## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

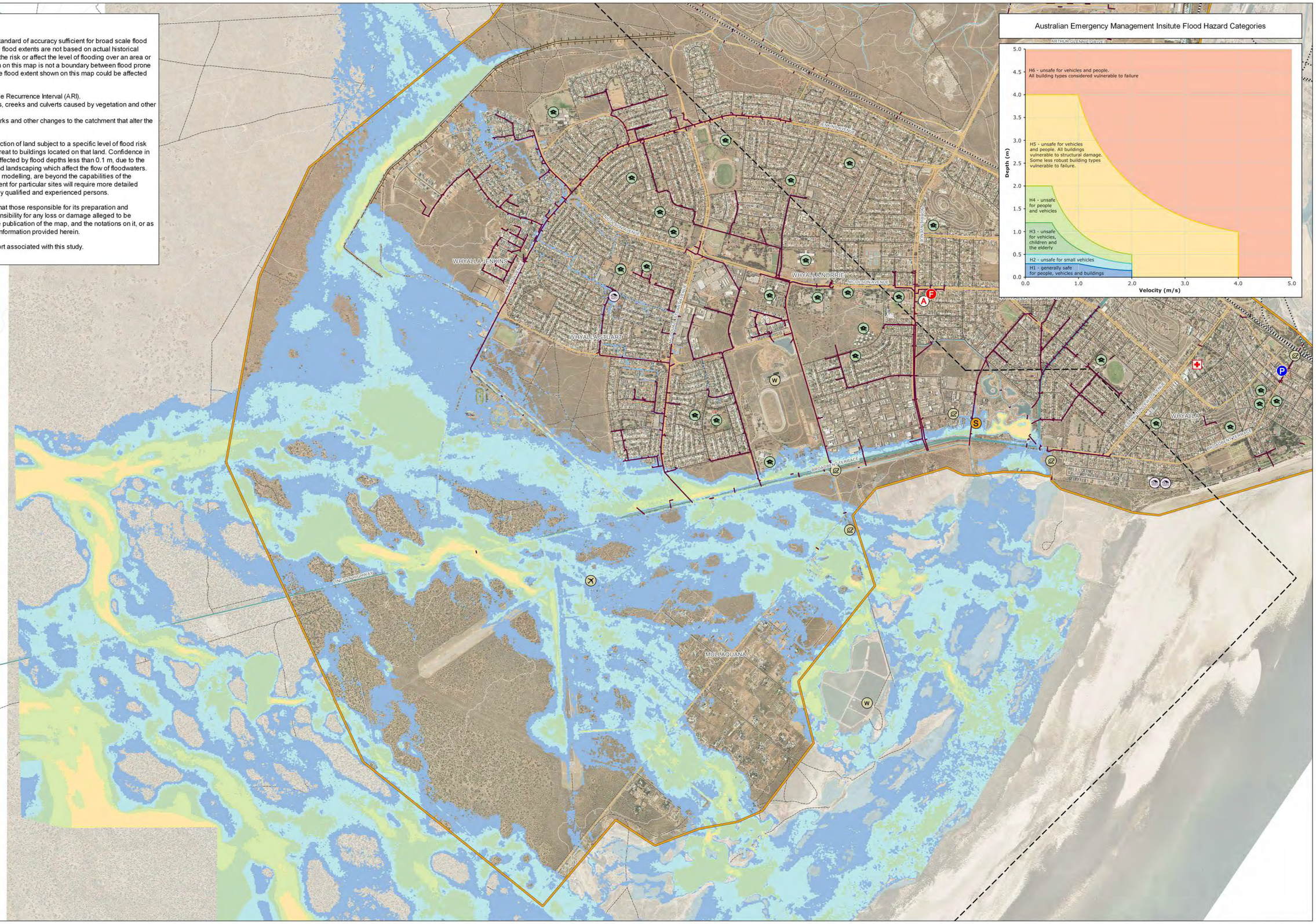
The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

Australian Emergency Management Insitute Flood Hazard Categories




## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facilities**

- Educational facility
- Aged Care facility

**Hazard category**

- No hazard
- H1
- H2
- H3
- H4
- H5
- H6

0 600 1200 1800 2400 3000 m

1:15,473 at A1

N

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev C
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 100 year ARI flood hazard existing development scenario

Map 23

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

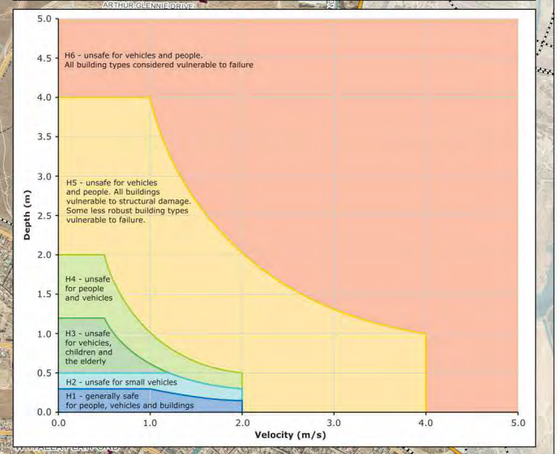
**Community facilities**

- Educational facility
- Aged Care facility

**Hazard category**

- No hazard
- H1
- H2
- H3
- H4
- H5
- H6

### Australian Emergency Management Insitute Flood Hazard Categories






0 600 1200 1800 2400 3000 m

1:15,473 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev C
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 500 year ARI flood hazard existing development scenario

Map 24

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

tonkin

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 10 year ARI flood depth mitigation development scenario

Map 25

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

tonkin

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 20 year ARI flood depth mitigation development scenario

Map 26

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 50 year ARI flood depth mitigation development scenario

Map 27

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more

IRON KNOB ROAD
ARTHUR GLENNIE DRIVE
LINCOLN HIGHWAY
WHYALLA JENKINS
WHYALLA NORRIE
WHYALLA STUART
WHYALLA PLAYFORD
WHYALLA
MULLAQUANA
NICOLSON AVENUE
BROADVIEW TERRACE

0 500 1000 1500 2000 2500 m

1:15,000 at A1

tonkin

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 100 year ARI flood depth mitigation development scenario

Map 28

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 500 year ARI flood depth mitigation development scenario

Map 29

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2018-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- PMF flood depth mitigation development scenario

Map 30

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

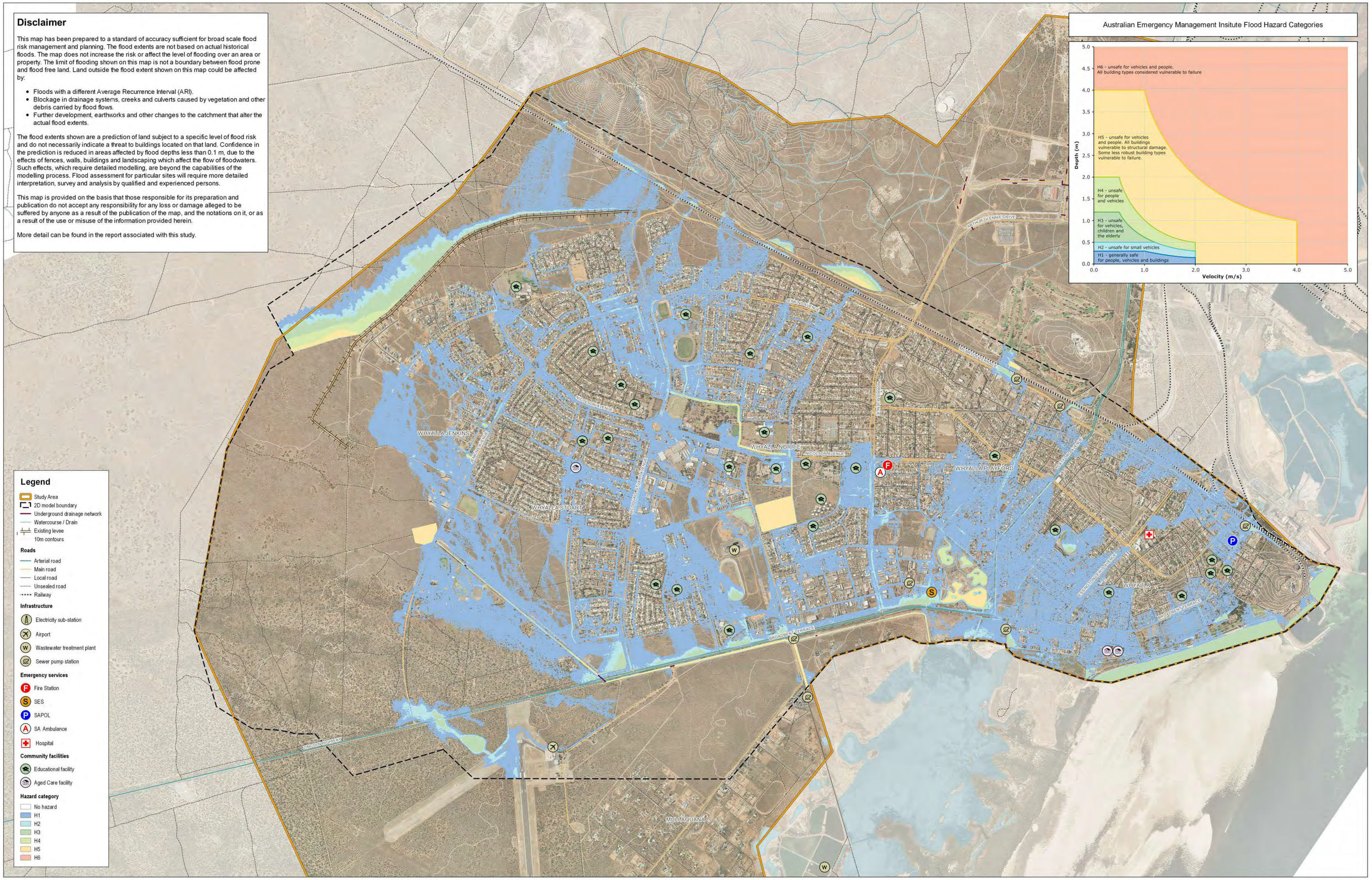
The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

