

Whyalla Stormwater Management Plan

Consultation Summary Report

City of Whyalla

16 January 2019

Ref: 20160064



Building exceptional
outcomes together



Document History and Status

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1 Introduction to the SMP process

1.1 What is a Stormwater Management Plan?

The Stormwater Management Authority (SMA), through the implementation of the *Local Government (Stormwater Management) Amendment Act 2007*, is charged with the responsibility of working with Local Government Councils to facilitate catchment stormwater management planning and allocates state funding to projects in collaboration with Councils and other funding bodies. Its establishment was a key element of an Agreement between the South Australian Government and Local Government Association on the management of stormwater within the state. The Agreement outlines the responsibilities for stormwater management and aims to support catchment scale stormwater planning to ensure adequate consideration of flood mitigation, water quality and reuse opportunities.

A key element of the SMA's Strategic Plan is to identify the need for and then drive the development of Stormwater Management Plans across South Australia.

A Stormwater Management Plan (SMP) is a strategic planning document which 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.

In the context of the City of Whyalla, the catchment is defined by a study area as shown in Figure 1.1.

1.2 Why is an SMP being prepared?

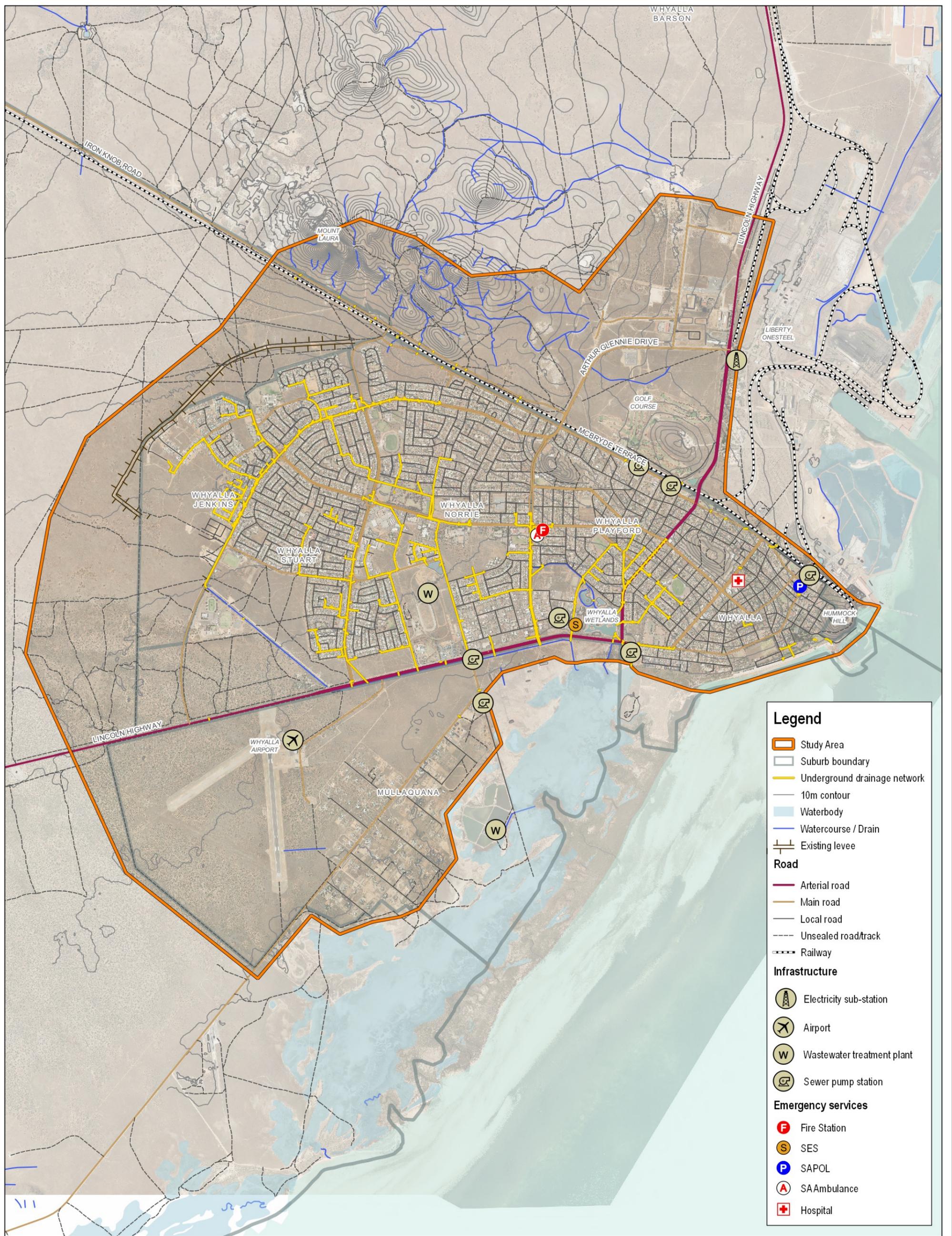
There is currently no stormwater management plan for Whyalla that documents how stormwater will be managed to accommodate future growth within the city or to improve the levels of service of the existing stormwater drainage infrastructure to reduce the risk of flooding, protect the city against flood risk from external catchments, improve the quality of stormwater runoff discharging into Spencer Gulf or maximise the harvesting and reuse of stormwater runoff within the city.

