

Snowy Monaro Regional

Local Flood Plan

September 2017

To be reviewed no later than September 2022

SNOWY MONARO REGIONAL FLOOD EMERGENCY SUB PLAN

A Sub-Plan of the Snowy Monaro Regional Local Emergency Management Plan (EMPLAN)

Volume 1 of the Snowy Monaro Regional Local Flood Plan

AUTHORISATION

The Snowy Monaro Regional Flood Emergency Sub Plan is a sub plan of the Snowy Monaro Regional Local Emergency Management Plan (EMPLAN). It has been prepared in accordance with the provisions of the **State Emergency Service Act 1989 (NSW)** and is authorised by the Local Emergency Management Committee in accordance with the provisions of the **State Emergency and Rescue Management Act 1989 (NSW)**.

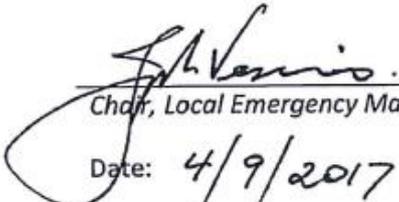
Recommended



NSW SES Local Controller/s

Date: 9/9/2017

Approved



Chair, Local Emergency Management Committee

Date: 4/9/2017

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DISTRIBUTION LIST

This Local Flood Plan is distributed through the NSW State Emergency Service in electronic format and is maintained on the NSW SES FloodSafe (www.floodsafe.com.au) website.

VERSION HISTORY

The following table lists all previously endorsed versions of this plan.

| Description | Date |
|-------------------------------|---------------|
| Bombala Local Flood Plan | August 2008 |
| Cooma Monaro Local Flood Plan | November 2010 |
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AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

The Snowy Monaro Local Controller/s
 NSW State Emergency Service
 PO Box 108
 BOMBALA, NSW 2632

Amendments promulgated in the amendments list below have been entered in this plan.

| Amendment Number | Description | Updated by | Date |
|------------------|-------------|------------|------|
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Document Issue: 02112015

LIST OF ABBREVIATIONS

The following abbreviations have been used in this plan:

| | |
|---------------|---|
| AEP | Annual Exceedance Probability |
| AHD | Australian Height Datum |
| AIIMS | Australasian Inter-service Incident Management System |
| ARI | Average Recurrence Interval (Years) |
| ALERT | Automated Local Evaluation in Real Time |
| AWRC | Australian Water Resources Council |
| BUREAU | Australian Government Bureau of Meteorology |
| CBRN | Chemical, Biological, Radiation or Nuclear |
| DCF | Dam Crest Flood |
| DSC | Dams Safety Committee |
| DSEP | Dam Safety Emergency Plan |
| DVR | Disaster Victim Registration |
| EMPLAN | Emergency Management Plan |
| FRNSW | Fire and Rescue NSW |
| GIS | Geographic Information System |
| GRN | Government Radio Network |
| IAP | Incident Action Plan |
| IFF | Imminent Failure Flood |
| LEMC | Local Emergency Management Committee |
| LEOCON | Local Emergency Operations Controller |
| LO | Liaison Officer |
| LGA | Local Government Area |
| MHL | Manly Hydraulics Laboratory |
| NOW | NSW Office of Water |

| | |
|----------------|---|
| NSW RFS | New South Wales Rural Fire Service |
| NSW SES | NSW State Emergency Service |
| NSW VRA | Volunteer Rescue Association |
| OEH | Office of Environment and Heritage (previously DECCW) |
| PMF | Probable Maximum Flood |
| PMR | Private Mobile Radio |
| PMP | Probable Maximum Precipitation |
| PIIC | Public Information and Inquiry Centre |
| REMC | Region Emergency Management Committee |
| REMO | Regional Emergency Management Officer |
| RMS | Roads and Maritime Services |
| RFS | Rural Fire Service |
| SEOCN | State Emergency Operations Controller |
| SERCON | State Emergency Recovery Controller |
| SEWS | Standard Emergency Warning Signal |
| SITREPs | Situation Reports |
| WICEN | Wireless Institute Civil Emergency Network |

GLOSSARY

Annual Exceedance Probability (AEP). The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood level (height) has an AEP of 5%, there is a 5% chance (that is, a one-in-20 chance) of such a level or higher occurring in any one year (see also Average Recurrence Interval).

Assistance Animal. A guide dog, a hearing assistance dog or any other animal trained to assist a person to alleviate the effect of a disability (Refer to Section 9 of the Disability Discrimination Act 1992).

Assembly Area. An assembly area is a designated location used for the assembly of emergency-affected persons before they move to temporary accommodation or a nominated evacuation centre. As such these areas do not provide welfare assistance nor are they used for long term sheltering or provision of meals. An assembly area may also be a prearranged, strategically placed area, where support response personnel, vehicles and other equipment can be held in readiness for use during an emergency.

Australian Height Datum (AHD). A common national surface level datum approximately corresponding to mean sea level.

Average Recurrence Interval (ARI). The long-term **average** number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods reaching a height as great as, or greater than, the 20 year ARI flood event will occur **on average** once every 20 years.

Catchment (River Basin). The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

Dambreak Study. A Dambreak Study is undertaken to determine the likely downstream inundation areas in case of a dam failure. Modelling is undertaken for a range of dam breach possibilities and design floods. The dambreak study includes information such as the extent of flooding, flood travel times and flood water velocities. The study can assist dam owners, regulators, and emergency agencies in the preparations of evacuation plans, dam break and other flood warning systems, and hazard classification of affected areas.

Dam Failure. The uncontrolled release of a water storage. The failure may consist of the collapse of the dam or some part of it, or excessive seepage or discharges. The most likely causes of dam failure are;

- **Flood Induced Dam Failure:** Dam failure caused by flood, either due to overtopping erosion or by subsequent structural failure.
- **Sunny Day Dam Failure:** Dam Failure as a result of factors other than flood i.e. other than flood flow into the reservoir. Causes of "Sunny Day" dam failure can include internal erosion, landslide, piping, earthquake or sabotage.

Dam Safety Emergency Plan (DSEP). A DSEP outlines the required actions of owners and their personnel at dams in response to a range of possible emergency situations. The NSW Dam Safety Committee requires a quality controlled DSEP, with associated dambreak warning procedures to be prepared for prescribed dams where persons may be at risk downstream, if the dam failed.

Design Flood (or Flood Standard). A flood of specified magnitude that is adopted for planning purposes. Selections should be based on an understanding of flood behaviour and the associated flood risk, and take account of social, economic and environmental considerations. There may be several design floods for an individual area.

Emergency Alert. The national telephone warning system used by emergency services to send voice messages to landlines and text messages to mobile phones within a defined area, about likely or actual emergencies.

EMPLAN (Emergency Management Plan). The Plan established in accordance with the provisions in the *State Emergency Rescue Management Act 1989*. The object of an EMPLAN is to ensure the coordinated response by all agencies having responsibilities and functions in emergencies.

Essential Services. Those services, often provided by local government authorities, that are considered essential to the life of organised communities. Such services include power, lighting, water, gas, sewerage and sanitation clearance.

Evacuation. The temporary movement of people from a dangerous or potentially dangerous place to a safe location, and their eventual return. It is a safety strategy which uses distance to separate people from the danger created by the hazard.

Evacuation Order. Notification to the community, authorised by the NSW SES, when the intent of an Incident Controller is to instruct a community to immediately evacuate in response to an imminent threat.

Evacuation Warning. Notification to the community, authorised by the NSW SES, when the intent of an Incident Controller is to warn a community of the need to prepare for a possible evacuation.

Flash Flooding. Flooding which is sudden and often unexpected because it is caused by sudden local or nearby heavy rainfall. It is sometimes defined as flooding which occurs within six hours of the rain that causes it.

Flood. Relatively high water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences, including Tsunami.

Flood Classifications. Locally defined flood levels used in flood warnings to give an indication of the severity of flooding (minor, moderate or major) expected. These levels are used by the State Emergency Service and the Australian Government Bureau of Meteorology in flood bulletins and flood warnings.

Flood Intelligence. The product of collecting, collating, analysing and interpreting flood-related data to produce meaningful information (intelligence) to allow for the timely preparation, planning and warning for and response to a flood.

Flood Fringe. The remaining area of flood prone land after floodway and flood storage have been defined.

Flood Liable Land (also referred to as Flood Prone Land). Land susceptible to flooding by the Probable Maximum Flood (PMF) event. This term also describes the maximum extent of a **floodplain** which is an area of a river valley, adjacent to the river channel, which is subject to inundation in floods up to this event.

Flood of Record. Maximum observed historical flood.

Floodplain. Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is, flood prone land (2).

Floodplain Management Plan. A plan developed in accordance with the principles and guidelines in the New South Wales Floodplain Development Manual. Such a plan usually includes both written and diagrammatic information describing how particular areas of flood prone land can be used and managed to achieve defined objectives.

Flood Plan. A response strategy plan that deals specifically with flooding and is a sub-plan of an Emergency Management Plan. Flood plans describe agreed roles, responsibilities, functions, strategies and management arrangements for the conduct of flood operations and for preparing for them. A flood plan contains information and arrangements for all floods whereas an IAP is for a specific flood/event.

Flood Rescue. The rescue or retrieval of persons trapped by floodwaters.

Flood Storage Areas. Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation.

Floodway. An area where a significant volume of water flows during floods. Such areas are often aligned with obvious naturally-defined channels and are areas that, if partially blocked, would cause a significant redistribution of flood flow which may in turn adversely affect other areas. They are often, but not necessarily, the areas of deeper flow or the areas where higher velocities occur.

Flood Watch. A Flood Watch is a notification of the potential for a flood to occur as a result of a developing weather situation and consists of short generalised statements about the developing weather including forecast rainfall totals, description of catchment conditions and indicates streams at risk. The Bureau will also attempt to estimate the magnitude of likely flooding in terms of the adopted flood classifications. Flood Watches are normally issued 24 to 36 hours in advance of likely flooding. Flood watches are issued on a catchment wide basis.

Flood Warning. A Flood Warning is a gauge specific forecast of actual or imminent flooding. Flood Warnings specify the river valley, the locations expected to be flooded, the likely severity of flooding and when it will occur.

Functional Area. A category of services involved in the preparations for an emergency, including the following:

- Agriculture and Animal Services;
- Energy and Utility Services;
- Engineering Services;
- Environmental Services;
- Health Services;
- Public Information Services;
- Telecommunication Services;
- Transport Services; and
- Welfare Services.

Geographic Information System (GIS). A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analysing, and displaying all forms of geographically referenced information.

Incident Controller. The individual responsible for the management of all incident control activities across a whole incident (3).

Incident Action Plan (IAP). An action plan for managing a specific event. Information from the Local Flood Plan is used to develop the flood IAP.

Indirect Effect. Indirect effects are generally a consequence of infrastructure damage or interruption of services and can affect communities distant from the actual flood footprint i.e. floodplain. Indirect effects can also refer to indirect losses due to disruption of economic activity, both in areas which are inundated or isolated. Indirect effects are one of the three primary sources of risk in the context of flooding (the other two are inundation and isolation).

Inundation. See definition for Flood.

Isolation. Properties and/or communities where flooding cuts access to essential services or means of supply. Isolation is one of the three primary sources of risk in the context of flooding (the other two are inundation and indirect effects).

Liaison Officer (LO). A person, nominated or appointed by an organisation or functional area, to represent that organisation or functional area at a control centre, emergency operations centre, or coordination centre. A liaison officer maintains communications with and conveys directions/requests to their organisation or functional area, and provides advice on the status, capabilities, actions and requirements of their organisation or functional area (3).

Local Emergency Management Committee (LEMC). The LEMC is responsible for the preparation of plans in relation to the prevention of, preparation for, response to and recovery from emergencies in the local government area for which it is constituted. In the exercise of its functions, the Committee is responsible to the Region Emergency Management Committee (REMC) and may communicate with the REMC for matters associated with Functional Areas that are not represented at the local Level.

Local Overland Flooding. Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.

Major Flooding. Flooding which causes inundation of extensive rural areas, with properties, villages and towns isolated and/or appreciable urban areas flooded.

Minor Flooding. Flooding which causes inconvenience such as closing of minor roads and the submergence of low-level bridges. The lower limit of this class of flooding, on the reference gauge, is the initial flood level at which landholders and/or townspeople begin to be affected in a significant manner that necessitates the

issuing of a public flood warning by the Australian Government Bureau of Meteorology.

Moderate Flooding. Flooding which inundates low-lying areas, requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered.

Moveable Dwellings. Any tent, or any caravan or other van or other portable device (whether on wheels or not), used for human habitation; or a manufactured home; or any conveyance, structure or thing of a class or description prescribed by the (Local Government) regulations (4).

Operational Area Commander. The individual commanding an operational area. An Operational Area Command may be established for an area with multiple incident management teams functioning, and can cross local government and NSW SES Region boundaries.

Peak Height. The highest level reached, at a nominated gauging station, during a particular flood event.

Prescribed Dam. "Prescribed" dams are those listed in Schedule 1 of the Dams Safety Act 1978. The NSW Dam Safety Committee will prescribe those dams with the potential for a failure which could have a significant adverse effect on community interests.

Probable Maximum Flood (PMF). The largest flood that could conceivably be expected to occur at a particular location, usually estimated from probable maximum precipitation. The PMF defines the maximum extent of flood prone land, that is, the floodplain. It is difficult to define a meaningful Annual Exceedance Probability for the PMF, but it is commonly assumed to be of the order of 10^4 to 10^7 (once in 10,000 to 10,000,000 years).

Riverine Flooding. Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam. Riverine flooding generally excludes watercourses constructed with pipes or artificial channels considered as stormwater channels (1).

Runoff. The amount of rainfall which ends up as stream flow, also known as 'rainfall excess' since it is the amount remaining after accounting for other processes such as evaporation and infiltration.

Stage Height. A level reached, at a nominated gauging station, during the development of a particular flood event.

Stream Gauging Station. A place on a river or stream at which the stage height is routinely measured, either daily or continuously, and where the discharge is measured from

time to time so as to develop a relationship between stage and discharge or rating curve.

Total Flood Warning System. A flood warning system is made up of components which must be integrated if the system is to operate effectively. Components of the total flood warning system include monitoring rainfall and river flows, prediction, interpretation of the likely impacts, construction and dissemination of warning messages, response by agencies and community members, and review of the warning system after flood events (5).

PART 1 - INTRODUCTION

1.1 PURPOSE

- 1.1.1 This plan covers preparedness measures, the conduct of response operations and the coordination of immediate recovery measures from flooding within the Snowy Monaro Regional LGA. It covers operations for all levels of flooding within the council area.

1.2 AUTHORITY

- 1.2.1 This plan is issued under the authority of the *State Emergency and Rescue Management Act 1989* (NSW) and the *State Emergency Service Act 1989* (NSW). It has been approved by the NSW SES Snowy Monaro Local Controller/s and the NSW SES Southern Highlands Region Controller as a NSW SES plan and endorsed by the Snowy Monaro Regional Local Emergency Management Committee as a sub plan of the Local EMPLAN.

1.3 AREA COVERED BY THE PLAN

- 1.3.1 The area covered by the plan is the Snowy Monaro Regional LGA which includes:
- a. **Bombala Area:** the townships of Bombala and Delegate, villages and closely settled areas of Ando, Bibbenluke, Bungarby, Cathcart, Craigie, Creewah, Currowidgin, Merriangaa, Mila and Rockton and rural properties. The majority of the area covered by the Shire eventually drains into the Snowy River. Tributaries include those of the Ashton Creek, Bombala River, Cambalong Creek, Coolumbooka River, Currawong Creek, Delegate River, Little Plains River, Maclaughlin River, Parsonage Creek, Sandy Creek, Saucy Creek and Tombong Creek. The exception is a small area in the southern part of the Shire which drains into the Genoa River.
 - b. **Cooma Monaro Area:** the townships and villages of Cooma, Bredbo, Jerangle, Michelago, Nimmitabel and Numeralla. The area covers the lower reaches of Cooma Creek and Cooma Back Creek, Numeralla River and its tributaries including Rock Flat Creek, Tom Groggins Creek, Kybeyan River and Big Badja River, Bredbo River and its tributaries, Ryries Creek, the Murrumbidgee River from its source downstream to the vicinity of Smiths Road, north of Michelago and Maclaughlin River to the crossing on the Old Bombala Road south of Nimmitabel.
 - c. **Snowy River Area:** the townships and villages of Adamidaby, Berridale, Dalgety, and Jindabyne. There is also the Ski Resort villages of Perrisher Valley and Thredbo which increase markedly in population during the Winter months. The Snowy River area is nestled in the western section of the new Snowy Monaro Regional LGA. There are

two Alpine Lakes in the area being Lake Eucumbene near Adamidaby, and Lake Jindabyne at Jindabyne. The main tributaries to the Snowy River in this area are the Eucumbene River and Thredbo River which join the Snowy River at Jindabyne.