Australian Emergency Management Insitute Flood Hazard Categories




## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facilities**

- Educational facility
- Aged Care facility

**Hazard category**

- No hazard
- H1
- H2
- H3
- H4
- H5
- H6

0 500 1000 1500 2000 2500 m

1:15,000
at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 100 year ARI flood hazard mitigation development scenario

Map 31

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

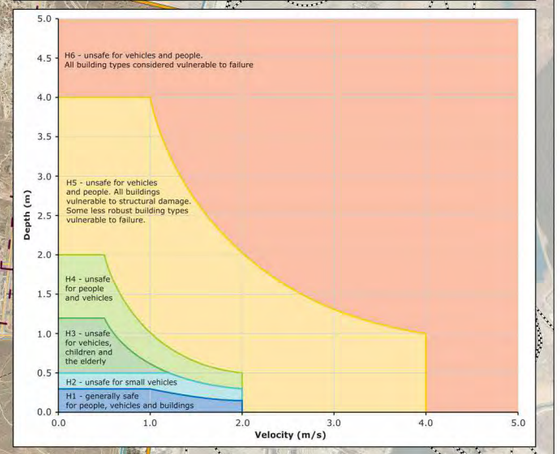
- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

Australian Emergency Management Insitute Flood Hazard Categories




## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facilities**

- Educational facility
- Aged Care facility

**Hazard category**

- No hazard
- H1
- H2
- H3
- H4
- H5
- H6

0 500 1000 1500 2000 2500 m

1:15,000
at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## CITY Catchment- 500 year ARI flood hazard mitigation development scenario

Map 32

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla.
Base data from DataSA.

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 10 year ARI flood depth mitigation development scenario

Map 33

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



tonkin

0 500 1000 1500 2000 2500 m

1:15,000 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla.
Base data from DataSA.

N

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 20 year ARI flood depth mitigation development scenario

Map 34

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

tonkin

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement.
Aerial imagery captured December 2013. Used with permission of City of Whyalla.
Base data from DataSA

N

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 50 year ARI flood depth mitigation development scenario

Map 35

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

tonkin

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev B
Date: 2016-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla.
Base data from DataSA

N

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 100 year ARI flood depth mitigation development scenario

Map 36

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more



0 500 1000 1500 2000 2500 m

1:15,000 at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla.
Base data from DataSA

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 500 year ARI flood depth mitigation development scenario

Map 37

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facility**

- Educational facility
- Aged Care facility

**Depth of inundation (m)**

- Less than 0.05m (not shown)
- 0.05m to 0.10m
- 0.10m to 0.25m
- 0.25m to 0.50m
- 0.50m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.5m
- 2.5m to 5.0m
- 5.0m and more

WHYALLA JENKINS
WHYALLA STUART
WHYALLA NORRIE
WHYALLA PLAYFORD
WHYALLA
MULLAQUANA
ARTHUR DENNIL DRIVE
NICOLSON AVENUE
BROADBENT TERRACE
LINCOLN HIGHWAY

0 500 1000 1500 2000 2500 m

1:15,000
at A1

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla.
Base data from DataSA.

N

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - PMF flood depth mitigation development scenario

Map 38

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

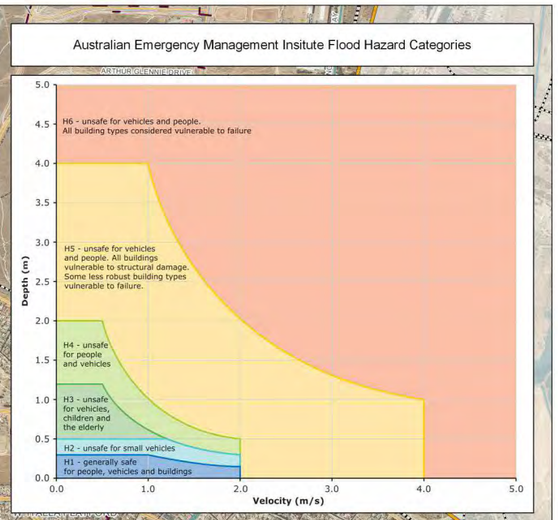
- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facilities**

- Educational facility
- Aged Care facility

**Hazard category**

- No hazard
- H1
- H2
- H3
- H4
- H5
- H6






Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 100 year ARI flood hazard mitigation development scenario

Map 39

## Disclaimer

This map has been prepared to a standard of accuracy sufficient for broad scale flood risk management and planning. The flood extents are not based on actual historical floods. The map does not increase the risk or affect the level of flooding over an area or property. The limit of flooding shown on this map is not a boundary between flood prone and flood free land. Land outside the flood extent shown on this map could be affected by:

- Floods with a different Average Recurrence Interval (ARI).
- Blockage in drainage systems, creeks and culverts caused by vegetation and other debris carried by flood flows.
- Further development, earthworks and other changes to the catchment that alter the actual flood extents.

The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings and landscaping which affect the flow of floodwaters. Such effects, which require detailed modelling, are beyond the capabilities of the modelling process. Flood assessment for particular sites will require more detailed interpretation, survey and analysis by qualified and experienced persons.

This map is provided on the basis that those responsible for its preparation and publication do not accept any responsibility for any loss or damage alleged to be suffered by anyone as a result of the publication of the map, and the notations on it, or as a result of the use or misuse of the information provided herein.

More detail can be found in the report associated with this study.

## Legend

- Study Area
- 2D model boundary
- Underground drainage network
- Watercourse / Drain
- Existing levee
- 10m contours

**Roads**

- Arterial road
- Main road
- Local road
- Unsealed road
- Railway

**Infrastructure**

- Electricity sub-station
- Airport
- Wastewater treatment plant
- Sewer pump station

**Emergency services**

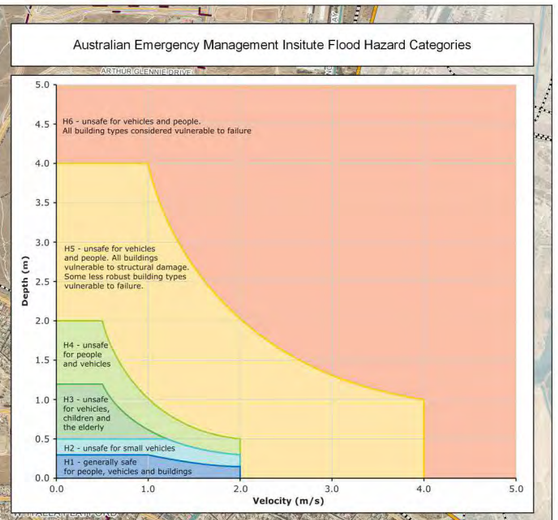
- Fire Station
- SES
- SAPOL
- SA Ambulance
- Hospital

**Community facilities**

- Educational facility
- Aged Care facility

**Hazard category**

- No hazard
- H1
- H2
- H3
- H4
- H5
- H6






N

tonkin

WHYALLA

City of Whyalla

# WHYALLA STORMWATER MANAGEMENT PLAN

## AIRPORT Catchment - 500 year ARI flood hazard mitigation development scenario

Map 40

Job Number: 2016.0064
Filename: 2016.0064 - Whyalla SMP - Flood maps v3.qgs
Revision: Rev. B
Date: 2019-06-04
Drawn: SEM

Data Acknowledgement:
Aerial imagery captured December 2013. Used with permission of City of Whyalla
Base data from DataSA