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

In response to this, Council, with financial support from the State and Federal Governments, has commissioned Tonkin Consulting to develop a Stormwater Management Plan for the City of Whyalla.

The document will provide a clear understanding of the current issues and will enable Council to adopt a consistent, sustainable, environmentally aware and integrated approach to stormwater management which will provide a framework to address priority drainage issues, integrate future development, land use and infrastructure planning across the city.

Whilst largely driven by the need to address stormwater flooding within the city, Council are also keen to explore opportunities for integrated water management, including addressing the quality of water discharging to Spencer Gulf and potential reuse to augment Council's existing non-potable irrigation scheme.



Legend

- Study Area
- Suburb boundary
- Underground drainage network
- 10m contour
- Waterbody
- Watercourse / Drain
- Existing levee
- Road**
 - Arterial road
 - Main road
 - Local road
 - Unsealed road/track
 - Railway
- Infrastructure**
 - Electricity sub-station
 - Airport
 - Wastewater treatment plant
 - Sewer pump station
- Emergency services**
 - Fire Station
 - SES
 - SAPOL
 - SA Ambulance
 - Hospital



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CITY OF WHYALLA
WHYALLA STORMWATER MANAGEMENT PLAN
STUDY AREA

Figure 1.1



1.3 What does an SMP aim to achieve?

The intent of a stormwater management plan is to set out strategies, actions and programs that can be implemented to work towards achieving Council's objective of "...stormwater management, asset and development planning and risk management for the Whyalla City Council."

It seeks to ensure that stormwater management is addressed on a total catchment basis with the relevant NRM board, various local government authorities and state government agencies responsible for the catchment working together to develop, implement and fund a coordinated and multi-objective approach to management of stormwater for the area.

It will provide a template for consistent management of stormwater within the City, aimed at addressing existing problems and capitalising on opportunities for providing a range of benefits through multi-objective planning. The plan will be used as the basis for developing budgets and allocating state support funds (matched by the council) across the study area.

The SMP will aim to:

- Clearly set out the objectives for managing stormwater in the city
- Identify actions (both structural and non-structural) required to manage stormwater to achieve beneficial outcomes and meet the specified objectives
- Provide a justification for any proposed catchment studies, works, measures or actions
- Estimate 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.

1.4 How is an SMP developed?

The SMP will be developed in accordance with the SMA's Stormwater Management Planning Guidelines (2007), which provides a framework to ensure consistency in the planning and implementation of projects and measures across the state.

The Project Steering Committee, which oversees the SMPs preparation includes representatives from Council, the Stormwater Management Authority and Natural Resources Eyre Peninsula.

