QUEANBEYAN-PALERANG REGIONAL COUNCIL

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

DECEMBER 2020

VOLUME 2 – FIGURES

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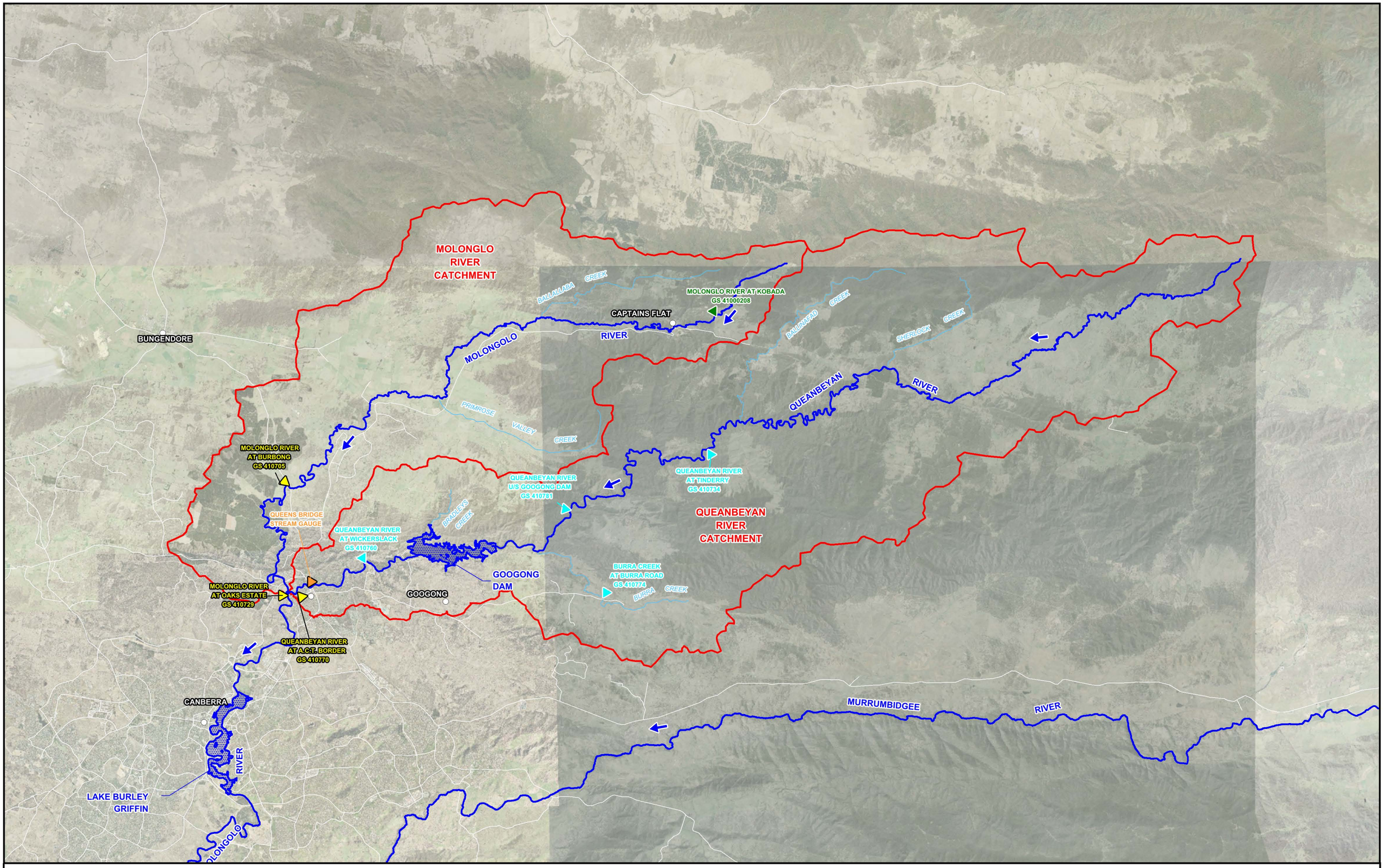
LIST OF FIGURES



N

2500 0 2500 5000 7500 m

Scale: 1:250,000

LEGEND

- Catchment Boundary
- Manually Read Stream Gauge
- IconWater Stream Gauge
- EPSDD Stream Gauge
- WaterNSW Stream Gauge

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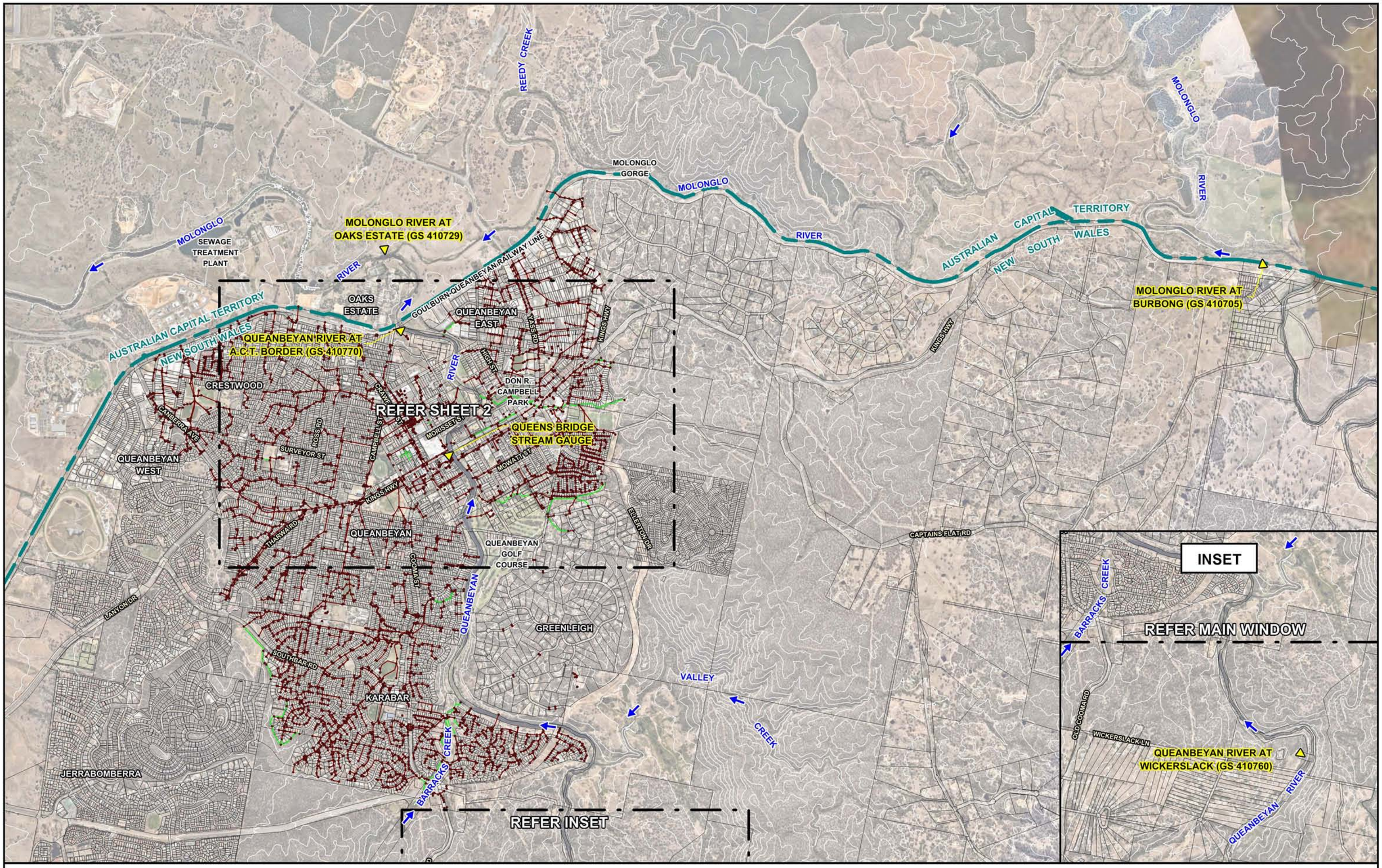
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 1.1

STUDY LOCATION PLAN



N 300 0 300 600 900 m

Scale: 1:30,000

Lyall & Associates

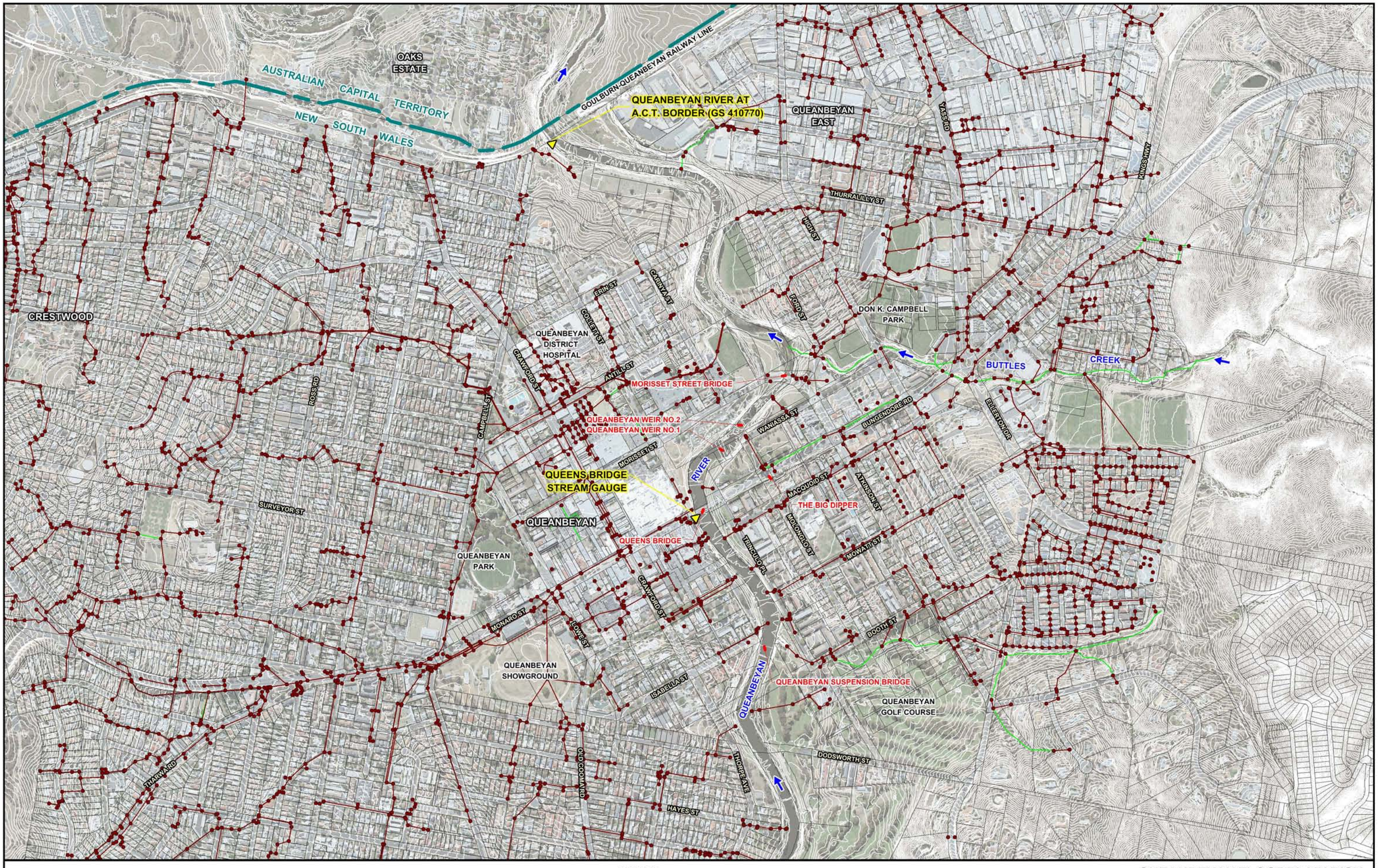
LEGEND

- Existing Piped Stormwater Drainage System
- Existing Stormwater Channel
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.1
(Sheet 1 of 2)

EXISTING DRAINAGE SYSTEM AT QUEANBEYAN



N

100 0 100 200 300 m

Scale: 1:10,000

LEGEND

- Existing Piped Stormwater Drainage System
- Existing Stormwater Channel
- Stream Gauge

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QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.1
(Sheet 2 of 2)

EXISTING DRAINAGE SYSTEM AT QUEANBEYAN

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMAST
THORPE AVE
QUEANBEYAN GOLF COURSE
DANE ST
WOODGER PDE
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS FLAT DR
BARRACKS CREEK
RIVER
WICKERSLACK LANE

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
OAKS ESTATE
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
CRESTWOOD
CRAWFORD ST
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
ELLERTON DR
MOWATT ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
CAMERON RD
COOMAST
THORPE AVE
DANE ST
WOODGER PDE

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N 200 0 200 400 600 m

Scale: 1:20,000

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NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.2
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
1% AEP

N

50 0 50 100 150 m

Scale: 1:5,000

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NOTE:

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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 573.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.2
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
1% AEP

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

QUEANBEYAN GOLF COURSE

HAYES ST

COOMA ST

THORPE AVE

DANE ST

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

FLAT

BARRACKS CREEK

BARRACKS

RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER

SEWAGE TREATMENT PLANT

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

OAKS ESTATE

CRESTWOOD

QUEANBEYAN WEST

QUEENS BRIDGE STREAM GAUGE

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

CRAWFORD ST

MORISSET ST

ROSS RD

CAMPBELL ST

SURVEYOR ST

MOWATT ST

ELLERTON DR

THARWA RD

QUEANBEYAN

NOTE:
Depth legend differs from that shown on Figure 2.2.

Indicative Depth of Inundation (m)

- 0.10 to 1.00
- 1.00 to 2.00
- 2.00 to 3.00
- 3.00 to 5.00
- 5.00 to 7.50
- 7.50 to 10.00
- 10.00 to 12.50
- 12.50 to 15.00
- 15.00 to 17.50
- 17.50 to 20.00
- > 20.00

N

200 0 200 400 600 m

Scale: 1:20,000

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NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

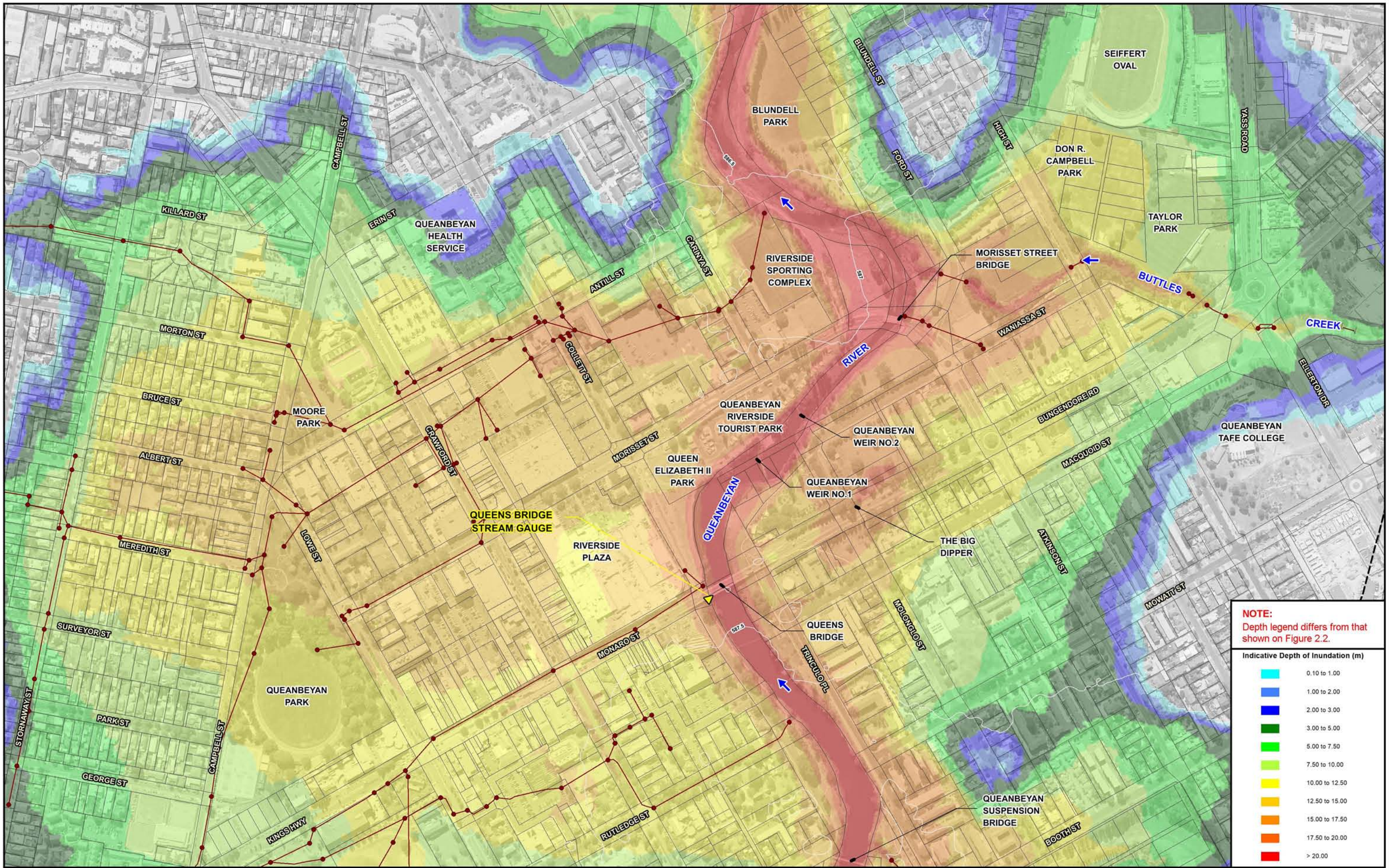
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.3
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
PMF



NOTE:
Depth legend differs from that shown on Figure 2.2.

Indicative Depth of Inundation (m)

0.10 to 1.00
1.00 to 2.00
2.00 to 3.00
3.00 to 5.00
5.00 to 7.50
7.50 to 10.00
10.00 to 12.50
12.50 to 15.00
15.00 to 17.50
17.50 to 20.00
> 20.00

N

50 0 50 100 150 m

Scale: 1:5,000

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NOTE:
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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

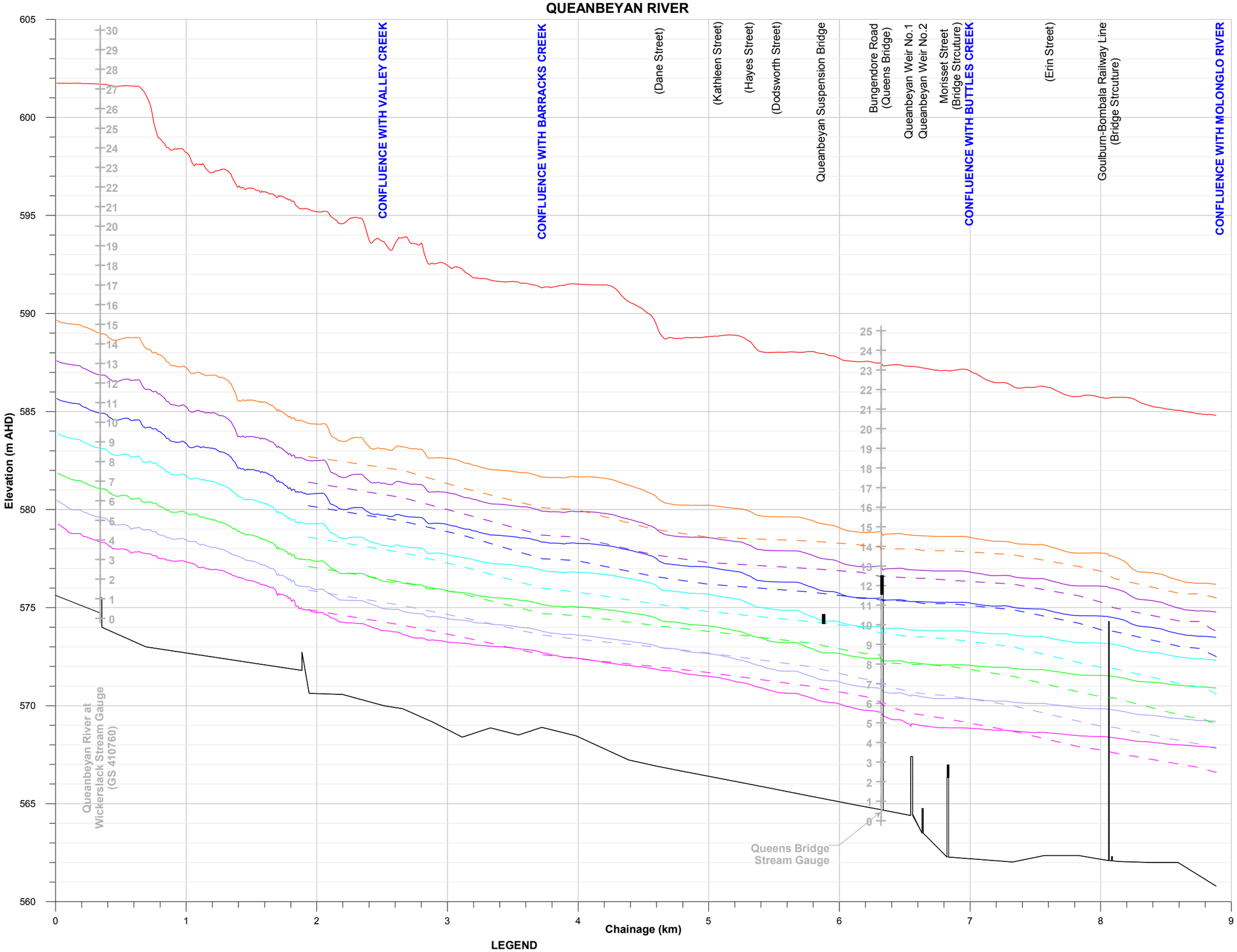
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.3
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
PMF

QUEANBEYAN RIVER



LEGEND

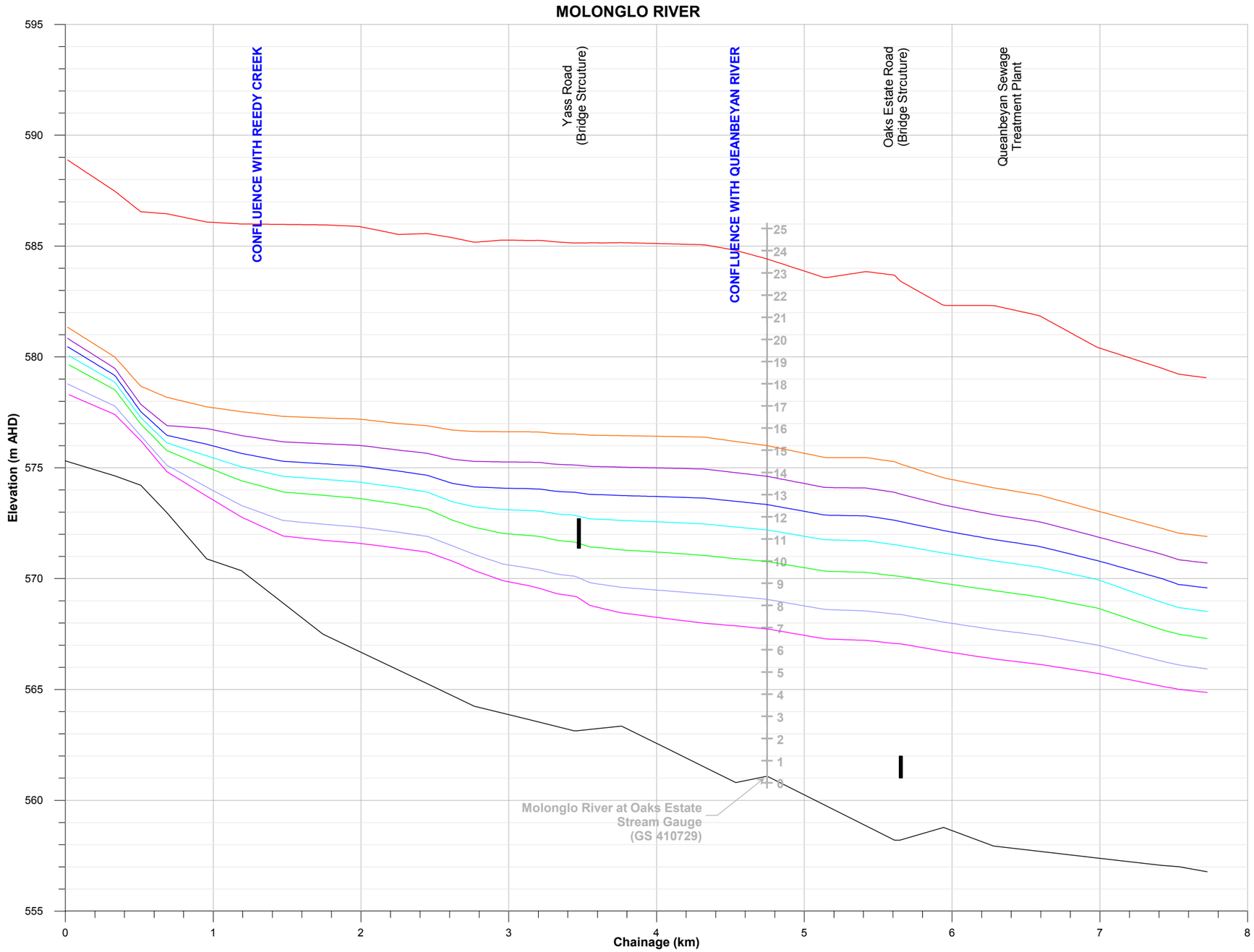
DWR, 1992	Present Study
	PMF
	0.2% AEP
	0.5% AEP
	1% AEP
	2% AEP
	5 %AEP
	10% AEP
	20% AEP

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.4
(Sheet 1 of 2)

DESIGN WATER SURFACE PROFILES
QUEANBEYAN AND MOLONGLO RIVERS

Lyall & Associates



LEGEND

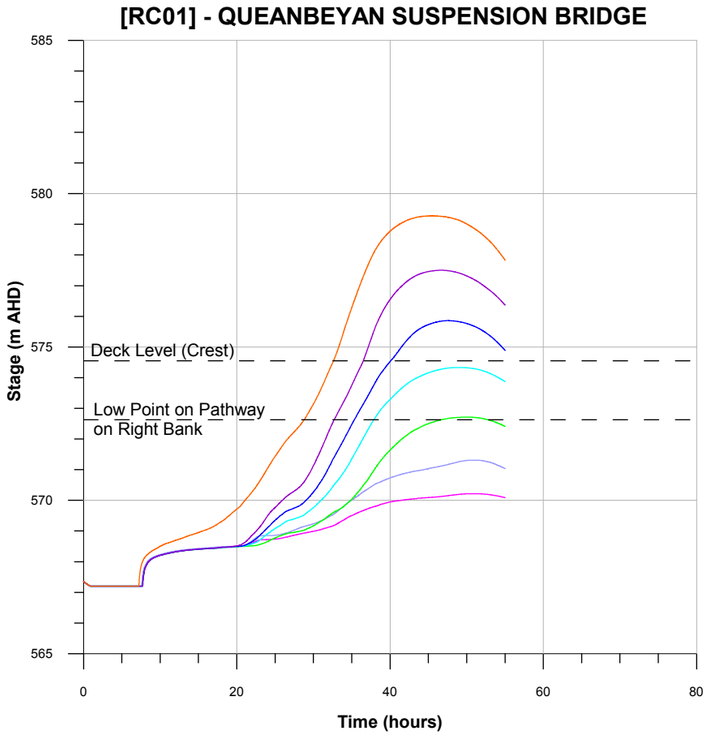
PMF	2% AEP
0.2% AEP	5 %AEP
0.5% AEP	10% AEP
1% AEP	20% AEP

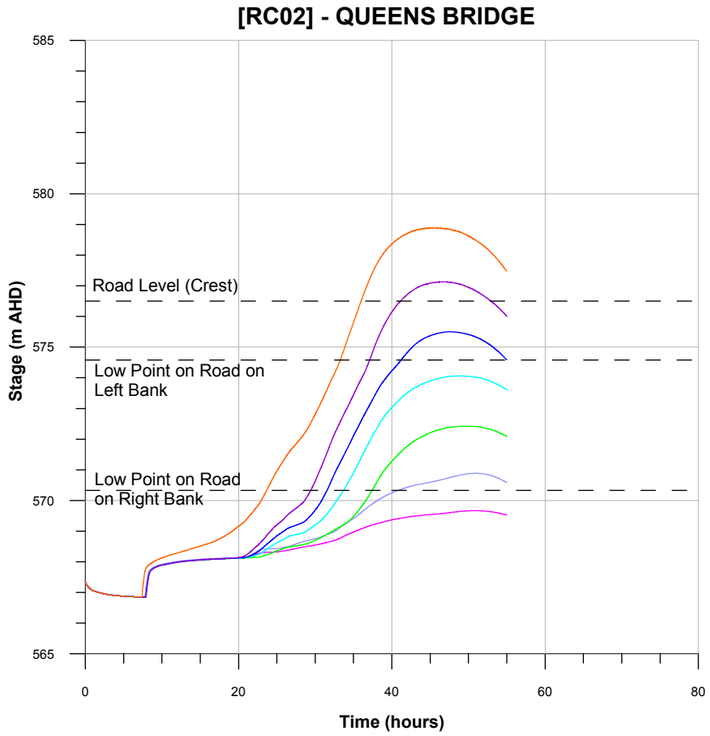
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

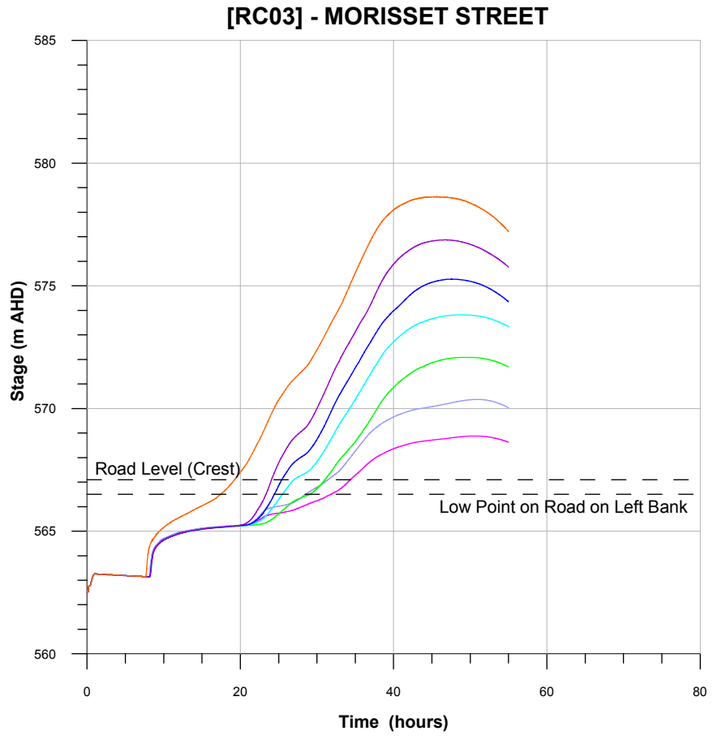
Figure 2.4
(Sheet 2 of 2)

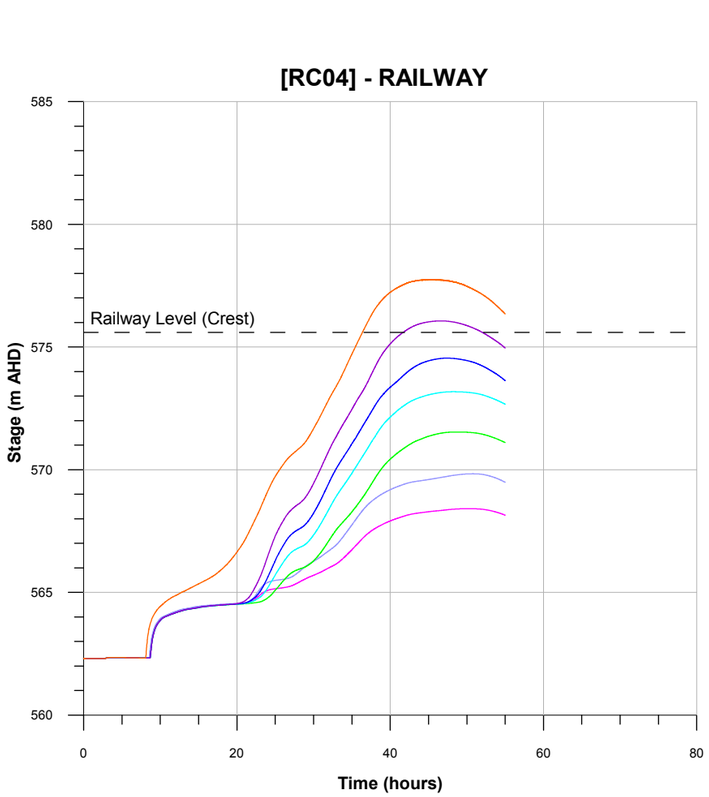
DESIGN WATER SURFACE PROFILES
QUEANBEYAN AND MOLONGLO RIVERS

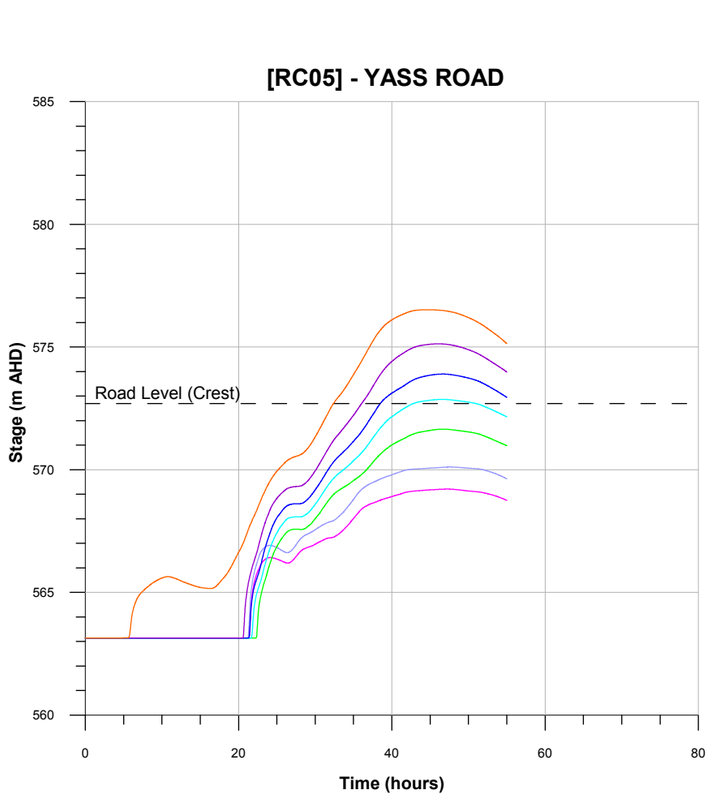
Lyall & Associates

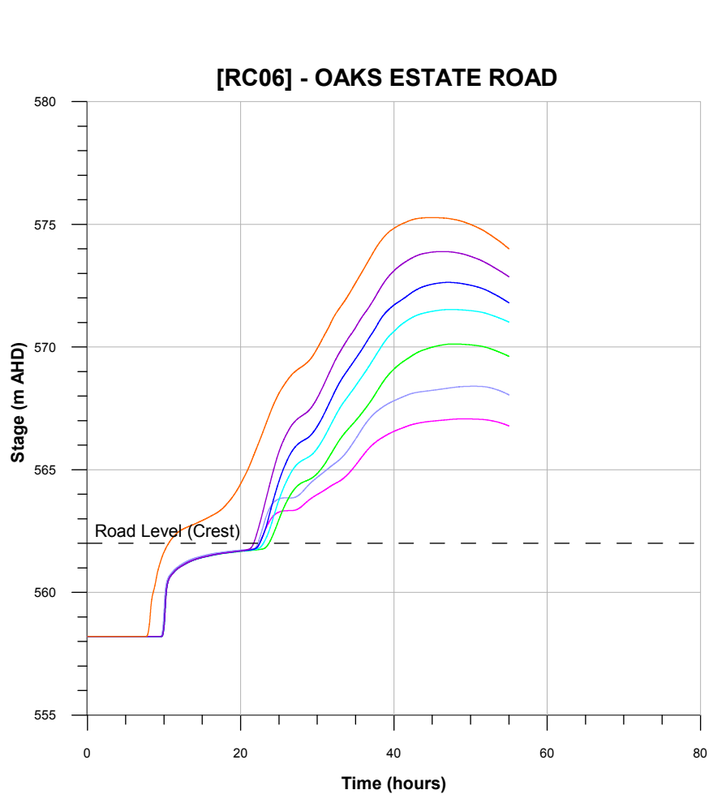


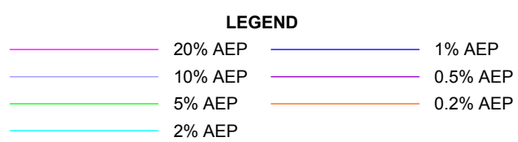












QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.5

TIME OF RISE OF FLOODWATERS
AT LOCATION OF BRIDGE CROSSINGS

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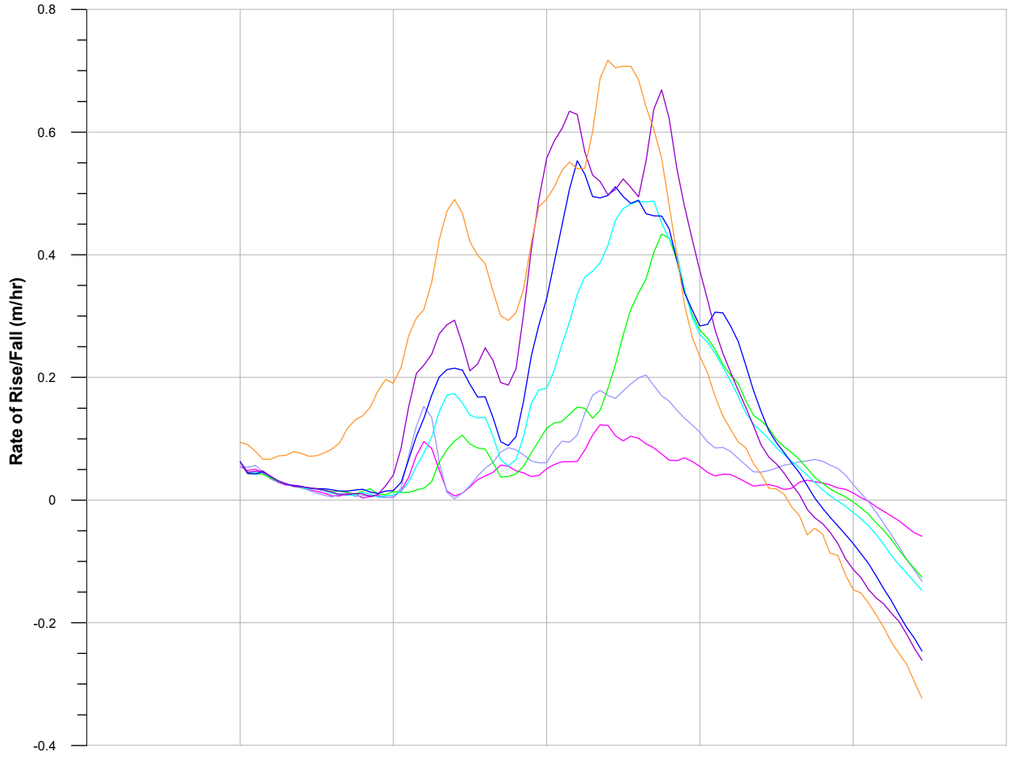