- 1.3.2 The council area and its principal rivers and creeks are shown in Attachment 3.
- 1.3.3 The council area is in the NSW SES Southern Highlands Region and for emergency management purposes is part of the Monaro Emergency Management Region.

1.4 DESCRIPTION OF FLOODING AND ITS EFFECTS

- 1.4.1 The NSW SES maintains information on the nature of flooding and effects of flooding on the community in the Snowy Monaro Regional LGA.

1.5 RESPONSIBILITIES

- 1.5.1 The general responsibilities of emergency service organisations and supporting services (functional areas) are listed in the State Emergency Management Plan (EMPLAN). Some specific responsibilities are expanded upon in the following paragraphs. The extent of their implementation will depend on the severity of the flooding.
- 1.5.2 **NSW SES Snowy Monaro Local Controller/s.** The NSW SES Snowy Monaro Local Controller/s is/are responsible for dealing with floods as detailed in the State Flood Plan, and will;

Preparedness

- a. Maintain a Local Headquarters at the Waterworks, Cathcart Road, Bombala in accordance with the NSW SES Controllers' Guide and the NSW SES Operations Manual.
- b. Maintain a Local Headquarters at Geebung Street, Polo Flat in accordance with the NSW SES Controllers' Guide and the NSW SES Operations Manual.
- c. Maintain a Local Headquarters at Lee Avenue, South Jindabyne in accordance with the NSW SES Controllers' Guide and the NSW SES Operations Manual.
- d. Ensure that NSW SES members are trained to undertake operations in accordance with current service policy, procedures and guidelines.
- e. Coordinate the development and operation of a flood warning service for the community.
- f. Participate in floodplain risk management initiatives organised by the Snowy Monaro Regional Council.

- g. Coordinate a community engagement and capacity building program regarding local flood issues and associated risks to assist communities in building resilience to floods.
- h. Identify and monitor people and/or communities at risk of flooding.
- i. Ensure that the currency of this plan is maintained.

Response

- j. Appoint an appropriate Incident Controller to undertake response roles. The Incident Controller will;
 - Control flood and storm response operations. This includes;
 - Directing the activities of the NSW SES units operating within the council area.
 - Coordinating the activities of supporting agencies and organisations and ensuring that liaison is established with them.
 - Contribute to preparation of Region IAP.
 - Coordinate the provision of information services in relation to;
 - Flood heights and flood behaviour.
 - Road conditions and closures.
 - Advice on methods of limiting property damage.
 - Confirmation of evacuation warnings and evacuation orders.
 - Direct the conduct of flood rescue operations.
 - Coordinate the provision of the evacuation of people and/or communities.
 - Provide immediate welfare support for evacuated people.
 - Coordinate the provision of emergency food and medical supplies to isolated people and/or communities.
 - Coordinate operations to assist the community to protect property. This may include;
 - Arranging resources for sandbagging operations.
 - Lifting or moving household furniture.
 - Lifting or moving commercial stock and equipment.
 - Where possible, arrange for support (for example, accommodation and meals) for emergency service organisation members and volunteers assisting them.
 - Ensure that the managers of caravan parks are advised of flood warnings and the details of any evacuation order.
 - If NSW SES resources are available, assist with emergency fodder supply operations conducted by Agriculture and Animal Services.

- If NSW SES resources are available, assist the NSW Police Force, RMS and Council with road closure and traffic control operations.
- Exercise financial delegations relating to the use of emergency orders as set out in NSW SES Policies and Procedures.
- Coordinate the collection of flood information for development of intelligence.
- Submit Situation Reports to the NSW SES Southern Highlands Region Headquarters and agencies assisting within the council area. These should contain information on;
 - Road conditions and closures.
 - Current flood behaviour.
 - Current operational activities.
 - Likely future flood behaviour.
 - Likely future operational activities.
 - Probable resource needs.
- Keep the Local Emergency Operations Controller advised of the flood situation and the operational response.
- Issue the 'All Clear' when flood operations have been completed.

Recovery

- k. Ensure that appropriate After Action Reviews are held after floods.
- l. Provide appropriate representation to the recovery committee for the duration of the response phase of an event and as agreed during the recovery phase.

1.5.3 NSW SES Nimmitabel Unit Controller

- a. Assist the NSW SES Snowy Monaro Local Controller/s with flood preparedness activities, including;
 - Flood planning.
 - Training of unit members.
 - The development of flood intelligence.
 - The development of warning services.
 - Floodplain risk management initiatives.
 - Community engagement and capacity building.
- b. Conduct flood operations within the Snowy Monaro Regional LGA as directed by the NSW SES Incident Controller.
- c. Submit Situation Reports to the NSW SES Snowy Monaro Local Headquarters, the NSW SES Southern Highlands Region Headquarters and agencies assisting within the local area.

1.5.4 **NSW SES Bombala, Cooma Monaro, Nimmitabel and Snowy River Unit Members**

- a. Carry out flood response tasks. These may include;
 - The management of the NSW SES Bombala, Cooma Monaro and Snowy River Local and Unit Headquarters Operations Centres.
 - Assist in the collection of flood information for the development of intelligence.
 - Flood rescue.
 - Evacuation.
 - Providing immediate welfare for evacuated people.
 - Delivery of warnings and information.
 - Resupply.
 - Sandbagging.
 - Lifting and/or moving household furniture and commercial stock.
 - Animal rescue.
 - Assisting with road closure and traffic control operations.
 - Assisting with emergency fodder supply operations.
- b. Assist with preparedness activities.
- c. Undertake training in flood and storm response operations.

1.5.5 **Snowy Monaro Regional Local Emergency Operations Controller (LEOCON)**

- a. Monitor flood operations.
- b. Request and coordinate support to the NSW SES Snowy Monaro Incident Controller if requested to do so.

1.5.6 **Snowy Monaro Regional Local Emergency Management Officer**

- a. Provide executive support to the LEMC and LEOCON in accordance with the Snowy Monaro Regional Local Emergency Management Plan.
- b. At the request of the NSW SES Snowy Monaro Local Controller/s, advise appropriate agencies and officers of the start of response operations.

1.5.7 **Snowy Monaro Regional Council**

Preparedness

- a. Develop and implement floodplain risk management plans in accordance with the NSW Government's Flood Prone Land Policy and the Floodplain Development Manual.
- b. Establish and maintain floodplain risk management committees and ensure that key agencies are represented on such committees.

- c. Provide levee studies, flood studies, floodplain management studies to the NSW SES.
- d. Maintain a Dam Safety Emergency Plan for the Delegate Flood Retarding Basin and provide copies to the NSW SES.
- e. The Lake Wallace Dam Project is due for completion in approximately 2017. The Dam is to be located six kilometres South of Nimmitabel Township. Further details such as Dam Safety Emergency Plans must be provided to the NSW SES once developed.
- f. Provide information on the consequences of dam failure to the NSW SES for incorporation into planning and flood intelligence.
- g. Maintain a plant and equipment resource list for the council area.
- h. Work with NSW SES on the development and implementation of a community engagement and capacity building program.

Response

- i. At the request of the NSW SES Incident Controller, deploy personnel and resources for flood related activities.
- j. Close and reopen council roads (and other roads nominated by agreement with the RMS) and advise the NSW SES Incident Controller and the Police.
- k. Close (and reopen) the following causeways in Cooma Township when they are overtopped or in flood, and advise the NSW SES Snowy Monaro Local Controller/s and the Police:
 - Commissioner Street
 - Massie Street
 - Barrack Street
 - Mulach Street (near Lambie Street)
- l. Provide information on the status of roads.
- m. Provide filled sandbags to urban and village areas in which flooding is expected.
- n. Assist with the removal of caravans from caravan parks.
- o. Provide back-up radio communications.
- p. In the event of evacuations, assist with making facilities available for the domestic pets and companion animals of evacuees.

Recovery

- q. Provide for the management of health hazards associated with flooding. This includes removing debris and waste.
- r. Ensure premises are fit and safe for reoccupation and assess any need for demolition.

- s. Arrange for storage of evacuees' furniture as required.

1.5.8 **Community Members**

Preparedness

- a. Understanding the potential risk and impact of flooding;
- b. Preparing homes and property to reduce the impact of flooding;
- c. Understanding warnings and other triggers for action and the safest actions to take in a flood;
- d. Households, institutions and businesses developing plans to manage flood risks, sharing and practicing this with family, friends, employees and neighbours;
- e. Having an emergency kit;
- f. Being involved in local emergency planning processes.

1.5.9 **Agriculture and Animal Services Functional Area**

- a. When requested by NSW SES;
 - Activate the Agriculture and Animal Services Supporting Plan as required and coordinate the provision of required services which may include;
 - Co-ordinate response for all animals including pets, livestock and wildlife.
 - Supply and delivery of emergency fodder.
 - Emergency water replacement in certain circumstances.
 - Coordinate the management of livestock and farm animals.
 - Advice on dealing with dead and injured farm animals.
 - Financial, welfare and damage assessment assistance to flood affected farmers.
 - Co-ordinate the establishment of animal shelter facilities for the domestic pets and companion animals of evacuees.

1.5.10 **The New South Wales Ambulance**

- a. Assist with the evacuation of at risk communities (in particular elderly and/or infirm people).
- b. Deploy ambulance resources to appropriate locations if access is expected to be lost.
- c. Assist the NSW SES with flood rescue operations.

1.5.11 **Australian Government Bureau of Meteorology (The Bureau)**

- a. Provide Flood Watches for the East Gippsland, Snowy and Murrumbidgee River Basins.
- b. Provide Flood Warnings, incorporating height-time predictions, for Bombala Town Gauge (222019).

- c. Provide severe weather warnings when flash flooding is likely to occur.

1.5.12 Caravan Park Proprietor(s)

- a. Prepare a flood emergency plan for the Caravan Park.
- b. Ensure that owners and occupiers movable dwellings are aware that the caravan park is flood liable by;
 - Providing a written notice to occupiers taking up residence. The notice will indicate that the caravan park is liable to flooding and designate the location of flood liable land within the park.
 - Displaying this notice and the emergency arrangements for the Caravan Park prominently in the park.
- c. Ensure that owners and occupiers of movable dwellings are aware that if they are expecting to be absent for extended periods, they should:
 - Provide the manager of the caravan park with a contact address and telephone number in case of an emergency.
 - Leave any movable dwelling in a condition allowing it to be relocated in an emergency (i.e.: should ensure that the wheels, axles and draw bar of the caravans are not removed, and are maintained in proper working order) (6).
- d. Ensure that occupiers are informed of Flood Information. At this time, occupiers should be advised to;
 - Ensure that they have spare batteries for their radios.
 - Listen to a local radio station for updated flood information.
 - Prepare for evacuation and movable dwelling relocation.
- e. Ensure that owners and occupiers of caravans are aware of what they must do to facilitate evacuation and movable dwelling relocation when flooding occurs.
- f. Coordinate the evacuation of people and the relocation of movable dwellings when floods are rising and their return when flood waters have subsided. Movable dwellings will be relocated back to the caravan park(s) by owners or by vehicles and drivers arranged by the park managers.
- g. Secure any movable dwellings that are not able to be relocated to prevent floatation.
- h. Inform the NSW SES of the progress of evacuation and/or movable dwellings relocation operations and of any need for assistance in the conduct of these tasks.

1.5.13 Child Care Centres and Preschools

- a. Childcare Centres are to be contacted by the NSW SES in the event of possible flooding or isolation.

- b. When notified the child care centres and preschools should;
 - Liaise with the NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures.
 - Assist with coordinating the evacuation of preschools and child care centres.

1.5.14 Energy and Utility Services Functional Area

- a. When requested by NSW SES;
 - Implement the Energy and Utilities Services Functional Area Supporting Plan.
 - Where required, coordinate energy and utility services emergency management planning, preparation, response and recovery, including the restoration of services following a flood event.
 - Coordinate advice to the NSW SES of any need to disconnect electricity, gas, water or wastewater services.
 - Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.
 - Identify interdependencies between flooding and utility services due to secondary impacts of flooding and advise the NSW SES.
 - Assist the NSW SES with advisory notices relating to hazards from utility services during flooding.
 - Coordinate with utilities on restoration of services, including advisory notices relating to estimated time for restoration and mandatory safety checks prior to reconnection. Advise the NSW SES and the relevant recovery committee and coordinator of the timetable for restoration.
- b. Local utility service distribution providers (electricity, gas, water, waste water):
 - Provide advice to the NSW SES Snowy Monaro Local Controller/s of any need to disconnect power/gas/water/waste water supplies or of any timetable for reconnection.
 - Advise the NSW SES of any hazards from utility services during flooding.
 - Advise the public with regard to electrical hazards during flooding and to the availability or otherwise of the electricity supply.
 - Clear or make safe any hazard caused by power lines or electricity distribution equipment.
 - Reconnect customers' electrical/ gas/ water/waste water installations, when certified safe to do so and as conditions allow.

- Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.

1.5.15 **Engineering Services Functional Area**

- a. When requested by NSW SES;
 - Provide engineering advice regarding the integrity of damaged structures.
 - Assist the NSW SES with damage assessment.
 - Acquire and/or provide specialist technical engineering expertise.
 - Assist the NSW SES and councils with the assessment and operation of flood protection levees when requested.
 - Assist with property protection, including the construction or repair of levees.
 - Coordinate the restoration of critical public facilities.
- b. When requested by the Recovery Coordinator:
 - Establish Recovery Centres by the procurement and fit-out of suitable properties.

1.5.16 **Environmental Services Functional Area**

- a. When requested by NSW SES;
 - Implement the Environmental Services Functional Area (Enviroplan) Supporting Plan if required.

1.5.17 **Fire and Rescue NSW, Bombala, Cooma, Jindabyne**

- a. FRNSW responsibilities are primarily confined to the FRNSW Fire District. Any deployment of FRNSW resources to assist NSW SES in flood events rests with the respective FRNSW Commander which must be a Senior Officer.
- b. The FRNSW Commander will assess the capability of FRNSW to assist NSW SES in the following tasks:
 - Assist the NSW SES with the warning and/or evacuation of at risk communities.
 - Assist the NSW SES with the monitoring / reconnaissance of flood prone areas.
 - Assist the NSW SES with the resupply of isolated communities and/or properties.
 - Assist the NSW SES with property protection tasks including sandbagging.
 - Provide resources for pumping flood water out of buildings and from low-lying areas.

- Assist with clean-up operations, including the hosing out of flood affected properties.
 - Coordinate the deployment of fire resources to communities within Fire and Rescue NSW fire districts if access is expected to be lost in consultation with the NSW SES.
- c. FRNSW will use its best endeavours to deploy appliances and or resources into locations where access is expected to be lost.
- 1.5.18 Forestry Corporation of NSW
- a. Close and evacuate at risk camping grounds in State Forest managed areas.
 - b. Close and reopen Forestry Corporation of NSW roads when affected by flood waters and advise the NSW SES of its status.
 - c. Facilitate the safe reliable access of emergency resources on Forestry Corporation managed roads.
 - d. Assist the NSW SES with identification of road infrastructure at risk of flooding.
 - e. Manage traffic in Forestry Corporation of NSW roads.
 - f. Assist the NSW SES with the communication of warnings and information provision to the public through variable message signs and other appropriate means.
- 1.5.19 **Health Services Functional Area**
- a. When requested by NSW SES;
 - Activate Healthplan if required.
 - Ensure that appropriate business continuity plans are developed for essential health infrastructure and are activated during floods.
 - Provide medical support to the NSW SES.
 - Establish health surveillance in affected areas.
 - Assess potential public health risks that either acutely endanger the health of human populations or are thought to have longer term consequences.
 - Provide environmental health advice.
 - Provide public health warnings and advice to affected communities.
 - Provide psychological counselling support to the community and emergency response workers impacted, via NSW Health Mental Health Division.
 - Assist the NSW SES with the warning and coordination of evacuation of public hospitals, private hospitals and residential aged care facilities.

- Undertake vulnerable persons assessment for mental health and drug and alcohol dependant persons, dialysis, community health clients and oxygen dependant persons in the community, known to the health service.