# Appendix B – Hydraulic Modelling Report

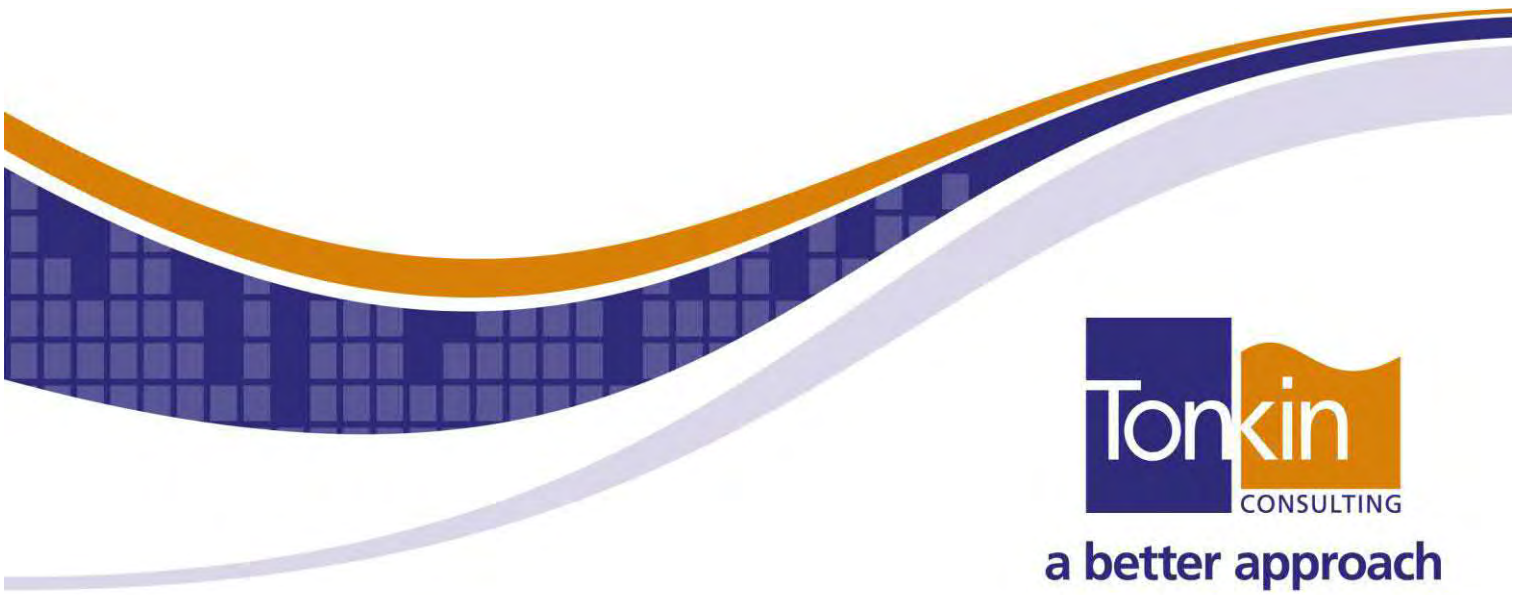
# Whyalla Stormwater Management Plan

## Hydraulic Modelling Report

### City of Whyalla

November 2017

Ref No. 20160064R002A



Tonkin CONSULTING

a better approach

# Document History and Status

| Rev | Description | Author | Reviewed | Approved | Date |
|---|---|---|---|---|---|
| A | For Client Comment | DNB | SEM | SEM | 6 November 2017 |

# Contents



## Tables



## Figures



## Appendices

# 1 Introduction

This report is concerned with the preparation of a 1D–2D linked hydrodynamic flood model of the City of Whyalla. The report outlines the steps undertaken to prepare the model inputs and the verification and validation of the model outputs.

The primary purpose of the work undertaken has been to define the extent and magnitude of flooding during events of differing frequency and to identify areas of significant inundation within the model areas. The risk to public safety, otherwise known as the 'flood hazard' has also been categorised for some of the recurrence intervals investigated.

The flood maps created herein will be used for the purposes of development assessment, town planning, emergency response planning, infrastructure planning and flood warning.

The flood events investigated ranged between a 10-year Average Recurrence Interval (ARI) through to a probable maximum precipitation (PMP) event. Higher frequency events have been assessed using the 1-dimensional model DRAINS only.

The study area is presented in Figure 1.1.

## 1.1 Previous studies

In 2009, Australian Water Environments (AWE) were engaged to undertake a flood risk assessment of Whyalla city (AWE 2009). The study investigated the catchment boundaries, catchment properties and estimated major flows through the relevant catchments. The study identified potential flood locations and potential areas of deficient stormwater infrastructure. An assessment of past flooding and future flooding risk was undertaken.

In 2014, AWE were engaged to undertake floodplain modelling of the rural areas surrounding the urban area around Whyalla (AWE 2014). Two models were prepared; one covering the area to the south of the city around the airport and another to the north of the city around the industrial area. The study used RORB models to assess external catchment flows and TUFLOW models to undertake the floodplain modelling and mapping.

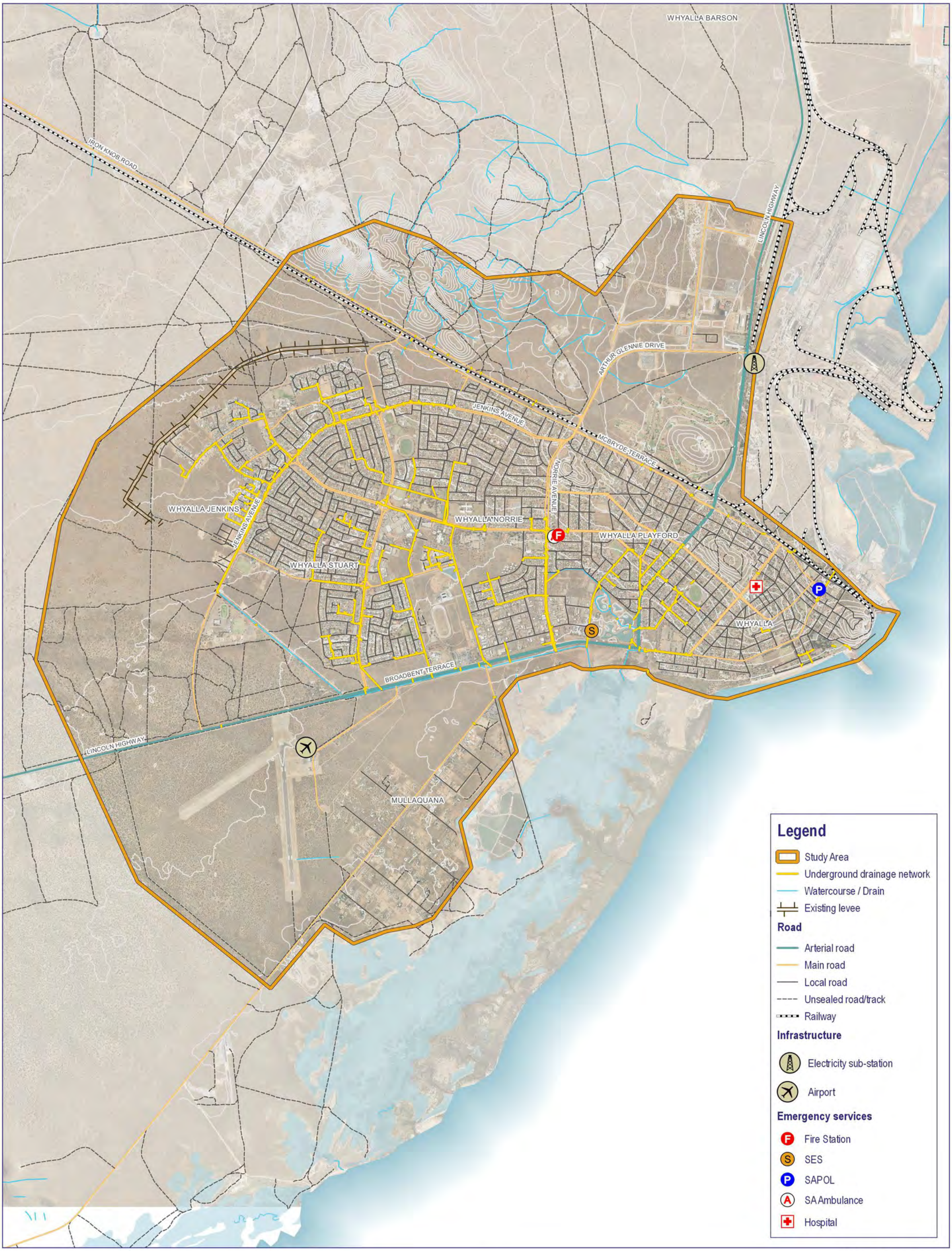
## 1.2 Scope of services

The general scope of services for this study was aimed at determining the extent of flood inundation during various flood events within the City of Whyalla. The project included the following tasks:

- Collection and review of existing information including aerial photography, Digital Elevation Model (DEM), previous stormwater network survey / corresponding GIS database, previous DRAINS modelling and catchment delineation of the area and council development plans.
- Manipulation of existing GIS database of the full pit and pipe network.
- Obtaining details of hydraulic structures, such as inlet structures and parts of the pipe network that could not be accessed during field measurement.
- Survey of floodplain features not adequately represented in the DEM.
- Preparation of a hydrological model of the urban and rural catchments.
- Preparation of a DRAINS hydrological model of the study area for standards mapping.
- Manipulation of previous RORB models to define external catchment flows.
- Preparation of a combined 1D–2D hydrodynamic computer model of the study area based on the existing general city and future level of development in the Ocean Eyre region.
- Analysing the resulting flooding for the following storm events:
  - 10 year ARI

- 20 year ARI
- 50 year ARI
- 100 year ARI
- 500 year ARI
- PMP event.