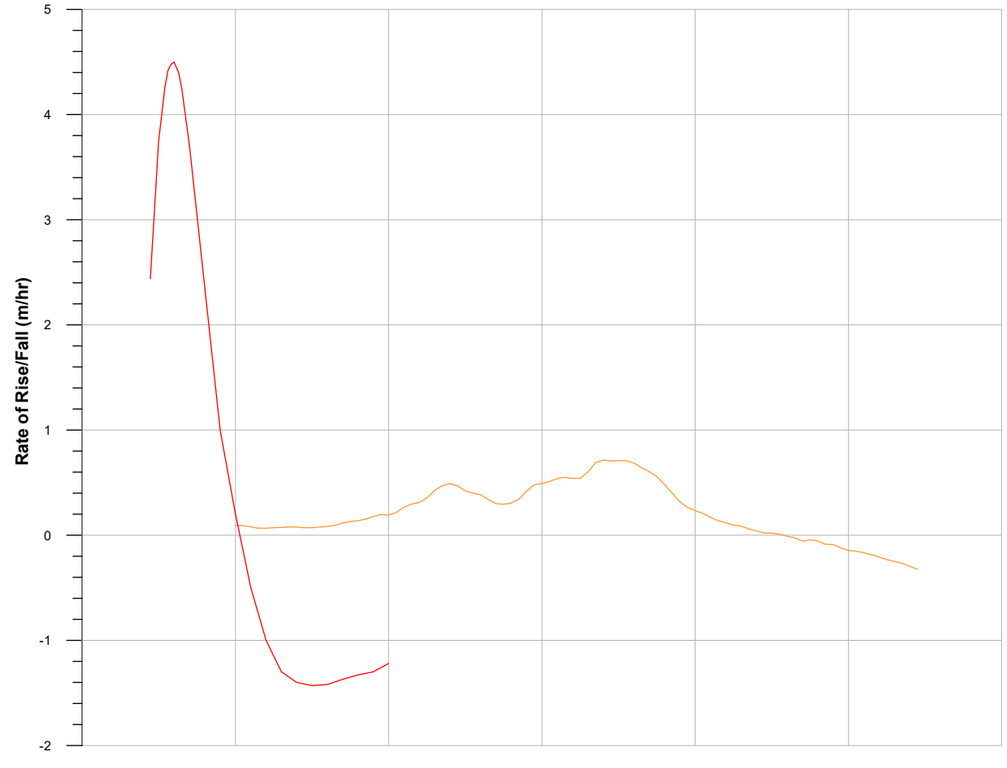

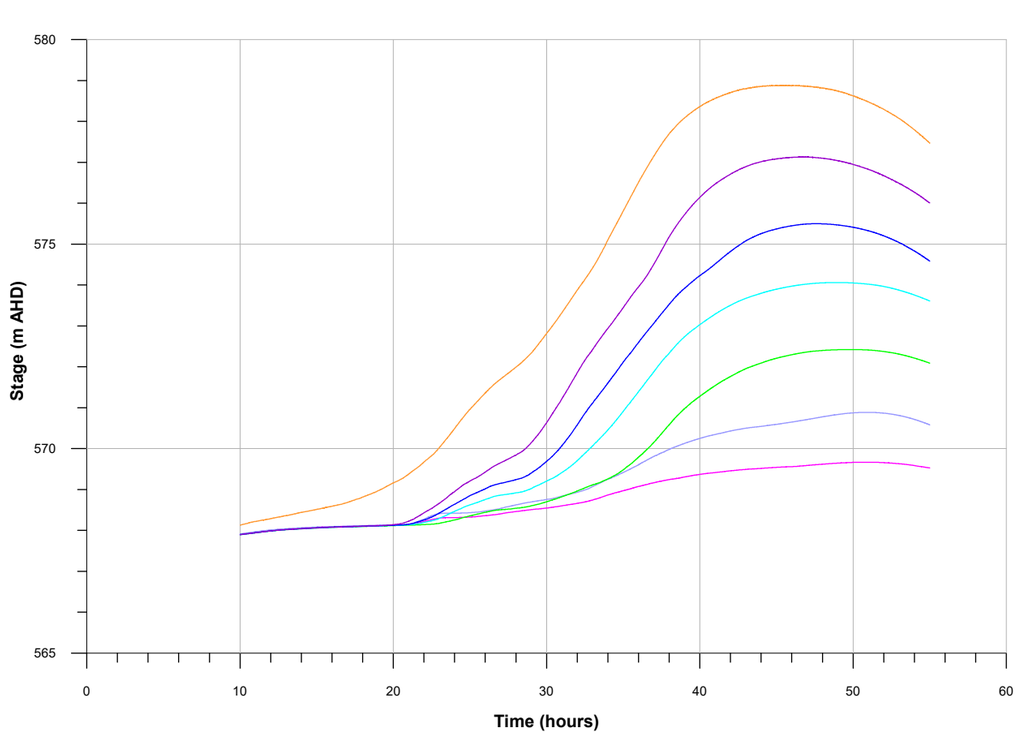

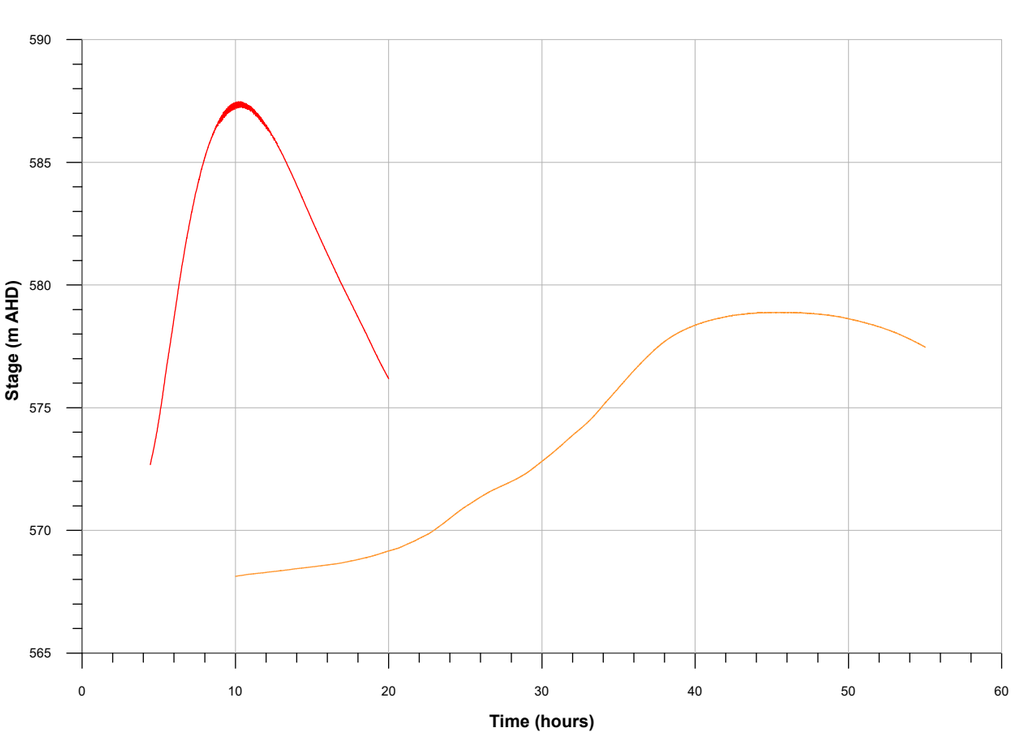

LEGEND

PMF	2% AEP
0.2% AEP	5% AEP
0.5% AEP	10% AEP
1% AEP	20% AEP

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QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.6

RATE OF RISE OF FLOODWATERS AT QUEENS BRIDGE

NOTE:
Depth legend differs from that shown on Figures 2.2 and 2.3.

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Extent of Queanbeyan River Flooding Not Shown
- Indicative Extent of 1% AEP Main Stream Flooding

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.7

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
LOCAL CATCHMENT FLOODING IN QUEANBEYAN CBD - 1% AEP

WINDOW 1

WINDOW 2

EXTENT OF INUNDATION

- 20% AEP
- 10% AEP
- 5% AEP
- 2% AEP
- 1% AEP
- 0.5% AEP
- 0.2% AEP
- PMF

NOTE:
Extents trimmed to areas inundated to depths greater than 100mm.

COMMUNITY ASSET

- Telephone Exchange
- Sewage Treatment Plant
- Major Road Crossing and Identifier

EMERGENCY SERVICES

- RFS Station
- Police Station
- F&R NSW Station
- Ambulance Facility
- SES Station
- Evacuation Centre

VULNERABLE DEVELOPMENT

- Educational Facility
- Chid Care Facility
- Caravan Park
- Aged Care Facility
- Hospital

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
DANE ST
WOODGER PDE
GREENLEIGH
CC5
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS FLAT CREEK
BARRACKS
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)
GOOGONG
MOLONGLO RIVER
SEWAGE TREATMENT PLANT
RC6
RC5
MOLONGLO
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
RC4
QUEANBEYAN EAST
YASS RD
KINGS HWY
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
CC6
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
CC3
CC2
CRESTWOOD
EF6
AC2
HIGH ST
EF1
EC3
DON R. CAMPBELL PARK
AC1
CRAWFORD ST
CC10
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
RC2
EF2
RFS1
RFS2
EC4
EF9
BUTTLES CREEK
ELLERTON DR
MOWATT ST
SURVEYOR ST
EC1
EF7
QUEENS BRIDGE STREAM GAUGE
AC3
KINGS HWY
EF3
CC1
RC1
EF4
CC11
THARWA RD
QUEANBEYAN
HIRST AVE
HAYES ST
COOMA ST
CAMERON RD
THORPE AVE
QUEANBEYAN GOLF COURSE

N
200 0 200 400 600 m
Scale: 1:20,000

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

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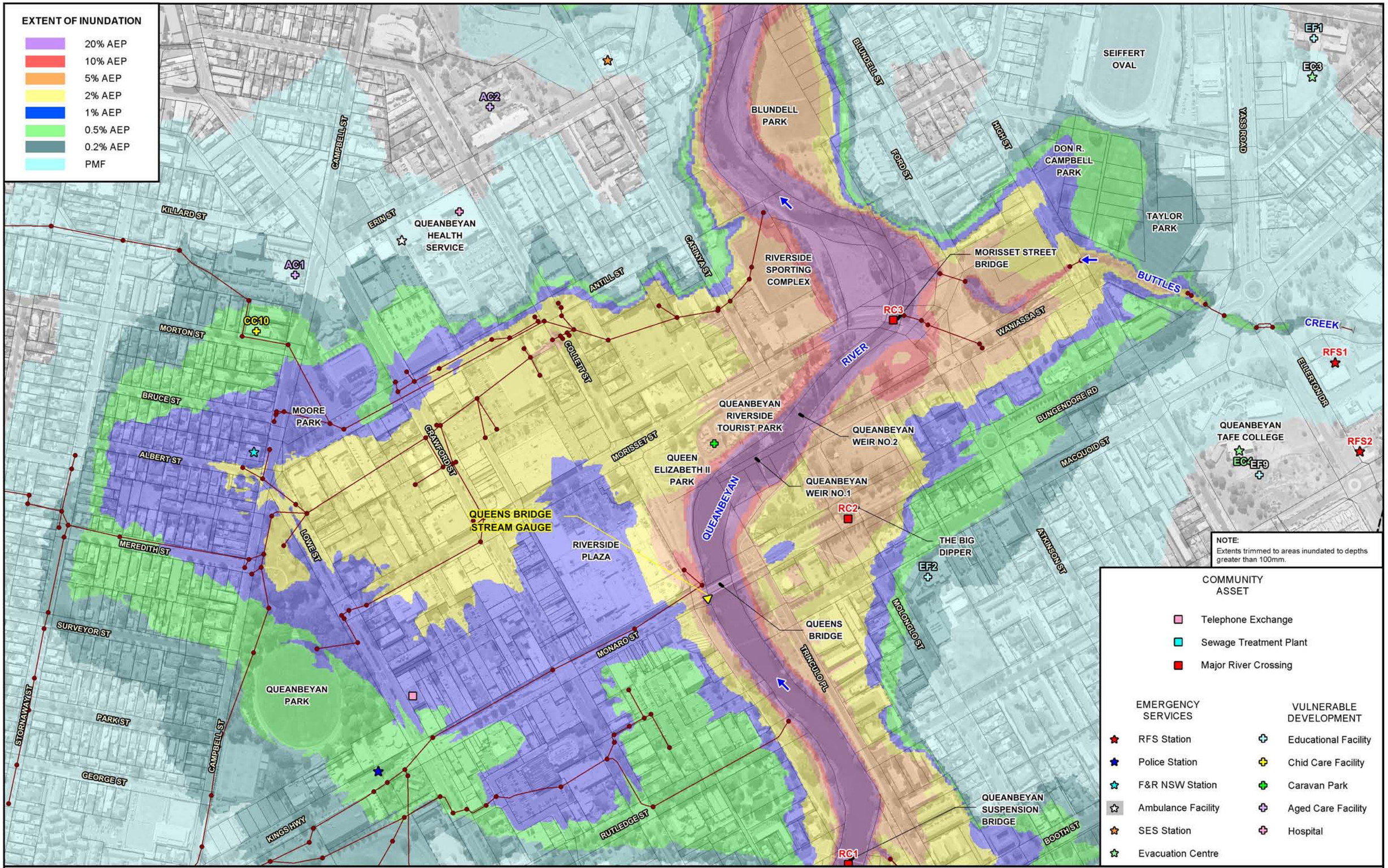
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.8
(Sheet 1 of 2)

INDICATIVE EXTENT OF INUNDATION AND LOCATION OF VULNERABLE DEVELOPMENT AND CRITICAL INFRASTRUCTURE



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.8
(Sheet 2 of 2)

INDICATIVE EXTENT OF INUNDATION AND LOCATION OF VULNERABLE DEVELOPMENT AND CRITICAL INFRASTRUCTURE

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Extent of Queanbeyan River Flooding Not Shown

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.9

POTENTIAL IMPACT OF FUTURE URBANISATION ON LOCAL CATCHMENT FLOODING PATTERNS IN VICINITY OF QUEANBEYAN CBD 1% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMAST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
FLAT DR
BARRACKS CREEK
BARRACKS
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
QUEANBEYAN EAST
YASS RD
KINGS HWY
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
HIGH ST
CRESTWOOD
DON R. CAMPBELL PARK
BUTTLES CREEK
CRAWFORD ST
REFER SHEET 2
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
ELLERTON DR
MOWATT ST
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1
COOMAST
THORPE AVE
CAMERON RD

Afflux (m)

- -0.01 to 0.01
- 0.01 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 3.00
- 3.00 to 4.00
- > 4.00
- Additional Area of Land Inundated to Depths Greater than 100 mm as a Result of Change

N

200 0 200 400 600 m

Scale: 1:20,000

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NOTE:

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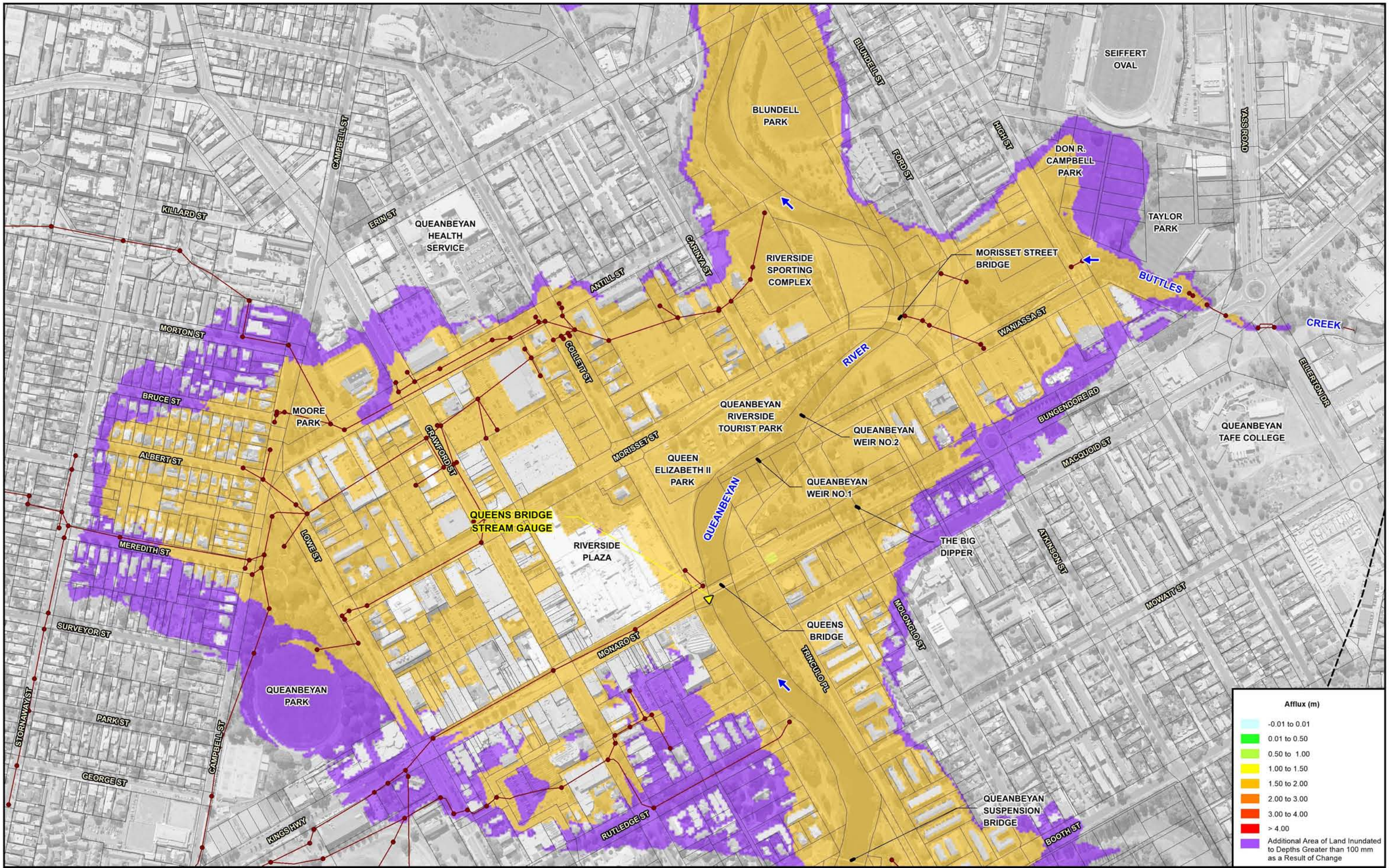
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.10
(Sheet 1 of 2)

POTENTIAL IMPACT OF A 10% INCREASE IN RAINFALL INTENSITIES ON FLOODING PATTERNS
1% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.10
(Sheet 2 of 2)

POTENTIAL IMPACT OF A 10% INCREASE IN RAINFALL INTENSITIES ON FLOODING PATTERNS
1% AEP

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMAST
THORPE AVE
QUEANBEYAN GOLF COURSE
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
FLAT DR
BARRACKS
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
QUEANBEYAN EAST
YASS RD
KINGS HWY
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
HIGH ST
CRESTWOOD
CRAWFORD ST
DON R. CAMPBELL PARK
BUTTLES CREEK
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
ELLERTON DR
MOWATT ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
COOMAST
THORPE AVE
CAMERON RD
QUEANBEYAN GOLF COURSE

Afflux (m)

- -0.01 to 0.01
- 0.01 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 3.00
- 3.00 to 4.00
- > 4.00
- Additional Area of Land Inundated to Depths Greater than 100 mm as a Result of Change

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

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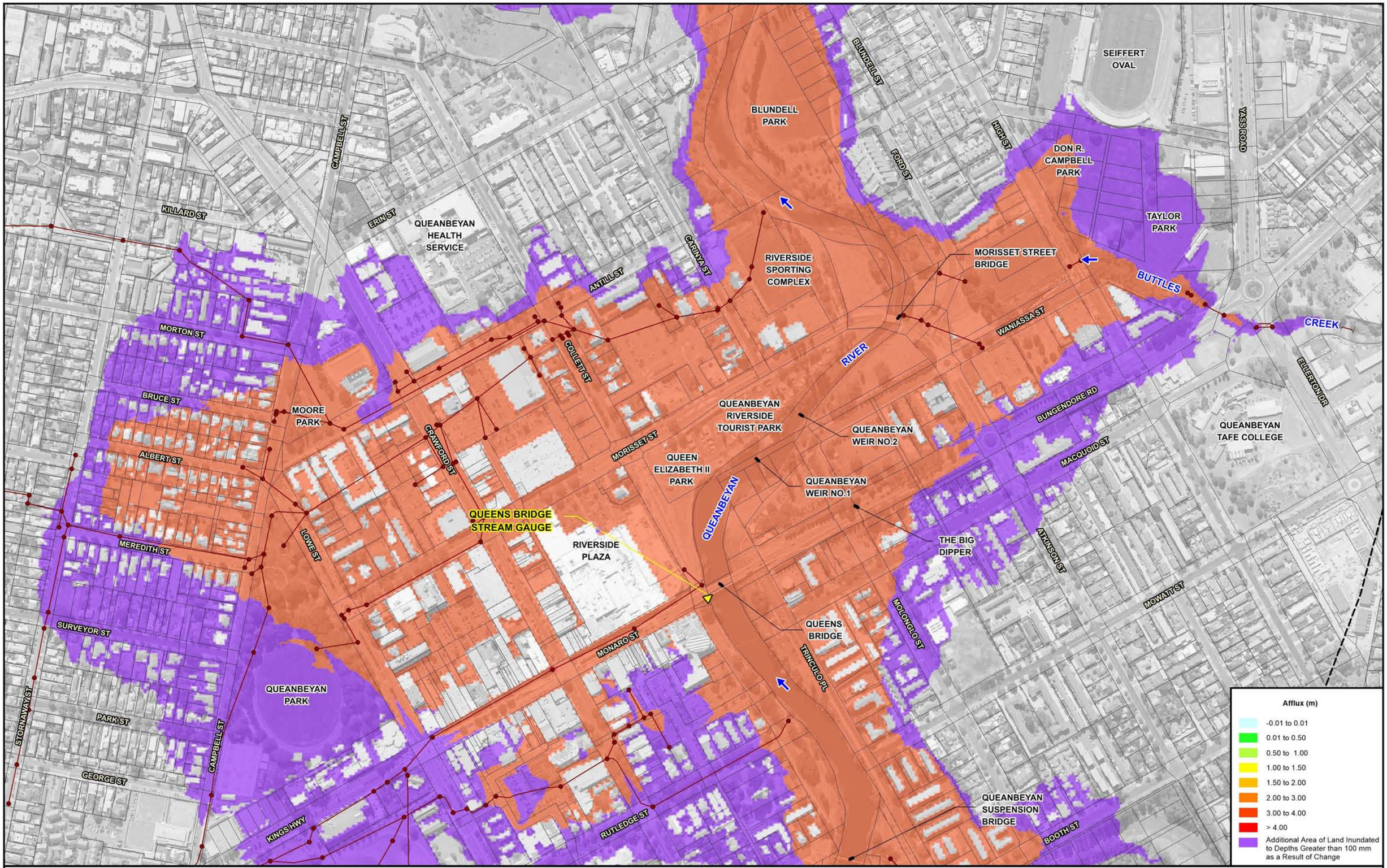
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.11
(Sheet 1 of 2)

POTENTIAL IMPACT OF A 30% INCREASE IN RAINFALL INTENSITIES ON FLOODING PATTERNS
1% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.11
(Sheet 2 of 2)

POTENTIAL IMPACT OF A 30% INCREASE IN RAINFALL INTENSITIES ON FLOODING PATTERNS
1% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)
GOOGONG

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
QUEANBEYAN EAST
YASS RD
KINGS HWY
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
CRESTWOOD
CRAMPTON ST
REFER SHEET 2
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
ROSS RD
SURVEYOR ST
CAMPBELL ST
MORISSET ST
QUEANBEYAN
ELLERTON DR
MOWATT ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1
CAMERON RD
COOMA ST
THORPE AVE

LEGEND

	Low Hazard	High Hazard
Floodway		
Flood Fringe		
Flood Storage		

N 200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.12
(Sheet 1 of 2)

FLOOD HAZARD AND HYDRAULIC CATEGORISATION OF FLOODPLAIN
1% AEP

BLUNDELL PARK
SEIFFERT OVAL
BLUNDELL ST
FORD ST
HIGH ST
YASS ROAD
DON R. CAMPBELL PARK
TAYLOR PARK
CAMPBELL ST
ERIN ST
QUEANBEYAN HEALTH SERVICE
KILLARD ST
CARINYA ST
ANTILL ST
RIVERSIDE SPORTING COMPLEX
MORISSET STREET BRIDGE
BUTTLES
CREEK
WANIASSA ST
MORTON ST
COLLETT ST
RIVER
ELLERTON DR
BRUCE ST
MOORE PARK
QUEANBEYAN RIVERSIDE TOURIST PARK
QUEANBEYAN WEIR NO.2
BUNGENDORE RD
CRAWFORD ST
MORISSET ST
QUEANBEYAN TAFE COLLEGE
ALBERT ST
QUEEN ELIZABETH II PARK
MACQUOID ST
QUEANBEYAN
QUEANBEYAN WEIR NO.1
QUEENS BRIDGE STREAM GAUGE
LOWE ST
RIVERSIDE PLAZA
THE BIG DIPPER
ATKINSON ST
MEREDITH ST
MOLONGLO ST
MOWATT ST
SURVEYOR ST
QUEENS BRIDGE
TRINCULO PL
MONARO ST
QUEANBEYAN PARK
STORNAWAY ST
PARK ST
CAMPBELL ST
GEORGE ST
QUEANBEYAN SUSPENSION BRIDGE
BOOTH ST
KINGS HWY
RUTLEDGE ST

LEGEND

	Low Hazard	High Hazard
Floodway		
Flood Fringe		
Flood Storage		

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.12
(Sheet 2 of 2)

FLOOD HAZARD AND HYDRAULIC CATEGORISATION OF FLOODPLAIN
1% AEP

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.13

FLOOD HAZARD AND HYDRAULIC CATEGORISATION OF FLOODPLAIN
LOCAL CATCHMENT FLOODING IN VICINITY OF QUEANBEYAN CBD - 1% AEP

MOLONGLO GORGE
MOLONGLO RIVER
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
MOLONGLO SEWAGE TREATMENT PLANT
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
CRESTWOOD
CRAWFORD ST
CANBERRA AVE
ROSS RD
SURVEYOR ST
CAMPBELL ST
MORISSET ST
QUEENS BRIDGE STREAM GAUGE
MOWATT ST
QUEANBEYAN WEST
KINGS HWY
THARWA RD
QUEANBEYAN
COOMA ST
QUEANBEYAN GOLF COURSE
ELLERTON DR
LANYON DR
QUEANBEYAN
GREENLEIGH
SOUTHBAR RD
KARABAR
VALLEY
CREEK
JERRABOMBERRA
BARRACKS CREEK
OLD COOMA RD
WICKERSLACK LN
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

LEGEND

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- B7 Business Park
- E1 National Parks and Nature Reserves
- E2 Environmental Conservation
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- SP1 Special Activities
- SP2 Infrastructure
- W1 Natural Waterways

N

300 0 300 600 900 m

Scale: 1:30,000

LEGEND

- Two-Dimensional Model Boundary
- Extent of 1% AEP Flood
- Extent of Flood Prone Land

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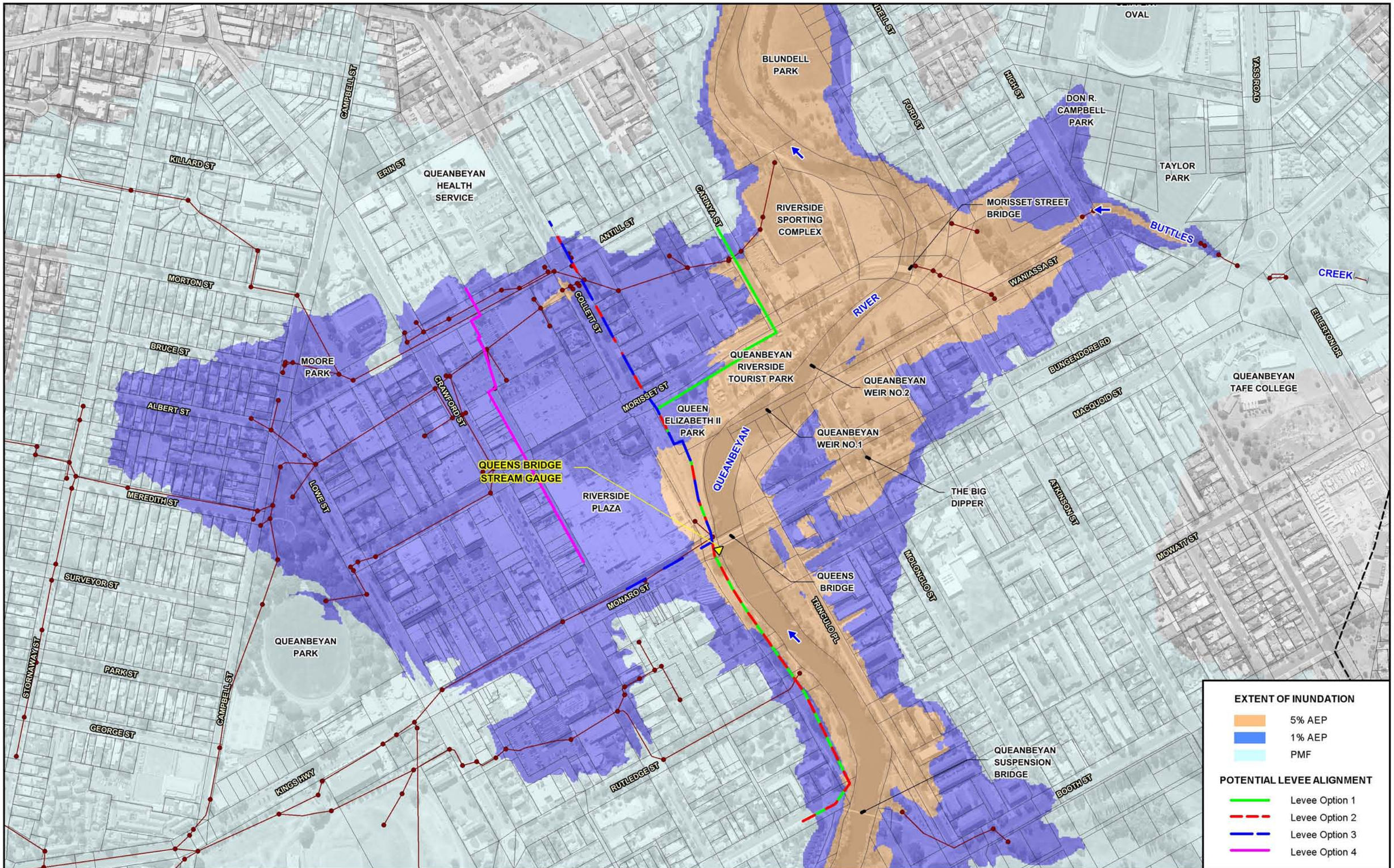
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 2.14

QUEANBEYAN LEP 2012 ZONING



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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LEGEND

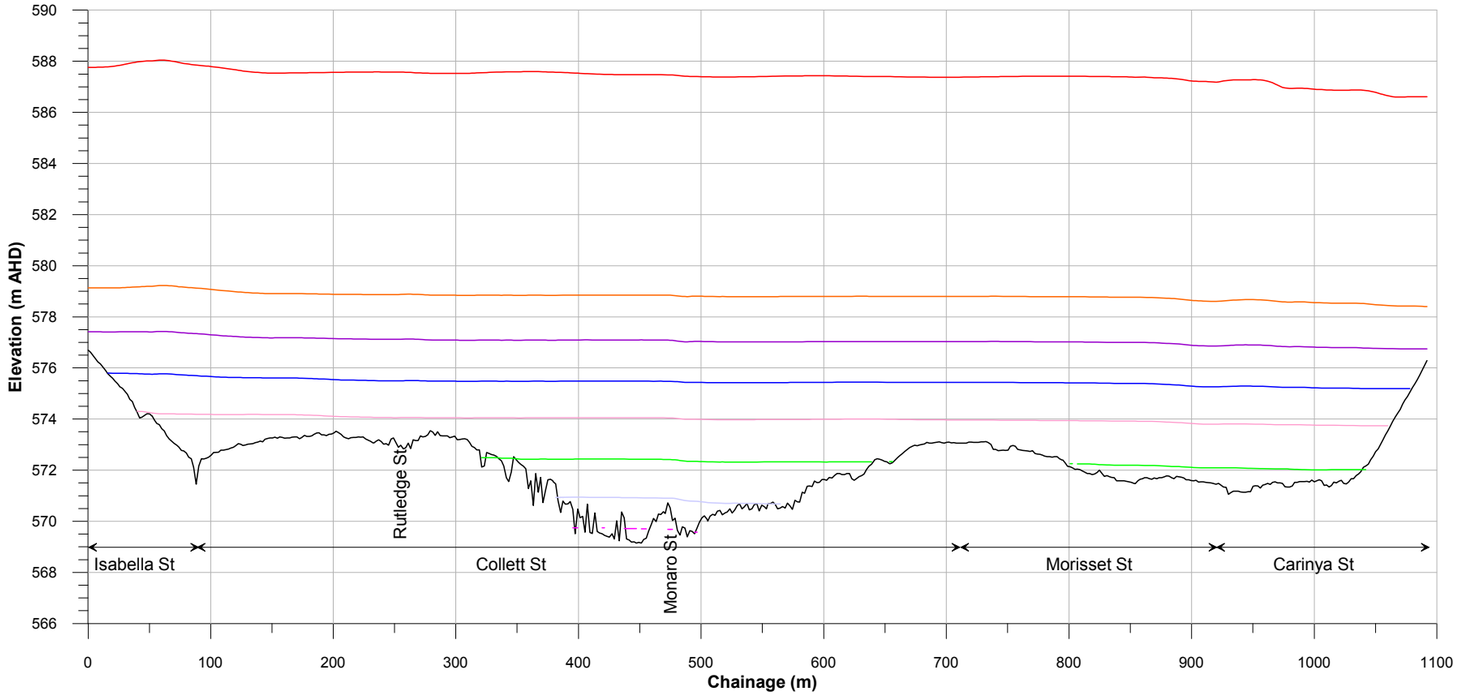
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

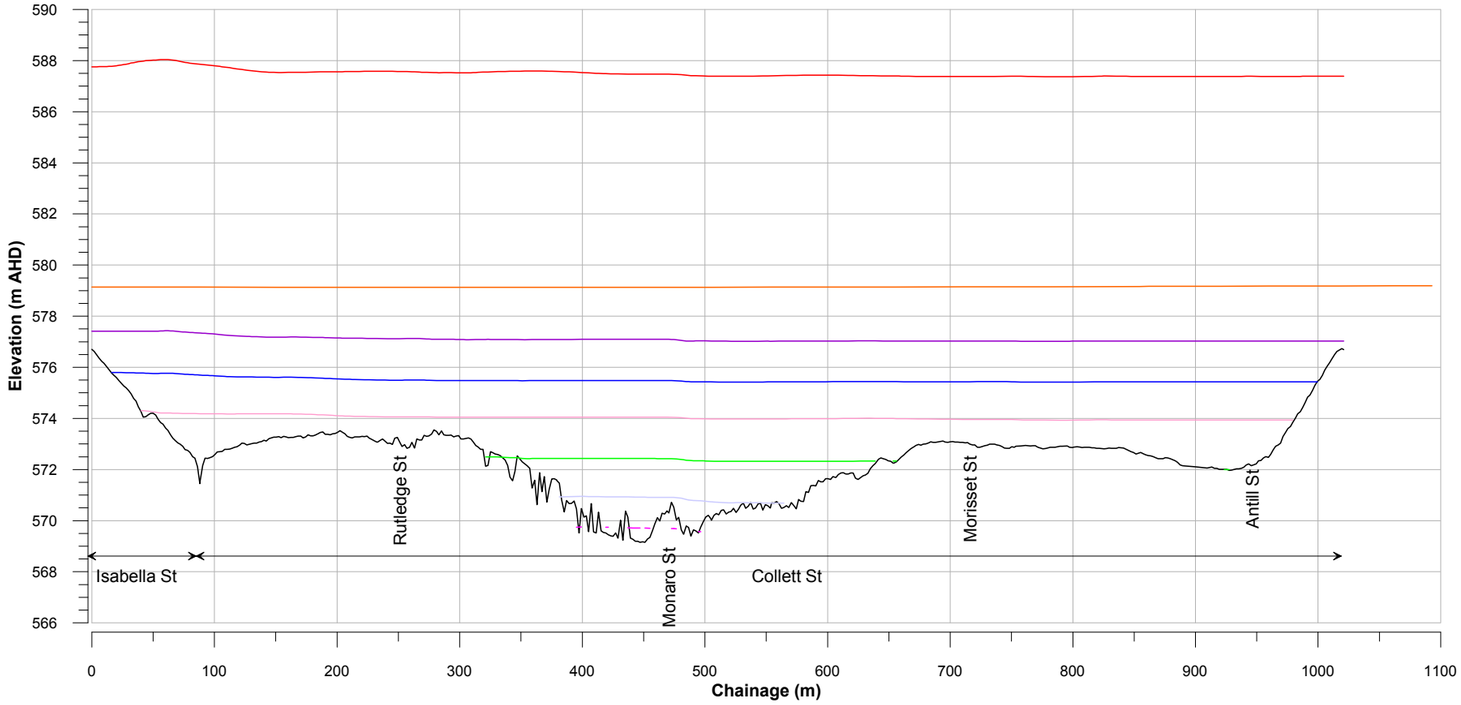
Figure 3.1

POTENTIAL CBD LEVEE ALIGNMENTS

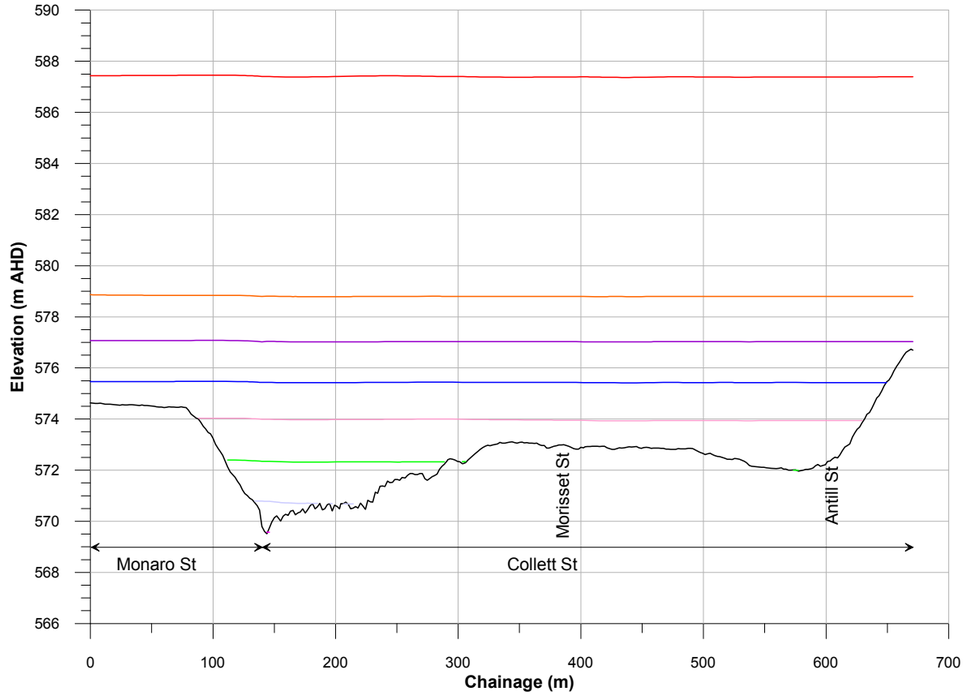
LEVEE OPTION 1



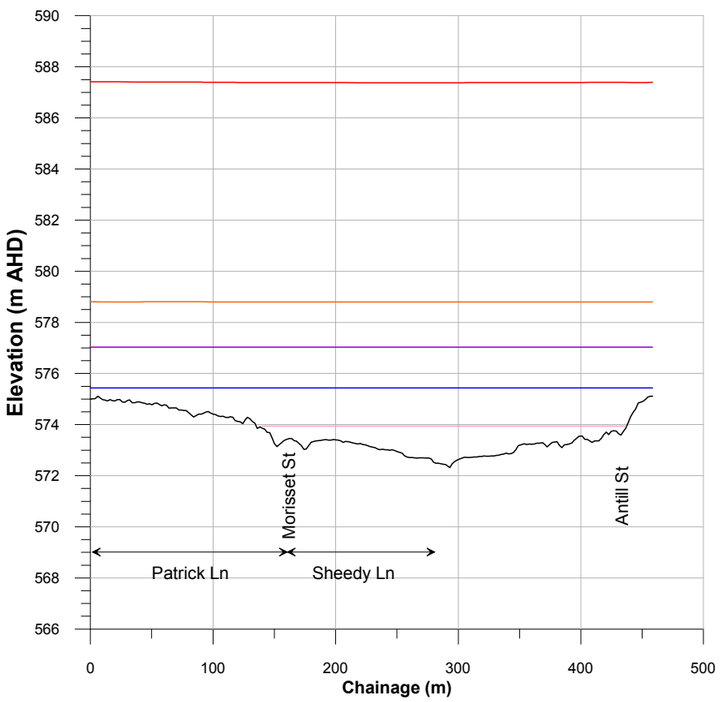
LEVEE OPTION 2



LEVEE OPTION 3



LEVEE OPTION 4



LEGEND

- PMF
- 0.2% AEP
- 0.5% AEP
- 1% AEP
- 2% AEP
- 5% AEP
- 10% AEP
- 20% AEP
- Natural Surface Elevation

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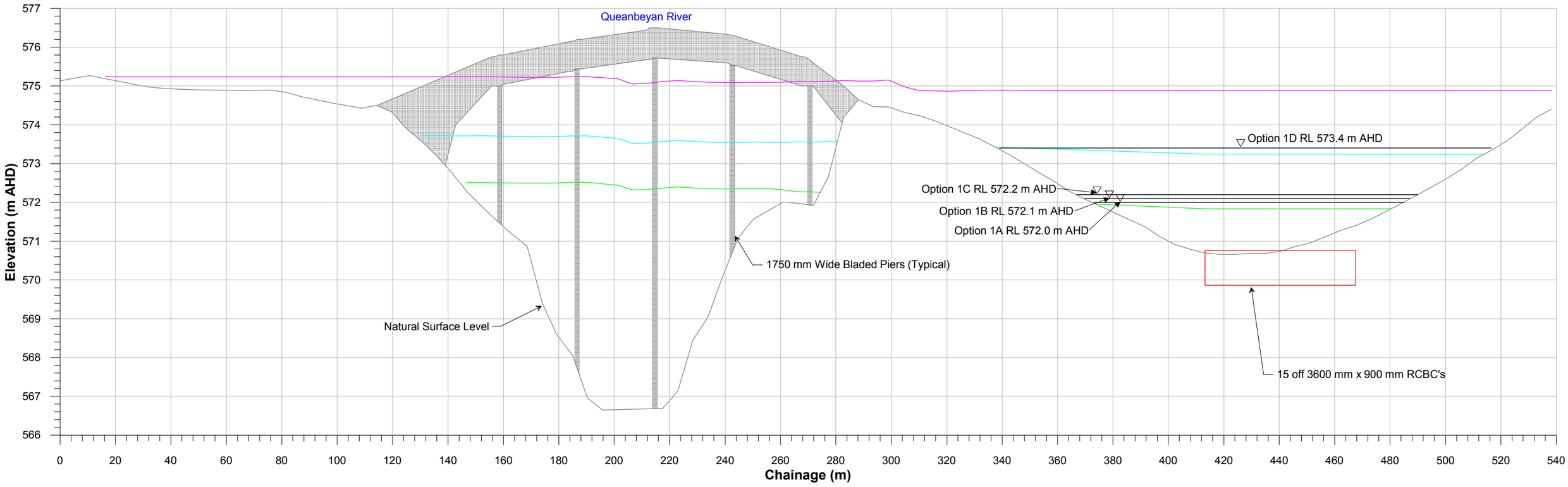
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.2

LONGITUDINAL SECTIONS ALONG POTENTIAL CBD LEVEE ALIGNMENTS

Document Set ID: 1169204
Version: 1, Version Date: 15/03/2021

OPTION 1



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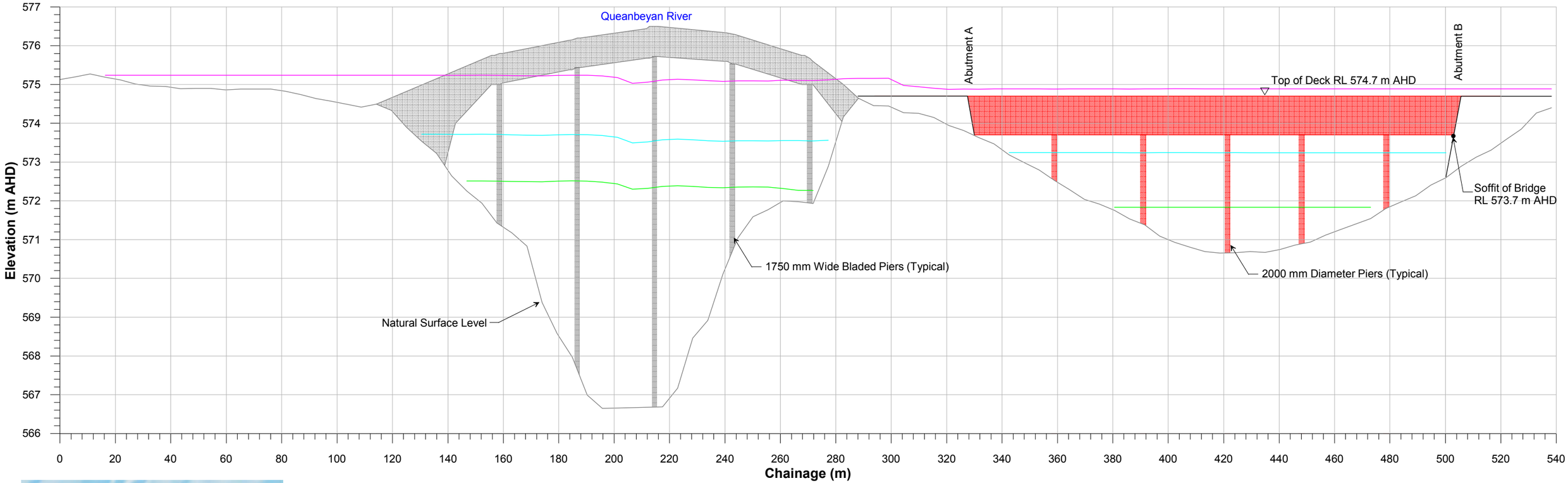

WATER SURFACE PROFILES

- 100 year ARI
- 50 year ARI
- 20 year ARI

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NOTE:

1. Cross sections drawn looking in the downstream direction.
2. Peak flood levels based on results generated by the Kings Highway TUFLOW Model.