In accordance with the guidelines, the SMP must:

- Identify the objectives and outcomes for management of stormwater in the catchment, as defined by Council and the NRM Board
- Clearly define the area covered by the plan
- Describe all known existing stormwater assets within the catchment
- Through the use of modelling, historical records and technical investigations, identify stormwater management problems and opportunities, including flooding risk, water quality and reuse potential
- Based on the outcomes of the investigations, identify strategies (structural and non-structural) to meet the specified management objectives for the catchment
- Determine capital and maintenance (including recurring) costs associated with the management strategies and how those costs will be apportioned between councils and government agencies if relevant
- Assess the benefits to be gained by implementation of the proposed management strategies
- Prioritise the proposed strategies and identify a timeframe for implementation
- Assign responsibility for implementing the strategies and meeting any costs
- Provide a plan for communication / consultation of the strategy.

The process for development of an SMP is shown in Figure 1.2.

The process to date has included a large amount of data collection and analysis, followed by detailed computer modelling to predict the risk of flooding under a range of varying rainfall conditions. These



models have been used to produce flood inundation maps within the City, as well as estimating the likely pollutants that are transported within the stormwater, which ultimately ends up in the Spencer Gulf.

Results of the modelling and analysis have enabled a preliminary list of potential management strategies to be developed. The next step in the SMP process will involve testing the effectiveness of the proposed strategies and estimating the cost of implementation.

Further details of the work undertaken to date, the outcomes, and the next steps are provided in the following sections.