1.5.20 **NSW Office of Water**

- a. Collect and maintain flood data including data relating to flood heights, velocities and discharges.
- b. Provide the Bureau of Meteorology and NSW SES real-time or near real-time access to river height gauges and height data for the development of official flood warnings.
- c. Provide flow rating charts for river height gauges.
- d. Manage (with technical support from OEH) the approval process under the Water Act 1912 and Water Management Act 2000 for flood control works (earthworks, embankments and levees which can affect the distribution of floodwaters) including;
 - Assessment and approval of flood control works (including flood mitigation works) in rural areas designated under the Acts.
 - Use of floodplain management plans prepared by OEH in rural areas designated under the Acts to assess flood control work approvals.
 - Giving the NSW SES access to relevant studies regarding flooding and studies supporting floodplain management plans prepared by OEH including flood studies, floodplain risk management studies and flood behaviour investigations.

1.5.21 **NSW Police Force, Monaro Local Area Command (LAC)**

- a. Assist the NSW SES with the delivery of evacuation warnings and evacuation orders.
- b. Assist the NSW SES with the conduct of evacuation operations.
- c. Conduct road and traffic control operations in conjunction with council and/or RMS.
- d. Coordinate the registration of evacuees.
- e. Secure evacuated areas.

1.5.22 **NSW Rural Fire Service (RFS Monaro)**

- a. Provide personnel in rural areas and villages to;
 - Inform the NSW SES Snowy Monaro Local Controller/s about flood conditions and response needs in their own communities, and
 - Disseminate flood information.
- b. Provide personnel and high-clearance vehicles for flood related activities.

- c. Assist the NSW SES with the delivery of evacuation warnings and evacuation orders.
- d. Assist the NSW SES with the conduct of evacuations.
- e. Provide equipment for pumping flood water out of buildings and from low-lying areas.
- f. Assist with the removal of caravans.
- g. Provide back-up radio communications.
- h. Assist with clean-up operations, including the hosing of flood affected properties.
- i. Deploy fire resources to appropriate locations if access is expected to be lost.

1.5.23 NSW Volunteer Rescue Association (VRA)

- a. Assist the NSW SES Snowy Monaro Local Controller/s with flood operations, where equipment and training are suitable.

1.5.24 Office of Environment and Heritage

- a. Assist the NSW SES gain access to relevant studies regarding flooding, including Flood Studies and Floodplain Risk Management Studies undertaken under the Floodplain Management Program.
- b. Assist the NSW SES in obtaining required outputs (Section 3.1.4) from Flood Studies and Floodplain Risk Management Studies under the Floodplain Management Program which assist the NSW SES in effective emergency response planning and incorporating information into the NSW Floods Database.
- c. Coordinate the collection of post event flood data, in consultation with the NSW SES.
- d. Provide specialist advice to the NSW SES on flood related matters on;
 - The identification of flood risks.
 - Conditions which may lead to coastal flooding or retarded river drainage near the coast.
- e. Collect and maintain flood data relating to flood heights, velocities and discharges in coastal areas of NSW (through a contract with MHL as discussed separately).
- f. Provide data to the Bureau of Meteorology and NSW SES real-time or near real-time access to river height gauges and height data for the development of official flood warnings (through a contract with MHL as described in the Response section of this plan).
- g. Assist the NSW SES in the exercising of this Flood Sub Plan.

h. Parks and Wildlife Service

- Close and reopen Parks and Wildlife Service roads when affected by flood waters and advise the NSW SES of its status.
- Facilitate the safe reliable access of emergency resources on National Parks and Wildlife Service managed roads.
- Assist the NSW SES with identification of road infrastructure at risk of flooding.
- Manage traffic on Parks and Wildlife Service roads.
- Assist the NSW SES with the communication of warnings and information provision to the public through variable message signs and other appropriate means.

1.5.25 Owners of Prescribed Dams within or upstream of Snowy Monaro Regional LGA

| Dam | Owner |
|------------------------|-------------------------------------|
| Cowarra Creek Tailings | DPI - Lands, Department of Industry |
| Eucumbene | Snowy Hydro Limited |
| Guthega | Snowy Hydro Limited |
| Island Bend | Snowy Hydro Limited |
| Jindabyne | Snowy Hydro Limited |
| Tantangra Dam | Snowy Hydro Limited |

- a. Maintain and operate the Dam Failure Warning System for their Dam(s).
- b. Contribute to the development and implementation of community engagement and capacity building programs on flooding.
- c. Consult with NSW SES on the determination of dam failure alert levels and notification arrangements when developing Dam Safety Emergency Plans.
- d. Maintain a Dam Safety Emergency Plan and provide copies to the NSW SES.
- e. Provide information on the consequences of dam failure to the NSW SES for incorporation into planning and flood intelligence.
- f. Close and evacuate at risk camping grounds/recreational areas within their managed areas.

1.5.26 Public Information Services Functional Area

- a. When requested by NSW SES;
 - Assist the NSW SES in the establishment and operation of a Joint Media Information Centre.

1.5.27 Roads and Maritime Services

- a. Manage traffic on state roads, state highways and waterways affected by flood waters and advise the NSW SES of their status including the Monaro Highway.
- b. Facilitate the safe reliable access of emergency resources on RMS managed roads.
- c. Assist the NSW SES with identification of road infrastructure at risk of flooding.
- d. Assist in Traffic management associated with evacuations where necessary.
- e. Enter state road closure information into the Live Traffic site.
- f. Assist the NSW SES and local councils with the communication of warnings and information provision to the public through variable message signs.
- g. Cooperate with the Southern Highlands Region Transport Services Functional Area Coordinator.

1.5.28 School Administration Offices (including Catholic Education Office Archdioceses of Canberra and Goulburn, Department of Education NSW District Office and Private Schools)

- a. Liaise with the NSW SES and arrange for the early release of students whose travel arrangements are likely to be disrupted by flooding and/or road closures (or where required, for students to be moved to a suitable location until normal school closing time).
- b. Pass information to school bus drivers/companies and/or other schools on expected or actual impacts of flooding.
- c. Assist with coordinating the evacuation of schools when flooding or isolation is expected to occur.
- d. Provide space in schools for evacuation centres where necessary.

1.5.29 Service and Sporting Clubs - Rotary, Lions, Catholic Ladies and RSL Clubs

- a. Assist with;
 - Delivery of evacuation warnings.
 - Conduct of evacuations.
 - Lifting and/or moving household furniture and commercial stock.
 - Sandbagging.
 - Monitoring of levees.
 - Relocation of caravans.

1.5.30 Telecommunication Services Functional Area

- a. When requested by NSW SES;

- Coordinate the restoration of telephone facilities damaged by flooding.
- Assist the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.

1.5.31 The Southern Highlands Region Transport Services Functional Area Coordinator (TSFAC)

- a. The TSFAC will assist NSW SES, emergency services and other functional areas through the provision of traffic and transport operations as consistent with the roles of Transport organisations, including;
- The movement of emergency equipment and personnel.
 - The movement of emergency supplies and goods, including water, fuel and food.
 - The evacuation of people and animals.
 - Assistance for medical transport.
 - Transportation of animals and infectious material/dangerous goods.
 - Maintaining and operating a transport route advisory service to the NSW SES, emergency services organisations and other Functional Areas and members of the community.
 - Coordinate the provision of traffic and transport operations as consistent with the roles of Transport organisations.

1.5.32 NSW Train Link, Sydney Trains, and Country Link

- a. Operate NSW rail services (and/or Coach Services) through the Snowy Monaro Region including the management of services affected by flood waters and advise the NSW SES.
- b. Assist the NSW SES with the movement or evacuation of people during flood response operations if required.
- c. Convey flood information and flood warnings to passengers and travellers on NSW Train Link, Sydney Trains, and Country Link services.
- d. Cooperate with, and assist the NSW SES Local Controller/s in relation to public safety during flood emergencies.
- e. Cooperate with the Southern Highlands Region Transport Services Functional Area Coordinator.

1.5.33 Welfare Services Functional Area

- a. When requested by NSW SES;
- Establish and manage evacuation centres, and provide disaster welfare services from recovery centres.

- Administer the Personal Hardship and Distress component of the NSW Disaster Relief Scheme established to provide financial assistance to people affected by emergencies.

1.5.34 Snowy Monaro Regional Council Community Services (Aboriginal Communities)

- a. Act as the point of contact between the NSW SES and the Ngarigo and Walgalu communities if required. These communities are not in one locality, but spread throughout the LGA. General communication channels should suffice, but notification to Council may also assist.
- b. Inform the NSW SES Bombala, Cooma Monaro and Snowy River Local Controllers about flood conditions and response needs.
- c. Disseminate flood information, including flood and evacuation warnings, to the Ngarigo and Walgalu communities if required.

1.5.35 Church Road Rural Network

- a. Provide flood information to the NSW SES Snowy Monaro Local Controller/s.
- b. Distribute flood warnings and flood information provided by the NSW SES Snowy Monaro Local Controller/s.

1.6 CROSS- BOUNDARY ASSISTANCE ARRANGEMENTS

- 1.6.1 A local cross-boundary mutual assistance arrangement exists in which the NSW SES Cooma Monaro Unit and the NSW SES Queanbeyan Unit will deploy resources to support each other.
- 1.6.2 Operations along and north of Michelago Creek and to the West of the Queanbeyan River within the Cooma Monaro Unit area, will be conducted by the NSW SES Queanbeyan Unit.
- 1.6.3 Operations along Smith's Road within the Cooma Monaro Unit area, (near 'The Angle' NSW) are conducted by NSW SES Queanbeyan Unit due to closer proximity.

PART 2 - PREPAREDNESS

2.1 MAINTENANCE OF THIS PLAN

- 2.1.1 The NSW SES Snowy Monaro Local Controller/s will maintain the currency of this plan by;
- a. Ensuring that all agencies, organisations and officers mentioned in it are aware of their roles and responsibilities.
 - b. Conducting exercises to test arrangements.
 - c. Reviewing the contents of the plan;
 - After each flood operation.
 - When significant changes in land-use or community characteristics occur.
 - When new information from flood studies become available.
 - When flood control or mitigation works are implemented or altered.
 - When there are changes that alter agreed plan arrangements.
- 2.1.2 The plan is to be reviewed no less frequently than every five years.

2.2 FLOODPLAIN RISK MANAGEMENT

- 2.2.1 The NSW SES Snowy Monaro Local Controller/s will ensure that;
- a. NSW SES participates in local floodplain risk management committee activities when those committees are formed, in accordance with the protocols outlined in the NSW SES Controllers' Guide.
 - b. The NSW SES Southern Highlands Region Headquarters is informed of involvement in floodplain risk management activities.

2.3 DEVELOPMENT OF FLOOD INTELLIGENCE

- 2.3.1 Flood intelligence describes flood behaviour and its effects on the community.
- 2.3.2 The NSW SES maintains a centralised flood intelligence system.

2.4 DEVELOPMENT OF WARNING SYSTEMS

- 2.4.1 The NSW SES establishes total flood warning systems for areas affected by flooding. This requires;
- a. An identification of the potential clients of flood warning information at different levels of flooding (i.e. who would be affected in floods of differing severities).
 - b. Available information about the estimated impacts of flooding at different heights.

- c. Identification of required actions and the amounts of time needed to carry them out.
 - d. Appropriate means of disseminating warnings to different clients and at different flood levels.
- 2.4.2 Council and the Bureau have installed hardware and software to monitor water levels in the Cooma Creek and Cooma Back Creek catchments. Data informs Flood Warnings issued by the Bureau and is provided to the NSW SES.

2.5 COMMUNITY RESILIENCE

- 2.5.1 The community needs to be as prepared as emergency agencies for the impact of all hazards (5), including flooding.
- 2.5.2 As the combat agency, NSW SES has the primary responsibility for the collation, assessment and public dissemination of information relating to flooding (3). To do this, NSW SES will require assistance from other agencies, particularly local government councils, dam owners, and the Bureau in the development and delivery of materials.
- 2.5.3 The NSW SES Snowy Monaro Local Controller/s, with the assistance of the Snowy Monaro Regional Council, the NSW SES Southern Highlands Region Headquarters and NSW SES State Headquarters, is responsible for the collation, assessment and public dissemination of information relating to flooding (3).
- 2.5.4 A range of tailored strategies to be employed with NSW communities include:
- a. Dissemination of flood-related brochures and booklets in flood liable areas.
 - b. Talks and displays orientated to at-risk groups, community organisations, businesses and schools.
 - c. Publicity given to this plan and to flood-orientated NSW SES activities through local media outlets, including articles in local newspapers about the flood threat and appropriate responses.

2.6 TRAINING

- 2.6.1 Throughout this document there are references to functions that must be carried out by the members of the NSW SES Bombala, Cooma, Nimmitabel and Snowy River Units. The NSW SES Snowy Monaro Local Controller/s is responsible for ensuring that the members are;
- a. Familiar with the contents of this plan.
 - b. Trained in the skills necessary to carry out the tasks allocated to the NSW SES.

2.7 RESOURCES

- 2.7.1 The NSW SES Snowy Monaro Local Controller/s is responsible for maintaining the condition and state of readiness of NSW SES equipment and the NSW SES Bombala, Cooma Monaro and Snowy River Local Headquarters.
- 2.7.2 The NSW SES Nimmitabel Unit Controller has similar responsibilities in relation to the Nimmitabel Unit Headquarters and equipment.
- 2.7.3 The NSW SES Bombala Unit Controller has similar responsibilities in relation to the Bombala Unit Headquarters and equipment.
- 2.7.4 The NSW SES Snowy River Unit Controller has similar responsibilities in relation to the Snowy River Unit Headquarters and equipment.
- 2.7.5 The NSW SES Cooma Monaro Unit Controller has similar responsibilities in relation to the Cooma Monaro Unit Headquarters and equipment.

PART 3 - RESPONSE

CONTROL

3.1 CONTROL ARRANGEMENTS

- 3.1.1 The NSW SES is the legislated Combat Agency for floods and is responsible for the control of flood operations. This includes the coordination of other agencies and organisations for flood management tasks.
- 3.1.2 The Local EMPLAN will operate to provide support as requested by the NSW SES Incident Controller.

3.2 OPERATIONAL MANAGEMENT

- 3.2.1 NSW SES utilises the Australasian Inter-service Incident Management System (AIIMS), which is based on five principles;
- a. Flexibility;
 - b. Functional management;
 - c. Management by objectives;
 - d. Unity of Command; and
 - e. Span of control.
- 3.2.2 AIIMS provides for different incident levels based on the complexity of management.
- 3.2.3 The Local Government Area may be divided into sectors and divisions to manage the flood event (divisions are usually a group of sectors).
- 3.2.4 Sectors and divisions may be based on floodplain classifications, geographical, physical or functional boundaries. A town, city or suburb may be one sector or split into several sectors and divisions.

3.3 START OF RESPONSE OPERATIONS

- 3.3.1 This plan is always active to ensure that preparedness actions detailed in this plan are completed.
- 3.3.2 Response operations will begin;
- a. On receipt of a Bureau of Meteorology Preliminary Flood Warning, Flood Warning, Flood Watch, Severe Thunderstorm Warning or a Severe Weather Warning for flash flooding.
 - b. On receipt of a dam failure alert.
 - c. When other evidence leads to an expectation of flooding within the council area.

- 3.3.3 Contact with the Bureau of Meteorology to discuss the development of flood warnings will normally be through the NSW SES Southern Highlands Region Headquarters and/or NSW SES State Headquarters.
- 3.3.4 The following persons and organisations will be advised of the start of response operations regardless of the location and severity of the flooding anticipated:
- a. NSW SES Southern Highlands Region Headquarters.
 - b. NSW SES Snowy Monaro Local Controller/s.
 - c. NSW SES Bombala, Cooma Monaro, Nimmitabel and Snowy River Units.
 - d. Snowy Monaro Regional Local Emergency Operations Controller (for transmission to the NSW Police Force).
 - e. Snowy Monaro Regional Local Emergency Management Officer (for transmission to appropriate council officers and departments).
 - f. Snowy Monaro Regional Council Mayor.
 - g. Other agencies listed in this plan will be advised by the Local Emergency Management Officer on the request of the NSW SES Incident Controller and as appropriate to the location and nature of the threat.

