Appendix B Inundation Maps and Emergency Control Measures

Part 1: Flood Impact—Downstream and Inundation Maps

B1 Flood Impact Maps – Downstream

B2 Inundation Maps

Part 2: Emergency Control Measures

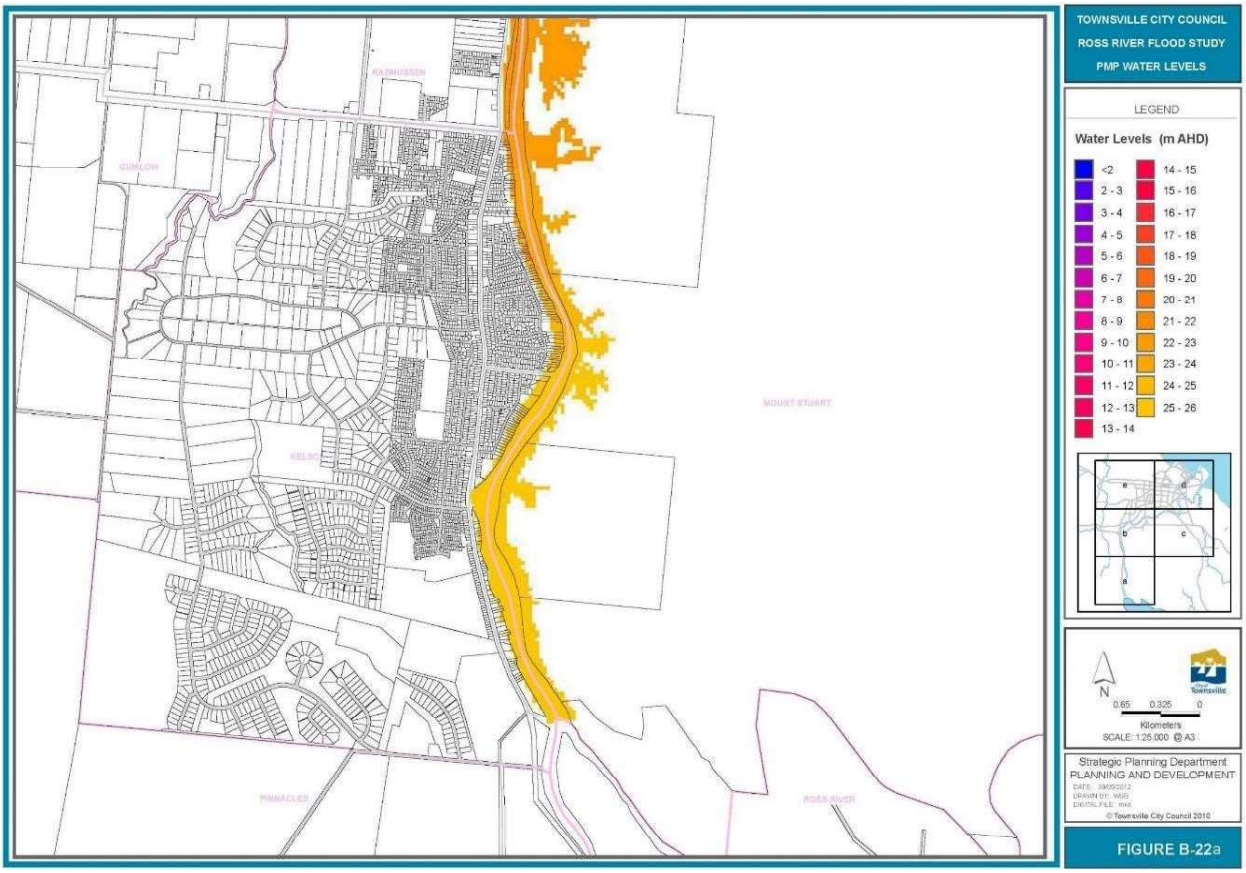
B3 Emergency Access Routes and Locality plan

