2.141
O_N_R185	N_R185	N_R079	0.333	0.436	0.563	0.674	0.791	1.03	4.898
O_N_R079	N_R079	N_R078	0.395	0.517	0.661	0.784	0.915	1.195	5.614
O_N_R078	N_R078	N_R077	0.515	0.662	0.835	0.979	1.144	1.489	6.822
O_N_R077	N_R077	N_R076	0.605	0.775	0.971	1.132	1.326	1.73	7.837
O_N_R076	N_R_076	9	0.655	0.838	1.048	1.218	1.428	1.866	8.427
O_13	13	11	0	0	0	0	0	0	0
O_N_R090	N_R090	N_R092	0.269	0.336	0.415	0.471	0.547	0.706	4.296
O_N_R075	N_R075	8	0.655	0.838	1.048	1.218	1.428	1.866	8.427
O_N_R093	N_R093	N_R081	0.344	0.43	0.528	0.597	0.695	0.894	5.06
O_N_R004	N_R004	N_R092	0.037	0.044	0.053	0.061	0.071	0.09	0.413
O_N_R003	N_R003	HW1	0.17	0.215	0.268	0.313	0.364	0.462	0.807
O_N_R005	N_R005	R_17_out	0.294	0.381	0.474	0.544	0.634	0.831	2.72
O_N_R112	N_R112	N_R111	0.181	0.239	0.31	0.373	0.439	0.572	2.731
O_N_R113	N_R113	N_R008	0.204	0.258	0.322	0.377	0.442	0.59	2.656
O_R_18_out	R_18_out	N_R089	0.213	0.288	0.379	0.437	0.511	0.667	3.218
O_N_R089	N_R089	N_R038	0.384	0.52	0.684	0.781	0.927	1.466	12.426
O_N_R099	N_R099	N_R038	0.172	0.238	0.313	0.352	0.414	0.553	2.621
O_N_R122	N_R122	N_R044	0.117	0.15	0.182	0.209	0.245	0.317	1.473
O_N_R053	N_R053	N_R057	0.814	1.084	1.345	1.608	1.931	2.537	12.213
O_42	42	N_R147	0.229	0.375	0.553	0.719	0.941	1.385	9.178
O_N_R071	N_R071	R10_out	0	0	0	0	0	0.061	4.235
O_N_R146	N_R146	N_R146B	1.309	2.06	2.943	3.78	4.667	6.599	37.056
O_Pit3	Pit3	Pit3_out	0.548	0.952	1.449	1.973	2.487	3.74	20.458
O_N_R040B	N_R040B	RYLSTONE1	0.067	0.08	0.096	0.11	0.128	0.161	0.739
O_24	24	25	0.488	0.729	1.019	1.275	1.535	2.068	10.015
O_N_R072	N_R072	R9_out	0.324	0.583	0.888	1.3	1.644	2.791	15.53

Figure D2-1. Kandos Subcatchments



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ATT 6.2.21

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Checked by : [INITIALS]

Table D2-1:Kandos subcatchments data

Catchment draining to pit	Total area (ha)	Paved area (%)	Grass area (%)
ST00297	0.17	67.5	32.5
ST00298	0.91	38.5	61.5
ST00299	0.33	43.4	56.6
N_K005	0.32	48	52
ST00304	0.15	68.7	31.3
ST00306	0.46	51.6	48.4
ST00308	1.09	35.7	64.3
ST00309	0.96	46.8	53.2
ST00301	0.67	47.3	52.8
ST00300	0.09	63.5	36.5
ST00302	0.19	67.7	32.3
ST00310	0.07	69.9	30.1
ST00311	2.91	38.1	61.9
ST00312	2.25	41.7	58.3
ST00313	0.46	49.8	50.2
N_K052	0.09	48.2	51.8
ST00315	0.01	70	30
ST00318	1.9	36.5	63.5
ST00319	0.74	49.8	50.2
ST00316	1.61	41.2	58.8
ST00317	0.84	53.4	46.6
ST00320	0.42	44.7	55.3
ST00322	0.64	51.3	48.7
ST00323	0.09	64.9	35.1
ST00324	1.99	33.8	66.2
ST00325	0.26	41.5	58.5
ST00328	0.16	53.1	46.9
ST00501	0.03	65.9	34.1
ST00327	1.15	39.5	60.5
ST00326	0.14	50.3	49.7
ST00329	0.17	40.8	59.3
ST00330	0.71	33.3	66.8
ST00332	2.54	37.7	62.3
ST00331	0.02	70	30
ST00335	0.1	43.1	56.9
ST00337	0.22	65.6	34.4
ST00338	0.67	43.8	56.2
ST00340	1.56	33	67
ST00341	0.24	55.5	44.5
ST00342	0.51	42.8	57.2
ST00345	0.52	43.9	56.1
ST00346	0.03	70	30
ST00348	1.69	36.2	63.8
ST00347	0.25	55	45
ST00350	1.15	40.9	59.1
ST00349	0.33	42.7	57.3
ST00351	0.54	41	59

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ST00354	0.18	50.7	49.3
ST00360	0.12	56.6	43.4
ST00361	2.4	21.8	78.2
ST00370	10.59	7.7	92.3
ST00375	0.43	38.1	61.9
ST00372	1.46	39	61
ST00377	0.58	38.1	61.9
ST00376	0.12	67.6	32.4
ST00380	0.3	52.9	47.1
ST00367	0.26	49.1	50.9
ST00384	0.01	61.8	38.2
ST00383	4.78	14.1	85.9
ST00381	5.09	12.9	87.1
ST00366	0.09	67.2	32.8
ST00365	5.95	19.5	80.5
ST00379	0.18	37.4	62.6
ST00388	1.51	40.2	59.8
ST00387	6.22	9.9	90.1
N_K060	0.03	59.9	40.1
ST00389	0.15	45.2	54.8
ST00390	0.33	50.2	49.8
ST00392	11.6	7.5	92.5
ST00393	0.06	69.6	30.4
ST00394	0.3	51.4	48.6
ST00401	0.14	56.2	43.8
N_K043	4.82	39.1	60.9
N_K046	2.84	37.1	62.9
ST00397	0.21	53	47
ST00396	0.36	42.6	57.4
ST00403	0.28	70	30
ST00402	2.59	35.7	64.3
ST00398	17.83	10.3	89.8
ST00404	4.43	40.2	59.8
ST00410	0.03	66.3	33.7
ST00510	0.01	70	30
ST00411	0.43	37.4	62.6
ST00412	1.83	38.4	61.6
ST00413	0.26	67.5	32.5
ST00415	0.63	38.4	61.6
ST00416	0.29	46.5	53.5
ST00418	0.02	63.6	36.4
ST00420	0.17	60.8	39.2
ST00421	0.1	66.9	33
ST00424	0.05	70	30
ST00425	0.36	30.4	69.6
ST00427	0.02	70	30
ST00430	3.56	39.4	60.6
K5_out	0.86	33.4	66.6
ST00432	1.86	9.9	90.1
ST00433	1.51	9.3	90.8
ST00499	1.15	39	61

ATT 6.2.11 | ATT 6.2.17 | ATT 6.2.21

N_K051	0.32	44.7	55.3
ST00500	0.28	20.5	79.5
ST00529	3.49	39.5	60.5
K1_out	1.3	29.2	70.8
K2_out	6.45	19.6	80.4
K3_out	0.99	31	68.9
K4_out	0.82	39.9	60.1
HW1	0.58	25.7	74.3
HW2	0.67	29.1	70.9
HW3	0.88	41	59
N_K007	0.9	32.4	67.6
N_K008	0.43	32	68
HW6	5.48	12.9	87.1
N_K016	0.8	7.7	92.3
N_K017	2.98	16.1	83.9
N_K018	0.66	36.5	63.5
K8_out	4.25	20.5	79.5
N_K020	0.96	28.4	71.6
HW7	0.28	25.4	74.6
K7_out	0.23	32.8	67.2
N_K024	0.25	29.4	70.6
HW9	21.96	9.1	90.9
HW8	44.79	7.4	92.6
N_K026	1.16	33.9	66.1
HW12	15.29	6.3	93.7
HW10	99.74	21.4	78.6
N_K032	151.85	8.9	91.1
ST00303	0.81	44.6	55.4
N_K035	0.78	37	63
N_K038	0.74	43	57
N_K040	1.27	14.7	85.3
HW13	3.96	16	84
N_K049	0.15	68	32
N_K050	0.52	39.4	60.6
N_K053	1.18	33.8	66.2
K9_out	1.01	36.7	63.3
K10_out	0.28	26.7	73.3
K11_out	4.87	36.7	63.3
N_K055	0.99	37.9	62.1
K12_out	1.07	29.1	70.9
N_K056	0.8	35.1	64.9
K13_out	0.99	36.2	63.8
N_K057	0.58	43.5	56.5
N_K058	0.05	62.5	37.5
N_K059	1.27	36.5	63.5
N_K061	0.03	56	44
N_K062	0.76	13.1	86.9
N_K063	1.06	18	82
HW15	1.32	36.3	63.7
N_K068	0.26	37.1	62.9
N_K069	0.28	42.1	57.9

ATT 6.2.11 ATT 6.2.17 ATT 6.2.21

N_K073	8.81	7.6	92.4
N_K075	0.08	61.6	38.4
N_K077	0.09	66.8	33.3
N_K080	0.14	18.6	81.4
N_K082	0.17	62.6	37.4
N_K084	0.04	70	30
HW17	1.46	38.6	61.4
N_K089	0.97	40.8	59.2
N_K090	0.44	30.9	69.2
N_K093	0.07	55.8	44.2
N_K094	0.22	45.9	54.1
N_K095	0.21	35.2	64.8
N_K096	0.65	38.9	61.1
N_K098	0.73	35.4	64.6
N_K099	0.59	43.3	56.7
N_K101	0.15	39.8	60.2
N_K103	0.15	55.7	44.3
N_K104	0.05	70	30
N_K106	1.06	39.7	60.3
N_K109	0.07	70	30
N_K110	0.25	41.9	58.1
N_K112	1.27	36.1	63.9
N_K113	1.86	44.3	55.7
N_K114	3.99	35.5	64.6
N_K115	2.19	40.9	59.1
N_K116	0.12	56.8	43.2
N_K117	0.17	33.4	66.6
N_K120	0.17	63.4	36.6
N_K121	1.54	37.6	62.4
N_K122	0.51	30.1	69.9
N_K123	0.09	65.3	34.7
N_K125	0.03	69.3	30.8
N_K127	24.39	5	95
N_K128	2.13	34.6	65.4
N_K129	0.4	30.7	69.3
N_K130	0.11	67.6	32.4
N_K132	3.36	38.9	61.1
N_K133	0.04	69.6	30.4
N_K134	0.75	43.7	56.3
N_K135	0.2	32.2	67.8
N_K136	0.28	44.5	55.5
K14_out	0.55	47.5	52.5
N_K137	1.24	37.3	62.7
N_K138	0.36	34.4	65.6
N_K139	0.45	36.8	63.2
N_K141	0.81	28	72
N_K142	1.14	14.4	85.6
N_K143	5.51	8.8	91.2
N_K144	0.97	40.2	59.8
ST00429	0.1	45.9	54.1
ST00428	0.46	36.3	63.7

ST00356b	0.27	56.8	43.2

Table D.2.2: Kandos peak pipe flow results

	Peak pipe flows (m^3/s)						
Pipe ID	**20% AEP**	**10% AEP**	**5% AEP**	**2% AEP**	**1% AEP**	**0.5% AEP**	**PMF**
ST00277	0.09	0.11	0.133	0.158	0.182	0.242	0.554
A46	1.565	1.72	1.93	2.232	2.328	2.419	3.055
ST00278	1.782	1.807	1.835	1.839	1.872	1.948	2.664
ST00135	0.991	0.992	0.991	0.991	0.991	0.991	0.968
ST00137	0.456	0.446	0.448	0.448	0.447	0.447	0.408
ST00136	0.338	0.346	0.323	0.336	0.34	0.33	0.312
ST00134	0.471	0.472	0.472	0.472	0.472	0.472	0.472
ST00132	0.62	0.62	0.62	0.62	0.62	0.62	0.674
P_ST00299	0.072	0.083	0.098	0.112	0.129	0.161	0.21
ST00127	0.311	0.336	0.35	0.355	0.356	0.358	0.382
ST00126	0.198	0.227	0.265	0.303	0.311	0.313	0.316
ST00130	0.23	0.265	0.309	0.355	0.405	0.496	0.631
ST00275	0.44	0.442	0.442	0.443	0.442	0.444	0.44
P_ST00431	0.638	0.638	0.639	0.64	0.641	0.641	0.643
A71	0.788	0.806	0.828	0.852	0.871	0.942	1.344
A72	1.959	2.464	3.174	4.046	4.817	6.7	10.221
A66	0.458	0.469	0.483	0.494	0.507	0.537	0.896
KANDOS 21	0.158	0.155	0.157	0.158	0.156	0.156	0.143
KANDOS 22	0.428	0.429	0.429	0.429	0.429	0.429	0.428
ST00165	0.159	0.185	0.219	0.245	0.285	0.293	0.298
ST00166	0.267	0.267	0.267	0.267	0.267	0.267	0.274
ST00167	0.43	0.43	0.43	0.43	0.43	0.43	0.432
ST00169	0.083	0.096	0.113	0.132	0.157	0.189	0.393
ST00170	0.082	0.096	0.113	0.132	0.157	0.189	0.418
ST00172	0.014	0.016	0.02	0.024	0.027	0.027	0.147
ST00171	0.262	0.306	0.361	0.368	0.371	0.373	0.381
ST00173	0.026	0.03	0.038	0.061	0.118	0.186	0.265
ST00174	0.284	0.33	0.387	0.437	0.492	0.493	0.494
ST00175	0.439	0.442	0.444	0.445	0.447	0.447	0.449
ST00176	0.096	0.107	0.121	0.128	0.134	0.135	0.153
ST00177	0.437	0.44	0.441	0.442	0.442	0.443	0.443
ST00179	0.009	0.01	0.012	0.039	0.095	0.235	0.438
ST00178	0.389	0.39	0.39	0.39	0.39	0.399	0.409
P_ST00510	0.397	0.399	0.402	0.422	0.477	0.505	0.506
ST00180	0.165	0.191	0.225	0.258	0.296	0.37	0.462
ST00181	0.255	0.297	0.351	0.368	0.37	0.372	0.374
KANDOS7	0.369	0.376	0.383	0.391	0.397	0.412	0.538
C15	0.196	0.238	0.29	0.34	0.395	0.519	0.635
C14	0.242	0.249	0.256	0.264	0.27	0.286	0.414
ST00195	0.506	0.509	0.512	0.514	0.515	0.515	0.526
ST00196	0.946	1.079	1.111	1.104	1.105	1.101	1.091
ST00208	0.051	0.059	0.069	0.079	0.09	0.111	0.183
ST00209	0.135	0.156	0.183	0.211	0.241	0.298	0.312
ST00210	0.134	0.155	0.182	0.209	0.24	0.298	0.49
ST00207	0.609	0.604	0.616	0.585	0.623	0.558	0.627
ST00197	0.818	0.815	0.817	0.807	0.809	0.814	0.896

	ATT 6.2.11		ATT 6.2.17		ATT 6.2.21	
ST00198	1.117	1.117	1.118	1.119	1.12	1.12	1.152
ST00199	0.661	0.638	0.618	0.614	0.611	0.608	0.57
ST00183	0.333	0.333	0.334	0.333	0.334	0.328	0.33
P_ST00414	0.346	0.344	0.35	0.344	0.346	0.332	0.334
ST00184	0.143	0.166	0.195	0.224	0.257	0.322	0.435
ST00212	0.09	0.099	0.118	0.136	0.163	0.163	0.252
ST00213	0.115	0.124	0.141	0.151	0.171	0.182	0.228
ST00214	0.54	0.542	0.541	0.542	0.542	0.542	0.535
ST00215	0.572	0.572	0.573	0.573	0.573	0.573	0.573
ST00216	0.515	0.515	0.525	0.528	0.532	0.524	0.579
ST00200	0.91	0.91	0.91	0.91	0.91	0.91	0.91
P_N_K043	0.542	0.54	0.541	0.542	0.543	0.545	0.561
P_N_K044	0.659	0.659	0.659	0.659	0.659	0.659	0.659
P_N_K045	0.931	0.932	0.932	0.934	0.933	0.933	0.931
ST00201	1.032	1.032	1.032	1.032	1.03	1.031	0.998
P_N_K046	1.058	1.067	1.072	1.069	1.063	1.062	0.798
ST00188	0.232	0.231	0.228	0.229	0.227	0.233	0.194
ST00187	0.221	0.222	0.225	0.228	0.231	0.235	0.248
C06	0.216	0.214	0.216	0.218	0.223	0.224	0.354
ST00203	0.666	0.544	0.554	0.535	0.527	0.539	0.45
ST00202	0.053	0.063	0.072	0.084	0.094	0.113	0.538
ST00191	0.199	0.229	0.268	0.3	0.302	0.304	0.429
P_ST00333	1.65	1.654	1.655	1.652	1.653	1.651	1.653
ST00193	0	0	0	0.012	0.054	0.137	0.397
ST00163	0.006	0.007	0.008	0.01	0.012	0.011	0.061
ST00162	0.043	0.05	0.062	0.078	0.089	0.112	0.387
ST00161	0.184	0.194	0.195	0.206	0.207	0.201	0.209
ST00160	0.271	0.273	0.276	0.288	0.308	0.31	0.326
ST00508	0.131	0.155	0.186	0.23	0.264	0.276	0.389
ST00157	0.477	0.517	0.565	0.594	0.61	0.628	0.642
ST00150	0.155	0.179	0.209	0.24	0.274	0.337	0.603
C01	0.05	0.051	0.052	0.05	0.054	0.053	0.091
P_ST00328	0.043	0.049	0.058	0.073	0.083	0.087	0.263
ST00503	0.176	0.176	0.201	0.217	0.231	0.226	0.348
ST00504	0.427	0.429	0.429	0.429	0.429	0.432	0.41
ST00153	0.545	0.551	0.561	0.57	0.575	0.575	0.575
ST00152	0.439	0.441	0.445	0.449	0.451	0.451	0.451
ST00143	0.103	0.119	0.139	0.159	0.183	0.227	0.298
ST00144	0.125	0.145	0.17	0.194	0.222	0.271	0.309
ST00145	0.126	0.146	0.171	0.197	0.224	0.28	0.403
ST00146	0.555	0.555	0.555	0.555	0.555	0.555	0.555
P_ST00530	1.005	1.006	1.01	1.011	1.015	1.014	1.024
ST00148	0.199	0.229	0.269	0.299	0.304	0.313	0.342
P_ST00318	0.651	0.651	0.685	0.698	0.704	0.709	0.713
ST00204	0.648	0.669	0.648	0.648	0.65	0.65	0.626
ST00219	0.211	0.245	0.293	0.33	0.346	0.356	0.371
ST00220	0.241	0.286	0.343	0.381	0.402	0.42	0.45
ST00221	0.356	0.409	0.471	0.533	0.561	0.563	0.566
ST00222	0.329	0.385	0.396	0.396	0.396	0.396	0.396
ST00225	0.428	0.43	0.431	0.432	0.432	0.432	0.437
ST00256	0.219	0.216	0.211	0.219	0.217	0.198	0.198

	ATT 6.2.11		ATT 6.2.17		ATT 6.2.21		
ST00526	0.547	0.547	0.547	0.547	0.547	0.547	0.554
ST00258	0.3	0.296	0.277	0.277	0.281	0.279	0.288
ST00259	0.46	0.461	0.461	0.461	0.462	0.462	0.475
ST00260	0.46	0.461	0.461	0.463	0.464	0.465	0.486
P_ST00380	0.067	0.077	0.09	0.103	0.118	0.146	0.532
ST00263	0.707	0.708	0.708	0.708	0.708	0.708	0.709
ST00264	0.478	0.479	0.479	0.479	0.479	0.479	0.479
ST00265	0.475	0.475	0.475	0.475	0.476	0.475	0.477
ST00239	0.14	0.162	0.204	0.259	0.298	0.312	0.482
ST00246	0.474	0.475	0.478	0.474	0.49	0.468	0.436
ST00249	0.432	0.431	0.434	0.44	0.438	0.433	0.432
ST00527	0.431	0.431	0.432	0.433	0.433	0.432	0.434
ST00267	0.476	0.475	0.475	0.48	0.481	0.482	0.49
ST00253	0.032	0.037	0.044	0.055	0.063	0.065	0.327
ST00243	0.093	0.112	0.139	0.169	0.199	0.29	0.537
ST00520	0.534	0.534	0.535	0.535	0.535	0.536	0.538
ST00242	0.217	0.231	0.248	0.261	0.271	0.269	0.314
ST00241	0.166	0.173	0.184	0.191	0.193	0.193	0.227
KANDOS 10	0.468	0.478	0.491	0.504	0.515	0.54	0.817
C10	1.058	1.107	1.144	1.175	1.201	1.268	1.799
C09	1.557	1.607	1.644	1.675	1.701	1.768	2.041
ST00375	0.062	0.061	0.061	0.061	0.061	0.062	0.072
ST00237	0.209	0.207	0.207	0.207	0.208	0.206	0.2
C07	0.191	0.185	0.186	0.185	0.185	0.18	0.126
ST00238	0.399	0.41	0.422	0.44	0.442	0.442	0.45
ST00230	0.187	0.217	0.255	0.296	0.352	0.408	0.416
ST00232	0.048	0.056	0.067	0.083	0.095	0.097	0.483
A44	0.606	0.708	0.84	0.938	1.068	1.364	2.481
ST00247	0.47	0.47	0.47	0.47	0.47	0.469	0.473
ST00248	0.47	0.469	0.509	0.528	0.515	0.503	0.471
ST00128	0.158	0.183	0.214	0.246	0.278	0.286	0.297
ST00129	0.181	0.209	0.245	0.281	0.318	0.324	0.423
A54	6.203	7.058	7.934	8.315	8.567	9.198	16.848