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.3

TYPICAL CROSS SECTIONS SHOWING KINGS HIGHWAY UPGRADE OPTIONS

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

5% AEP

2% AEP

1% AEP

RIVER

QUEANBEYAN

15 OFF 3600 mm x 900 mm RCBC's

571.8

573.4

574.9

KINGS HIGHWAY

No. 18 TRINCULO PLACE

No. 10 MACQUOID STREET

No. 2 MACQUOID STREET

MACQUOID STREET

TRINCULO PLACE

N

20 0 20 40 60 m

Scale: 1:2,000

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LEGEND

Section of Road Raised to RL 573.4 m AHD

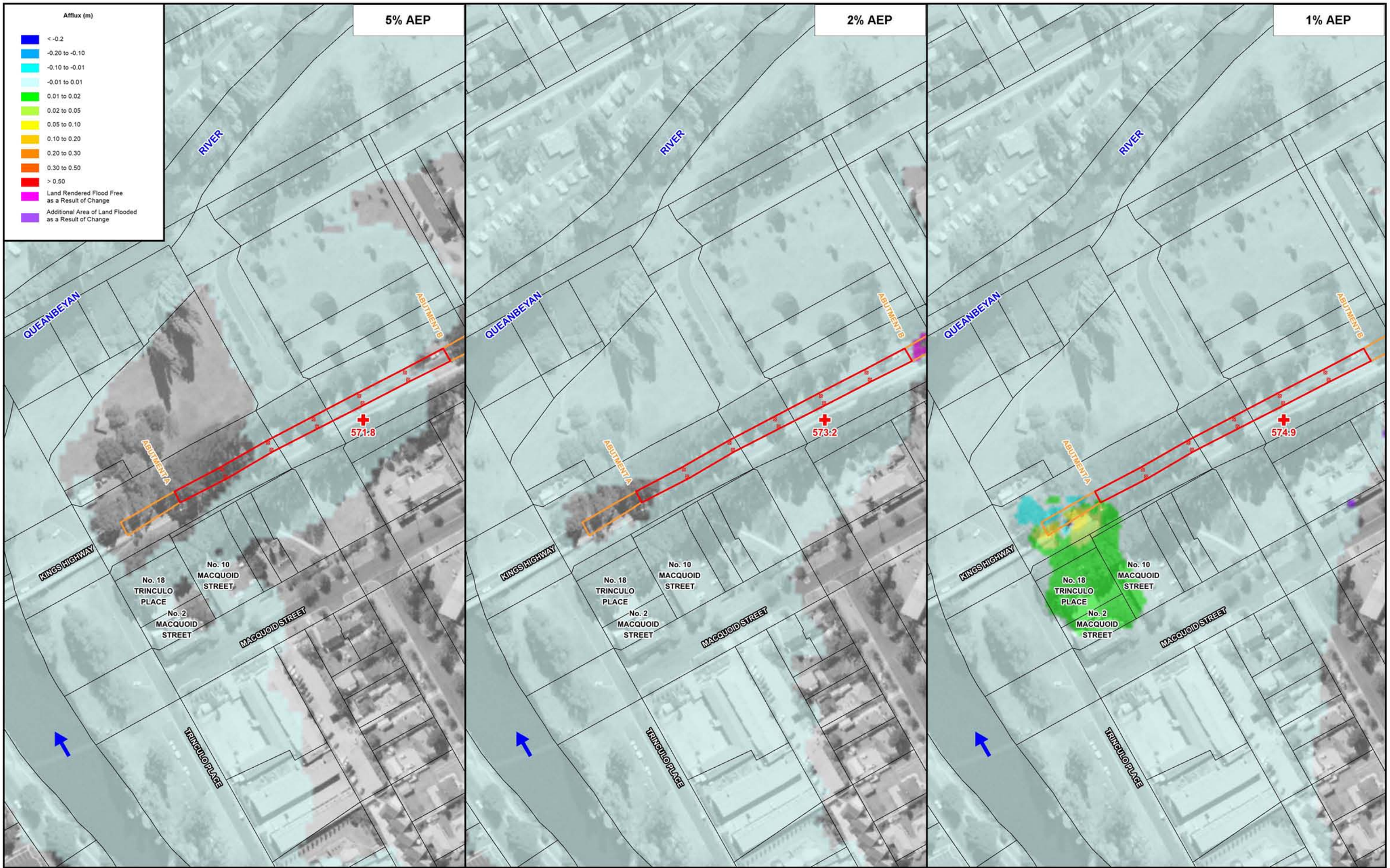
RL 573.4 m AHD Contour Upstream of Raised Section of Road

573.4 Peak Flood Level Under Post-Upgrade Conditions (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.4

IMPACT OF KINGS HIGHWAY UPGRADE OPTION 1D ON MAIN STREAM FLOOD BEHAVIOUR



N

20 0 20 40 60 m

Scale: 1:2,000

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LEGEND

- Elevated Bridge Deck
- Bridge Approach
- Bridge Piers
- 573.2 Peak Flood Level Under Post-Upgrade Conditions (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.5

IMPACT OF KINGS HIGHWAY UPGRADE OPTION 2A ON MAIN STREAM FLOOD BEHAVIOUR

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
FLAT DR
BARRACKS
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)
GOOGONG

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
CRESTWOOD
DON R. CAMPBELL PARK
REFER SHEET 2
CRAWFORD ST
BUTTLES CREEK
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
MOWATT ST
ELLERTON DR
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1
CAMERON RD
COOMA ST
THORPE AVE

LEGEND

- High Hydraulic Hazard Flooding
- Low Hydraulic Hazard Flooding
- Low Flood Island
- Low Trapped Perimeter
- High Trapped Perimeter
- Area on the Floodplain with Rising Road Access
- Area on the Floodplain with Overland Escape Routes

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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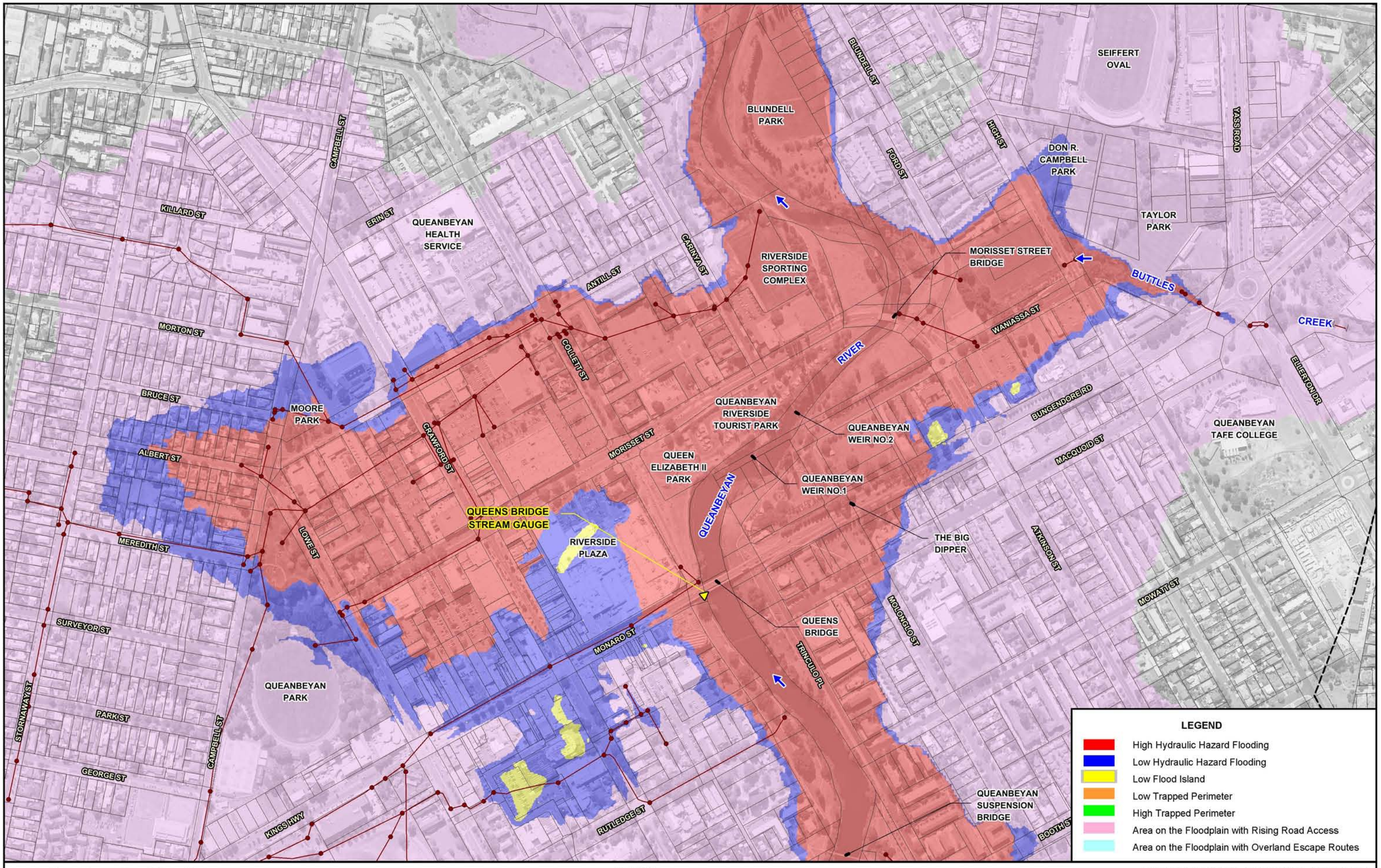
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.6
(Sheet 1 of 2)

FLOOD EMERGENCY RESPONSE PLANNING CLASSIFICATIONS
1% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
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LEGEND
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.6
(Sheet 2 of 2)

FLOOD EMERGENCY RESPONSE PLANNING CLASSIFICATIONS
1% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
FLAT
BARRACKS
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)
GOOGONG
MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
CRESTWOOD
DON R. CAMPBELL PARK
REFER SHEET 2
CRAWFORD ST
BUTTLES CREEK
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
ELLERTON DR
MOWATT ST
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1
COOMA ST
CAMERON RD
THORPE AVE

LEGEND

- High Hydraulic Hazard Flooding
- Low Hydraulic Hazard Flooding
- High Flood Island
- Low Flood Island
- High Trapped Perimeter

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

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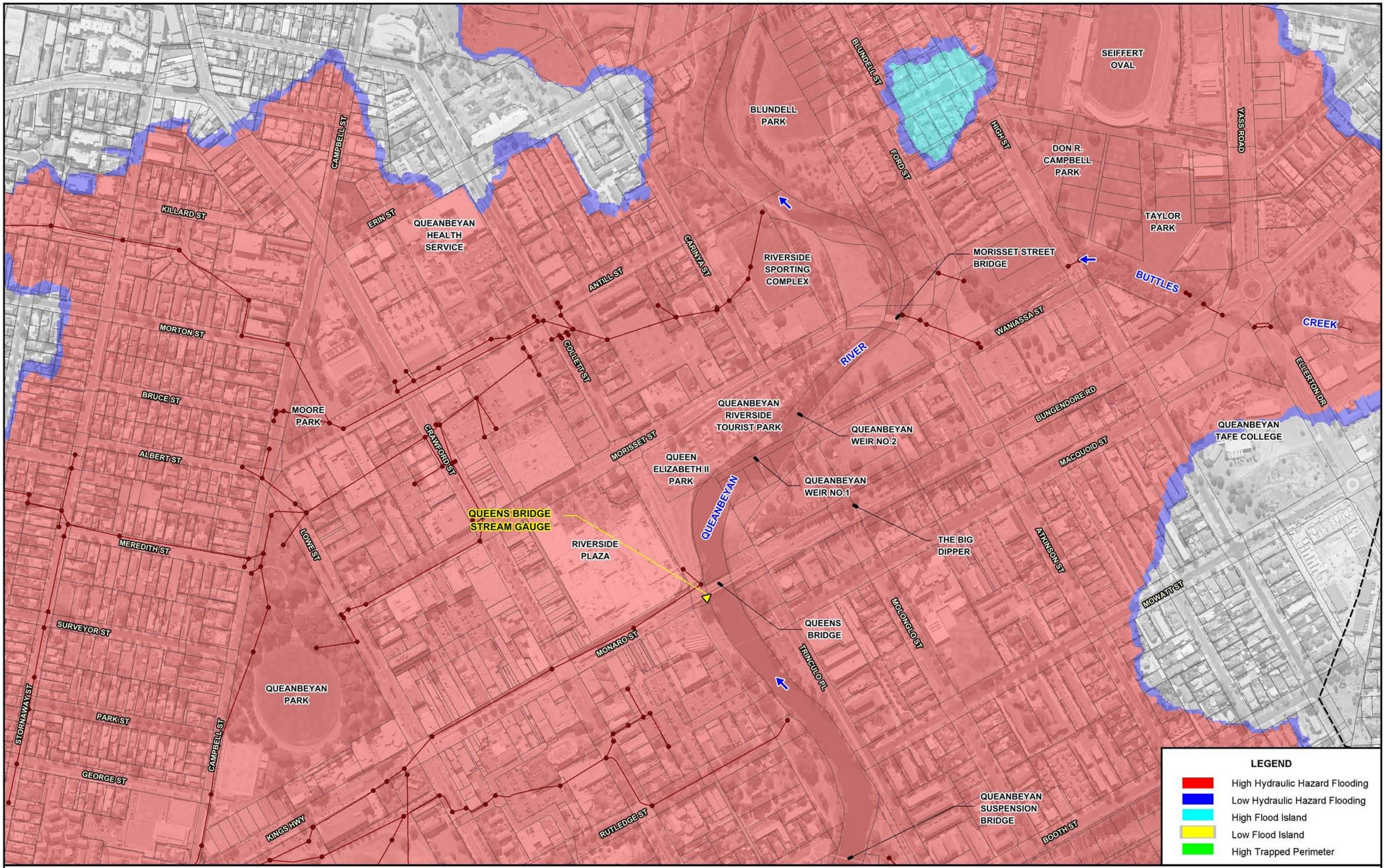
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.7
(Sheet 1 of 2)

FLOOD EMERGENCY RESPONSE PLANNING CLASSIFICATIONS
PMF



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure 3.7
(Sheet 2 of 2)

FLOOD EMERGENCY RESPONSE PLANNING CLASSIFICATIONS
PMF

APPENDIX B

HISTORIC FLOOD DATA

LIST OF FIGURES (APPENDIX B)

LOWER BORO (ANNWYN)
GS 70342

MOUNT FAIRY (MERIGAN)
GS 70105

BRAIDWOOD (KHAN YUNIS)
GS 70219

BRAIDWOOD (KRAWARREE)
GS 70057

JERRABATTGULLA (GILSTON)
GS 70261

SNOWBALL
GS 69062

ROSSI (SAWMILL)
GS 570923

PARKERS GAP
GS 70214

PARKER'S GAP
GS 570960

MOLONGLO RIVER CATCHMENT

BUNGENDORE (GIDLEIGH)
GS 70035

BUNGENDORE POST OFFICE
GS 70011

BUNGENDORE

BALLALLABA CREEK

CAPTAINS FLAT (FOXLOW ST)
GS 70016

MOLONGLO RIVER AT KOBADA
GS 41000208

CAPTAINS FLAT

MOLONGOLO RIVER

HOSKINTOWN RADIO OBSERVATORY
GS 70048

CAPTAINS FLAT (BALLINAFADO PLANTATION)
GS 70324

BALLINAFAD CREEK

SHERLOCK CREEK

JERANGLE (SLAP-UP)
GS 570931

JINGERA (HILLSIDE)
GS 570916

QUEANBEYAN RIVER

PRIMROSE VALLEY CREEK

MOLONGLO RIVER AT BURBONG
GS 410705

TINDERRY (QUEANBEYAN RIVER)
GS 570965

JERANGLE (LYONS CREEK)
GS 70321

QUEANBEYAN RIVER U/S GOOGONG DAM
GS 410781

QUEANBEYAN RIVER AT TINDERRY
GS 410734

SUTTON THE ANCHORAGE
GS 70233

QUEENS BRIDGE STREAM GAUGE

BRADLEYS CREEK

QUEANBEYAN RIVER AT WICKERSLACK
GS 410760

QUEANBEYAN RIVER U/S GOOGONG DAM
GS 570816

QUEANBEYAN RIVER CATCHMENT

SUTTON (UBA)
GS 70232

SUTTON (GOOLABRI DVE)
GS 70346

MOLONGLO RIVER AT OAKS ESTATE
GS 570943

MOLONGLO RIVER AT OAKS ESTATE
GS 410729

WICKERSLACK
GS 570983

GOOGONG

GOOGONG CLIMATE STATION
GS 570818

GOOGONG DAM

BURRA CREEK AT BURRA ROAD
GS 410774

BURRA CREEK

CANBERRA AIRPORT COMPARISON
GS 70351

QUEANBEYAN BOWLING CLUB
GS 70072

QUEANBEYAN RIVER AT A.C.T. BORDER
GS 410770

GOOGONG (FERNLEIGH DVE)
GS 70347

BURRA CREEK AT BURRA ROAD
GS 570951

CANBERRA PARLIAMENT HOUSE
GS 70246

AINSLIE TYSON ST
GS 70000

CANBERRA

MICHELAGO (SOGLIO)
GS 70064

MURRUMBIDGEE RIVER

BREDBO (BREDBO STATION)
GS 70098

CANBERRA (AUSTRALIAN NATIONAL BOTANIC GA
GS 70247

MAWSON (BERNACCHI ST)
GS 70256

TUGGERANONG (ISABELLA PLAINS) AWS
GS 70339

GARRAN (FEDERAL GOLF CLUB)
GS 70249

MOLONGLO RIVER

CHAKOLA (RIVERSDALE)
GS 70073

LAKE BURLEY GRIFFIN

TORRENS (DARKE ST)
GS 70308

LANYON HOUSE
GS 70331

STROMLO FOREST
GS 70231

THARWA GENERAL STORE
GS 70083

MOLONGOLO

2500 0 2500 5000 7500 m

Scale: 1:250,000

LEGEND

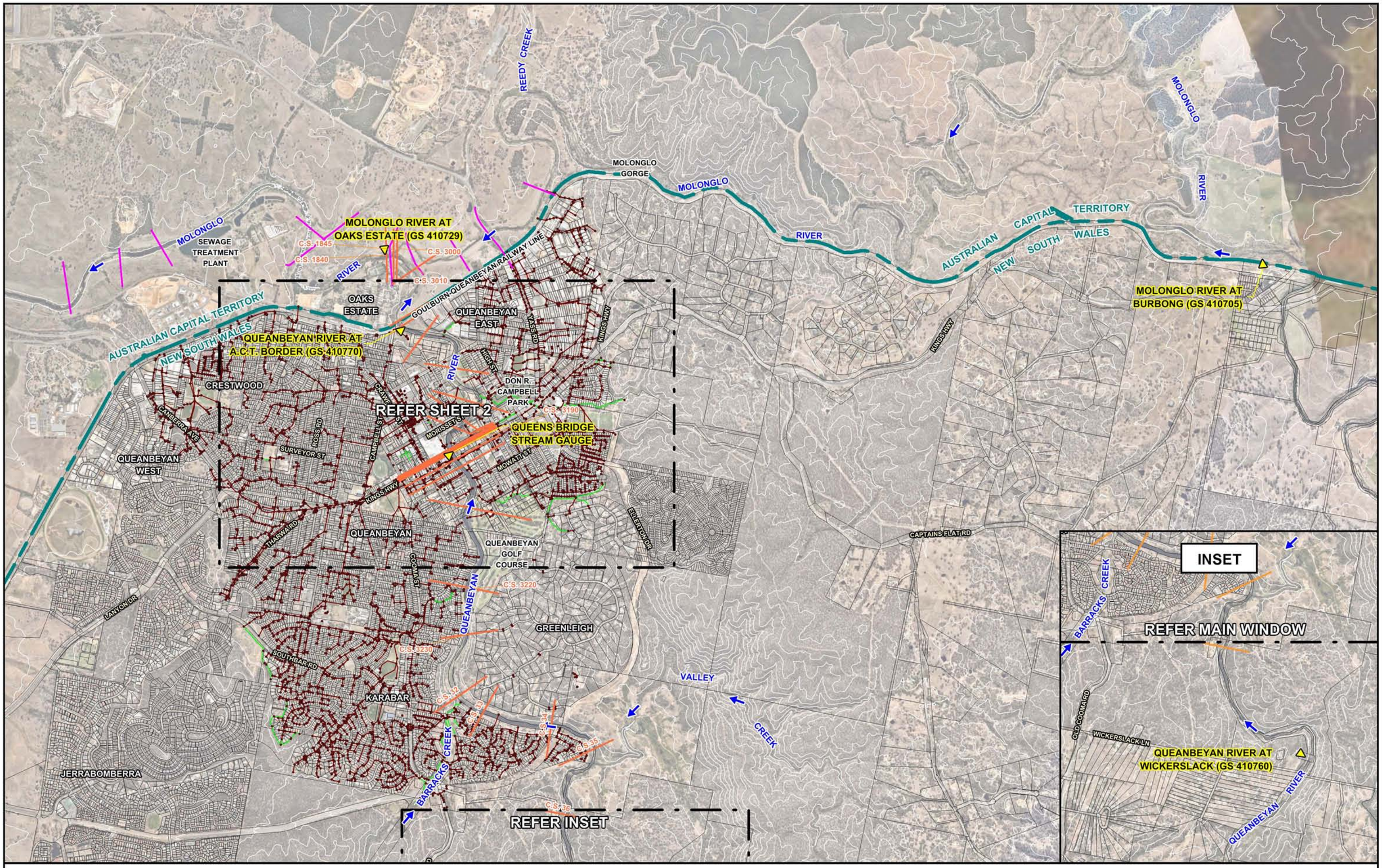
- Catchment Boundary
- Manually Read Stream Gauge
- IconWater Stream Gauge
- EPSDD Stream Gauge
- WaterNSW Stream Gauge
- BoM Daily Rainfall Station
- EPSDD Pluviographic Gauge

Lyall & Associates

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B1.1

LOCATION OF RAIN AND STREAM FLOW GAUGES



N 300 0 300 600 900 m

Scale: 1:30,000

Lyall & Associates

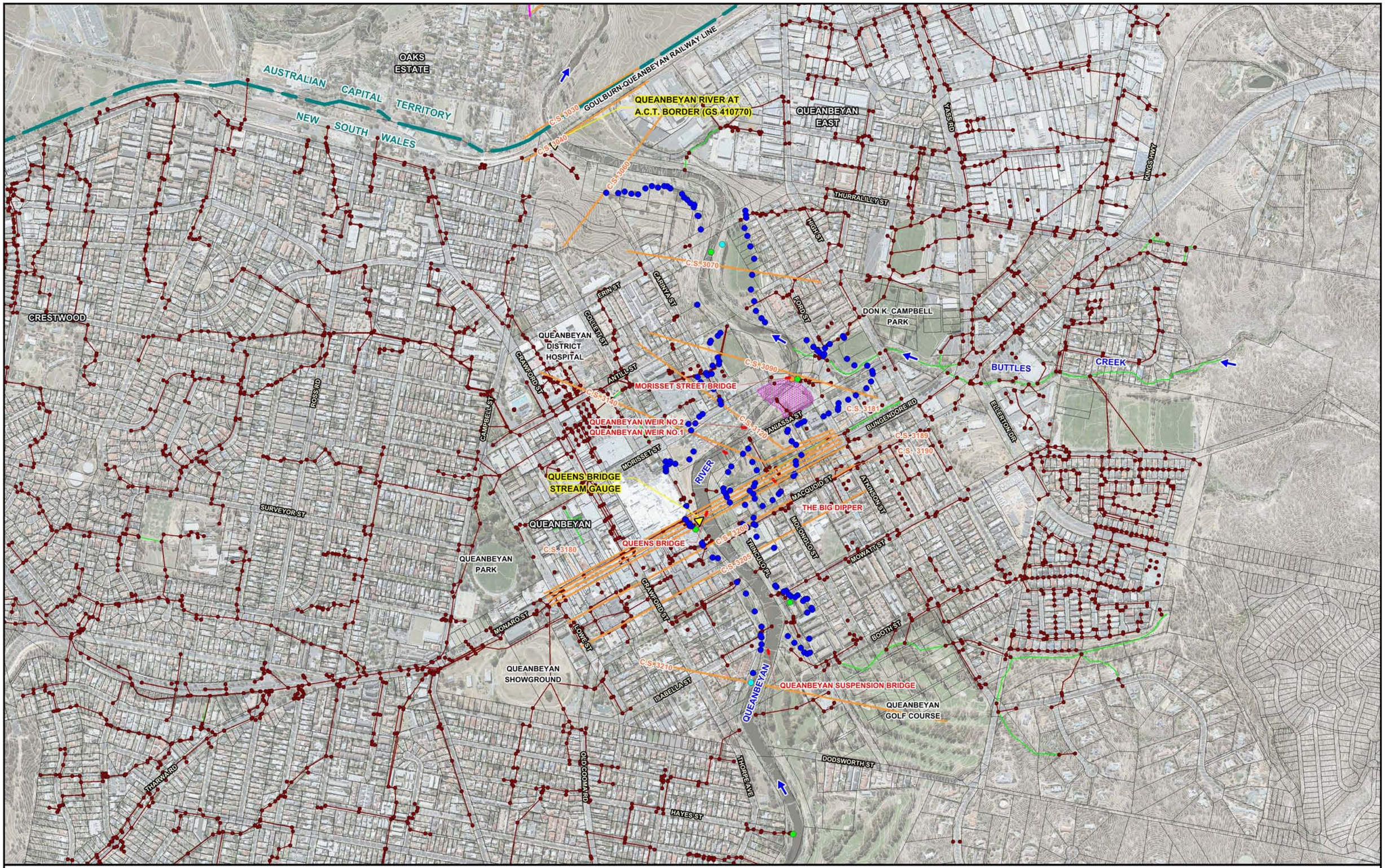
LEGEND

- Existing Piped Stormwater Drainage System
- Existing Stormwater Channel
- Stream Gauge
- Surveyed Cross Section (Lyall & Associates, 2008)
- Surveyed Cross Section (DWR, 1992)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B1.2
(Sheet 1 of 2)

LOCATION OF HISTORIC FLOOD MARKS AND SOURCES OF DATA AT QUEANBEYAN



N

100 0 100 200 300 m

Scale: 1:10,000

Lyall & Associates

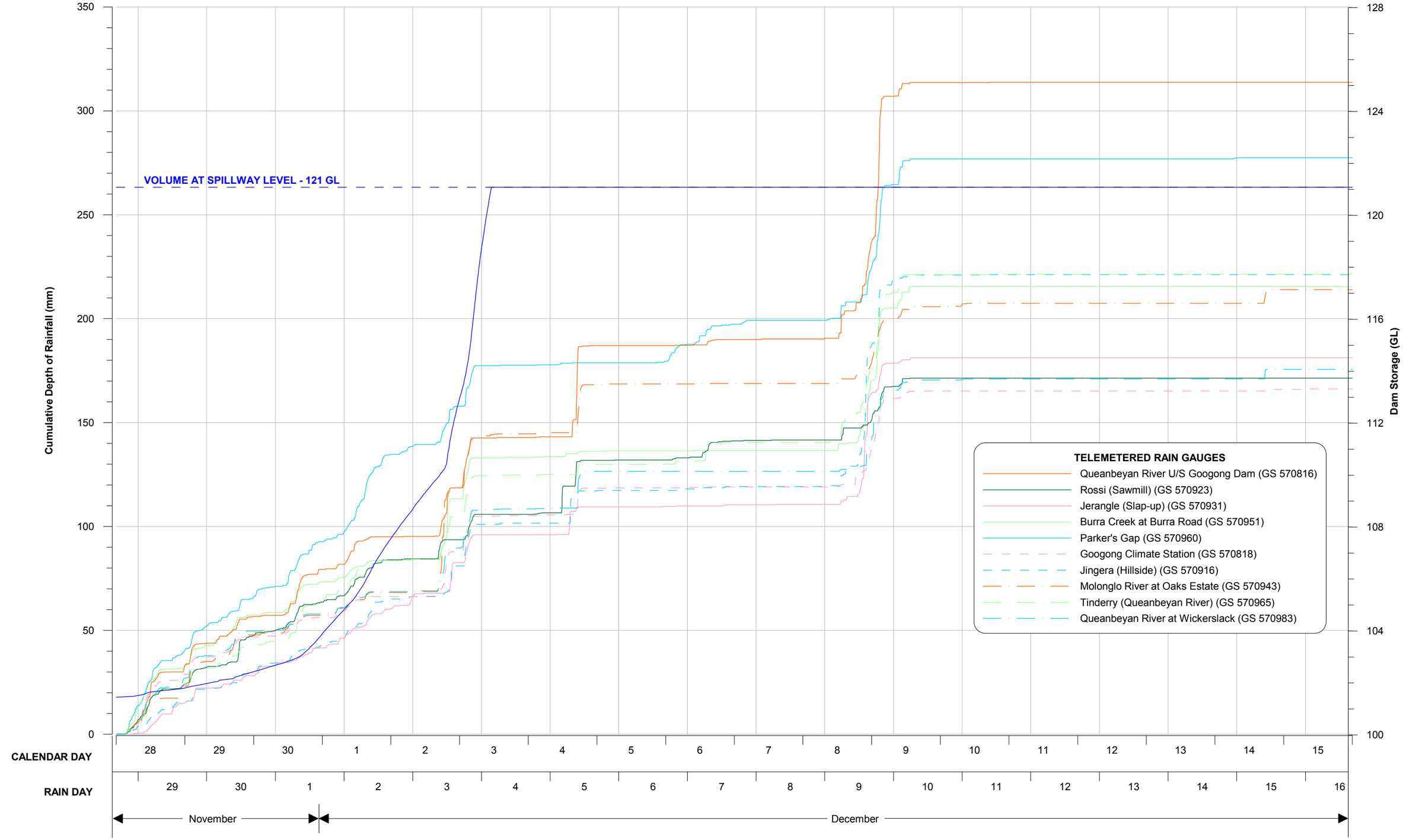
LEGEND

- May 1925 Flood Mark
- August 1974 Flood Mark
- October 1976 Flood Mark
- December 2010 Flood Mark
- Stream Gauge
- Existing Piped Stormwater Drainage System
- Existing Stormwater Channel
- Extent of Detailed Ground Survey
- Surveyed Cross Section (Lyall & Associates, 2008)
- Surveyed Cross Section (DWR, 1992)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B1.2
(Sheet 2 of 2)

LOCATION OF HISTORIC FLOOD MARKS AND SOURCES OF DATA AT QUEANBEYAN



NOTE :
Time zero on calendar day axis = 00:00 hours on 28 November 2010

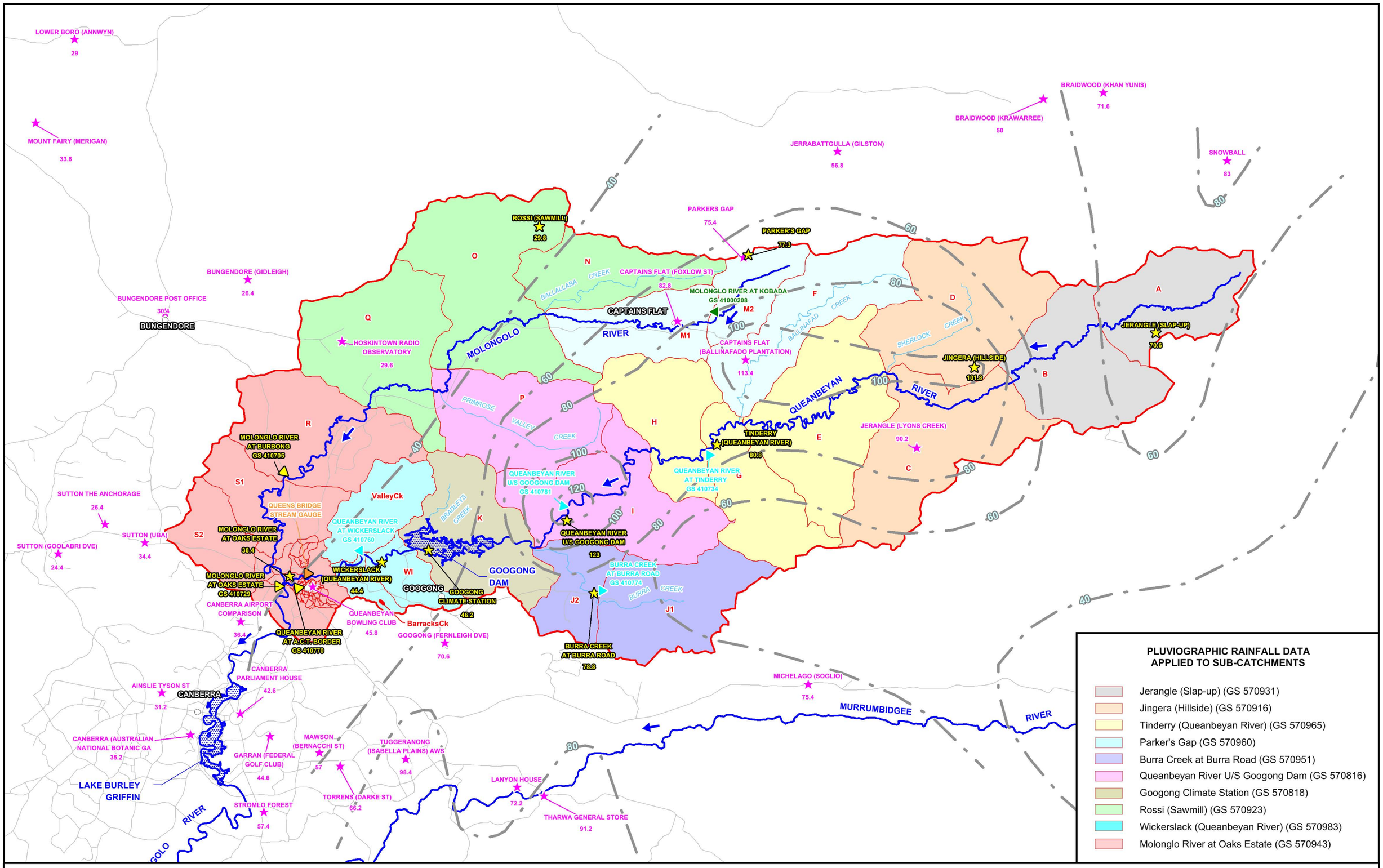
LEGEND
Storage Volume

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B3.1

CUMULATIVE RAINFALL
DECEMBER 2010 STORM

Lyall & Associates



PLUVIOGRAPHIC RAINFALL DATA APPLIED TO SUB-CATCHMENTS

- Jerangle (Slap-up) (GS 570931)
- Jingera (Hillside) (GS 570916)
- Tinderry (Queanbeyan River) (GS 570965)
- Parker's Gap (GS 570960)
- Burra Creek at Burra Road (GS 570951)
- Queanbeyan River U/S Googong Dam (GS 570816)
- Googong Climate Station (GS 570818)
- Rossi (Sawmill) (GS 570923)
- Wickerslack (Queanbeyan River) (GS 570983)
- Molonglo River at Oaks Estate (GS 570943)

N

2500 0 2500 5000 7500 m

Scale: 1:250,000

LEGEND

- J1 — Sub-Catchment Boundary and Identifier
- Manually Read Stream Gauge
- IconWater Stream Gauge
- EPSDD Stream Gauge
- WaterNSW Stream Gauge
- BoM Daily Rainfall Station and Recorded Depth (mm)
- EPSDD Pluviographic Gauge and Recorded Depth (mm)
- 48 Hour Depth of Rainfall (mm)