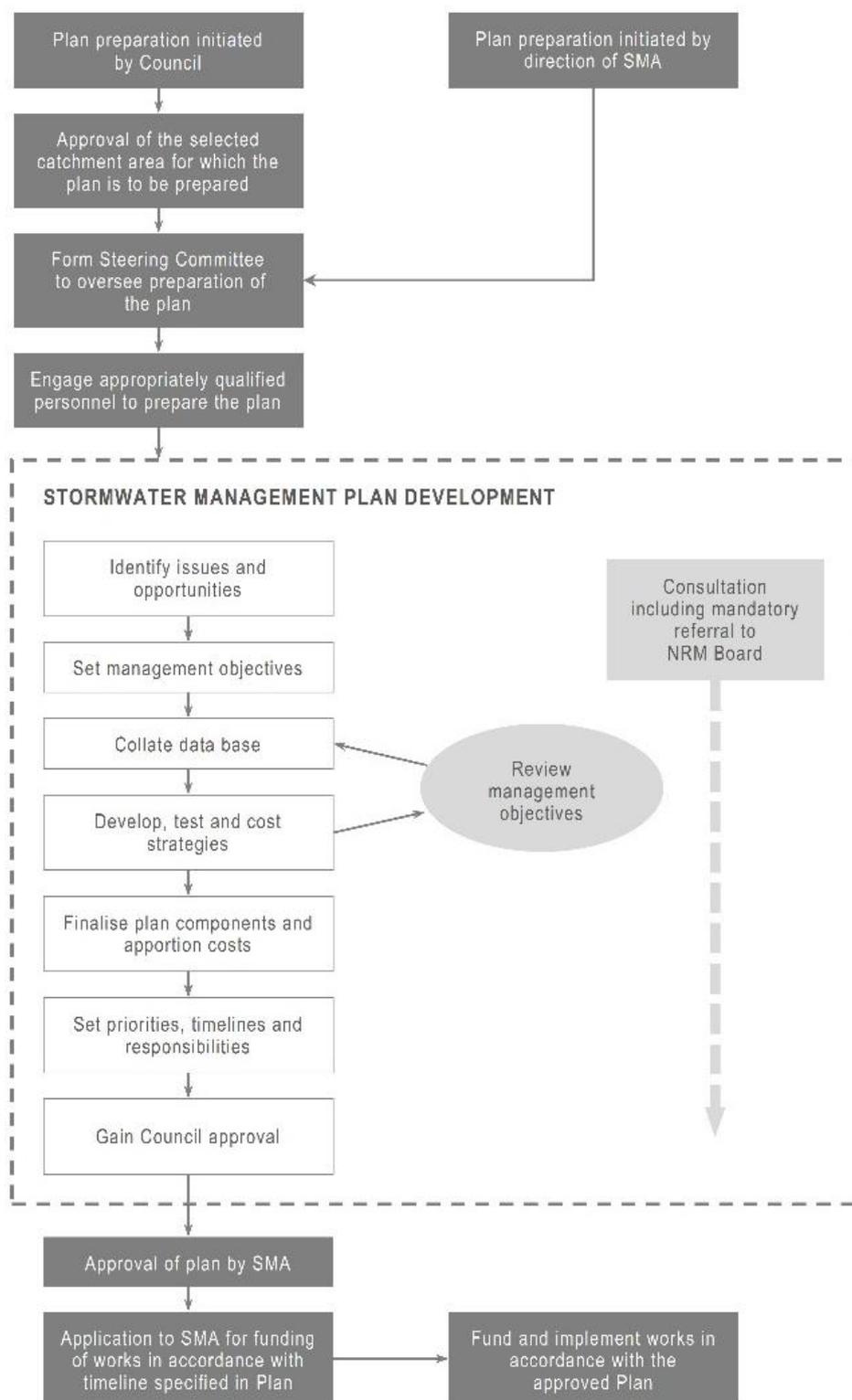


Figure 1.2 Stormwater Management Plan preparation process (adapted from Stormwater Management Planning Guidelines 2007)



2 Study area

Broadly the study area covers the industrial areas north of the city, the urban centre and residential areas of the city, and the airport and rural living areas south of the city. Figure 1.1 shows the study area for the SMP.

Each area (Industrial Area, City, Airport and rural living zone) has been considered and flood modelled separately due to the nature of the catchments. For example, the airport area lies within a very large rural catchment that extends as far as Iron Knob, drained by Salt Creek. Significant rain within that catchment may cause flooding near Whyalla. However, flooding within the city area will require a storm be located right above the city. Therefore, the storm events that cause flooding of the airport via Salt Creek are likely to be quite different to the storms that cause flooding of the city.

By analysing each area separately, flooding issues specific to that area can be properly assessed.



3 Flood risk in Whyalla

The SMP process includes computer modelling to assess the potential of flooding across the various parts of the study area. The computer models have been used to develop a set of flood maps that show the extent and depth of flooding for a range of floods. Each flood is described by the average number of years between floods of similar severity, known as the Average Recurrence Interval (ARI). For example, a 100-year ARI event may occur on average once in a hundred years.

The flood maps identify the risk of flooding in different areas of the city and help the Council and its staff develop strategies to manage and reduce flooding in those areas. Ultimately, the maps may also assist in emergency response planning during a flood emergency.

Figure 3.1 is an example of the mapping undertaken for the flood with a 100-year ARI. The map shows the severity of flooding is greatest near the low-lying areas south of the city, such as along Broadbent Terrace. Significant flooding also occurs within the valley that stretches between the intersection of Jenkins Avenue and McDouall Stuart Avenue and the intersection of Norrie Avenue and Broadbent Terrace.

The SMP will contain a full set of maps for flood events both smaller (more frequent) and larger (less frequent) than the 100-year ARI event.

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.