Table D.2.3: Kandos peak overland flow results

			Peak overland flows (m^3/s)						
Overland flowpath ID	**from**	**to**	**20% AEP**	**10% AEP**	**5% AEP**	**2% AEP**	**1% AEP**	**0.5% AEP**	**PMF**
O_N_K039	N_K039	ST00405	0.255	0.297	0.351	0.368	0.37	0.372	1.816
O_ST00408	ST00408	ST00406	0.165	0.191	0.225	0.258	0.296	0.37	0.462
O_HW8	HW8	N_K023	0	0	0	0	0	0.828	37.92
O_N_K023	N_K023	N_K024	1.959	2.464	3.174	4.046	4.817	7.527	47.994
O_HW9	HW9	N_K025	0.47	0.749	1.154	1.651	2.112	3.629	25.511
O_N_K024	N_K024	N_K071	1.961	2.466	3.178	4.054	4.827	7.536	48.089
O_N_K025	N_K025	N_K071	1.258	1.555	1.982	2.503	2.983	4.568	26.855
O_N_K071	N_K071	N_K022	3.201	3.992	5.127	6.549	7.802	11.829	71.587
O_N_K022	N_K022	K7_out	3.201	3.992	5.127	6.549	7.802	11.829	71.587
O_HW7	HW7	N_K021	0.238	0.278	0.328	0.375	0.431	0.552	2.893
O_N_K026	N_K026	N_K072	2.761	3.271	3.926	4.492	5.214	7.043	37.946
O_N_K027	N_K027	N_K072	2.305	2.803	3.445	3.999	4.708	6.507	37.074
O_HW12	HW12	N_K027	2.999	3.547	4.253	4.85	5.636	7.594	40.836
O_N_K072	N_K072	N_K073	3.704	4.425	5.344	6.169	7.116	9.732	52.665
O_N_K073	N_K073	N_K074	3.704	4.425	5.344	6.169	7.116	9.732	52.665
O_N_K074	N_K074	N_K020	3.712	4.434	5.354	6.208	7.164	9.807	52.893
O_N_K020	N_K020	HW7	0.021	0.025	0.03	0.037	0.042	0.043	0.232
O_N_K075	N_K075	N_K076	0.904	1.089	1.327	1.578	1.845	2.533	13.219
O_N_K017	N_K017	N_K076	0.908	1.093	1.332	1.589	1.856	2.545	13.317
O_N_K076	N_K076	N_K018	0.137	0.163	0.196	0.227	0.264	0.355	1.93
O_N_K016	N_K016	N_K018	0.24	0.295	0.365	0.447	0.526	0.737	3.74
O_ST00432	ST00432	N_K077	0.218	0.267	0.33	0.392	0.457	0.625	3.308
O_ST00433	ST00433	N_K077	1.552	1.88	2.29	2.758	3.222	4.426	22.939
O_N_K077	N_K077	K8_out	1.096	1.321	1.606	1.919	2.24	3.064	16.07
O_N_K018	N_K018	N_K077	0	0	1.097	4.624	7.753	17.785	81.352
O_HW10	HW10	N_K028	6.203	7.058	9.031	12.939	16.32	26.984	98.197
O_N_K028	N_K028	N_K029	6.203	7.058	9.031	12.939	16.32	26.984	98.197
O_N_K029	N_K029	N_K030	6.203	7.058	9.031	12.939	16.32	26.984	98.197
O_N_K030	N_K030	N_K013	6.203	7.058	9.031	12.939	16.32	26.984	98.197
O_N_K013	N_K013	N_K012	6.203	7.058	9.031	12.939	16.32	26.984	98.197
O_N_K012	N_K012	N_K011	6.23	7.094	9.078	13.007	16.421	27.158	98.197
O_HW6	HW6	N_K011	6.23	7.094	9.078	13.007	16.421	27.158	98.197
O_N_K011	N_K011	HW11	6.23	7.094	9.078	13.007	16.421	27.158	98.197
O_HW11	HW11	N_K031	0.194	0.226	0.267	0.306	0.352	0.448	2.326
O_N_K007	N_K007	N_K079	0.065	0.077	0.095	0.119	0.137	0.149	0.806
O_ST00500	ST00500	N_K079	0.134	0.156	0.193	0.244	0.283	0.305	1.581
O_N_K008	N_K008	N_K077	0.024	0.028	0.034	0.042	0.048	0.049	0.259
O_N_K077	N_K077	K6_out	0.032	0.039	0.047	0.059	0.069	0.075	0.407
O_N_K080	N_K080	N_K008	0.387	0.529	0.681	0.789	0.956	1.317	10.123
O_ST00430	ST00430	ST00431	5.413	6.774	8.719	10.962	13.091	20.261	124.46
N_K032	N_K032	HW10	0	0	0	0	0.004	0.073	1.637
O_ST00301	ST00301	ST00302	0	0	0	0	0	0	0
O_ST00300	ST00300	ST00302	0	0	0	0	0	0	1.918
O_ST00302	ST00302	ST00430	0.044	0.05	0.059	0.077	0.089	0.092	0.47
O_N_082	N_K082	N_K083	0.395	0.644	0.923	1.242	1.53	2.167	13.968
O_ST00306	ST00306	N_K083	0.161	0.161	0.161	0.161	0.161	0.161	0.161
O_ST00307	ST00307	ST00308	0.323	0.373	0.425	0.472	0.532	0.651	2.888
O_ST00308	ST00308	ST00309	0.309	0.446	0.671	1.064	1.403	2.16	15.233
O_ST00309	ST00309	N_K004	1.236	1.345	1.569	1.962	2.301	3.059	16.132
O_N_K004	N_K004	HW2	0	0	0	0	0.256	1.058	14.201
O_HW2	HW2	N_K002	1.565	1.72	1.93	2.232	2.582	3.476	17.255
O_N_K002	N_K002	HW3	0.014	0.164	0.347	0.627	0.909	1.691	15.866
O_HW3	HW3	N_K003	1.782	1.92	2.144	2.46	2.778	3.636	18.528
O_N_K003	N_K003	K4_out	0.402	0.652	0.939	1.263	1.556	2.201	14.127

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O_N_K083	N_K083	ST00309	0.361	0.418	0.492	0.563	0.646	0.81	4.176
O_ST00316	ST00316	HW17	0	0	0	0	0	0	4.57
O_HW17	HW17	N_K070	0.606	0.708	0.84	0.938	1.068	1.364	7.05
O_N_K070	N_K070	N_K084	0	0	0	0	0	0	0.664
O_HW1	HW1	N_K001	0.09	0.11	0.133	0.158	0.182	0.242	1.217
O_N_K001	N_K001	N_K085	0.625	0.731	0.867	0.968	1.103	1.406	7.277
O_N_K084	N_K084	N_K085	0.711	0.833	0.989	1.11	1.273	1.641	8.48
O_N_K085	N_K085	K3_out	0	0	0	0.01	0.058	0.139	1.912
O_ST00317	ST00317	ST00318	1.065	1.362	1.727	1.993	2.326	3.117	17.008
O_ST00318	ST00318	ST00319	1.722	2.018	2.414	2.756	3.129	3.954	19.04
O_ST00319	ST00319	N_K053	0	0	0	0	0	0	0.884
O_ST00313	ST00313	N_K052	0	0	0	0	0	0.01	1.164
O_N_K052	N_K052	ST00315	0	0	0	0	0	0	0.99
O_ST00315	ST00315	ST00530	0.646	0.846	1.075	1.247	1.461	1.956	10.199
O_ST00529	ST00529	ST00530	0.211	0.418	0.692	0.894	1.137	1.686	11.073
O_ST00530	ST00530	ST00318	0.714	0.785	0.866	0.936	1.05	1.265	5.61
O_N_K037	N_K037	ST00529	0	0	0	0	0	0	0.661
O_ST00299	ST00299	N_K005	0.07	0.12	0.186	0.254	0.295	0.361	1.722
O_N_K005	N_K005	N_K086	0.232	0.474	0.682	0.917	1.138	1.615	12.085
O_ST00304	ST00304	N_K086	0.232	0.477	0.733	1.034	1.31	1.924	13.436
O_N_K086	N_K086	ST00306	0	0	0	0	0.035	0.127	1.973
O_ST00298	ST00298	ST00304	0.244	0.423	0.594	0.817	1.035	1.458	10.355
O_ST00303	ST00303	ST00304	0	0	0	0	0	0.072	1.614
O_N_K035	N_K035	N_K034	0.392	0.521	0.626	0.771	0.918	1.188	7.124
O_ST00311	ST00311	N_K034	0.018	0.021	0.025	0.032	0.037	0.038	0.195
O_ST00310	ST00310	N_K084	0.159	0.185	0.219	0.245	0.285	0.293	0.298
O_N_K036	N_K036	N_K087	0.159	0.185	0.219	0.245	0.285	0.293	0.298
O_N_K087	N_K087	ST00303	0.044	0.051	0.06	0.073	0.087	0.092	0.47
O_ST00297	ST00297	ST00431	0	0	0	0	0	0	0.626
O_ST00425	ST00425	ST00426	0	0	0	0	0	0	0.588
O_ST00426	ST00426	ST00427	0	0	0	0	0	0	0
O_ST00424	ST00424	ST00423	0	0	0	0.044	0.103	0.231	2.786
O_ST00427	ST00427	ST00421	0	0	0	0	0	0.07	2.848
O_ST00421	ST00421	ST00420	0.207	0.24	0.283	0.324	0.372	0.469	2.438
O_N_K089	N_K089	ST00417	0.036	0.113	0.211	0.336	0.388	0.586	2.7
O_ST00417	ST00417	ST00412	0	0.017	0.047	0.064	0.084	0.133	1.059
O_ST00411	ST00411	ST00412	0.43	0.532	0.731	0.931	1.137	1.486	7.841
O_ST00412	ST00412	ST00413	0.535	0.651	0.844	1.051	1.275	1.679	8.502
O_ST00413	ST00413	ST00416	0.1	0.117	0.137	0.158	0.182	0.23	1.175
O_N_K090	N_K090	ST00416	0.28	0.41	0.668	0.882	1.099	1.547	9.443
O_ST00416	ST00416	N_K092	0	0	0	0	0	0	0
O_ST00414	ST00414	N_K092	0	0	0	0	0	0	1.224
O_ST00415	ST00415	N_K042	0.28	0.41	0.668	0.882	1.099	1.547	9.443
O_N_K092	N_K092	N_K091	0.708	0.859	1.118	1.365	1.596	2.157	11.259
O_N_K091	N_K091	N_K043	0.018	0.022	0.026	0.032	0.037	0.038	0.209
O_N_K093	N_K093	N_K094	0.072	0.083	0.1	0.13	0.149	0.156	0.826
O_N_K094	N_K094	N_K046	4.673	5.706	7.021	8.36	9.835	13.688	72.371
O_ST00336	ST00336	N_K047	0	0	0	0	0	0	0.163
O_ST00334	ST00334	N_K047	0	0	0	0	0	0	0.033
O_ST00337	ST00337	ST00333	4.579	5.618	6.939	8.277	9.756	13.609	72.316
O_N_K047	N_K047	ST00333	0	0	0	0.013	0.054	0.136	1.921
O_ST00338	ST00338	ST00339	4.125	5.185	6.548	8.097	9.455	13.675	79.12
O_ST00333	ST00333	N_K095	0.303	0.355	0.421	0.472	0.587	0.826	5.656
O_ST00340	ST00340	N_K095	0	0	0	0	0	0	1.526
O_ST00339	ST00339	ST00340	4.143	5.215	6.598	8.217	9.546	13.946	81.758
O_N_K095	N_K095	ST00332	0.059	0.068	0.079	0.091	0.104	0.127	0.646
O_ST00341	ST00341	ST00332	3.584	4.675	6.124	7.673	9.141	13.659	84.645
O_ST00332	ST00332	ST00331	5.839	6.931	8.38	9.928	11.396	15.918	81.96
O_ST00331	ST00331	N_K054	0.124	0.143	0.169	0.207	0.247	0.274	1.388

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O_ST00342	ST00342	N_K054	5.859	6.956	8.411	9.947	11.441	15.982	82.426
O_N_K054	N_K054	K11_out	1.027	1.236	1.466	1.686	1.982	2.559	13.482
O_ST00326	ST00324	K11_out	0	0	0	0	0	0	1.218
O_ST00322	ST00322	ST00323	0.178	0.205	0.24	0.275	0.315	0.385	1.946
O_ST00323	ST00323	ST00324	0.564	0.656	0.774	0.871	1.001	1.277	6.8
O_ST00324	ST00324	K10_out	0	0	0	0	0	0	0
O_ST00418	ST00418	N_K048	0	0	0	0	0	0	2.715
O_ST00420	ST00420	N_K048	0.156	0.182	0.216	0.246	0.282	0.352	3.806
O_N_K049	N_K049	ST00498	0	0.03	0.069	0.109	0.155	0.249	3.746
O_ST00498	ST00498	ST00499	0.173	0.259	0.356	0.451	0.579	0.838	5.128
O_ST00499	ST00499	N_K096	0.249	0.341	0.463	0.602	0.754	1.063	6.417
O_N_K096	N_K096	ST00501	0	0	0	0	0	0	0.198
O_ST00328	ST00328	ST00327	0.583	0.792	1.017	1.217	1.505	2.058	12.806
O_ST00327	ST00327	ST00326	0	0	0	0	0	0.057	1.329
O_N_K050	N_K050	N_K051	0	0	0	0	0	0	1.922
O_N_K051	N_K051	ST00330	0	0.046	0.148	0.235	0.318	0.423	3.864
O_ST00330	ST00330	ST00502	0.392	0.521	0.626	0.771	0.918	1.188	7.124
O_ST00311	ST00311	ST00312	0.255	0.297	0.351	0.402	0.464	0.593	3.127
O_N_K099	N_K099	ST00409	0	0	0	0	0	0.078	0.308
O_ST00510	ST00510	ST00403	0	0	0	0	0	0	2.36
O_ST00410	ST00410	ST00404	1.81	2.148	2.438	2.839	3.321	4.354	22.8
O_ST00404	ST00404	ST00403	0.147	0.171	0.202	0.225	0.258	0.334	1.774
O_N_K098	N_K098	N_K099	0	0	0	0	0	0	1.445
O_N_K038	N_K038	N_K039	0	0	0	0.034	0.094	0.222	2.757
O_ST00409	ST00409	ST00410	0.167	0.28	0.424	0.591	0.752	1.176	7.383
O_HW13	HW13	N_K145	0	0	0	0	0	0.014	2.313
O_N_K040	N_K040	N_K102	0.196	0.238	0.29	0.34	0.395	0.519	0.635
O_N_K041	N_K041	N_K102	0.196	0.238	0.29	0.34	0.395	0.532	2.813
O_N_K102	N_K102	N_K101	0.536	0.656	0.807	0.981	1.15	1.588	7.921
O_N_K145	N_K145	HW14	0.294	0.407	0.552	0.719	0.881	1.304	7.509
O_HW14	HW14	ST00406	0.184	0.331	0.507	0.717	0.92	1.436	7.888
O_ST00406	ST00406	ST00405	0	0.063	0.342	0.584	0.79	1.307	9.036
O_ST00405	ST00405	N_K101	0.215	0.28	0.607	0.936	1.199	1.865	11.983
O_N_K101	N_K101	ST00404	0.038	0.043	0.053	0.068	0.078	0.081	0.415
O_N_K103	N_K103	ST00404	0.763	1.068	1.5	1.997	2.441	3.799	24.415
O_ST00398	ST00398	N_K104	0	0	0	0	0	0	0.437
O_ST00397	ST00397	ST00400	0	0	0	0	0	0	1.088
O_ST00400	ST00404	N_K104	0	0	0	0	0	0	0.832
O_ST00396	ST00396	ST00400	0.765	1.07	1.503	2.001	2.445	3.806	24.589
O_N_K104	N_K104	ST00403	2.192	2.754	3.329	4.169	5.032	7.056	39.132
O_ST00403	ST00403	ST00402	3.119	3.735	4.353	5.217	6.093	8.322	42.553
O_ST00402	ST00402	ST00401	3.576	4.411	5.253	6.342	7.474	10.421	58.333
O_ST00401	ST00401	N_K043	0.403	0.55	0.788	1.038	1.331	2.274	16.072
O_ST00392	ST00392	ST00393	0.38	0.549	0.792	1.023	1.321	2.262	16.074
O_ST00393	ST00393	ST00394	0.463	0.629	0.874	1.113	1.396	2.352	16.296
O_ST00394	ST00394	ST00401	0	0	0	0	0.019	0.039	0.883
O_ST00390	ST00390	ST00391	0	0	0	0	0	0	0.707
O_ST00391	ST00391	ST00392	5.113	6.108	7.366	8.658	10.082	13.783	69.74
O_N_K043	N_K043	N_K044	4.952	5.946	7.204	8.496	9.92	13.621	69.578
O_N_K044	N_K044	N_K045	4.756	5.747	7.004	8.298	9.723	13.425	69.518
O_N_K045	N_K045	ST00513	4.46	5.451	6.708	8.002	9.426	13.129	69.228
O_ST00513	ST00513	N_K046	0.037	0.044	0.054	0.067	0.077	0.081	0.421
O_ST00389	ST00389	N_K105	0.105	0.155	0.216	0.264	0.386	0.533	3.433
O_ST00388	ST00388	ST00387	0.212	0.368	0.569	0.777	1.059	1.667	10.926
O_ST0387	ST00387	N_K060	0.781	0.974	1.167	1.387	1.668	2.292	12.389
O_ST00384	ST00384	ST00385	0.781	0.974	1.167	1.387	1.668	2.292	12.389
O_ST00385	ST00385	N_K105	0.805	1.072	1.367	1.708	2.101	3.199	19.216
O_N_K105	N_K105	ST00386	0.379	0.677	0.965	1.312	1.714	2.822	18.967
O_ST00379	ST00379	N_K106	0.605	0.827	1.211	1.654	2.065	3.35	20.477