B4 Catchment Map

Part 1: Flood Impact—Downstream and Inundation Maps

Appendix B1: Flood Impact Maps – Downstream

Disclaimer: Every effort has been made to ensure the currency of the flood inundation maps reproduced in this EAP. However, as the maps have been extracted from external sources, their accuracy cannot be guaranteed. Please refer to the Local Disaster Management Plan for the most current information.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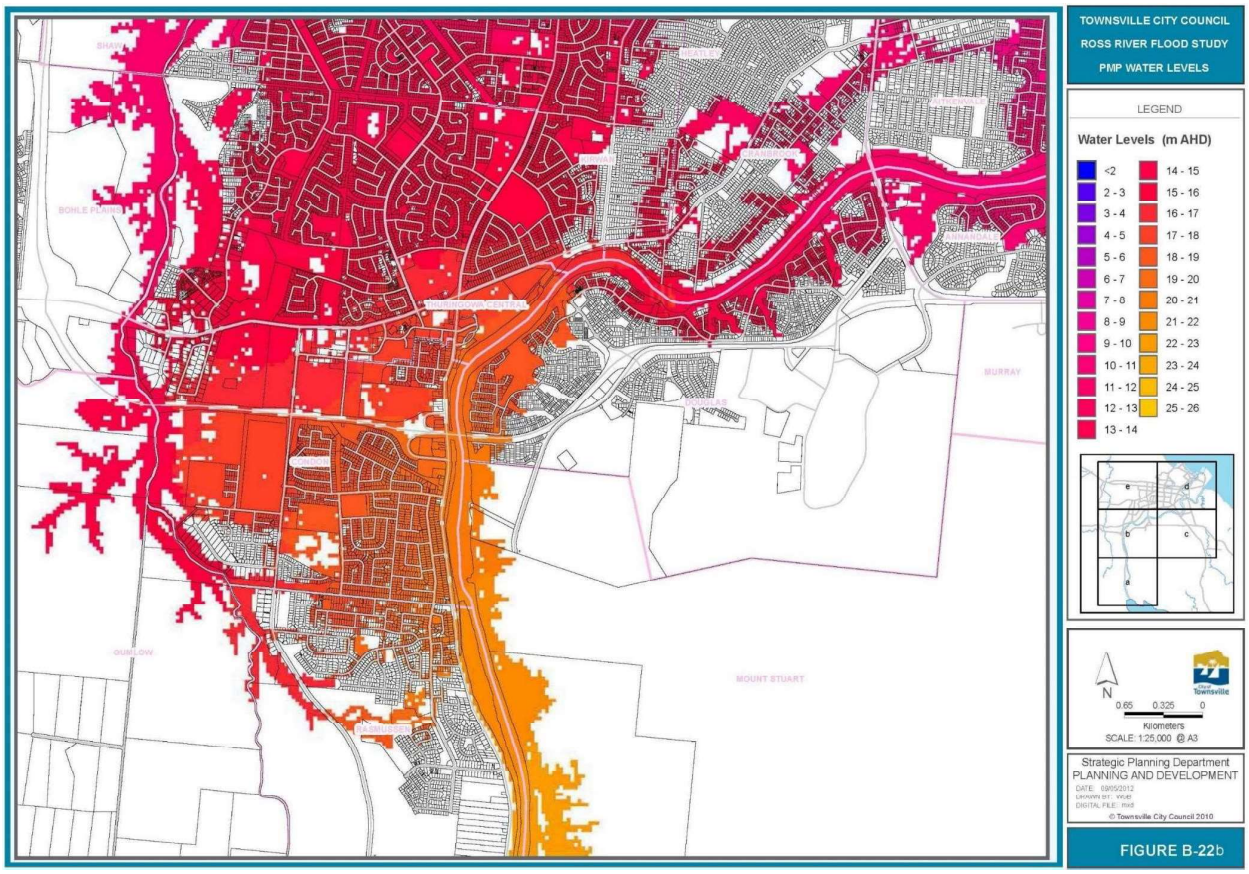
ROSS RIVER FLOOD STUDY
PMP WATER LEVELS
LEGEND
Water Levels (m AHD)
<2
2 - 3
3 - 4
4 - 5
5 - 6
6 - 7
7 - 8
8 - 9
9 - 10
10 - 11
11 - 12
12 - 13
13 - 14
14 - 15
15 - 16
16 - 17
17 - 18
18 - 19
19 - 20
20 - 21
21 - 22
22 - 23
23 - 24
24 - 25
25 - 26
N
0.65 0.325 0
Kilometers
SCALE: 1:25,000 @ A3
Strategic Planning Department
PLANNING AND DEVELOPMENT
© Townsville City Council 2010
FIGURE B-22a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ROSS RIVER FLOOD STUDY
PMP WATER LEVELS
LEGEND
