Frequently Asked Questions

PlanSA

Understanding and using flood maps

Introduction

The Flood Hazard Mapping and Assessment Project (the Project) will look at extending flood hazard mapping coverage, developing consistent flood hazard mapping, applying current national best practice and enhancing overlay policies.

There are three stages to this project:

- Stage 1 – *Flood Hazards Mapping Update Code Amendment:* the Chief Executive of the Attorney General's Department has initiated a Code Amendment for certain local government areas to incorporate current flood hazard mapping that was not available when the Code was implemented in March 2021.
- Stage 2 – *Preparation of Mapping Products:* the Department is commissioning updated and new flood hazard mapping across the State to better identify flood risk using improved data and more consistent modelling.
- Stage 3 – *State-wide Flooding Hazards Code Amendment:* the State Planning Commission (Commission) will initiate a state-wide amendment to the Code to include the new mapping and updated policy.

About this FAQ

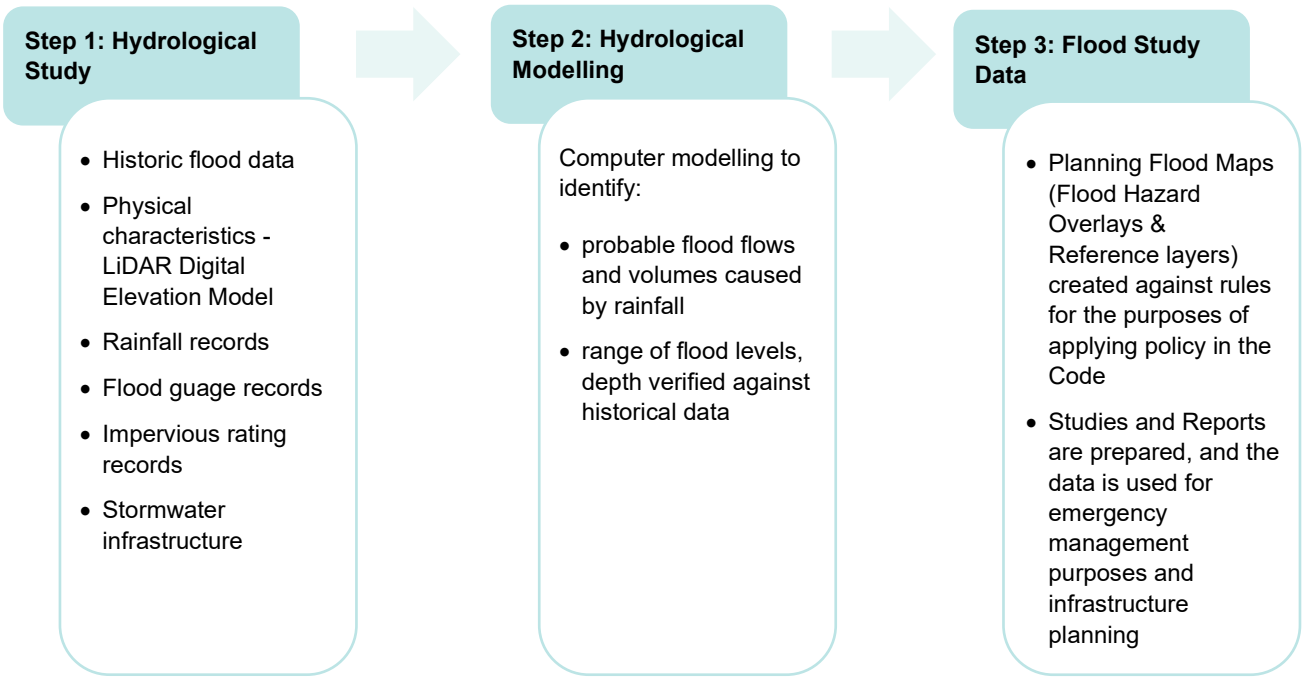
This FAQ address how flood maps are being developed and used to support flood risk management in South Australia. It also assists with understanding how the new flood maps will be prepared for incorporation into the Planning and Design Code (the Code).

Frequently Asked Questions

Q – How are flood maps created?

A – The first step in preparing flood maps is to undertake a hydrological study and prepare a hydrological model. This helps to better understand, predict and manage water resources and understand how much water from rainfall runs off the land surface into watercourses.