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O_N_K109	N_K109	N_K108	0	0	0	0	0	0	0
O_N_K107	N_K107	N_K112	0.237	0.28	0.332	0.374	0.43	0.554	2.921
O_N_K112	N_K112	N_K111	0.034	0.033	0.035	0.034	0.035	0.036	0.035
O_ST00368	ST00368	N_K111	0.211	0.245	0.289	0.33	0.38	0.481	2.502
O_N_K055	N_K055	ST00343	0.03	0.037	0.044	0.055	0.063	0.065	0.34
O_N_K116	N_K116	ST00344	0	0	0	0.028	0.091	0.191	2.214
O_ST00343	ST00343	ST00344	0	0	0	0	0.083	0.199	2.511
O_ST00344	ST00344	ST00345	0	0	0	0	0.061	0.215	3.442
O_ST00345	ST00345	ST00346	0.363	0.416	0.474	0.538	0.631	0.789	4.066
O_ST00346	ST00346	K11_out	0	0	0.059	0.113	0.187	0.352	3.616
O_ST00348	ST00348	ST00347	0.388	0.454	0.532	0.592	0.675	0.864	4.501
O_ST00347	ST00347	K12_out	0.003	0.068	0.155	0.24	0.341	0.541	4.764
O_ST00350	ST00350	ST00349	0.505	0.581	0.685	0.787	0.904	1.136	5.999
O_ST00349	ST00349	K13_out	0.19	0.221	0.26	0.342	0.398	0.429	2.193
O_N_K056	N_K056	ST00350	0.039	0.045	0.053	0.061	0.07	0.088	0.451
O_N_K117	N_K117	N_K114	0	0	0	0	0	0.012	1.805
O_ST00351	ST00351	ST00353	0.187	0.217	0.255	0.296	0.352	0.408	0.416
O_ST00352	ST00352	ST00353	0	0	0	0	0	0	0.058
O_ST00354	ST00354	ST00353	0.225	0.26	0.306	0.352	0.415	0.504	2.644
O_ST00353	ST00353	N_K114	0.141	0.163	0.192	0.236	0.282	0.312	1.579
O_N_K057	N_K057	N_K058	0.147	0.171	0.201	0.242	0.288	0.328	1.701
O_N_K058	N_K058	N_K059	0.453	0.527	0.621	0.711	0.817	1.035	5.554
O_N_K059	N_K059	N_K118	1.539	1.811	2.16	2.64	3.034	4.124	26.965
O_N_K118	N_K118	N_K119	1.539	1.811	2.16	2.64	3.034	4.124	26.965
O_N_K119	N_K119	N_K114	0.119	0.133	0.153	0.179	0.199	0.246	1.129
O_ST00357	ST00357	ST00355	0.367	0.438	0.526	0.619	0.713	0.922	4.481
O_ST00355	ST00355	N_K113	2.109	2.571	3.161	3.778	4.327	5.747	27.817
O_ST00358	ST00358	ST00356	2.652	3.113	3.706	4.336	4.889	6.321	28.563
O_ST00356	ST00356	HW15	2.242	2.666	3.257	3.929	4.495	5.967	82.839
O_HW15	HW15	N_K064	2.71	3.144	3.748	4.434	5.01	6.506	83.586
O_N_K064	N_K064	HW16	0	0.19	0.484	0.795	1.103	2.043	49.694
O_HW16	HW16	N_K066	2.21	2.644	3.248	3.934	4.51	6.006	83.126
O_N_K065	N_K065	N_K066	1.058	1.296	1.628	1.97	2.304	3.309	18.412
O_N_K062	N_K062	HW16	0.555	0.784	1.103	1.429	1.755	2.775	17.218
O_ST00370	ST00370	ST00369	1.028	1.257	1.575	1.901	2.227	3.247	17.691
O_ST00369	ST00369	N_K062	0.085	0.103	0.128	0.158	0.186	0.268	1.513
O_N_K063	N_K063	ST00359	0	0	0	0	0	0	0.031
O_ST00360	ST00360	ST00359	0	0	0	0	0	0	1.115
O_ST00359	ST00359	ST00358	0.294	0.347	0.41	0.459	0.534	0.693	3.491
O_N_K111	N_K111	N_K120	0.317	0.373	0.441	0.496	0.571	0.746	3.762
O_N_K120	N_K120	N_K124	2.135	2.427	2.821	3.213	3.581	4.583	20.066
O_N_K121	N_K121	N_K124	2.32	2.695	3.169	3.638	4.068	5.184	22.618
O_N_K124	N_K124	N_K123	0.108	0.126	0.149	0.17	0.196	0.25	1.307
O_N_K122	N_K122	N_K123	0.309	0.377	0.463	0.561	0.656	0.9	4.482
O_ST00361	ST00361	N_K123	0.107	0.145	0.177	0.212	0.246	0.285	1.238
O_ST00375	ST00375	N_K125	0	0	0	0.004	0.087	0.232	3.179
O_ST00372	ST00372	N_K125	0.602	0.824	1.206	1.649	2.058	3.342	20.439
O_N_K067	N_K067	N_K109	0.371	0.637	0.931	1.273	1.666	2.764	18.78
O_ST00386	ST00386	ST00379	0	0	0	0	0	0	1.136
O_ST00377	ST00377	ST00376	0.171	0.197	0.247	0.314	0.362	0.377	1.947
O_ST00376	ST00376	N_K125	0.058	0.146	0.271	0.414	0.543	0.913	6.672
O_ST00383	ST00383	N_K105	0	0	0	0	0	0	0
O_ST00382	ST00382	ST00381	0	0	0	0	0	0	0.25
O_ST00380	ST00380	ST00367	0.164	0.261	0.393	0.541	0.676	1.076	7.173
O_ST00381	ST00381	ST00366	0.13	0.15	0.176	0.201	0.231	0.285	1.297
O_ST00367	ST00367	ST00363	0.058	0.067	0.079	0.09	0.104	0.129	0.661
O_N_K110	N_K110	N_K111	0.396	0.494	0.628	0.777	0.914	1.318	7.493
O_ST00366	ST00366	N_K061	0.666	0.814	1.003	1.222	1.432	1.988	10.214
O_ST00365	ST00365	ST00364	1.137	1.286	1.474	1.693	1.903	2.459	10.685

ATT 6.2.11 | ATT 6.2.17 | ATT 6.2.21

O_ST00364	ST00364	N_K061	0.077	0.104	0.163	0.202	0.228	0.291	1.306
O_ST00363	ST00363	ST00362	0.508	0.535	0.595	0.633	0.66	0.722	1.738
O_ST00362	ST00362	N_K121	2.609	3.058	3.629	4.216	4.761	6.1	27.038
O_N_K123	N_K123	ST00358	0.062	0.076	0.091	0.114	0.131	0.14	0.736
O_N_K068	N_K068	N_K059	0.068	0.083	0.1	0.124	0.142	0.151	0.792
O_N_K069	N_K069	ST00351	0.23	0.265	0.309	0.355	0.405	0.496	0.631
O_N_K006	N_K006	HW2	0.255	0.388	0.491	0.64	0.783	1.123	8.543
O_N_K034	N_K034	ST00303	0	0	0	0	0.001	0.093	0.223
O_N_K126	ST00422	ST00417	1.583	1.987	2.558	3.233	3.814	5.658	33.141
O_N_K127	N_K127	N_K032	0.063	0.073	0.09	0.115	0.132	0.14	0.718
O_N_K128	N_K128	ST00357	1.901	2.167	2.675	3.058	3.476	4.4	21.307
O_N_K129	N_K129	ST00357	1.474	1.69	1.979	2.328	2.652	3.524	16.607
O_ST00325	ST00325	K11_out	0.137	0.192	0.287	0.385	0.487	0.539	2.694
O_N_K053	N_K053	K9_out	0	0	0	0	0	0	0
O_N_K061	N_K061	N_K121	0.164	0.22	0.321	0.428	0.532	0.599	2.987
O_ST00374	ST00374	N_K130	0.361	0.528	0.712	0.874	1.088	1.451	7.043
O_ST00373	ST00373	N_K130	0.303	0.343	0.356	0.371	0.388	0.401	0.786
O_N_K130	N_K130	N_K125	0	0	0	0	0.073	0.196	3.989
O_ST00501	ST00501	N_K131	0.361	0.528	0.712	0.874	1.088	1.529	10.363
O_ST00329	ST00329	ST00330	0.763	0.885	1.042	1.194	1.37	1.719	8.812
O_ST00502	ST00502	N_K131	0.011	0.013	0.015	0.019	0.021	0.022	0.119
O_N_K131	N_K131	ST00327	0.764	0.921	1.122	1.33	1.612	2.22	11.51
O_N_K132	N_K132	ST00333	0.866	1.04	1.264	1.479	1.762	2.39	12.451
O_N_K133	N_K133	ST00530	0.134	0.155	0.182	0.234	0.272	0.296	3.692
O_N_K060	N_K060	N_K134	0.047	0.057	0.069	0.087	0.1	0.107	0.562
O_N_K134	N_K134	ST00385	0.481	0.495	0.521	0.551	0.583	0.648	1.979
O_N_K048	N_K048	N_K049	0.506	0.544	0.589	0.622	0.67	0.758	2.622
O_N_K135	N_K135	ST00498	0.261	0.303	0.358	0.409	0.47	0.597	3.115
O_N_K042	N_K042	N_K136	0.195	0.346	0.522	0.652	0.843	1.262	11.21
O_N_K136	N_K136	N_K091	0	0	0	0	0	0	0
O_N_K137	N_K137	ST00392	0.176	0.205	0.243	0.278	0.32	0.409	2.116
O_N_K139	N_K139	K5_out	0.216	0.255	0.304	0.347	0.402	0.534	2.852
O_N_K140	N_K140	ST00300	0.422	0.524	0.666	0.824	0.967	1.407	7.975
O_N_K141	N_K141	ST00427	0.234	0.271	0.335	0.427	0.491	0.521	2.678
O_N_K142	N_K142	N_K017	0.086	0.099	0.117	0.153	0.179	0.193	0.987
O_N_K143	N_K143	N_K017	0.275	0.319	0.376	0.388	0.397	0.4	0.528
O_N_K144	N_K144	ST00374	0.101	0.246	0.404	0.518	0.691	1.064	10.278
O_N_K138	N_K138	N_K048	0.4	0.699	0.997	1.39	1.803	2.985	19.998
O_ST00423	ST00423	ST00422	0.427	0.547	0.712	0.886	1.089	1.463	8.913
O_ST00431	ST00431	N_K139	1.03	1.197	1.412	1.754	2.179	3.558	23.07
O_N_K106	N_K106	N_K067	0.299	0.359	0.436	0.524	0.608	0.792	4.038
O_N_K125	N_K125	N_K108	0	0	0	0	0	0	0
O_N_K108	N_K108	N_K118	4.82	5.849	7.163	8.503	9.98	13.835	72.485
O_N_K115	N_K115	N_K118	0	0	0	0	0	0	0.258

Appendix E Overland Flood Behaviour

Table E1 - HEC-RAS Model Results for Rylstone

Cross Section ID	River	Reach	River Station	20% AEP			10% AEP			5% AEP			2% AEP			1% AEP			0.5% AEP			PMF		
				Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)
trib 9_9_0.85	trib 9	9	0.85	0.11	590.7	0.29	0.13	590.71	0.32	0.16	590.71	0.33	0.18	590.72	0.34	0.21	590.72	0.36	0.27	590.73	0.4	1.2	590.81	0.57
trib 9_9_0.74	trib 9	9	0.74	0.11	586.68	0.66	0.13	586.69	0.59	0.16	586.69	0.62	0.18	586.7	0.63	0.21	586.7	0.68	0.27	586.71	0.76	1.2	586.78	1.24
trib 9_9_0.7	trib 9	9	0.7	0.11	585.45	0.59	0.13	585.41	21.08	0.16	585.46	0.75	0.18	585.47	0.74	0.21	585.47	0.81	0.27	585.48	0.82	1.2	585.55	1.24
trib 9_9_0.63	trib 9	9	0.63	0.67	583.21	0.56	0.87	583.22	0.63	1.11	583.24	0.64	1.41	583.25	0.73	1.71	583.19	2.35	2.32	583.27	0.9	10.94	583.46	1.41
trib 9_9_0.56	trib 9	9	0.56	0.67	581.99	1.08	0.87	582	1.11	1.11	582.02	1.21	1.41	582.03	1.3	1.71	582.04	1.36	2.32	582.06	1.55	10.94	582.24	2.41
trib 9_9_0.52	trib 9	9	0.52	1.56	580.98	1.43	2.04	581.01	1.52	2.59	581.03	1.6	3.09	581.05	1.71	3.62	581.06	1.8	4.83	581.11	1.88	22.06	581.47	2.46
trib 9_9_0.46	trib 9	9	0.46	1.56	579.83	1.87	2.04	579.86	2.04	2.59	579.9	2.08	3.09	579.86	3.01	3.62	579.93	1.53	4.83	579.96	1.65	22.06	580.07	4.34
trib 9_9_0.38	trib 9	9	0.38	1.56	578.13	1.07	2.04	578.16	1.15	2.59	578.18	1.21	3.09	578.21	1.22	3.62	578.22	1.3	4.83	578.25	0.56	22.06	578.32	1.24
trib 9_9_0.34	trib 9	9	0.34	1.56	577.1	0.94	2.04	577.11	1.05	2.59	577.13	1.15	3.09	577.15	1.16	3.62	577.15	1.37	4.83	577.19	1.39	22.06	577.35	2.13
trib 9_9_0.31	trib 9	9	0.31	1.56	576.27	1.11	2.04	576.28	1.19	2.59	576.68	0.17	3.09	576.7	0.19	3.62	576.72	0.21	4.83	576.76	0.26	22.06	576.51	2.56
trib 9_9b_0.23	trib 9	9b	0.23	1.31	576.61	3.08	2.06	576.64	0.21	2.94	576.64	0.31	3.78	576.64	0.39	4.67	576.64	0.49	6.6	576.66	0.6	37.06	576.84	1.22
trib 9_9b_0.18	trib 9	9b	0.18	2.27	575.19	0.67	3.06	575.21	0.74	3.98	575.24	0.8	4.85	575.27	0.85	5.77	575.29	0.9	7.76	575.33	0.97	37.56	575.54	2.41
trib 9_9b_0.15	trib 9	9b	0.15	2.27	574.86	0.5	3.06	574.89	0.56	3.98	574.91	0.62	4.85	574.93	0.67	5.77	574.94	0.72	7.76	574.87	1.63	37.56	575.08	2.5
trib 9_9b_0.13	trib 9	9b	0.13	2.27	574.69	0.39	3.06	574.72	0.44	3.98	574.73	0.51	4.85	574.75	0.54	5.77	574.77	0.57	7.76	574.81	0.63	37.56	575.09	1.11
trib 9_9b_0.11	trib 9	9b	0.11	2.27	574.67	0.22	3.06	574.7	0.25	3.98	574.71	0.31	4.85	574.72	0.35	5.77	574.74	0.39	7.76	574.78	0.44	37.56	575.05	0.85
trib 9_9b_0.07	trib 9	9b	0.07	2.32	574.58	0.78	3.1	574.6	0.82	4.05	574.61	0.41	5.04	574.61	0.51	5.95	574.61	0.6	8.16	574.61	0.82	38.75	574.79	1.44
trib 8_8_0.38	trib 8	8	0.38	0.07	583.4	0.48	0.09	583.4	0.5	0.1	583.41	0.51	0.12	583.41	0.27	0.14	583.41	0.32	20.18	583.88	1.88	85.86	584.27	2.66
trib 8_8_0.36	trib 8	8	0.36	0.07	582.4	0.59	0.09	582.4	0.63	0.1	582.41	0.69	0.12	582.41	0.76	0.14	582.42	0.71	20.18	582.9	1.35	85.86	583.11	3.91
trib 8_8_0.35	trib 8	8	0.35	0.24	582.2	0.79	0.3	582.21	0.87	0.36	582.22	0.83	0.41	582.23	0.84	0.48	582.24	0.77	20.61	582.71	1.78	87.68	583.19	2.83
trib 8_8_0.32	trib 8	8	0.32	0.24	581.01	0.72	0.3	581.01	0.99	0.36	581.01	1.09	0.41	581.02	1.16	0.48	581.02	1.22	20.61	581.29	2.91	87.68	581.68	4.61
trib 8_8_0.29	trib 8	8	0.29	0.24	579.96	1.22	0.3	579.94	1.88	0.36	580.01	1.27	0.41	580.02	1.28	0.48	580.03	1.47	20.61	580.57	3.03	87.68	581.1	4.49
trib 8_8_0.27	trib 8	8	0.27	0.24	579.3	0.84	0.3	579.32	0.81	0.36	579.33	0.88	0.41	579.26	2.8	0.48	579.33	1.23	20.61	579.69	2.99	87.68	580.22	4.52
trib 8_8_0.25	trib 8	8	0.25	0.24	578.87	0.11	0.3	578.9	0.11	0.36	578.93	0.11	0.41	578.95	0.11	0.48	578.98	0.11	20.61	579.58	0.85	87.68	580.5	1.34
trib 8_8_0.23	trib 8	8	0.23	0.24	578.87	0.14	0.3	578.9	0.1	0.36	578.93	0.11	0.41	578.95	0.11	0.48	578.97	0.12	20.61	579.58	0.58	87.68	580.52	1.01
trib 8_8_0.21	trib 8	8	0.21	0.5	578.86	0.24	0.64	578.89	0.27	0.81	578.92	0.3	0.93	578.94	0.13	1.1	578.97	0.14	21.43	579.57	0.66	91.74	580.5	1.13
trib 8_8_0.19	trib 8	8	0.19	0.5	578.84	0.61	0.64	578.86	0.64	0.81	578.9	0.65	0.93	578.91	0.67	1.1	578.94	0.69	21.43	579.53	0.86	91.74	580.43	1.37
trib 8_8_0.17	trib 8	8	0.17	0.5	578.64	0.91	0.64	578.67	1.04	0.81	578.69	1.15	0.93	578.7	1.28	1.1	578.72	1.33	21.43	579.48	0.92	91.74	580.4	1.42
trib 8_8_0.15	trib 8	8	0.15	0.5	578.62	0.23	0.64	578.64	0.29	0.81	578.65	0.35	0.93	578.64	0.42	1.1	578.65	0.49	21.43	579.19	2.27	91.74	579.87	3.51
trib 8_8_0.14	trib 8	8	0.14	0.72	578.62	0.17	0.95	578.64	0.21	1.2	578.65	0.25	1.43	578.63	0.33	1.71	578.64	0.37	22.24	578.92	1.11	95.58	578.93	4.63
trib 8_8_0.12	trib 8	8	0.12	1.42	578.59	0.14	1.89	578.6	0.19	2.4	578.64	0.19	2.86	578.59	0.29	3.21	578.6	0.31	23.8	578.83	0.99	97.59	579.19	1.97
trib 8_8_0.09	trib 8	8	0.09	1.42	578.11	0.36	1.89	578.19	0.44	2.4	578.26	0.51	2.86	578.32	0.56	3.21	578.32	0.62	23.8	578.52	1.51	97.59	579.04	1.91
trib 8_8_0.07	trib 8	8	0.07	1.42	576.23	1.99	1.89	576.33	2.1	2.4	576.45	1.98	2.86	576.55	1.8	3.21	576.6	0.11	23.8	576.6	0.79	97.59	576.96	1.9
trib 8_8_0.06	trib 8	8	0.06	1.42	575.45	1.19	1.89	575.47	1.32	2.4	575.48	1.41	2.86	575.49	1.52	3.21	575.5	1.65	23.8	575.78	2.81	97.59	576.53	3.5
trib 8_8_0.05	trib 8	8	0.05	1.42	574.52	1.26	1.89	574.53	1.41	2.4	574.53	1.85	2.86	574.53	2.14	3.21	574.54	2.28	23.8	574.67	2.77	97.59	574.88	5.17
trib 8_8_0.04	trib 8	8	0.04	1.42	574.03	1.28	1.89	574.04	1.47	2.4	574.05	1.59	2.86	574.07	1.57	3.21	574.08	1.6	23.8	574.42	2.29	97.59	575.08	3.55
trib 8_8_0.02	trib 8	8	0.02	1.42	573.19	1.26	1.89	573.2	1.45	2.4	573.22	1.58	2.86	573.23	1.62	3.21	573.24	1.67	23.8	573.47	3.29	97.59	573.89	5.24
trib 8_8_0.01	trib 8	8	0.01	1.42	572.3	0.36	1.89	572.34	0.17	2.4	572.37	0.2	2.86	572.4	0.22	3.21	572.43	0.23	23.8	572.36	2.08	97.59	572.57	4.81
trib 7_7_0.15	trib 7	7	0.15	0.1	602.46	0.17	0.12	602.46	0.2	0.15	602.46	0.25	0.17	602.46	0.28	0.19	602.46	0.33	20.24	602.82	1.94	86.15	603.39	3.18
trib 7_7_0.13	trib 7	7	0.13	0.1	601.26	0.69	0.12	601.27	0.72	0.15	601.28	0.75	0.17	601.26	1.14	0.19	601.18	1.9	20.24	601.72	3.77	86.15	602.4	3.72
trib 7_7_0.12	trib 7	7	0.12	0.1	599.09	0.81	0.12	599.09	0.85	0.15	599.1	0.89	0.17	599.09	1.15	0.19	599.07	2.87	20.24	599.51	5.39	86.15	600.09	7.77
trib 7_7_0.09	trib 7	7	0.09	0.1	597.36	0.93	0.12	597.36	0.97	0.15	597.37	0.99	0.17	597.38	0.89	0.19	597.39	0.82	20.24	597.82	3.95	86.15	598.22	6.99
trib 7_7_0.07	trib 7	7	0.07	0.19	595.18	0.91	0.22	595.19	0.96	0.26	595.19	1.02	0.3	595.19	1.11	0.35	595.2	1.23	20.44	595.52	3.86	87.06	595.85	6.75
trib 7_7_0.04	trib 7	7	0.04	0.19	593.54	1.15	0.22	593.55	1.19	0.26	593.56	1.25	0.3	593.57	1.25	0.35	593.58	1.26	20.44	594.01	4.32	87.06	594.38	6.55
trib 7_7_0.03	trib 7	7	0.03	0.19	592.07	1.11	0.22	592.08	1.16	0.26	592.09	1.23	0.3	592.1	1.25	0.35	592.1	1.29	20.44	592.59	4.39	87.06	593	6.56
trib 7_7_0.01	trib 7	7	0.01	0.27	591.09	1.06	0.33	591.08	1.33	0.4	591.1	1.39	0.46	591.11	1.4	0.53	591.12	1.45	20.67	591.74	4.03	88.2	592.18	6.14
trib 6_6_0.64	trib 6	6	0.64	0.04	599.04	0.4	0.05	599.03	0.71	0.06	599.03	0.61	0.06	599.04	0.52	0.07	599.05	0.52	20.09	599.54	1.84	85.42	600.08	2.68
trib 6_6_0.62	trib 6	6	0.62	0.04	597.78	0.72	0.05	597.79	0.7	0.06	597.79	0.68	0.06	597.8	0.6	0.07	597.8	0.61	20.09	598.26	3.1	85.42	598.63	5.07
trib 6_6_0.59	trib 6	6	0.59	0.04	595.89	0.4	0.05	595.89	0.43	0.06	595.89	0.48	0.06	595.89	0.63	0.07	595.89	0.67	20.09	596.25	3.45	85.42	596.65	5.5
trib 6_6_0.56	trib 6	6	0.56	0.04	593.95	0.56	0.05	593.95	0.6	0.06	593.93	2.19	0.06	593.96	0.64	0.07	593.95	0.89	20.09	594.36	3.45	85.42	594.65	5.99
trib 6_6_0.53	trib 6	6	0.53	0.04	592.24	0.55	0.05	592.25	0.57	0.06	592.24	0.82	0.06	592.25	0.64	0.07	592.24	1.08	20.09	592.6	3.05	85.42	592.9	5.14
trib 6_6_0.51	trib 6	6	0.51	0.27	591.36	1	0.37	591.39	1.05	0.47	591.41	1.13	0.53	591.43	1.13	0.63	591.45	1.17	20.83	591.66	2.59	89	592.05	4.52
trib 6_6b_0.47	trib 6	6b	0.47	0.45	590.29	3.91	0.59	590.41	1.11	0.74	590.44	1.14	0.84	590.45	1.19	0.99	590.46	1.25	21.27	590.74	1.91	91.05	590.74	8.06
trib 6_6b_0.42	trib 6	6b	0.42	0.45	588.55	0.66	0.59	588.54	1.31	0.74	588.54	1.39	0.84	588.59	0.68	0.99	588.58	0.91	21.27	588.88	2.49	91.05	589.23	4.18
trib 6_6b_0.39	trib 6	6b	0.39	0.45	587.44	0.48	0.59	587.4	3.59	0.74	587.44	0.7	0.84	587.43	1.03	0.99	587.45	0.81	21.27	587.65	2.46	91.05	587.92	4.13
trib 6_6b_0.36	trib 6	6b	0.36	0.45	586.26	0.77	0.59	586.27	0.8	0.74	586.27	1.14	0.84	586.29	0.81	0.99	586.27	1.3	21.27	586.57	2.58	91.05	586.89	3.99