3.4 RESPONSE STRATEGIES

- 3.4.1 The main response strategies for NSW SES flood operations include;
- a. Information Provision and Warning
 - Provision of warnings, information and advice to communities.
 - Inform the community regarding the potential impacts of a flood and what actions to undertake in preparation for flooding.
 - Provide timely and accurate information to the community.
 - b. Property protection
 - Protect the property of residents and businesses at risk of flood damage.
 - Assistance with property protection by way of sandbagging and the lifting or transporting of furniture, personal effects, commercial stock and caravans.
 - Assistance with the protection of essential infrastructure.
 - c. Evacuation
 - Evacuation is a risk management strategy that may be used to mitigate the effects of an emergency on a community. It involves the movement of people to a safer location and their return. For an evacuation to be effective it must be appropriately planned and implemented (7).

- d. Flood Rescue
 - The rescue or safe retrieval of persons or animals trapped by floodwaters.
 - e. Resupply
 - Minimise disruption upon the community by resupplying areas which have become isolated as a consequence of flooding.
 - Ensure supplies are maintained to property owners by coordinating the resupply of properties which have become isolated as a consequence of flooding.
- 3.4.2 The NSW SES Incident Controller will select the appropriate response strategy to deal with the expected impact of the flood in each sector and/or community. The impact may vary so a number of different strategies may need to be selected and implemented across the whole operational area. The available strategies for each sector and/or community are maintained by the NSW SES.
- 3.4.3 Supporting agency strategies may include;
- a. Protect the community from incidents involving fire and hazardous materials.
 - b. Maintain the welfare of communities and individuals affected by the impact of a flood.
 - c. Minimise disruption to the community by ensuring supply of essential energy and utility services.
 - d. Ensure coordinated health services are available to and accessible by the flood affected communities.
 - e. Maintain the welfare of animals affected by the impact of a flood.

3.5 OPERATIONS CENTRES

- 3.5.1 The NSW SES Snowy Monaro Regional Operations Centre is located at Geebung Street, Cooma NSW 2630
- 3.5.2 NSW SES Unit Operations Centre(s) are located at:
- a. NSW SES Bombala Unit - Waterworks Hill, Cathcart Rd, Bombala NSW 2632.
 - b. NSW SES Cooma Monaro Unit – Geebung Street, Cooma NSW 2630.
 - c. NSW SES Nimmitabel Unit – Bentley Street, Nimmitabel NSW 2631.
 - d. NSW SES Snowy River Unit – Lee Ave ‘Leesville Estate’, South Jindabyne NSW 2627.

3.6 LIAISON

- 3.6.1 Any agency with responsibilities identified in this plan may be requested by the NSW SES to provide liaison (including a liaison officer where necessary) to the NSW SES Snowy Monaro Regional Operations Centre, or designated Emergency Operations Centre.
- 3.6.2 In accordance with NSW EMPLAN, Liaison Officers will;
- a. Maintain communication with and convey directions/requests to their organisation or functional area;
 - b. Provide advice on the status, resource availability, capabilities, actions and requirements of their organisation or functional area, and
 - c. Where appropriate, have the authority to deploy the resources of their parent organisation at the request of the NSW SES Incident Controller.

3.7 END OF RESPONSE OPERATIONS

- 3.7.1 When the immediate danger to life and property has passed the NSW SES Operational Area Commander or the NSW SES Incident Controller will issue an 'All Clear' message signifying that response operations have been completed. The message will be distributed through the same media outlets as earlier evacuation messages. The relevant Controller will also advise details of recovery coordination arrangements, arrangements made for clean-up operations prior to evacuees being allowed to return to their homes, and stand-down instructions for agencies not required for recovery operations.

PLANNING

3.8 COLLATING SITUATIONAL INFORMATION

Strategy

- 3.8.1 The NSW SES maintains and records situational awareness of current impacts and response activities.

Actions

- 3.8.2 The NSW SES Bombala, Cooma Monaro and Snowy River Local Headquarters collates information on the current situation in the Snowy Monaro Regional LGA and incorporates in Situation Reports.
- 3.8.3 The NSW SES Southern Highlands Region Headquarters collates Region-wide information for inclusion in NSW SES Region Situation Reports.
- 3.8.4 Sources of situational information during times of flooding are;
- a. **Agency Situation Reports.** Agencies and functional areas provide regular situation reports (SITREPs) to the NSW SES.

- b. **Active Reconnaissance.** The NSW SES Incident Controller is responsible for coordinating the reconnaissance of impact areas, recording and communicating observations. Reconnaissance can be performed on the ground and using remote sensing (more commonly aerial).
 - c. The **Bureau of Meteorology's Flood Warning Centre** provides river height and rainfall information, data is available on the website <http://www.bom.gov.au/nsw/flood/>. However there is no specific flood information for the Snowy Monaro Regional LGA as there is no rainfall / river gauge system on the Delegate River and the Murrumbidgee River within the LGA to provide information to the Bureau.
 - d. **Manly Hydraulics Laboratory (a business unit within NSW Public Works)** automated river watch system funded by the Office of Environment and Heritage. This system provides river height and rainfall readings for a number of gauges in the Snowy Monaro Regional LGA. Recent data from this system is available on the Manly Hydraulic Laboratory website: <http://www.mhl.nsw.gov.au>. A history of area floods is also available upon request via the website.
 - e. **NSW Office of Water.** This office advises flow rates and rates of rise for the Bombala and Murrumbidgee Rivers. Daily river reports containing information on gauge heights and river flows are available from the website: <http://waterinfo.nsw.gov.au/>.
 - f. **Lake Wallace Dam Project.** This is a new Dam under construction six kilometres South of Nimmitabel Township. It is expected to be completed by early 2017 and further planning details will be updated as the Dam develops. The Dam Owner will provide that detail to the NSW SES.
 - g. **NSW SES Southern Highlands Region Headquarters.** The Region Headquarters provides information on flooding and its consequences, including those in nearby council areas (this information is documented in Bulletins and Situation Reports).
 - h. **Snowy Monaro Regional Council.** Council may release alerts or bulletins regarding road closures or reopenings, and will advise NSW SES of such details. Council will monitor and advise NSW SES Snowy Monaro Local Controller/s of any levee integrity concerns.
- 3.8.5 During flood operations sources of information on roads closed by flooding include;
- a. Snowy Monaro Regional Council (Website www.snowymonaro.nsw.gov.au)
 - b. Phone: 1300 345 345
 - c. Monaro Police Local Area Command.
 - d. Roads and Maritime Services (website and/or telephone service).
 - e. NSW SES Southern Highlands Region Headquarters.

- f. NSW SES Bombala, Cooma Monaro and Snowy River Local Headquarters.
- 3.8.6 Situational information relating to consequences of flooding should be used to verify and validate NSW SES Flood Intelligence records.

3.9 PROVISION OF FLOOD INFORMATION AND WARNINGS

Strategy

- 3.9.1 The NSW SES Bombala, Cooma Monaro and Snowy River Local Headquarters provides advice to the NSW SES Southern Highlands Region Headquarters on current and expected impacts of flooding in the Snowy Monaro Regional LGA.
- 3.9.2 The NSW SES Southern Highlands Region Headquarters issues NSW SES Flood Bulletins, NSW SES Livestock and Equipment Warnings, Evacuation Warnings and Evacuation Orders to media outlets and agencies on behalf of all NSW SES units in the Region.

Actions

- 3.9.3 The **NSW SES Incident Controller** will ensure that the NSW SES Operational Area Commander is regularly briefed on the progress of operations.
- 3.9.4 **NSW SES Bombala, Cooma Monaro and Snowy River Local Headquarters operations staff** will be briefed regularly so that they can provide information in response to inquiries received in person or by other means such as phone or fax.
- 3.9.5 **Bureau of Meteorology Severe Thunderstorm Warning.** These are issued direct to the media by the Bureau when severe thunderstorms are expected to produce dangerous or damaging conditions, including flash flooding. Severe thunderstorms are usually smaller in scale than events covered by Flood Watches and Severe Weather Warnings.
- 3.9.6 **Bureau of Meteorology Severe Weather Warnings for Flash Flooding.** These are issued direct to the media by the Bureau and provide a warning of the possibility for flash flooding as a result of intense rainfall. These warnings are issued when severe weather is expected to affect land based communities with 6 to 24 hours. Severe Weather Warnings may also include other conditions such as Damaging Winds.
- 3.9.7 **Bureau of Meteorology Flood Watches.** Flood Watches are issued by the Bureau to advise people of the potential for flooding in a catchment area based on predicted or actual rainfall. Flood Watches will be included in NSW SES Flood Bulletins issued by the NSW SES Southern Highlands Region Headquarters.
- 3.9.8 **Bureau of Meteorology Flood Warnings.** The NSW SES Southern Highlands Region Headquarters will send a copy of Bureau Flood Warnings to the NSW SES Bombala, Cooma Monaro, Nimmitabel and Snowy River Units. On receipt the NSW SES Incident Controller will provide the NSW SES Southern Highlands Region Headquarters with information on the estimated impacts of flooding at the predicted heights for inclusion in NSW SES Region Flood Bulletins.

- 3.9.9 **NSW SES Livestock and Equipment Warnings.** Following heavy rain or when there are indications of significant creek or river rises (even to levels below Minor Flood heights), the NSW SES Incident Controller will advise the NSW SES Southern Highlands Region Headquarters which will issue NSW SES Livestock and Equipment Warnings.
- 3.9.10 **NSW SES Local Flood Advices.** The NSW SES Incident Controller may issue Local Flood Advices for locations not covered by Bureau Flood Warnings. They may be provided verbally in response to phone inquiries but will normally be incorporated into NSW SES Region Flood Bulletins.
- 3.9.11 **NSW SES Flood Bulletins.** The NSW SES Southern Highlands Region Headquarters will regularly issue NSW SES Flood Bulletins which describe information on the estimated impacts of flooding at the predicted heights (using information from Bureau Flood Warnings and NSW SES Local Flood Advices) to NSW SES units, media outlets and agencies on behalf of all NSW SES units in the Region.
- 3.9.12 **NSW SES Evacuation Warnings and Evacuation Orders.** These are usually issued to the media by the NSW SES Operational Area Commander on behalf of the NSW SES Incident Controller.
- 3.9.13 **Dam Failure Alerts.** Dam failure alerts are issued to NSW SES by the dam owner, in accordance with arrangements in the Dam Safety Emergency Plan (DSEP), the system involves the Dam Owner notifying NSW SES State Headquarters Operations Communications Centre, who in turn distribute the warning to the NSW SES Region Headquarters and NSW SES Unit Headquarters.
- 3.9.14 A flow chart illustrating the notification arrangements for potential dam failure is shown in Attachment 2.
- 3.9.15 Dam failure alert levels are set in consultation with the NSW SES and are used to trigger appropriate response actions. The conditions that define each of the alert levels are listed in the relevant DSEP. Responses escalate as the alert level migrates from white to amber to red. Table 1 briefly outlines example defining conditions and appropriate NSW SES responses associated with each alert.

| Alert Level | Example Defining Condition | NSW SES Response | NSW SES Warning Product |
|-------------|---|---|---|
| White | May be a structural anomaly. May be increased monitoring in response to a heavy rainfall event | Implements notification flowchart. Check operational readiness. | This is a preliminary alert to assist the NSW SES in its preparation. This is not a public alert. |
| Amber | Failure possible if storage level continues to rise or structural anomaly not fixed | Implements notification flowchart. Warn downstream population at risk to prepare to evacuate | NSW SES Evacuation Warning |
| Red | Failure imminent or occurred | Implements notification flowchart. Evacuation of downstream populations | NSW SES Evacuation Order |

Table 1: Dam Failure Alert Levels

Note: Some DSEPs will have alert levels that proceed directly from White to Red. This is the case if adequate time does not exist between the three alert levels to evacuate the downstream population at risk. The decision to omit the Amber Alert level, and the general setting of Alert levels should be undertaken in consultation with the NSW SES.

- 3.9.16 The NSW SES / Dam Owner will disseminate warnings to the population at risk of dam failure (these arrangements are specific to each dam, are negotiated between the Dam Owner and NSW SES, and are documented in the DSEP).
- 3.9.17 **Standard Emergency Warning Signal (SEWS)**. This signal may be played over radio and television stations to alert communities to Evacuation Warnings, Evacuation Orders, Special Warnings or Dam-Failure Warnings. Approval to use the signal is associated with who approves the warning/order message.
- 3.9.18 **The Public Information and Inquiry Centre (PIIC)** (operated by the NSW Police Force) will answer calls from the public regarding registered evacuees and provide authorised emergency information to the public.
- 3.9.19 **The Disaster Welfare Assistance line** is a central support and contact point for disaster affected people inquiring about welfare services advice and assistance. This normally operates during business hours, but can be extended when required.
- 3.9.20 **The RMS Transport Information Line** will provide advice to callers on the status of roads. The RMS website also lists road closure information.
- 3.9.21 **Snowy Monaro Regional Council** will provide information on the status of roads.
- 3.9.22 Collation and dissemination of road information is actioned as follows:

- a. As part of Situation Reports, the NSW SES Incident Controller provides road status reports for main roads in the council area to the NSW SES Southern Highlands Region Headquarters.
- b. The NSW SES Southern Highlands Region Headquarters distributes information on main roads to NSW SES units, media outlets and agencies as part of NSW SES Flood Bulletins.

OPERATIONS

3.10 AIRCRAFT MANAGEMENT

- 3.10.1 Aircraft can be used for a variety of purposes during flood operations including evacuation, rescue, resupply, reconnaissance and emergency travel.
- 3.10.2 Air support operations will be conducted under the control of the NSW SES Region Headquarters, which may allocate aircraft to units if applicable.
- 3.10.3 NSW SES maintains the following information for the Snowy Monaro Regional Council area;
 - a. Locations of suitable helicopter landing points.
 - b. Locations of suitable airports and records detailing aircraft size and type that can land at airports.
 - c. Intelligence on when access to these locations is expected to be lost.

3.11 ASSISTANCE FOR ANIMALS

- 3.11.1 Matters relating to the welfare of livestock, companion animals and wildlife are to be referred to Agriculture and Animal Services Functional Area.
- 3.11.2 Requests for emergency supply and/or delivery of fodder to stranded livestock, or for livestock rescue, are to be referred to Agriculture and Animal Services Functional Area.
- 3.11.3 Requests for animal rescue should be referred to the NSW SES.

3.12 COMMUNICATION SYSTEMS

- 3.12.1 The primary means of communications between fixed locations is by telephone, email and facsimile.
- 3.12.2 The primary means of communication to and between deployed NSW SES resources across the NSW SES Southern Highlands Region is predominantly by GRN, however some isolated locations do still operate on PMR.
- 3.12.3 All liaison officers will provide their own communication links back to their parent agencies.
- 3.12.4 All other organisations will provide communications as necessary to their deployed field teams.

- 3.12.5 Back-up communications are provided as follows:
- a. Bombala and Cooma Rural Fire Service radio network.

3.13 PRELIMINARY DEPLOYMENTS

- 3.13.1 When flooding is expected to be severe enough to cut road access to communities, the NSW SES Incident Controller will ensure that resources are in place for the distribution of foodstuffs and medical supplies to the areas that could become isolated.
- 3.13.2 When access between locations is expected to be cut, the NSW SES Incident Controller will advise appropriate agencies so that resources (including sandbags, fire fighting appliances, ambulances, etc.) are deployed to ensure that operational capability is maintained.

3.14 ROAD AND TRAFFIC CONTROL

- 3.14.1 A number of roads within the council area are affected by flooding. NSW SES maintains details of these roads.
- 3.14.2 The council closes and re-opens its own roads and, acting as agent for the RMS, does the same for the Dalgety and Mount Darragh Road as well as the Bonang, Cann Valley and Monaro Highways. This includes the placement of road closure signs and providing a road information service to the public and emergency services.
- 3.14.3 The NSW Police Force has the authority to close and re-open roads but will normally only do so (if the Council or the RMS have not already acted) if public safety requires such action.
- 3.14.4 When resources permit, the NSW SES assists Council, RMS or the Police by erecting road closure signs and barriers.
- 3.14.5 In flood events, the NSW SES Incident Controller may direct the imposition of traffic control measures. The entry into flood affected areas will be controlled in accordance with the provisions of the State Emergency Service Act, 1989 (Part 5, Sections 19, 20, 21 and 22) and the State Emergency Rescue Management Act, 1989 (Part 4, Sections 60KA, 60L and 61).
- 3.14.6 Police, RMS or Council officers closing or re-opening roads or bridges affected by flooding are to advise the NSW SES Bombala, Cooma Monaro and Snowy River Local Headquarters, which will then provide a road information service to local emergency services, the public and the NSW SES Southern Highlands Region Headquarters. All such information will also be passed to the Police, RMS and the Council.