A hydrological model can help to estimate the volume and rate of run-off for a range of Annual Exceedance Probability scenarios (AEP[1]) and calculate flood behaviour. The diagram below outlines the three key steps to creating a flood map:



[1] **Annual Exceedance Probability** (AEP) is a term used to the express the percentage of likelihood of a flood of a given size or larger occurring in a given year. If a flood has an AEP of 1%, it has a one in 100 likelihood of occurring in any given year.

Q – Why is flood hazard mapping important and how does it support flood risk management?

A – Flood hazard mapping supports flood risk management in a number of ways.

Flood maps can be used:

- to draft flood-risk management plans
- to prevent flood damage through the location and design of new development
- in regional and land use planning
- to provide information on floods
- in emergency management including flood response planning
- in determining what the lowest allowable construction elevation should be to avoid flood risk for infrastructure planning.

Q – How will the project support flood risk management?

A – In addition to updating the flood mapping across the state, the floodplain studies undertaken as part of this project, will further support flood risk management actions in the following ways:

Land Use Planning

Flood mapping is an important tool for determining the appropriateness of a rezoning and for determining future areas of growth and the location of infrastructure in regional planning.

The best way to ensure future development avoids or minimises the impacts of flooding on people, property and the environment is to apply the provision of 'Avoid, Accommodate and Adapt' to land use polices in the Code through areas mapped as subject to flooding.

New detailed flood studies incorporating climate change impacts and future growth will be introduced into mapping for land use planning through the Project.

Community Awareness

A community that understands and prepares for flood risk is more resilient to flood events and can help reduce its impact on people, property and the environment.

The Flood Awareness website has been designed to assist stakeholders and the wider public in understanding the flood risk at their property or other places of interest. The site provides information that has been collected from existing flood studies, including a range of Annual Exceedance Probabilities (AEP)[2], depth categories and other information.

The current flood overlay mapping in the SA Property and Planning Atlas (SAPPA), is also accessible to the community enabling the community to understand whether a property has been identified as being subject to flood risk in a 1% AEP event.

The Project proposes to introduce new flood hazard information into SAPPA through reference layers that will include the 5%, 1% and 0.2% AEP, hazard and depth ratings. Refer to the mapping and assessment project overview to learn more about flood hazard terminology.

Government agencies like the South Australian State Emergency Service (SASES) and the Department for Environment and Water (DEW)—the control agency and hazard leader, respectively, for flood management under the State Emergency Management Plan—use flood mapping to educate and raise awareness about existing flood risk within the community.

Flood Mitigation and Infrastructure Works

Flood mapping is most commonly prepared by councils and the Stormwater Management Authority (SMA) to assist in planning for infrastructure and mitigation works that will reduce the flood hazard in particular areas.

Water Quality and the Environment

Flood mapping assists government agencies and councils to prepare for and reduce the impact of floods on our natural environment, water quality, the land and biodiversity. The impact of floods is also reflected in policy in the Code, through the flood hazard overlays.

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Emergency Management and Response

Flood mapping assists the SASES to prepare for a flood and to plan for actions before, during and after flooding events including providing warnings to the community, and facilitating evacuations.

Flood mapping is also used by DEW's hydrology support service during incidents, to inform development of flood forecasting and warning services, and to undertake flood risk assessments.

The SES website provides information to enable people to prepare for a flood.

Use of Flood Mapping for Insurance Purposes

Floods, whether caused by a flooding river, burst water pipe or storm, can cause extensive damage to your home, contents and other assets.

It's important to understand how flood and other water-related events may be covered under insurance policies, as the cost of even minor flooding in your home can potentially be high.

Flood insurance is often built into insurance policies, including home and contents, strata title, motor vehicle and business insurance policies.

The risk of a flood occurring is reflected in the cost of the premium – property owners with a high risk of flood will pay a higher premium than other property owners.

Insurers treat floods in different ways in their policies:

- Many insurers include flood cover as a compulsory part of taking out a household policy.
- Some insurers include flood as a standard inclusion, but allow the policyholder to remove it– this is known as opt-out flood cover.
- Some insurers will cover flood in policies only up to very low defined values – for instance, damage of $15,000 or less.
- Some insurers will not cover flood under any circumstances.