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

Cross Section ID	River	Reach	River Station	20% AEP			10% AEP			5% AEP			2% AEP			1% AEP			0.5% AEP			PMF		
				Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)
trib 6_6b_0.32	trib 6	6b	0.32	0.45	584.7	1.07	0.59	584.72	1.14	0.74	584.72	1.37	0.84	584.74	1.21	0.99	584.76	1.25	21.27	585.38	1.28	91.05	586	2.85
trib 6_6b_0.29	trib 6	6b	0.29	0.45	584.26	0.13	0.59	584.3	0.17	0.74	584.34	0.2	0.84	584.36	0.22	0.99	584.4	0.25	21.27	585.15	1.42	91.05	585.79	1.9
trib 6_6b_0.26	trib 6	6b	0.26	0.51	583.34	1	0.77	583.38	1.2	1.02	583.41	1.31	1.27	583.44	1.44	1.58	583.48	1.53	22.17	584.03	1.93	96.85	584.42	2.92
trib 6_6b_0.22	trib 6	6b	0.22	0.51	582.33	1.05	0.77	582.37	1	1.02	582.39	1.03	1.27	582.4	1.11	1.58	582.41	1.2	22.17	582.71	2.9	96.85	583.1	4.2
trib 6_6b_0.19	trib 6	6b	0.19	0.51	581.36	0.78	0.77	581.37	0.89	1.02	581.38	0.99	1.27	581.39	1.07	1.58	581.4	1.12	22.17	581.61	2.55	96.85	581.92	4.06
trib 6_6b_0.16	trib 6	6b	0.16	0.51	579.9	0.92	0.77	579.91	1.1	1.02	579.93	1.22	1.27	579.94	1.27	1.58	579.96	1.29	22.17	580.26	2.84	96.85	580.69	4.33
trib 6_6b_0.12	trib 6	6b	0.12	0.51	578.06	0.81	0.77	578.08	0.81	1.02	578.09	0.98	1.27	578.1	1.05	1.58	578.11	1.15	22.17	578.41	2.63	96.85	578.82	3.97
trib 6_6b_0.08	trib 6	6b	0.08	0.51	576.91	114.07	0.77	577.01	0.88	1.02	577.03	0.89	1.27	577.03	1.09	1.58	577.05	1.09	22.17	577.45	2.39	96.85	578.04	3.69
trib 6_6b_0.02	trib 6	6b	0.02	0.51	575.36	0.88	0.77	575.39	0.96	1.02	575.38	1.3	1.27	575.42	1.07	1.58	575.44	1.17	22.17	575.8	2.43	96.85	576.22	4.24
trib 5_5_1.19	trib 5	5	1.19	0.54	600.92	0.93	0.73	600.94	1	0.96	600.97	0.95	1.22	600.99	1.05	1.49	601.01	1.08	22.1	601.45	2.08	94.86	602.08	3.23
trib 5_5_1.16	trib 5	5	1.16	0.54	598.64	1.01	0.73	598.66	1.11	0.96	598.68	1.18	1.22	598.69	1.29	1.49	598.7	1.41	22.1	599.09	3.24	94.86	599.57	4.94
trib 5_5_1.13	trib 5	5	1.13	0.54	596.61	0.87	0.73	596.62	0.96	0.96	596.63	1.03	1.22	596.64	1.14	1.49	596.65	1.26	22.1	596.97	3.12	94.86	597.39	5.33
trib 5_5_1.08	trib 5	5	1.08	0.54	593.19	0.81	0.73	593.2	0.89	0.96	593.21	0.98	1.22	593.22	1.05	1.49	593.23	1.13	22.1	593.49	2.71	94.86	593.83	4.74
trib 5_5_1.01	trib 5	5	1.01	0.61	589.55	1.31	0.81	589.55	1.41	1.06	589.56	1.5	1.33	589.57	1.5	1.61	589.58	1.6	22.25	589.78	3.59	95.58	590.09	5.3
trib 5_5_0.98	trib 5	5	0.98	0.61	588.53	1.5	0.81	588.55	1.59	1.06	588.57	1.72	1.33	588.6	1.69	1.61	588.62	1.72	22.25	588.98	3.09	95.72	589.39	4.87
trib 5_5_0.9	trib 5	5	0.9	0.71	586.95	1.61	0.95	586.98	1.69	1.23	587.01	1.78	1.49	587.03	1.9	1.8	587.05	1.95	22.5	587.57	2.82	96.68	587.89	6.02
trib 5_5_0.87	trib 5	5	0.87	0.75	584.33	2.36	1.01	584.34	2.58	1.31	584.36	2.71	1.57	584.37	2.84	1.89	584.39	2.99	22.64	584.66	5.37	97.25	585.05	8.02
trib 5_5_0.8	trib 5	5	0.8	0.8	582.74	1.22	1.07	582.75	1.31	1.38	582.76	1.42	1.67	582.77	1.49	1.98	582.79	1.53	22.79	583.05	3.64	97.83	583.38	6.45
trib 5_5_0.76	trib 5	5	0.76	0.72	581.67	1.84	1.08	581.7	2.01	1.51	581.75	2.01	1.92	581.79	1.9	2.37	581.84	1.64	23.49	582.07	2.93	90.62	582.24	5.23
trib 5_5_0.73	trib 5	5	0.73	0.98	580.69	0.85	1.43	580.71	1.05	1.93	580.73	1.19	2.41	580.75	1.23	2.95	580.77	1.33	24.23	581.06	2.34	94.1	581.41	3.41
trib 5_5_0.64	trib 5	5	0.64	1.42	578.64	0.93	1.86	578.61	1.66	2.39	578.65	1.4	2.95	578.6	2.94	3.5	578.69	1.57	24.83	579.07	2.09	107.79	579.52	3.19
trib 5_5_0.55	trib 5	5	0.55	1.51	576.98	23.01	1.97	577.14	0.69	2.53	577.07	2.03	3.11	577.1	1.66	3.7	577.18	0.88	25.09	577.35	2.04	109.03	577.66	3.16
trib 5_5_0.51	trib 5	5	0.51	1.6	576.68	0.5	2.08	576.7	0.54	2.66	576.72	0.58	3.26	576.74	0.64	3.87	576.76	0.68	25.31	576.78	3.3	110.06	577.46	1.68
trib 5_5_0.48	trib 5	5	0.48	1.6	576.48	0.61	2.08	576.52	0.55	2.66	576.55	0.54	3.26	576.59	0.53	3.87	576.62	0.53	25.31	576.81	1.51	110.06	577.15	2.73
trib 5_5_0.45	trib 5	5	0.45	1.6	576.11	0.36	2.08	576.12	0.47	2.66	576.12	0.59	3.26	576.13	0.71	3.87	576.14	0.83	25.31	576.41	1.29	110.06	576.73	2.08
trib 5_5_0.4	trib 5	5	0.4	1.6	576.11	0.01	2.08	576.11	0.01	2.66	576.11	0.02	3.26	576.12	0.02	3.87	576.12	0.03	25.31	576.23	0.22	110.06	576.36	0.96
trib 5_5_0.36	trib 5	5	0.36	1.6	576.1	0.22	2.08	576.1	0.29	2.66	576.1	0.37	3.26	576.1	0.46	3.87	576.1	0.54	25.31	576.22	0.12	110.06	576.22	0.53
trib 5_5_0.32	trib 5	5	0.32	1.6	575.76	0.76	2.08	575.77	0.82	2.66	575.78	0.92	3.26	575.79	0.03	3.87	575.79	0.04	25.31	575.79	0.24	110.06	575.9	1.18
trib 5_5_0.3	trib 5	5	0.3	1.6	575	0.09	2.08	575	0.11	2.66	575	0.15	3.26	575	0.18	3.87	575	0.21	25.31	575.22	1.04	110.06	575.58	1.97
trib 5_5_0.24	trib 5	5	0.24	1.6	574.37	0.65	2.08	574.39	0.71	2.66	574.41	0.76	3.26	574.43	0.8	3.87	574.45	0.83	25.31	574.75	1.21	110.06	575.18	1.71
trib 5_5_0.18	trib 5	5	0.18	1.6	573.97	1.14	2.08	573.99	1.09	2.66	574	1.2	3.26	574.02	1.24	3.87	574.03	1.37	25.31	574.32	2.12	110.06	574.75	3.04
trib 5_5_0.17	trib 5	5	0.17	1.6	573.99	0.09	2.08	573.88	0.15	2.66	573.91	0.18	3.26	573.93	0.21	3.87	573.95	0.25	25.31	574.17	0.95	110.06	574.74	1.73
trib 5_5b_0.16	trib 5	5b	0.16	5.79	573.99	0.29	2.08	573.88	0.13	2.66	573.91	0.15	3.26	573.93	0.18	3.87	573.95	0.21	25.31	574.16	0.78	110.06	574.73	1.52
trib 5_5b_0.14	trib 5	5b	0.14	6.03	573.3	1.48	5.92	573.27	1.66	7.98	573.34	1.63	10.14	573.39	1.71	12.26	573.42	1.85	37.36	573.58	2.09	175.78	574.07	2.93
trib 5_5b_0.13	trib 5	5b	0.13	6.03	572.2	2.12	5.92	572.19	2.19	7.98	572.24	2.4	10.14	572.28	2.65	12.26	572.31	2.89	37.36	572.68	3.5	175.78	573.42	4.27
trib 5_5b_0.1	trib 5	5b	0.1	6.03	571.51	1.75	5.92	571.51	1.74	7.98	571.58	1.84	10.14	571.59	2.28	12.26	571.68	2.12	37.36	572.04	2.9	175.78	572.77	4.31
trib 5_5b_0.08	trib 5	5b	0.08	6.03	571.13	1.52	5.92	571.13	1.51	7.98	571.22	1.6	10.14	571.31	1.67	12.26	571.37	1.76	37.36	571.69	2.77	175.78	572.4	4.45
trib 5_5b_0.06	trib 5	5b	0.06	6.03	570.74	1.93	5.92	570.74	1.92	7.98	570.83	2.06	10.14	570.92	2.12	12.26	571.04	1.97	37.36	571.4	2.63	175.78	571.99	4.46
trib 5_5b_0.02	trib 5	5b	0.02	6.03	568.98	1.9	5.92	569.21	0.72	7.98	569.32	0.72	10.14	569.45	0.69	12.26	569.57	0.69	37.36	569.27	3.77	175.78	570.01	5.79
trib 4_4_1.14	trib 4	4	1.14	5.09	580.55	0.65	7.06	580.56	0.85	9.82	580.6	0.95	14.36	580.65	1.12	19.12	580.7	1.23	23.29	580.74	1.31	100.82	581.2	2.13
trib 4_4_1.06	trib 4	4	1.06	5.09	579.92	0.79	7.06	579.97	0.94	9.82	580.01	1.08	14.36	580.07	1.24	19.12	580.12	1.39	23.29	580.16	1.5	100.82	580.61	2.44
trib 4_4_1.02	trib 4	4	1.02	5.09	579.5	1.07	7.06	579.53	1.21	9.82	579.58	1.25	14.36	579.63	1.32	19.12	579.69	1.38	23.29	579.72	1.45	100.82	580.16	2.26
trib 4_4_0.96	trib 4	4	0.96	5.09	579.05	0.52	7.06	579.09	0.57	9.82	579.13	0.64	14.36	579.18	0.75	19.12	579.24	0.83	23.29	579.28	0.9	100.82	579.76	1.59
trib 4_4_0.92	trib 4	4	0.92	5.09	578.9	0.96	7.06	578.94	1.01	9.82	578.95	1.34	14.36	579	1.27	19.12	579.04	1.35	23.29	579.07	1.42	100.82	579.48	2.09
trib 4_4_0.85	trib 4	4	0.85	5.09	578.33	0.49	7.06	578.36	0.59	9.82	578.41	0.68	14.36	578.46	0.79	19.12	578.51	0.9	23.29	578.55	0.97	100.82	578.98	1.82
trib 4_4_0.8	trib 4	4	0.8	5.09	578.06	0.37	7.06	578.06	0.52	9.82	578.09	0.6	14.36	578.13	0.72	19.12	578.17	0.82	23.29	578.2	0.89	100.82	578.55	1.59
trib 4_4_0.75	trib 4	4	0.75	5.21	577.68	0.86	7.19	577.72	0.89	9.97	577.75	0.95	14.5	577.8	1.01	19.29	577.83	1.09	23.68	577.86	1.14	102.39	578.22	1.77
trib 4_4_0.7	trib 4	4	0.7	5.21	577.25	1.03	7.19	577.2	1.79	9.97	577.33	1.26	14.5	577.38	1.42	19.29	577.42	1.58	23.68	577.59	1.07	102.39	577.79	2.53
trib 4_4_0.65	trib 4	4	0.65	5.21	576.88	0.66	7.19	576.91	0.72	9.97	576.93	0.89	14.5	576.97	1	19.29	577.01	1.15	23.68	577.04	1.25	102.39	577.36	1.82
trib 4_4_0.62	trib 4	4	0.62	5.21	576.61	0.55	7.19	576.61	0.75	9.97	576.63	0.8	14.5	576.65	0.96	19.29	576.69	1.02	23.68	576.72	1.09	102.39	577.05	1.73
trib 4_4_0.58	trib 4	4	0.58	5.21	576.03	1.19	7.19	576.06	1.52	9.97	576.09	1.99	14.5	576.21	1.22	19.29	576.25	1.43	23.68	576.28	1.62	102.39	576.7	2.36
trib 4_4_0.54	trib 4	4	0.54	5.34	575.69	1.52	7.36	575.67	1.95	10.19	575.79	1.86	14.78	575.88	1.91	19.62	575.95	2.03	24.11	576.01	2.07	104.45	576.37	2.83
trib 4_4_0.52	trib 4	4	0.52	5.34	575.11	1.78	7.36	575.18	1.79	10.19	575.22	2.04	14.78	575.26	2.56	19.62	575.31	2.59	24.11	575.36	2.52	104.45	575.77	3.36
trib 4_4_0.49	trib 4	4	0.49	5.34	574.3	0.73	7.36	574.51	0.82	10.19	574.79	0.89	14.78	575.08	1	19.62	575.03	1.38	24.11	574.96	1.8	104.45	575.58	1.68
trib 4_4_0.48	trib 4	4	0.48	5.34	574.11	1.01	7.36	574.22	1.18	10.19	574.31	1.35	14.78	574.43	1.5	19.62	574.41	2.11	24.11	574.48	2.2	104.45	574.95	1.82
trib 4_4_0.42	trib 4	4	0.42	5.34	573.61	1.29	7.36	573.67	1.36	10.19	573.74	1.52	14.78	573.84	1.79	19.62	573.93	1.93	24.11	574	2	104.45	574.52	2.78