Water Levels (m AHD)
<2
2 - 3
3 - 4
4 - 5
5 - 6
6 - 7
7 - 8
8 - 9
9 - 10
10 - 11
11 - 12
12 - 13
13 - 14
14 - 15
15 - 16
16 - 17
17 - 18
18 - 19
19 - 20
20 - 21
21 - 22
22 - 23
23 - 24
24 - 25
25 - 26
N
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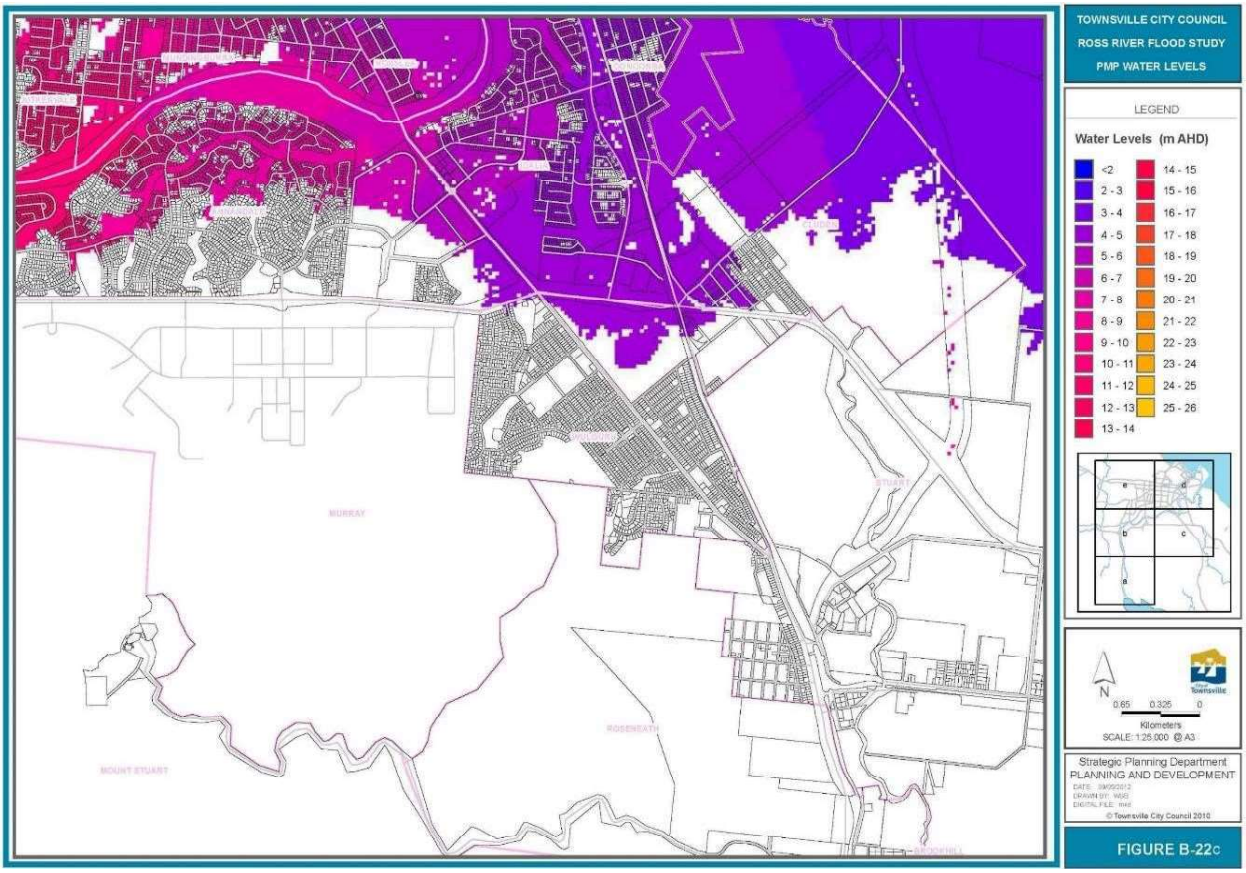
Kilometers
SCALE: 1:25,000 @ A3
Strategic Planning Department
PLANNING AND DEVELOPMENT
© Townsville City Council 2010
FIGURE B-22b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ROSS RIVER FLOOD STUDY
PMP WATER LEVELS
LEGEND
Water Levels (m AHD)
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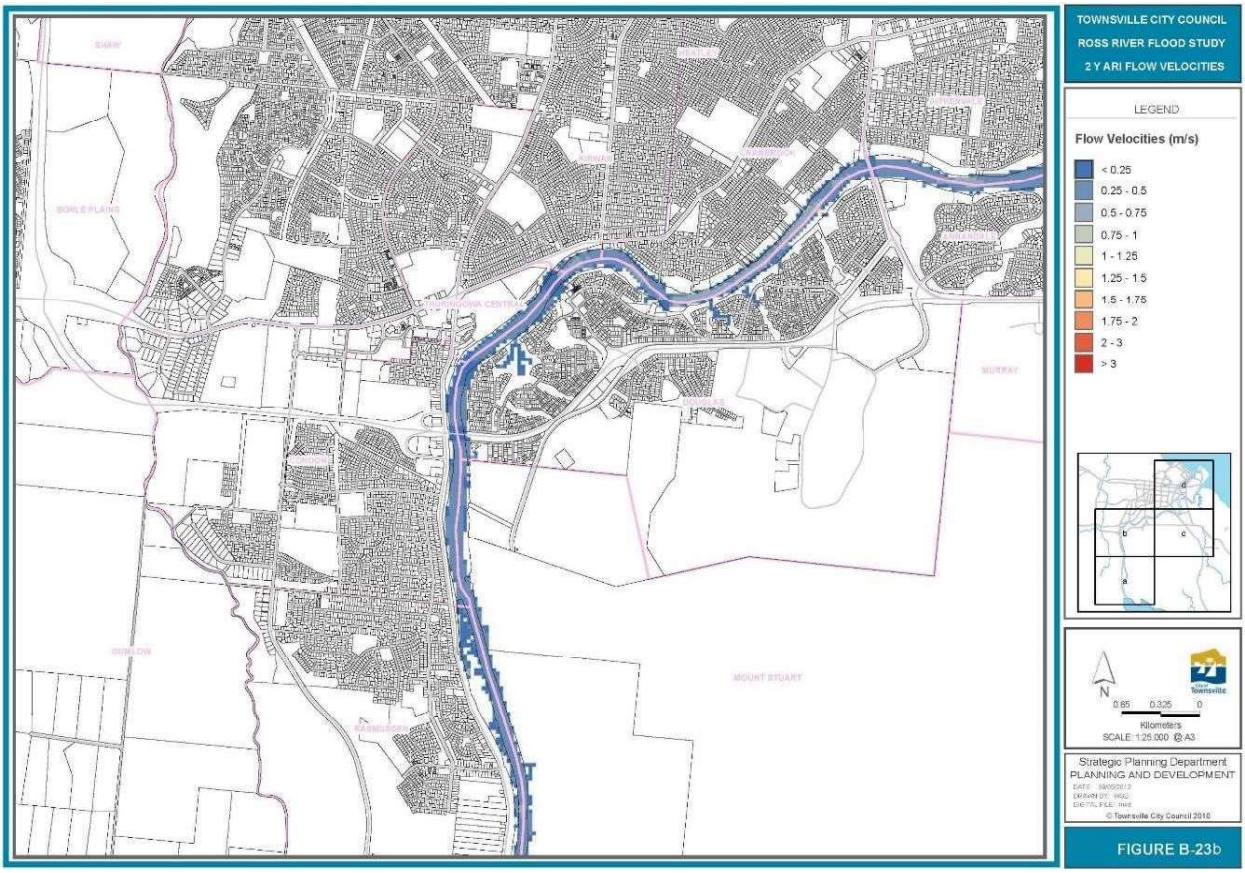
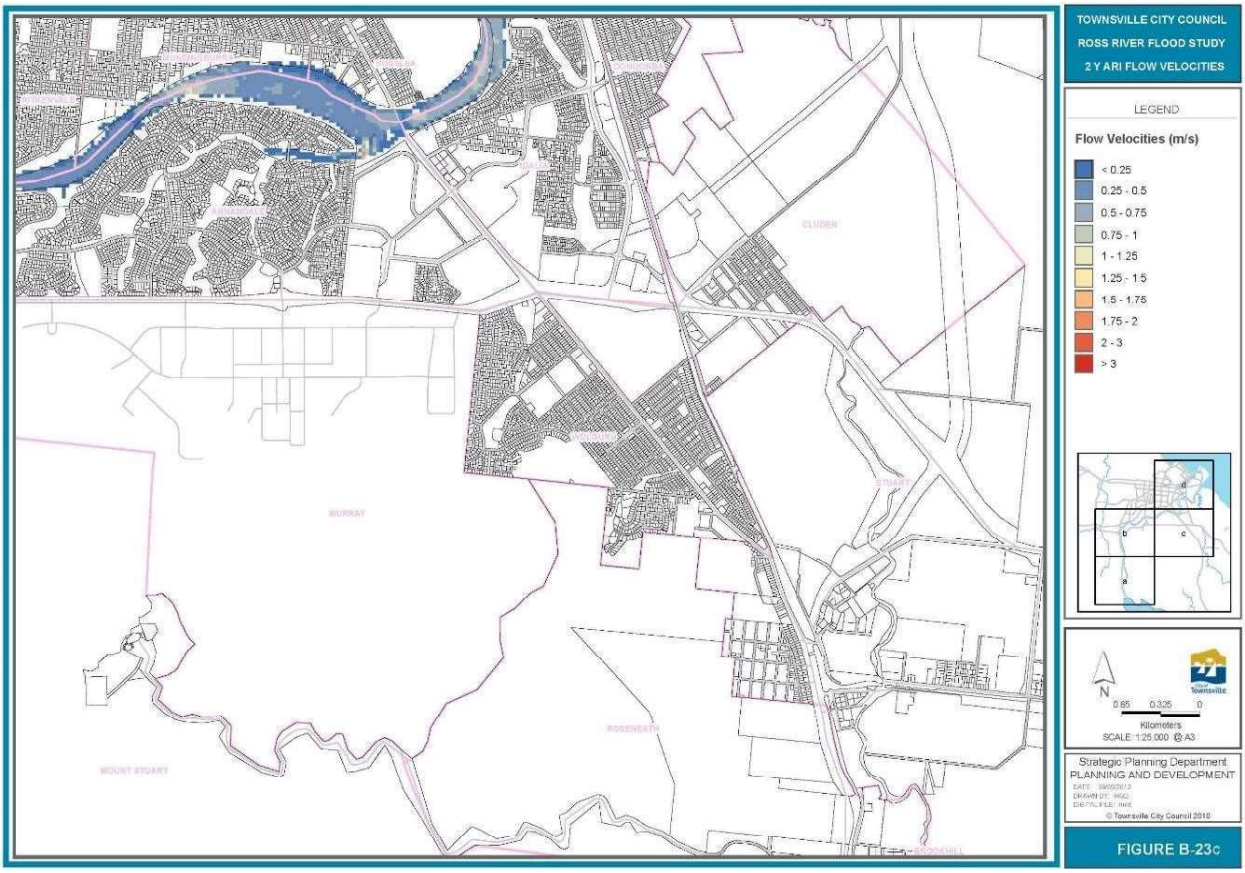
2 - 3
3 - 4
4 - 5
5 - 6
6 - 7
7 - 8
8 - 9
9 - 10
10 - 11
11 - 12
12 - 13
13 - 14
14 - 15
15 - 16
16 - 17
17 - 18
18 - 19
19 - 20
20 - 21
21 - 22
22 - 23
23 - 24
24 - 25
25 - 26
N
0.65 0.325 0
Kilometers
SCALE: 1:25,000 @ A3
Strategic Planning Department
PLANNING AND DEVELOPMENT
© Townsville City Council 2010
FIGURE B-22c