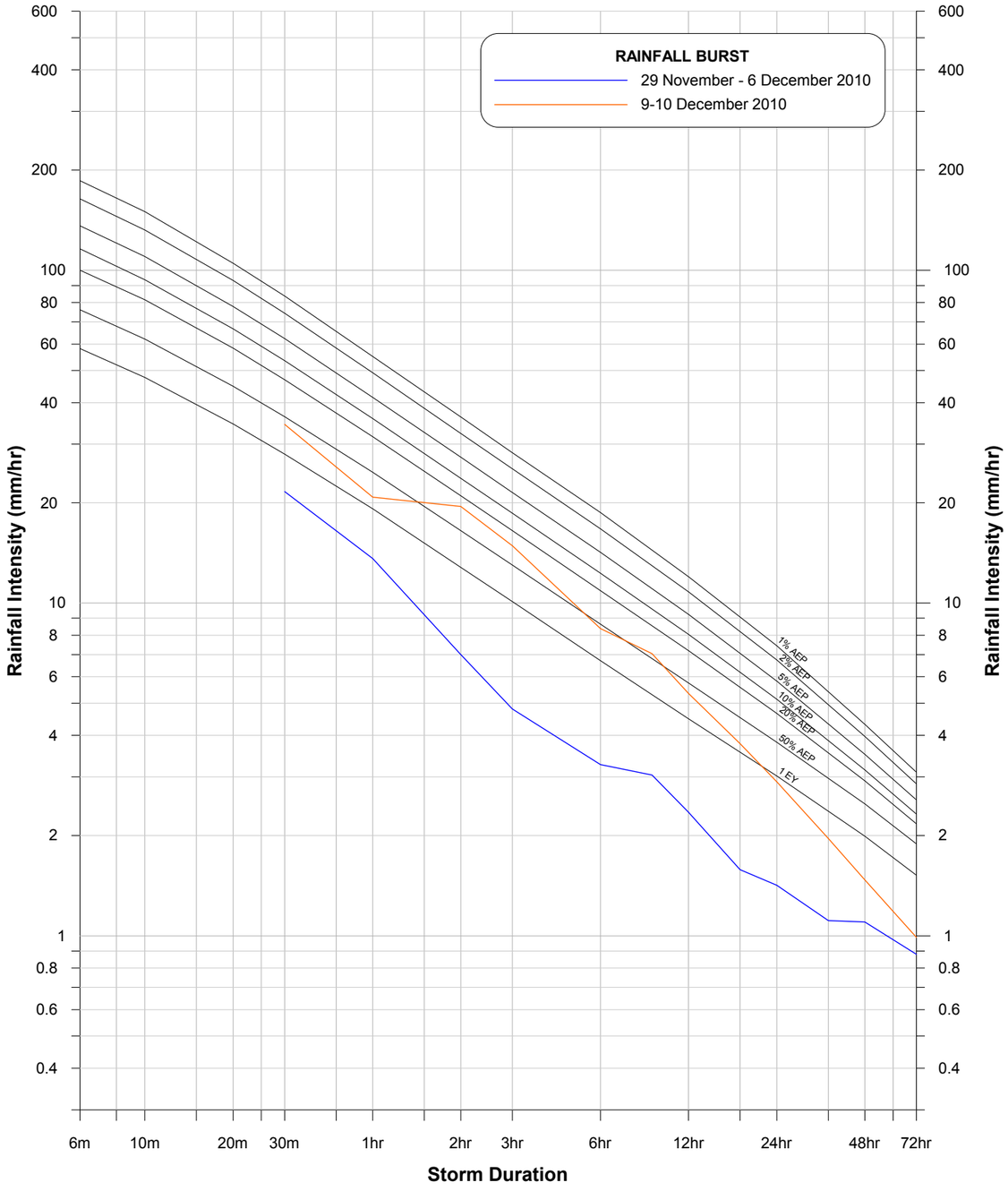
Lyall & Associates

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

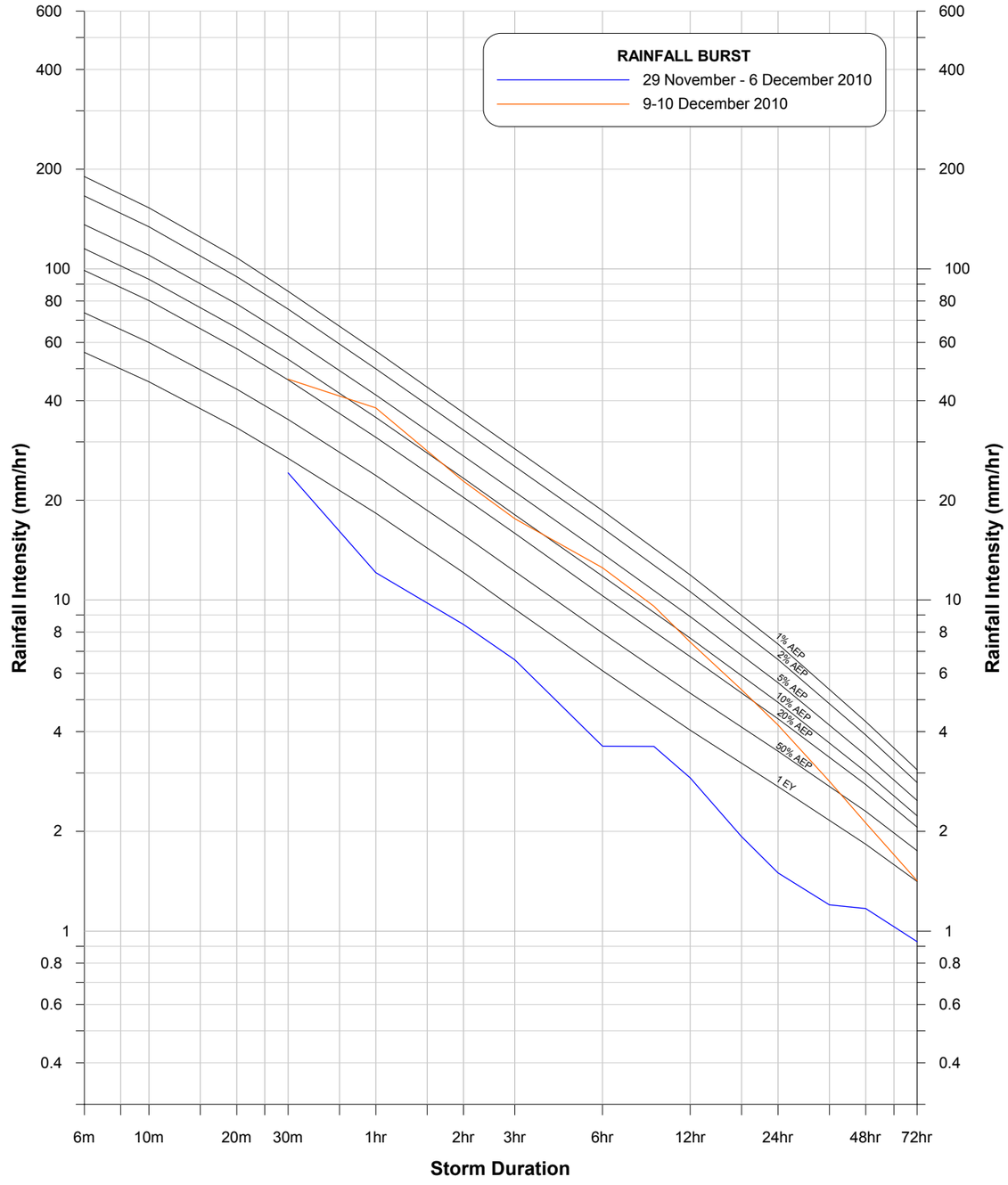
Figure B3.2

ISOHYETAL MAP
RAIN DAYS OF 9 AND 10 DECEMBER 2010

JERANGLE (SLAP-UP)
(GS 570931)



JINGERA (HILLSIDE)
(GS 570916)



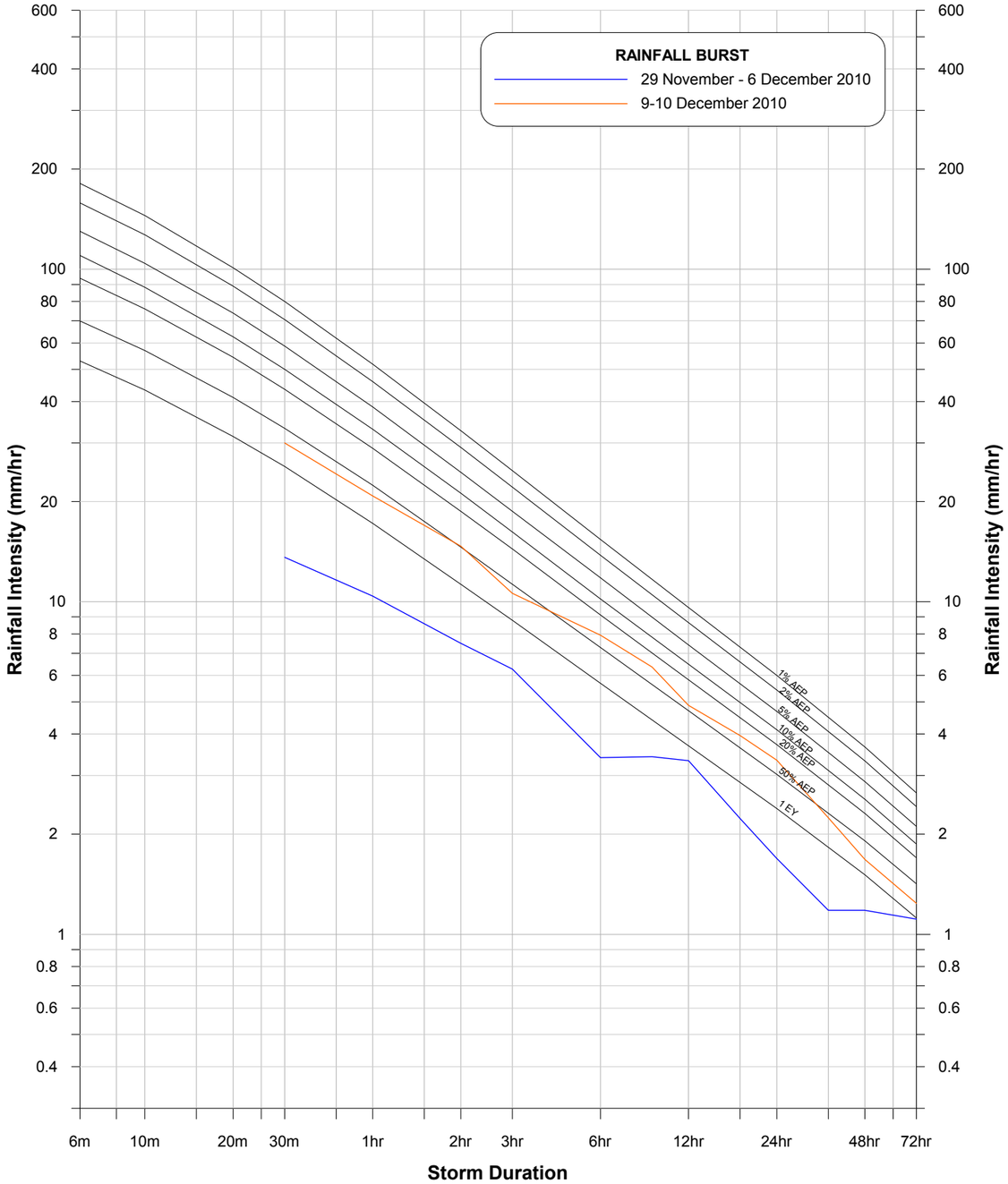
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B3.3
(Sheet 1 of 5)

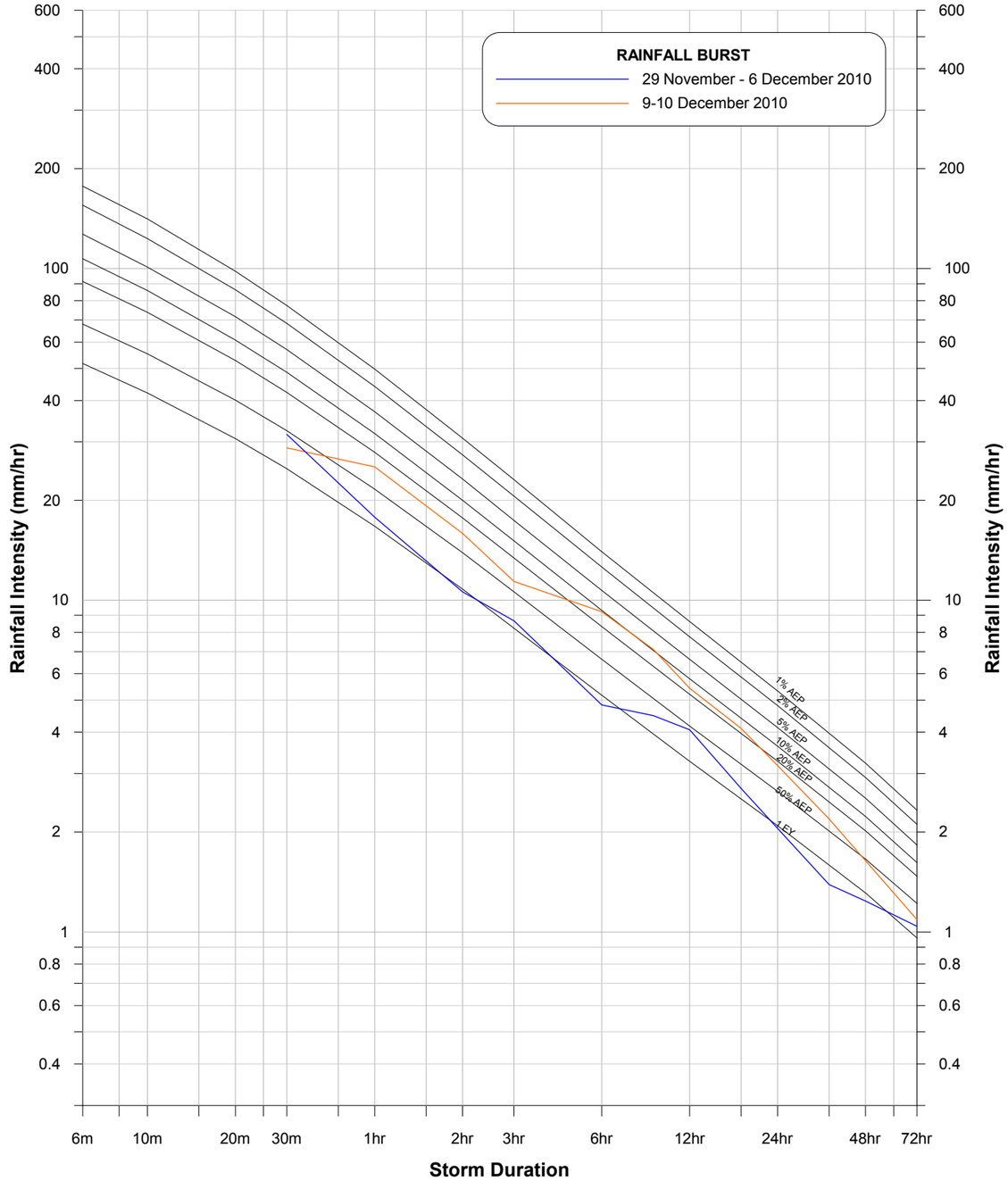
INTENSITY-FREQUENCY-DURATION CURVES
AND HISTORIC RAINFALL

Lyall & Associates

TINDERRY (QUEANBEYAN RIVER) (GS 570965)



BURRA CREEK AT BURRA ROAD (GS 570951)



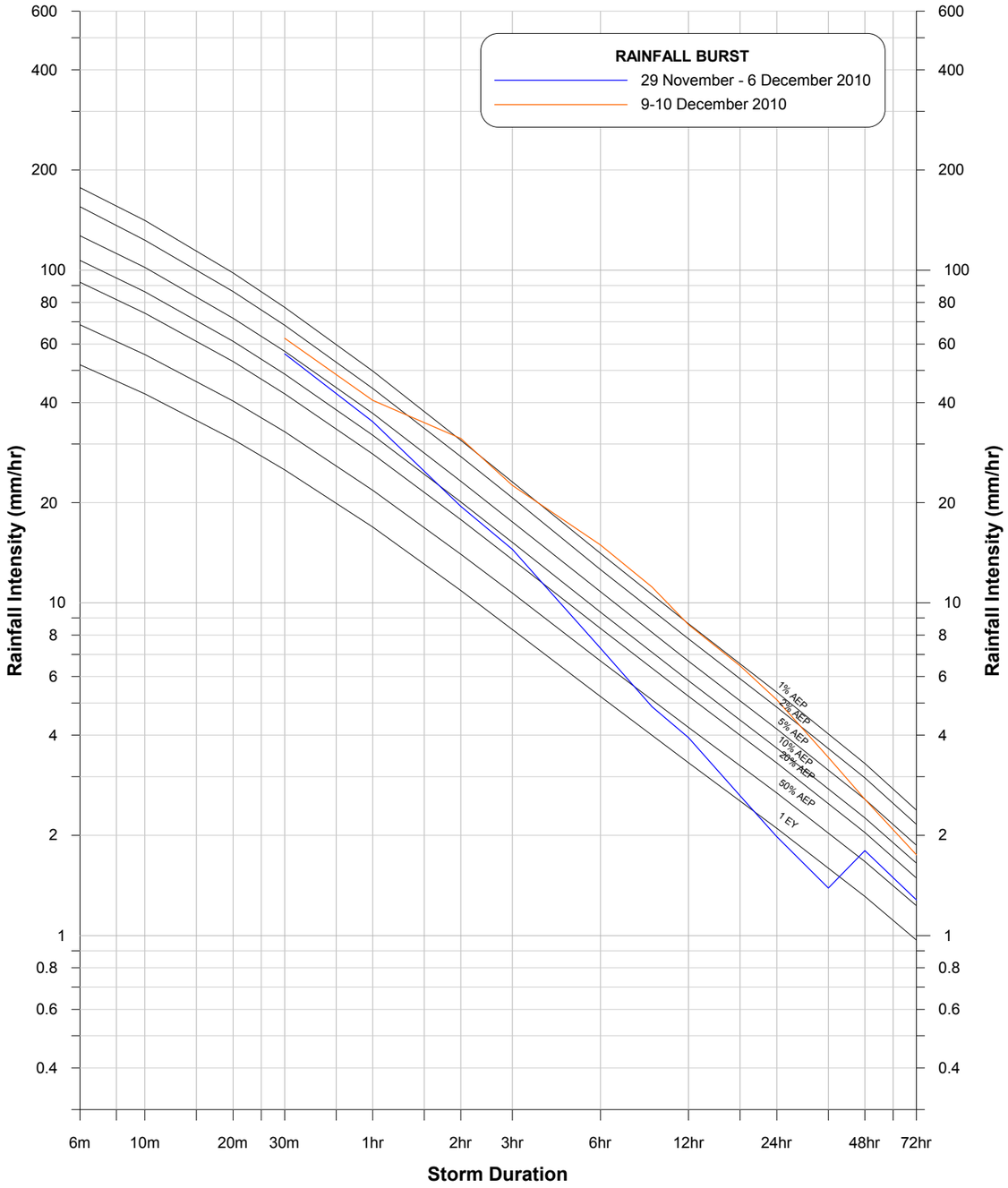
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B3.3
(Sheet 2 of 5)

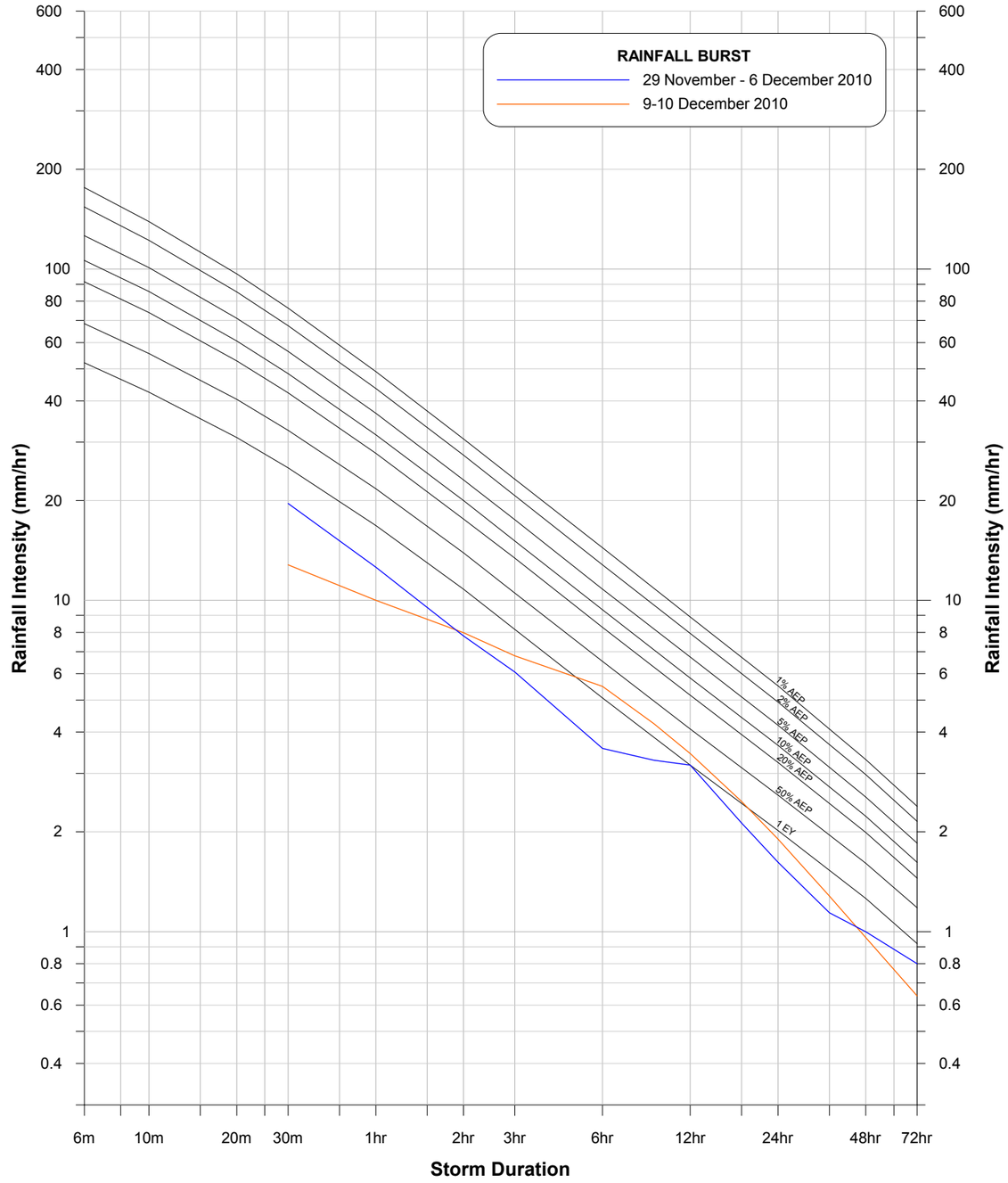
INTENSITY-FREQUENCY-DURATION CURVES AND HISTORIC RAINFALL

Lyall & Associates

QUEANBEYAN RIVER U/S GOOGONG DAM
(GS 570816)



GOOGONG CLIMATE STATION
(GS 570818)



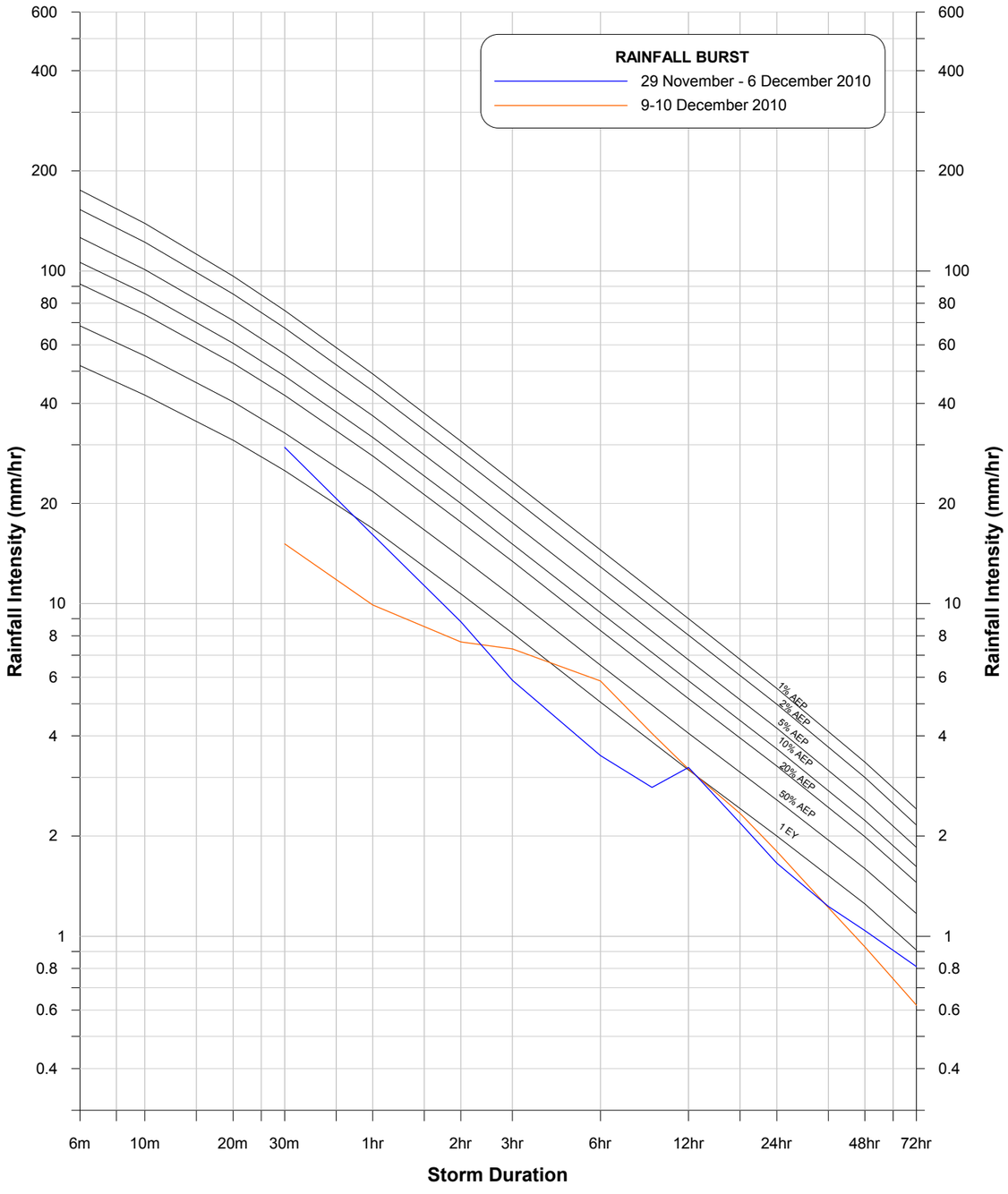
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B3.3
(Sheet 3 of 5)

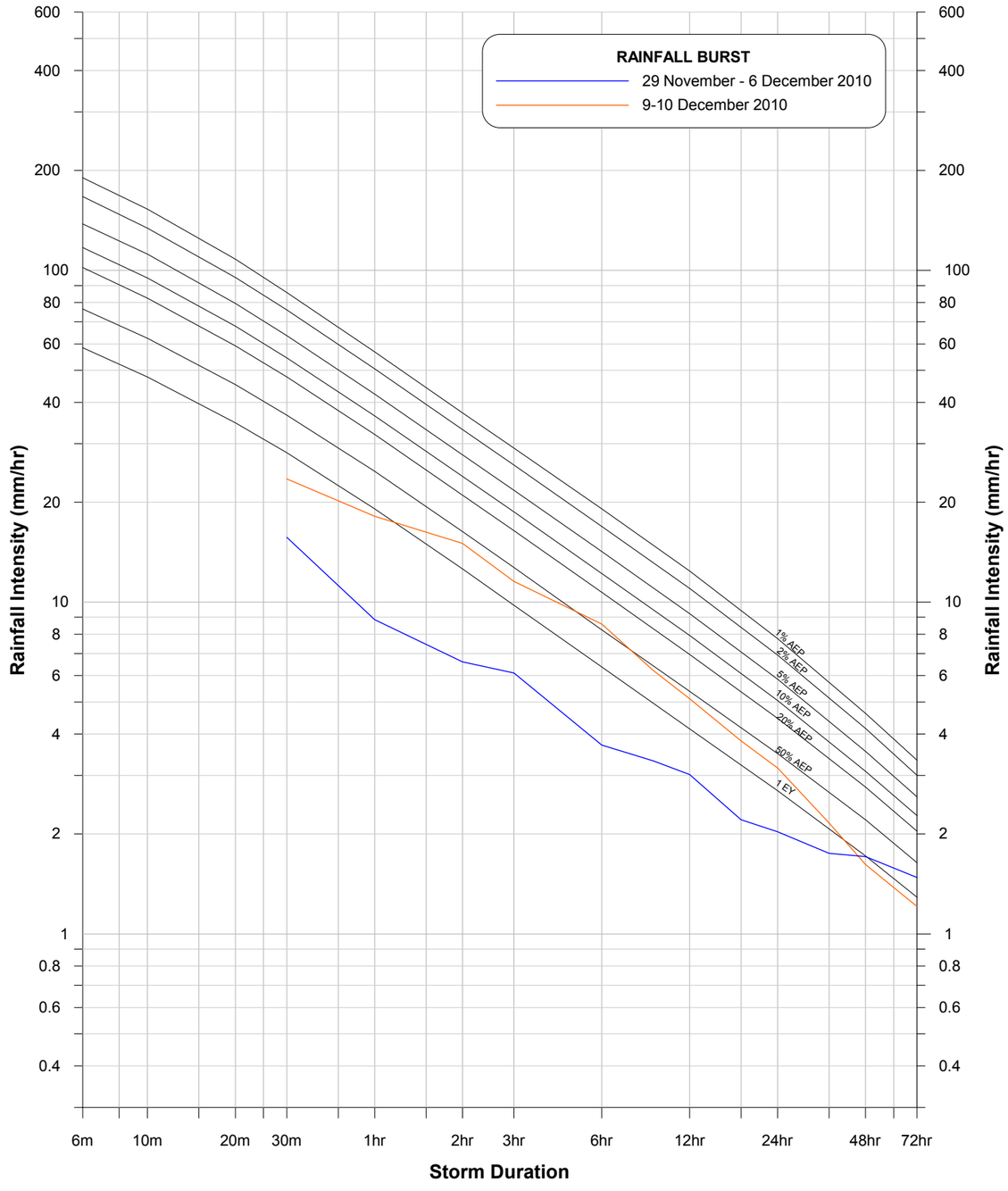
INTENSITY-FREQUENCY-DURATION CURVES
AND HISTORIC RAINFALL

Lyall & Associates

WICKERSLACK (QUEANBEYAN RIVER)
(GS 570983)



PARKERS GAP
(GS 570960)



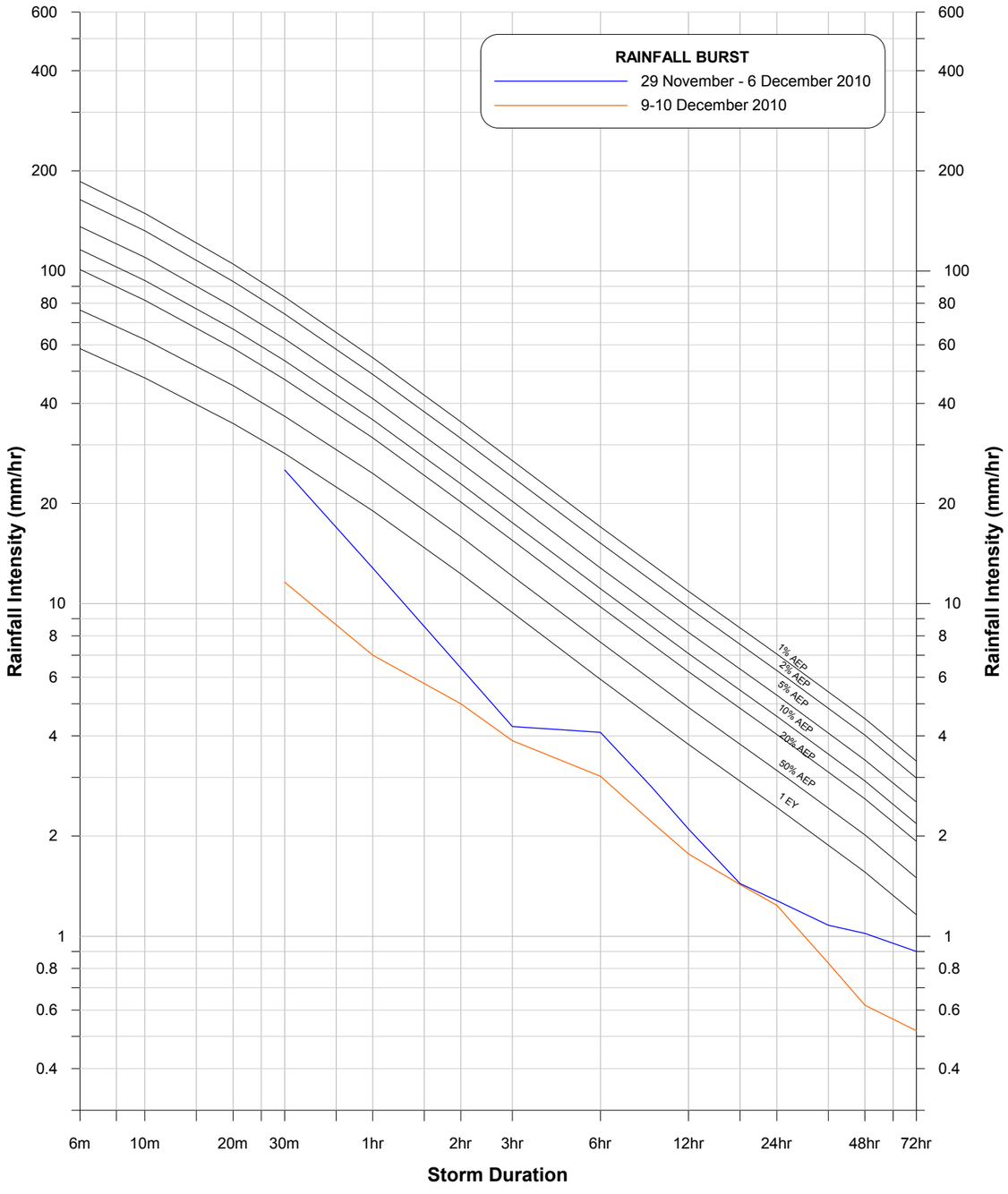
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B3.3
(Sheet 4 of 5)

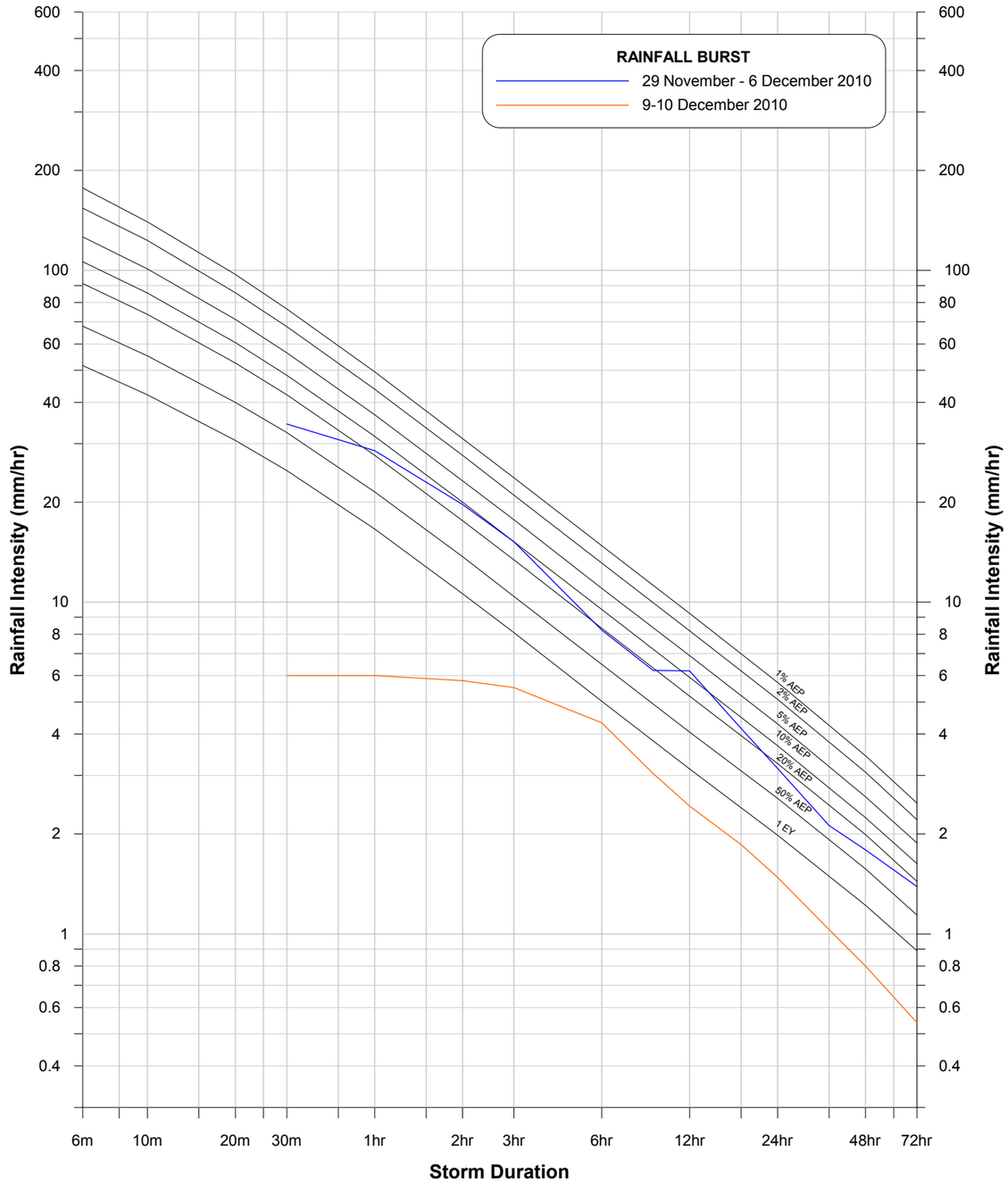
INTENSITY-FREQUENCY-DURATION CURVES AND HISTORIC RAINFALL

Lyall & Associates

ROSSI (SAWMILL)
(GS 570923)



MOLONGLO RIVER AT OAKS ESTATE
(GS 570943)



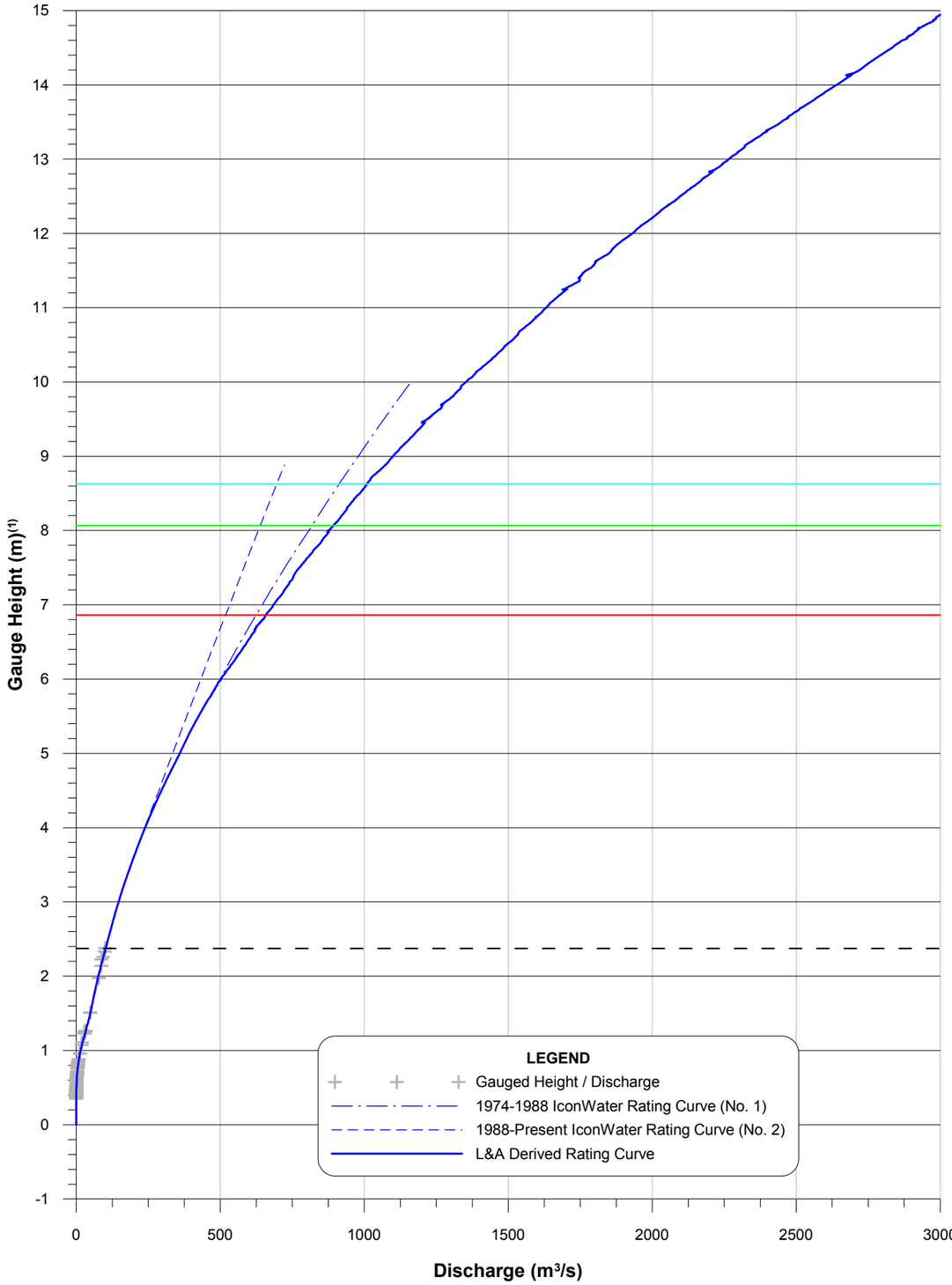
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B3.3
(Sheet 5 of 5)