All Australian insurers define a flood as:

The covering *of normally dry land by water that has escaped or been released from the normal confines of any lake, river, creek or other natural watercourse, whether or not altered or modified, or any reservoir, canal, or dam. Things that aren't considered a flood is stormwater damage, storm surge and tidal inundation (your insurance policy may cover these water hazards even it if does not cover flood).*

The insurance industry uses a range of flood maps and studies provided from a number of local, state, Commonwealth and private sources in setting the insurance premiums for properties. In South Australia the Insurance Council of Australia advises that 'flood prone addresses' for insurance purposes are located near the River Murray, Torrens River, Gawler River and Light River.

If accurate mapping is not available, the industry makes assumptions about the flood risk, and may be forced to use alternative methods for estimating risks that may not be accurate. For instance, if historical or out-dated flood data is used, new flood mitigation infrastructure or changes in infill development (for example) may not have been considered. This may result in applying higher premiums than is necessary.

Generally, residents underestimate their exposure to flood risk. Insurers, due to solvency regulation and need for business sustainability, tend to be more conservative in their assessment of the risk as they need to compensate for the uncertainty. This results in higher insurance premiums.

The potential use of the Flood Hazards Mapping and Assessment Project data for insurance purposes

The insurance industry currently uses maps that show the present-day riverine flood hazard for properties to determine flood risk.

The Project seeks to reduce the potential for riverine and surface water (storm water) flood hazard impacts to new development by ensuring future developments are not located in areas identified as having a high flood risk or impacted by flood hazards in a 1% AEP event up to 2050 via new hazard overlay maps in the Code. In lower to medium flood hazard locations, developments will be built above the flood plain to minimise any impacts.

It is unlikely the insurance industry will use these maps directly when ascertaining flood hazards; however, data resulting from the Project will provide greater certainty in areas expected to be impacted by flooding, especially in areas where limited flood information is available.

When released, this flood data will be used by state authorities to plan and build flood mitigation works, which in turn can potentially help to mitigate flood hazard and insurance costs.

For more information refer to

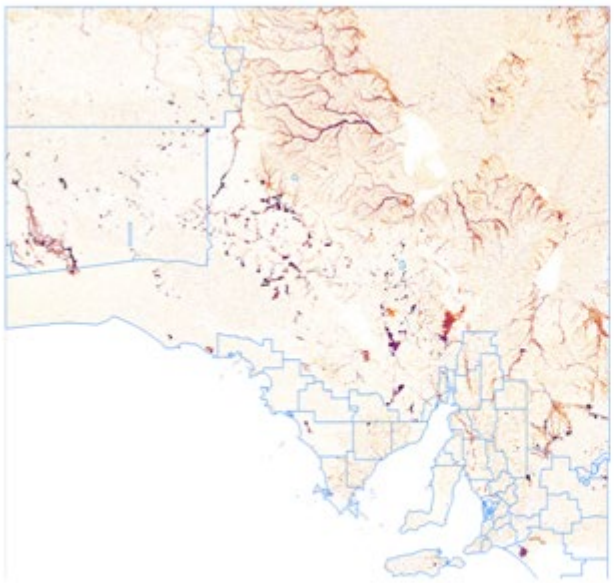
- www.floods.org.au
- www.floods.org.au/client_images/1787686.pdf
- insurancecouncil.com.au/articles/flood-insurance-explained

Q – What types of studies and products will the Project use?

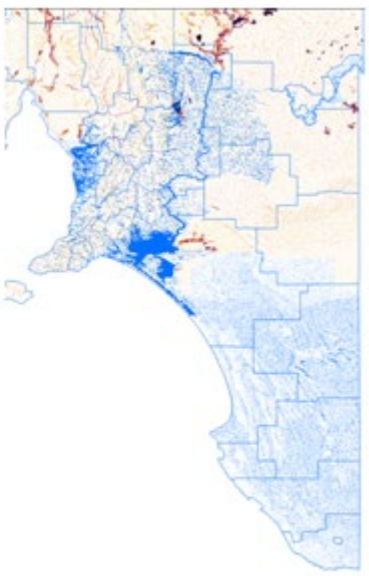
A – The Project will use the following studies and products to update the spatial application of the flood hazard overlays across the State.