- Producing flood inundation and hazard zone maps for the 100 and 500 year ARI flood events within the Study Area.
- Assessment of damages caused by flooding.
- Assessment of flood mitigation strategies including modelling.
- Preparation of a modelling report and associated flood maps
- Issue of data in electronic format.




500 0 500 1000 1500 m

N

Tonkin CONSULTING

| | |
|---|---|
| Job Number: | 20160064 |
| Filename: | 20160064GQ003A |
| Revision: | REV A |
| Date: | 6 November 2017 |
| Drawn: | SEM |

Data Acknowledgement:
Aerial photography supplied by Council, 2013
Base data from DataSA

CITY OF WHYALLA

# WHYALLA STORMWATER MANAGEMENT PLAN STUDY AREA

Figure 1.1

# 2 Hydraulic modelling

## 2.1 Introduction

Hydraulic modelling uses the outputs of hydrologic modelling to determine the extent, depth and behaviour of flood flows within the study area. Details of the hydrologic modelling are outlined in the hydrology discussion paper (Tonkin Consulting 2017, reference 20160064R001A).

Three detailed 1D-2D flood models were created for this study, as there are three main catchments contributing to flooding within the study area. The Industrial and Airport catchments were modelled using amended flood models developed for previous flood studies of these areas (AWE 2014). The modelling techniques used for the three models are summarised in Table 2.1.

The extents of each of the hydraulic models are shown on

Figure 2.1.

*Table 2.1 Whyalla model descriptions*

| Model | Modelled Area ($km^2$) | Description | Technique |
|---|---|---|---|
| City | 36 | Central urban catchment bounded by the Lincoln Highway and Iron Knob Road. | Hydraulic |
| Industrial | 26 | Industrial area north of Iron Knob Road. | Rainfall-on-grid |
| Airport | 118 | Large external catchment that directs flows towards the Whyalla Airport. | Hydraulic |

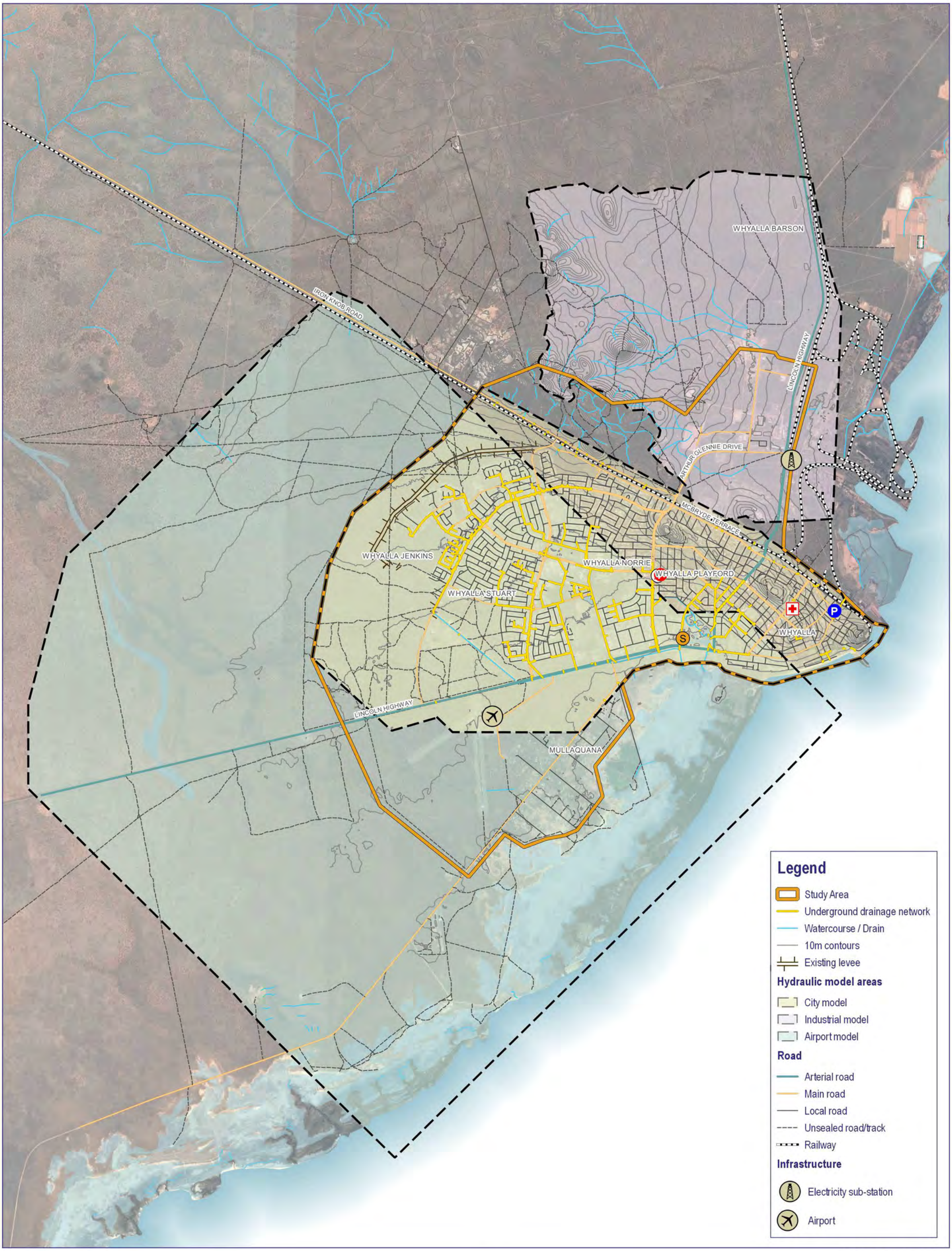
The three models were run to simulate storm events within the study area and generate flood inundation and hazard maps for the existing level of development.

## 2.2 Modelling software

The modelling was carried out using the TUFLOW computer program. The program simulates depth averaged, one and two-dimensional, free surface flows, such as those that occur from floods and tides (BMT WBM 2016). TUFLOW has the ability to dynamically link to the ESTRY one-dimensional (1D) model, which enables the creation of models containing both 1D and 2D domains.

The TUFLOW simulation engine uses a finite difference, alternating direction implicit (ADI) solution scheme developed by Stelling (1984) that solves the full 2D free surface flow equations. The solution scheme includes viscosity and sub-grid-scale turbulence terms that other schemes do not. The ESTRY component uses a Runge-Kutta explicit solution scheme to solve the full 1D Saint-Venant flow equations (BMT WBM 2016).

Tonkin Consulting assisted in pioneering the use of TUFLOW for urban flood inundation mapping. The drainage network is modelled in 1D and dynamically linked at each inlet/outlet structure to the floodplain represented in 2D. This allows for the integrated modelling of the drainage network and floodplain in urban areas.




500 0 500 1000 1500 m

N

Tonkin CONSULTING

| | |
|---|---|
| Job Number: | 20160064 |
| Filename: | 20160064GQ003A |
| Revision: | REV A |
| Date: | 6 November 2017 |
| Drawn: | SEM |

Data Acknowledgement:
Aerial photography supplied by Council, 2013
Base data from DataSA

CITY OF WHYALLA

# WHYALLA STORMWATER MANAGEMENT PLAN
# HYDRAULIC MODEL EXTENTS

Figure 2.1

## 2.3 Digital elevation model

A digital elevation model (DEM) of the study area was provided by Council. The DEM was based on data captured by LiDAR. LiDAR is a remote sensing method that uses laser pulses to measure the distance to features in the terrain. The reflected laser pulses are captured and processed to create a 3D model of the landscape.

Tonkin Consulting reviewed the DEM to ensure it was suitable for use with the flood model. Whilst being of slightly lower resolution than is typically preferred for urban flood studies, after discussing the limitations of the DEM resolution with Council it was determined that the DEM would be adequate for the broad-scale mapping being used for the development of the SMP. Two features were identified as needing additional detail:

- the levee north-west of the city
- the Airport drainage channel (adjacent the Lincoln Highway).

Survey of these features was undertaken to improve their hydraulic representation within the model.

The full DEM obtained is presented in Figure 2.2.

The full extent of the existing DEM (provided by Council) did not cover the entirety of the Airport model. Areas on the western perimeter of the model where runoff enters the model was lacking in data. Extra data was sought in this area from the original LiDAR collection. This enabled better definition of the braided flow paths in this area.

## 2.4 TUFLOW model setup

### 2.4.1 Computational grid cell size

Determining an appropriate cell size for the computation grid used by TUFLOW requires a compromise between the resolution of flood mapping and the simulation time required to run the models. Smaller 2D cell sizes more accurately reproduce detailed topography and the hydraulic behaviour of the flood, but significantly increase the amount of memory and computational power required to run the model.

The cell size for each model was selected so that it provided a good compromise between resolution and computational power. A cell size of 4 m is considered by Tonkin Consulting as a reasonable compromise between resolution and computational power for urban areas. The selected cell size for each model is as follows:

- City model: 4 m cell size
- Industrial model: 5 m cell size
- Airport model: 10 m cell size.