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

Cross Section ID	River	Reach	River Station	20% AEP			10% AEP			5% AEP			2% AEP			1% AEP			0.5% AEP			PMF		
				Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)
trib 4_4_0.36	trib 4	4	0.36	5.34	572.15	2.1	7.36	572.35	1.51	10.19	572.45	1.64	14.78	572.58	1.8	19.62	572.68	1.96	24.11	572.77	2.08	104.45	573.49	3.42
trib 4_4_0.32	trib 4	4	0.32	5.34	571.65	1.37	7.36	571.74	1.51	10.19	571.84	1.65	14.78	571.97	1.84	19.62	572.11	1.92	24.11	572.16	2.15	104.45	572.77	3.28
trib 4_4_0.29	trib 4	4	0.29	5.34	571.2	1.77	7.36	571.29	1.88	10.19	571.36	2.16	14.78	571.42	1.9	19.62	571.41	2.61	24.11	571.47	2.7	104.45	572.13	3.57
trib 4_4_0.26	trib 4	4	0.26	5.34	570.3	1.89	7.36	570.36	2.07	10.19	570.45	2.2	14.78	570.56	2.35	19.62	570.63	2.7	24.11	570.69	2.9	104.45	571.52	3.76
trib 4_4_0.22	trib 4	4	0.22	5.34	569.04	1.66	7.36	569.38	0.78	10.19	569.48	0.87	14.78	569.62	0.98	19.62	569.73	1.07	24.11	569.36	2.69	104.45	569.93	4.17
trib 4_4c_0.2	trib 4	4c	0.2	9.55	568.92	1.95	13.28	569.1	1.53	18.17	569.18	1.72	24.92	569.28	1.93	31.88	569.37	2.11	41.47	569.19	3.87	195.23	569.89	6.29
trib 4_4c_0.15	trib 4	4c	0.15	10.52	568.59	0.8	14.46	568.69	0.88	19.56	568.72	1.11	26.58	568.82	1.29	33.8	568.88	1.5	43.93	568.97	1.7	205.83	570.14	2.66
trib 4_4c_0.12	trib 4	4c	0.12	10.52	567.98	1.75	14.46	568.01	2.21	19.56	568.08	2.53	26.58	568.19	2.68	33.8	568.37	2.52	43.93	568.53	2.58	205.83	570.12	1.91
trib 4_4c_0.09	trib 4	4c	0.09	10.52	567.68	1.2	14.46	567.81	1.29	19.56	567.96	1.36	26.58	568.14	1.43	33.8	568.3	1.5	43.93	568.51	1.58	205.83	569.83	2.92
trib 4_4c_0.06	trib 4	4c	0.06	10.52	567.43	1.66	14.46	567.54	1.81	19.56	567.66	2	26.58	567.8	2.24	33.8	567.92	2.46	43.93	568.08	2.69	205.83	569.39	4.13
trib 4_4c_0.03	trib 4	4c	0.03	10.52	567.24	0.76	14.46	567.27	1.01	19.56	567.29	1.35	26.58	567.26	1.88	33.8	567.23	2.45	43.93	567.03	3.88	205.83	568.12	5.53
trib 2_2_1.13	trib 2	2	1.13	1.41	611.18	0.95	1.92	611.21	1.06	2.57	611.23	1.19	3.32	611.26	1.21	3.99	611.28	1.26	6.19	611.34	1.37	28.98	611.59	1
trib 2_2_1.08	trib 2	2	1.08	1.41	608.47	1.46	1.92	608.5	1.64	2.57	608.54	1.76	3.32	608.57	1.86	3.99	608.6	1.95	6.19	608.67	2.19	28.98	608.88	1.95
trib 2_2_0.99	trib 2	2	0.99	1.41	605.67	0.1	1.92	605.69	0.13	2.57	605.72	0.16	3.32	605.75	0.19	3.99	605.78	0.22	6.19	605.75	0.36	28.98	606.03	1.08
trib 2_2_0.98	trib 2	2	0.98	1.41	605.67	0.03	1.92	605.69	0.04	2.57	605.72	0.05	3.32	605.75	0.07	3.99	605.78	0.08	6.19	605.75	0.12	28.98	606.05	0.46
trib 2_2_0.95	trib 2	2	0.95	1.41	605.63	0.88	1.92	605.64	0.93	2.57	605.66	0.99	3.32	605.68	1.07	3.99	605.7	1.09	6.19	605.71	0.24	28.98	605.82	1.15
trib 2_2_0.91	trib 2	2	0.91	1.41	602.38	1.84	1.92	602.39	1.98	2.57	602.41	2.12	3.32	602.42	2.23	3.99	602.43	2.36	6.19	602.47	2.68	28.98	602.71	4.05
trib 2_2_0.87	trib 2	2	0.87	1.41	601.22	1.03	1.92	601.24	1.18	2.57	601.27	1.29	3.32	601.29	1.42	3.99	601.31	1.52	6.19	601.33	1.86	28.98	601.59	2.84
trib 2_2_0.83	trib 2	2	0.83	1.41	599.93	0.89	1.92	599.94	1.06	2.57	599.94	1.55	3.32	599.9	2.94	3.99	600.01	1.3	6.19	600.07	1.4	28.98	600.33	2.32
trib 2_2_0.78	trib 2	2	0.78	1.88	598.39	2.24	2.52	598.41	2.45	3.33	598.51	1.07	4.23	598.51	1.37	5.04	598.55	1.26	7.8	598.61	1.41	36.25	598.85	2.08
trib 2_2_0.74	trib 2	2	0.74	1.88	597.38	0.97	2.52	597.4	1.07	3.33	597.43	1.17	4.23	597.45	1.22	5.04	597.47	1.29	7.8	597.54	1.39	36.25	597.62	1.58
trib 2_2_0.71	trib 2	2	0.71	1.88	595.21	1.88	2.52	595.26	2.03	3.33	595.31	2.18	4.23	595.36	2.31	5.04	595.42	2.31	7.8	595.54	2.27	36.25	595.9	3.6
trib 2_2_0.68	trib 2	2	0.68	1.88	592.15	1.52	2.52	592.11	2.28	3.33	592.19	2.39	4.23	592.27	2.49	5.04	592.34	2.53	7.8	592.49	2.84	36.25	593.3	4.21
trib 2_2_0.65	trib 2	2	0.65	1.88	591.16	2.29	2.52	591.4	0.85	3.33	591.48	0.88	4.23	591.56	0.91	5.04	591.62	0.94	7.8	591.81	1.04	36.25	591.97	3.82
trib 2_2_0.63	trib 2	2	0.63	2.57	591.26	0.28	3.45	591.34	0.33	4.59	591.43	0.37	5.87	591.51	0.42	7.03	591.58	0.45	10.84	591.77	0.54	50.93	592.23	1.35
trib 2_2_0.61	trib 2	2	0.61	2.57	591.06	1.41	3.45	591.1	1.56	4.59	591.15	1.71	5.87	591.21	1.83	7.03	591.25	1.93	10.84	591.38	2.2	50.93	591.88	1.98
trib 2_2_0.59	trib 2	2	0.59	2.57	589.55	0.42	3.45	589.65	0.48	4.59	589.75	0.54	5.87	589.85	0.61	7.03	589.88	0.7	10.84	590.04	0.87	50.93	590.65	2
trib 2_2_0.55	trib 2	2	0.55	2.57	589.25	1.66	3.45	589.32	1.78	4.59	589.4	1.86	5.87	589.48	1.89	7.03	589.62	1.07	10.84	589.64	1.51	50.93	589.88	2.84
trib 2_2_0.5	trib 2	2	0.5	2.57	586.53	2.27	3.45	586.58	2.38	4.59	586.64	2.58	5.87	586.69	2.71	7.03	586.73	2.89	10.84	586.84	3.23	50.93	587.43	4.94
trib 2_2_0.47	trib 2	2	0.47	2.57	586.01	1.6	3.45	586.07	1.71	4.59	586.07	2.24	5.87	586.21	1.91	7.03	586.26	2.02	10.84	586.36	2.51	50.93	586.91	3.93
trib 2_2_0.45	trib 2	2	0.45	2.57	585.31	1.43	3.45	585.32	1.84	4.59	585.37	2.08	5.87	585.43	2.21	7.03	585.48	2.33	10.84	585.61	2.66	50.93	586.31	3.52
trib 2_2_0.42	trib 2	2	0.42	2.57	584.41	2.05	3.45	584.51	1.94	4.59	584.58	2.14	5.87	584.63	2.4	7.03	584.7	2.39	10.84	584.88	2.45	50.93	585.51	3.6
trib 2_2_0.37	trib 2	2	0.37	2.57	581.8	1.61	3.45	581.9	1.75	4.59	582.02	1.88	5.87	582.14	1.99	7.03	582.23	2.09	10.84	582.47	2.36	50.93	583.65	3.66
trib 2_2_0.34	trib 2	2	0.34	2.57	580.66	1.39	3.45	580.73	1.55	4.59	580.81	1.7	5.87	580.89	1.86	7.03	580.95	1.99	10.84	581.13	2.36	50.93	582.11	4.57
trib 2_2_0.32	trib 2	2	0.32	2.57	579.84	1.28	3.45	579.92	1.41	4.59	580.01	1.55	5.87	580.1	1.67	7.03	580.18	1.76	10.84	580.38	2.01	50.93	581.44	3.42
trib 2_2_0.28	trib 2	2	0.28	2.57	578.87	1.52	3.45	578.93	1.69	4.59	579	1.87	5.87	579.08	2.03	7.03	579.13	2.17	10.84	579.3	2.47	50.93	580.37	3.75
trib 2_2_0.26	trib 2	2	0.26	2.57	578.07	1.33	3.45	578.14	1.48	4.59	578.22	1.65	5.87	578.29	1.8	7.03	578.35	1.93	10.84	578.38	2.84	50.93	579.29	4.51
trib 2_2_0.25	trib 2	2	0.25	2.57	577.58	1.05	3.45	577.66	1.15	4.59	577.74	1.26	5.87	577.83	1.36	7.03	577.9	1.43	10.84	578.08	1.63	50.93	579	2.82
trib 2_2_0.23	trib 2	2	0.23	2.57	577.25	1.01	3.45	577.31	1.13	4.59	577.39	1.26	5.87	577.47	1.37	7.03	577.53	1.46	10.84	577.7	1.71	50.93	578.37	3.39
trib 2_2_0.2	trib 2	2	0.2	2.57	576.63	1.59	3.45	576.68	1.74	4.59	576.76	1.84	5.87	576.83	1.94	7.03	576.88	2.02	10.84	577.06	2.13	50.93	577.34	3.82
trib 2_2_0.17	trib 2	2	0.17	2.57	575.71	0.77	3.45	575.75	0.81	4.59	575.8	0.86	5.87	575.85	0.9	7.03	575.88	0.93	10.84	575.98	1.03	50.93	576.44	1.72
trib 2_2_0.14	trib 2	2	0.14	2.57	575.4	1.52	3.45	575.46	1.26	4.59	575.5	1.27	5.87	575.53	1.32	7.03	575.55	1.41	10.84	575.5	3.01	50.93	575.61	1.39
trib 2_2_0.11	trib 2	2	0.11	3.56	574.33	0.13	4.8	574.37	0.17	6.41	574.41	0.21	8.26	574.46	0.26	9.92	574.48	0.3	15.32	574.57	0.41	72.94	575.18	1.09
trib 2_2_0.1	trib 2	2	0.1	3.56	573.42	1.39	4.8	573.46	1.49	6.41	573.5	1.67	8.26	573.55	1.75	9.92	573.58	1.82	15.32	573.71	1.94	72.94	574.33	2.84
trib 2_2_0.06	trib 2	2	0.06	3.56	572.31	1.47	4.8	572.35	1.64	6.41	572.39	1.85	8.26	572.43	2.08	9.92	572.48	2.19	15.32	572.58	2.53	72.94	573.25	3.89
trib 2_2_0.04	trib 2	2	0.04	3.56	571.36	2	4.8	571.43	2.15	6.41	571.5	2.3	8.26	571.58	2.44	9.92	571.64	2.54	15.32	571.79	2.89	72.94	572.47	4.52
trib 10_10_0.16	trib 10	10	0.16	0.45	582.64	0.44	0.69	582.67	0.47	0.97	582.69	0.52	1.16	582.7	0.55	1.41	582.71	0.58	1.96	582.73	0.66	10.35	582.92	0.99
trib 10_10_0.14	trib 10	10	0.14	0.45	581.02	0.63	0.69	581.03	0.8	0.97	581.05	0.84	1.16	581.07	0.87	1.41	581.08	0.91	1.96	581.12	0.95	10.35	581.29	1.5
trib 10_10_0.1	trib 10	10	0.1	0.45	579.58	0.58	0.69	579.61	0.64	0.97	579.63	0.72	1.16	579.64	0.77	1.41	579.65	0.82	1.96	579.68	0.93	10.35	579.86	1.47
trib 10_10_0.07	trib 10	10	0.07	0.45	578.56	0.78	0.69	578.58	0.91	0.97	578.6	0.93	1.16	578.61	0.96	1.41	578.63	0.97	1.96	578.65	1	10.35	578.82	1.64
trib 10_10_0.05	trib 10	10	0.05	0.45	577	1.58	0.69	577.03	1.58	0.97	577.04	1.82	1.16	577.05	1.91	1.41	577.06	2	1.96	577.07	2.32	10.35	577.21	3.59

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Table E2 - HEC-RAS Model Results for Kandos

Cross Section ID	River	Reach	River Station	20% AEP			10% AEP			5% AEP			2% AEP			1% AEP			0.5% AEP			PMF		
				Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)
1_59_1.13	1	59	1.13	0.17	651.84	0.65	0.28	651.85	0.76	0.42	651.87	0.8	0.59	651.89	0.88	0.75	651.9	0.94	1.18	651.93	1.07	7.38	652.13	1.63
1_59_1.11	1	59	1.11	0.22	650.76	1.22	0.28	650.77	1.33	0.61	650.79	1.44	0.94	650.81	1.55	1.2	650.82	1.62	1.84	650.84	1.81	10.32	650.98	2.87
1_59_1.08	1	59	1.08	0.22	649.9	0.6	0.28	649.9	0.66	0.61	649.91	0.94	0.94	649.92	1.08	1.2	649.93	1.18	1.84	649.94	1.36	10.32	650.02	2.55
1_59_1.05	1	59	1.05	0.22	648.55	0.23	0.28	648.55	0.25	0.61	648.58	0.34	0.94	648.61	0.4	1.2	648.62	0.43	1.87	648.66	0.5	11.98	648.92	0.92
1_59_1.01	1	59	1.01	0.22	646.96	0.27	0.28	646.97	0.28	0.61	647	0.38	0.94	647.03	0.43	1.2	647.04	0.47	1.87	647.08	0.52	11.98	647.32	1.03
1_59_0.96	1	59	0.96	0.22	644.6	1.11	0.28	644.6	1.14	0.61	644.63	1.44	0.94	644.64	1.54	1.2	644.66	1.62	1.87	644.69	1.71	11.98	644.85	2.57
1_59_0.91	1	59	0.91	2.19	643.02	1.23	2.75	643.06	1	3.33	643.06	1.19	4.17	643.07	1.28	5.03	643.1	1.28	7.06	643.13	1.41	39.13	643.45	2.41
1_59_0.87	1	59	0.87	2.19	641.1	0.57	2.75	641.13	0.6	3.33	641.15	0.64	4.17	641.19	0.68	5.03	641.22	0.72	7.06	641.27	0.81	39.13	641.76	1.46
1_59_0.83	1	59	0.83	2.19	639.42	1.07	2.75	639.44	1.18	3.33	639.46	1.24	4.17	639.48	1.3	5.03	639.5	1.44	7.06	639.54	1.59	39.13	639.84	2.9
1_59_0.78	1	59	0.78	3.58	637.84	1.23	4.41	637.87	1.29	5.25	637.89	1.37	6.34	637.91	1.43	7.47	637.93	1.5	10.42	637.98	1.65	58.33	638.47	2.6
1_59_0.74	1	59	0.74	3.58	637.08	1.03	4.41	637.09	1.19	5.25	637.09	1.44	6.34	637.13	1.3	7.47	637.15	1.37	10.42	637.2	1.46	58.33	637.54	2.93
1_59_0.7	1	59	0.7	3.58	636.11	0.92	4.41	636.13	1.02	5.25	636.13	1.21	6.34	636.16	1.14	7.47	636.17	1.3	10.42	636.21	1.42	58.33	636.49	2.91
1_59_0.66	1	59	0.66	4.13	635.12	1.25	5.19	635.15	1.28	6.55	635.19	1.35	8.3	635.22	1.45	9.72	635.24	1.51	13.13	635.3	1.64	69.52	635.83	2.54
1_59_0.62	1	59	0.62	4.13	634.07	1.06	5.19	634.05	1.54	6.55	634.11	1.21	8	634.13	1.31	9.43	634.14	1.46	13.13	634.17	1.67	69.23	634.49	3.05
1_59_0.59	1	59	0.59	4.13	633.04	1.37	5.19	633.07	1.3	6.55	633.08	1.58	8	633.1	1.63	9.43	633.12	1.7	13.13	633.16	1.86	69.23	633.47	3.36
1_59_0.55	1	59	0.55	4.13	631.94	1.21	5.19	631.95	1.39	6.55	631.99	1.34	8.1	632.01	1.48	9.46	632.03	1.59	13.68	632.08	1.73	72.49	632.46	3.08
1_59_0.52	1	59	0.52	4.13	631.16	1.17	5.19	631.17	1.36	6.55	631.2	1.48	8.1	631.23	1.57	9.46	631.25	1.64	13.68	631.31	1.88	79.12	631.81	3.73
1_59_0.49	1	59	0.49	4.13	630.39	1.26	5.19	630.41	1.37	6.55	630.44	1.45	8.1	630.46	1.5	9.46	630.48	1.59	13.68	630.54	1.73	80.65	630.92	3.51
1_1c_0.44	1	1c	0.44	5.84	629.55	1.08	6.93	629.57	1.13	8.38	629.58	1.28	9.93	629.54	2.04	11.4	629.55	2.15	15.92	629.66	1.53	81.96	630.19	2.1
1_1c_0.4	1	1c	0.4	5.84	628.66	1.65	6.93	628.67	1.77	8.38	628.69	1.89	9.93	628.7	1.99	11.4	628.72	2.05	15.92	628.75	2.28	81.96	629.04	3.94
1_1c_0.36	1	1c	0.36	5.86	627.74	1.19	6.96	627.77	1.2	8.41	627.78	1.35	9.95	627.8	1.42	11.44	627.82	1.43	15.98	627.87	1.63	82.43	628.24	2.73
1_1c_0.31	1	1c	0.31	5.86	626.6	2.01	6.96	626.69	1.02	8.41	626.63	2.03	9.95	626.65	1.97	11.44	626.67	1.92	15.98	626.72	1.84	82.43	627.22	2.01
1_1c_0.27	1	1c	0.27	5.86	625.56	3.32	6.96	625.62	1.45	8.41	625.66	1.21	9.95	625.69	1.19	11.44	625.7	1.25	15.98	626.04	0.5	82.43	626.42	1.35
1_1a_0.22	1	1a	0.22	1.03	624.85	0	1.24	624.86	0	1.47	624.95	0.16	1.69	625.22	0.06	1.98	625.54	0.03	2.56	626.05	0.02	13.48	626.48	0.07
1_1a_0.22	1	1a	0.22	6.89	624.52	0.86	1.24	624.86	0	1.47	624.95	0.16	1.69	625.22	0.06	13.42	625.54	0.17	2.56	626.05	0.02	95.91	626.47	0.46
1_1a_0.18	1	1a	0.18	6.89	623.24	1.04	8.19	623.26	1.08	9.88	623.28	1.08	11.63	623.29	1.13	13.42	623.3	1.2	18.54	623.35	1.28	95.91	623.73	2.06
1_1a_0.14	1	1a	0.14	6.89	622.3	1.07	8.19	622.28	1.49	9.88	622.31	1.43	11.63	622.33	1.53	13.42	622.35	1.57	18.54	622.4	1.62	95.91	622.71	3.01
1_1a_0.11	1	1a	0.11	6.89	621.75	1.31	8.19	621.78	1.35	9.88	621.83	1.29	11.63	621.85	1.33	13.42	621.88	1.37	18.54	621.82	2.47	95.91	622.34	2.63
1_1a_0.06	1	1a	0.06	6.89	621.03	0.45	8.19	621.08	0.48	9.88	621.13	0.5	11.63	621.18	0.53	13.42	621.23	0.55	18.54	621.34	0.61	95.91	622.27	1.05
trib 2_2_0.35	trib 2	2	0.35	0.76	643.93	0.7	0.89	643.93	0.73	1.04	643.94	0.77	1.19	643.94	0.8	1.37	643.95	0.84	1.72	643.96	0.9	8.81	644.08	1.69
trib 2_2_0.33	trib 2	2	0.33	0.76	642.95	0.42	0.89	642.95	0.46	1.04	642.97	0.48	1.19	642.98	0.49	1.37	642.99	0.51	1.72	643.01	0.54	8.81	643.19	0.79
trib 2_2_0.29	trib 2	2	0.29	0.76	641.54	0.39	0.89	641.54	0.43	1.04	641.55	0.46	1.19	641.56	0.47	1.37	641.57	0.48	1.72	641.6	0.49	8.81	641.81	0.91
trib 2_2_0.26	trib 2	2	0.26	0.76	640.32	0.92	0.89	640.32	1.06	1.04	640.32	1.2	1.19	640.33	1.26	1.37	640.34	1.28	1.72	640.35	1.33	8.81	640.47	2.45
trib 2_2_0.24	trib 2	2	0.24	0.76	638.91	0.34	0.89	638.91	0.38	1.04	638.92	0.42	1.19	638.94	0.42	1.37	638.95	0.45	1.72	638.97	0.49	8.81	639.22	0.85
trib 2_2_0.2	trib 2	2	0.2	0.76	637.99	0.54	0.89	637.99	0.69	1.04	637.99	0.8	1.19	638	0.74	1.37	638	0.7	1.72	638.01	0.72	8.81	638.09	1.22
trib 2_2_0.15	trib 2	2	0.15	1.3	636	0.98	1.51	636.02	0.94	1.78	636.02	1.09	2.04	636.03	1.11	2.34	636.04	1.16	2.95	636.07	1.08	15.23	636.24	1.95
trib 2_2_0.11	trib 2	2	0.11	1.3	634.33	0.86	1.51	634.27	5.95	1.78	634.34	0.93	2.04	634.35	0.98	2.34	634.36	1.01	2.95	634.36	1.21	15.23	634.51	1.88
trib 2_2_0.08	trib 2	2	0.08	1.3	632.84	1.26	1.51	632.86	1.17	1.78	632.86	1.36	2.04	632.87	1.38	2.34	632.88	1.43	2.95	632.9	1.42	15.23	633.06	2.26
trib 2_2_0.05	trib 2	2	0.05	1.3	632.12	0.52	1.51	632.12	0.59	1.78	632.14	0.58	2.04	632.15	0.59	2.34	632.16	0.65	2.95	632.19	0.66	15.23	632.43	1.22
trib 2_2_0.03	trib 2	2	0.03	1.3	631.1	0.97	1.51	631.11	0.96	1.78	631.12	1.07	2.04	631.12	1.17	2.34	631.13	1.17	2.95	631.14	1.39	15.23	631.36	2.25
trib 3_3_0.3	trib 3	3	0.3	0.17	635	0.54	0.26	635	0.69	0.36	635.02	0.69	0.45	635.02	0.75	0.58	635.03	0.9	0.84	635.05	0.9	5.13	635.2	1.59
trib 3_3_0.28	trib 3	3	0.28	0.25	633.41	1.29	0.34	633.41	1.39	0.46	633.42	1.49	0.6	633.43	1.57	0.75	633.43	1.62	1.06	633.45	1.76	6.42	633.55	2.66
trib 3_3_0.25	trib 3	3	0.25	0.36	633.04	0.28	0.53	633.04	0.37	0.71	633.07	0.34	0.87	633.07	0.39	1.09	633.1	0.38	1.53	633.12	0.44	10.36	633.32	0.9
trib 3_3_0.21	trib 3	3	0.21	0.36	631.42	0.61	0.53	631.42	0.85	0.71	631.44	0.69	0.87	631.44	0.83	1.09	631.46	0.7	1.53	631.47	0.85	10.56	631.61	1.76
trib 3_3_0.17	trib 3	3	0.17	0.58	629.73	0.17	0.79	629.75	0.19	1.02	629.55	22.58	1.22	629.78	0.24	1.51	629.8	0.27	2.06	629.83	0.31	12.81	630.12	0.65
trib 3_3_0.13	trib 3	3	0.13	1.03	629.64	0.85	1.24	629.64	0.98	1.47	629.66	0.87	1.69	629.66	0.99	1.98	629.69	0.84	2.56	629.69	1.02	13.48	629.89	1.52
trib 3_3_0.1	trib 3	3	0.1	1.03	627.31	1.15	1.24	627.31	1.25	1.47	627.32	1.24	1.69	627.32	1.34	1.98	627.34	1.32	2.56	627.35	1.47	13.48	627.46	2.5
trib 3_3_0.05	trib 3	3	0.05	1.03	625.93	0.8	1.24	625.94	0.9	1.47	625.94	0.97	1.69	625.95	0.97	1.98	625.95	1.16	2.56	626.04	0.48	13.48	626.47	0.43
12_14_0.86	12	14	0.86	3.2	631.87	1.01	3.99	631.89	1.06	5.13	631.91	1.25	6.55	631.94	1.32	7.8	631.97	1.36	11.83	632.03	1.53	71.59	632.56	2.44
12_14_0.81	12	14	0.81	3.2	630.83	1.08	3.99	630.85	1.18	5.13	630.88	1.15	6.55	630.91	1.28	7.8	630.92	1.38	11.83	630.98	1.55	71.59	631.24	3.27
12_14_0.77	12	14	0.77	6.2	629.53	1.25	7.54	629.55	1.31	9.38	629.56	1.49	11.4	629.58	1.58	13.44	629.59	1.65	19.42	629.64	1.86	112.42	629.99	2.75
12_14_0.7	12	14	0.7	6.2	627.16	1.42	7.54	627.18	1.54	9.38	627.21	1.59	11.4	627.23	1.7	13.44	627.25	1.8	19.42	627.3	1.99	112.42	627.55	3.25
12_14_0.66	12	14	0.66	6.2	625.94	0.42	7.54	625.98	0.45	9.38	626.01	0.5	11.4	626.05	0.53	13.44	626.09	0.58	19.42	626.18	0.66	112.42	626.77	1.25
12_14_0.6	12	14	0.6	6.2	625.73	1.11	7.54	625.74	1.27	9.38	625.77	1.34	11.4	625.8	1.38	13.44	625.82	1.44	19.42	625.89	1.55	112.42	626.38	2.3
12_14_0.51	12	14	0.51	6.91	620.58	3.42	8.42	620.61	3.04	10.47	620.63	3.3	12.72	620.65	3.46	14.92	620.66	3.63	21.56	620.69	4.56	124.25	621.03	7.32
12_14_0.48	12	14	0.48	6.91	619.91	1.36	8.42	619.94	1.43	10.47	619.98	1.51	12.72	620.02	1.57	14.92	620.05	1.63	21.56	620.12	1.79	124.25	620.49	3.92
12_14_0.46	12	14	0.46	6.91	619.26	1.49	8.42	619.28	1.63	10.47	619.31	1.77	12.72	619.33	1.9	14.92	619.35	2.01	21.56	619.42	2.22	124.25	619.9	3.16
12_12c_0.31	12	12c	0.31	6.93	615.72	1.18	8.45	615.74	1.25	10.51	615.76	1.33	12.76	615.79	1.41	14.97	615.81	1.47	21.61	615.87	1.66	124.51	616.28	3.16
12_12c_0.19	12	12c	0.19	6.93	612.62	0.86	8.45	612.63	0.98	10.51	612.65	1.09	12.76	612.68	1.18	14.97	612.64	1.7	21.61	612.69	1.92	124.51	614.05	0.99