3.15 STRANDED TRAVELLERS

- 3.15.1 Flood waters can strand travellers. Travellers seeking assistance will be referred to the Welfare Services Functional Area for the arrangement of emergency accommodation.

3.16 MANAGING PROPERTY PROTECTION OPERATIONS

Strategy

- 3.16.1 Protect the property of residents and businesses at risk of flood damage.

Actions

- 3.16.2 The NSW SES is the responsible agency for the coordination of operations to protect property.
- 3.16.3 Property may be protected from floods by;
- Lifting or moving of household furniture.
 - Lifting or moving commercial stock and equipment.
 - Sandbagging to minimise entry of water into buildings.

3.17 MANAGING FLOOD RESCUE OPERATIONS

Strategy

- 3.17.1 Rescue of people and animals from floods.

Actions

- 3.17.2 The NSW SES Incident Controller controls flood rescue in Snowy Monaro Regional LGA during a flood emergency.
- 3.17.3 Flood rescues, may be carried out by accredited units in accordance with appropriate standards.
- 3.17.4 Additional flood boats and crews can be requested through the NSW SES Southern Highlands Region Headquarters.
- 3.17.5 There may be some residual population which did not evacuate during the early stages of flooding and which require rescue.

3.18 MANAGING EVACUATION OPERATIONS

Strategy

- 3.18.1 When there is a risk to public safety, evacuation is the primary strategy. Circumstances may include;
- Evacuation of people when their homes or businesses are likely to flood.
 - Evacuation of people who are unsuited to living in isolated circumstances, due to flood water closing access.

- c. Evacuation of people where essential energy and utility services are likely to fail, have failed or where buildings have been made uninhabitable.

Actions

- 3.18.2 The evacuation operation will have the following stages:
- a. Decision to evacuate.
 - b. Mobilisation (mobilisation may begin prior to the decision to evacuate).
 - c. Evacuation Warning delivery.
 - d. Evacuation Order delivery.
 - e. Withdrawal.
 - f. Shelter.
 - g. Return.
- 3.18.3 During floods evacuations will be controlled by the NSW SES. Small-scale evacuations will be controlled by the NSW SES Incident Controller. Should the scale of evacuation operations be beyond the capabilities of local resources control may be escalated to the next operational command level.

Decision to evacuate

- 3.18.4 In most cases the decision to evacuate rests with the NSW SES Incident Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989. However, the decision to evacuate will usually be made after consultation with the NSW SES Operational Area Commander and the Local Emergency Operations Controller.
- 3.18.5 In events that require large scale evacuations, the decision to evacuate must be escalated to the NSW SES Operational Area Commander or the State Controller.
- 3.18.6 Some people will make their own decision to evacuate earlier and move to alternate accommodation, using their own transport. This is referred to as self-managed evacuation (8).

Mobilisation

- 3.18.7 The NSW SES Incident Controller will request the following personnel for doorknock teams for designated Sectors/locations:
- a. NSW SES Bombala, Cooma Monaro, Nimmitabel and Snowy River Unit members.
 - b. RFS Monaro District members via the RFS Fire Control Officer.
 - c. Local Police Force officers via the local area command.
- 3.18.8 The NSW SES Operational Area Commander will request any additional personnel required to assist with doorknock teams using;

- a. NSW SES members from the NSW SES Southern Highlands Region and surrounding NSW SES Regions.
 - b. FRNSW personnel arranged via the FRNSW Liaison Officer.
 - c. RFS personnel arranged via the RFS Liaison Officer.
- 3.18.9 The NSW SES Incident Controller will request the LEMC to provide Council personnel to assist with traffic coordination within Sector(s)/Community.
- 3.18.10 The NSW SES Incident Controller will arrange liaison officers for Sector Command Centres.
- 3.18.11 The NSW SES Operational Area Commander will request the required number of buses for Sectors via the Transport Services Functional Area.

Delivery of Evacuation Warnings and Evacuation Orders

- 3.18.12 The NSW SES will advise the community of the requirements to evacuate. The NSW SES will issue an **Evacuation Warning** when the intent of an NSW SES Incident Controller is to warn the community of the need to prepare for a possible evacuation.
- 3.18.13 The NSW SES will issue an **Evacuation Order** when the intent of the NSW SES Incident Controller is to instruct a community to immediately evacuate in response to an imminent threat.
- 3.18.14 The NSW SES Incident Controller will distribute Evacuation Warnings and Evacuation Orders to;
- a. Sector/Division Command Centres (where established).
 - b. Snowy Monaro Regional Local Emergency Operations Centre.
 - c. Snowy Monaro Regional Council.
 - d. Monaro Police Local Area Command.
 - e. Monaro Rural Fire Service Control Centre.
 - f. Radio Stations.
 - g. Other local agencies and specified individuals.
- 3.18.15 The NSW SES Operational Area Commander will distribute Evacuation Warnings and Evacuation Orders to;
- a. The NSW SES State Operations Centre.
 - b. The NSW SES Incident Controller.
 - c. Affected communities via dial-out warning systems where installed or applicable.
 - d. Relevant media outlets and agencies.
- 3.18.16 Evacuation Warnings and Evacuation Orders may be delivered through;
- a. Radio and television stations.
 - b. Doorknocking by emergency service personnel.

- c. Public address systems (fixed or mobile).
 - d. Telephony-based systems (including Emergency Alert).
 - e. Two-way Radio.
 - f. Direct access to Radio Station 2XL and Snow FM (2MNO).
- 3.18.17 The Standard Emergency Warning Signal (SEWS) may be used to precede all Evacuation Orders broadcast on Radio Stations.
- 3.18.18 Sector Commanders, where established, will distribute Evacuation Orders via Emergency Service personnel in doorknock teams to areas under threat of inundation.
- 3.18.19 Doorknock teams will work at the direction of either;
- a. The Sector Commander if a Sector Command Centre is established.
 - b. The relevant Division Commander where a Sector Command Centre has not been established.
 - c. The Incident Controller.
- 3.18.20 Field teams conducting doorknocks will record and report back the following information to their Sector Commander/Division Commander/ Incident Controller;
- a. Addresses and locations of houses doorknocked and/or evacuated.
 - b. The number of occupants.
 - c. Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
 - d. Details of residents who refuse to comply with the Evacuation Order.
- 3.18.21 Refusal to evacuate. Field teams should not waste time dealing with people who are reluctant or refuse to comply with any Evacuation Order. These cases are to be referred to the NSW Police Force.

Withdrawal

- 3.18.22 Evacuations will generally be carried out in stages starting from the lowest areas, low flood islands and low trapped perimeters; and progressively from higher areas.
- 3.18.23 The most desirable method of evacuation is via road using private transport. This may be supplemented by buses for car-less people. However, other means of evacuation may also be used if available and as necessary (e.g. by foot, rail, air).
- 3.18.24 Evacuees who require emergency accommodation or disaster welfare assistance will be directed to designated evacuation centres. Evacuees who have made their own accommodation arrangements will not be directed to evacuation centres. It is not possible to determine in advance how many will fall into this category.

- 3.18.25 Evacuees will:
- a. Move under local traffic arrangements from the relevant Sectors/Community;
 - b. Continue along the suburban/regional/rural road network to allocated Evacuation Centres.
- 3.18.26 **Health Services.** The Health Services Functional Area will coordinate the evacuation of hospitals, health centres and aged care facilities (including nursing homes).
- 3.18.27 **Schools.** School administration offices (Department of Education, Catholic Education Office and Private Schools) will coordinate the evacuation of schools if not already closed.
- 3.18.28 If there is sufficient time between the start of response operations and the evacuation of communities, the NSW SES Operational Area Commander will discuss the temporary closure of appropriate schools with the Regional Director, Department of Education. This will enable pupils to stay at home or be returned home so they can be evacuated (if required) with their families.
- 3.18.29 Note that in the Snowy Monaro Regional LGA, school principals may close some schools affected by flooding in the early stages of flooding.
- 3.18.30 **Caravan parks.** When an evacuation order is given occupiers of movable dwellings should:
- a. Isolate power to moveable dwellings.
 - b. Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.
 - c. Lift the other contents in any remaining dwellings as high as possible.
 - d. Move to friends, relatives or a designated evacuation centre if they have their own transport, or move to the caravan office to await transport.
 - e. If undertaking self-managed evacuation, register their movements with the caravan park management upon leaving the park.
- 3.18.31 Where possible, dwellings that can be moved will be relocated by their owners. Park managers will arrange for the relocation of movable dwellings as required. Council and NSW SES personnel may assist if required.
- 3.18.32 Caravan park managers will ensure that their caravan park is capable of being evacuated in a timely and safe manner.
- 3.18.33 Advise the NSW SES Snowy Monaro Local Controller/s of:
- a. The number of people requiring transport.
 - b. Details of any medical evacuations required.
 - c. Whether additional assistance is required to effect the evacuation.
- 3.18.34 Check that all residents and visitors are accounted for.

- 3.18.35 Inform the NSW SES Snowy Monaro Local Controller/s when the evacuation of the caravan park has been completed.
- 3.18.36 Provide the NSW SES Snowy Monaro Local Controller/s with a register of people that have been evacuated.
- 3.18.37 **Assistance Animals, Pets and Companion Animals of Evacuees:** Assistance animals (guide dogs, hearing assistance animals, etc.) will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres etc.
- Where possible owners should take their companion animals with them when they are asked to evacuate. Due to safety restrictions, it may not be possible to allow companion animals to accompany their owners when being transported via aircraft or flood rescue boat. In such circumstances Agriculture and Animal Services will coordinate separate arrangements for evacuation and care of companion animals.
- 3.18.38 **Transport and storage:** Transport and storage of furniture from flood threatened properties will be arranged as time and resources permit.
- 3.18.39 **Security:** The NSW Police Force will coordinate the provision of overall security for evacuated areas.
- 3.18.40 The NSW SES Incident Controller is to provide the following reports to the NSW SES Southern Highlands Region Headquarters:
- a. Advice of commencement of the evacuation of each Sector,
 - b. Half-hourly progress reports (by Sectors) during evacuations,
 - c. Advice of completion of the evacuation of each Sector.
- 3.18.41 **Assembly areas:** An assembly area is a designated location used for the assembly of emergency-affected persons before they move to temporary accommodation or a nominated evacuation centre. As such these areas do not provide welfare assistance nor are they used for long term sheltering or provision of meals. An assembly area may also be a prearranged, strategically placed area, where support response personnel, vehicles and other equipment can be held in readiness for use during an emergency.

Shelter

- 3.18.42 **Evacuation Centres:** Evacuees will be advised to go to friends or relatives, or else be taken to the nearest accessible evacuation centre, which may initially be established at the direction of the NSW SES Incident Controller, but managed as soon as possible by Welfare Services.
- 3.18.43 The following locations are suitable for use as flood evacuation centres:
- a. Multi Purpose Hall - Bombala
 - b. Bombala High School
 - c. Monaro High School, Mittagong Road, Cooma

- d. St Patrick's Parish School, Murray Street, Cooma
 - e. Cooma Multifunction Centre, Cromwell Street, Cooma
 - f. Cooma Ex-Serviceman's Club, Vale Street, Cooma
- 3.18.44 **Registration:** The NSW Police Force will facilitate the requirement of Disaster Victim Registration for people evacuated to designated evacuation centres.
- 3.18.45 **Animal Shelter:** Facilities to hold and care for companion animals of evacuees will be coordinated by Agriculture and Animal Services if required. If required, Agriculture and Animal Services will also coordinate refuge areas for livestock (eg horses) where feasible.

Return

- 3.18.46 The NSW SES Incident Controller will advise when return to evacuated areas is safe after flood waters have receded and reliable access is available.
- 3.18.47 The NSW SES Incident Controller will determine when it is safe for evacuees to return to their homes in consultation with:
- a. The Recovery Coordinating Committee (if established)
 - b. Welfare Services Functional Area Coordinator (welfare of evacuees)
 - c. Engineering Services Functional Area Co-ordinator (safety of buildings, structural integrity of levees/dams)
 - d. Health Service Functional Area Coordinator (public health)
 - e. Transport Services Functional Areas Coordinator (arrangement of transport)
 - f. The Snowy Monaro Regional LEOCON
 - g. The Snowy Monaro Regional Council
 - h. NSW SES Operational Area Commander
 - i. Other appropriate agencies/functional areas as required (mitigation and advice regarding identified risks resulting from the flood event).
- 3.18.48 Once it is considered safe to do so, the NSW SES Incident Controller will authorise the return of evacuees.
- 3.18.49 The return will be controlled by the NSW SES Incident Controller and may be conducted, at their request, by the Recovery Coordinator.

3.19 MANAGING RESUPPLY OPERATIONS

- 3.19.1 The NSW SES is responsible for the coordination of the resupply of isolated communities and properties.
- 3.19.2 If isolation is expected to occur, residents should be encouraged to consider their needs and suitability for an unknown period of isolation.

- 3.19.3 If properties/communities are going to remain in locations expected to become isolated, households/retailers should be encouraged to stock up on essential supplies.
- 3.19.4 Where practicable, once supplies are delivered to the NSW SES designated loading point, the NSW SES Incident Controller will arrange for the delivery of essential foodstuffs, fuels or urgent medical supplies required by an isolated property or community.
- 3.19.5 All reasonable effects will be made to deliver supplies, however where necessary the NSW SES will prioritise the delivery of items.

Resupply of Isolated Towns and Villages

Strategy

- 3.19.6 Minimise disruption upon the community by resupplying areas which have become isolated as a consequence of flooding.

Actions

- 3.19.7 The NSW SES is responsible for the coordination of the resupply of isolated communities.
- 3.19.8 If flood predictions indicate that areas are likely to become isolated, the NSW SES Incident Controller should advise retailers that they should stock up.
- 3.19.9 When isolation occurs, retailers will be expected to place orders with suppliers where they have a line of credit and to instruct those suppliers to package their goods and deliver them to loading points designated by the NSW SES.
- 3.19.10 The NSW SES is prepared to deliver mail to isolated communities but may not be able to do so according to normal Australia Post timetables.
- 3.19.11 The NSW SES will assist hospitals with resupply of linen and other consumables where able.

Resupply of Isolated Properties

Strategy

- 3.19.12 Ensure supplies are maintained to properties by coordinating the resupply of properties which have become isolated as a consequence of flooding.

Actions

- 3.19.13 The resupply of isolated properties is a common requirement during floods and coordination can be difficult because requests can emanate from a variety of sources. Isolated properties may call their suppliers direct, place their orders through their own social networks or contact the NSW SES.
- 3.19.14 The principles to be applied when planning for the resupply of isolated properties are;
- a. The NSW SES will coordinate resupply and establish a schedule.

- b. Some isolated households will not have the ability to purchase essential grocery items due to financial hardship. If an isolated household seeks resupply from the NSW SES and claims to be, or is considered to be, in dire circumstances, he/she is to be referred to Welfare Services for assessment of eligibility. Where financial eligibility criteria are met, Welfare Services will assist with the purchase of essential grocery items. Welfare Services will deliver the essential grocery items to the NSW SES designated loading point for transport.
 - c. Local suppliers will liaise with the NSW SES regarding delivery of resupply items to the designated loading point.
 - d. Local suppliers are responsible for packaging resupply items for delivery.
- 3.19.15 A flowchart illustrating the Resupply process is shown in Attachment 1. Please note that the flowchart outlines the resupply process but does not encompass all potential situations and/or outcomes.

PART 4 - RECOVERY

4.1 RECOVERY COORDINATION AT THE LOCAL LEVEL

- 4.1.1 The NSW SES Snowy Monaro Local Controller/s will ensure that planning for long-term recovery operations begins at the earliest opportunity, initially through briefing the Local Emergency Management Committee (LEMC). As soon as possible the LEMC will meet to discuss recovery implications including the need for a Local Recovery Committee. The LEMC will consider any impact assessment in determining the need for recovery arrangements. This is conveyed in the first instance to the State Emergency Operations Controller (SEOCN) for confirmation with the State Emergency Recovery Controller (SERCON).
- 4.1.2 Once the need for recovery has been identified, the SERCON, in consultation with the SEOCN, may recommend the appointment of a Local Recovery Coordinator and nominate an appropriate candidate to the Minister for Emergency Services.
- 4.1.3 The SERCON may send a representative to the LEMC and subsequent recovery meetings to provide expert recovery advice and guidance.
- 4.1.4 The NSW SES Snowy Monaro Local Controller/s and Local Emergency Operations Controller (LEOCN) attend recovery meetings to provide an overview of the emergency response operation.
- 4.1.5 The NSW SES Operational Area Commander, the Regional Emergency Management Officer and appropriate Regional Functional Area Coordinators will be invited to the initial local meeting and to subsequent meetings as required.
- 4.1.6 The recovery committee will:
- a. Develop and maintain a Recovery Action Plan with an agreed exit strategy.
 - b. Monitor and coordinate the activities of agencies with responsibility for the delivery of services during recovery.
 - c. Ensure that relevant stakeholders, especially the communities affected, are involved in the development and implementation of recovery objectives and strategies and are informed of progress made.
 - d. Provide the SERCON with an end of recovery report.
 - e. Ensure the recovery is in line with the National Principles of Disaster Recovery and the NSW tenets.