TOWNSVILLE CITY COUNCIL
ROSS RIVER FLOOD STUDY
2 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
< 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
N
0.65 0.325 0
Kilometers
SCALE 1:25,000 @ A3
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-23b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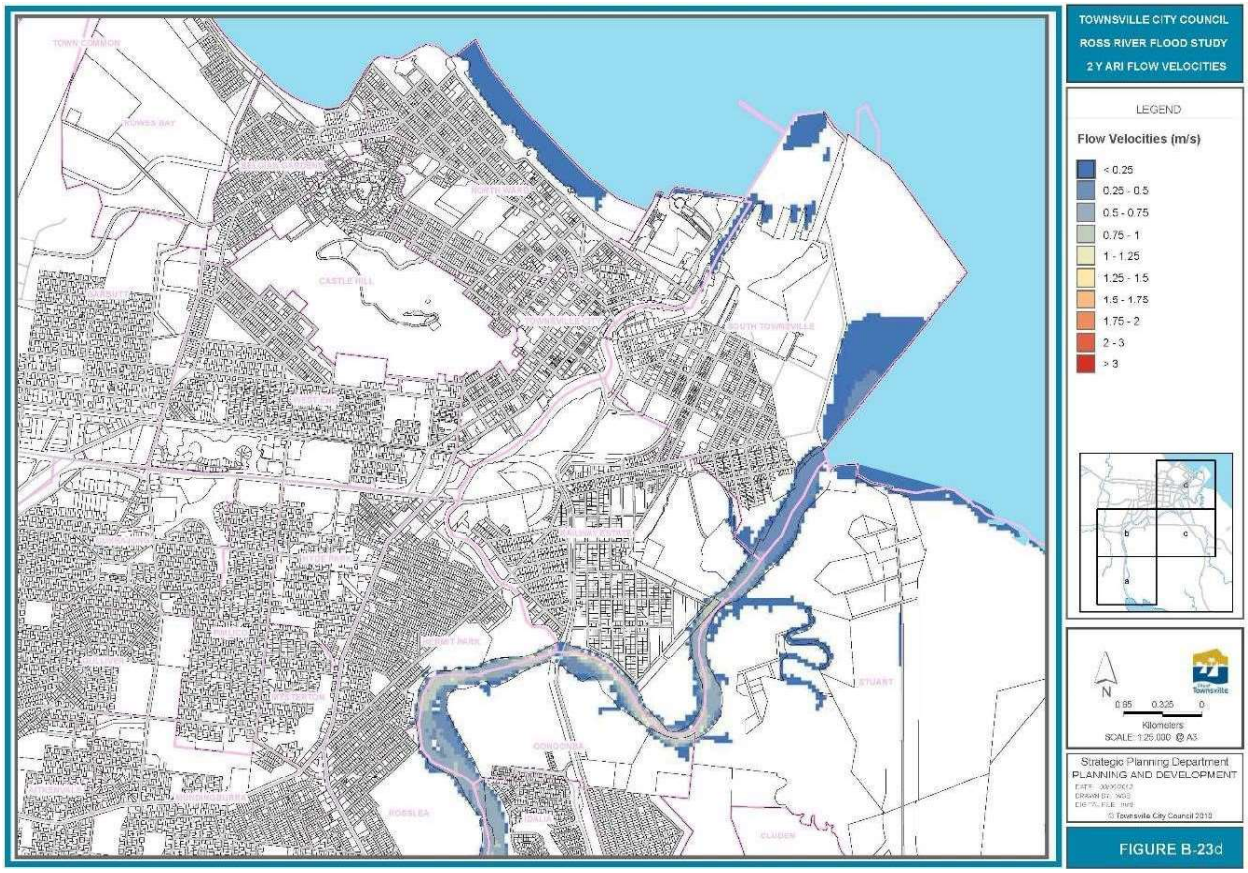
ROSS RIVER FLOOD STUDY
2 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
< 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
CLUDEN
MURRAY
ROSEWOOD
MOUNT STUART