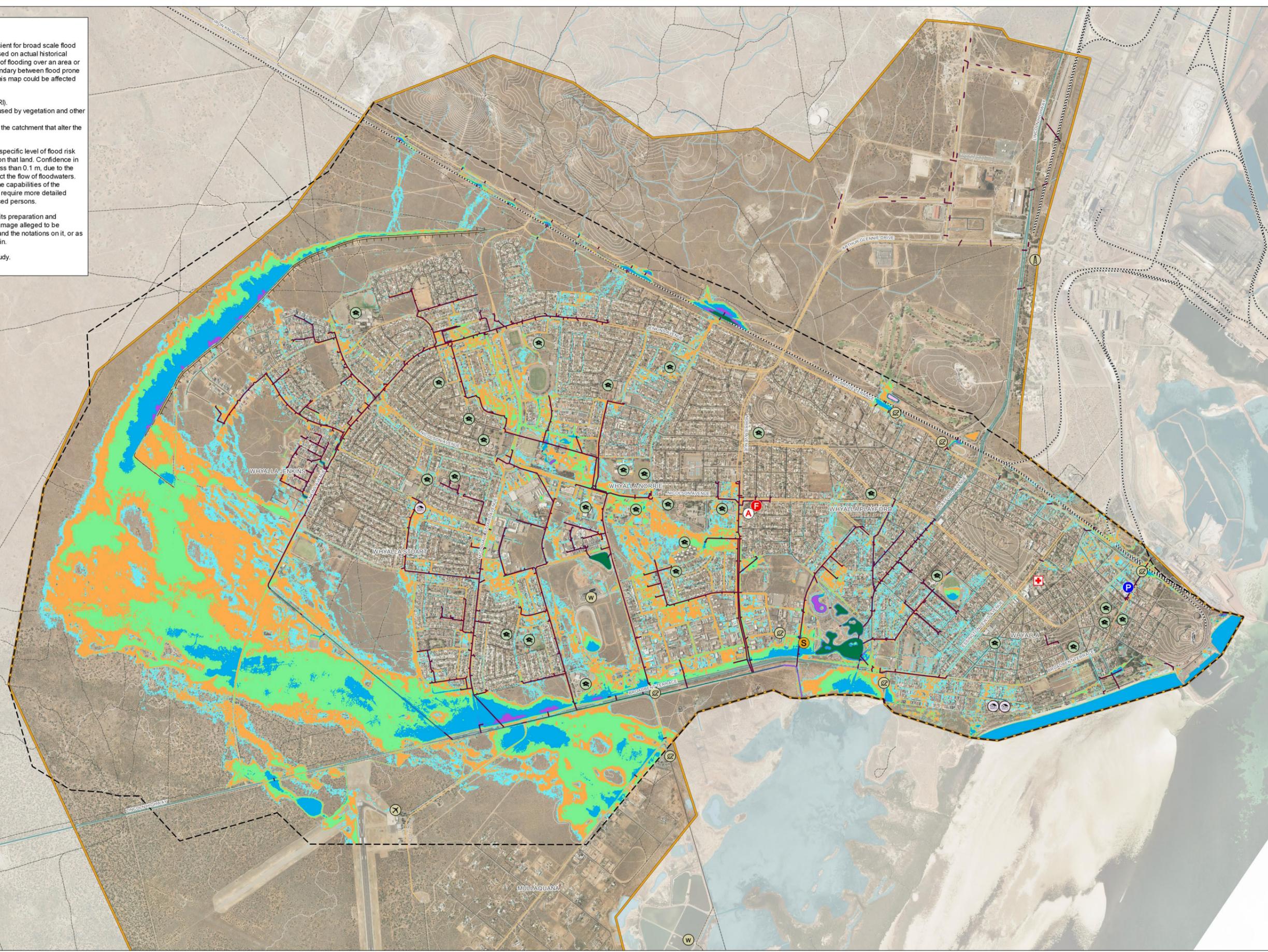
The flood extents shown are a prediction of land subject to a specific level of flood risk and do not necessarily indicate a threat to buildings located on that land. Confidence in the prediction is reduced in areas affected by flood depths less than 0.1 m, due to the effects of fences, walls, buildings 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

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





4 Possible flood mitigation measures

4.1 Introduction

The SMP process will identify and investigate a range of strategies to reduce the severity or frequency of flooding within Whyalla. A list of potential measures is given in the following sections. The list is a not exhaustive and is a preliminary set of measures only. Each measure will be subject to further investigation and discussion with Council and other stakeholders.

The focus of the stormwater management plan is to identify key drainage upgrades and development controls and does not seek to address all minor drainage issues at a street scale. It is expected that the results of the flood modelling will be used by Council in the future to identify the need for additional, smaller-scale stormwater improvement works.