4.2 RECOVERY COORDINATION AT THE REGION AND STATE LEVEL

- 4.2.1 In the event that an emergency affects several local areas, a Region Emergency Management Committee (REMC) will meet to discuss recovery

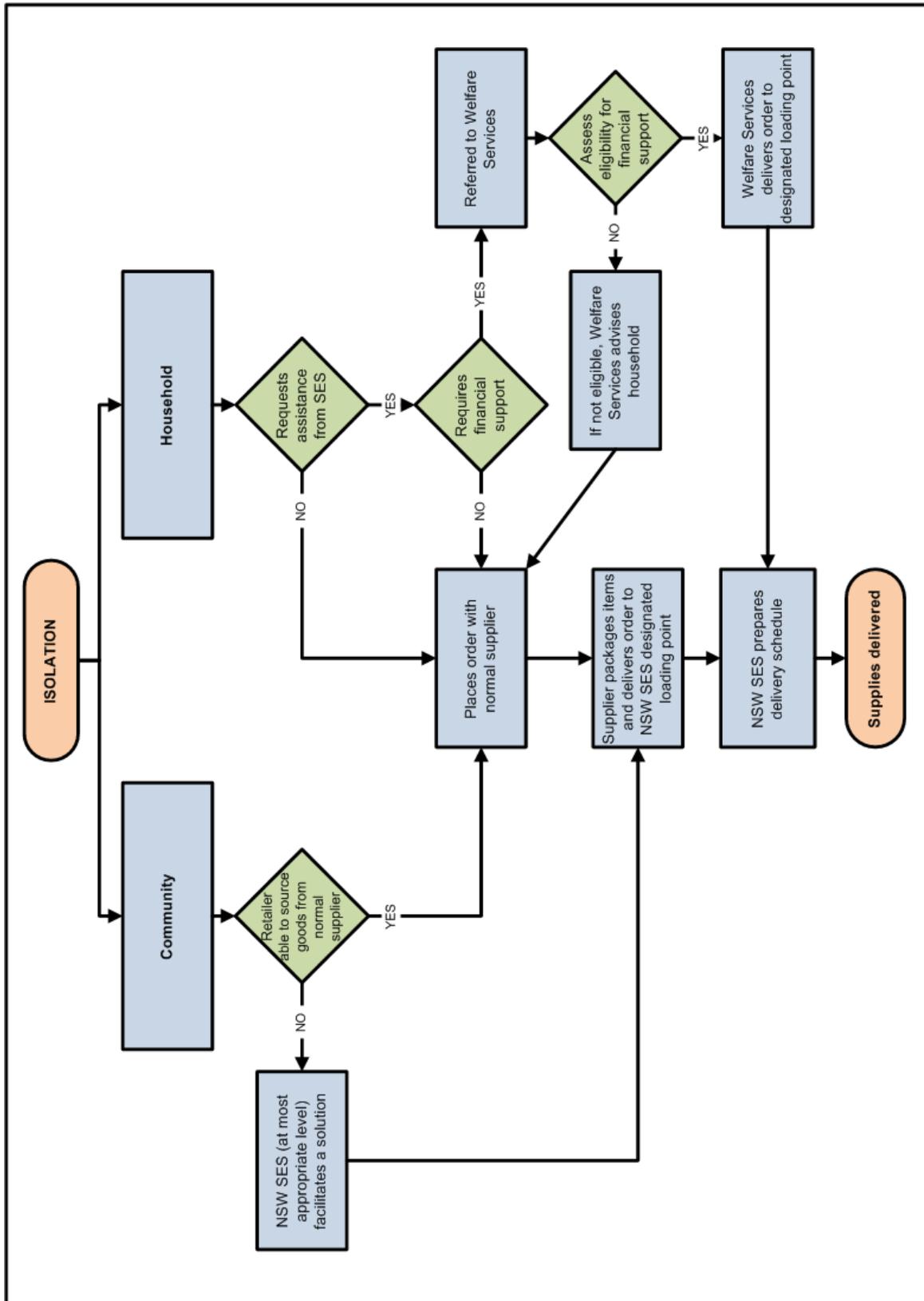
implications including the need for a Region Recovery Committee. This is conveyed in the first instance to the SEOCN for confirmation with the SERCON.

- 4.2.2 In the event of an emergency which affects multiple regions, or is of state or national consequence, or where complex, long term recovery and reconstruction is required, it may be necessary to establish a State Recovery Committee and the appointment of a State Recovery Coordinator.

4.3 ARRANGEMENTS FOR DEBRIEFS / AFTER ACTION REVIEWS

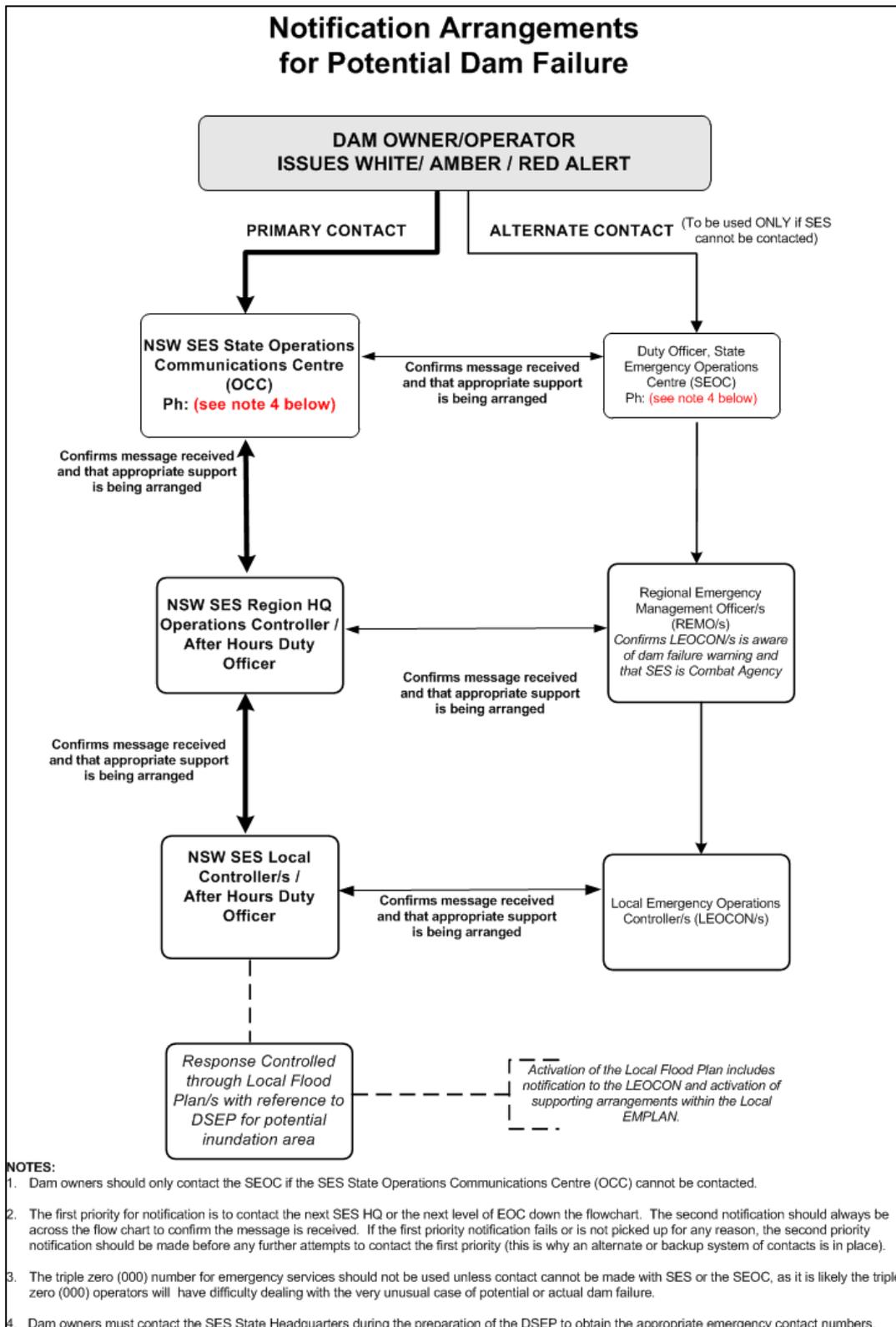
- 4.3.1 As soon as possible after flooding has abated, the NSW SES Snowy Monaro Local Controller/s will advise participating organisations of details of response operation after action review arrangements.
- 4.3.2 The NSW SES Snowy Monaro Local Controller/s will ensure that adequate arrangements are in place to record details of the after action review and each item requiring further action is delegated to an organisation or individual to implement.
- 4.3.3 Follow-up to ensure the satisfactory completion of these actions will be undertaken by the Snowy Monaro Regional Local Emergency Management Committee.

ATTACHMENT 1 - RESUPPLY FLOWCHART

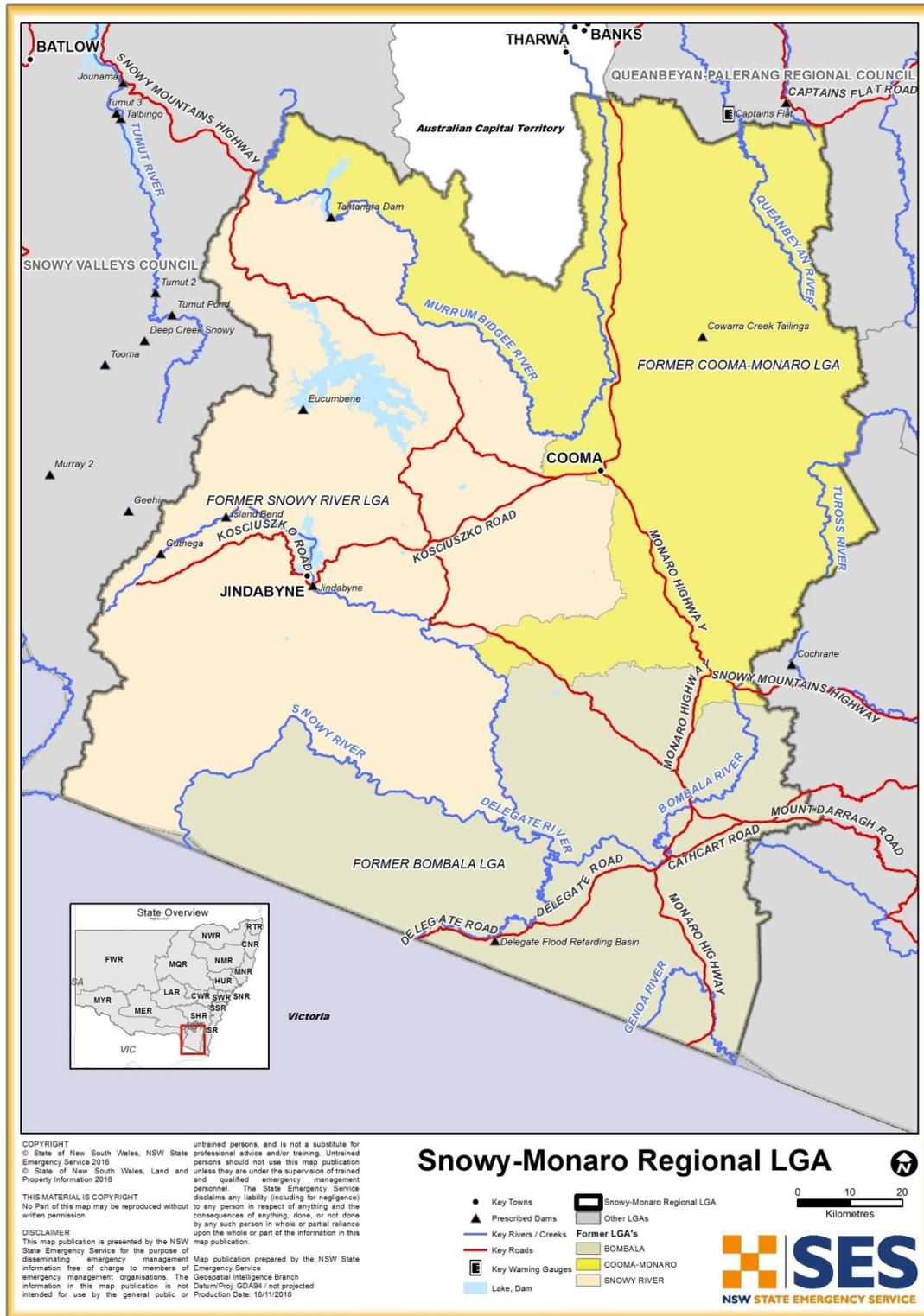


Please Note: The chart outlines the resupply process, but does not encompass all potential situations and outcomes.

ATTACHMENT 2 - DAM FAILURE ALERT NOTIFICATION ARRANGEMENTS FLOWCHART



ATTACHMENT 3 - SNOWY MONARO REGIONAL LGA MAP



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HAZARD AND RISK IN THE FORMER BOMBALA SHIRE LGA

Volume 2 of the Snowy Monaro Regional Local Flood Plan

Last Update: July 2017

AUTHORISATION

The Hazard and Risk in the former Bombala Shire LGA has been prepared by the NSW State Emergency Service (NSW SES) as part of a comprehensive planning process. The information contained herein has been compiled from the latest available technical studies.

Approved



Manager Emergency Risk Management

Date:

1/3/17

Approved



NSW SES Southern Highlands Region Controller

Date:

12/7/17

Tabled at LEMC

Date: 16 August 2017

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VERSION LIST

The following table lists all previously approved versions of this Volume.

| Description | Date |
|--|-------------|
| Bombala Local Flood Plan – Annexes A and B | August 2008 |
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AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

The Snowy Monaro Local Controller/s

NSW State Emergency Service

Cathcart Road

Bombala NSW 2632

Amendments promulgated in the amendments list below have been entered in this Volume.

| Amendment Number | Description | Updated by | Date |
|------------------|-------------|------------|------|
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Document Issue: Version 2-18042016

1 THE FLOOD THREAT

1.1 OVERVIEW

1.1.1 In 2016 the former Bombala Shire Local Government Area (LGA) was amalgamated into the new Snowy Monaro Regional Council. This Local Flood Plan (LFP) only covers the footprint of the former Bombala Shire LGA which is the area located in the lower South Eastern part of the new entity. The Snowy River Basin itself is divided by the NSW/Victorian Border in this area. The main towns at risk of flooding within the former LGA are Bombala and Delegete. Bombala Town is located at the confluence of the Coolumbooka River and Bombala River, a major tributary to the Snowy River. Flooding within the former Bombala Shire area can vary considerably depending on individual catchments within the former LGA **(1) (2) (3)**. The Snowy River Basin is shown in Map 1.

1.1.2 Catchments within the former Bombala Shire LGA footprint include:

- a. Southern catchments of Ashton Creek, Currawong Creek, Delegate River, Little Plains River and Tombong Creek;
- b. Northern catchments of Bombala River, Cambalong Creek, and Maclaughlin River; and
- c. Eastern catchments of Coolumbooka River, Genoa River and Saucy Creek.

1.1.3 The most severe flooding occurs within this shire when the Bombala River and Coolumbooka River coincide. Flooding at Bombala Township can be caused by runoff from either river, or a combination of both. This can result in flooding of several streets, several homes and businesses and potential evacuations (1).

1.1.4 Surrounding localities of Creewah, Thoko-Glen Allen and Bibbenluke are also vulnerable to road closures, potential isolation, and possible flooding of a small number of residences and businesses (1).

1.1.5 Major flooding of the Bombala River has the potential to result in evacuations, and substantial public and private losses (4).

1.2 LANDFORMS AND RIVER SYSTEMS

1.2.1 The former Bombala Shire LGA adjoins the former Cooma-Monaro LGA, and the former Snowy River LGA to form the new Snowy Monaro Regional Council. The former Bombala Shire LGA footprint also adjoins the Bega Valley Shire LGA, and Victoria's East Gippsland LGA (2) (3).