As the Industrial and Airport models predominantly consist of rural land, larger cell sizes were considered suitable for capturing hydraulic behaviour.

### 2.4.2 Computational time step

The selection of an appropriate time step for the 2D domain of TUFLOW is critically important to the accuracy of the model output. Time steps that are too large may result in models that are unstable. Time steps that are too small may unnecessarily increase simulation times. An appropriate time step will balance simulation time with the model's stability and numerical accuracy.

WHYALLA BARSON
IRON KNOB ROAD
LINCOLN HIGHWAY
ARTHUR GLENNIE DRIVE
McBRYDE TERRACE
WHYALLA JENKINS
WHYALLA NORRIE
WHYALLA PLAYFORD
WHYALLA STUART
WHYALLA
LINCOLN HIGHWAY
MULLAQUANA

## Legend

- Study Area
- Model boundary
- Watercourse / Drain
- Existing levee

**Road**

- Arterial road
- Main road
- Local road
- Unsealed road/track
- Railway

**Elevation (mAHD)**

- -1.0
- 2
- 1.0
- 15
- 20
- 30
- 40
- 60
- 80
- 10m contours

500 0 500 1000 1500 m

N

Tonkin CONSULTING

| | |
|---|---|
| Job Number: | 20160064 |
| Filename: | 20160064GQ003A |
| Revision: | REV A |
| Date: | 6 November 2017 |
| Drawn: | SEM |

Data Acknowledgement:
Aerial photography supplied by Council, 2013
Digital Elevation Model supplied by Council, 2013
Base data from DataSA

CITY OF WHYALLA

# WHYALLA STORMWATER MANAGEMENT PLAN
# HYDRAULIC MODEL EXTENTS

Figure 2.2

The time step adopted for the 2D domain for each model is as follows:

- City model: 1 second time step
- Industrial model: 1 second time step
- Airport model: 5 second time step.

Ninety-nine per cent of computational effort is expended solving the 2D surface flow equations and very little effort is needed to resolve the 1D domain. Consequently, the 1D domain time step has a negligible impact on simulation time. A time step of 0.2 seconds was used for the 1D domain for all models.

## 2.5 Boundary and initial conditions

### 2.5.1 Inflow boundary conditions

The inflow inputs were dependent on the TUFLOW modelling technique used (refer Table 2.1). The City and Airport models required input hydrographs specifying flow rates generated by internal and external catchments. The Industrial model required input hyetographs specifying the rainfall depth at various time steps during the simulation.

#### City and Airport models

Inflow hydrographs were generated for each ARI and duration of storm event analysed, using parameters outlined in the Hydrology Discussion Paper (Tonkin Consulting 2017). In the urban areas, the inflow hydrograph for each sub-catchment was generally applied to an inlet pit, grate, or headwall. Inlet capacity tables were used to accurately represent the capacity of the network to capture surface flow from the road network. This allowed runoff to pass directly into the drainage network until the pit or pipe capacity was exceeded, with the excess spilling into the street network (2D floodplain).

In rural areas, where there is minimal drainage infrastructure, the inflow hydrograph was applied to an area at the downstream end of the sub-catchment.

#### Industrial model

Inflow hyetographs were generated for each ARI and duration of storm event analysed, using rainfall depth and temporal patterns as outlined in the Hydrology Discussion Paper (Tonkin Consulting 2017). The hyetographs specify the amount of rainfall falling on every computational grid cell across the modelled catchment. Runoff from each grid cell is determined dynamically by the model using loss parameters assigned to that cell based on surface type.

### 2.5.2 Outflow boundary conditions

Where water interacts with the boundaries of the model, special attention is required to ensure the correct hydraulic conditions at the boundary are recreated.

Where shallow sheet flow was expected to reach a model boundary, the boundary condition at that location was set to allow flow to freely leave the model. For channelised flows, the boundary condition was set to represent the hydraulic conditions downstream using an automatically generated stage–discharge relationship determined by the topography and expected hydraulic grade at that location.

For this model there were few boundaries that required special attention as the majority of runoff was eventually directed to the sea. The sea boundary is set to a static elevation of 0.96 mAHD which is equivalent to the Mean High Water Spring (MHWS) tide. The MHWS tide is generally accepted as an appropriate tide level for flood modelling when the joint probability of fluvial and tidal interaction is not being considered. Comparatively, the highest astronomical tide (HAT) for Whyalla is 1.40 mAHD.

Predictions of sea level rise associated with climate change were considered in the context of the model boundary conditions.

The Climate Change in Australia website provides climate change projections for Australia's NRM regions. Whyalla is within the Southern and South Western Flatlands (East) cluster. There is very high confidence in future sea-level rise. By 2030 the projected range of sea-level rise is 0.07 to 0.17 m above the 1986–2005 level with only minor differences between emission scenarios. As the century progresses, projections are sensitive to concentration pathways. By 2090, the intermediate emissions scenario (RCP4.5) is associated with a rise of 0.28 to 0.63 m (median 0.45 m) and the high emissions scenario (RCP8.5) a rise of 0.39 to 0.83 m, with a median projected rise of 0.60. Under certain circumstances, sea-level rises higher than these may occur.

Whilst it is common practice to undertake a sensitivity analysis of boundary conditions, in this case it was not considered necessary as both the HAT and MHWS + sea level rise (1.54 mAHD for the median projected rise by 2090) are below the invert of the main outfall channel's invert level of 2.0 mAHD. These higher tide levels are therefore not expected to influence the extents of flooding within any of the models.

### 2.5.3 Initial conditions

The catchment was assumed to be 'dry' before the onset of the storm event. Consequently, no initial conditions were applied to alter storage levels of basins within the model.

To ensure stability of the model, areas of the model affected by marine waters were set to the same level as the ocean tide level boundary.

## 2.6 Existing stormwater drainage infrastructure

### 2.6.1 Modelling of the underground drainage network

The drainage network consists mostly of underground drainage network discharging directly to the channel at the southern boundary of the city. There are also a number of wetlands of varying volume that act as detention basins within the drainage network.

Base drainage infrastructure data was developed from previous DRAINS modelling in conjunction with a GIS stormwater network database as surveyed by PPS in 2013. This database was manipulated and converted into the required format needed by TUFLOW.

Invert elevations for the underground drainage were determined using the following procedure:

1. Where a surveyed pit lid elevation and a measured depth to the conduit invert was available, the invert elevation was determined by subtracting the measured depth from the surveyed pit lid elevation.
2. Where only a measured depth to the conduit invert was available, the invert elevation was determined by subtracting the measured depth from the DEM elevation at the pit location.
3. Where no measured depth to the conduit invert was available, design drawings were used if available.
4. Where no other information regarding the pipe invert or depth was available, an invert level equal to the DEM elevation minus 0.6 m nominal cover minus the conduit height was assumed.

The final inverts assigned to all pipes were reviewed for consistency. In areas where technique four was used to determine inverts, some manual manipulation was undertaken to ensure drainage networks graded downhill.

In addition to the above, the drainage network was checked as follows:

- Pipe diameters and box culvert sizes were reviewed to check for consistency with standard dimensions and that sizes generally increased in the downstream direction.
- Checks were carried out to ensure all drains were digitised in the downstream direction. For flood modelling it is preferable that drains be drawn in the downstream direction, so that flow results are positive in the downstream direction.
- Checks were made to ensure connectivity of the drainage network.

Particular effort was made to ensure the following structures were accurately represented:

- Jenkins Avenue drain
- Culverts under Iron Knob Road
- Culverts under Arthur Glennie Drive
- Culverts under the Lincoln Highway.

### 2.6.2 Modelling of inlets

Inlet pits were modelled using head–flow relationships to provide a good estimate of the inlet capacity of each pit. The head–flow relationships adopted were based on standard 'Transport SA' pit capacity tables. Different curves were created for single, double and triple side entry pits (SEPs) as well as 450×450 and 600×600 grated inlet pits (GIPs).

### 2.6.3 Allowance for blockages

During large storm events, objects could be swept into inlet pits, headwalls and creek channels, exacerbating flooding in the local area. Siltation, particularly at beach outlets, could also reduce the capacity of the stormwater network exacerbating flooding in the local area. Due to the broad scale objective of this flood study, no specific allowance has been made to account for blockages that may occur during storm events.

## 2.7 Bed resistance

The TUFLOW model requires bed resistance be specified by the modeller. In this model, the Manning's n roughness coefficient is used to define the bed resistance. The bed resistance is a primary determinant of water depth within the 2D model domain.

Areas that have few obstructions to flow, such as the road reserve, have relatively low Manning's n values. Conversely, areas with many obstructions, such as buildings, fences, and dense vegetation, have high Manning's n coefficients.

The Manning's n roughness coefficients used in this model are listed in Table 2.2. These values were selected based on current literature and the prior experience of Tonkin Consulting.