4.2 Development controls to reduce runoff

The primary cause of flooding within urban areas is stormwater runoff from hard, impervious surfaces such as roofs and driveways. As development within the city grows and more houses are built, the amount of runoff generated by these impervious surfaces can increase to a point where the drainage network cannot cope. The end result is an increased risk of flooding.

Development controls can be an effective way to control flood risk in urban areas by limiting the amount of impervious area that can be added to a catchment. Careful control of development helps prevent existing stormwater drains from becoming overloaded and preserves the ability of the existing drainage network to manage stormwater runoff.

Other controls can include requirements for new development to set the floor level of buildings above the predicted flood height so that even in the event of a major flood, buildings will remain undamaged.

Development controls are some of the least costly management strategies available.

4.3 Levee systems to redirect large floods

A primary cause of flooding along Broadbent Terrace and throughout Whyalla Jenkins is runoff from surrounding catchments, outside the existing city limits. One possible solution to this issue is to upgrade the existing levee bank on the northern side of the city to divert floodwater to areas of open space where it is likely to cause less damage to buildings and homes.

Another possible levee location is far west of the city to direct water from the Salt Creek catchment away from the airport.

The potential levee upgrades are shown on Figure 4.1.

4.4 Detention systems to control floods

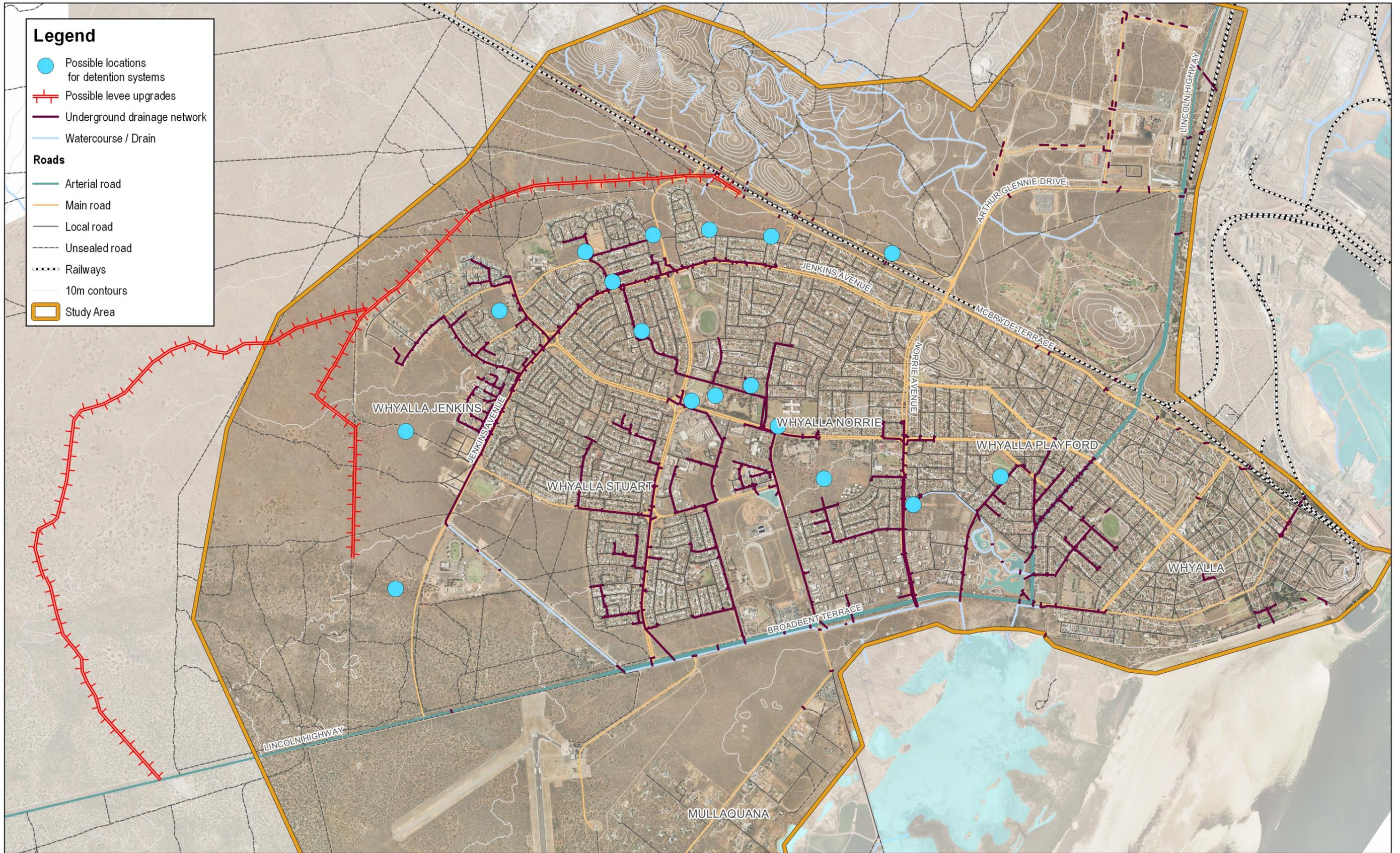
When the rate of rainfall exceeds the capacity of the existing drains to cope with runoff, one possible solution is the construction of detention systems. Detention systems, such as basins and tanks, function by capturing and temporarily storing stormwater from the surrounding catchment and then releasing it at a slower rate back into the drainage network. By reducing the rate of outflow from the basin, stormwater can be released at a rate which doesn't overload the downstream drainage network.