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

Cross Section ID	River	Reach	River Station	20% AEP			10% AEP			5% AEP			2% AEP			1% AEP			0.5% AEP			PMF		
				Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)
12_12c_0.15	12	12c	0.15	6.93	612	1.31	8.45	612.04	1.29	10.51	612.07	1.33	12.76	612.1	1.39	14.97	612.12	1.45	21.61	612.18	1.63	124.51	614.06	0.65
12_12b_0.04	12	12b	0.04	13.16	608.66	8.99	15.54	608.7	8.99	19.58	608.76	9	25.77	608.84	9.04	31.39	608.91	9.07	48.77	609.09	9.12	222.71	611.65	1.75
12_12b_0.01	12	12b	0.01	13.16	608.69	0.72	15.54	608.79	0.76	19.58	608.95	0.81	25.77	609.16	0.88	31.39	609.34	0.94	48.77	609.8	1.06	222.71	611.63	1.55
trib 10_10_0.41	trib 10	10	0.41	0.46	628.63	0.95	0.56	628.66	0.79	0.69	628.67	0.82	0.84	628.68	0.91	0.98	628.69	0.95	1.36	628.72	1.06	7.05	628.93	1.49
trib 10_10_0.38	trib 10	10	0.38	0.46	627.93	2.44	0.56	627.99	0.81	0.69	628	0.92	0.84	628.01	0.9	0.98	628.02	0.95	1.36	628.05	1.02	7.05	628.21	1.79
trib 10_10_0.36	trib 10	10	0.36	0.46	627.07	0.59	0.56	627.06	0.92	0.69	627.07	0.92	0.84	627.07	1.06	0.98	627.08	1.12	1.36	627.09	1.28	7.05	627.25	1.93
trib 10_10_0.34	trib 10	10	0.34	0.46	626.38	0.84	0.56	626.4	0.62	0.69	626.4	0.77	0.84	626.41	0.75	0.98	626.41	0.8	1.36	626.42	0.96	7.05	626.56	1.43
trib 10_10_0.32	trib 10	10	0.32	0.46	625.24	0.82	0.56	625.22	1.51	0.69	625.24	1.19	0.84	625.24	1.5	0.98	625.24	1.55	1.36	625.26	1.49	7.05	625.35	2.75
trib 10_10_0.3	trib 10	10	0.3	0.46	624.35	0.88	0.56	624.37	0.75	0.69	624.38	0.81	0.84	624.35	1.56	0.98	624.35	2.04	1.36	624.41	1	7.05	624.55	1.66
trib 10_10_0.28	trib 10	10	0.28	0.46	623.58	0.57	0.56	623.59	0.63	0.69	623.51	4.04	0.84	623.61	0.7	0.98	623.63	0.71	1.36	623.62	1.02	7.05	623.8	1.63
trib 10_10_0.26	trib 10	10	0.26	0.46	623.07	0.65	0.56	623.07	0.64	0.69	623.08	0.67	0.84	623.08	0.77	0.98	623.09	0.86	1.36	623.04	5.32	7.05	623.25	1.35
trib 10_10_0.24	trib 10	10	0.24	0.46	622.12	0.23	0.56	622.05	0.77	0.69	622.15	0.25	0.84	621.99	11.04	0.98	622.07	0.83	1.36	622.22	0.31	7.05	622.18	2.06
trib 10_10b_0.22	trib 10	10b	0.22	1.12	621.85	5.52	1.35	621.86	5.57	1.64	621.86	5.59	1.96	621.94	1.51	2.29	621.88	5.67	3.11	621.89	5.74	16.33	622.01	6.12
trib 10_10b_0.2	trib 10	10b	0.2	1.12	621.5	0.97	1.35	621.52	0.91	1.64	621.54	0.91	1.96	621.55	0.99	2.29	621.56	1.11	3.11	621.59	1.16	16.33	621.9	1.79
trib 10_10b_0.18	trib 10	10b	0.18	1.12	621.2	0.6	1.35	621.21	0.67	1.64	621.24	0.67	1.96	621.25	0.74	2.29	621.28	0.72	3.11	621.32	0.82	16.33	621.61	1.51
trib 10_10b_0.15	trib 10	10b	0.15	1.12	620.73	0.99	1.35	620.76	0.94	1.64	620.76	1.08	1.96	620.79	1.03	2.29	620.79	1.24	3.11	620.83	1.26	16.33	621.11	1.82
trib 10_10b_0.13	trib 10	10b	0.13	1.12	620.49	0.41	1.35	620.5	0.44	1.64	620.52	0.49	1.96	620.53	0.52	2.29	620.55	0.55	3.11	620.58	0.6	16.33	620.85	1.03
trib 10_10b_0.08	trib 10	10b	0.08	1.12	619.95	0.89	1.35	619.97	0.9	1.64	619.98	0.92	1.96	620	0.93	2.29	620.01	0.97	3.11	620.03	1.06	16.33	620.27	1.69
trib 11_11_0.34	trib 11	11	0.34	0.42	634.04	0.76	0.52	634.04	0.88	0.67	634.06	0.94	0.82	634.07	1.01	0.97	634.09	1.03	1.41	634.12	1.13	7.98	634.38	1.75
trib 11_11_0.3	trib 11	11	0.3	0.42	632.61	0.45	0.52	632.62	0.51	0.67	632.63	0.53	0.82	632.64	0.56	0.97	632.65	0.64	1.41	632.67	0.73	7.98	632.73	2.61
trib 11_11_0.25	trib 11	11	0.25	0.42	631.55	0.56	0.52	631.56	0.57	0.67	631.57	0.65	0.82	631.57	0.72	0.97	631.58	0.69	1.41	631.6	0.78	7.98	631.74	1.36
trib 11_11_0.23	trib 11	11	0.23	0.42	630.69	0.88	0.52	630.71	0.62	0.67	630.72	0.64	0.82	630.73	0.63	0.97	630.73	0.79	1.41	630.74	0.91	7.98	630.85	1.63
trib 11_11_0.21	trib 11	11	0.21	0.42	629.89	0.69	0.52	629.9	0.68	0.67	629.91	0.76	0.82	629.91	0.88	0.97	629.93	0.76	1.41	629.95	0.83	7.98	630.09	1.3
trib 11_11_0.18	trib 11	11	0.18	0.42	628.25	1.03	0.52	628.26	1.18	0.67	628.27	1.22	0.82	628.3	1.18	0.97	628.29	1.48	1.41	628.32	1.66	7.98	628.56	2.4
trib 11_11_0.16	trib 11	11	0.16	0.42	627.51	0.68	0.52	627.52	0.75	0.67	627.52	0.91	0.82	627.48	2.17	0.97	627.55	0.98	1.41	627.58	1.05	7.98	627.8	1.7
trib 11_11_0.12	trib 11	11	0.12	0.91	626.19	0.54	1.09	626.1	2.22	1.33	626.22	0.59	1.59	626.23	0.63	1.86	626.25	0.64	2.55	626.29	0.7	13.32	626.53	1.19
trib 11_11_0.1	trib 11	11	0.1	1.1	625.81	0.7	1.32	625.82	0.76	1.61	625.83	0.8	1.92	625.84	0.8	2.24	625.85	0.89	3.06	625.87	0.99	16.07	626.06	1.57
trib 11_11_0.07	trib 11	11	0.07	1.1	625.07	0.85	1.32	625.09	0.85	1.61	625.1	0.91	1.92	625.1	1.01	2.24	625.12	0.98	3.06	625.14	1.05	16.07	625.33	1.74
trib 11_11_0.04	trib 11	11	0.04	1.1	623.48	1.3	1.32	623.48	1.47	1.61	623.5	1.53	1.92	623.51	1.54	2.24	623.52	1.76	3.06	623.54	1.97	16.07	623.76	2.7
trib 9_9_1.07	trib 9	9	1.07	1.58	637.68	0	1.99	637.71	0	2.56	637.74	0	3.23	637.78	0	3.81	637.81	0	5.66	637.9	0	33.14	638.58	0.08
trib 9_9_1.05	trib 9	9	1.05	1.58	637.61	1.07	1.99	637.64	1.08	2.56	637.66	1.19	3.23	637.69	1.28	3.81	637.71	1.36	5.66	637.77	1.54	33.14	638.27	2.37
trib 9_9_1.03	trib 9	9	1.03	1.58	637	1.57	1.99	637.06	1.13	2.56	637.09	1.22	3.23	637.11	1.32	3.81	637.14	1.37	5.66	637.19	1.55	33.14	637.57	2.9
trib 9_9_1.02	trib 9	9	1.02	1.58	636.35	1.04	1.99	636.38	1.04	2.56	636.4	1.13	3.23	636.42	1.22	3.81	636.44	1.29	5.66	636.49	1.48	33.14	636.86	2.56
trib 9_9_0.96	trib 9	9	0.96	1.58	634.4	0.13	1.99	634.42	0.16	2.56	634.45	0.17	3.23	634.47	0.19	3.81	634.5	0.16	5.66	636.15	0.04	33.14	636.92	0.14
trib 9_9_0.9	trib 9	9	0.9	1.58	634.16	0.52	1.99	634.18	0.52	2.56	634.15	0.94	3.23	634.18	0.87	3.81	634.17	1.06	5.66	636.15	0.03	33.14	636.92	0.13
trib 9_9_0.83	trib 9	9	0.83	1.58	632.24	0.87	1.99	632.24	1.09	2.56	632.47	0.37	3.23	632.96	0.12	3.81	633.63	0.06	5.66	636.15	0.02	33.14	636.92	0.09
trib 9_9_0.82	trib 9	9	0.82	5.41	631.79	0.85	6.77	632.05	0.93	8.72	632.41	1	10.96	632.89	1.04	13.09	633.57	1	20.26	636.15	0.07	98.2	636.92	0.26
trib 9_9_0.78	trib 9	9	0.78	5.41	630.14	5.07	6.77	630.78	2.52	8.72	630.65	3.72	10.96	631	3.27	13.09	631.14	3.46	20.26	631.54	4.03	98.2	634.59	6.76
trib 9_9_0.77	trib 9	9	0.77	6.2	630.75	0.89	7.06	630.76	0.93	9.03	630.79	1.04	12.94	630.86	1.15	16.32	630.76	2.2	26.98	630.77	3.51	98.2	630.82	10.01
trib 9_9_0.75	trib 9	9	0.75	6.2	630.5	1.26	7.06	630.51	1.31	9.03	630.55	1.35	12.94	630.59	1.55	16.32	630.63	1.64	26.98	630.74	1.88	98.2	630.91	4.53
trib 9_9_0.73	trib 9	9	0.73	6.2	629.94	1.79	7.06	629.95	1.86	9.03	629.98	2.05	12.94	630.03	2.19	16.32	630.06	2.35	26.98	630.15	2.71	98.2	630.6	3.67
trib 9_9_0.69	trib 9	9	0.69	6.2	629.6	1.25	7.06	629.61	1.35	9.03	629.64	1.42	12.94	629.7	1.55	16.32	629.75	1.67	26.98	629.86	1.93	98.2	630.37	2.79
trib 9_9_0.66	trib 9	9	0.66	6.2	628.99	1	7.06	628.92	1.64	9.03	628.97	1.62	12.94	629	1.91	16.32	629.04	2.07	26.98	629.11	2.51	98.2	629.46	3.86
trib 9_9_0.6	trib 9	9	0.6	6.2	628.18	1.18	7.06	628.2	1.22	9.03	628.22	1.32	12.94	628.28	1.45	16.32	628.31	1.56	26.98	628.41	1.82	98.2	628.87	2.61
trib 9_9_0.59	trib 9	9	0.59	6.2	627.85	0.62	7.06	628.11	0.06	9.03	628.15	0.07	12.94	628.2	0.1	16.32	628.24	0.12	26.98	628.34	0.19	98.2	628.77	0.53
trib 9_9_0.56	trib 9	9	0.56	6.2	625.14	2.47	7.06	625.19	2.58	9.03	625.31	2.8	12.94	625.53	3.17	16.32	625.7	3.41	26.98	626.17	4.04	98.2	628.09	0.36
trib 9_9_0.51	trib 9	9	0.51	6.23	623.22	3.12	7.09	623.23	3.35	9.08	623.24	3.86	13.01	623.27	4.63	16.42	623.28	5.22	27.16	623.33	6.51	98.2	623.52	9.78
trib 9_9_0.45	trib 9	9	0.45	6.23	621.83	1.25	7.09	621.85	1.31	9.08	621.88	1.45	13.01	621.95	1.64	16.42	621.99	1.81	27.16	622.13	2.09	98.2	622.56	3.67
trib 9_9_0.41	trib 9	9	0.41	6.23	621.1	1.24	7.09	621.11	1.31	9.08	621.14	1.4	13.01	621.2	1.58	16.42	621.24	1.7	27.16	621.32	2.15	98.2	621.78	3.24
trib 9_9_0.38	trib 9	9	0.38	6.23	620.34	1.61	7.09	620.39	1.38	9.08	620.42	1.51	13.01	620.47	1.75	16.42	620.51	1.86	27.16	620.64	2.09	98.2	621.05	3.31
trib 9_9_0.35	trib 9	9	0.35	6.23	619.5	2.48	7.09	619.6	1.68	9.08	619.64	1.78	13.01	619.73	1.91	16.42	619.78	2.07	27.16	619.92	2.4	98.2	620.58	2.95
trib 9_9_0.32	trib 9	9	0.32	6.23	618.82	1.54	7.09	618.82	1.79	9.08	618.85	1.98	13.01	618.92	2.27	16.42	618.97	2.4	27.16	619.12	2.76	98.2	619.66	3.92
trib 9_9_0.28	trib 9	9	0.28	6.23	617.09	2.1	7.09	617.12	1.88	9.08	617.14	2.02	13.01	617.18	2.26	16.42	617.21	2.5	27.16	617.28	3.05	98.2	617.61	4.69
trib 9_9_0.21	trib 9	9	0.21	6.23	616.23	1.33	7.09	616.25	1.36	9.08	616.29	1.45	13.01	616.35	1.59	16.42	616.4	1.68	27.16	616.52	1.87	98.2	616.97	2.58
trib 9_9_0.13	trib 9	9	0.13	6.23	614.26	1.7	7.09	614.27	1.79	9.08	614.3	1.96	13.01	614.35	2.22	16.42	614.39	2.42	27.16	614.48	2.92	98.2	614.84	4.49
trib 9_9_0.1	trib 9	9	0.1	6.23	612.91	2.24	7.09	612.94	2.29	9.08	612.99	2.38	13.01	613.06	2.55	16.42	613.12	2.66	27.16	613.27	2.92	98.2	613.74	3.56
87_0_0.79	87	0	0.79	0.54	641.3	0.55	0.83	641.3	0.74	1.18	641.32	0.78	1.59	641.33	0.93	2.03	641.36	0.79	3.14	641.38	0.9	20.73	641.59	1.55
87_0_0.77	87	0	0.77	0.55	640.18	1.19	0.87	640.2	0.95	1.21	640.21	1.17	1.63	640.22	1.12	2.08	640.21	1.81	3.2	640.23	1.91	20.91	640.38	3.09
87_0_0.7	87	0	0.7	1.03	637.34	0.84	1.2	637.34	0.92	1.41	637.35	0.94	1.75	637.37	0.92	2.18	637.39	0.9	3.56	637.43	0.96	23.07	637.62	1.77
87_0_0.64	87	0	0.64	1.03	635.24	0.85	1.2	635.24	0.83	1.41	635.25	0.81	1.75	635.26	0.85	2.18	635.27	0.96	3.56	635.29	1.15	23.07	635.43	2.3