*Table 2.2 Adopted bed resistance parameters*

| Land Use | Manning's n |
|---|---|
| Houses/Residential areas, obstructions to flow | 0.200 |
| Medium and high density residential and commercial areas | 0.300 |
| Parklands with scattered trees | 0.045 |
| Grassed areas and bare ground | 0.035 |
| Roads (including verges) | 0.020 |
| Unlined creek channels | 0.040-0.065 |
| Plastic conduits | 0.011 |
| Concrete conduits | 0.014 |

## 2.8 Modelling uncertainty

While every care has been taken in preparation of the TUFLOW model and the choice of the adopted parameters, all hydrological and hydraulic modelling has an inherent level of uncertainty. This inherent uncertainty is due a number of factors which may include any of the following:

- The accuracy and resolution of the DEM used and the interpretation of this information by the hydraulic model (refer Section 2.3)
- Dynamic changes to topography due to erosion or deposition of soil during a flood event; which can lead to changes in the distribution of flow. These processes have not been included in this model.
- Uncertainty in the rainfall patterns and catchment conditions prior to a flood. Actual flood events are dependent on the antecedent moisture conditions prior to rainfall, initial detention storage levels at the onset of rainfall runoff, and the intensity and uniformity of the rainfall event itself. The floods modelled by this study are based on design storm bursts which attempt to reproduce the expected average temporal pattern of a storm burst within specified rainfall zones. As such, individual rainfall events may exhibit different behaviour than those modelled.
- Estimation of input parameters to the model (such as runoff coefficients, time of concentration, Manning's roughness, and entry and exit losses).
- Blockage or failure of drainage infrastructure during a flood event.

## 2.9 TUFLOW simulations

Six different flood events were modelled:

- 10 year ARI flood event
- 20 year ARI flood event
- 50 year ARI flood event
- 100 year ARI flood event
- 500 year ARI flood event
- Probable maximum flood (PMF) event.

For each flood event, a number of different storm durations were modelled in order to obtain the peak flood level at different points within the catchment. The durations modelled were different for each model, as the critical duration is dependent on the catchment properties, including response time and development levels.

### City model

The durations modelled were:

- 30 minutes
- 1 hour
- 1.5 hours
- 3 hours
- 6 hours
- 9 hours

### Industrial model

The durations modelled were:

- 30 minutes
- 1 hour
- 1.5 hours
- 2 hours
- 3 hours

### Airport model

The durations modelled were:

- 9 hours
- 12 hours
- 24 hours
- 36 hours
- 48 hours

# 3 Modelling results

During each model run, the peak flood depth and hazard category (100 and 500 year ARI events only) was recorded across the 2D model domain. The results from each duration were spliced together to create a maximum depth and hazard envelope for each flood event.

Flood inundation and hazard maps were produced so that the impact of flooding could be visually analysed. The flood inundation and hazard data was overlaid onto aerial imagery, with the drainage network and street names shown to allow for easy identification and assessment of flooding. The flood depth data was classified into discrete intervals to allow for easy discrimination of flood depths. Flooding less than 25 mm deep is not shown as it is not considered relevant to the wider flood map. Within the industrial model, flooding less than 50 mm is not shown to minimise 'noise' associated with the rainfall on grid method.

The flood inundation and hazard maps have been produced and are presented in Appendix A of this report.

## 3.1 Model verification

A number of techniques were employed to verify the model implementation. Manual and automated checks of the pipe network to detect connectivity issues in addition to comparison of recorded peak flow against expected pipe capacity ensured confidence in the correct modelling of the pit and pipe network.

## 3.2 Validation of results

To help validate the TUFLOW model results, the peak recorded flow rate in key drains was compared with the theoretical capacity of the drains. In the majority of cases, the results compared favourably, providing confidence in the modelling of the underground drainage network. In a few cases, peak flow in the drainage network was significantly lower than the estimated capacity. It is believed that this is likely due to the upstream catchment producing a much lower peak flow compared with the capacity of the pipe.

Draft flood inundation results were discussed with Council staff, however, no areas of unexpected flooding were noted.

# 4 References


Australian Water Environments (2009) *Whyalla Floodplain Modelling*, Report 13123 R001 Issue 2, October 2014, Prepared for the City of Whyalla.

Australian Water Environments (2014) *Whyalla Stormwater Management Study Flood Risk Assessment*, Report 47900b v9, June 2009, Prepared for the City of Whyalla.

BMT WBM Pty Ltd (2016) *TUFLOW User Manual – Build 2016-03-AE*, Brisbane, Australia.

Stelling, GS (1984) *On the Construction of Computational Methods for Shallow Water Flow Problems*, Rijkswaterstaat Communications, No. 35/1984, The Hague, The Netherlands.

Tonkin Consulting (2017) *Whyalla Stormwater Management Plan Hydrology Summary Paper*, Reference No. 20160064R001A, Adelaide, Australia.

# Appendix A

# Flood inundation and hazard maps

# Appendix C – Community Survey Results

**Josh Berkett**
**Digital Content Officer**
**Phone: (08) 8640 3444**
**Mobile: 0429 323 380**
**E-mail: josh.berkett@whyalla.sa.gov.au**

# Media release

**For immediate release**
Tuesday, July 02, 2019

## Residents have say on stormwater plan

The City of Whyalla's draft Stormwater Management Plan (SMP) has received a thumbs-up from the community after the first round of community consultation.

A total of 26 people responded to the public consultation and information sharing with 22 filling out the online survey and four submitting their responses via a hard copy.

Significantly, 85 per cent of those respondents supported the measures proposed by the draft SMP.

From the survey responses, 85 per cent of respondents identified themselves as local residents and 40 per cent have interest or experience in flooding and water conservation including stormwater harvesting and reuse.

Council Project Engineer Tim Bayly said comments from respondents reflected the community's interest in reducing the township's impact on the local environment by the capture and reuse of stormwater and catchment of waste materials prior to entering waterways. Increased protection for localised nuisance flooding caused by stormwater is also a common topic.

Mr Bayly said all the comments provided in the survey would now be taken into consideration when formalising the final SMP document.

"Although the SMP does not address all localised nuisance flooding within the city, the measures proposed by the draft SMP indirectly impact this flooding positively," Mr Bayly said.

"These impacts are realised through larger scale capture, control and redirection of stormwater which reduces the loads experienced by the current infrastructure during storm events.

"This reduction in load will lead to less surface water and reduced drainage times."

The SMP will now move into the planning and costing stage. There will be further updates and information sharing with the community as the project progresses.

Works carried out by Council associated with stormwater are not limited to the measures identified by the SMP with a series of projects currently underway and further projects being considered.

A SMP is a strategic planning document that aims to address existing stormwater problems within a catchment, or catchments, and identify opportunities for providing a range of benefits through a multi-objective planning process. This multi-objective planning includes consideration of flood risk, protection of water quality and opportunities for stormwater reuse.

There have been numerous occurrences of flooding within Whyalla, including those in November 2015 and September 2016. While heavy downpours have historically resulted in nuisance flooding within the city, there had been no detailed assessment of the flooding risk posed by varying rainfall events to clearly document the extent and severity of problem areas.

**The SMP aims to:**

* Clearly set out the objectives for managing stormwater in the city

* Identify actions (both structural and non-structural) to manage stormwater to achieve beneficial outcomes and meet the specified objectives

* Provide a justification for any proposed catchment studies, works, measures or actions

* Provide an initial estimate of capital and recurrent costs and assign priorities and timeframes to each of the actions

* Define the obligations of the relevant parties in funding, implementing and communicating the plan.

Information on the SMP and the public consultation process can found on Council's website at http://www.whyalla.sa.gov.au/page.aspx?u=182&c=73742

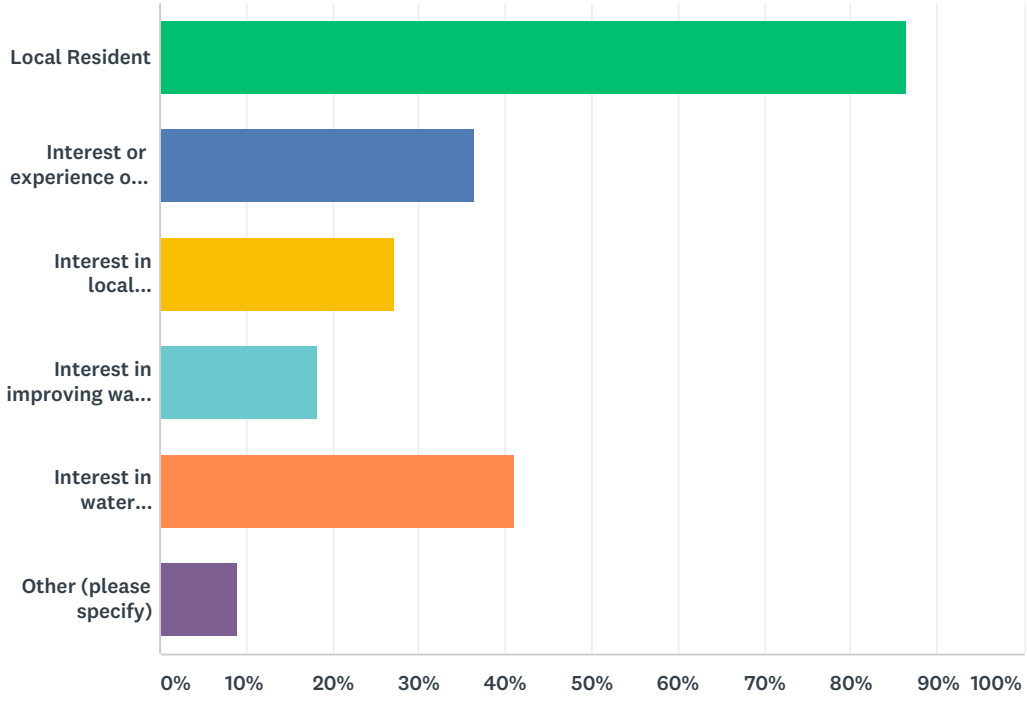
---

**For further media information or comment please contact:**
**Manager Communications and Public Relations Jon Ortlieb 8640 3474 or 0488 051 311**