Detailed flood studies: New flood studies and enhancement of existing flood studies will be undertaken by private consultancies using standard parameters as defined by the Project (refer diagram below).

Coarse-scale mapping (August 2021): This mapping is predominantly commissioned for and used by insurance companies in estimating flood risk and damages and is available across Australia. It provides for mapping at a 30m and 5m scale. The 5m data is available in metropolitan and outer metropolitan Adelaide areas plus the South East of South Australia. The 30m data is available for the remainder of the State.



30m scale Flood Hazard Mapping



5m scale Flood Hazard Mapping

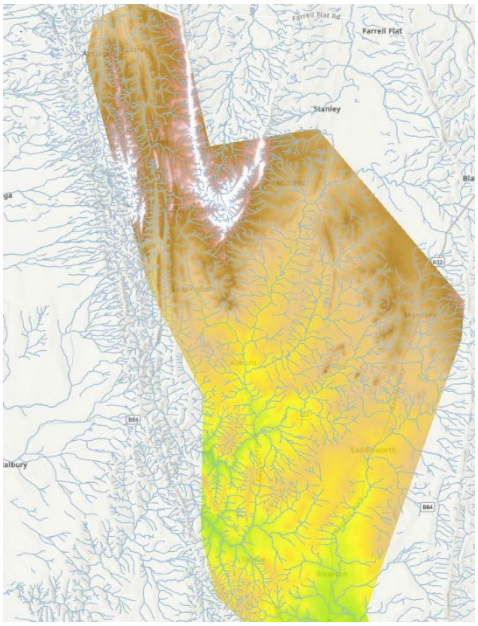
The 5m data works well in lower density sloping areas and more rural areas. The 30m also works well in rural areas of the State. Due to limitations with data accuracy and climate change considerations, the 30m scale will be utilised by the Project at a 0.5% AEP flood event to cater for any potential data accuracy issues.

LiDAR data: New LiDAR (light detection and ranging) data in the form of a 0.5m digital elevation model, will be used to improve the accuracy of flood modelling. The LiDAR capture is in addition to the mapping being prepared through the DEW and covers:

- Clare and Gilbert Valley townships
- Barossa, Middle Beach to Barossa
- Upper Torrens River
- Adelaide Hills including Mt. Barker, Strathalbyn and Nairne
- Upper Onkaparinga catchment area including Bremer Flat and Langhorne Creek
- Goolwa to Port Elliot
- Townships in the Fleurieu Peninsula

In addition, the data is suitable for many other mapping purposes, including:

- Bushfire risk modelling
- Strategic planning and concept planning.
- Infrastructure planning and construction
- Urban heat mapping



Digital Elevation Model derived from LiDAR over the Clare / Stockport region

It can also be used to show detailed slope contours, tree canopies and elevation at 1m intervals as well as additional layers including tree canopy height and cover, and building extents. It is likely that new uses for the data will be found in the future in areas such as agribusiness and environment research.

This data will be made publicly available by DEW through the Elvis Elevation Foundation Spatial Data platform (ELVIS).

Q – How was the catchments/extents chosen for new and enhanced studies?

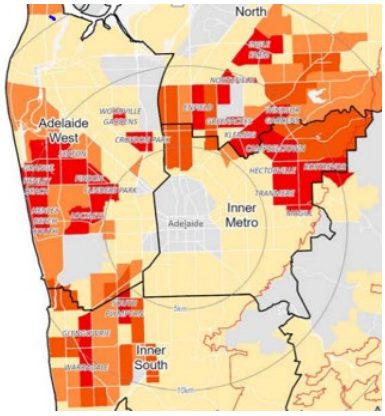
A – To ensure that the resources were spent on mapping where it could make the biggest difference, a detailed audit of flood studies has been undertaken across metropolitan Adelaide and growth areas of the State and have considered:

- the age of the study and therefore the accuracy of the data
- whether the study was missing any of the standard parameters as defined by the Project
- an analysis of the growth projections across the State, as well as known or estimated level of flood risk.