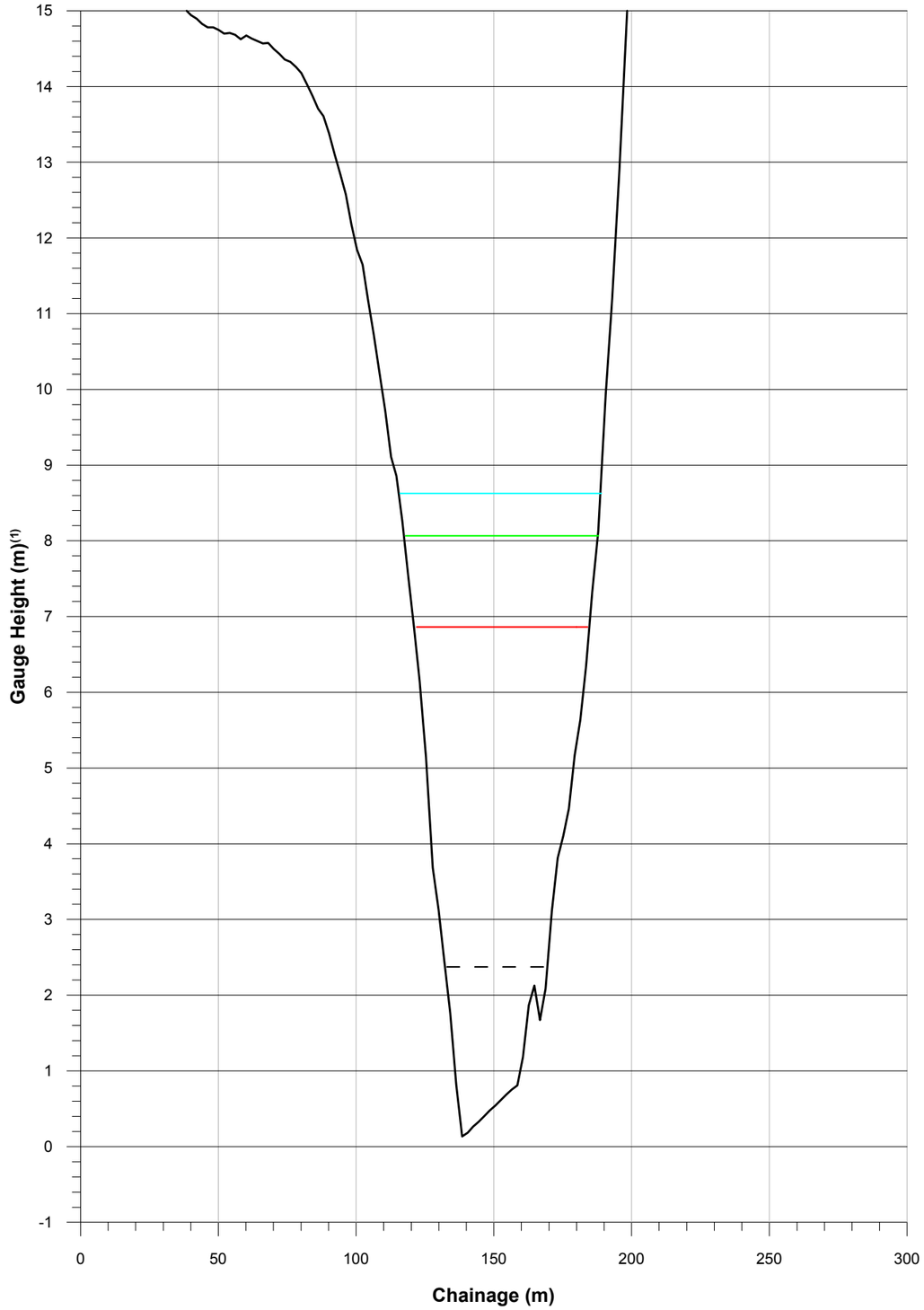
INTENSITY-FREQUENCY-DURATION CURVES
AND HISTORIC RAINFALL

Lyall & Associates

RATING CURVES



CROSS SECTION(2)



LEGEND

- August 1974 Peak Height - 8.63 m
- October 1976 Peak Height - 8.07 m
- December 2010 Peak Height - 6.86 m
- Max Gauged Height - 2.37 m

NOTES:

1. Gauge zero unknown.
2. Cross section derived using LiDAR survey data.

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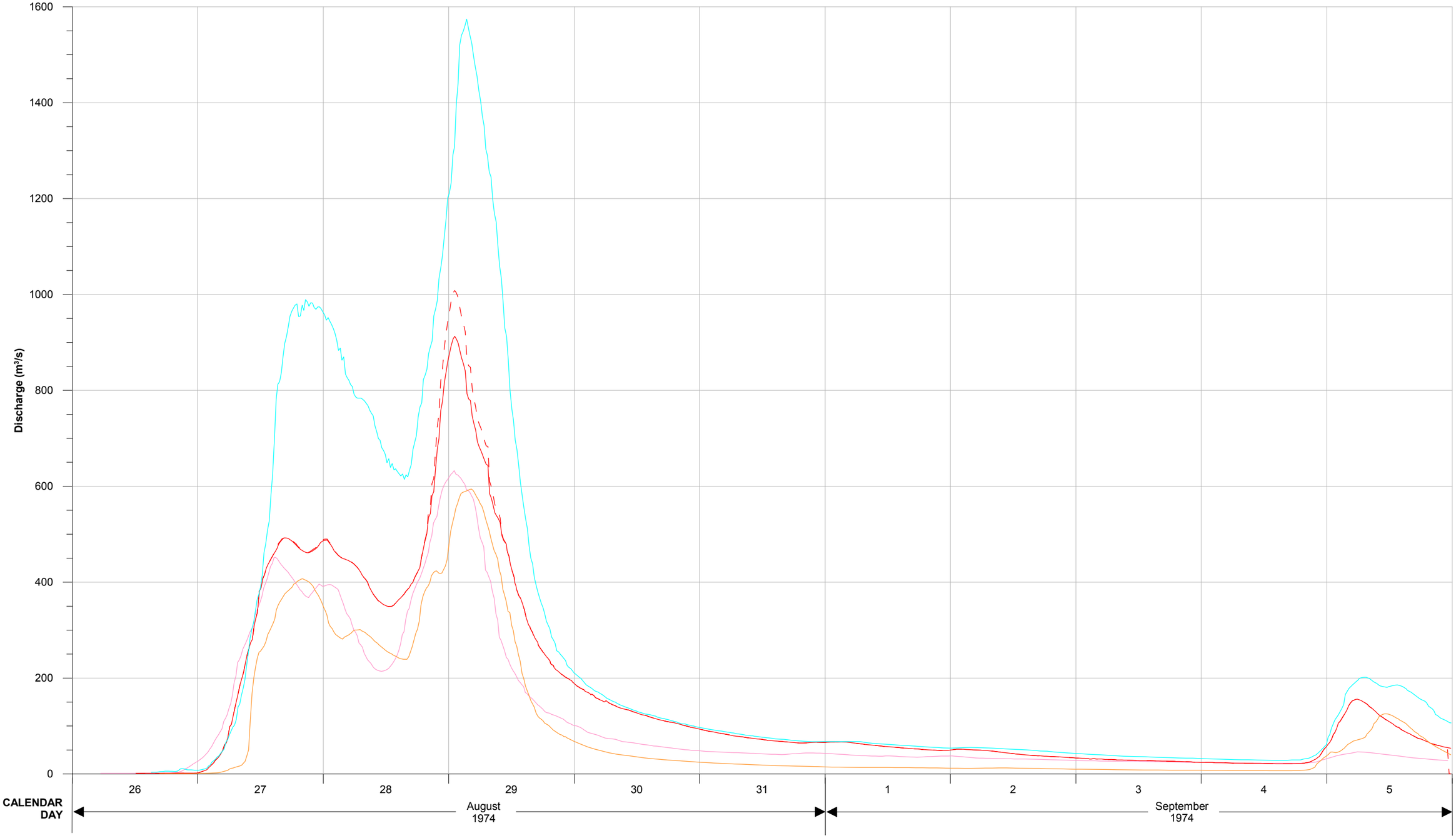
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.1

RATING CURVES AND CROSS SECTION
QUEANBEYAN RIVER AT WICKERSLACK STREAM GAUGE (GS 410760)



LEGEND

- Queanbeyan River at Tinderry (GS 410734)
- Queanbeyan River at Wickerslack (GS 410760)(3)
- Molonglo River at Burbong (GS 410705)
- Molonglo River at Oaks Estate (GS 410729)

NOTES:

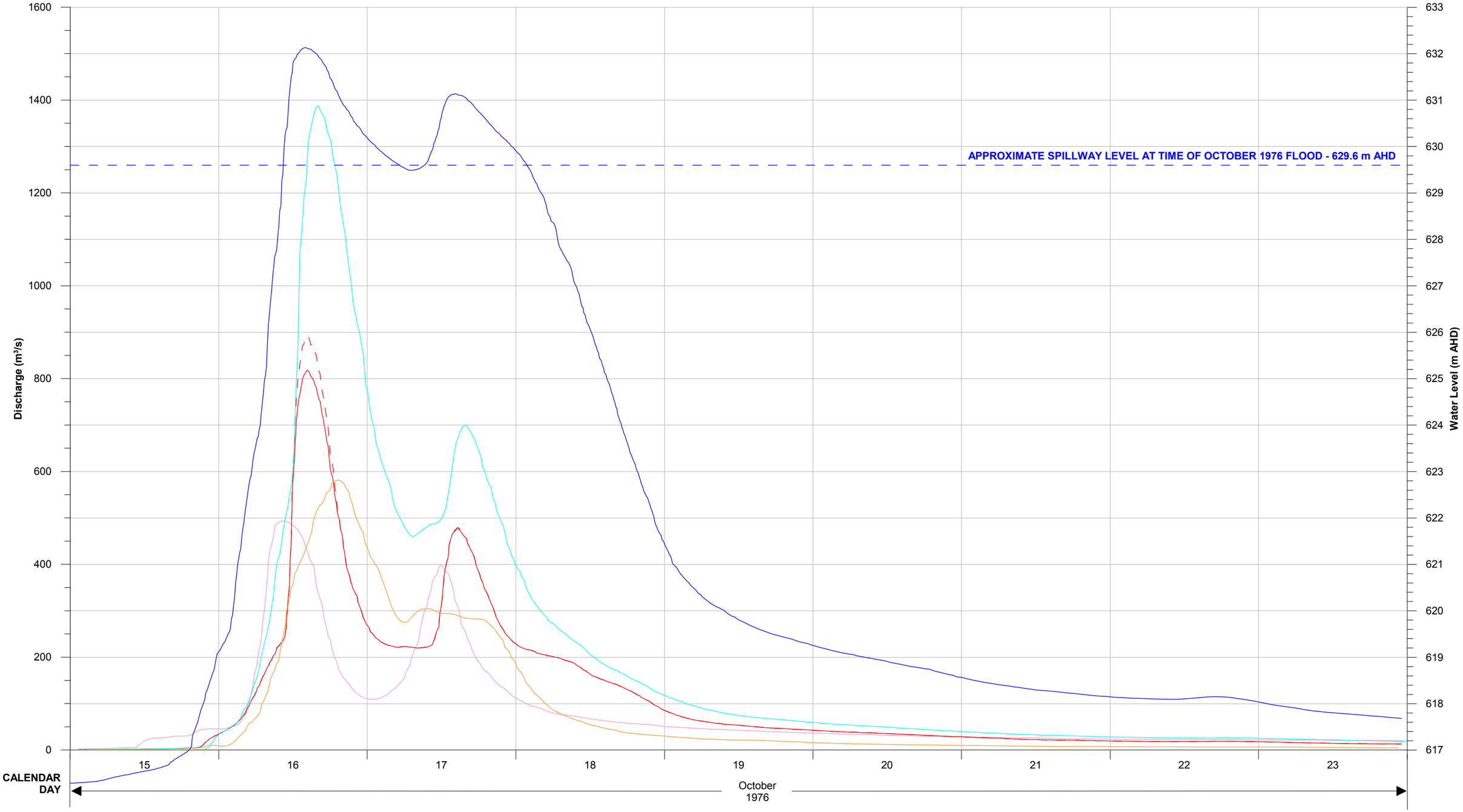
1. Time zero on calendar day axis = 00:00 hours on 26 August 1974.
2. Googong Dam was not present at the time of the August 1974 Flood.
3. Dashed line represents recorded discharge based on L&A Derived Rating Curve.

Lyall & Associates

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.2

RECORDED DISCHARGE HYDROGRAPHS
AUGUST 1974 FLOOD



LEGEND

- Queanbeyan River at Tinderry (GS 410734)
- Queanbeyan River at Wickerslack (GS 410760)(3)
- Molonglo River at Burbong (GS 410705)
- Molonglo River at Oaks Estate (GS 410729)
- Water Level - Googong Dam

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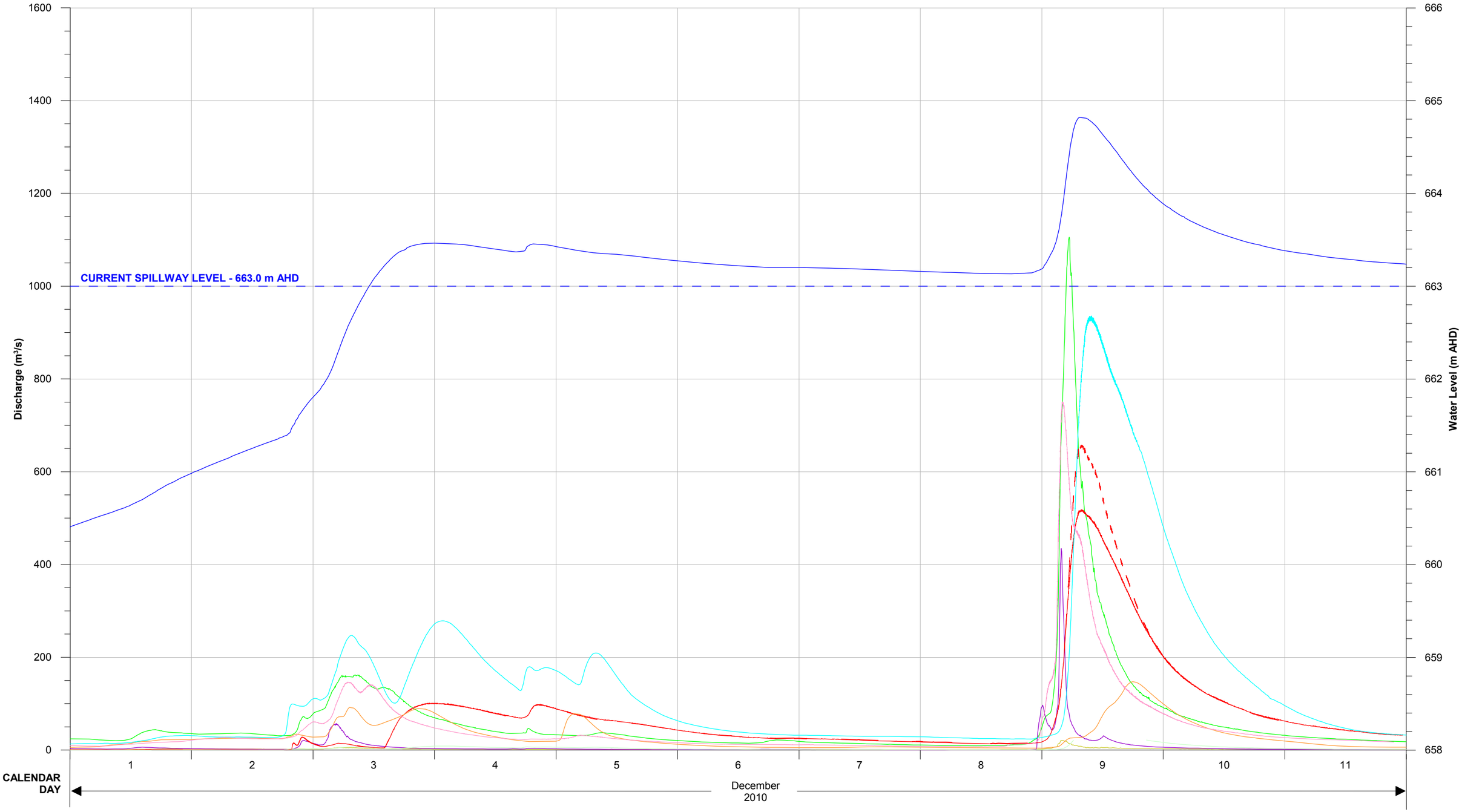
NOTES:

1. Time zero on calendar day axis = 00:00 hours on 15 October 1976.
2. Googong Dam was under construction at the time of the 1976 Flood.
3. Dashed line represents recorded discharge based on L&A Derived Rating Curve.

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.3

RECORDED DISCHARGE HYDROGRAPHS AND GOOGONG DAM DETAILS
OCTOBER 1976 FLOOD



LEGEND

- Queanbeyan River at Tinderry (GS 410734)
- Queanbeyan River U/S Googong Dam (GS 410781)
- Burra Creek at Burra Road (GS 410774)
- Queanbeyan River at Wickerslack (GS 410760)(2)
- Molonglo River at Burbong (GS 410705)
- Molonglo River at Oaks Estate (GS 410729)
- Molonglo River at Kobada (GS 41000208)(3)
- Queanbeyan River at A.C.T. Border (GS 410770)
- Water Level - Googong Dam

Lyall & Associates

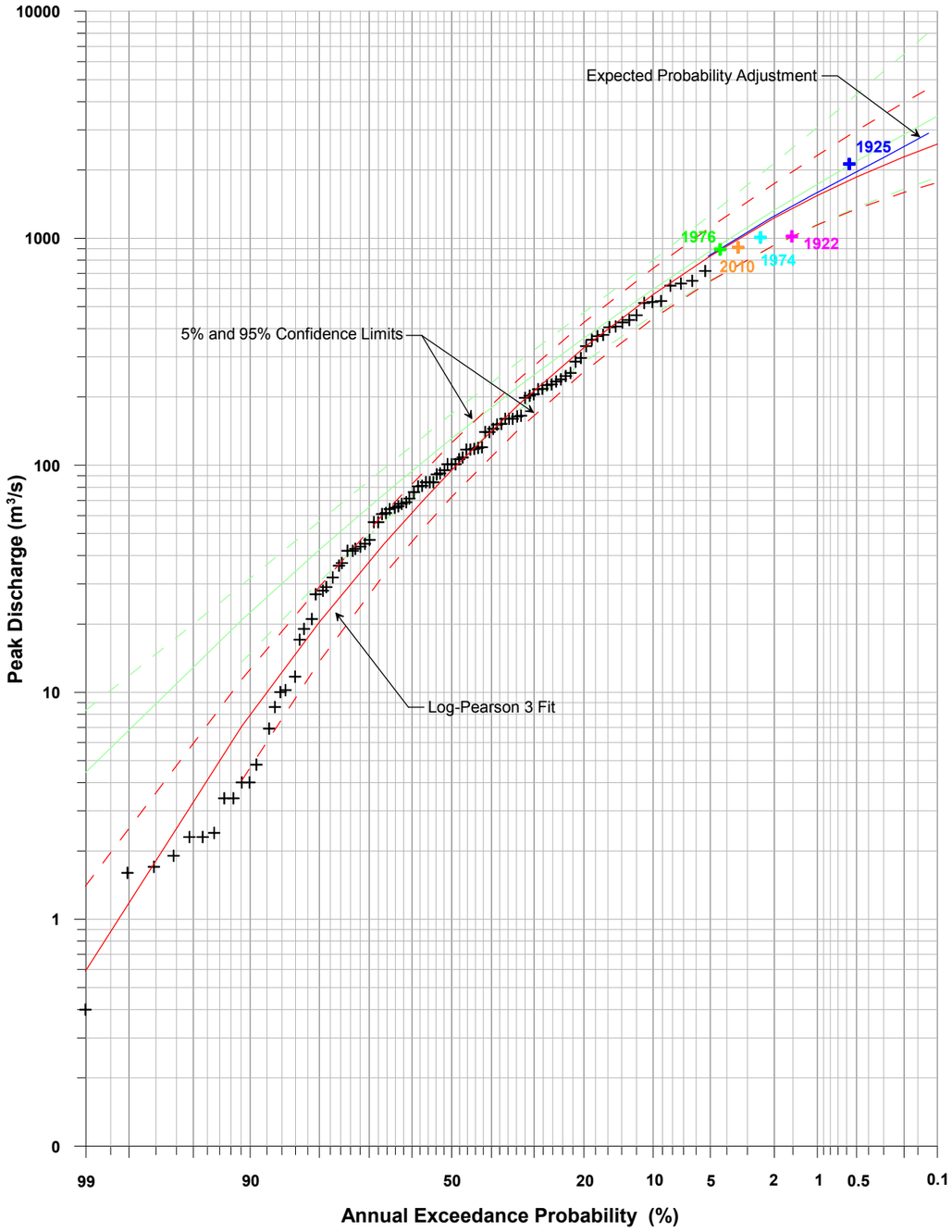
NOTES:

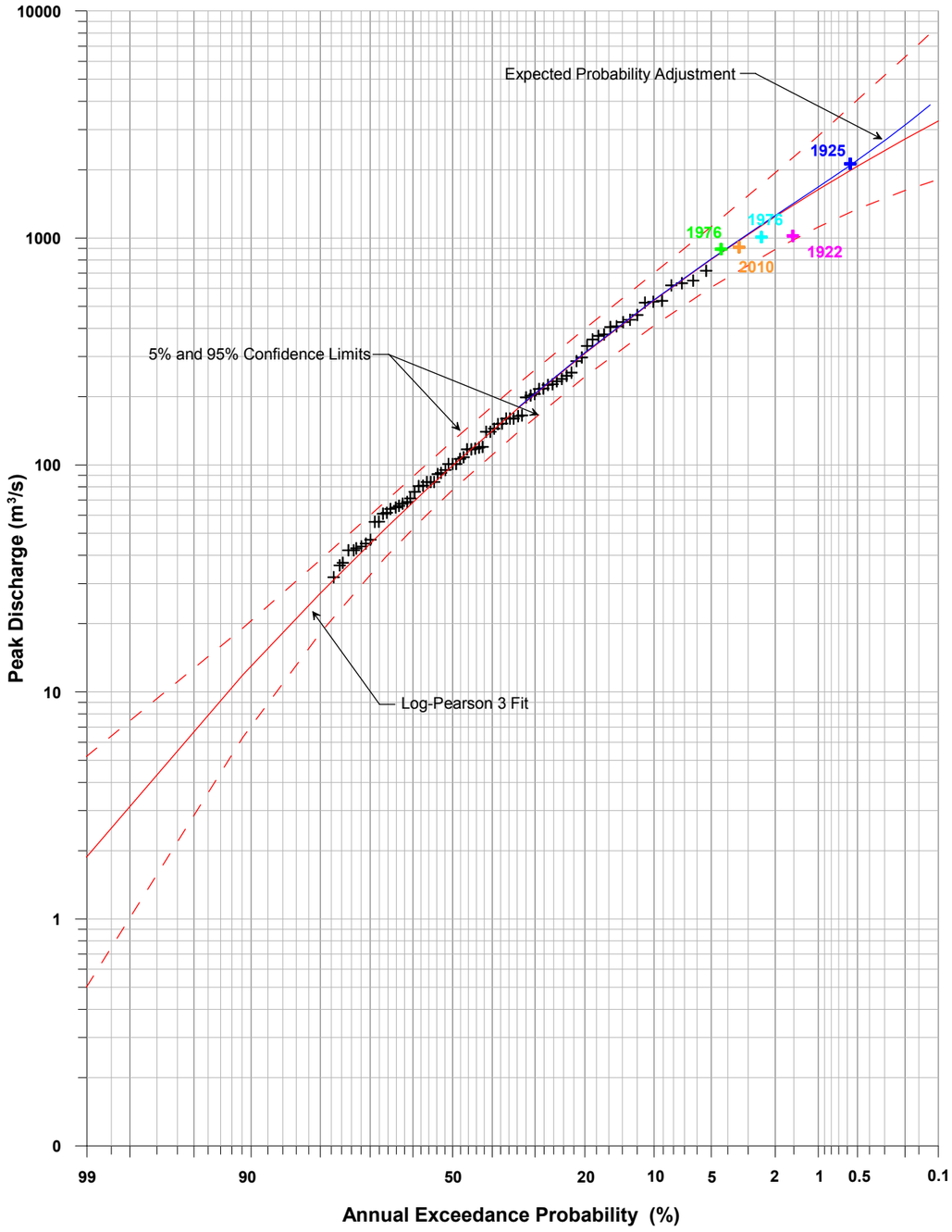
1. Time zero on calendar day axis = 00:00 hours on 1 December 2010.
2. Dashed line represents recorded discharge based on L&A Derived Rating Curve.
3. Discharge not recorded between 06:15 and 20:40 hours on 9 December 2010.

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.4

RECORDED DISCHARGE HYDROGRAPHS AND GOOGONG DAM DETAILS DECEMBER 2010 FLOOD





NOTES:

1. Flood frequency relationship based on pre-Googong Dam flows in the Queanbeyan River at the decommisioned Googong stream gauge. Annual peak flows for period of record after construction of the dam (i.e. 1977-2017) have been derived by converting post-dam peak flows recorded at the Wickerslack stream gauge using the pre- versus post-dam flow relationship presented in DWR, 1992 (refer Columns D and E in Table C2.2).
2. Red lines show flood frequency relationship based on full period of record (i.e. 1913-2017), while green lines show flood frequency relationship based on same period of record used in DWR, 1992 (i.e. 1913-1991).

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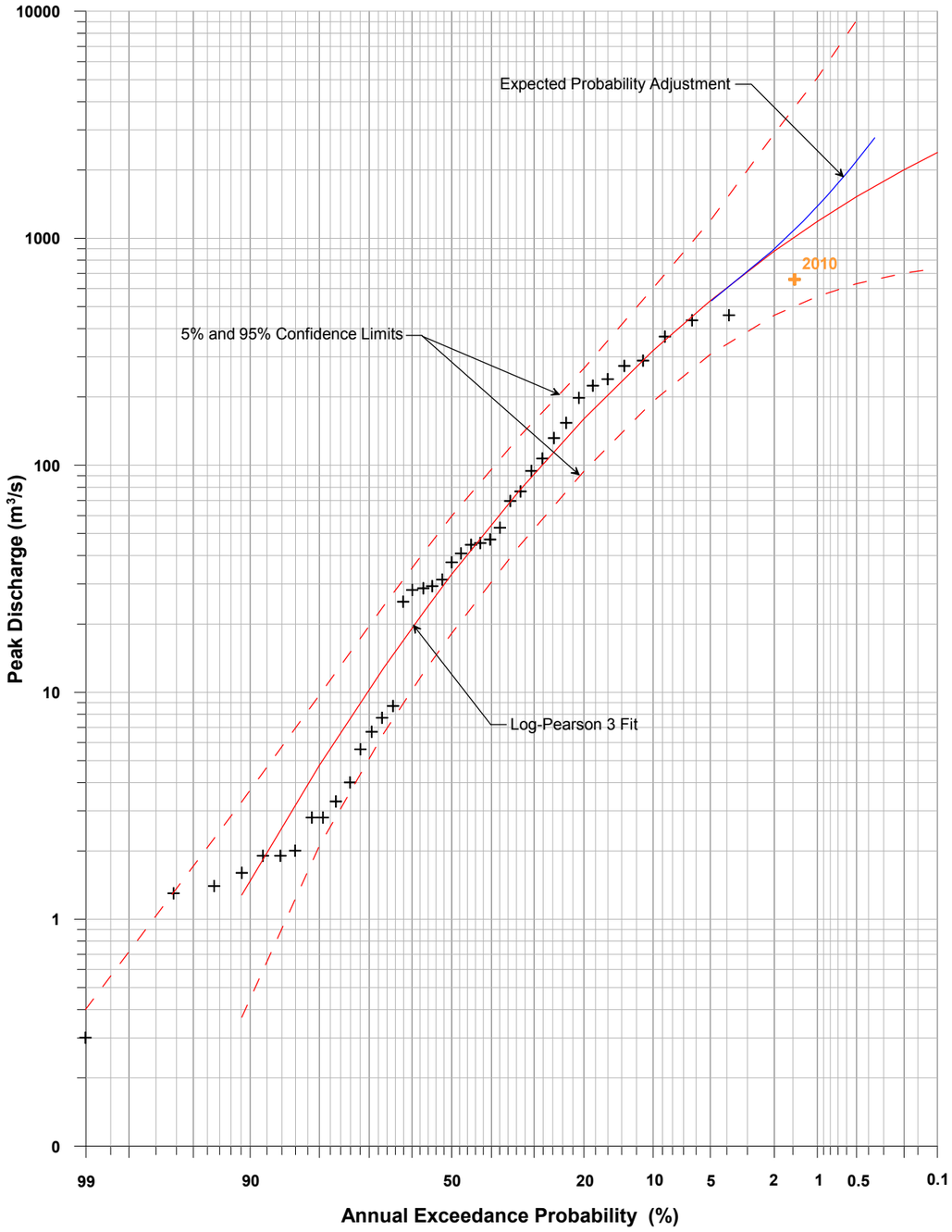
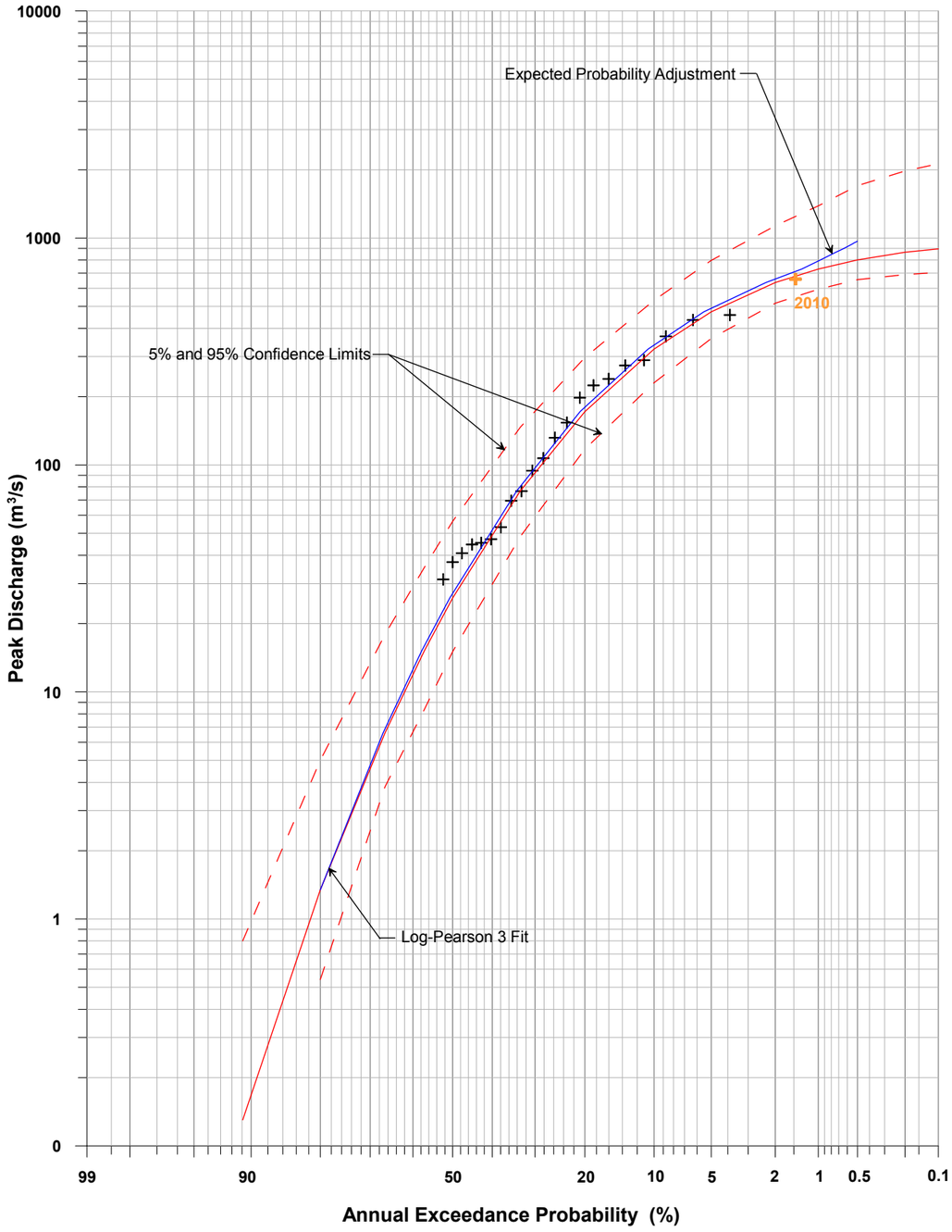
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.5

FLOOD FREQUENCY RELATIONSHIP
LOG-PEARSON 3 ANNUAL SERIES 1913-2017
QUEANBEYAN RIVER AT GOOGONG STREAM GAUGE (GS 410701)





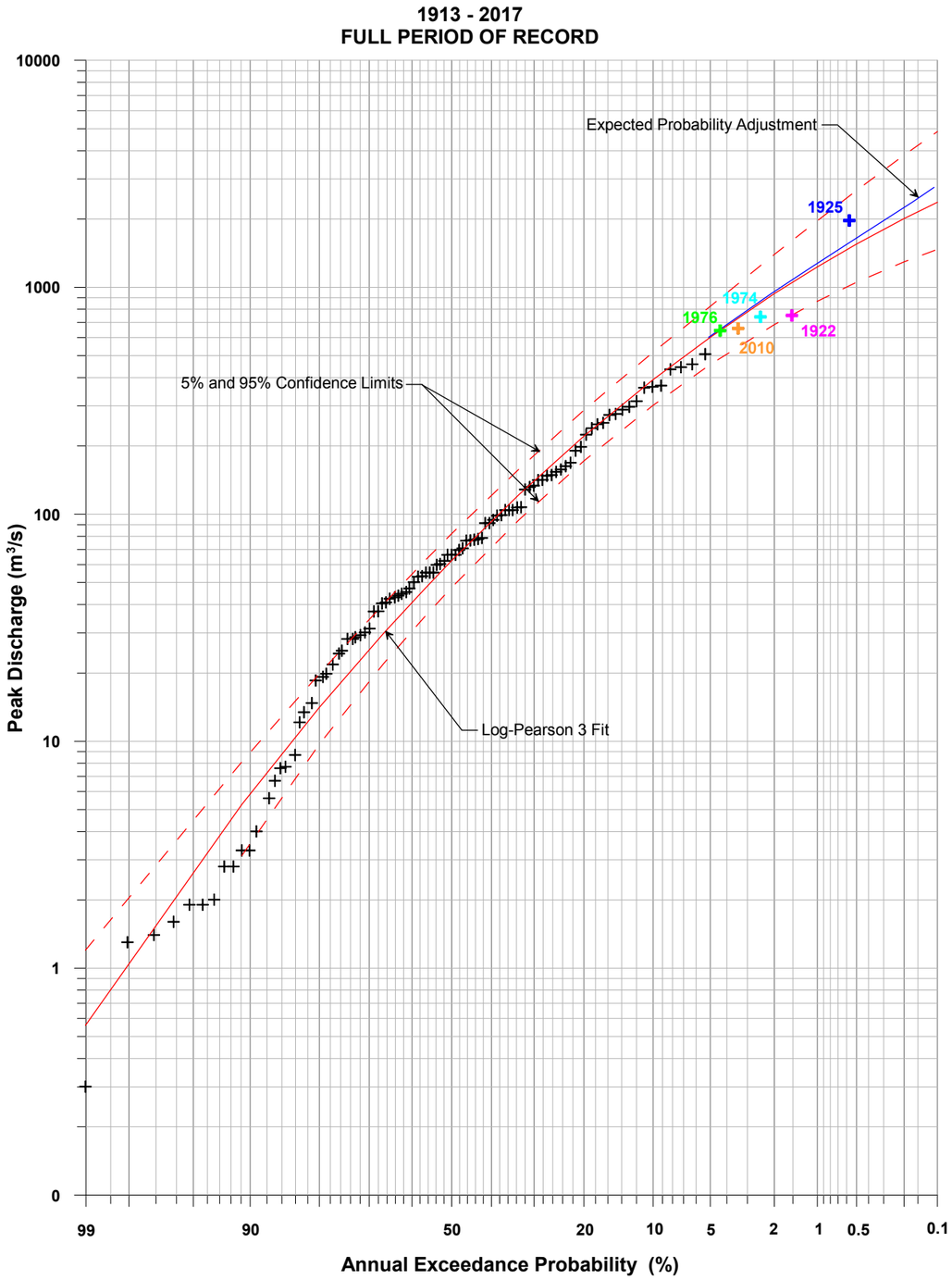
NOTE:

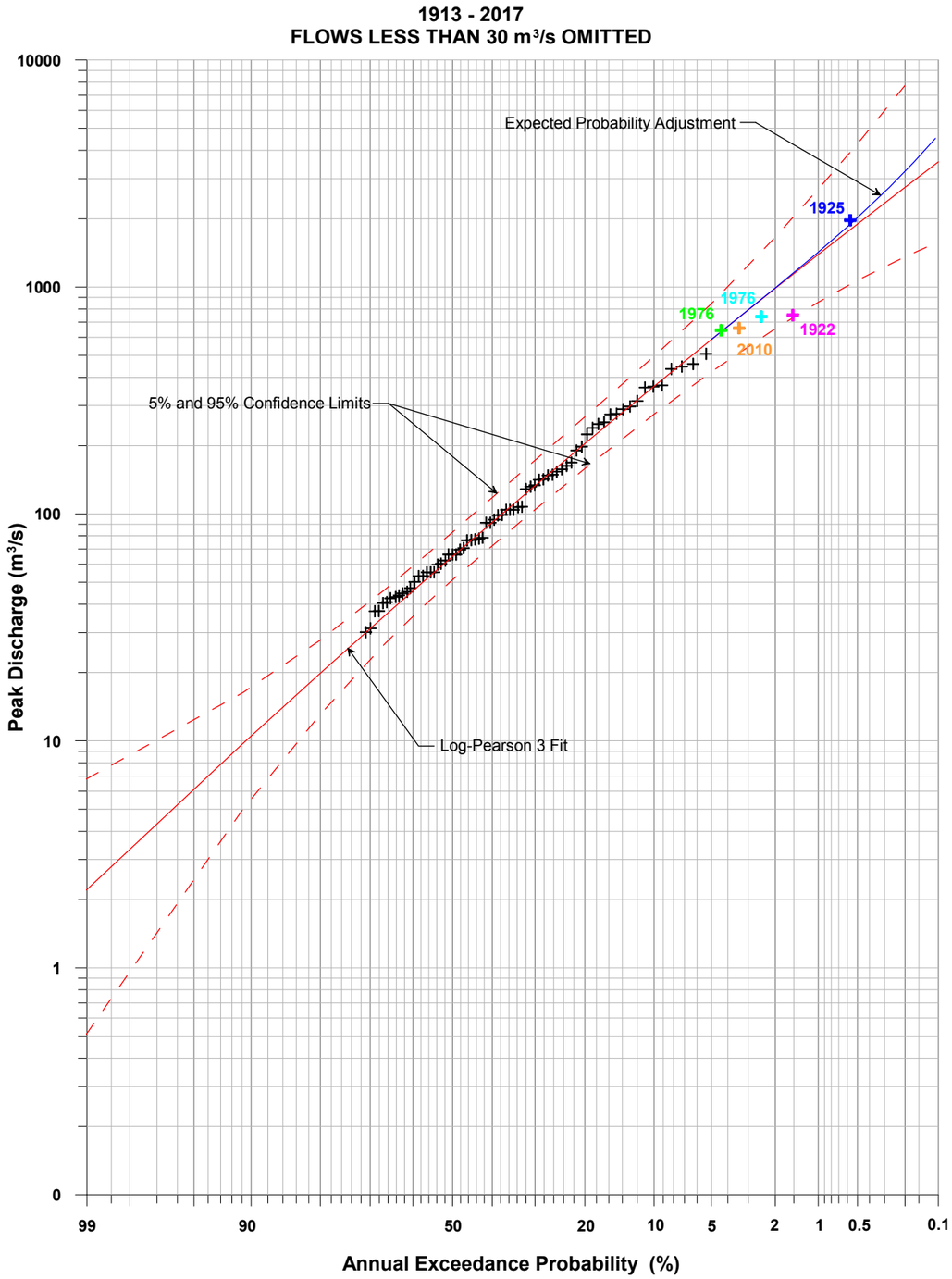
Flood frequency relationship based on post-Googong Dam flows in the Queanbeyan River at the Wickerslack stream gauge for period of record after construction of the dam (ie. 1977-2017).