Kilometers
SCALE 1:25,000 @ A3
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-23c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ROSS RIVER FLOOD STUDY
2 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
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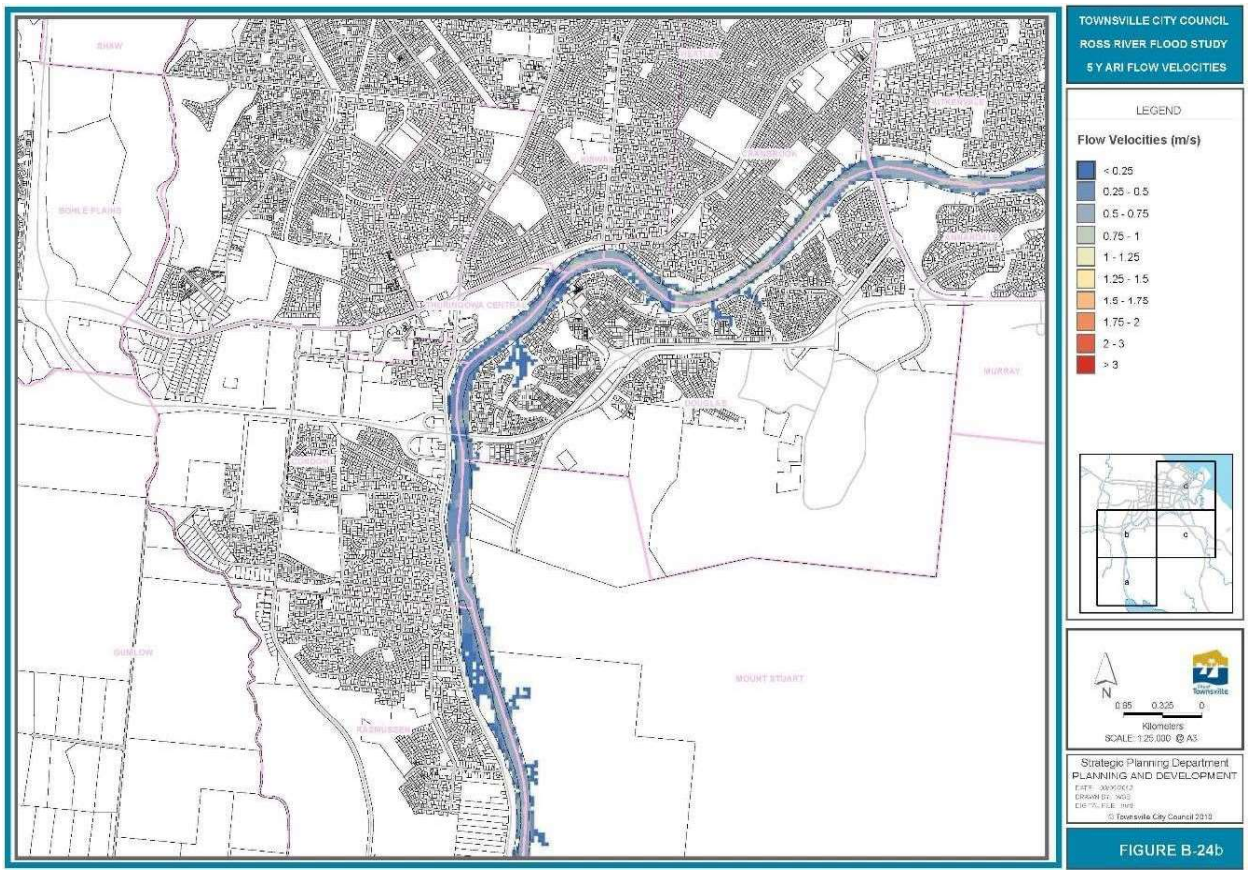
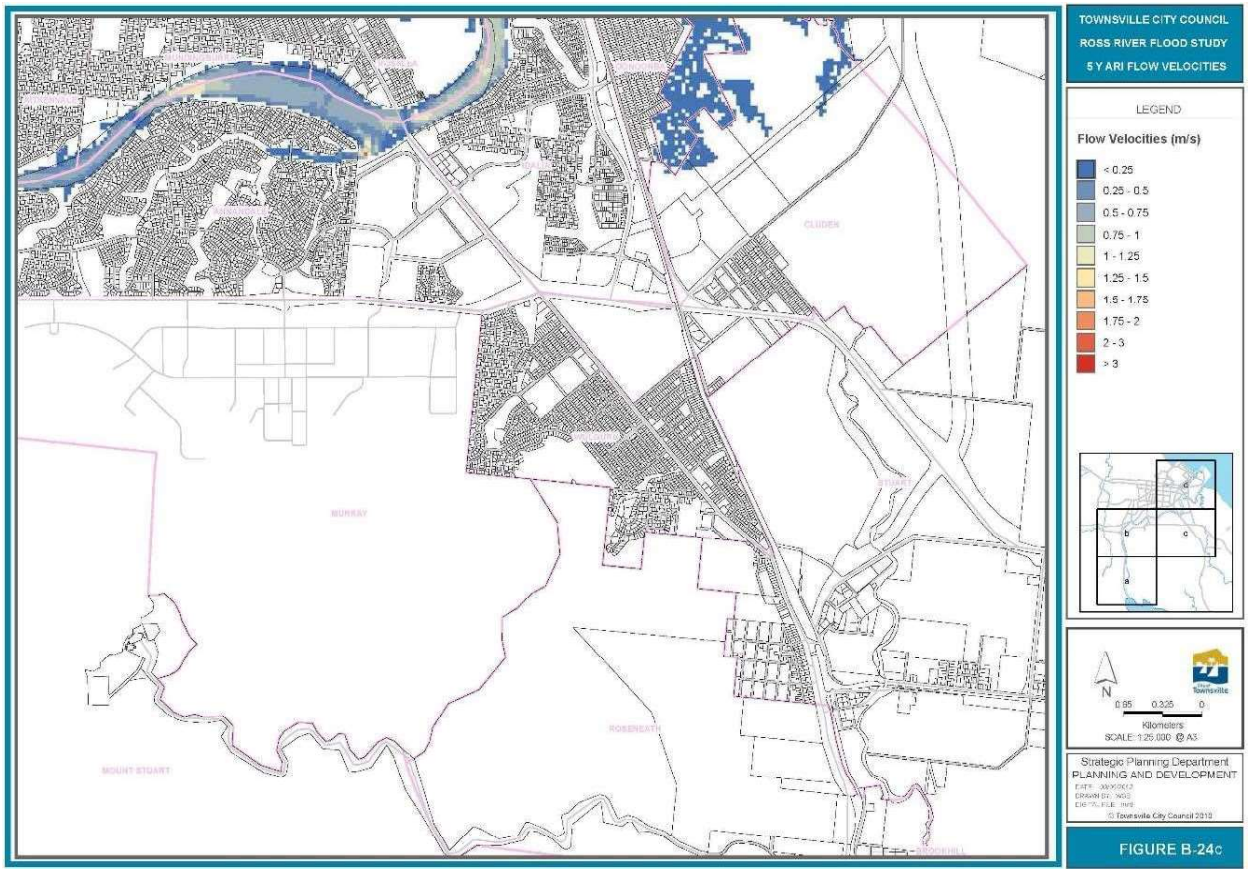
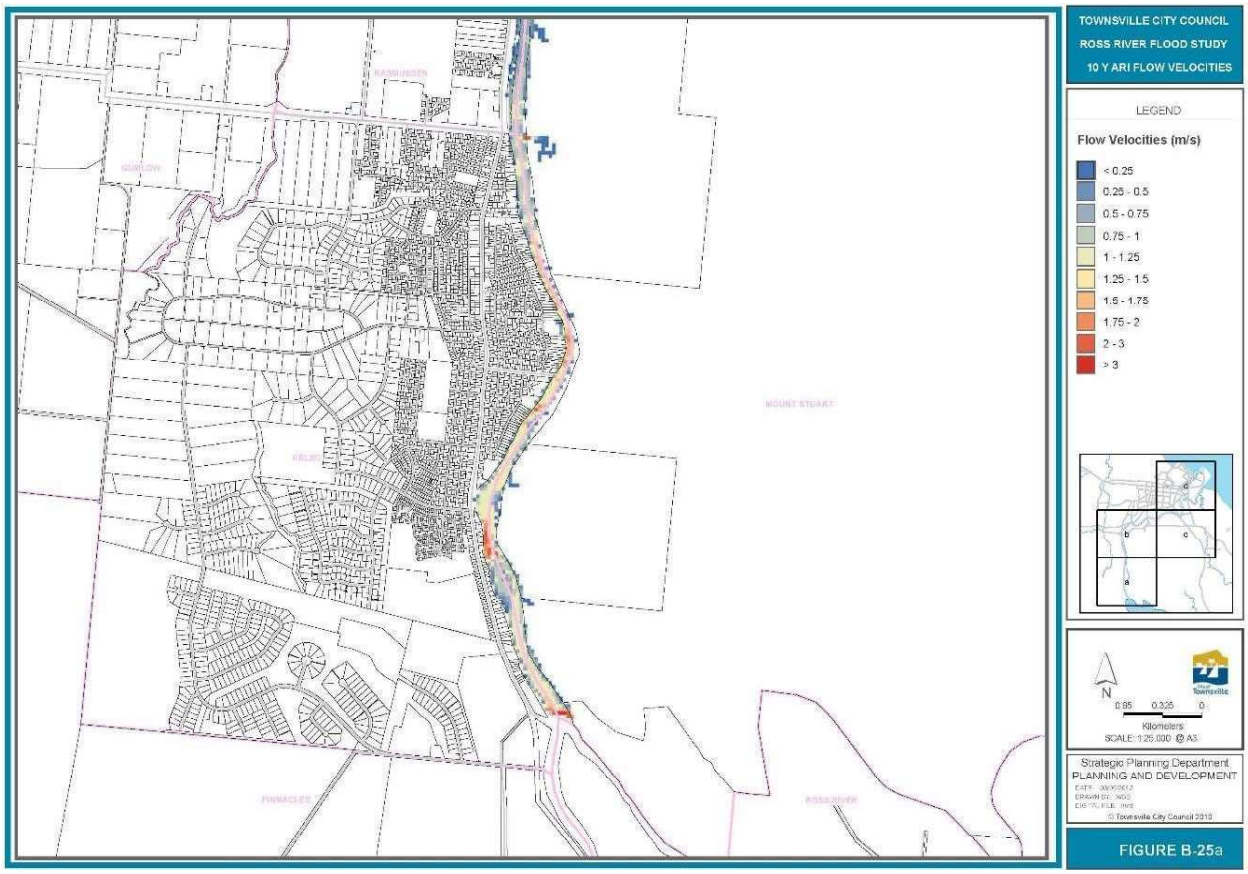
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
Kilometers
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-23d