1.2.2 Bombala Town is situated on the Bombala River: a major tributary of the Snowy River which enters the sea at Orbost in Victoria. The town is located at the confluence of the Bombala and Coolumbooka Rivers. At the junction, the Coolumbooka River and the Bombala Rivers have catchment areas of 200 sq km and 337 sq km respectively. Both the Bombala and Coolumbooka Rivers have their headwaters to the North-East of Bombala on the coastal range (1) (2).

- 1.2.3 The Bombala River originates in the Kybeyan Range, part of the Great Dividing Range which forms the eastern boundary of the valley. The highest peak in the range is Brown Mountain with an elevation of 1240m (1) (2).
- 1.2.4 Although most of the Shire area is contained within the Snowy River Basin (Map 1), the level of flood threat can vary considerably between individual river, stream, and creek catchments, as is further detailed in Section 1.5 Characteristics of Flooding (1) (2).

1.3 STORAGE DAMS

Delegate Flood Retarding Basin

- 1.3.1 Within the former Bombala Shire LGA the only prescribed dam is the Delegate Flood Retarding Basin located on the outskirts of. It is designed to reduce the flow of flood waters through part of Delegate Township. The basin is normally empty, except when holding rainfall runoff and in times of flood (5) (2). Its key features are summarised in Table 1 below and its location is shown on Map 1 – Snowy River Basin and Map 3 – Delegate Town Map.

Table 1: Prescribed Dams in the Former Bombala Shire LGA; Summary of Information.

| Delegate Flood Retarding Basin (6) | |
|------------------------------------|--|
| Owner / Operator | Snowy Monaro Regional Council |
| Dam Safety Emergency Plan (DSEP) | No DSEP exists at this time (2017). |
| Description of Dam | Storage Capacity of 200ML, with Unlined Channel Spillway. Spillway is 30m wide x 1m deep. Crest Height 5m, Basin Length 280m, Catchment of 4 sq km, Built in 1985 of earthfill construction. |
| Location | Parallel to Haydens Bog Rd and just South of Victoria Parade, Delegate. |
| Communities Downstream | Part of Delegate Township, approximately 12 residences, and approximately 35 people. |
| Monitoring System | Nil, as is normally empty. |
| Warning System | Nil, as is normally empty. |

Coolumbooka River Weir

- 1.3.2 Coolumbooka River Weir (also known as Coolumbooka River Dam) is located on the Coolumbooka River just upstream of the confluence with the Bombala River. The weir has a small capacity of 245 megalitres and is not a prescribed dam. Reticulated water in the former Bombala Shire LGA footprint is supplied from this weir (Delegate is supplied from the Delegate River) (7).

Bombala Retarding Basin

- 1.3.3 Bombala has an informal retarding basin located in Joseph Street, Bombala to the left of the Southern Cross Care Currawanna Residential Aged Care facility. It is essentially a mound of dirt built to slow water flow into the main street (Maybe Street) (8). Refer to section 3.1 for further detail.

1.4 WEATHER SYSTEMS AND FLOODING

- 1.4.1 Historically the highest rainfall generally occurs in the period from December to February, with another peak in June. However, high rainfall totals can also occur outside of these periods. The 2010 Bombala Flood Study indicates that the highest average flows at Bombala over the 50 year period 1951-2001 occurred in the Winter months with the highest peaks in June. Floods can occur at any time of the year (9) (2) (4).
- 1.4.2 Floods within the former Bombala LGA footprint (now within Snowy Monaro Regional LGA) can be caused by the following types of weather systems:
- a. Sequences of Southern air masses (frontal systems) coming from the Antarctic region and moving in North-Easterly direction over the catchment.
 - b. Low-pressure systems located over the East coast of Australia and causing moist airflows over the Monaro district and Snowy Mountains.
 - c. Short duration, high intensity convective thunderstorms also occur over small areas during summer (10).

1.5 CHARACTERISTICS OF FLOODING

Characteristics of Flooding in the LGA (former Bombala Shire footprint)

- 1.5.1 Although most of the former Bombala Shire area is contained within a single River Basin (the Snowy River Basin) the level of flood threat can vary considerably between individual river, stream, and creek catchments:
- a. Flooding in the Southern catchments (Ashton Creek, Currawong Creek, Delegate River, Little Plains River and Tombong Creek) tends not to be as severe as in the more Northerly streams.
 - b. Flooding in the catchments across the Northern part of the Shire (Bombala River, Cambalong Creek and Maclaughlin River) tends to occur simultaneously because it results from rainfall along the Great Dividing Range. Considerable variation occurs with the Annual Median Rainfall to the West (less than 500mm at Delegate) being significantly less than to the East (in excess of 875mm in the top of the Bombala River catchment).

- c. Flooding in the Eastern catchments (Coolumbooka River, Genoa River and Saucy Creek) can occur independently of flooding in the other catchments because it results from rainfall along the coastal escarpment.
- d. The most severe flooding around Bombala and downstream occurs when flooding on the Bombala River (a Northern catchment) and on the Coolumbooka River (an Eastern catchment) coincide, such as occurred in 1934, 1971 and 1978. The 1983 flood was reported to be the highest flood on record in the upper Bombala River, but there was only a minor contribution from the Coolumbooka River. Flooding can therefore be caused by runoff from either river or a combination of both (1) (2).
- e. The Bombala River catchment consists of the Bombala, Undowah, and Coolumbooka Rivers. In major storms of prolonged and heavy rainfall, runoff from the catchment is concentrated along these tributaries and can result in flooding at Bombala Town. A design storm of 36 hours in this catchment will generate the highest peak discharge of 1670m³/s at Bombala Town, equating to approximately 12m on the Bombala Town gauge (No. 222019) which is just 0.4m short of a 1% AEP (1 in 100 ARI) event (4).

1.5.2 An estimated concentration time for the Bombala River catchment is about 14 hours, with a flood peak travel time from Glen Allen to Bombala of about 4 hours, and from Bibbenluke to Bombala of about 1 to 1½ hours (Table 2) (2).

Table 2: Indicative Flow Travel Time for the Bombala River

| Locations | Travel Time |
|-----------------------|----------------|
| Glen Allen to Bombala | Around 4 hrs |
| Bibbenluke to Bombala | 1 to 1.5 hours |

Characteristics of Flooding on the Bombala and Coolumbooka Rivers

- 1.5.3 The Bombala River passes through steep gorge country before opening out onto Alpine Plains for the majority of its course leading to Bombala Town. The Bombala River is joined by the Undowah River at Bibbenluke, and then later joined by the Coolumbooka River just short of Bombala Town. The Undowah and Bombala Rivers drain the Western part of the catchment (4).
- 1.5.4 The Coolumbooka River flows through predominantly steep gorge country before opening out onto Alpine Plains much closer to Bombala Town. The Coolumbooka River drains the Eastern part of the catchment and has been responsible for contributing the majority of flow at Bombala Town in most major historical flood events (4).

- 1.5.5 The Bombala River at Bombala Town reaches the bankfull stage at 7.1m on the Bombala Town gauge (No. 222019)¹ located near the Forbes Street Bridge. Beyond this height, floodwaters enter the town by overtopping the riverbank and inundating low lying areas of parkland adjacent to the Forbes Street Bridge. As flood levels continue to rise, inundation extends progressively Southwards into Therry and Maybe Streets and the Northern ends of Forbes, Caveat and Young Streets (4).
- 1.5.6 At 7.8m on the Bombala Town gauge (No. 222019), which equates to a 10% AEP (1 in 10 ARI) event, the Bombala River is at the upper level of a Moderate Flood. At 8m on this gauge the river reaches the Major Flood level at which point development within Bombala Town begins to be affected. Refer to Section 3.1 for further detail of impacts (1) (2) (4).

1.6 FLOOD HISTORY

- 1.6.1 Large floods occurred in 1934, 1941, 1943, 1945 and 1948. Flood heights are not known but the 1934 flood was the biggest in living memory. During the 1934 flood event, water from the Bombala River reached the deck level of Cunningham's Point Bridge to the North of Bombala. Floodwaters entered the township and destroyed a number of buildings and much of the surrounding farmland was flooded (2).
- 1.6.2 The 1971 flood reached 10.23m at the Bombala Town gauge (222019). It was not as severe in Bombala as the 1934 flood. However, flood waters entered 16 houses and at least 6 business premises on the river side of Maybe Street with flood depths of between 2 and 2.4m (1). Both approaches to the Bombala Bridge were cut with up to 2 metres of water on the town approach. A new bridge was erected in 1987 but both approaches can still potentially be cut by flooding (2).
- 1.6.3 Table 3 below provides a chronological history of events since 1971. The most recent events occurred in 2007, 2010, 2011, 2012, and 2014. The 2007 and 2014 events reached Minor Flood level with no significant impacts recorded. The 2010 and 2011 events reached the Moderate Flood level resulting in a caravan park in Bombala being affected by overground flooding and requiring a small number of caravans to be relocated (11) (12).
- 1.6.4 The 6th of June 2016 event reached the Moderate Flood level and peaked at approximately 6.25m on the Bombala Town gauge (No. 222019). As a precaution, a few caravans were relocated from the caravan park located on the Western bank near the Forbes Street Bridge at Bombala. One rural property in the Creewah area was also isolated but only very briefly due to rising creeks, and the Cathcart Bridge was also closed briefly for assessment due to possible damage (11) (12).

¹ Bombala Town gauge (No. 222019) was previously known as Bombala Bridge gauge (No. 222905). These are the same gauge (19).

1.6.5 During 2012 Maybe Street was flooded from catchment flooding originating from above endeavour reserve. Impacts included overfloor flooding of a number of businesses in the main street (8).

Table 3: Flood History for the Bombala River²

| Date | Bombala Town gauge [No. 222019] (NOTE: Minor 3m, Moderate 5m, Major 8m) | Approx. Elevation (mAHD) |
|---------------|--|--------------------------|
| June 2016 | 6.25m | Approx. 697mAHD |
| December 2014 | 4.00m | 695mAHD |
| June 2012 | 4.00m | 695mAHD |
| March 2011 | 7.00m | 698mAHD |
| May 2010 | 5.00m | 696mAHD |
| June 2007 | 3.70m | Approx. 695mAHD |
| February 1992 | 3.20m | Approx. 694mAHD |
| December 1992 | 3.70m | Approx. 695mAHD |
| November 1998 | 4.50m | 695.5mAHD |
| November 1985 | 5.50m | 696.5mAHD |
| July 1991 | 6.00m | 697mAHD |
| July 1988 | 6.00m | 697mAHD |
| October 1985 | 6.30m | Approx. 697mAHD |
| June 1991 | 6.90m | Approx. 678mAHD |
| April 1990 | 6.90m | Approx. 678mAHD |
| March 1983 | 8.00m | 699mAHD |
| June 1978 | 10.08m | Approx. 701mAHD |
| February 1971 | 10.23m (Note: A 10.63m event is a 1% AEP, 1 in 100 ARI) | 703mAHD |

1.7 FLOOD MITIGATION SYSTEMS

1.7.1 There are currently no levee systems within the former Bombala Shire LGA footprint.

1.7.2 There is a small Flood Retarding Basin located at Delegate, a small Weir located on the Coolumbooka River at Bombala and an informal Flood Retarding Basin located in Bombala. For details refer to Section 1.3 Storage Dams, Table 1, Section 3.1.20 and Section 3.2.11. Weir and Basin locations are shown on their respective Maps (Map 1 – Snowy River Basin, MAP 2 – Bombala Town Map, Map 3 – Delegate Town Map) (2) (1) (5) (7).

² Some of these heights cannot be verified, but give an indication of peak flood levels (from 1996 LFP). Some figures (including the 1971 figure above) are taken from the latest 2010 Bombala Flood Study which uses Peak Discharge figures to determine heights, and therefore heights corresponding to Figure 12 of that study may differ from heights in Department of Water NSW Bombala Flood Study Report 1987, and NSW SES 1996 LFP.

1.8 EXTREME FLOODING

- 1.8.1 The 1971 flood, in which flood waters entered 16 houses and at least 6 business premises on the river side of Maybe Street, reached approximately 10.23m on Bombala Town gauge (No. 222019) which is around 0.4m below a 1% AEP (1 in 100 ARI) event (10.63m). Flooding above this level is possible. A 1% AEP (1 in 100 ARI) flood event would be characterised by fast rising, deep, and fast flowing floodwaters (4).
- 1.8.2 A Probable Maximum Flood (PMF) event would inundate large parts of Bombala with deep, high velocity, debris laden flood water. During a PMF the water depth in the channel is expected to reach approximately 20m on the Bombala Town gauge (No. 222019). A map showing the Predicted PMF Inundation Extents can be found in the 2010 Bombala Flood Study and Overland Flows Investigation (4). Maps are also shown in this study for 5% AEP (1 in 20 ARI), and 1% AEP (1 in 100 ARI) events. The PMF map shows that even with extensive inundation during such extreme flooding, there are still large parts of Bombala that remain flood free (high ground above the PMF). The town itself would be split in half by the Bombala River with higher ground areas still potentially affected by stormwater run-off and ponding (4).

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

2.1.1 The population of the former Bombala Shire LGA footprint was 2,409 at the last Census in 2011. Included in this figure was a small indigenous community of 47, and no people at all that do not speak English well. There were 485 people aged over 65yrs, and 150 people within the area who may require assistance due to illness or disability during an event. Of the 2,409 population, approximately 1,662 reside in Bombala Town, and 453 reside in Delegate Town. Table 4 below provides further detailed analysis (13).

Table 4: Census of Housing and Population data (2011)

| Census Description | Former Bombala LGA | Bombala | Delegate |
|--|--------------------|--------------|------------|
| Total Persons | 2,409 | 1,662 | 453 |
| Aged 0-4 yrs | 133 | 100 | 14 |
| Aged 5-14 yrs | 314 | 218 | 53 |
| Aged 65 + yrs | 485 | 336 | 99 |
| Of Indigenous Origin | 47 | 17 | 13 |
| Who do not speak English well | 0 | 0 | 0 |
| Have a need for assistance (profound/severe disability) | 150 | 103 | 27 |
| Living alone (Total) | 332 | 219 | 73 |
| Living alone (Aged 65+) | 122 | 70 | 30 |
| Residing in caravans, cabins or houseboats or improvised dwellings | 3 | 0 | 3 |
| Occupied Private Dwellings (Households) | 1,006 | 693 | 203 |
| No Motor Vehicle | 74 | 48 | 16 |
| Caravan, cabin, houseboat or improvised dwell | 6 | 0 | 3 |
| Rented via State or Housing Authority | 13 | 15 | 3 |
| Rented via Housing Co-Op or Community Church Group | 3 | 0 | 0 |
| No Internet Connection | 354 | 240 | 82 |
| Unoccupied Private Dwellings | 355 | 192 | 83 |
| Average persons per occup dwelling | 2.2 | 2.2 | 2.2 |
| Average vehicles per occup dwelling | 1.8 | 1.8 | 1.8 |

3 SPECIFIC RISK AREAS - FLOOD

3.1 BOMBALA

3.1.1 Bombala Town is the larger urban area within the former Bombala Shire LGA footprint. Bombala Town has a population of 1,662 which includes a community of 336 people aged over 65, a small indigenous community of 17, and approximately 103 people who are either ill or disabled and may require significant assistance during a flood event. There was no community that did not speak English well. Refer to Table 4 for detailed census data (13).

Characteristics of Flooding

3.1.2 Flooding results from over bank flooding of the Bombala River which commences at 3m (Minor Flood Level) on the Bombala Town gauge (No. 222019). Should an extreme event occur, Bombala would face a significant flood problem. Flooding in Bombala can occur quickly with flood peaks similar to 1971 event possible within approximately 24 hours from the commencement of rainfall (4). A 1978 modelled scenario (5% AEP, 1 in 20 ARI) peaked at Bombala in approximately 48 hours (4) (11).

Classification of Floodplain

3.1.3 Using the Floodplain Risk Management Guideline 2007, the Bombala Town is classified as 'Rising Road Access' (RRA) (14). These are areas where access roads exist and rise steadily in an uphill direction away from rising floodwater. Bombala Town can be split in half, but is unlikely to be completely isolated even in a PMF. Roads to the North (Monaro Hwy) and South (Cann River Hwy) are likely to remain open. If they do close then the town should only be isolated for a short period (14) (4) (15).

3.1.4 Bombala Town contains low-lying areas that people would need to be progressively evacuated from to higher ground as floodwaters rise, as fits with a RRA classification (14).