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.6

FLOOD FREQUENCY RELATIONSHIP
LOG-PEARSON 3 ANNUAL SERIES 1977-2017
QUEANBEYAN RIVER AT WICKERSLACK STREAM GAUGE (GS 410760)





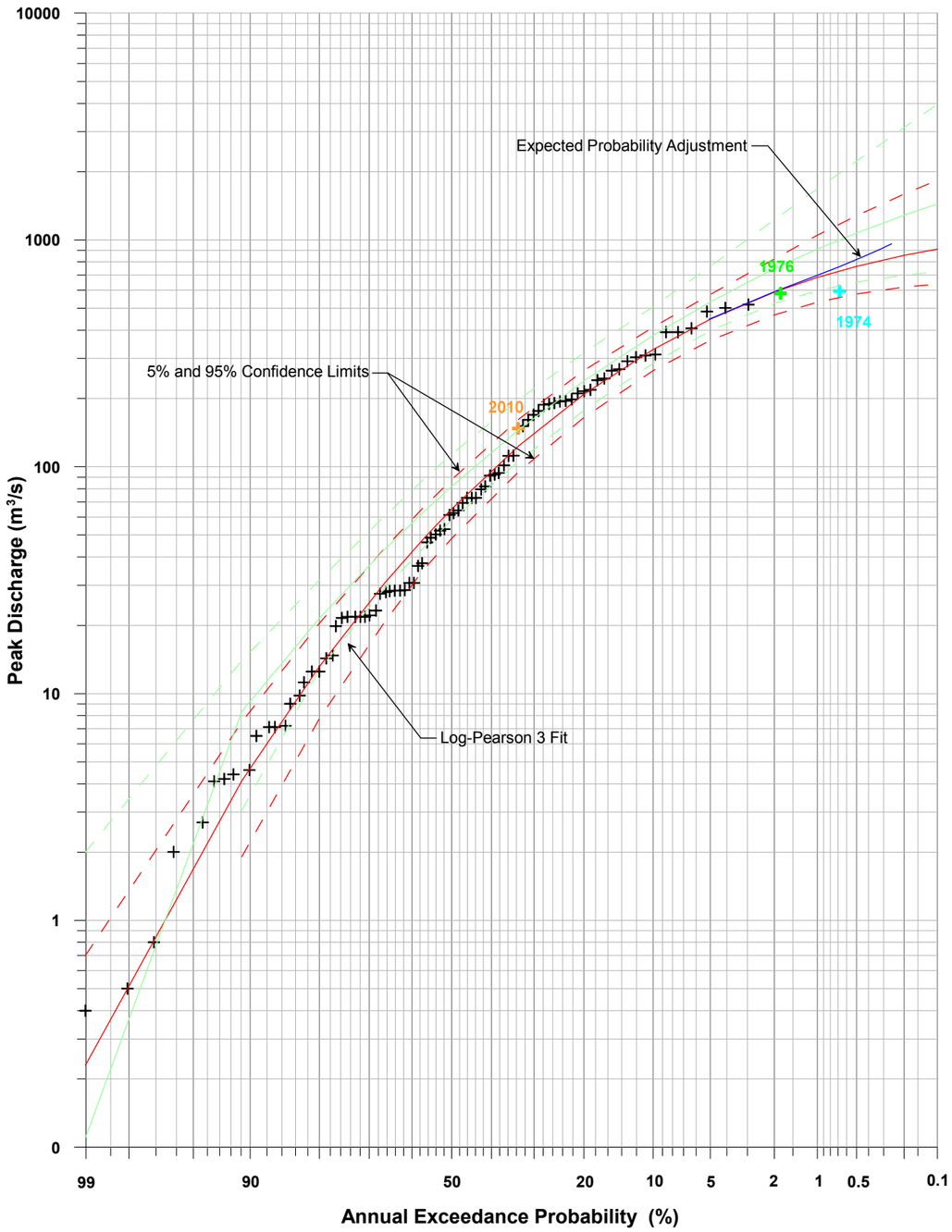
NOTE:

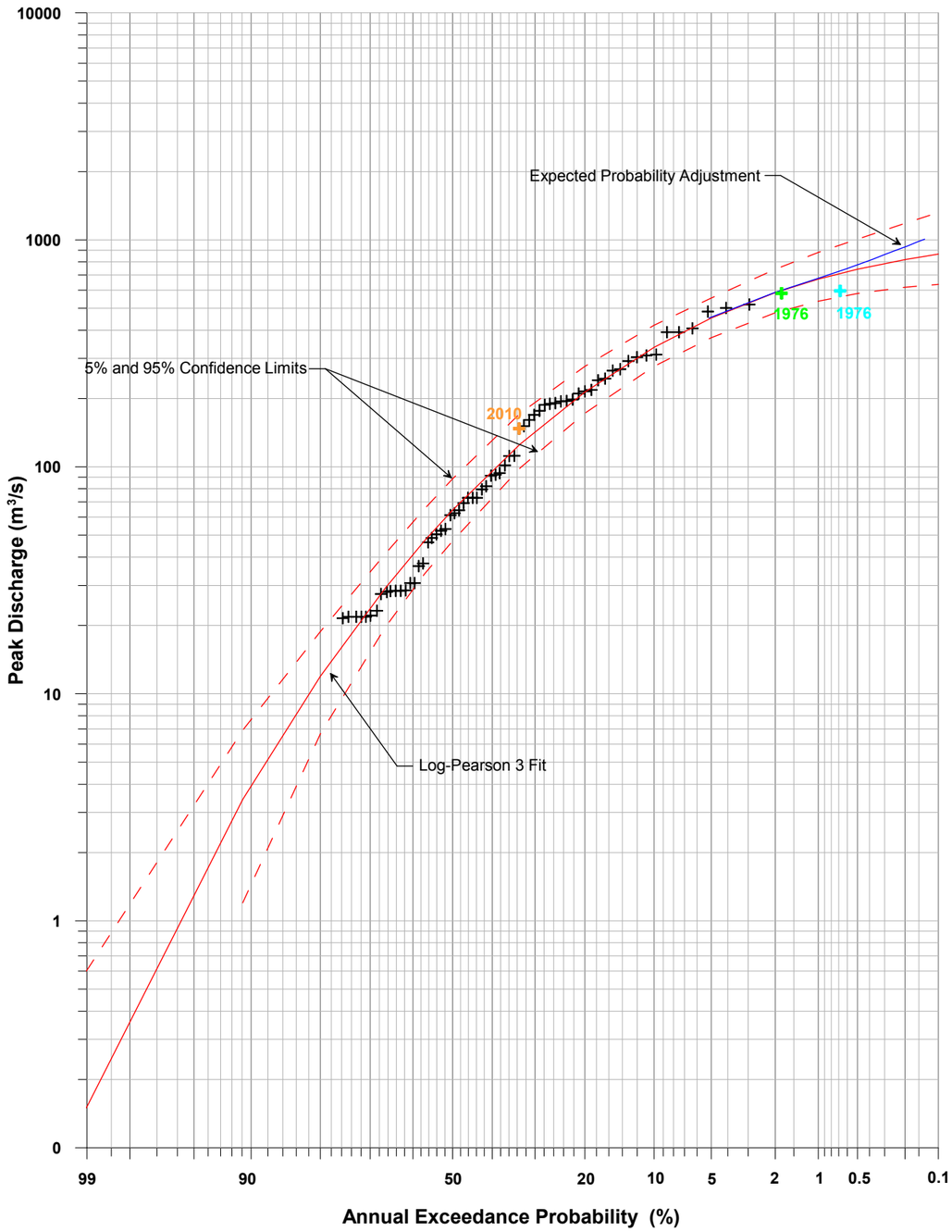
Flood frequency relationship based on post-Googong Dam flows in the Queanbeyan River at the Wickerslack stream gauge. Annual peak flows for period of record prior to construction of the dam (ie. 1913-1976) have been derived by converting pre-dam flows at the Googong stream gauge using the pre- versus post-dam flow relationship presented in DWR, 1992 (refer Columns D and E in Table C2.2).

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure B4.7

FLOOD FREQUENCY RELATIONSHIP
LOG-PEARSON 3 ANNUAL SERIES 1913-2017
QUEANBEYAN RIVER AT WICKERSLACK STREAM GAUGE (GS 410760)





NOTE:

1. Red lines show flood frequency relationship based on full period of record (i.e. 1930-2017), while green lines show flood frequency relationship based on same period of record used in DWR, 1992 (i.e. 1930-1991).

Lyall & Associates

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

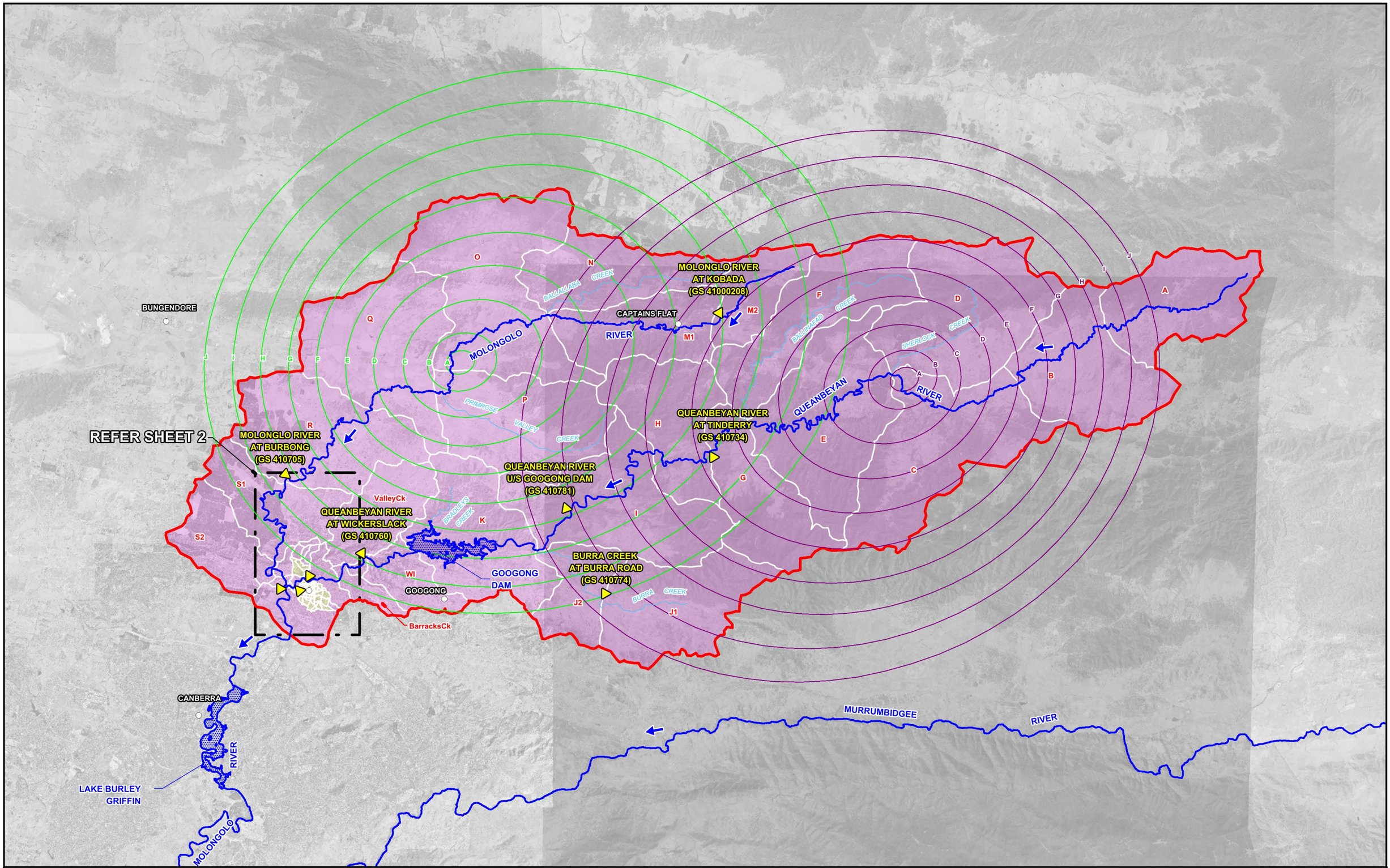
Figure B4.8

FLOOD FREQUENCY RELATIONSHIP
LOG-PEARSON 3 ANNUAL SERIES 1930-2017
MOLONGLO RIVER AT BURBONG STREAM GAUGE (GS 410705)

APPENDIX C

FLOOD STUDY UPDATE

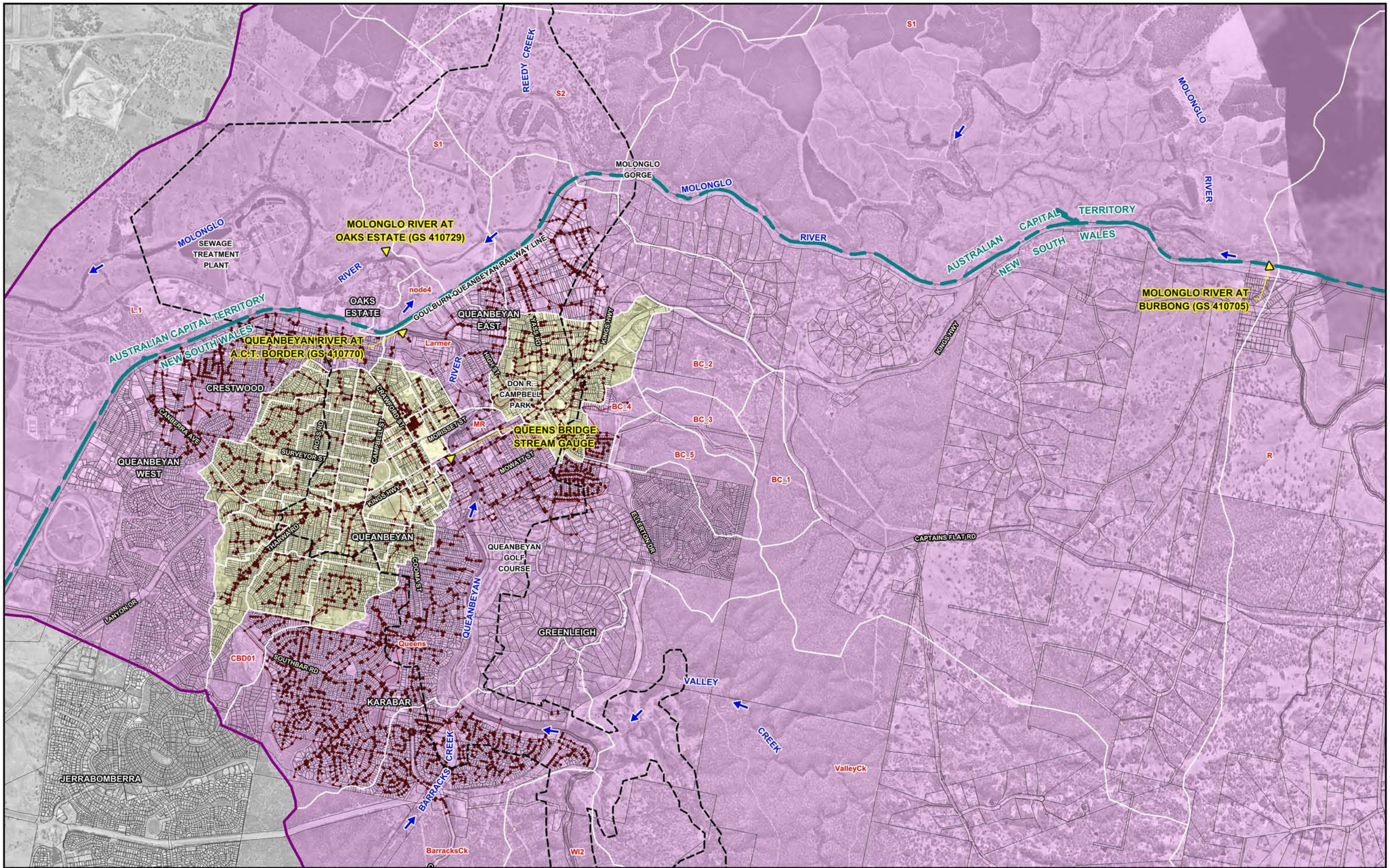
LIST OF FIGURES (APPENDIX C)



QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C1.1
(Sheet 1 of 2)

QUEANBEYAN HYDROLOGIC MODEL LAYOUT



N 300 0 300 600 900 m

Scale: 1:30,000

Lyall & Associates

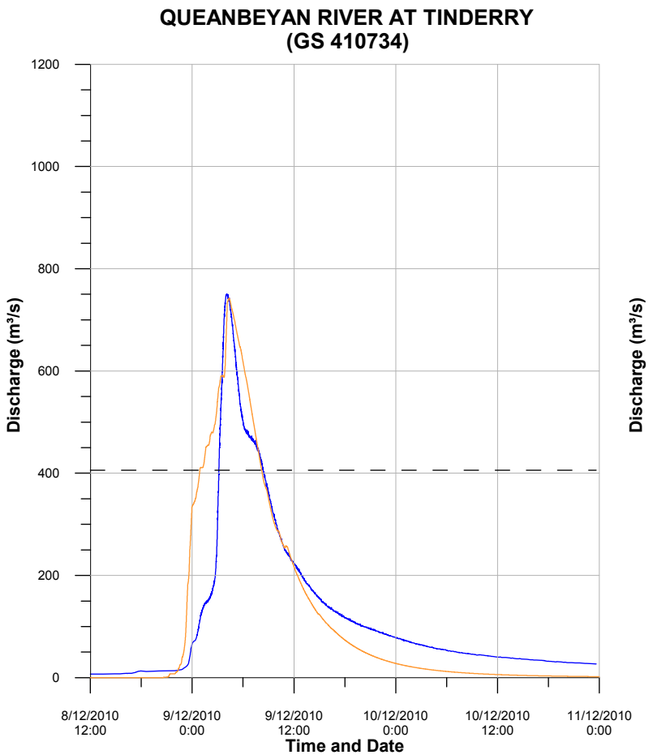
LEGEND

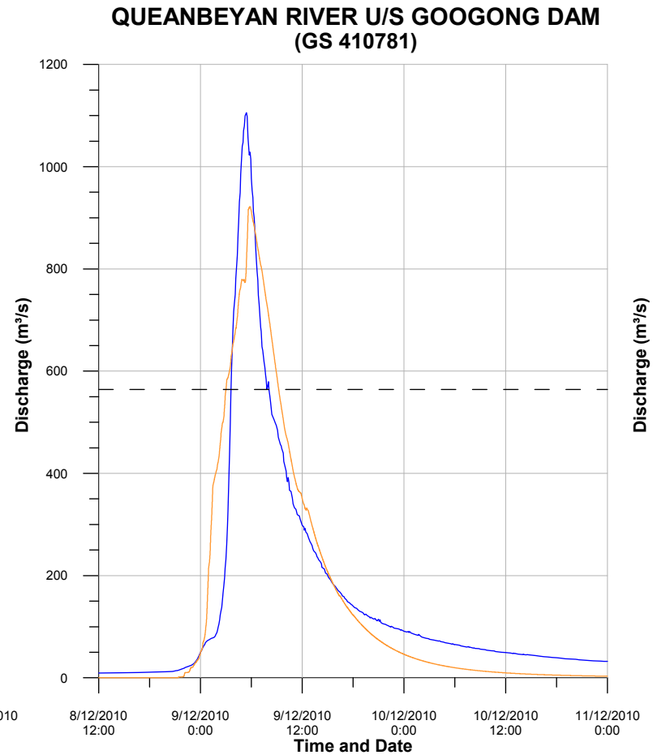
- Stream Gauge
- Stormwater Network
- Two-Dimensional Model Boundary
- BC_1 RAFTS Sub-Catchment Boundary and Identifier
- ILSAX Sub-Catchment Boundary

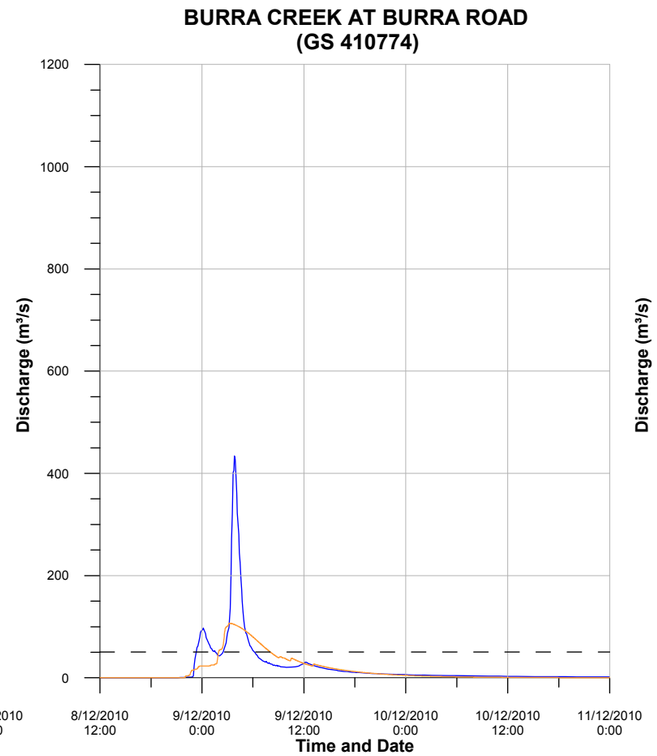
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

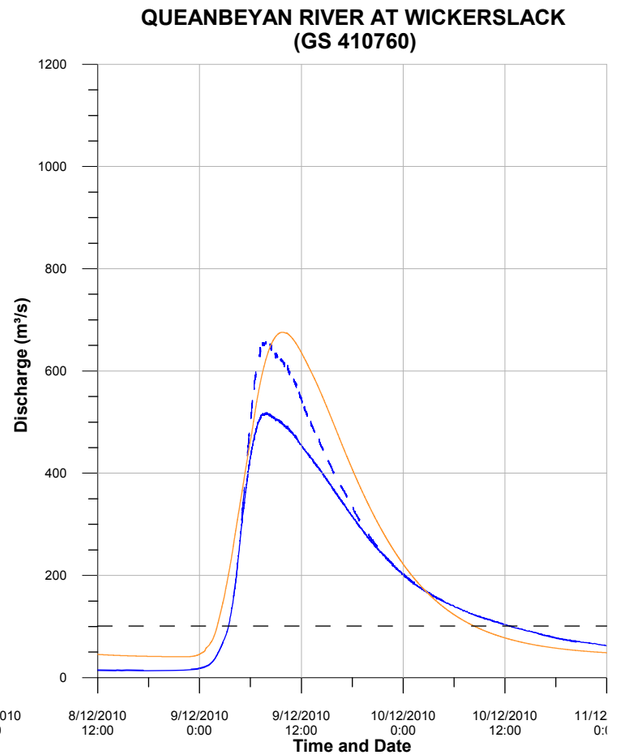
Figure C1.1
(Sheet 2 of 2)

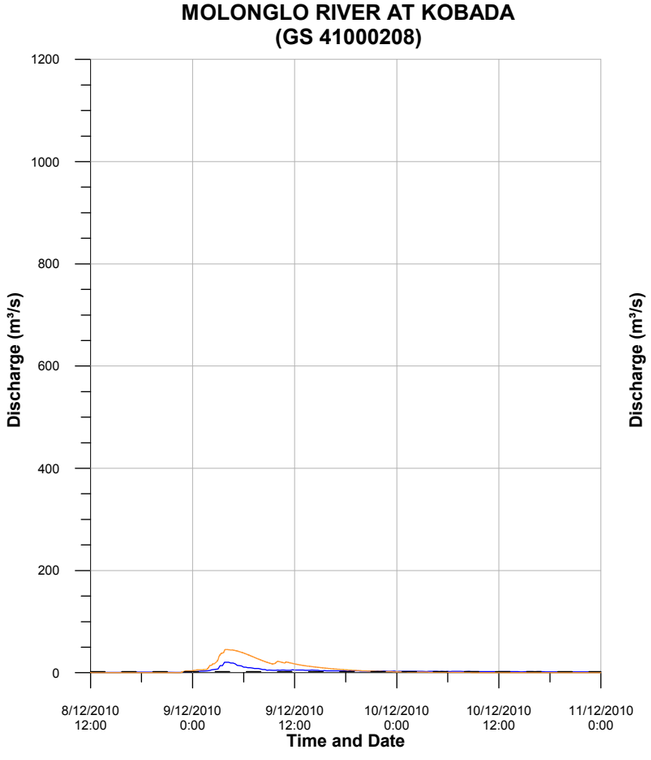
QUEANBEYAN HYDROLOGIC MODEL LAYOUT

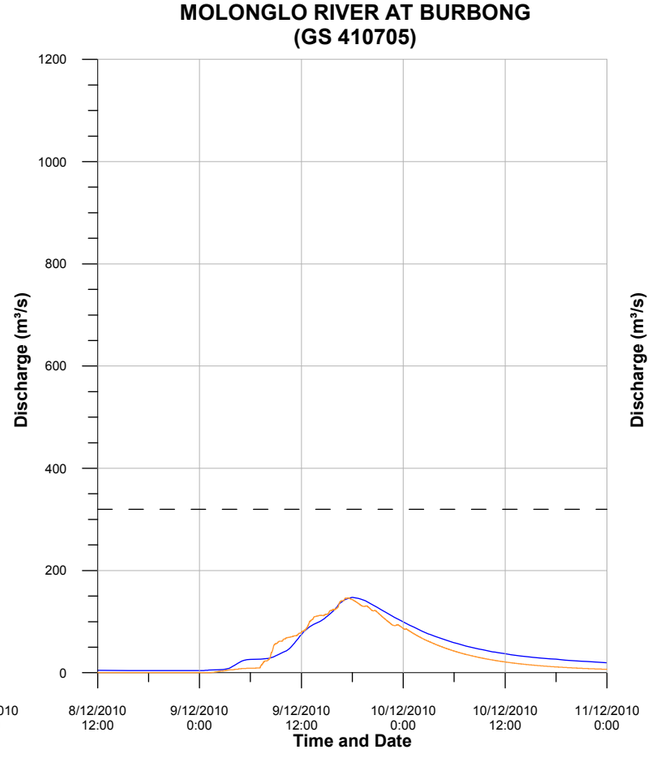


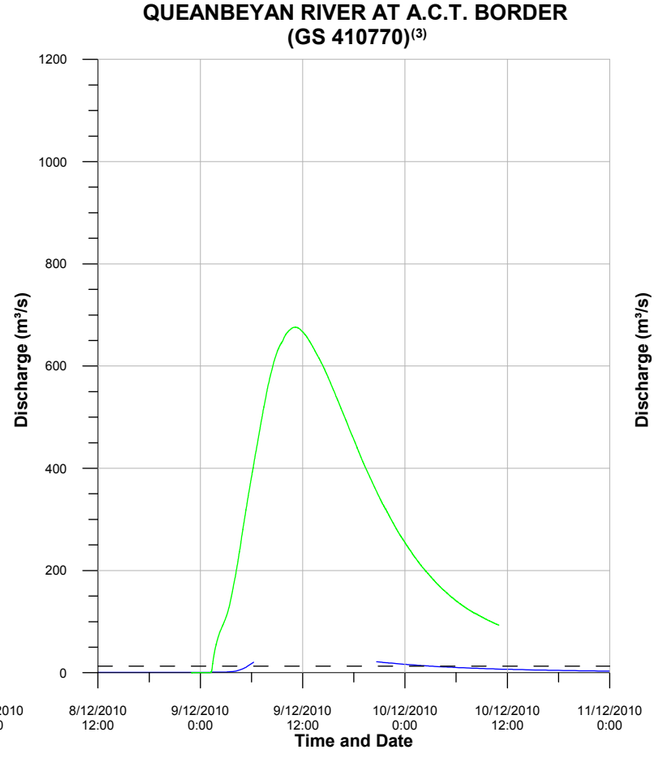


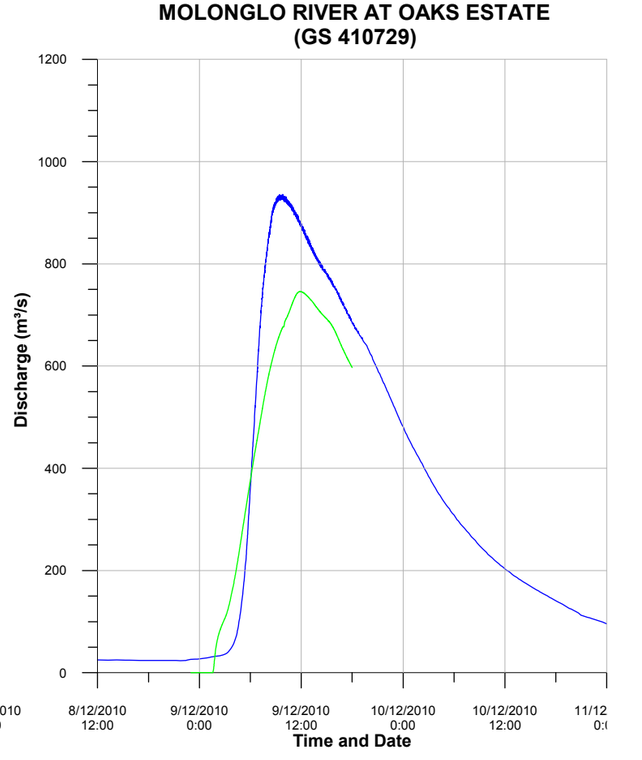












NOTES:

1. Dashed line represents recorded discharge based on the *L&A Derived Rating Curve*.
2. Discharges above maximum gauged value have been derived by extrapolating the rating curve and thereby may not represent actual recorded values.
3. Discharge not recorded between 06:15 and 20:40 hours on 9 December 2010.

LEGEND

- Recorded (Rating Curve Current at Time of Flood)(1)
- Modelled (Queanbeyan Hydrologic Model RAFTS)
- Modelled (Queanbeyan TUFLOW Model)

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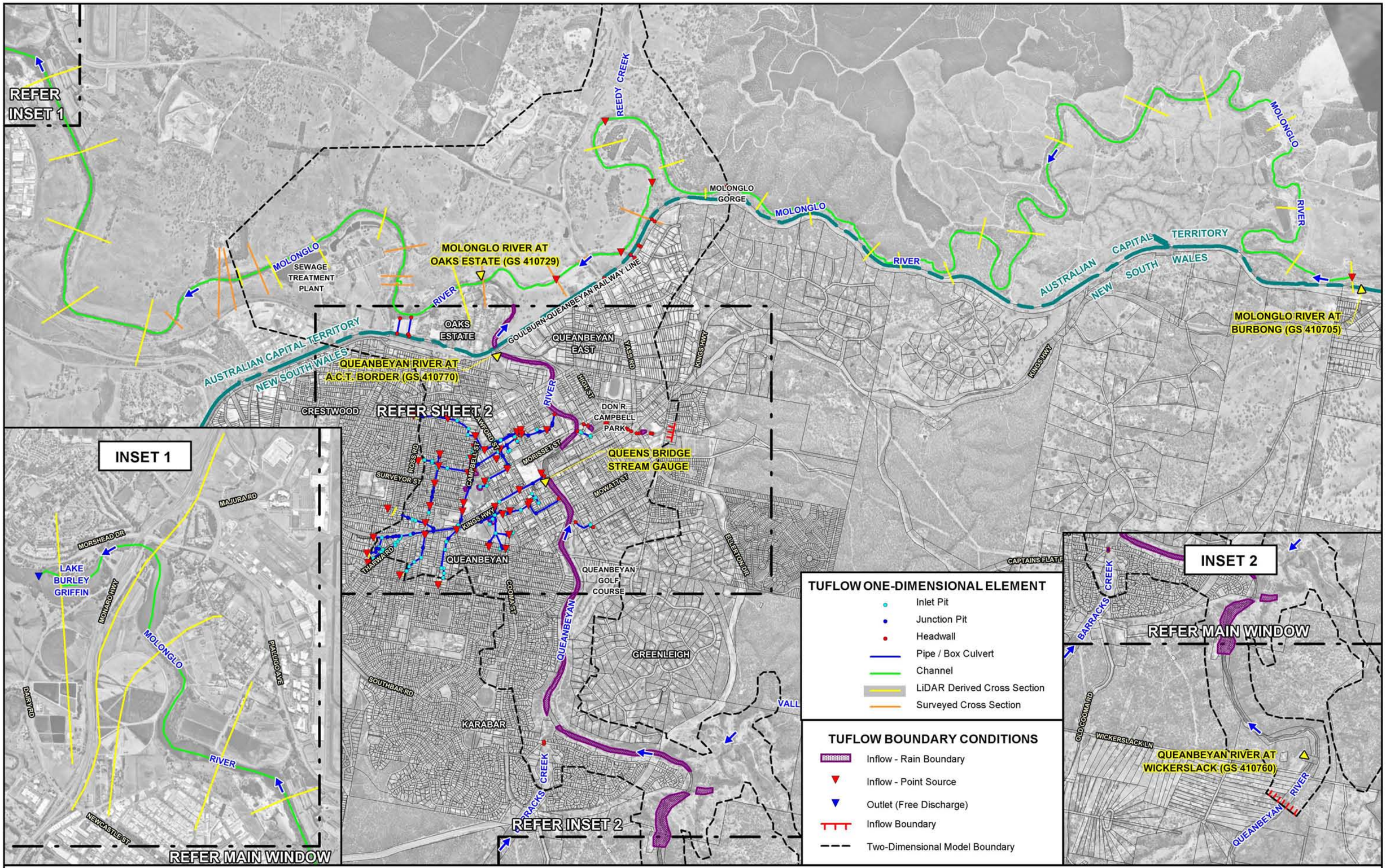
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C1.2

MODELLED AND RECORDED DISCHARGE HYDROGRAPHS
DECEMBER 2010 FLOOD



TUFLOW ONE-DIMENSIONAL ELEMENT

- Inlet Pit
- Junction Pit
- Headwall
- Pipe / Box Culvert
- Channel
- LiDAR Derived Cross Section
- Surveyed Cross Section

TUFLOW BOUNDARY CONDITIONS

- Inflow - Rain Boundary
- Inflow - Point Source
- Outlet (Free Discharge)
- Inflow Boundary
- Two-Dimensional Model Boundary

N 300 0 300 600 900 m

Scale: 1:30,000

LEGEND

- Stream Gauge

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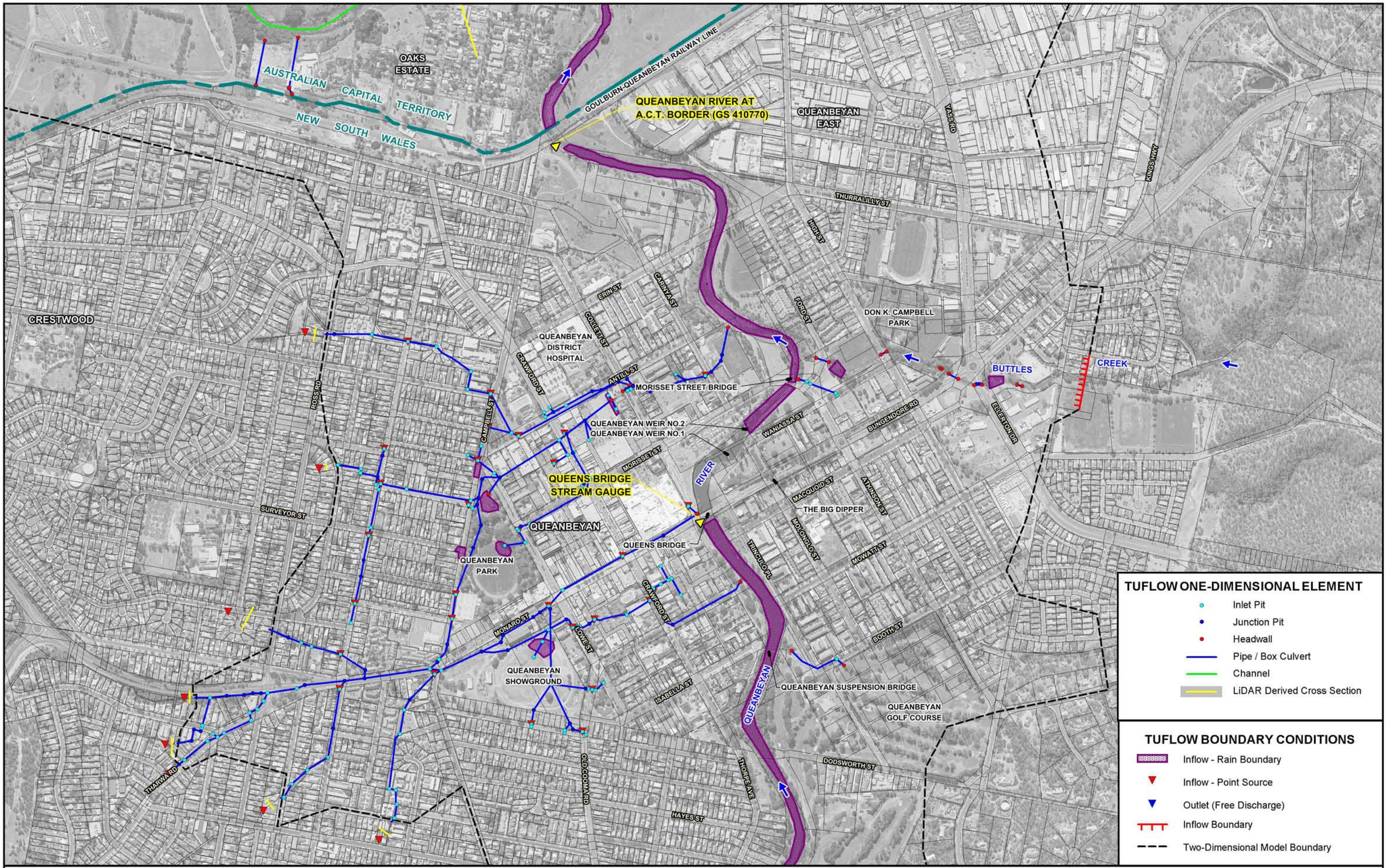
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.1
(Sheet 1 of 2)

QUEANBEYAN TUFLOW MODEL LAYOUT



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QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.1
(Sheet 2 of 2)

QUEANBEYAN TUFLOW MODEL LAYOUT

TUFLOW HYDRAULIC ROUGHNESS SCHEMATISATION

- Grassed Areas
- Roads
- Vegetation
- Dense Vegetation
- River Bed and Ponding Areas
- Maintained Parks
- Buildings
- Grassed/Paved Inter-Allotment Area

Indicative Depth of Inundation (m)

- 0.10 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.20
- 2.20 to 2.40
- 2.40 to 2.60
- 2.60 to 2.80
- 2.80 to 3.00
- 3.00 to 3.50
- > 3.50
- Flow Direction Arrow

RIVERSIDE SPORTING FACILITY
CARINYA ST
COLLETT ST
MORISSET ST
RIVERSIDE TOURIST PARK
RIVER
QUEEN ELIZABETH PARK
QUEANBEYAN

N

20 0 20 40 60 m

Scale: 1:2,000

LEGEND

- Modelled Stormwater Network
- Building Outlines

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QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.2

TUFLOW SCHEMATISATION OF FLOODPLAIN

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

QUEANBEYAN GOLF COURSE

HAYES ST

COOMAST

THORPE AVE

DANE ST

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

BARRACKS FLAT DR

BARRACKS CREEK

RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER

SEWAGE TREATMENT PLANT

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

OAKS ESTATE

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

CRESTWOOD

QUEANBEYAN WEST

QUEENS BRIDGE STREAM GAUGE

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

CRAWFORD ST

ROSS RD

CAMPBELL ST

SURVEYOR ST

MORISSET ST

MOWATT ST

ELLERTON DR

THARWARD

QUEANBEYAN

1925.1

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 1925.1 Flood Mark Location and Identifier
- 575.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.3

TUFLOW MODEL RESULTS
MAY 1925 FLOOD

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

QUEANBEYAN GOLF COURSE

HAYES ST

COOMA ST

THORPE AVE

DANE ST

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

BARRACKS FLAT DR

BARRACKS CREEK

QUEANBEYAN RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER

SEWAGE TREATMENT PLANT

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

OAKS ESTATE

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

CRESTWOOD

QUEANBEYAN WEST

QUEENS BRIDGE STREAM GAUGE

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

ELLERTON DR

MOWATT ST

MORISSET ST

CRAWFORD ST

ROSS RD

CAMPBELL ST

SURVEYOR ST

THARWARD

QUEANBEYAN

1974.1

1974.2

1974.3

1974.4

1974.5

Indicative Depth of Inundation (m)

- < 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.20
- 2.20 to 2.40
- 2.40 to 2.60
- 2.60 to 2.80
- 2.80 to 3.00
- 3.00 to 3.50
- > 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 1974.1 Flood Mark Location and Identifier
- 575.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.4