Audit of Study

Age of rainfall data, e.g. Not Over 10 years	☑
Depth & Velocity output (Hazard)	☒
All Events 5%, 1%, 0.2%	Not 0.2%
Climate change to 2050	☒
Impervious rating to 2050	☒

Growth Projections



Known / Estimated level of risk

Q – In which areas are new and/or enhanced studies being commissioned?

A – There are 9 new studies and 24 enhanced studies as listed below:

New Flood Studies

Council	Area
Burnside Council	1st to 3rd Creek catchment
Charles Sturt, Prospect and Port Adelaide Enfield Councils	Barker Inlet catchment
Playford and Gawler Councils	Smith Creek catchment
Clare Valley and Gilbert Valley Councils	Auburn township
Mitcham Council	Sturt River urban catchment, McLaren Street catchment, Brownhill Keswick Creek urban catchment
Port Lincoln Council	Port Lincoln
Unley Council	Unley Council Area
Naracoorte Lucindale Council	Naracoorte township and surrounds
Salisbury and Port Adelaide Enfield Councils	Dry Creek catchment

Enhanced Studies

Metropolitan Areas	Outer Metro / Regional Areas
• River Torrens • Lower River Torrens • Lower Sturt River • Lower Onkaparinga River • Barker Inlet • Cobbler Creek • Lefevre Peninsula • Gawler River • Upper and Lower Little Para • Numbered Creeks (1st – 3rd creek) in Campbelltown, Tea Tree Gully, Burnside and Norwood • Marion and Holdfast Bay Surface Water • Adams Creek • Little Para River (lower and upper) • West Lakes Surface Water • Smith Creek	– Nuriootpa • Victor Harbor • Balaklava to Pt. Wakefield • Pt. Lincoln • Light River • Gawler River • Naracoorte • Clare and Gilbert Valley townships • Kadina

Q – How are councils involved in the preparation of the studies?

A – The majority of the enhanced studies have been prepared by councils and the Storm Management Authority (SMA). All councils involved have agreed to provide their flood studies as part of this Project.

For all new and enhanced studies, councils will be invited to contribute to project meetings with the flood modelling consultants and be asked to provide up-to-date and historic flood and storm water asset data from their respective areas, where available.

Q – What are the Standard Flood Study parameters for this Project?

A – The Project's new standard parameters ensure flood hazard mapping—for the purposes of the Code—provides consistency when applying state-wide land use policy. These are:

- Extent of Flood Hazard under future conditions for the AEP of 1%, 5% and 0.2% - future conditions include climate change impacts on rainfall data, and a standard approach to calculate impervious data using infill data until 2050.
- Depth – contributes to hazard classification, and the extent of a development's vulnerability to structural damage due to a flood hazard
- Water surface elevation – state-wide flood magnitudes and frequencies in the riverine floodplains
- Hazard rating contours – is measured using the nationally agreed Flood Hazard Classification Curves, which combines the flood depth with flood velocity to determine the flood risk. (Further detail provided below)

As part of the Project, a guide to further explain the requirements will be prepared and provided in conjunction with the Stormwater Management Authority's (SMA) Flood Modelling Circular. The SMA's Circular provides information for councils on how to prepare a storm water management plan (SWMP) to meet the requirements of the SMA funding. If the Council intend to use the SWMP for flood hazard mapping in the Code, the guide will provide standardised requirements ensuring that they are fit for purposes and provide consistent mapping for the Code.

Q – What are Flood Hazard Classification Curves?

A – Flood Hazard Classification Curves (decribed below) sets hazard classifications that relate to a community's vulnerability thresholds when interacting with floodwaters. A flood's depth multiplied by its velocity determines the extent of the flood hazard's risk.

For the purposes of this Project the hazard classifications are then tabulated against the AEP events of 0.2%, 1% and 5% to further define the level of flood risk that can be considered acceptable or not unacceptable to the community. This will also form the basis for policy development of the flood hazard overlays in the Code.