TOWNSVILLE CITY COUNCIL
ROSS RIVER FLOOD STUDY
5 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
< 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
N
0.95 0.325 0
Kilometers
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-24a


TOWNSVILLE CITY COUNCIL
ROSS RIVER FLOOD STUDY
5 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
< 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
Kilometers
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-24b


TOWNSVILLE CITY COUNCIL
ROSS RIVER FLOOD STUDY
5 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
< 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
Kilometers
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-24c


TOWNSVILLE CITY COUNCIL
ROSS RIVER FLOOD STUDY
10 Y ARI FLOW VELOCITIES
LEGEND
Flow Velocities (m/s)
< 0.25
0.25 - 0.5
0.5 - 0.75
0.75 - 1
1 - 1.25
1.25 - 1.5
1.5 - 1.75
1.75 - 2
2 - 3
> 3
N
0.95 0.325 0
Kilometers
SCALE: 1:25,000 @ A3
Strategic Planning Department
PLANNING AND DEVELOPMENT
FIGURE B-25a

Appendix B2: Inundation Maps

Figure B1: Inundation Map: Sunny Day Failure

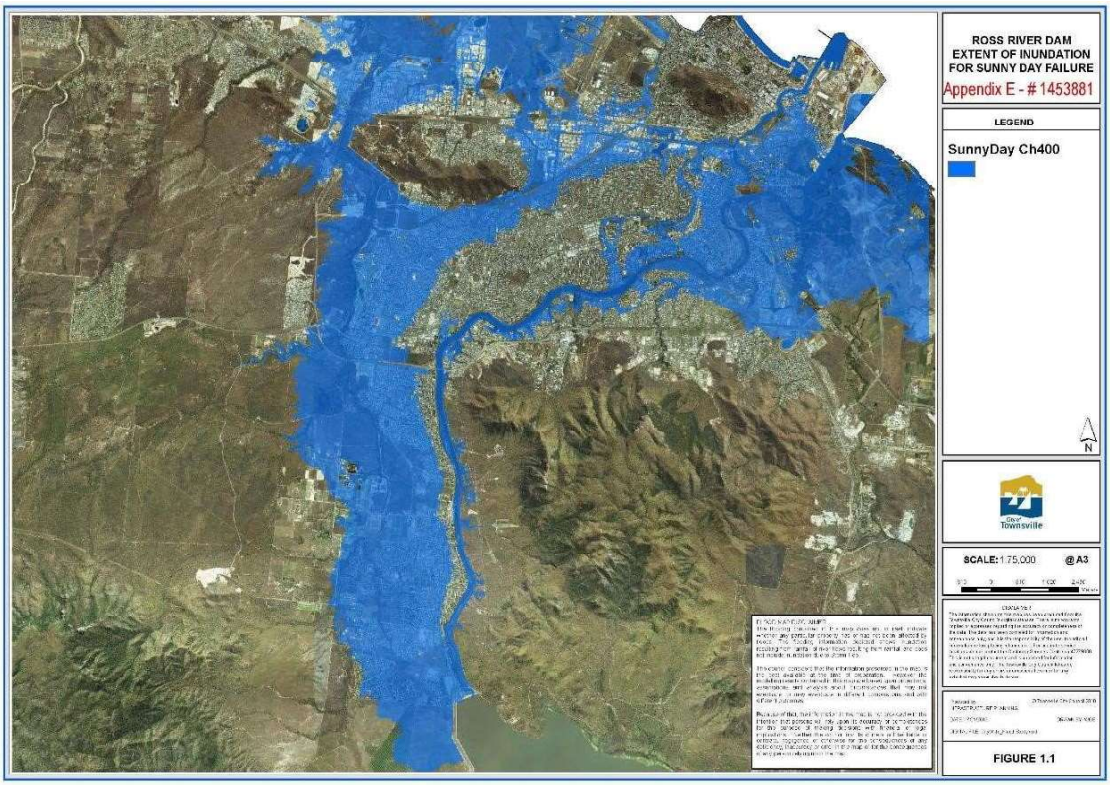


Figure B2: Inundation Map: Spillway Flow

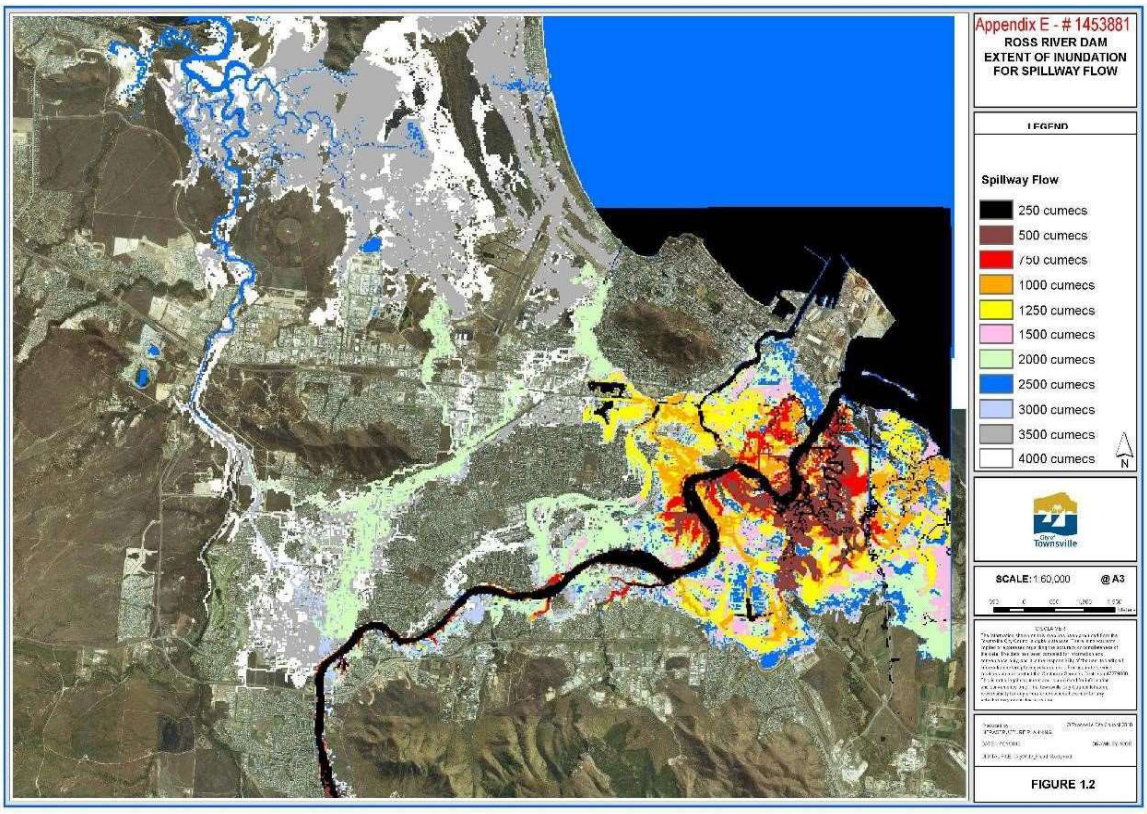


Figure B3: Inundation Map: Dam Breach (EL 43.00m)-Upper Ross

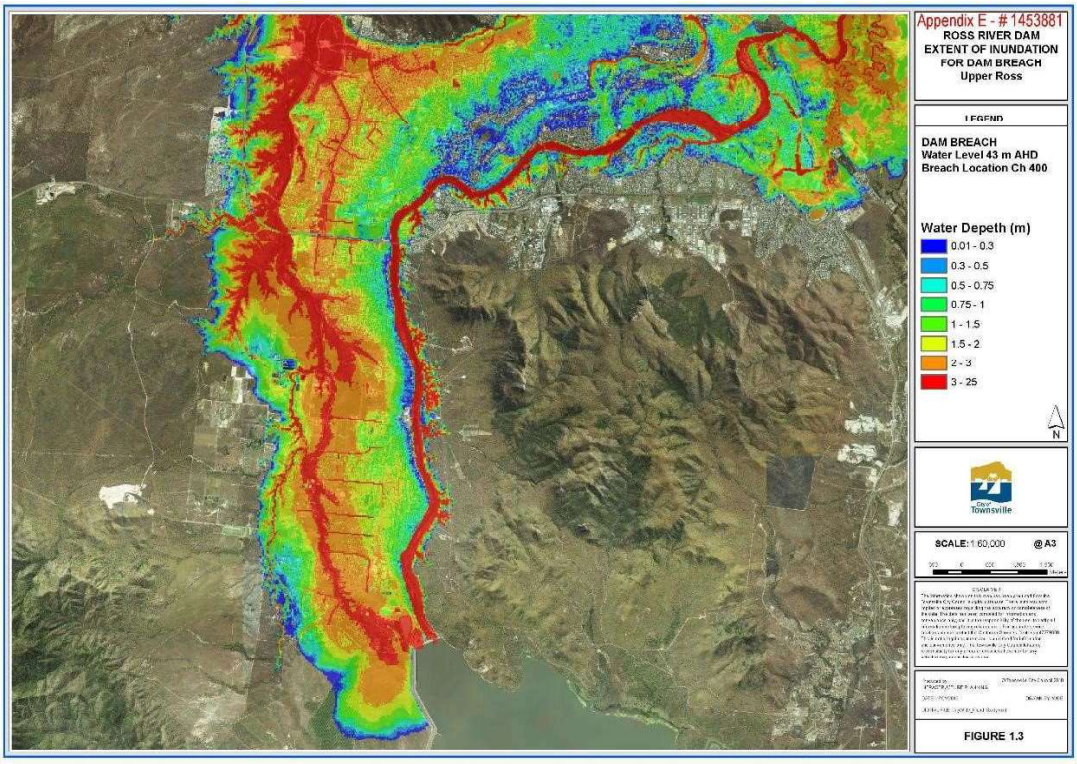


Figure B4: Inundation Map: Dam Breach (EL 43.00m)-Townsville

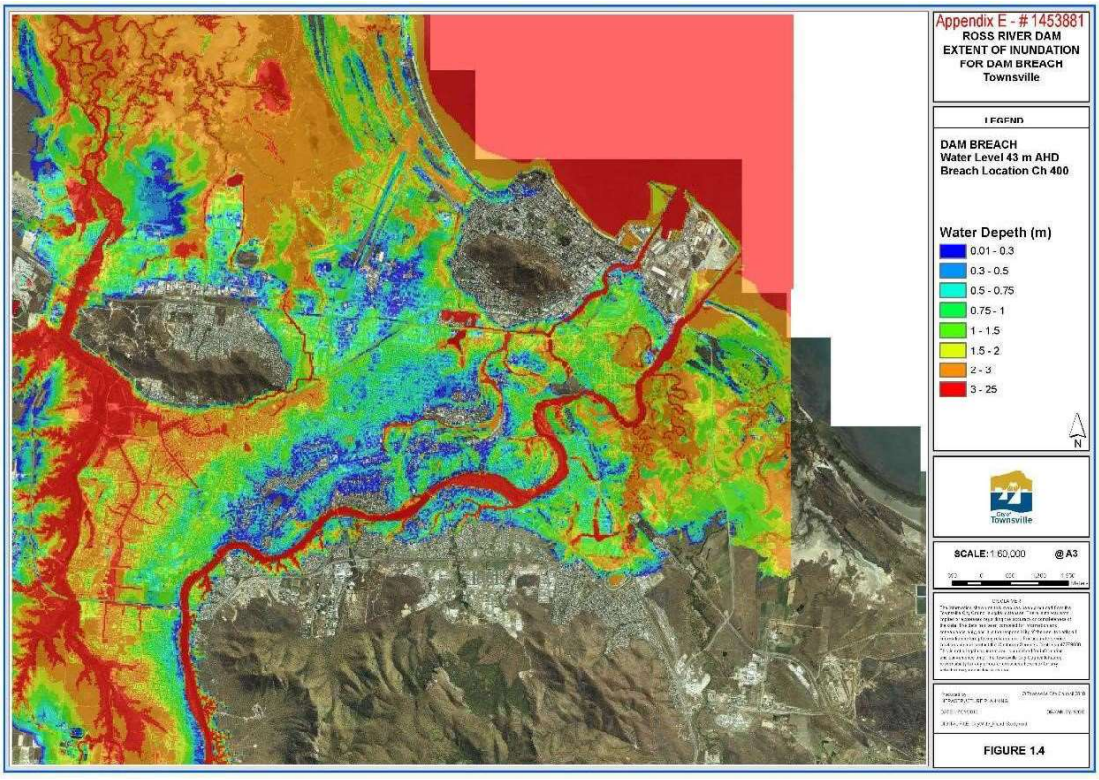


Figure B5: Inundation Map: Dam Breach (EL 43.00m)-Norther Suburbs

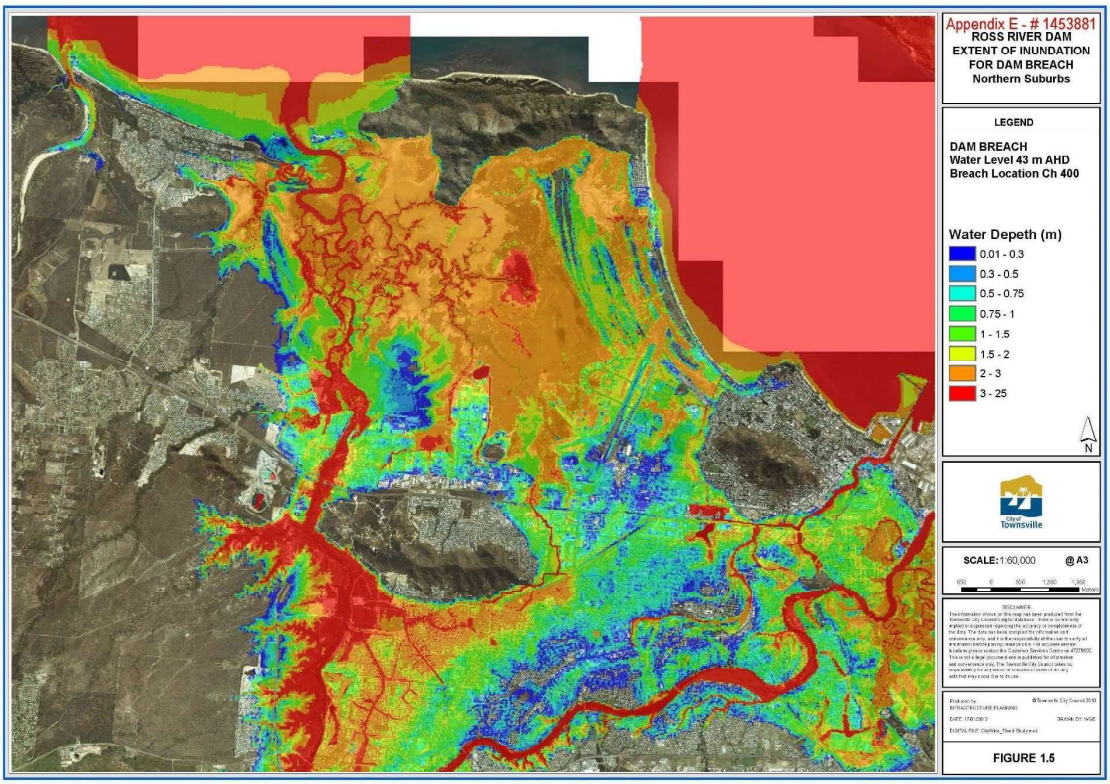
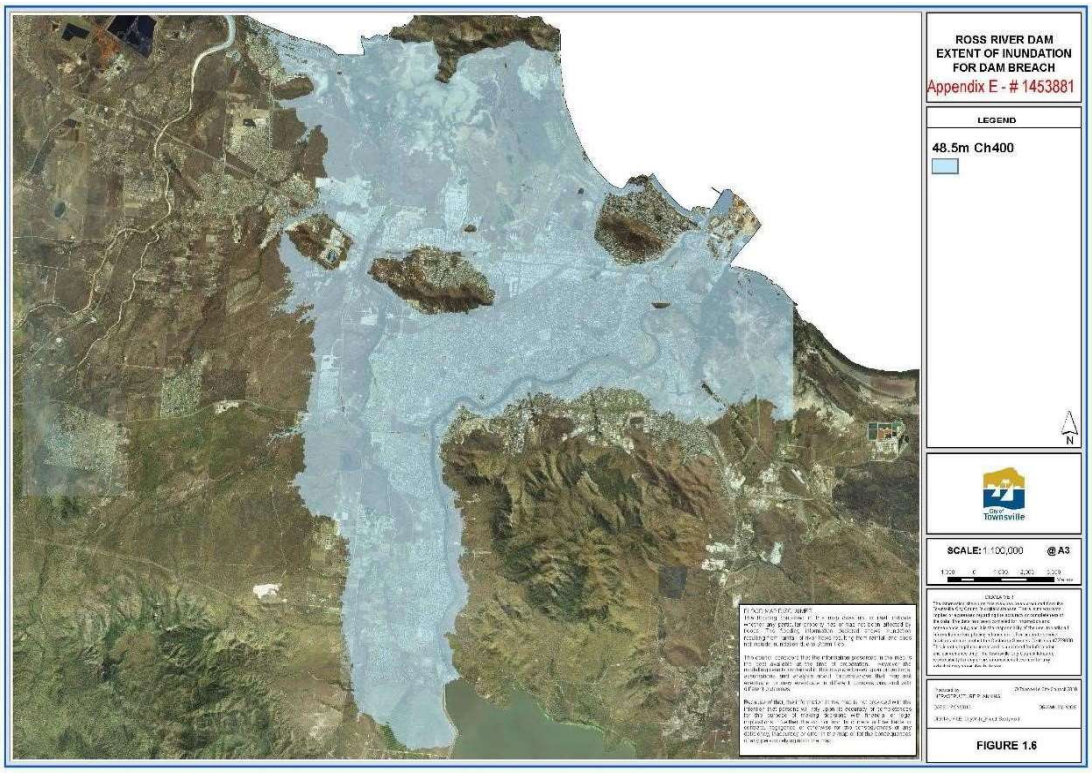
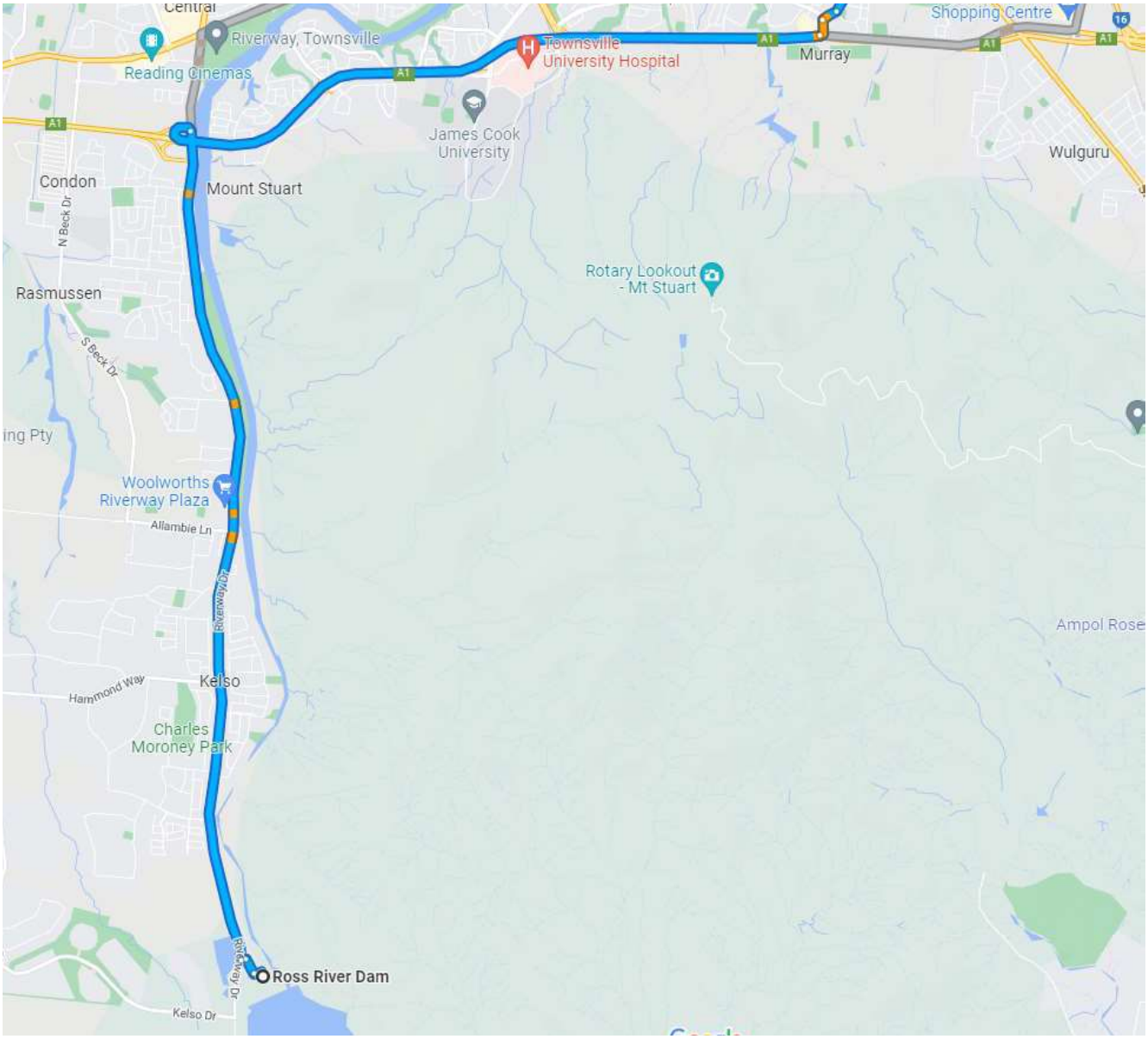