TUFLOW MODEL RESULTS
AUGUST 1974 FLOOD

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

QUEANBEYAN GOLF COURSE

HAYES ST

COOMA ST

THORPE AVE

DANE ST

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

BARRACKS FLAT DR

BARRACKS CREEK

RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

SEWAGE TREATMENT PLANT

MOLONGLO RIVER

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

OAKS ESTATE

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

CRESTWOOD

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

CRAWFORD ST

ROSS RD

CAMPBELL ST

MORISSET ST

QUEANBEYAN

SURVEYOR ST

QUEANBEYAN WEST

QUEENS BRIDGE STREAM GAUGE

MOWATT ST

ELLERTON DR

THARWA RD

QUEANBEYAN

HAYES ST

COOMA ST

THORPE AVE

QUEANBEYAN GOLF COURSE

1976.1

1976.2

1976.3

1976.4

1976.5

1976.6

Indicative Depth of Inundation (m)

- < 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.20
- 2.20 to 2.40
- 2.40 to 2.60
- 2.60 to 2.80
- 2.80 to 3.00
- 3.00 to 3.50
- > 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 1976.2 Flood Mark Location and Identifier
- 575.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.5

TUFLOW MODEL RESULTS
OCTOBER 1976 FLOOD

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HAYES ST

COOMAST

THORPE AVE

DANE ST

QUEANBEYAN GOLF COURSE

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

BARRACKS FLAT DR

BARRACKS CREEK

RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER

SEWAGE TREATMENT PLANT

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

OAKS ESTATE

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

CRESTWOOD

QUEANBEYAN WEST

QUEENS BRIDGE STREAM GAUGE

QUEANBEYAN

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

CRAWFORD ST

ROSS RD

CAMPBELL ST

SURVEYOR ST

MORISSET ST

MOWATT ST

ELLERTON DR

THARWARD

2010.01

2010.08

2010.09

2010.11

2010.59

2010.61

2010.62

2010.63

2010.64

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

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NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

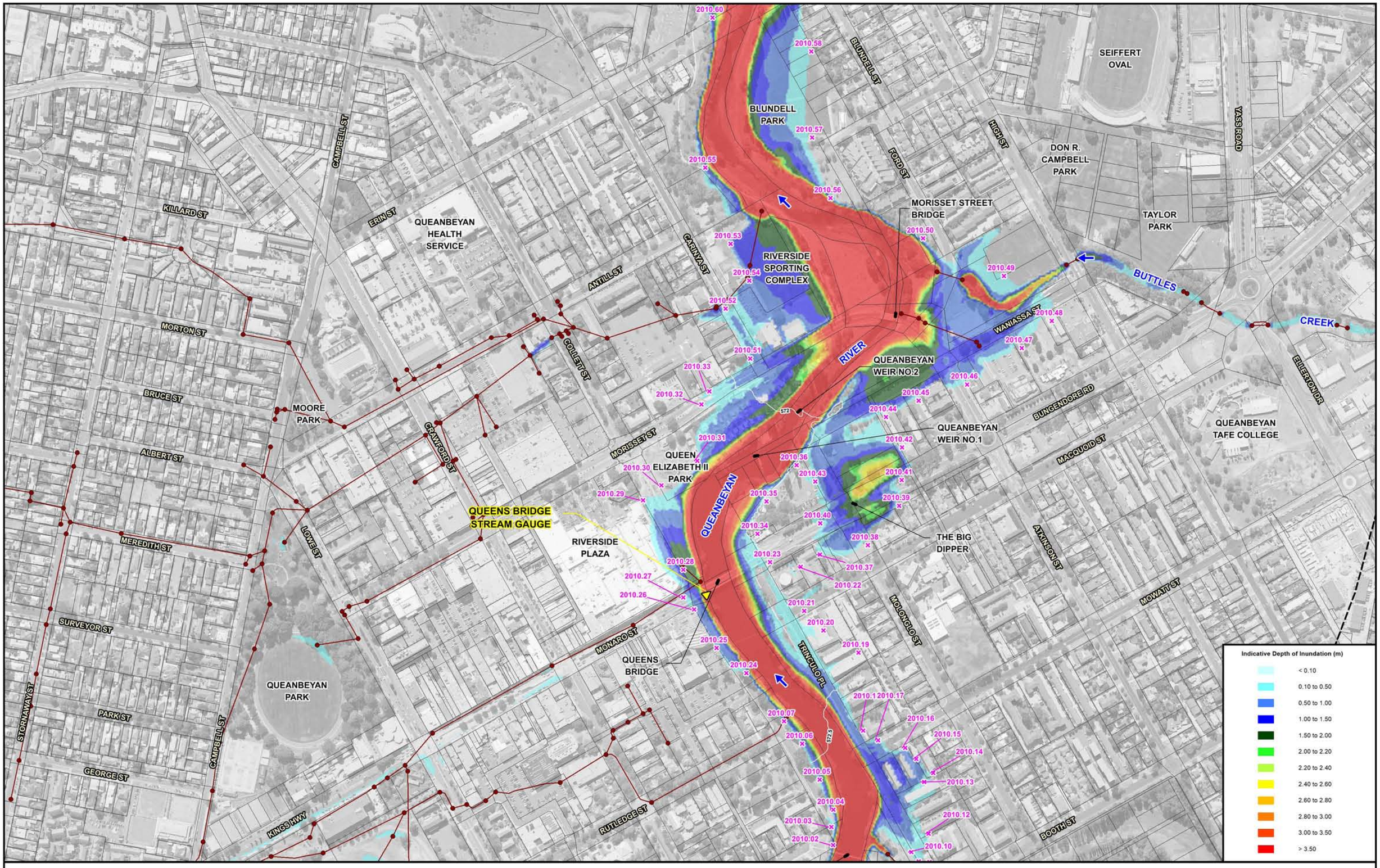
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 2010.63 Flood Mark Location and Identifier
- 575.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.6
(Sheet 1 of 2)

TUFLOW MODEL RESULTS
DECEMBER 2010 FLOOD



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

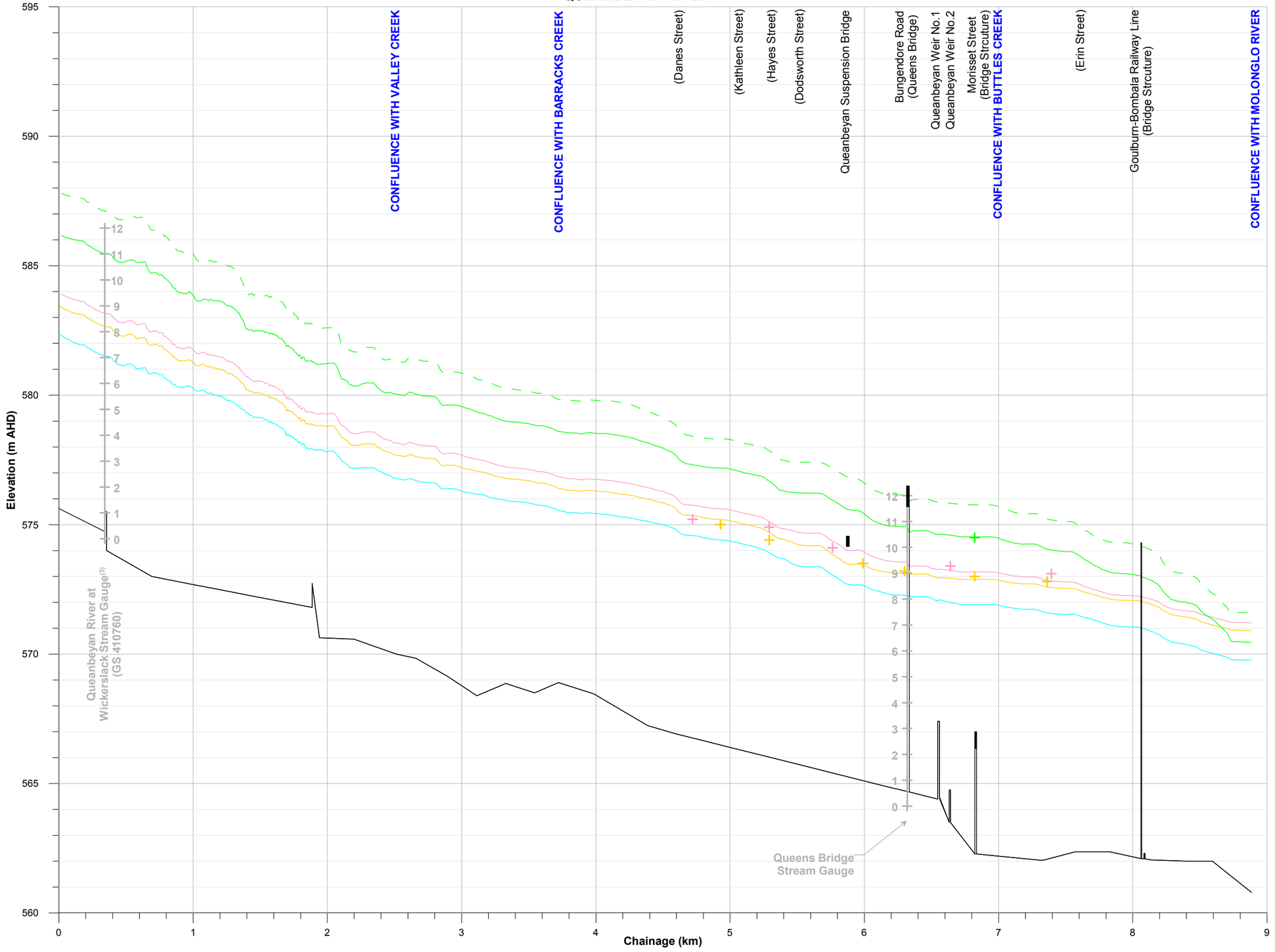
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 2010.21 Flood Mark Location and Identifier
- 575.0 Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.6
(Sheet 2 of 2)

TUFLOW MODEL RESULTS
DECEMBER 2010 FLOOD

QUEANBEYAN RIVER



LEGEND

Historic Flood Mark	Historic Water Surface Profile
+	May 1925 Flood(1)
+	August 1974 Flood
+	October 1976 Flood
	December 2010 Flood

NOTES:

1. Solid lines represent May 1925 water surface profile based on the Lower Estimate of the peak flow in the Queanbeyan River (i.e. 1,600 m^3/s), while the dashed line represents the surface profile based on the Upper Estimate of peak flow in the Queanbeyan River (i.e. 2,120 m^3/s).
2. Recorded flood marks are located on the edges of the flood affected area and are not representative of water levels within the inbank area of the Queanbeyan River. Table C4.7 shows the difference between modelled and recorded peak flood levels.
3. Gauge zero of Wickerslack stream gauge assummed to be 574.45 m AHD

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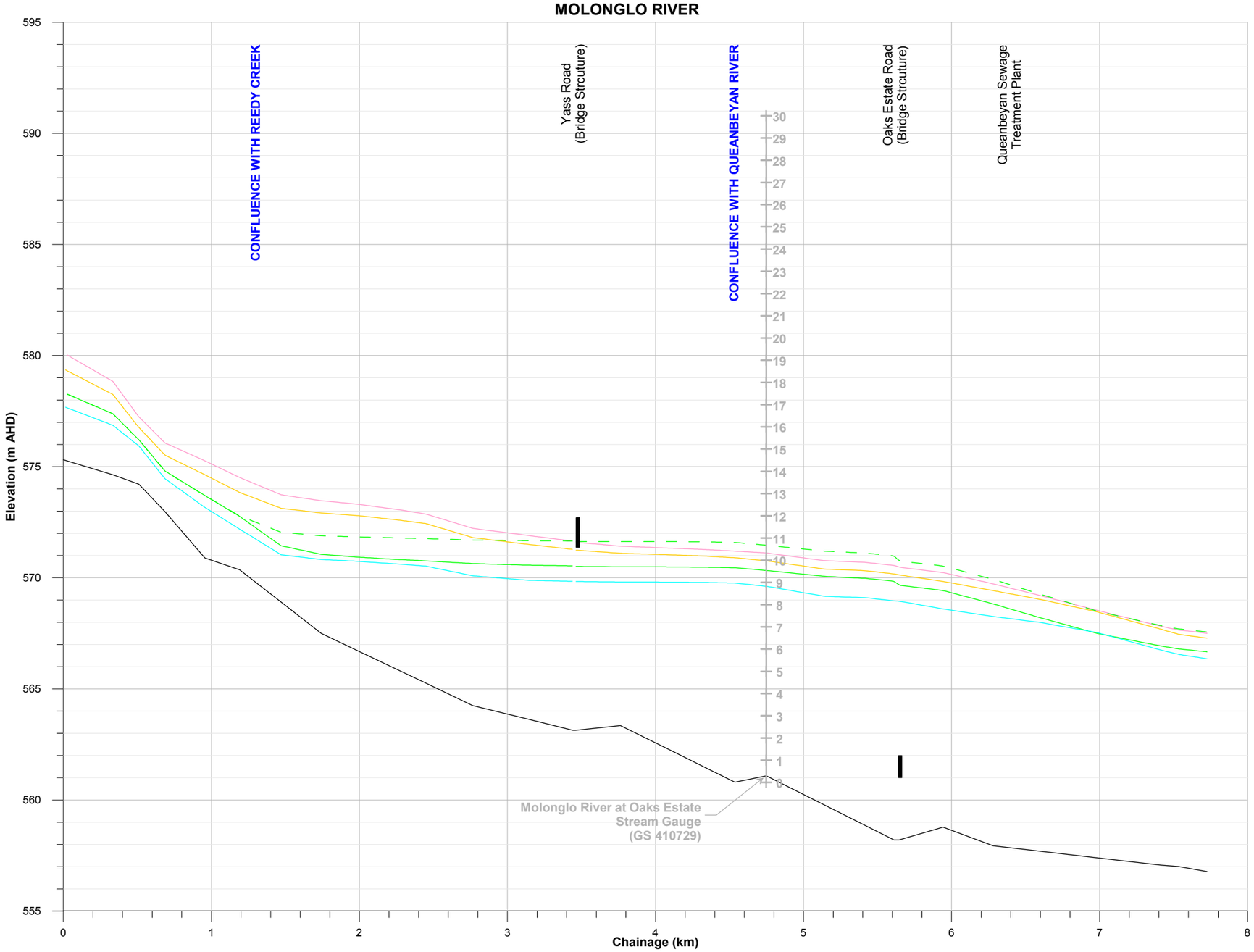
QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C2.7
(Sheet 1 of 2)

WATER SURFACE PROFILES
HISTORIC FLOOD EVENTS

MOLONGLO RIVER



LEGEND

Historic Water Surface Profile

- May 1925 Flood[(1)]
- August 1974 Flood
- October 1976 Flood
- December 2010 Flood

NOTE:

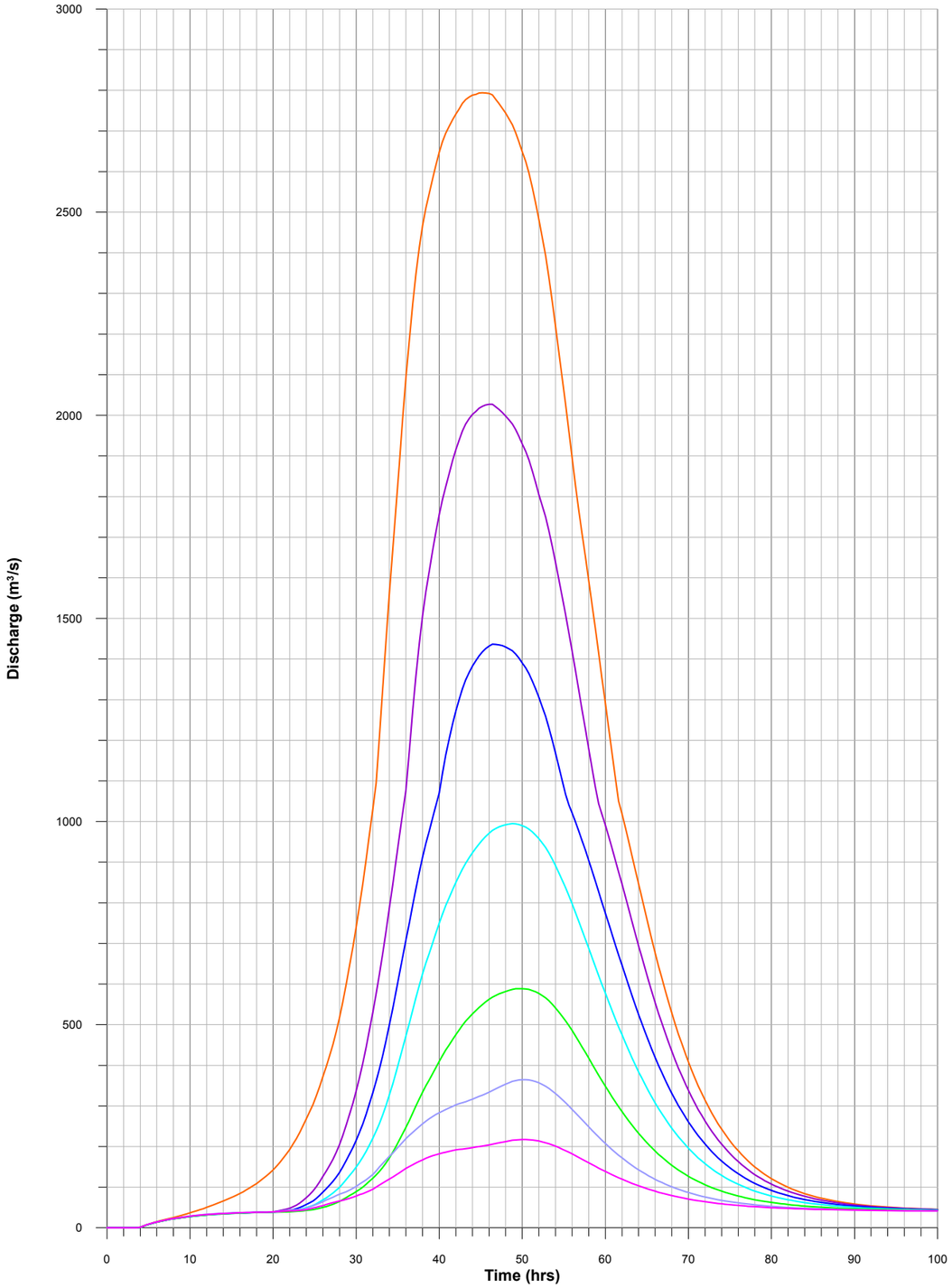
Solid lines represent May 1925 water surface profile based on the Lower Estimate of the peak flow in the Queanbeyan River (i.e. 1,600 m^3/s), while the dashed line represents the surface profile based on the Upper Estimate of peak flow in the Queanbeyan River (i.e. 2,120 m^3/s).

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

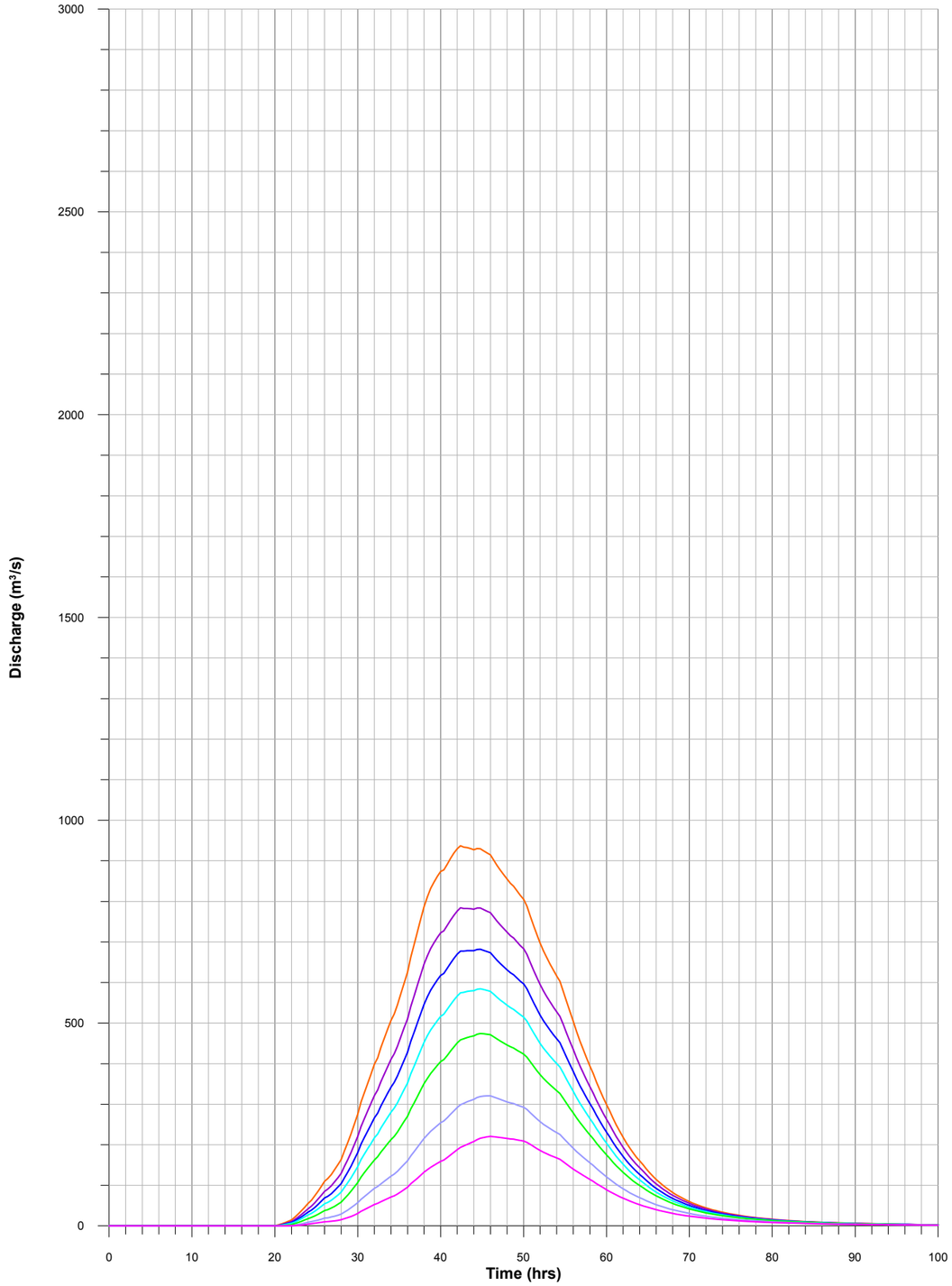
Figure C2.7
(Sheet 2 of 2)

WATER SURFACE PROFILES
HISTORIC FLOOD EVENTS

DESIGN INFLOW HYDROGRAPHS AT WICKERSLACK



DESIGN INFLOW HYDROGRAPHS AT BURBONG



LEGEND

- 2% AEP
- 5% AEP
- 10% AEP
- 20% AEP
- 0.2% AEP
- 0.5% AEP
- 1% AEP

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QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C3.1

DESIGN INFLOW HYDROGRAPHS

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
OAKS ESTATE
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
CRESTWOOD
CRAWFORD ST
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
ELLERTON DR
MOWATT ST
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
THARWARD
CAMERON RD

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

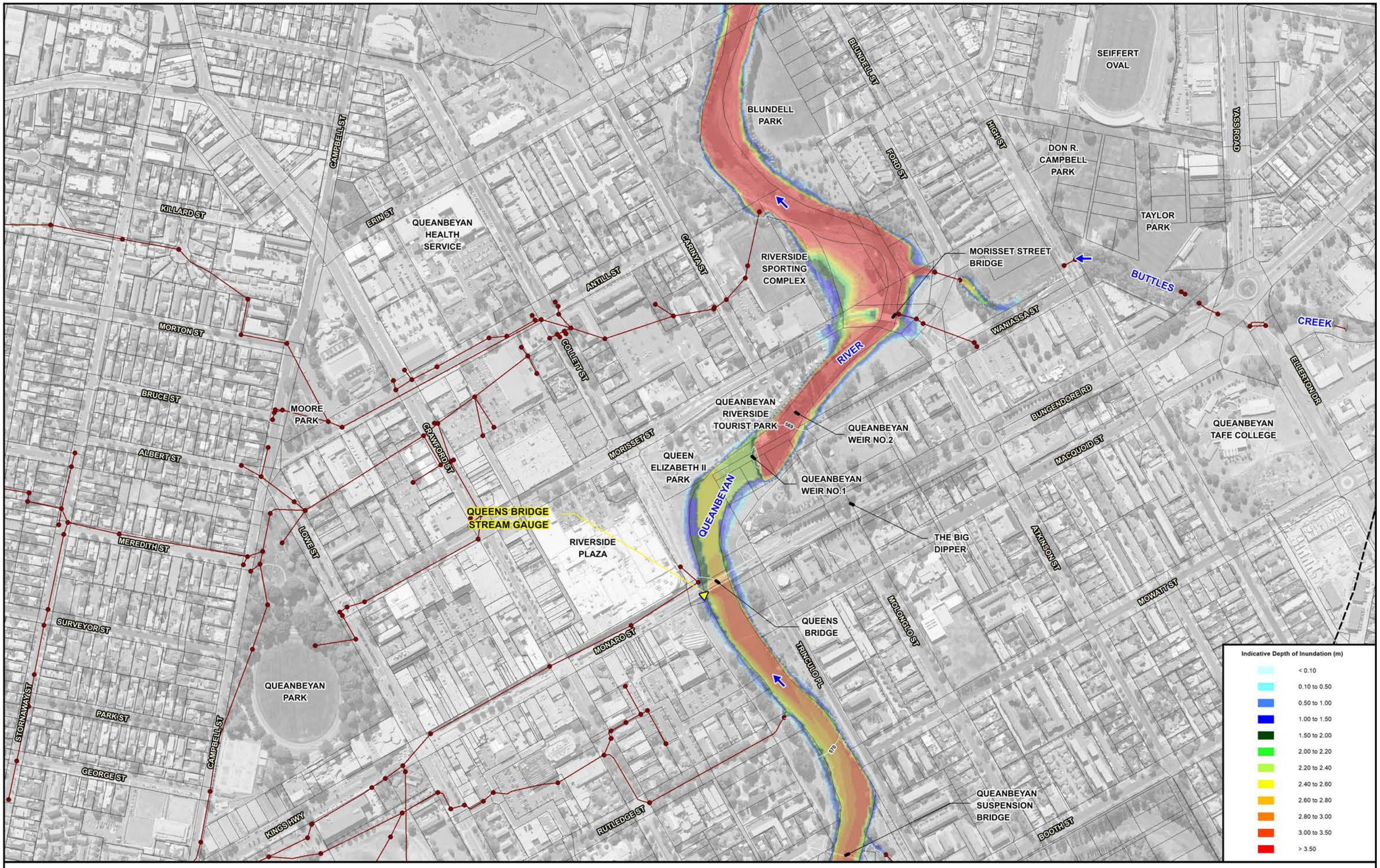
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.1
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
20% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.1
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
20% AEP

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)
MOLONGLO RIVER
SEWAGE TREATMENT PLANT
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
OAKS ESTATE
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
CRESTWOOD
CRAWFORD ST
ROSS RD
CAMPBELL ST
MORISSET ST
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
MOWATT ST
ELLERTON DR
THARWARD
CAMERON RD
QUEANBEYAN
QUEANBEYAN GOLF COURSE

Indicative Depth of Inundation (m)

- < 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.20
- 2.20 to 2.40
- 2.40 to 2.60
- 2.60 to 2.80
- 2.80 to 3.00
- 3.00 to 3.50
- > 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

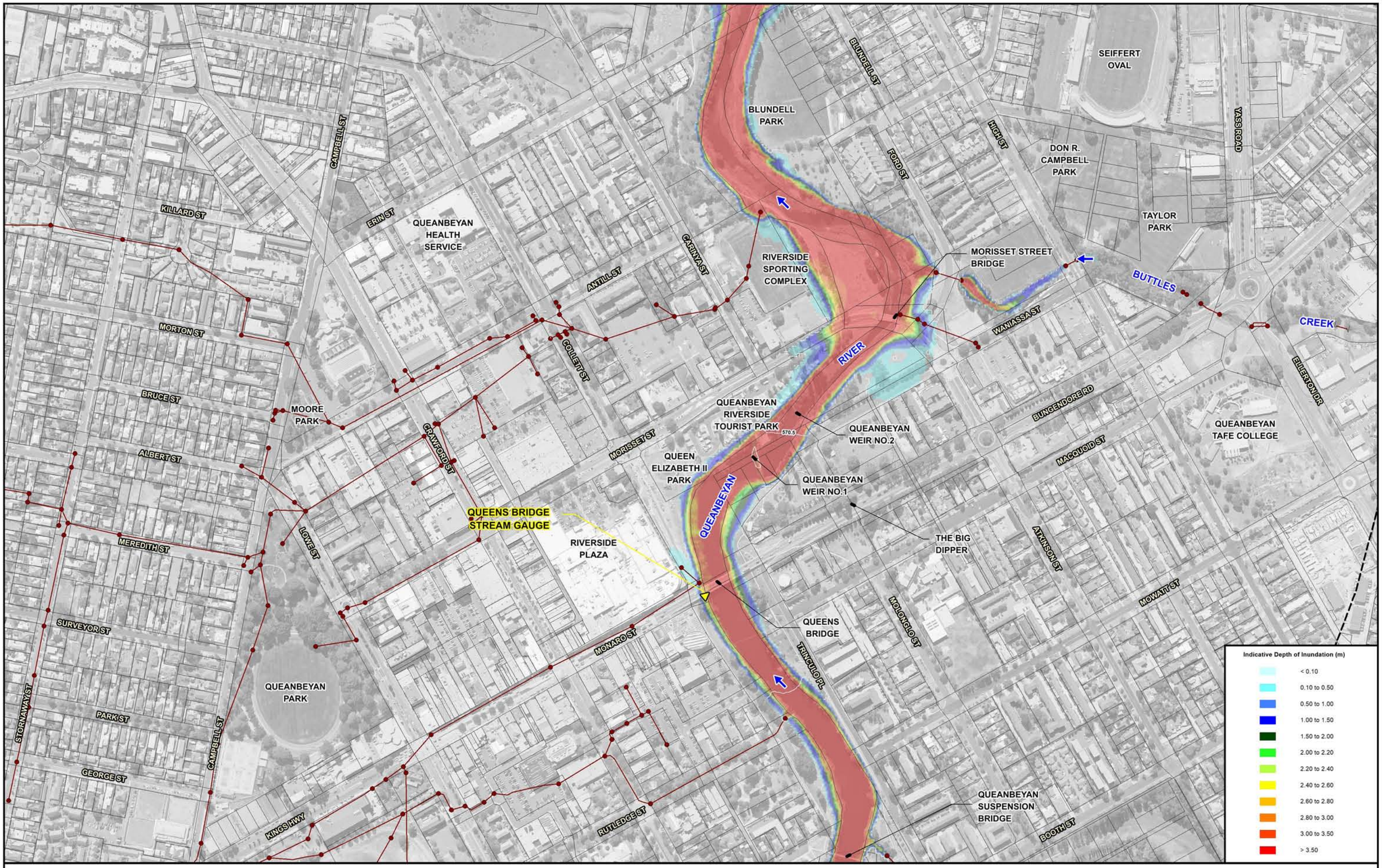
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.2
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
10% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.2
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
10% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
CRESTWOOD
CRAWFORD ST
REFER SHEET 2
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
MOWATT ST
ELLERTON DR
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
CAMERON RD
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

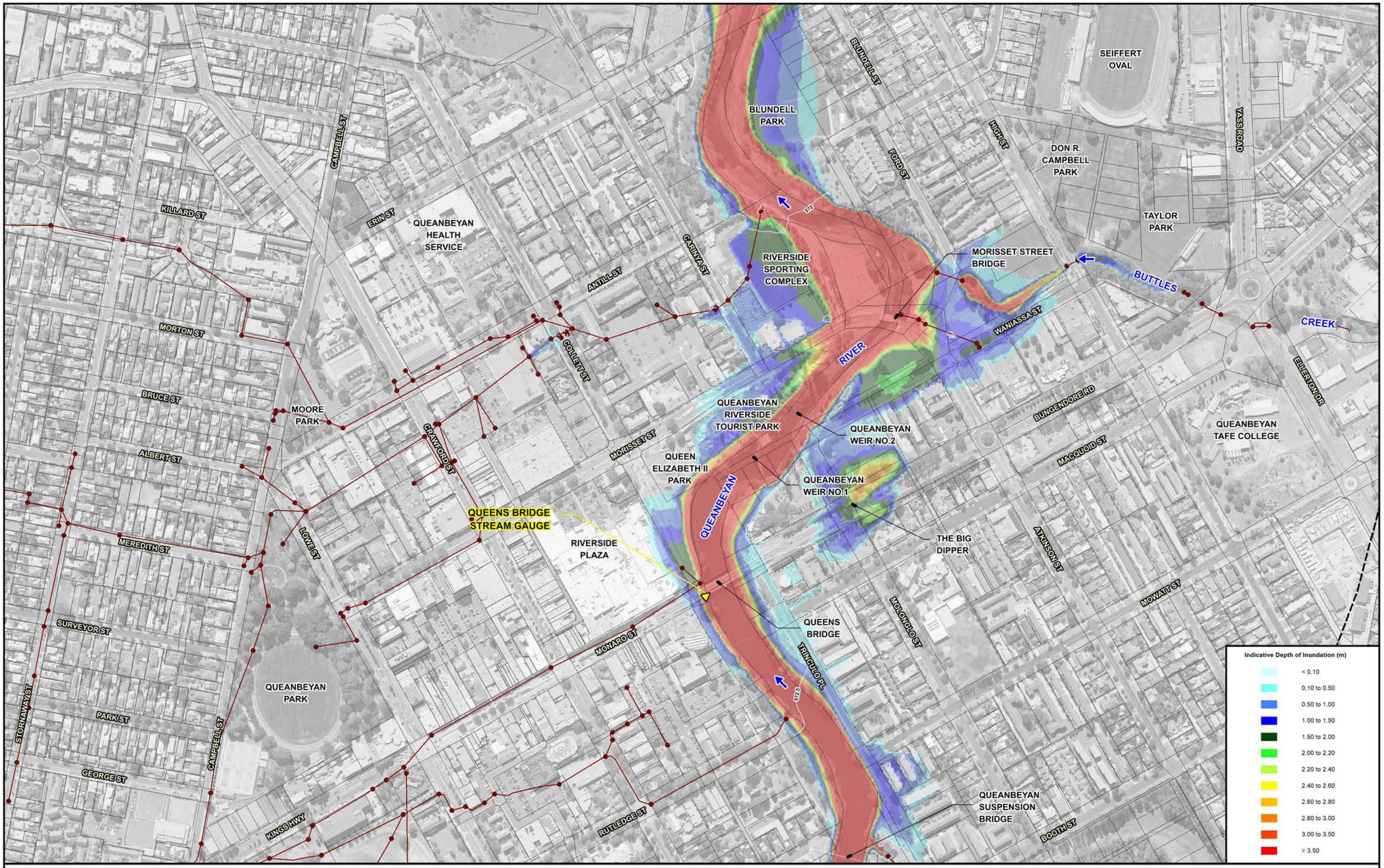
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.3
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
5% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.3
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
5% AEP

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
DANE ST
WOODGER PL
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS FLAT DR
BARRACKS CREEK
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)
MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
CRESTWOOD
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
CRAWFORD ST
ROSS RD
CAMPBELL ST
MORISSET ST
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
MOWATT ST
ELLERTON DR
THARWARD
CAMERON RD

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.4
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
2% AEP

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 573.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.4
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
2% AEP

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
DANE ST
WOODGER PDE
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
DON R. CAMPBELL PARK
BUTTLES CREEK
CRESTWOOD
CRAWFORD ST
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
MOWATT ST
ELLERTON DR
THARWARD
CAMERON RD

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

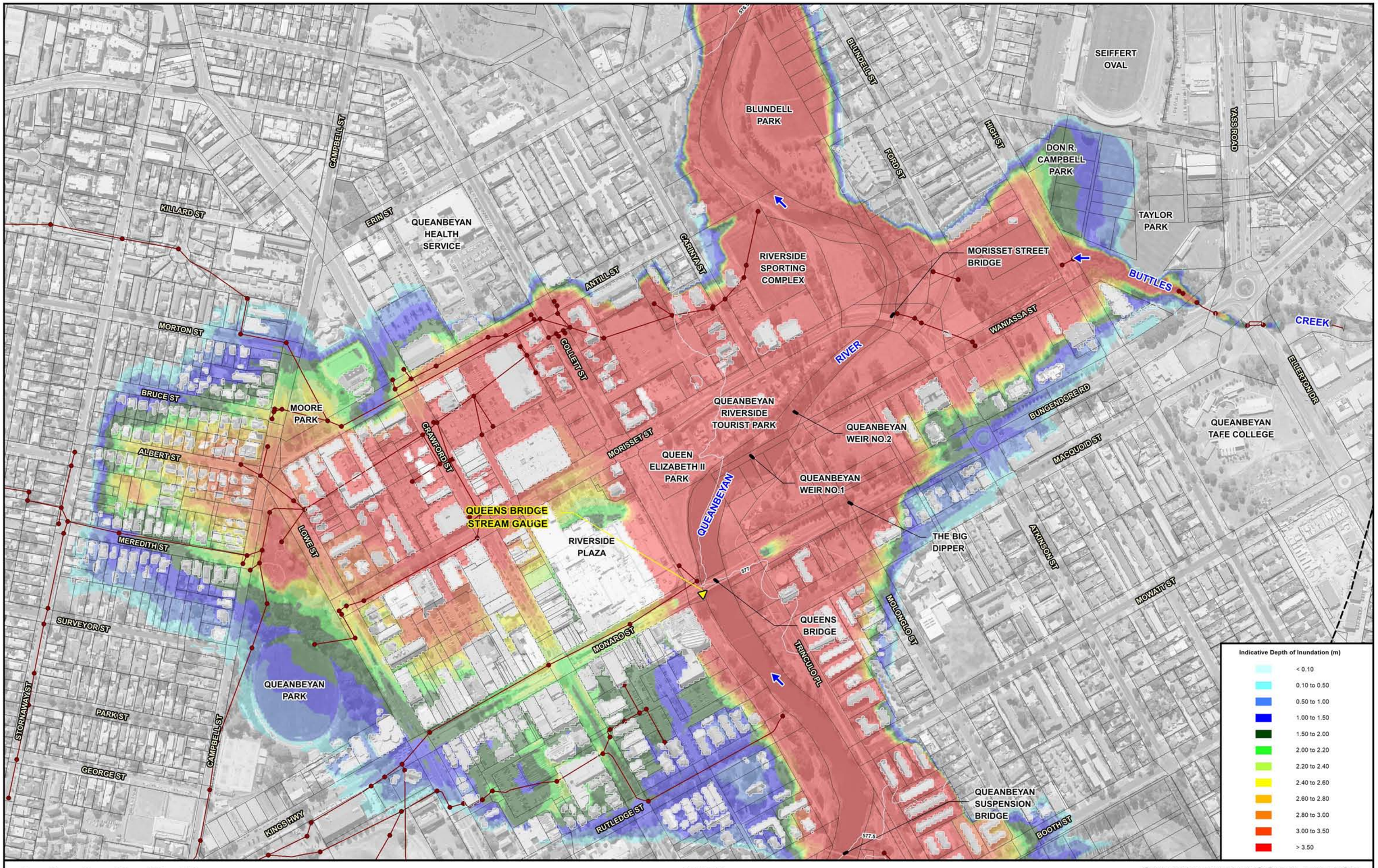
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.5
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
0.5% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.5
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
0.5% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
DANE ST
WOODGER PDE
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS FLAT
BARRACKS CREEK
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
GOULBURN-QUEANBEYAN RAILWAY LINE
QUEANBEYAN EAST
YASS RD
KINGS HWY
CRESTWOOD
CRAWFORD ST
REFER SHEET 2
DON R. CAMPBELL PARK
BUTTLES CREEK
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
MOWATT ST
ELLERTON DR
THARWARD
HIGH ST
CAMERON RD
JOINS WINDOW 1

Indicative Depth of Inundation (m)

< 0.10
0.10 to 0.50
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.20
2.20 to 2.40
2.40 to 2.60
2.60 to 2.80
2.80 to 3.00
3.00 to 3.50
> 3.50