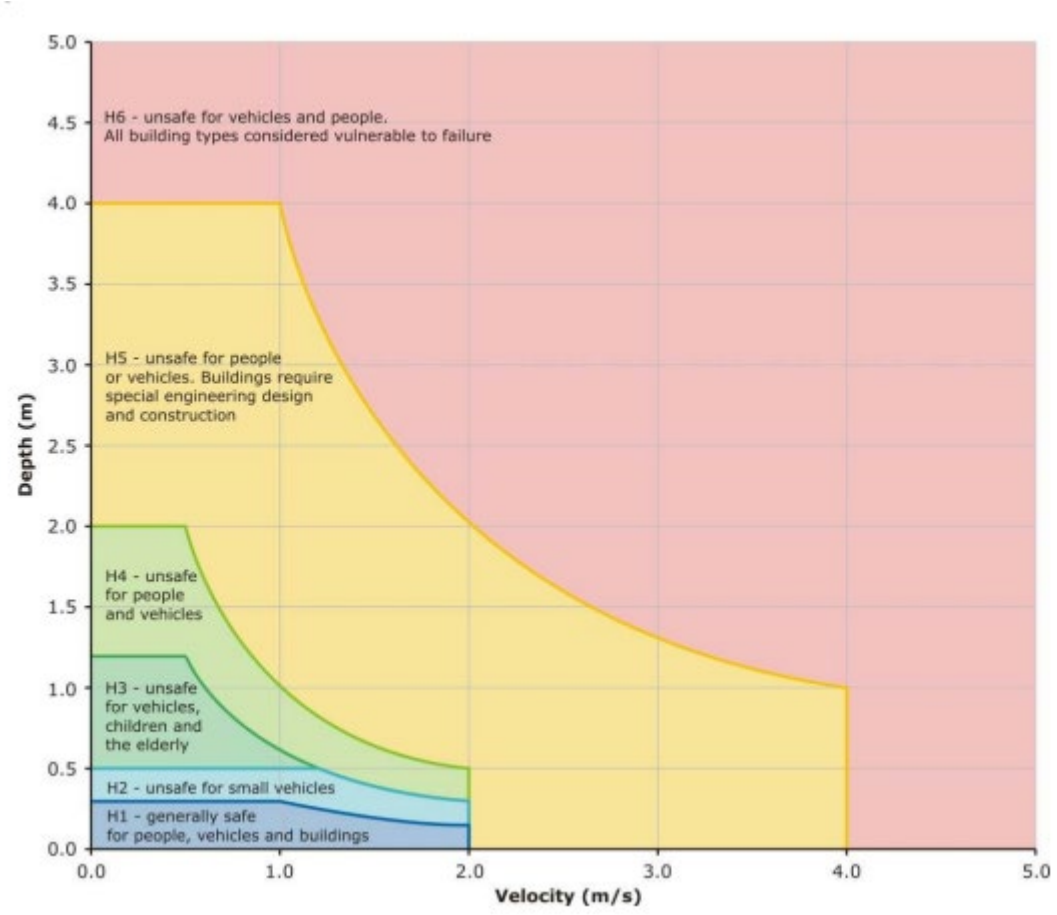


Table 1: Combined hazard curves – vulnerability thresholds

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings. Relatively benign flood conditions. No vulnerability constraints.
H2	Unsafe for small vehicles.
H3	Unsafe for vehicles, children and the elderly.
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. Buildings require special engineering design and construction.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Land use acceptability by Hazard Classification and AEP.

AEP	H1	H2	H3	H4-6
0.2%	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE	ACCEPTABLE
1%	TOLERABLE	TOLERABLE	INTOLERABLE	INTOLERABLE
5%	TOLERABLE	INTOLERABLE	INTOLERABLE	INTOLERABLE

ACCEPTABLE	No Flood Policy applies except for Critical Emergency Services and Housing for Vulnerable People.
TOLERABLE	Development is acceptable subject to suitable design responses so that contents damage is minimised (i.e. housing elevated above 1% AEP & 30cm freeboard).
INTOLERABLE	High risk areas where the safety to the community is paramount and to avoid damage to contents in more frequent events. PDI Regulations class additional structures as development in these areas

Q – Where can I find more information about this Project?

A – Visit the Flood Hazard Mapping and Assessment Project page on the PlanSA website and/or refer to the Project Information Series (below).

Flood Hazard Mapping and Assessment Project Information Series

- Flood Hazard – Project Overview
- Flood Hazard – Understanding the Flood Hazard Overlays in the Planning and Design Code
- Flood Hazard – Understanding and Using Flood Maps