A number of possible locations for detention basins will be considered as part of the SMP process. Some preliminary locations are shown on Figure 4.1. These will be further assessed to determine their effectiveness and will be discussed with Council prior to finalising the plan.



4.5 Drainage system upgrades

When the rate of runoff from the catchment exceeds the capacity of the existing drains and it is not possible to by any other means, then upgrades to the existing drains must be considered. Drainage system upgrades are usually quite costly in comparison with other measures, therefore, the cost of constructing the upgrades must be balanced against the reduction in flood damages.



0 500 1000 1500 2000 m



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 Base data from DataSA

City of Whyalla

**WHYALLA STORMWATER MANAGEMENT PLAN
 POSSIBLE DETENTION and LEVEE LOCATIONS**

Figure 4.1



5 Water quality and stormwater reuse

5.1 Water quality

When stormwater flows across the ground, it picks up a variety of pollutants. Common pollutants found in stormwater include nutrients from fertilisers and animal wastes, metals from various sources including vehicle wear and industrial emissions and sediments and organic matter such as leaves and grass clippings. These pollutants are ultimately carried with the stormwater to the outfall location, in the case of Whyalla, Spencer Gulf.

As part of the SMP, computer modelling will be used to estimate the volume of common stormwater pollutants likely to be generated within the city and discharged to the gulf. This will enable a number of treatment measures to be investigated to determine whether the volume of pollutants being discharged to the gulf can be reduced. Options may include providing plantings within the main city drainage channel to filter out pollutants, or potentially a wetland/basin near the outfall location.

5.2 Stormwater reuse

Council currently utilises at least 350 ML of recycled water each year to irrigate median strips, ovals, parks and reserves throughout Whyalla. This includes both recycled effluent from SA Water's system, and a small amount of stormwater reuse.

Council are keen to explore further opportunities to capture, treat and reuse stormwater to further reduce reliance on mains water.

As part of the SMP, development opportunities to supplement the supplies for existing schemes and/or establish new schemes will be identified.



6 How to contribute to the SMP process

To contribute to the public consultation process for the Whyalla Stormwater Management Plan (SMP), visit the Council's public consultation website and fill in the online comment form.

Public consultation website: <https://www.whyalla.sa.gov.au/page.aspx?u=1014>

For the latest details and updates, please visit the SMP website:

<https://www.whyalla.sa.gov.au/page.aspx?u=1014&t=uList&ulistId=0&c=55619>