---

# Q1 Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

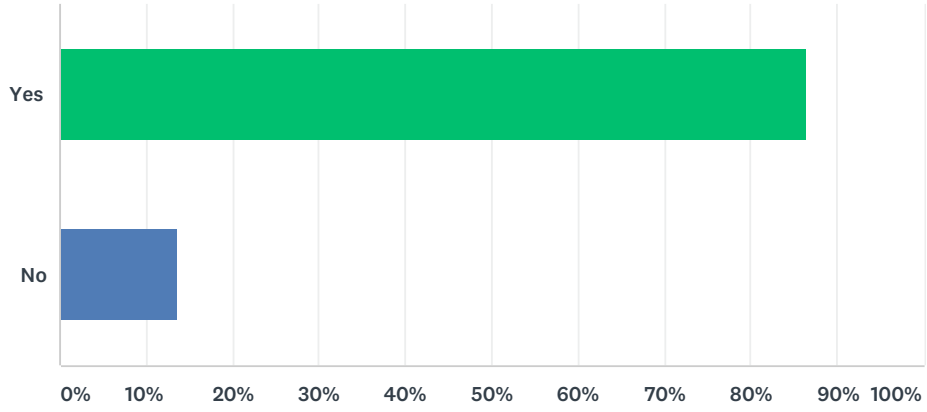
Answered: 22 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Local Resident | 86.36% | 19 |
| Interest or experience of flooding | 36.36% | 8 |
| Interest in local environment | 27.27% | 6 |
| Interest in improving water quality | 18.18% | 4 |
| Interest in water conservation and/or stormwater harvesting and reuse | 40.91% | 9 |
| Other (please specify) | 9.09% | 2 |
| Total Respondents: 22 | | |

# Q2 The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

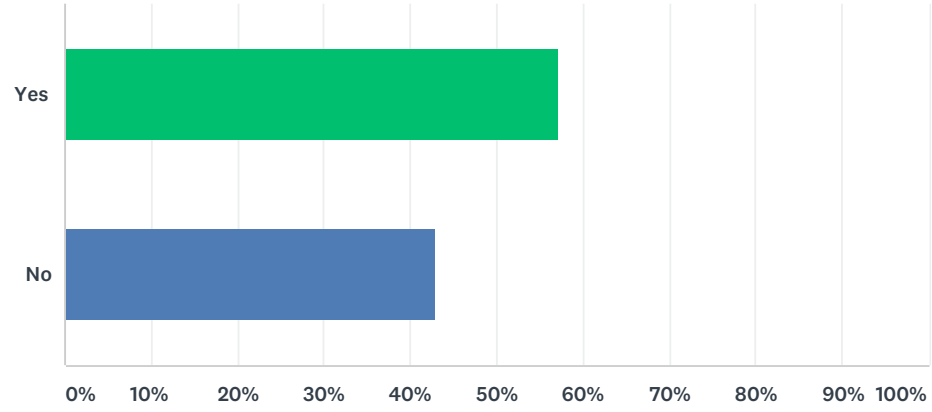
Answered: 22 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 86.36% | 19 |
| No | 13.64% | 3 |
| TOTAL | | 22 |

# Q3 Do you have any further suggestions regarding the draft SMP?

Answered: 21 Skipped: 1




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Yes | 57.14% | 12 |
| No | 42.86% | 9 |
| TOTAL | | 21 |

# Q4 To help us understand who participated in the consultation please leave the following details:

Answered: 21 Skipped: 1

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Street Name: | 100.00% | 21 |
| Suburb: | 100.00% | 21 |

# #1

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 07, 2019 1:27:55 PM |
| **Last Modified:** | Thursday, March 07, 2019 1:41:07 PM |
| **Time Spent:** | 00:13:11 |
| **IP Address:** | 118.210.8.87 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Interest in local environment ,**

**Interest in water conservation and/or stormwater harvesting and reuse**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes,**

Comments:

I can't see the drainage that was designed to capture the water that rushes down Cudmore TCE from Delprat and surrounding streets. A huge drain pipes were installed near playground end of Cudmore TCE with the plan for the water to flow onto Rotary Park, be filtered before going into sea by marina. Sadly the levels in the road are all incorrect and 90% bypasses catchment drains and ends in Carpark by beach and into the sea. This water is often very dirty due to dust from steel works. The drains across road are blocked full of sand so nothing is working to prevent drainage of fifthy water into sea.

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**

Comments:

Can filters be placed in drainage pipes which enter our wetlands. So much rubbish is washed into the ponds and they need to be pristine to maintain bird life. People from across Australia came to Whyalla in January 2019 as a rare bird was living there. Only one of sightings in Australia. Bird groups come from across SA to view this wetland

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **33 Delprat Tce** |
| Suburb: | **Whyalla** |

# #2

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 07, 2019 2:13:28 PM |
| **Last Modified:** | Thursday, March 07, 2019 2:14:47 PM |
| **Time Spent:** | 00:01:19 |
| **IP Address:** | 42.241.240.33 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding ,**

**Interest in local environment ,**

**Interest in improving water quality ,**

**Interest in water conservation and/or stormwater harvesting and reuse**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes**

**Q3** Do you have any further suggestions regarding the draft SMP?

**No**

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Mortimer street** |
| Suburb: | **Whyalla stuart** |

# #3

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 07, 2019 3:52:19 PM |
| **Last Modified:** | Thursday, March 07, 2019 3:56:04 PM |
| **Time Spent:** | 00:03:45 |
| **IP Address:** | 203.38.216.10 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Interest in water conservation and/or stormwater harvesting and reuse**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes,**
Comments:
We need action. Something we haven't had since 2013...

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**
Comments:
Get it assessed by an independent storm water engineering company, to ensure we have good advice.

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Tamworth Road** |
| Suburb: | **Mullaquana** |

# #4

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 07, 2019 4:34:34 PM |
| **Last Modified:** | Thursday, March 07, 2019 4:35:54 PM |
| **Time Spent:** | 00:01:19 |
| **IP Address:** | 49.178.31.74 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident,**<br>**Interest in improving water quality ,**<br>**Interest in water conservation and/or stormwater harvesting and reuse** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Hincks Ave** |
| Suburb: | **Whyalla Norrie** |

# #5

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 07, 2019 8:38:16 PM |
| **Last Modified:** | Thursday, March 07, 2019 8:40:29 PM |
| **Time Spent:** | 00:02:12 |
| **IP Address:** | 101.174.19.191 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | Comments:<br>Is there a better way to catch the water for alternate use like the watering of local plants or gardens, watering unsealed roads etc? |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Eyre ave** |
| Suburb: | **5608** |

# #6

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 07, 2019 11:41:18 PM |
| **Last Modified:** | Thursday, March 07, 2019 11:41:49 PM |
| **Time Spent:** | 00:00:30 |
| **IP Address:** | 49.178.8.132 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |
| **Q4** To help us understand who participated in the consultation please leave the following details: | **Respondent skipped this question** |

# #7

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Sunday, March 10, 2019 9:19:04 PM |
| **Last Modified:** | Sunday, March 10, 2019 9:33:47 PM |
| **Time Spent:** | 00:14:42 |
| **IP Address:** | 110.145.7.134 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding ,**

**Interest in local environment ,**

**Interest in improving water quality ,**

**Interest in water conservation and/or stormwater harvesting and reuse**

**,**

Other (please specify):

Why recycled water cannot be directed to the Wetlands as it's incredibly low at the moment and is starting to have a stench to it

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes,**

Comments:

The highlighted areas are the main concerns inheavy rains. Although some smaller residential streets Eg Pickhaver St , Haynes/Hanley St& Head Street areas to name a couple. These also concern the residents living in these areas as well and should be taken into consideration now or for future work?

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**

Comments:

My concerns as a past councillor is the cist bliwoutscas not one project has came within budget and this will be no exception as the cist shown in Figure 5.1 surely are based on today's figures? Eg the new jetty was approved at $M3.7 now $M6.? And my bet it will be closer to $M7

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **McBryde Tce** |
| Suburb: | **WHYALLA SA** |

# #8

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 11:16:24 AM |
| **Last Modified:** | Tuesday, March 12, 2019 11:27:35 AM |
| **Time Spent:** | 00:11:10 |
| **IP Address:** | 1.124.108.104 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding ,**

**Interest in local environment ,**

**Interest in water conservation and/or stormwater harvesting and reuse**

**,**

Other (please specify):

Wildlife attracted to stormwater at the end of the road

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes,**

Comments:

The section at the end of Robinson street bordering development has been neglected from plan. I otherwise support all measures.