Figure B6: Inundation Map: Dam Breach (EL 48.50m)



Part 2: Emergency Control Measures

Appendix B3 Emergency Access Route Information



Road Access to Ross River Dam

The Dam is usually accessible via Riverway Drive. From here, access to the control building can be obtained along the dam crest. This route may be cut should the Bohle River or the Ross River overtop their banks downstream of the dam. The following alternative access routes to the dam may be possible:

- Via helicopter (sufficient room exists in the vicinity of the dam for helicopter access)
- Via boat from the southern end of Lake Ross.

Access	Road Status	Speed limit	Travel time	Notes
Riverway Drive	Dual lane bitumen.	70 km/hr	15 minutes from Thuringowa Central (Willows intersection) or Ring Road	Provides the most reliable direct access to RRD from the city under most conditions. May be inundated in extreme floods. Alternative back street access available along most length in cases of road closures.

Angus Smith Drive via MT Stuart Training Area	90% dual Lane bitumen 10% single lane fire road closest to RRD.	60 km/h or less. Not a public road	30 minutes from Ring Road.	Defence Department approval required. Provides access to RH abutment. Viable alternative if Riverway drive impassable.
Riverway Drive (south).	Dual lane gravel.	N/A	2 minutes from Townsville Graded Sands.	Provides access to the LH abutment of embankment and chainage 6300 from the TGS site.

Road Conditions

Road conditions between home base of the operating staff and RRD is a very significant factor to consider during the period leading up to mobilisation. If required, the DDO shall mobilise before road conditions prevent road access. Road conditions in the Townsville area can be found at the RACQ website above.

Contingency plans shall be established for attendance at the dam during adverse weather and flooding and shall ensure that the emergency organisations:

- Are aware of the requirements to attend the dam during emergency situations
- Will assist if communication systems have failed.

Where alternative access to RRD is required during times that Riverway Drive is flooded, the Nominated Operator shall identify and co-ordinate with the Agencies or landowners to ensure that alternative access is available.

Control Building Access

Vehicle access to the RRD Control Building is generally across the causeway downstream of the spillway. The causeway is equipped with water level gauges at each end. The DDO shall NOT attempt to cross the causeway if there is any water flowing over the causeway.

When the causeway is not accessible, the route across the top of the dam should be used, provided wind conditions are suitable. The dam should only be crossed if the maximum wind gusts are below 125 kph (Category 1 Cyclone).

The wind speed at the left-hand abutment of the Ross River Dam is shown on the “Catchment Data” screen of the HMI. If necessary, this can be confirmed at the Ross River Ranger’s/TCC staff member’s Office HMI. It is noted that during strong winds that the wind speed is higher at the top of the embankment than on the spillway bridge. The wind passing through the gap between the top of the gate and the bridge greatly reduces the amplification caused by the embankment.

Ross River Dam Inaccessible

In the event that the DDO cannot travel to the RRD Control Room, the monitoring and control of the dam shall be established at one of the following alternate locations in order of preference:

Control Location	Responsibility
RRD Ranger’s/TCC staff member’s Office	DDO
DDO Base or Home via SCADA connection	DDO

As soon as conditions permit, the DDO shall travel from the alternate location to the RRD Control Room

Note: Refer to Section 5.1 for transfer of responsibility during travel (mobilisation).

Appendix B4: Catchment Map

Figure B7: Ross River Catchment Map