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

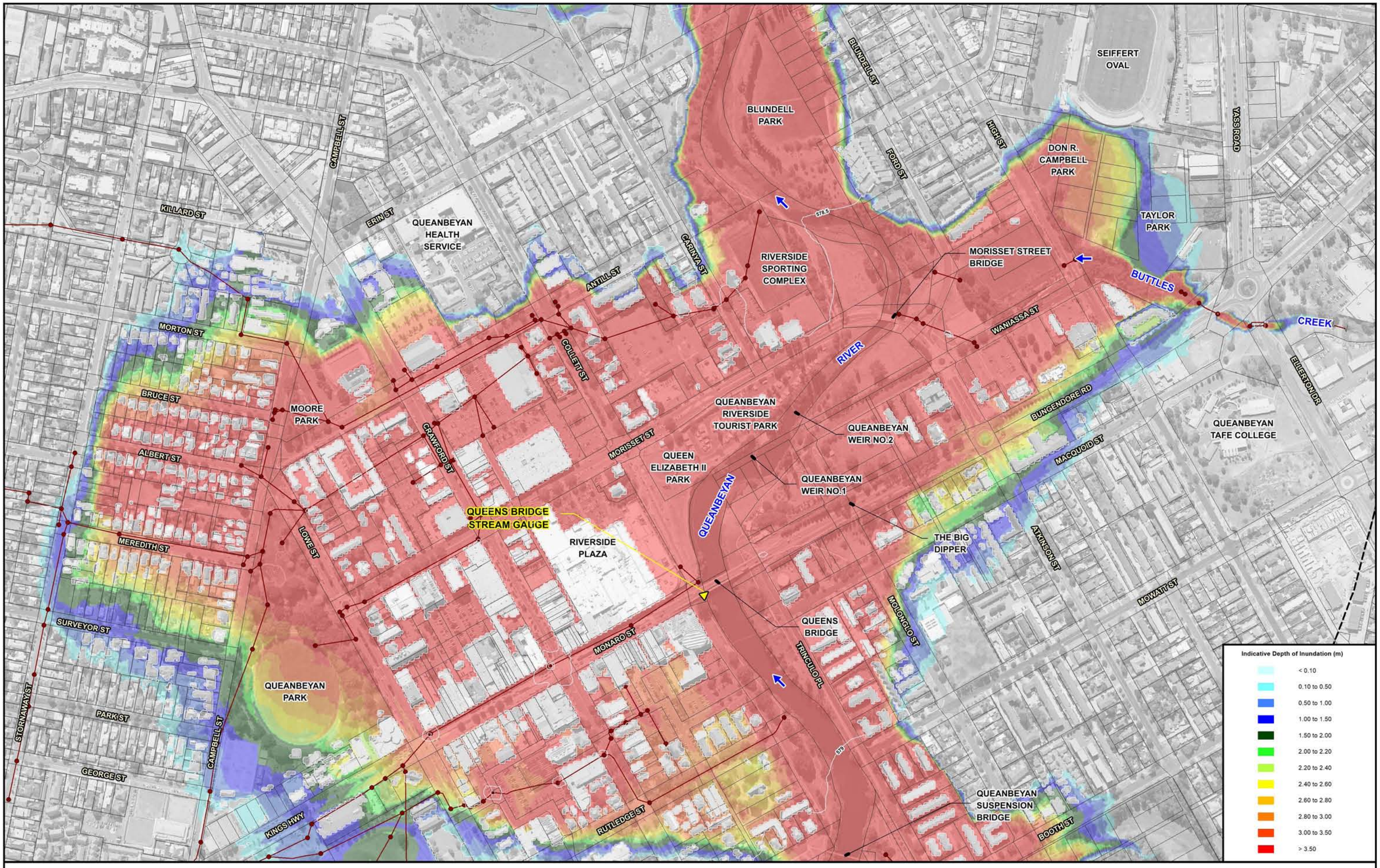
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 575.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.6
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
0.2% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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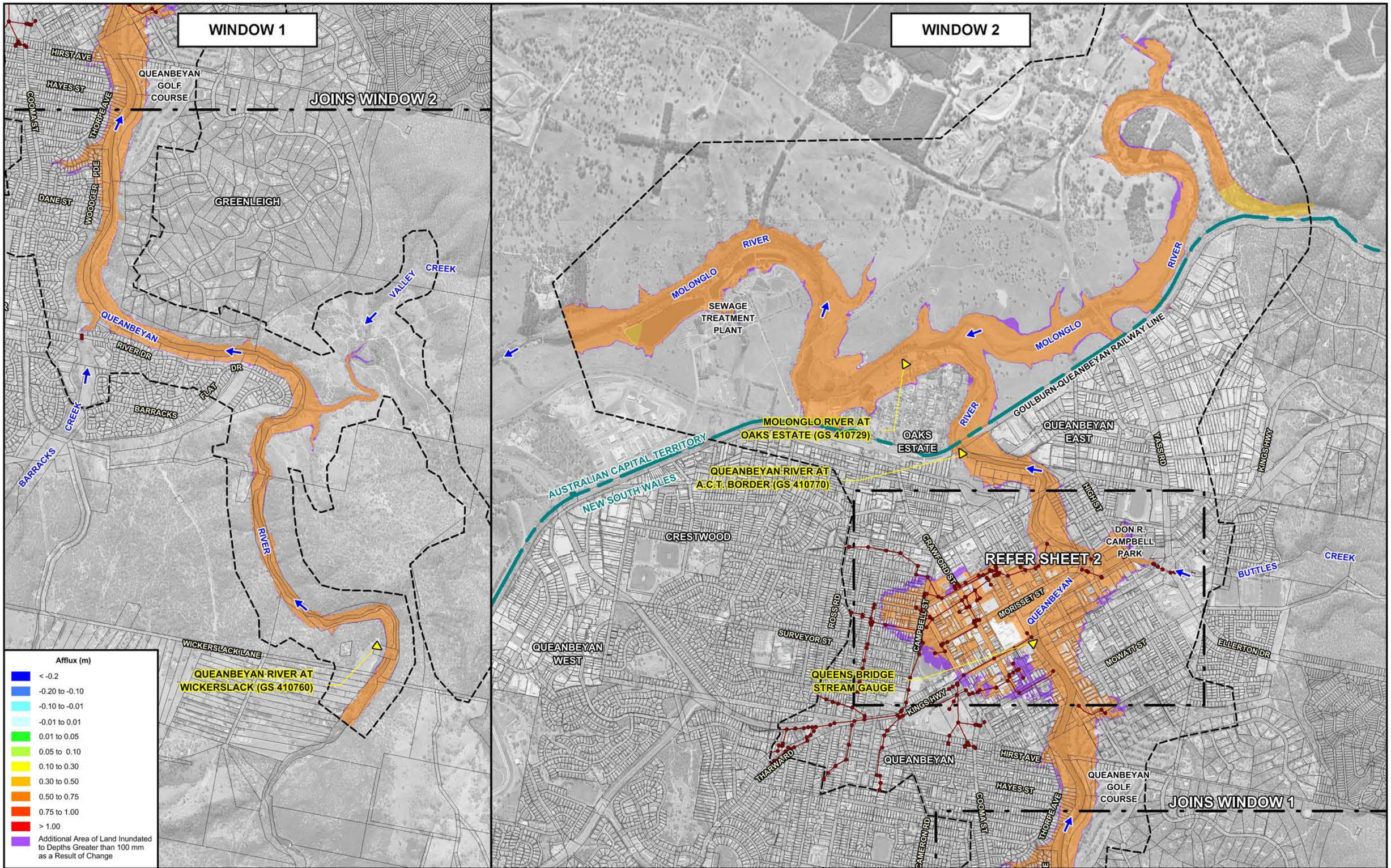
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- 578.0 Mainstream Water Surface Elevation Contours (m AHD)

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.6
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTHS OF INUNDATION
0.2% AEP



N 200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

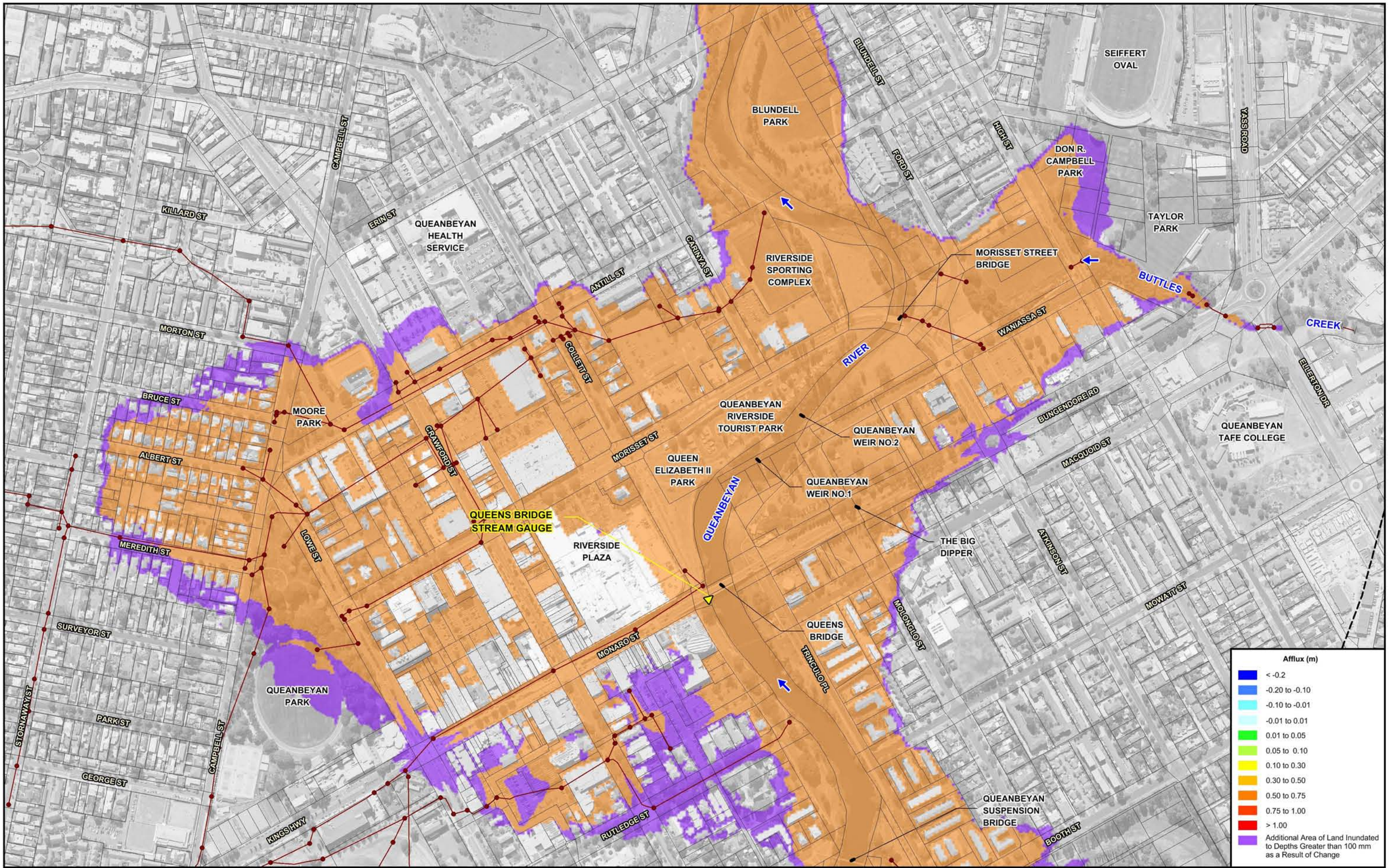
Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.7
(Sheet 1 of 2)

SENSITIVITY OF FLOOD BEHAVIOUR TO 20% INCREASE IN HYDRAULIC ROUGHNESS VALUES
1% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.7
(Sheet 2 of 2)

SENSITIVITY OF FLOOD BEHAVIOUR TO 20% INCREASE IN HYDRAULIC ROUGHNESS VALUES
1% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMA ST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
DANE ST
WOODGER PDE
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
MOLONGLO RIVER
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
QUEANBEYAN EAST
YASS RD
KINGS HWY
HIGH ST
CRESTWOOD
CRAWFORD ST
REFER SHEET 2
DON R. CAMPBELL PARK
BUTTLES CREEK
ROSS RD
SURVEYOR ST
CAMPBELL ST
MORISSET ST
QUEANBEYAN
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
KINGS HWY
MOWATT ST
ELLERTON DR
THARWARD
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1
CAMERON RD
COOMA ST
THORPE AVE

Afflux (m)

- < -2.00
- -2.00 to -1.50
- -1.50 to -1.00
- -1.00 to -0.50
- -0.50 to -0.01
- -0.01 to 0.01
- Additional Area of Land Inundated to Depths Less than 100 mm as a Result of Change

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

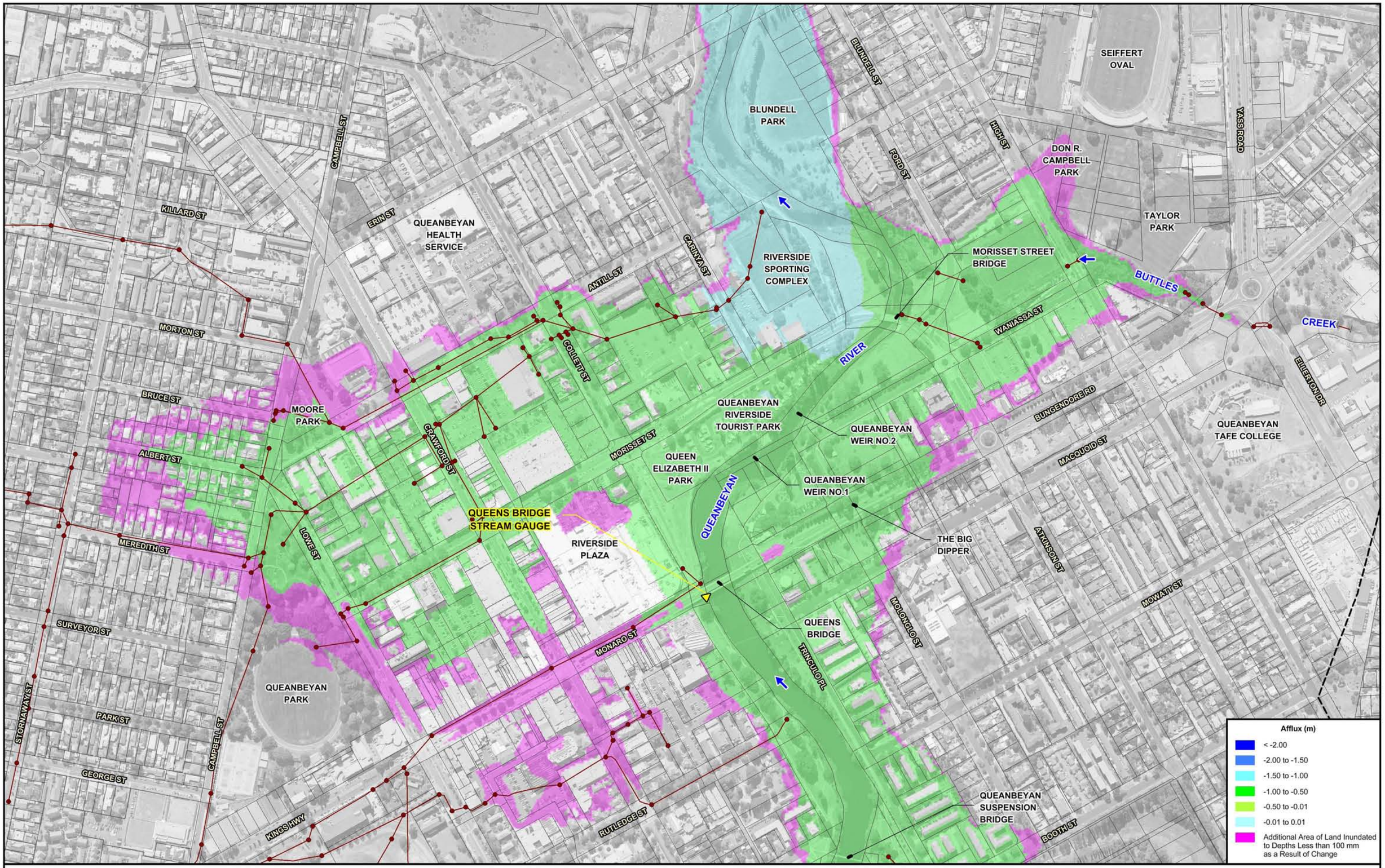
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.8
(Sheet 1 of 2)

SENSITIVITY OF FLOOD BEHAVIOUR TO REDUCTION IN HYDRAULIC ROUGHNESS VALUES IN LOWER REACHES OF MOLONGLO RIVER - 1% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.8
(Sheet 2 of 2)

SENSITIVITY OF FLOOD BEHAVIOUR TO REDUCTION IN HYDRAULIC ROUGHNESS VALUES IN LOWER REACHES OF MOLONGLO RIVER - 1% AEP

WINDOW 1

WINDOW 2

HIRST AVE
HAYES ST
COOMAST
THORPE AVE
QUEANBEYAN GOLF COURSE
JOINS WINDOW 2
WOODGER PDE
DANE ST
GREENLEIGH
VALLEY CREEK
QUEANBEYAN RIVER DR
BARRACKS CREEK
BARRACKS FLAT DR
RIVER
WICKERSLACK LANE
QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

MOLONGLO RIVER
SEWAGE TREATMENT PLANT
BLK6
BLK5
MOLONGLO RIVER
GOULBURN-QUEANBEYAN RAILWAY LINE
MOLONGLO RIVER AT OAKS ESTATE (GS 410729)
OAKS ESTATE
BLK4
QUEANBEYAN EAST
YASS RD
KINGS HWY
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)
REFER SHEET 2
HIGH ST
CRESTWOOD
CRAWFORD ST
DON R. CAMPBELL PARK
BLK3
BUTTLES CREEK
ROSS RD
CAMPBELL ST
MORISSET ST
QUEANBEYAN
SURVEYOR ST
QUEANBEYAN WEST
QUEENS BRIDGE STREAM GAUGE
ELLERTON DR
MOWATT ST
KINGS HWY
BLK1
THARWA RD
QUEANBEYAN
HIRST AVE
HAYES ST
QUEANBEYAN GOLF COURSE
JOINS WINDOW 1
CAMERON RD
COOMAST
THORPE AVE

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Additional Area of Land Inundated to Depths Greater than 100 mm as a Result of Change

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

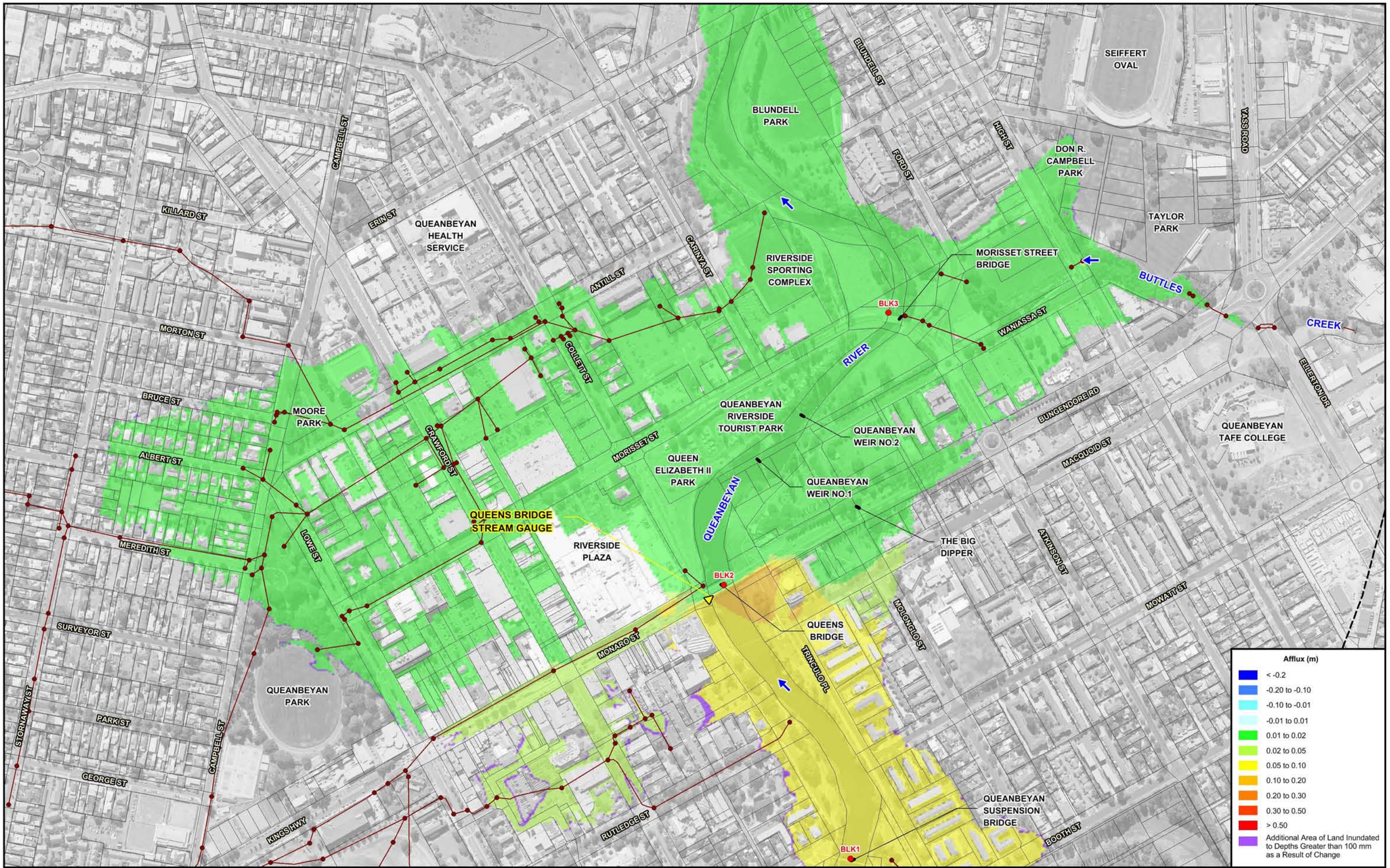
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- BLK3 — Location and Identifier of Blocked Structure

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.9
(Sheet 1 of 2)

SENSITIVITY OF FLOOD BEHAVIOUR TO PARTIAL BLOCKAGE OF HYDRAULIC STRUCTURES
MAIN STREAM FLOODING ONLY - 1% AEP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- BLK3 — Location and Identifier of Blocked Structure

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.9
(Sheet 2 of 2)

SENSITIVITY OF FLOOD BEHAVIOUR TO PARTIAL BLOCKAGE OF HYDRAULIC STRUCTURES
MAIN STREAM FLOODING ONLY - 1% AEP

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge
- Extent of Queanbeyan River Flooding Not Shown

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure C4.10

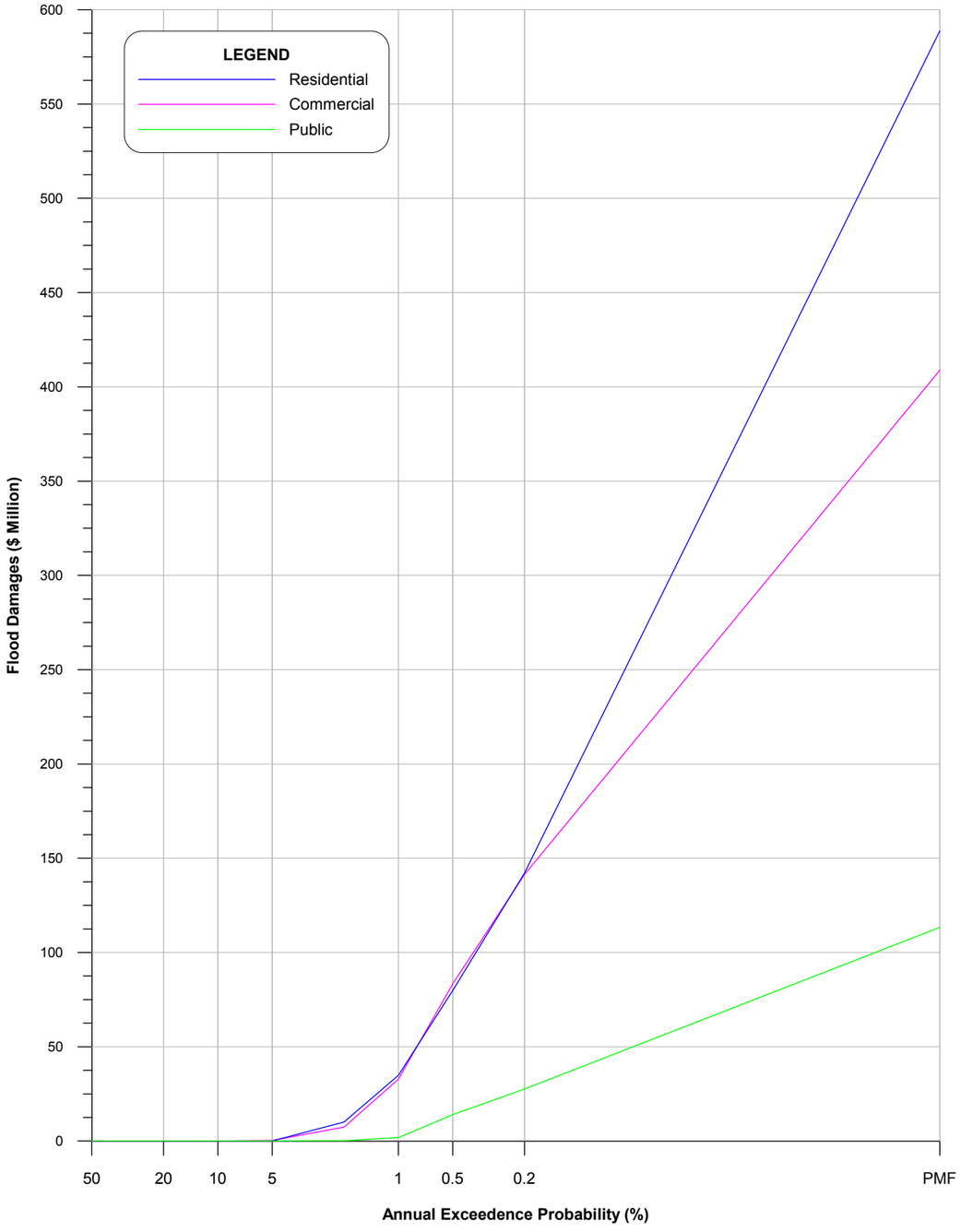
SENSITIVITY OF FLOOD BEHAVIOUR TO PARTIAL BLOCKAGE OF HYDRAULIC STRUCTURES
LOCAL CATCHMENT FLOODING IN VICINITY OF QUEANBEYAN CBD - 1% AEP

APPENDIX D

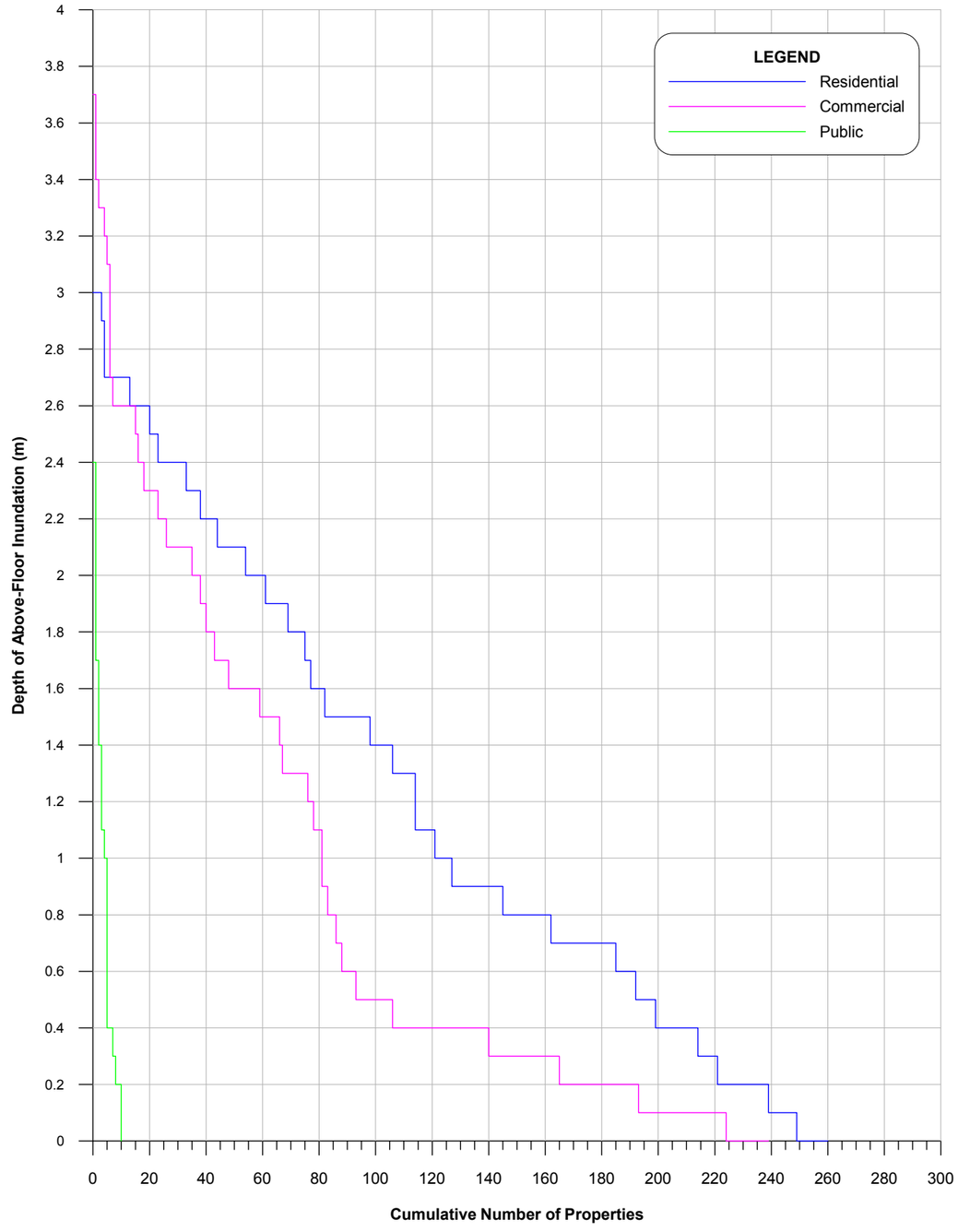
FLOOD DAMAGES

LIST OF FIGURES (APPENDIX D)

DAMAGE FREQUENCY CURVE



CUMULATIVE FLOODED PROPERTIES VERSUS DEPTH OF INUNDATION DIAGRAM - 1% AEP



Lyall & Associates

NOTE:
Values apply for nominal design flood levels case.

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure D8.1

DAMAGE - FREQUENCY CURVES AND CUMULATIVE FLOODED PROPERTIES VERSUS DEPTH OF INUNDATION DIAGRAM
1% AEP

APPENDIX E

DRAFT FLOOD POLICY

LIST OF FIGURES (APPENDIX E)

WINDOW 1

WINDOW 2

JOINS WINDOW 2

JOINS WINDOW 1

REFER SHEET 2

QUEANBEYAN GOLF COURSE

HAYES ST

COOMA ST

THORPE AVE

DANE ST

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

BARRACKS FLAT CREEK

BARRACKS

RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

GOOGONG

MOLONGLO RIVER

SEWAGE TREATMENT PLANT

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

OAKS ESTATE

CRESTWOOD

QUEANBEYAN WEST

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

CRAWFORD ST

ROSS RD

CAMPBELL ST

MORISSET ST

SURVEYOR ST

QUEANBEYAN

QUEENS BRIDGE STREAM GAUGE

MOWATT ST

ELLERTON DR

THARWARD

QUEANBEYAN GOLF COURSE

HAYES ST

COOMA ST

THORPE AVE

ST

ON RD

571 572 573 574 575 576 578 580 581 582 584 585 586

LEGEND

- Flood Planning Area
- Outer Floodplain
- 578 Flood Planning Level (m AHD) (Contours are spaced at 0.2 m intervals)

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 4 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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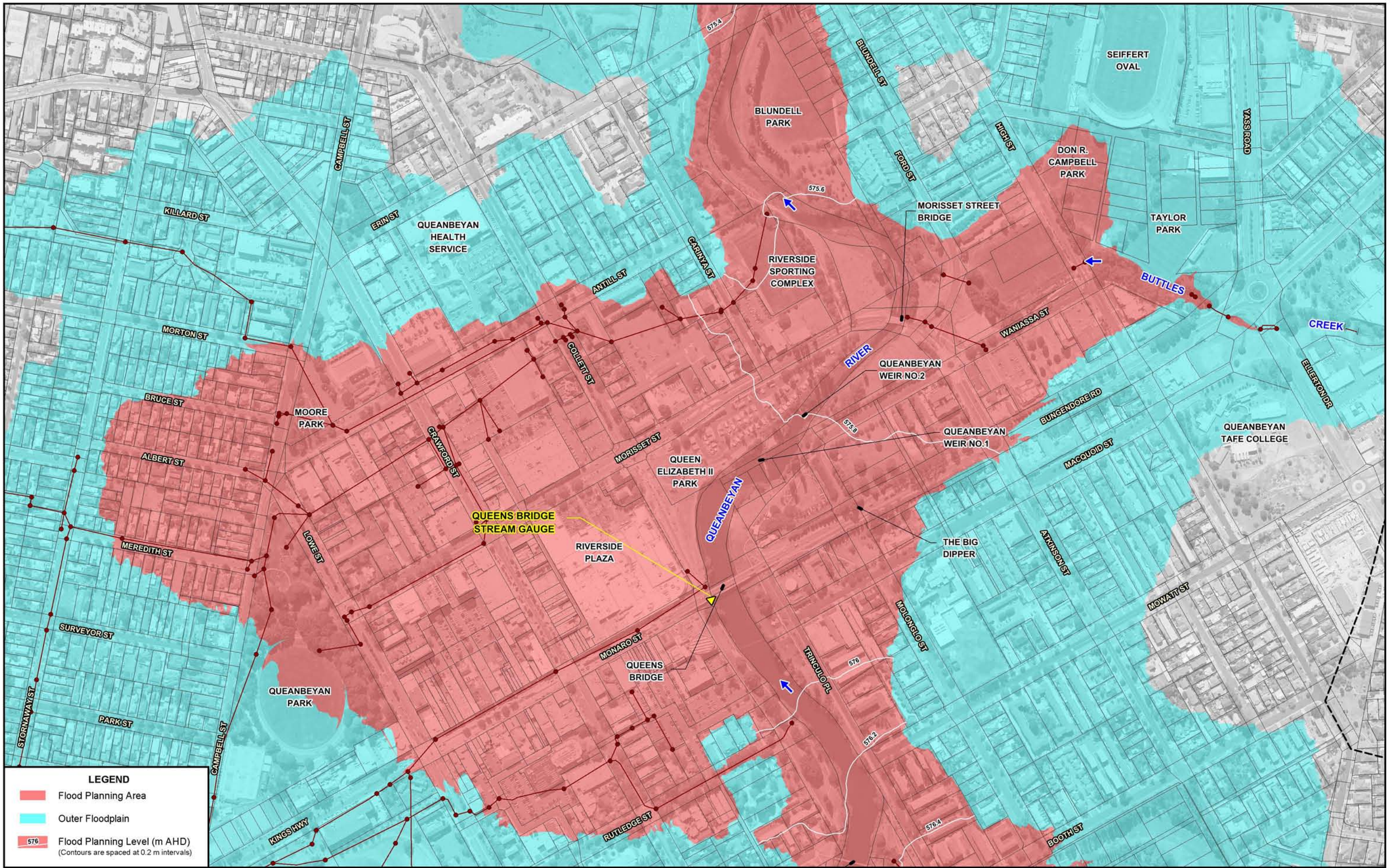
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure E1.1
(Sheet 1 of 2)

EXTRACT OF FLOOD PLANNING MAP AT QUEANBEYAN



Lyall & Associates

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QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure E1.1
(Sheet 2 of 2)

EXTRACT OF FLOOD PLANNING MAP AT QUEANBEYAN

WINDOW 1

WINDOW 2

QUEANBEYAN GOLF COURSE

JOINS WINDOW 2

HAYES ST

COOMAST

THORPE AVE

DANE ST

GREENLEIGH

VALLEY CREEK

QUEANBEYAN RIVER DR

BARRACKS FLAT DR

BARRACKS CREEK

RIVER

WICKERSLACK LANE

QUEANBEYAN RIVER AT WICKERSLACK (GS 410760)

GOOGONG

MOLONGLO RIVER

SEWAGE TREATMENT PLANT

MOLONGLO RIVER AT OAKS ESTATE (GS 410729)

AUSTRALIAN CAPITAL TERRITORY

NEW SOUTH WALES

QUEANBEYAN RIVER AT A.C.T. BORDER (GS 410770)

CRESTWOOD

OAKS ESTATE

GOULBURN-QUEANBEYAN RAILWAY LINE

QUEANBEYAN EAST

YASS RD

KINGS HWY

HIGH ST

DON R. CAMPBELL PARK

BUTTLES CREEK

REFER SHEET 2

CRAWFORD ST

ROSS RD

CAMPBELL ST

MORISSET ST

QUEANBEYAN

SURVEYOR ST

QUEANBEYAN WEST

QUEENS BRIDGE STREAM GAUGE

MOWATT ST

ELLERTON DR

KINGS HWY

THARWARD

QUEANBEYAN

HAYES ST

COOMAST

THORPE AVE

QUEANBEYAN GOLF COURSE

JOINS WINDOW 1

LEGEND

- Inner Floodplain (Category 1)
- Inner Floodplain (Category 2A)
- Inner Floodplain (Category 2B)
- Inner Floodplain (Category 2C)
- Intermediate Floodplain
- Outer Floodplain

N

200 0 200 400 600 m

Scale: 1:20,000

Lyall & Associates

NOTE:

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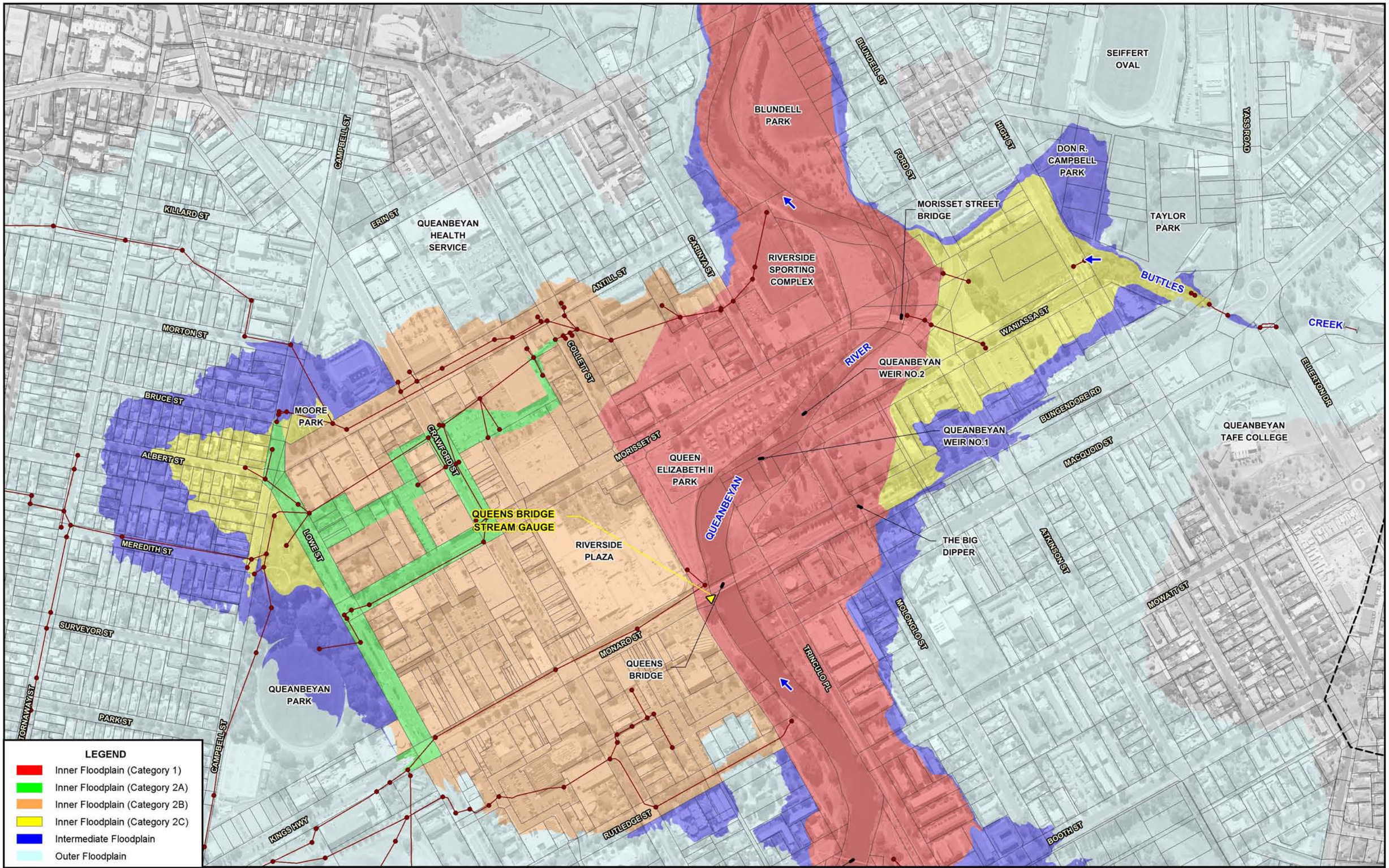
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure E1.2
(Sheet 1 of 2)

QUEANBEYAN FLOOD HAZARD MAP



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

NOTE:

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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Stream Gauge

QUEANBEYAN FLOODPLAIN RISK MANAGEMENT STUDY AND PLAN

Figure E1.2
(Sheet 2 of 2)

QUEANBEYAN FLOOD HAZARD MAP