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**

Comments:

Please look further into the capture at the end of Robinson st bordering new development, housing at risk of flooding from how the stormwater is currently managed and it attracts alot of wildlife. This causes issues for people's gardens and road users.

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Robinson st** |
| Suburb: | **Whyalla Jenkins** |

# #9

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 11:51:11 AM |
| **Last Modified:** | Tuesday, March 12, 2019 11:54:48 AM |
| **Time Spent:** | 00:03:36 |
| **IP Address:** | 1.128.104.112 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes,**<br>Comments:<br>Repair north levy and extend |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **Yes,**<br>Comments:<br>Install storm water drainage throughout Ocean Eyre |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Fairclough crescent** |
| Suburb: | **Whyalla Jenkins** |

# #10

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 1:37:38 PM |
| **Last Modified:** | Tuesday, March 12, 2019 1:43:03 PM |
| **Time Spent:** | 00:05:25 |
| **IP Address:** | 124.170.232.62 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes**

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**
Comments:
Remilton & Flavel Streets have no drainage and flood during heavy rains. Need work done here ASAP.

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Remilton Street** |
| Suburb: | **Whyalla Norrie** |

# #11

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 2:45:01 PM |
| **Last Modified:** | Tuesday, March 12, 2019 2:59:10 PM |
| **Time Spent:** | 00:14:09 |
| **IP Address:** | 1.125.110.223 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**No,**
Comments:
The risk of flooding is increasing as more build up happens in the West of the town but no increase has ever been done to the city drain which has significant siltation, weed growth and almost total lack of maintenance. More and more paved areas and housing all feeding unwanted storm water into a system not designed to cope with this flow. The large drain system should have an extension T junction at the 8 mile road junction and following the roadway Southward to empty onto the clay pans.

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**
Comments:
The army has bulldozed all the dams from Mt Whyalla (7 or 8 dams) which collected almost all the rain and flood flows, the city should be preparing for that extra flow to come our way, crossing the Iron Knob road West of the Speedway and flooding from the Western side of the city

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Paltridge Street** |
| Suburb: | **Whyalla Norrie** |

# #12

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 4:07:41 PM |
| **Last Modified:** | Tuesday, March 12, 2019 4:12:19 PM |
| **Time Spent:** | 00:04:38 |
| **IP Address:** | 143.216.49.250 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Newton St** |
| Suburb: | **Whyalla** |

# #13

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 4:43:57 PM |
| **Last Modified:** | Tuesday, March 12, 2019 4:44:58 PM |
| **Time Spent:** | 00:01:01 |
| **IP Address:** | 42.241.214.169 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Haynes Street** |
| Suburb: | **Whyalla Norrie** |

# #14

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 6:59:47 PM |
| **Last Modified:** | Tuesday, March 12, 2019 7:03:13 PM |
| **Time Spent:** | 00:03:26 |
| **IP Address:** | 1.158.145.59 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**No,**
Comments:
How is upgrading a levee going to stop streets from flooding. The issue is in the township not on the outskirts

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**
Comments:
You need to install underground drainage. We are sick of our homes almost flooding because previous councils approved building in old flood grounds! Poor management from eras ago.

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Fisk st** |
| Suburb: | **Whyalla Norrie** |

# #15

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 12, 2019 8:15:28 PM |
| **Last Modified:** | Tuesday, March 12, 2019 8:49:15 PM |
| **Time Spent:** | 00:33:47 |
| **IP Address:** | 60.227.233.209 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding ,**

**Interest in local environment ,**

**Interest in improving water quality ,**

**Interest in water conservation and/or stormwater harvesting and reuse**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes**

**Q3** Do you have any further suggestions regarding the draft SMP?

**No,**

Comments:

Rather difficult to read online, no facilities for printing and not in Whyalla so cannot come and pick up a hard copy. The one thing I cannot quite work out is how the samphire flats opposite the current wetlands will be impacted. These are a great carbon sink, a source of bush tucker, an unused resource and I would not like to see them destroyed.I recently spoke to visitors from WA in Whyalla who said they knew of some selling for $700 a kilo....an eco tourism resource and maybe a mico business?

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Brimage Street** |
| Suburb: | **Whyalla** |

# #16

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Friday, March 15, 2019 4:26:43 AM |
| **Last Modified:** | Friday, March 15, 2019 4:30:21 AM |
| **Time Spent:** | 00:03:37 |
| **IP Address:** | 42.241.199.107 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest in local environment ,**

**Interest in water conservation and/or stormwater harvesting and reuse**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes**

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes**

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **patten street** |
| Suburb: | **WHYALLA STUART** |

# #17

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Saturday, March 16, 2019 4:46:33 PM |
| **Last Modified:** | Saturday, March 16, 2019 4:58:02 PM |
| **Time Spent:** | 00:11:28 |
| **IP Address:** | 14.2.24.194 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**No,**
Comments:
It floods my house and neighbors, I live at 89 Broadbent Tce, the water runs down Bennett St and straight into my property. The council USED to build up the island on Broadbent but haven't for years. My house is now falling on the west side, I have plenty of photo's for viewing if desired. (Of the flood lines and my house moving).

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**
Comments:
How about improving the flooding in our area.

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Broadbent Tce** |
| Suburb: | **Whyalla** |

# #18

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Monday, March 18, 2019 2:25:04 PM |
| **Last Modified:** | Monday, March 18, 2019 2:28:34 PM |
| **Time Spent:** | 00:03:29 |
| **IP Address:** | 124.181.114.219 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Birt st** |
| Suburb: | **Whyalla** |

# #19

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Monday, March 18, 2019 5:27:17 PM |
| **Last Modified:** | Monday, March 18, 2019 5:28:41 PM |
| **Time Spent:** | 00:01:23 |
| **IP Address:** | 1.124.109.28 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Interest in water conservation and/or stormwater harvesting and reuse** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Nicolson Avenue** |
| Suburb: | **Whyalla Stuart** |

# #20

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Monday, March 18, 2019 8:32:58 PM |
| **Last Modified:** | Monday, March 18, 2019 8:35:01 PM |
| **Time Spent:** | 00:02:03 |
| **IP Address:** | 61.245.155.163 |

Page 1

| | |
|---|---|
| **Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan? | **Local Resident,**<br>**Interest or experience of flooding** |
| **Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response. | **Yes** |
| **Q3** Do you have any further suggestions regarding the draft SMP? | **No** |

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **McConville st** |
| Suburb: | **Whyalla Playford** |

# #21

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Wednesday, March 27, 2019 11:32:35 AM |
| **Last Modified:** | Wednesday, March 27, 2019 11:36:55 AM |
| **Time Spent:** | 00:04:20 |
| **IP Address:** | 110.145.130.22 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes**

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**
Comments:
Existing assets need to be maintained at a sufficient level to keep them operable, not just building new assets. The stormwater drain at the end of Marevista Cres is rarely cleaned out and builds up with weeds, reducing water flow in high rainfall events, potentially leading to flooding danger.

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Marevista Cres** |
| Suburb: | **Whyalla** |

# #22

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Friday, March 29, 2019 11:49:09 PM |
| **Last Modified:** | Saturday, March 30, 2019 12:24:25 AM |
| **Time Spent:** | 00:35:16 |
| **IP Address:** | 1.125.105.164 |

Page 1

**Q1** Which of the following best describes your interest in the Whyalla Stormwater Management Plan?

**Local Resident,**

**Interest or experience of flooding**

**Q2** The draft SMP proposes a range of measures to improve flood management, including detention basins, upgrade and extension of an existing levee bank, and upgrades to drainage systems. The draft SMP also presents recommended priorities for Whyalla with preliminary estimated costing to aid in project selection and planning.Do you support the proposed measures to provide better flood protection and manage stormwater as shown in Figure 5.1 of the Consultation Summary Report? Please explain your response.

**Yes,**

Comments:

Under-grounding, collection and re-use of captured water, not only to mitigate flooding, but also for the greening of Whyalla is long overdue.

**Q3** Do you have any further suggestions regarding the draft SMP?

**Yes,**

Comments:

Loveday Street is prone to flooding. I know. I am a resident and my property is regularly flooded along with others. Properties from the South East corner of the Netball Courts, ie from the Ryan Avenue/Loveday Street intersection on the southern side of Loveday Street are still flooded after a downpour. The water collects at the intersection, sometimes AFTER the rain has stopped falling because it comes from elsewhere, and the water has nowhere to go, despite the fact that extra drains were installed about 5 years ago. I have been complaining to council about this for 30 years! This AREA needs to be addressed!

**Q4** To help us understand who participated in the consultation please leave the following details:

| | |
|---|---|
| Street Name: | **Loveday Street** |
| Suburb: | **Whyalla Norrie** |