ATT 6.2.11

ATT 6.2.17

ATT 6.2.21

Cross Section ID	River	Reach	River Station	20% AEP			10% AEP			5% AEP			2% AEP			1% AEP			0.5% AEP			PMF		
				Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)	Q Total (m3/s)	W.S. Elev (mAHD)	Vel Chnl (m/s)
87_0_0.57	87	0	0.57	1.18	632.61	0.36	1.37	632.62	0.37	1.61	632.63	0.39	2	632.65	0.4	2.47	632.67	0.43	3.89	632.72	0.46	24.77	632.93	0.83
87_0_0.51	87	0	0.51	1.61	630.31	0.15	1.89	630.32	0.15	2.26	630.33	0.15	2.76	630.34	0.17	3.18	630.35	0.18	4.28	630.36	0.21	27.76	630.55	0.26
87_0_0.38	87	0	0.38	1.73	625.87	1.04	2.03	625.89	1.07	2.42	625.9	1.13	2.94	625.92	1.13	3.39	625.94	1.17	4.53	625.98	1.22	27.38	626.01	1.58
87_0_0.32	87	0	0.32	1.8	623.87	1.08	2.12	623.88	1.14	2.52	623.89	1.14	3.05	623.9	1.28	3.52	623.9	1.32	4.72	623.91	1.59	30.06	624.12	1.99
87_0_0.2	87	0	0.2	1.8	620.27	0.93	2.12	620.29	0.85	2.52	620.3	0.98	3.05	620.31	1	3.52	620.32	1.06	4.72	620.35	1.11	30.06	620.59	1.84
87_0_0.09	87	0	0.09	1.8	617.09	0.24	2.12	617.1	0.26	2.52	617.12	0.28	3.05	617.14	0.3	3.52	617.16	0.31	4.72	617.2	0.35	30.06	617.66	0.68
40_0_0.23	40	0	0.23	0.18	633.61	0.79	0.21	633.62	0.76	0.24	633.63	0.74	0.28	633.64	0.77	0.32	633.64	0.81	0.39	633.65	0.92	1.95	633.79	1.24
40_0_0.22	40	0	0.22	0.18	631.96	1.24	0.21	631.96	1.57	0.24	631.95	2.05	0.28	631.96	2.16	0.32	631.96	2.11	0.39	631.97	1.83	1.95	632	3.72
40_0_0.2	40	0	0.2	0.18	630.29	0.79	0.21	630.29	0.78	0.24	630.3	0.79	0.28	630.31	0.83	0.32	630.31	0.87	0.39	630.32	0.96	1.95	630.42	1.56
40_0_0.19	40	0	0.19	0.18	629.54	0.75	0.21	629.54	0.82	0.24	629.54	0.91	0.28	629.55	0.95	0.32	629.55	0.98	0.39	629.56	0.99	1.95	629.65	1.64
40_0_0.17	40	0	0.17	0.18	628.93	0.61	0.21	628.93	0.63	0.24	628.94	0.66	0.28	628.94	0.7	0.32	628.94	0.77	0.39	628.96	0.71	1.95	629.05	1.2
40_0_0.16	40	0	0.16	0.18	628.52	0.3	0.21	628.53	0.3	0.24	628.54	0.29	0.28	628.48	2.36	0.32	628.54	0.34	0.39	628.57	0.31	1.95	628.75	0.45
40_0_0.14	40	0	0.14	0.56	628.52	0.05	0.66	628.53	0.06	0.77	628.54	0.07	0.87	628.55	0.07	1	628.55	0.09	1.28	628.57	0.1	6.8	628.75	0.37
40_0_0.13	40	0	0.13	0.56	627.3	1.34	0.66	627.32	1.42	0.77	627.48	0.89	0.87	627.48	0.99	1	627.49	1.13	1.28	627.47	1.52	6.8	628.03	2.95
40_0_0.11	40	0	0.11	0.56	627.12	0.17	0.66	627.31	0.16	0.77	627.51	0.06	0.87	627.52	0.07	1	627.53	0.08	1.28	627.55	0.1	6.8	627.73	0.35
40_0_0.1	40	0	0.1	0.56	626.28	1.39	0.66	626.3	1.42	0.77	626.33	1.43	0.87	626.34	1.54	1	626.37	1.57	1.28	626.43	1.58	6.8	626.91	2.49
40_0_0.08	40	0	0.08	0.56	625.89	0.66	0.66	625.84	2.34	0.77	625.9	0.76	0.87	625.91	0.76	1	625.91	0.94	1.28	625.91	1.21	6.8	625.97	3.39
40_0_0.07	40	0	0.07	0.56	624.87	0.91	0.66	624.88	0.85	0.77	624.89	0.94	0.87	624.89	1.02	1	624.92	0.89	1.28	624.93	1	6.8	625.12	1.46
40_0_0.04	40	0	0.04	0.56	623.69	0.17	0.66	623.7	0.18	0.77	623.71	0.19	0.87	623.72	0.19	1	623.73	0.2	1.28	623.76	0.22	6.8	624.05	0.4
28_0_0.34	28	0	0.34	0.21	633.98	0.33	0.42	633.98	0.54	0.69	633.99	0.72	0.89	634.02	0.49	1.14	634.02	0.62	1.69	634.03	0.72	11.07	634.19	1.43
28_0_0.31	28	0	0.31	0.21	633.44	0.61	0.42	633.48	0.55	0.69	633.48	0.9	0.89	633.5	0.85	1.14	633.51	0.93	1.69	633.53	1.04	11.07	633.74	1.56
28_0_0.29	28	0	0.29	0.21	632.45	0.7	0.42	632.47	0.94	0.69	632.51	0.98	0.89	632.52	1.11	1.14	632.54	1.16	1.69	632.57	1.29	11.07	632.83	2.15
28_0_0.25	28	0	0.25	1.72	631.19	1.12	2.02	631.21	1.19	2.41	631.19	1.63	2.76	631.25	1.17	3.13	631.19	2.15	3.95	631.25	0.6	19.04	631.34	2.02
28_0_0.23	28	0	0.23	1.72	630.55	0.58	2.02	630.56	0.58	2.41	630.58	0.58	2.76	630.59	0.6	3.13	630.59	0.67	3.95	630.61	0.73	19.04	630.69	2.1
28_0_0.19	28	0	0.19	1.72	628.62	0.76	2.02	628.63	0.85	2.41	628.63	0.96	2.76	628.55	6.16	3.13	628.65	1.05	3.95	628.67	1.09	19.04	629.03	1.24
28_0_0.17	28	0	0.17	1.72	628.54	0.11	2.02	628.56	0.13	2.41	628.57	0.14	2.76	628.59	0.16	3.13	628.6	0.18	3.95	628.65	0.2	19.04	628.97	0.59
28_0_0.14	28	0	0.14	1.9	627.55	0.99	2.17	627.64	1.02	2.68	627.79	1.05	3.06	627.9	1.06	3.48	628.02	1.07	4.4	628.28	1.08	21.31	628.77	0.79
28_0_0.11	28	0	0.11	1.9	627.55	0.53	2.17	627.64	0.56	2.68	627.79	0.61	3.06	627.9	0.64	3.48	628.02	0.68	4.4	628.28	0.74	21.31	628.78	0.29
28_0_0.09	28	0	0.09	1.9	625.83	1.79	2.17	625.86	1.83	2.68	625.91	1.98	3.06	625.95	2.05	3.48	625.98	2.18	4.4	626.06	2.35	21.31	627.1	3.96
28_0_0.06	28	0	0.06	1.9	624.96	0.98	2.17	624.97	1.01	2.68	624.98	1.05	3.06	625	1.05	3.48	625.01	1.09	4.4	625.03	1.13	21.31	625.23	1.92
28_0_0.03	28	0	0.03	1.9	623.87	0.3	2.17	623.89	0.31	2.68	623.93	0.33	3.06	623.95	0.34	3.48	623.98	0.35	4.4	624.03	0.38	21.31	624.54	0.66
32_0_0.37	32	0	0.37	0.36	637.06	0.8	0.42	637.07	0.76	0.49	637.07	0.78	0.56	637.08	0.82	0.65	637.08	0.9	0.81	637.1	0.91	4.18	637.25	1.3
32_0_0.35	32	0	0.35	0.36	635.77	0.29	0.42	635.77	0.32	0.49	635.78	0.32	0.56	635.79	0.33	0.65	635.8	0.35	0.81	635.81	0.37	4.18	635.98	0.64
32_0_0.32	32	0	0.32	0.36	635	0.58	0.42	635.01	0.54	0.49	635.01	0.62	0.56	635.02	0.64	0.65	635.03	0.66	0.81	635.04	0.7	4.18	635.16	1.22
32_0_0.3	32	0	0.3	0.36	634.48	0.67	0.42	634.47	0.81	0.49	634.49	0.78	0.56	634.49	0.81	0.65	634.5	0.86	0.81	634.5	0.98	4.18	634.66	1.36
32_0_0.27	32	0	0.27	0.36	633.4	0.96	0.42	633.41	0.84	0.49	633.41	0.95	0.56	633.42	0.96	0.65	633.44	0.82	0.81	633.44	1.02	4.18	634.56	0.13
32_0_0.25	32	0	0.25	0.36	632.26	0.1	0.42	632.28	0.11	0.49	632.3	0.13	0.56	632.32	0.15	0.65	632.34	0.17	0.81	632.41	0.19	4.18	634.56	0.07
32_0_0.22	32	0	0.22	0.61	632.23	0.08	0.71	632.24	0.09	0.84	632.24	0.11	0.94	632.25	0.12	1.07	632.24	0.14	1.36	632.26	0.17	7.05	632.36	0.83
32_0_0.19	32	0	0.19	0.61	632.23	0.01	0.71	632.24	0.01	0.84	632.25	0.01	0.94	632.25	0.01	1.07	632.25	0.01	1.36	632.26	0.02	7.05	632.38	0.07
32_0_0.18	32	0	0.18	0.63	632.23	0.01	0.73	632.24	0.01	0.87	632.25	0.01	0.97	632.25	0.01	1.1	632.25	0.01	1.41	632.26	0.01	7.94	632.38	0.07
32_0_0.13	32	0	0.13	0.71	628.91	1.37	0.83	628.94	1.38	0.99	628.96	1.44	1.11	628.99	1.46	1.27	629.01	1.54	1.64	629.05	1.65	8.48	629.6	2.79
32_0_0.11	32	0	0.11	0.71	628.03	0.53	0.83	628.04	0.53	0.99	628.05	0.58	1.11	628.06	0.59	1.27	628.07	0.65	1.64	628.09	0.71	8.48	628.17	2.25
32_0_0.07	32	0	0.07	0.71	627.26	0.81	0.83	627.27	0.91	0.99	627.27	1.02	1.11	627.28	0.97	1.27	627.31	0.88	1.64	627.31	1.1	8.48	627.52	1.62
32_0_0.03	32	0	0.03	0.71	625.43	0.31	0.83	625.45	0.33	0.99	625.48	0.35	1.11	625.5	0.36	1.27	625.52	0.37	1.64	625.57	0.4	8.48	626.09	0.63
18_0_0.29	18	0	0.29	0.23	637.06	0.7	0.48	637.09	0.8	0.73	637.11	0.85	1.03	637.13	0.94	1.31	637.14	1.01	1.92	637.17	1.13	13.44	637.39	2.07
18_0_0.27	18	0	0.27	0.23	636.09	1.37	0.48	636.11	1.56	0.73	636.13	1.73	1.03	636.15	1.88	1.31	636.17	1.93	1.92	636.19	2.12	13.44	636.4	3.57
18_0_0.25	18	0	0.25	0.23	635.27	0.29	0.48	635.31	0.38	0.73	635.35	0.45	1.03	635.38	0.51	1.31	635.41	0.56	1.92	635.45	0.64	13.44	635.48	3.93
18_0_0.23	18	0	0.23	0.23	635.21	0.76	0.48	635.24	0.83	0.73	635.27	0.93	1.03	635.29	1.01	1.31	635.31	1.11	1.92	635.35	1.17	13.44	635.68	1.62
18_0_0.21	18	0	0.21	0.23	634.7	0.83	0.48	634.71	1.07	0.73	634.73	1.09	1.03	634.75	1.15	1.31	634.76	1.2	1.92	634.78	1.29	13.44	634.92	2.49
18_0_0.18	18	0	0.18	0.63	631.96	1.69	0.92	631.97	1.79	1.25	631.98	1.97	1.62	631.99	2.05	1.96	631.99	2.13	2.7	632.16	0.44	14.76	632.75	0.4
18_0_0.14	18	0	0.14	1.24	631.67	0.93	1.35	631.67	0.95	1.57	631.68	1.04	1.96	631.7	1.04	2.3	631.72	1.07	3.06	632.16	0.16	16.13	632.75	0.24
18_0_0.11	18	0	0.11	1.57	629.39	0.46	1.72	629.54	0.44	1.93	629.79	0.41	2.23	630.25	0.34	2.58	630.73	0.31	3.48	632.15	0.25	17.26	632.75	0.13
18_0_0.09	18	0	0.09	1.57	628.46	0.38	1.72	628.66	0.36	1.93	628.96	0.34	2.23	629.13	0.36	2.58	629.23	0.4	3.48	629.44	0.49	17.26	631.15	1.4
18_0_0.06	18	0	0.06	1.78	627.6	0.69	1.92	627.63	0.72	2.14	627.66	0.78	2.46	627.69	0.86	2.78	627.72	0.94	3.64	627.78	1.15	18.53	628.35	3.56
18_0_0.04	18	0	0.04	1.78	627.39	1.82	1.92	627.41	1.86	2.14	627.5	1.52	2.46	627.53	1.51	2.78	627.56	1.52	3.64	627.62	1.54	18.53	627.95	2.37
18_0_0.02	18	0	0.02	1.78	626.82	0.38	1.92	626.84	0.39	2.14	626.86	0.41	2.46	626.88	0.43	2.78	626.91	0.44	3.64	626.96	0.49	18.53	627.45	0.83

ATT 6.2.11

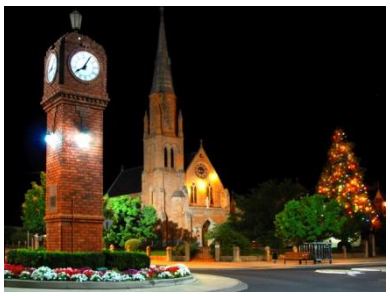
ATT 6.2.17

ATT 6.2.21

ATT 6.2.11 ATT 6.2.17

Mid-Western REGIONAL COUNCIL

ATTACHMENT 6.2.21

MRWC Evaluation Plan – Banking Services

Evaluation Plan

Procurement Title	Provision of Banking Services to Mid-Western Regional Council
Tender Number	2012/01
Project Manager	Neil Bungate
Records Folder No.	A0411201
Whole of Life Cost	$ 403,000
Risk Classification	Medium
Procurement Method	Request for Tender

Contents

1 Introduction

1.1 About this Evaluation

1.1.1 The following Evaluation Plan outlines the policy and procedures in the evaluation of responses to the Request for Tender (RFT) – 2012/01 Provision of Banking Services.

1.1.2 The nominated Tender Evaluation Panel (TEP) contained therein will be subjected to the contents of this Plan. This document has been prepared for use by the TEP in conducting the assessment of responses to the RFT.

1.2 About this Evaluation Plan

1.2.1 The conduct of the evaluation must be consistent with the evaluation process detailed in the RFT. This Evaluation Plan seeks to establish this linkage and also provides:

a) a description of the staff resources, including a description of the roles and the responsibilities of the TEP;

b) protocols for handling tenders;

c) the disallowance of late tenders;

d) protocols for identifying and handling conflicts of interest;

e) protocols for safekeeping of tenders;

f) the evaluation criteria and the associated weightings to be applied;

g) evaluation methodology;

h) the nominated approver (Procurement Delegate); and

i) an indicative evaluation timetable.

1.2.2 Any departure from this evaluation plan by the TEP after it has been approved may create procurement risk which may have serious management and legal implications for Mid-Western Regional Council (MWRC).

1.3 Objective of the Evaluation

1.3.1 The overall objective is to evaluate tenders and identify tenders demonstrating best value for money.

1.3.2 Value for money is a comprehensive assessment that takes into account both cost represented by the assessment of price, and value represented by technical assessment in the context of the risk profile presented by each Tender.

1.3.3 To identify best value for money requires the TEP to take into account all relevant risks, benefits and costs over the whole of life procurement cycle.

2 The Procurement

2.1 Purpose of the Procurement

2.1.1 Council invites authorised deposit-taking institutions (ADI) to tender for the provision of a full range of banking services to the Council. Legislation and Council policy require the tender of Banking Services to Council. A full range of banking services is essential for cash management, providing a range of facilities for customers to pay accounts, provide sufficient information to satisfy auditing requirement.

2.2 Tenders Received

2.2.1 In accordance with the Procurement Plan, an RFT will be issued for this procurement.

2.2.2 A Tenderer means any person or organisation who receives the RFT and who submits a Tender in response.

2.2.3 Tenders received in response to the RFT will be assessed in accordance with this Evaluation Plan.

3 The Evaluation Governance

3.1 Declared Evaluation Roles

3.1.1 Declared Evaluation Roles are:

a) Chairperson of the Tender Evaluation Panel;

b) Tender Evaluation Panel Member;

c) Tender Evaluation Working Group Member;

d) Probity Advisor;

e) Probity Auditor; and

f) Procurement Delegate.

3.2 The Tender Evaluation Panel

3.2.1 The Tender Evaluation Panel (TEP) comprises the Chairperson of the Panel and Panel members as follows:

Role	Description	Appointee
Chairperson of the Tender Evaluation Panel	To manage the evaluation process and report to the Procurement Delegate.	Neil Bungate – Financial Accoutant
Tender Evaluation Panel Members	Perform a detailed evaluation of the tender submissions.	Leonie Johnson – Acting Group Manager Finance & Administration Wendy Cruz – Senior Accounts Payable Officer Kate Riach – Manger Customer Service

3.2.2 Individuals nominated on the TEP may change with approval of the General Manager.

3.2.3 Panel members will possess the necessary technical/subject matter skills to effectively assess tenders.

3.2.4 Each member is to possess a sound understanding of the requirements and will maintain confidentiality, probity and will conduct a fair and unbiased process.

3.3 The Role of the Tender Evaluation Panel

3.3.1 The outcome of an evaluation is a recommendation of preferred tenderer(s) that MWRC may enter into contract negotiation with and, if required, make recommendations on the negotiation strategy that should be employed.

3.3.2 The role of the TEP will be to evaluate the tenders received and make a recommendation on the preferred tenderer(s) to the Council.

3.3.3 The preferred tenderer(s) must be those offering best value-for-money while taking into account all relevant risks, benefits and costs over the whole Procurement Life Cycle.

3.4 Tender Evaluation Working Groups

3.4.1 The TEP may form Tender Evaluation Working Groups to provide assistance during the conduct of the evaluation and act on its behalf.

3.4.2 Any Tender Evaluation Working Group (TEWG) formed will report to the TEP.

3.4.3 Any TEWG formed will undertake tender evaluation in accordance with this Evaluation Plan.

3.4.4 The membership of a TEWG will be decided by the TEP prior to commencement of Stage 2 of the evaluation process.

3.4.5 The role of TEWG will be clearly defined and documented by the TEP.

3.4.6 The outcomes of any assessment undertaken by an Evaluation Working Group will be reported to the TEP.

3.5 The Procurement Delegate

3.5.1 The Procurement Delegate must be a person who has authority to commit MWRC to the nominated whole-of-life value in the Procurement Plan.

3.5.2 The nominated Procurement Delegate for this procurement process is:

Role	Description	Appointee
Procurement Delegate	To review and approve the recommendations of the TEP.	Council

3.5.3 The Procurement Delegate must decide who MWRC will enter into contract negotiations with.

3.5.4 In making this decision, the Procurement Delegate must take into consideration the Evaluation Report submitted by the TEP.

3.5.5 A departure from the TEP's recommendation may create procurement risk which may have serious management and legal implications for MWRC. Legal advice must be sort before such a decision is taken.

3.6 Weighted Evaluation Criteria

3.6.1 Some evaluation criteria mean more than others. MWRC reflect this relative importance through assigning weight to individual evaluation criteria.

3.6.2 Weighted Evaluation Criteria are used to determine the effectiveness of a tender against the Statement of Requirement contained in the RFT.

3.6.3 The effectiveness is calculated as a percentage by multiplying scores assigned by the TEP by the nominated criteria weight.

3.6.4 Weighting applied to the Evaluation Criteria for this procurement is detailed within the Evaluation Model at Appendix 3.

3.7 Changes to the Evaluation Plan

3.7.1 This plan will not be materially changed after the tender closing date has passed; this will ensure there is no basis for allegations that the evaluation methodology was changed after potential contact with tenderers.

3.7.2 No change will be made to the Evaluation Model (Appendix 3) after tenders have been opened.

3.8 Commencing the Evaluation

3.8.1 The Evaluation Process must not commence until the Evaluation Plan has been approved.

3.9 Tender Evaluation Software

3.9.1 MWRC does not currently utilise any tender evaluation software.

3.10 Clarifications/Presentations/Interviews

3.10.1 In addition to tenders received, the TEP may in its absolute discretion:

a) invite some or all tenderers to give presentations for the purpose of demonstrating the features and capabilities of their applications and specifically how their proposed solution would address MWRC's requirements; and

b) visit tenderer reference sites and conduct discussions with, and visits to, customers of a tenderer (whether or not listed as referees in the tenderer's Tender).

3.10.2 The TEP may seek clarification from, and enter into discussion with any or all the tenderers in relation to their tender.

3.10.3 The TEP may seek additional information in respect of any aspect of a tender at any time.

3.10.4 The TEP is not under any obligation to take into account additional information provided by a tenderer in response to a request and will not do so where that would introduce unfairness into the evaluation process.

3.10.5 It is permissible for the TEP during evaluation phases to clarify any errors of form, such as technical omissions, ambiguities and anomalies, in a tender with the tenderer. However, this should not extend to a substantial re-tailoring of the tender.

3.10.6 It is not permissible for the TEP to negotiate during an evaluation process.

3.10.7 The Chair of the TEP will determine if further information or clarification is required from any tenderer.

3.11 Unintentional Errors of Form

3.11.1 If the TEP considers that there are unintentional errors of form in a tender, the TEP may ask the tenderer to correct or clarify the error. However, this should not extend to a substantial re-tailoring of the tender.

3.12 Scoring Scales

3.12.1 Each non-price response to the Tender Response Schedule within the RFT will be scored on a scale from 0 – 10. The response will be judged definitively or as a value judgement as follows:

Score	Definitive Answers	Value Judgement
0	Unsatisfactory	Fails to meet the requirement. Unimaginative/No apparent economic benefit.
2	Poor	Minimal Compliance. Moderately creative/benefits difficult to assess.
4	Satisfactory	Moderately satisfies the requirement. Worthwhile concept/may realise benefits.
6	Good	Partially satisfies the requirement. Creative/enduring benefits over time.
8	Very Good	Satisfies the majority of the requirement. Highly creative/enduring high benefits.
10	Excellent	Fully satisfies the requirement. Exceptional/immediate & enduring high benefits.

3.12.2 Scores must be recorded against each response. Where a score of less than ten (10) is made, a comment must be provided. Comments must detail deficiencies in the tenderer's response. There should be a clear linkage between the score and comment. That is, a score of 0 should have an appropriate degree of substantiation as to why the tenderer fails to meet the requirement.

3.12.3 Where a tender response exceeds requirements, or the criteria is not applicable to the tender, a score of ten (10) will be awarded. A note should be made of where the tender response exceeds stated requirements.

3.12.4 As a guide, careful consideration should be given to comments as these comments substantiate the treatment of a tender during the evaluation process. Comments provide the basis of de-briefing unsuccessful tenderers so should give sufficient detail of deficiencies.

4 Probity and Ethics

4.1 About Probity and Ethics

4.1.1 Probity is the evidence of ethical behaviour in a particular process.

4.1.2 Probity is defined as complete and confirmed integrity, uprightness and honesty. It contributes to sound procurement processes that accord equal opportunities for all participants. A good outcome is achieved when probity is applied with common sense.

4.1.3 Procurement must be conducted with probity in mind to enable the Department and tenderers to deal with each other on the basis of mutual trust and respect. Adopting an ethical, transparent approach enables business to be conducted fairly, reasonably and with integrity.

4.1.4 Ethical behaviour also enables procurement to be conducted in a manner that allows all tenderers to compete as equally as possible. The procurement process rules must be clear, open, well understood and applied equally to all parties to the process.

4.1.5 The basis for government procurement policy is Section 44 of the *FMA Act*, which specifies that Chief Executives are responsible for ensuring the ethical use of resources, including in relation to government procurement.

4.2 Conflict of Interest

4.2.1 Any person with a Declared Evaluation Role for this evaluation must detail any circumstances that may give rise to an actual or potential conflict of interest.

4.2.2 In the first instance, the Chair of the TEP should be notified of any conflict of interest.

4.3 Confidentiality

4.3.1 The establishment of security procedures for handling tender-related documents are as follows:

a) requiring all officials and external consultants with access to tender information to sign an appropriate confidentiality undertaking;

b) storing documents which contain tender-related, commercially sensitive information in appropriately secure conditions; and

c) allowing only authorised officials with a direct “need-to know” access to tender-related sensitive information.

4.3.2 Any person with a Declared Evaluation Role must be instructed by the Chair of the TEP that each tender response contains confidential information and as such should be treated in the appropriate manner and not left on desks (overnight or weekends) or removed from the evaluation area without prior written approval by the Chairperson of the TEP or nominee. All evaluation material must be treated in the same manner.

4.3.3 As decisions must be made without 'fear or favour' the potential for a conflict of interest must be avoided, and if one exists, it should be declared for public record.

4.3.4 All tender responses will be treated as Commercial in Confidence and tenderer's intellectual property must not be plagiarised or placed in the public domain.

4.4 Conflict of Interest and Confidentiality Declaration

4.4.1 Any person with a Declared Evaluation Role will be required to sign a Conflict of Interest and Confidentiality Declaration form at Appendix 1.

4.4.2 Any person providing administrative assistance to the TEP or to a Tender Evaluation Working Group will be required to sign a Conflict of Interest and Confidentiality Declaration form at Appendix 1.

4.5 Probity Advice to Staff

4.5.1 The Chair of the TEP should circulate advice (Appendix 2) in relation to probity protocols during the procurement process to staff that may come into contact with potential tenderers.

4.6 Probity Advisor

4.6.1 The Probity Adviser will provide advice to the TEP on probity matters to assist the Evaluation Committee in ensuring that all tenders are analysed fairly, uniformly and transparently.

4.6.2 The Probity Adviser is not a member of the TEP and must not engage in any evaluation activity.

4.6.3 The Probity Adviser must sign a Probity Declaration form at Appendix 1, and must not have any Conflict of Interest with any tenderer.

4.6.4 The Probity Adviser will also be available for the tenderers to raise concerns they may have regarding fairness throughout the RFT process.

4.6.5 The Probity Adviser will report to the Chair of the TEP; however the Probity Adviser may also approach the Procurement Delegate.

4.6.6 The Probity Advisor is:

Name	Mr Ian Roberts
Position	Manager Governance
Telephone	(02) 6378 2868
Email	Ian.Roberts@midwestern.nsw.gov.au

4.7 Probity Auditor

4.7.1 If required, the Probity Auditor will be appointed by the General Manager.

4.7.2 The Probity Auditor will be self-directing and will independently establish a program of audit testing based on identified criteria.

4.7.3 At the end of the Evaluation Process the Probity Auditor will report an objective opinion on probity issues to the General Manager.

4.7.4 The Probity Auditor will not be contacted to resolve any specific probity issues during the evaluation.

4.7.5 The Probity Auditor may be contacted by the Probity Advisor to endorse any actions taken to resolve a probity issue during the evaluation. Endorsement is limited to ensuring probity requirements have been met by actions taken and it is appropriate to continue with the evaluation.

4.7.6 The Probity Auditor:

has not been appointed for this procurement.

5 The Evaluation Process

5.1 Stage 1 – Opening the Tender Box

5.1.1 No tenders are to be opened before the Closing Time.

5.1.2 The MWRC Tender Box will be opened by the Project Manager and two Council Officers delegated by the General Manager.

5.1.3 The MWRC Electronic Tender Box will be opened by three witnesses who are registered on Tenderlink. Opening the Electronic Tender Box will be automatically recorded by Tenderlink. MWRC will receive an RFT lodgement summary of the registration receipt of each tender and content thereof.

5.1.4 Late Tenders will not be accepted (or considered further) unless lateness is clearly due to a mishandling of the tender by MWRC or it is evident that formal tender documents and all other requisite essential information were posted or lodged at a Post Office or other recognised delivery agency before the deadline for the closing of tenders. The reasons for admitting any Late Tender must be documented by the TEP in the Evaluation Report.

5.1.5 Late Tenders (i.e. those received after the Closing Time) must not be opened.

5.1.6 Tenders will be assessed against the Minimum Content and Format Requirements specified in the RFT.

5.1.7 Any tender failing to meet a Minimum Content and Format Requirement specified in the RFT must not be considered further.

5.2 Stage 2 – Tendering Conditions

5.2.1 The Tendering Conditions are mandatory requirements. They are minimum standards that suppliers must meet in order to participate in this procurement process.

5.2.2 Remaining tenders will be assessed against the Tendering Conditions stated in the RFT.

5.2.3 Any tender failing to meet a Tendering Condition specified in the RFT must not be considered further.

5.3 Stage 3 – Compliance Evaluation

5.3.1 Remaining tenders will be evaluated to assess the risk associated with responses to the following:

a) Compliance with Conditions of Tender;

b) Compliance with the Draft Contract;

c) Tenderer Details; and

d) The Tenderer's Declaration.

5.3.2 Tenders representing unacceptable levels of risk may be excluded from further consideration.

5.4 Stage 4 – Technical Worth

5.4.1 For each remaining tender a quantitative (score) and qualitative (comment) assessment of the response to the Statement of Requirement will be conducted to determine the degree of effectiveness against the Evaluation Criteria.

5.4.2 Scoring will be conducted in accordance with the Scoring Scales.

5.4.3 The Chair of the TEP may determine that assessments are carried individually or as a group. Where individual assessments are conducted the Chair should nominate a statistical method to calculate a preliminary final score for the group to consider. Where individual evaluations are conducted a consensus final score for each criteria (for each tender) must be reached where the standard deviation between individual scores is higher than 2.5.

5.4.4 The assessment should also include identification of any risk issues. Where a risk is identified a substantive comment should be made.

5.4.5 The TEP will undertake a gap analysis (i.e. the difference between what is offered in a tender and what is required by MWRC) to determine the possible materiality of any weaknesses of a tender.

5.4.6 Any tender demonstrating a significant gap, which would reduce the likelihood of MWRC achieving the stated project objective, may be excluded from further consideration.

5.5 Stage 5 – Price Evaluation

5.5.1 The TEP will then consider pricing details for remaining tenders and identify tenders which are cost-effective.

5.5.2 If appropriate, the TEP may use 'marginal cost/marginal utility' to assist in identifying cost-effective tenders. The principal of the model states the critical point is where an increment of cost is matched by an equal increment of utility. This condition is met when a line is drawn on the marginal cost/utility graph through the zero point at an angle of 45º with each axis. The last plot cut by the line as it is moved at 45º towards maximum utility and minimum cost is the plot representing the optimum utility for minimum cost. This plot is considered to represent best value for money.

5.5.3 The TEP will also identify any risks associated with tendered pricing.

5.5.4 Tenders which are not cost-effective may be excluded from further consideration.

5.6 Stage 6 – Risk Analysis

5.6.1 A risk evaluation will be conducted for remaining tenders against risk issues identified, using the risk matrix (Appendix 4).

5.6.2 The risk evaluation may also include such security, referee or financial checks and procedures as considered necessary in relation to the Tenderer, its officers, employees, partners, associates or related entities (including

consortium members and their officers or employees if applicable). These checks may include (without limitation) ascertaining risk associated with each Tenderer in relation to: financial viability; corporate history; significant litigation (past, present or pending); past performance; experience, qualifications and skills of resources; and other issues of risk.

5.6.3 A risk profile of each tenderer will be created for each tender taking into account the collective determination of risk magnitude for each risk issue identified.

5.6.4 Any tender demonstrating unacceptable risk, which would reduce the likelihood of MWRC achieving the stated project objective, may be excluded from further consideration.

5.7 Stage 7 – Presentations

5.7.1 The TEP will determine the need for presentations for remaining tenderers. The TEP may in its absolute discretion invite some or all tenderers to give presentations for the purpose of demonstrating how their tender would address the Statement of Requirements.

5.7.2 At least two members of the TEP will attend all presentations. An agenda must be established and transmitted to the tenderers prior to the presentations.

5.7.3 The TEP will assess presentations in the context of further developing the risk profile for a tenderer.

5.7.4 Any tender demonstrating unacceptable risk, which would reduce the likelihood of MWRC achieving the stated project objective, may be excluded from further consideration.

5.8 Stage 8 – Interviews

5.8.1 For remaining tenders, the TEP may in its absolute discretion visit tenderer reference sites, and/or visit customers of a tenderer (whether or not listed as referees), to conduct an interview for the purpose of assessing how the tenderer would address the Statement of Requirements.

5.8.2 At least two members of the TEP will participate in all interviews.

5.8.3 The TEP will assess interviews in the context of further developing the risk profile for a tenderer.

5.8.4 Any tender demonstrating unacceptable risk, which would reduce the likelihood of MWRC achieving the stated project objective, may be excluded from further consideration.

5.9 Stage 9 – Evaluation Recommendations

5.9.1 Remaining tenders will be assessed to determine their relative ability to satisfy the overall requirement (Technical Worth) at a competitive cost and at an acceptable risk.

5.9.2 A preferred tenderer, or tenderers, will be recommended on a value for money basis.

5.9.3 The TEP will develop an Evaluation Report containing the recommendation of preferred tenderer(s).

5.9.4 The Evaluation Report must contain:

a) an executive summary containing an overview of the tender, including its purpose, advertising period and number of tender responses received

b) a listing of each tender received;

c) a listing of late tenders;

d) a listing of conforming tenders;

e) a listing of non-conforming or alternative tenders;

f) a statement relating to the evaluation methodology;

g) a summary of the tender evaluation process;

h) details of the tender evaluation panel;

i) a summary of the evaluation findings; and

j) confidential attachments (Evaluation Plan; Scores and Prices)

6 Concluding the Evaluation

6.1 Final Review

6.1.1 If appointed, the Probity Adviser will review the draft evaluation report.

6.1.2 The Probity Adviser may propose amendments to the Evaluation Report to the Chair of the TEP.

6.1.3 The TEP will consider any proposed amendments suggested by the Probity Adviser.

6.1.4 The TEP will agree to a Final Evaluation Report. Any dissenting report should be an appendix to the majority report.

6.1.5 If appointed, the Probity Auditor should be provided with all procurement documentation needed to conduct the independent program of audit testing and reporting to the Procurement Delegate.

6.2 The Procurement Delegate's Decision

6.2.1 The TEP will submit the Final Evaluation Report to the Procurement Delegate for consideration.

6.2.2 If appointed, the Probity Auditor will submit an audit report on the procurement process to the Procurement Delegate for consideration.

6.2.3 The Procurement Delegate will decide who MWRC enters into contract negotiations with. The decision must be consistent with the core principle underpinning Australian Government procurement, i.e. obtaining best value for money.

6.2.4 The Procurement Delegate must not force a TEP to change its Evaluation Report.

6.3 Notification and Debriefing

6.3.1 All tenderers will be informed in writing of the outcome of their tender after the Procurement Delegate has made a decision.

6.3.2 Unsuccessful Tenderers may request in writing:

a) a statement of the reasons their tender was unsuccessful; and

b) an opportunity to be debriefed.

6.3.3 The content and/or format of any statement or debriefing is at MWRC's absolute discretion.

7 Plan Authorisations

7.1 Project Manager

7.1.1 This Evaluation Plan and the RFT have been reviewed; both are compliant with the MWRC Procurement Policy and MWRC Tendering Procedure. This Evaluation Plan is consistent with the evaluation process described in the RFT, and the RFT can be published:

…… …… ……/……/…….

Name & Role Signature Date

7.2 Chair – Tender Evaluation Panel

7.2.1 The evaluation will be conducted in accordance with this Evaluation Plan:

…… …… ……/……/…….

Name & Role Signature Date

7.3 Group Manager

7.3.1 The Evaluation Plan is approved and the Request for Tender can be published.

7.3.2 I understand this procurement may proceed to contract unless it is the public interest to cancel the procurement.

…… …… ……/……/…….

Name & Role Signature Date

Appendix 1 Conflict of Interest and Confidentiality Declaration

I, the undersigned, do not currently have a conflict of interest and acknowledge my obligation to immediately make written notification to the Chair of the Tender Evaluation Panel of any conflict of interest including, but not limited to any:

- ownership of shares in any of the companies associated with a Tenderer;
- employment, contract for services or potential employment or contract for services opportunities for myself or members of my family with Tenderers or their sub-contractors;
- contact with any of the officer(s) of any Tenderers (or their sub-contractors) regarding their Tender;
- involvement with the preparation of a Tender; and
- other relevant matter likely to affect my objective and impartial evaluation of any Tenders.

Also, I acknowledge that during the evaluation process that I will not discuss issues regarding the evaluation with any Tenderer and will refer all enquires to the Chair of the Tender Evaluation Panel.

Should I, due to changed circumstances, be subjected to any of the above situations, I will immediately provide written notification to the Chair of the Tender Evaluation Panel of the circumstances and suspend myself from further evaluation activities pending further consideration by the Tender Evaluation Panel.

Person making the Probity Declaration	**Witness**
.....	.....
Signed	Signed
.....	.....
Print Name	Print Name
.....	.....
Date	Date

Appendix 2 Probity Advice to Staff

Probity Advice to Staff

The procurement process is underway for RFT, and a Probity Adviser for the process has been appointed.

It is essential that interested providers and the public at large are able to have complete confidence that the processes involved have been conducted in a manner which has due regard to probity; being, complete and confirmed integrity, uprightness and honesty.

It is possible that individuals or companies may approach MWRC staff, in either an official or informal way, seeking details of the tendering processes. In order to ensure the probity of the projects is maintained at the highest standard it has been decided to implement a process for responding to and reporting these contacts.

All individuals or organisations that make contact regarding the procurement process shall be advised that the appropriate point for discussion of the issues involved or for the provision of information is the Contact Officer. The Contact Officer is:

Name	Neil Bungate
Position	Financial Accountant
Telephone	6378 2812
Email	neil.bungate@midwestern.nsw.gov.au

No public statements shall be made by MWRC staff unless specifically authorised by the Contact Officer and the Corporate Communications Manager. By having a nominated point of contact we will ensure that all parties are given equal access to the same information.

Outside parties, with whom MWRC has an existing business relationship, may contact staff as part of the normal day-to-day relationship. It is important that staff follow the following guidelines throughout the entire process:

- No discussion shall be held with any potential Tenderer about the evaluation process in relation to any aspect of any Tender or the evaluation process without the prior approval or at the direction of the Contact Officer or nominee.
- No potential Tenderer shall receive or be perceived to have received additional information to that which is publicly available in respect of the selection process.
- Potential Tenderers shall be advised to deal directly with the Contact Officer in all matters in relation to the selection process, their tender or its current status. Staff shall refuse to enter discussions of this nature.
- Should any potential Tenderer request a copy of any document excluding the RFT, they should be referred to the Contact Officer. Staff should provide no documents other than the RFT, which should then be recorded in the Register of RFT's Issued.

- Unusual or exceptional invitations from any party with a declared interest in the procurement should not be accepted.

- Routine business meetings and social activities may continue as usual, but managers and employees shall exercise caution, and shall not discuss the evaluation, the evaluation procedures, or contents of responses to any RFT. Contact with potential Tenderers should be reported to the Contact Officer.

- Where any party in an unrelated business meeting or social situation seeks to raise issues in respect of the evaluation, or contents of any RFT, the employee shall indicate that it is not appropriate to discuss such matters.

The purpose of these instructions is to assist individuals having contact with this process to acquit their responsibilities in a way which is, and is seen to be, fair and unbiased.

Questions from MWRC staff regarding these instructions are to be directed to the Contact Officer.

Staff should contact the Probity Advisor with any concerns in relation to the probity of this process. The Probity Advisor is:

Name	Mr Ian Roberts
Position	Manager Governance
Telephone	(02) 6378 2868
Email	Ian.Roberts@midwestern.nsw.gov.au

Appendix 3 Evaluation Model

Evaluation Criteria	Weighting
1. Price	50%
2. Internet and processing software capabilities	30%
3. Customer service	15%
4. Additional services	5%

Justification of Weightings Assigned

Due to increasing budget pressure price and value is considered the most important criteria, thus has received the heaviest weighting at 50%.

Internet and processing software capabilities relates to the tenderers ability to deliver quality, secure, user friendly services to Council and our customers, thus receiving the next highest weighting of 30%.

Due to the medium risk impact if operational procedures fail a weighting of 15% is given to customer service for the bank's ability to deal with urgent issues and general enquiries.

Additional services requested in the scope of requirements and additional services offered outside the scope of requirements are non-essential and given the lowest weighting of 5%.

Characteristics of Preferred Responses

1. Price

Tender provides the lowest price for comparable services. Evaluation will include assessment of any additional costs involved should Council change service provider.

2. Internet and processing software capabilities

Preferred responses will deliver the best quality security of online services, credit card security and information and fraud protection.

Banking software will allow ease of credit card transaction processing and approvals, online banking export of information, access to transaction information, importing payment files and authorisation.

3. Customer service

Council expects to be able to deal with a dedicated customer service account manager, without being directed to a call centre. Any service delivery timeframes

will also be assessed. Customer relationship management process will be assessed.

Preference for shopfront presence in Mudgee to provide agency services to ratepayers.

4. Additional services

Tenderers provide a solution for additional services in the scope of requirements that meets evaluation criteria 1 and 2. Other additional services will be assessed on the same criteria.

Risk Issues

- Financial viability risk – the risk of the supplier becoming bankrupt
- Offer risk – the risk of the supplier being unable to supply the goods or services offered
- Commercial risk – the risk of the supplier being unable to execute or manage the contract

Appendix 4 Risk Evaluation Matrix

Determination of Risk Effect

The effect of identified risks should be classified as High, Medium, Low or Insignificant depending on the nature of the identified risks. Guidance on classifying risks is given by the following table:

Risk Impact Description	Financial	Human	Reputation and Image	Service Delivery	Environmental
High	Above $500,000	Death	Reputation of MWRC affected nationally and/or internationally.	High numbers of unhappy clients. Services not delivery.	Long term harm
Medium	Between $50,000 and $500,000	Physical injury to staff requiring treatment by Dr/Hospital	Employee and/or community concern, heavy local media coverage.	Individual clients/groups unhappy with service provided. Lengthy delay in service delivery.	Medium-term harm

Low	Under $50,000	First Aid	Minor concern amongst a small number of employee/clients.	Minor impact on service provision. Short service delay anticipated.	Short-term harm

Assessment of Risk Likelihood

This assessment is based on the likelihood that the risk will occur in light of the tender provided by each tenderer. Guidance on this assessment is given in the following table:

Category	Description
Unlikely	A risk event is possible, but unlikely, in the next 12 months.
Probable	A risk event is likely to occur at some time in the next 12 months.
Certain	The risk is occurring now – and MWRC is already exposed to its potential impact (i.e. this is an 'issue' now, not simply a risk that may occur in the future.)

Risk Magnitude

The assessment of risk magnitude is a function of both the risk effect and risk likelihood, as set out in the following table:

	Risk Impact Description		
Risk Likelihood	High	Medium	Low
Certain	Extreme	High	Medium
Probable	High	Medium	Medium
Unlikely	Medium	Medium	Low

Risk magnitude should be assigned to each risk issue identified, *inter alia*: Extreme, High, Medium, or Low.