3.1.5 In an RRA classification, evacuation is possible by vehicle or on foot using these access roads as floodwaters rise. People should not become trapped in homes unless their decision to evacuate their properties is delayed. An example of this is potentially occupants of multiple storey buildings who initially thought they would stay, but later wished to leave when their evacuation route may already have been cut off (14).

Inundation

3.1.6 The 2010 Bombala Flood Study provides predicted inundation mapping for a 5% AEP (1 in 20 ARI), 1% AEP (1 in 100 ARI), and PMF events (4).

3.1.7 These predictions indicate that a 5% AEP would inundate sections of Plunkett Street, Forbes Street, High Street, Mort Street, and all of Mahratta Street in the Northern part of the town. Marhatta Street is a section of the Monaro Hwy near

Forbes Street Bridge. It would also inundate parts of Caveat Street, Young Street, Cardwell Street, Therry Street, Forbes Street and Burton Street Creek in the Southern part of the town.

- 3.1.8 A 1% AEP extends further into those streets and also reaches the base of the War Memorial in the mid section of Maybe Street in the Southern part of town.
- 3.1.9 A PMF would extend further to include parts of Stephen Street, Manning Street, and Queen Streets in the Northern part of town, and in the Southern part of town it would significantly impact the CBD area of Maybe Street, before extending as far as Wellington Street. Refer to the 2010 Bombala Flood Study for detailed prediction mapping of flood extents (4).

Minor Flooding

- 3.1.10 Overbank flow commences in Bombala Township when the river level at Bombala Town gauge (No. 222019) reaches about 3m (Minor Flood Level) metres.

Moderate Flooding

- 3.1.11 At about 5m (Moderate Flood Level), the Caravan Park on the Northern bank begins to be affected. The first impact on the Southern bank occurs at a height between 6.5 and 7 metres when water backs up in the Burton Street creek near Therry Street.

Major Flooding

- 3.1.12 The main impacts in Bombala begins at about 8m (Major Flood Level) when water starts to back up the creek at the low end of Young Street. This affects the area behind the Manaroo Motel and then properties on the South Western side of Caveat Street - slowly filling nearly all of the area bounded by the river and Maybe Street between Burton Street and Young Street (2) (11).

Flood of Record

- 3.1.13 The 1971 flood of record reached approximately 10.23m on Bombala Town gauge (No. 222019). During this event flood waters entered 16 houses and at least 6 businesses on the river side of Maybe Street, and reached the base of the War Memorial in Forbes Street. Since then Bombala has seen further development and a similar event today would have significantly more impacts.

Probable Maximum Flood

- 3.1.14 A Probable Maximum Flood (PMF) event would inundate large parts of Bombala with deep, high velocity, debris laden flood water expected to reach approximately 20m on the Bombala Town gauge (No. 222019). See also Section 1.8 Extreme Flooding. Maps of Predicted Inundation Extents can be found in the 2010 Bombala Flood Study (4).

Other Areas

3.1.15 The Bombala and Coolumbooka River Catchments contain rural areas and villages adjacent to rivers and creeks that can experience flooding with landholders needing to relocate livestock and equipment to higher ground, and residents potentially being isolated for short periods due to road closures (refer to section 3.2.15).

Property Inundation

3.1.16 Satellite imagery comparison against the Predicted Inundation Extent mapping shown in the 2010 Bombala Flood Study (Figure 14) suggests that a flood of 10.63m at the Bombala Gauge (222019) (1% AEP or 1 in 100 ARI) event would inundate a significant section of the Bombala CBD and nearby residences on the river side of Maybe Street. Approximately 20 businesses along the Maybe Street retail area (between Burton and Young Street), 1 business near the intersection of Mahratta Street (South bank section) and Young Streets, and approximately 22 residences spread across Burton, Forbes, Caveat, Young, Maybe, and Therry Street may be affected (4) (14).

3.1.17 Table 5 below provides estimated numbers of inundated properties within Bombala. Refer also to section 3.2.15 for further locality details (16).

Table 5: Estimated Number of Properties Inundated Above Floor Level and Over Ground in Bombala related to the Bombala Town gauge (No. 222019).

| Bombala Town gauge (222019) Gauge Height (m) | % AEP ARI) | Range of Over Floor Depths (m) | No. of Properties with Over floor Flooding | No. of Properties with Over ground Flooding |
|---|--|---|--|---|
| 10.23m | Approx 0.4m below the 1% AEP | Businesses flooded to 2m, and houses flooded to 2.4m | Expect more than 16 residences 6 businesses (in 1971 event ¹) | Possibly more than previous column. Reports are not clear enough to determine numbers. The 1971 event reached the base of the War Memorial at the intersection of Forbes and Maybe Streets ¹ . |
| 10.63m | 1% AEP (1 in 100) | Unknown | | Estimated 21 businesses and 22 residences today (based on Satellite imagery) |

¹These numbers are from the 2010 Bombala Flood Study and are based upon the 1971 flood event. This event was the Flood of Record and reached 10.23m on the Bombala Town gauge (No. 222019).

Isolation

- 3.1.18 Generally creeks rise and fall quickly and result in only short term isolation in some areas of up to two days, however in more extreme events some rural areas may remain isolated for longer periods due to damaged roads or infrastructure. In the June 2016 event the Cathcart Bridge was closed briefly due to unknown damage, however other access roads remained open to Cathcart. Refer to Section 3.2.15 for further details regarding access to rural areas.
- 3.1.19 For road closures refer to Section 3.4 Road Closures, and Section 3.5 Summary of Isolated Communities and Properties.

Flood Mitigation Systems

- 3.1.20 Bombala has an informal retarding basin located in Joseph Street, Bombala to the left of the Southern Cross Care Currawanna Residential Aged Care facility. This consists of a small mound of dirt which has been built to slow water flow into the main street of Bombala (Maybe St). If there is heavy rainfall upstream it can quickly run through Endeavour Reserve and into town. During the 2012 event Maybe Street was flooded. Impacts included overfloor flooding of: the Bombala Maneroo Motel (No. 167), Firestation (No. 182), Caltex Petrol Station (No. 161) and Heritage Guest House Restaurant (No. 121). The Monaro Regional Library carpark (No. 81) was also flooded (8).

Dams

- 3.1.21 Coolumbooka River Weir (creating the Coolumbooka River Dam) is located on the Coolumbooka River just upstream of the confluence with the Bombala River. The weir has a small capacity of 245 megalitres and is not a prescribed dam. Reticulated water in the former Bombala Shire LGA footprint is supplied from this weir (Delegate is supplied from the Delegate River) (7).
- 3.1.22 The Coolumbooka Weir location is shown on MAP 2 – Bombala Town Map.

At Risk Facilities

- 3.1.23 At 5m (Moderate Flood Level) on the Bombala Town gauge (No. 222019) a small caravan park located on the Northern riverbank near the Forbes Street Bridge begins to be impacted, requiring several vans to be relocated (2) (11).
- 3.1.24 At 6.5m to 7m the water backs up in the Burton Street Creek (unformed end of Burton Street) near the intersection of Therry Street and Maybe Streets, potentially affecting the Village Ford car dealership (2) (11) (15).
- 3.1.25 The main impacts in Bombala begin at about 8m (Major Flood Level) when water starts to back up the creek at the low end of Young Street. By 10.63m (1% AEP) nearly all businesses and properties would be flood affected. This affects the area behind the Maneroo Motel and then properties on the South Western side of Caveat Street - slowly filling nearly all of the area bounded by the river and Maybe Street between Burton Street and Young Street at which time it would then equate to around 10.63m (an approximate 1% AEP or 1 in 100 ARI) (2) (11).

3.1.26 A number of businesses may be impacted in:

- a. Maybe Street between Burton Street and Young Street,
- b. Forbes Street between Maybe Street and the bridge.
- c. Caveat Street between Maybe Street and the river.
- d. The South bank section of Mahratta Street near the intersection with Young Street, and the Bombala Swimming Pool, Therry Street.
- e. At Risk Facilities can be found in Annex 1: Facilities at risk of flooding and/or isolation (4) (15).

3.2 DELEGATE

3.2.1 Delegate is located on the Southern bank of the Delegate River. It is the second urban centre within the former Bombala Shire LGA footprint. Delegate Town has a population of 453 which includes a community of 99 people aged over 65yrs, a small indigenous community of 13, and approximately 27 people who are either ill or disabled and may require significant assistance during a flood event. The community can all speak English. Refer to Table 4 above for detailed census data (13).

Characteristics of Flooding

3.2.2 There is no-longer a stream gauge at Delegate³. Since the 1971 flood of record in this area, road infrastructure has been upgraded between Bombala and Delegate, and a Flood Retention Basin has been constructed at Delegate. These works have lessened the impacts of flooding since their completion (17).

3.2.3 Flooding in the Delegate River Catchment can result in the short term isolation of properties, road closures, inundation of low-lying farmland, and potential evacuation of some areas adjacent to creeks.

3.2.4 Delegate Township has in the past been prone to minor flooding from an unnamed creek which approaches from the South along Haydens Bog Road. Flooding in the main street area has been reduced since the construction of the Delegate Flood Retarding Basin in 1985 which is located on the unnamed creek along Haydens Bog road to the South of the town.

Classification of Floodplain

3.2.5 Using the DECC Floodplain Risk Management Guideline 2007, Delegate Town is classified as 'Rising Road Access' (RRA) (14). These are areas where access roads exist and rise steadily uphill away from rising floodwater allowing people to evacuate. The Bombala-Delegate Road may be cut in major flood events, but is likely to remain open in lesser events. If roads were cut, short term isolation may occur (14) (4) (15).

Inundation

3.2.6 Delegate Township is prone to minor flooding from an unnamed creek from the south along Haydens Bog Road. Flooding may occur in the vicinity of the dwellings along the lower end of Bombala Street located between Church Street and Corrowong Road (2).

3.2.7 Flooding is also likely in the vicinity of the Delegate Caravan Park which is located on a dirt track between the Showground and the Delegate River. Access

³ NSW Office of Water – Real Time Data – Indicates that a Delegate Town gauge (No. 222014) operated up until the mid 1980's, but it was discontinued at some stage prior to November 1996.

is via the Northern end of Campbell Street. Evacuation of campers and vans to higher ground may be required, most likely to the Delegate Showgrounds (2).

- 3.2.8 The previous level of flooding in the main street area has been reduced by the construction of the Delegate Flood Retarding Basin to the South of the town on the unnamed creek along Haydens Bog Road (2).

Isolation

- 3.2.9 Since the 1971 flood of record (estimated to be around 0.4m below 1% AEP, 1 in 100 ARI), bridges and culverts at waterway crossings along the Bombala-Delegate Road have been significantly improved. Whilst a major flood event may still lead to some road closures, it is far less likely to occur in lesser events, and as such the town of Delegate is less likely to become isolated today (17).
- 3.2.10 In a major flood event it is still possible that the Delegate River itself may cause flooding of low lying areas around Delegate that could still cut roads and cause isolation of the town for short periods (17).

Flood Mitigation Systems

- 3.2.11 The Delegate Flood Retarding Basin is located on the outskirts of Delegate, parallel to Haydens Bog Rd and just South of Victoria Parade. It is designed to reduce the flow of flood waters through part of Delegate Township. It stores and retards floods from an unnamed creek 0.5km South of Delegate, with a catchment area of approximately 4 sq km, and a storage of 200ML up to its crest level of 5m. The basin is normally empty, except when holding rainfall runoff and in times of flood (5) (2).
- 3.2.12 Discharge from the basin is onto Haydens Bog Rd. Downstream of the basin the creek flows for approximately 0.5km before passing through part of the Delegate residential area. This area is relatively flat and is flood prone (prompting the construction of the retarding basin). Several houses on either side of the floodway would be expected to be inundated to some degree if a relatively rapid dambreak event was to occur. Further details of this basin can be found under Section 1.3 Storage Dams (5) (2).
- 3.2.13 There are no levee systems in Delegate.

Dams

- 3.2.14 Refer to Section 3.2.11 (Flood Mitigation Systems) above and Section 1.3 (Storage Dams), for details of the Delegate Flood Retarding Basin. This basin is prescribed by the NSW Dam Safety Committee.

At Risk Facilities

- 3.2.15 There is minimal history of any significant impacts upon facilities in Delegate. The Delegate Caravan Park behind the Showground (off Campbell Street), and a couple of residences at the lower end of Bombala Street near Victoria Parade and Corrowong Road may be inundated in larger events. Further details can be found in Annex 1 (4) (15).

3.3 OTHER SURROUNDING AREAS

3.3.1 Flooding of other streams and rivers within the former Bombala Shire LGA footprint can result in the isolation of properties, road closures, inundation of low-lying farmland, and the potential evacuation of some areas adjacent to creeks. These areas are detailed below under their specific catchments:

Bombala River Catchment

- a. **Bibbenluke:** The Bombala River is crossed by a high level concrete bridge, and there is now very little likelihood of flooding of the Monaro Highway. Flooding in this area may affect one residence in Bibbenluke, as happened in the 1971 flood (Map 4) (2).
- b. **Creewah Area:** This area contains the highest number of people directly affected by flooding (Map 5). It can be isolated by the Bombala River and a number of small tributaries plus the Big Dipper, Native Dog, Dragon Swamp and Yellow Waterhole Creeks. Limited access can be gained by 4WD vehicles under most conditions via Packers Swamp Road which runs off the Brown Mountain Road (2).
- c. **Thoko - Glen Allen Area:** Access to this area can be limited by flooding (Map 6) (2).

Coolumbooka River Catchment

- d. **Cathcart Area:** Dragon Swamp Creek can cause access problems in the Cathcart area (Map 7) (2).

3.3.2 Maps of relevant villages have been included in this plan (Maps 4-7) as they may assist in locating potential road closure points referenced within Section 3.4 Road Closures (1).

ROAD CLOSURES AND ISOLATED COMMUNITIES

3.4 ROAD CLOSURES

3.4.1 Table 6 lists roads liable to flooding in the former Bombala Shire LGA footprint.

Table 6: Roads liable to flooding in the former Bombala Shire LGA.

| Road | Closure location | Consequence of closure | Alternate Route | Indicative gauge height |
|----------------------------------|---|--|---|--|
| BOMBALA RIVER CATCHMENT | | | | |
| Creewah Road | Potentially several points along road between Bibenluka and Creewah locality. | Road may be cut by various creeks, leading to short term isolation. Generally around Moderate Flood Level on Bombala Town gauge (No. 222019) | Nil | Around Moderate Flood Level (5m) Bombala Town gauge (No. 222019) |
| CAMBALONG CREEK CATCHMENT | | | | |
| Gunningrah Road | Bukalong | Cut by Buckalong Ck. Variable length closure. | Potentially via Buckalong Siding Road to Monaro Hwy. | Unknown |
| Bibenluka to Gunningrah Road | Gunningrah | Cut by Cambalong Ck. Variable length closure. | Potentially North to Monaro Hwy. | Unknown |
| Cambalong Road | Cambalong locality (West North West of Bombala). | Cut by Bombala River. Variable length closure. | Potentially via Palarang and Redcliffe Roads if not closed. | Unknown |
| Redcliffe Road | Cambalong locality (West North West of Bombala). | Cut by Cambalong Ck. Variable length closure. | Potentially via Palarang and Redcliffe Roads if not closed. | Unknown |
| Redcliffe Road | Palarang locality (North West of Bombala). | Cut by Cambalong Ck. Variable length closure. | Potentially via Redcliffe and Cambalong Roads if not closed. | Unknown |
| Palarang Road | Merriangaa locality (North West of Bombala). | Cut off from Bombala by flooding for up to 3 days. | Nil | Unknown |
| CURRAWONG CREEK CATCHMENT | | | | |
| Browns Camp Road | Balwins turnoff near Brooklands and Karachi | Effectuated at a low-level causeway near Baldwin's turnoff, near Brooklands, and at Karachi by the | Possibly only via Browns Camp road to either direction if not closed elsewhere. | Unknown |

| Road | Closure location | Consequence of closure | Alternate Route | Indicative gauge height |
|--------------------------------------|--|---|--|--|
| | | Currawong Creek and its tributaries | | |
| Settlers Road | Corrowong Creek | Affected at a number of locations by Currawong Creek and its tributaries | Nil | Unknown |
| Snodgreass and Kangaroo Ground Roads | Unknown | Usually accessible as far as the Kangaroo Ground boundary where a low-level crossing can cause problems. | Unknown | Unknown |
| Unnamed Road | Currowidgin locality (North of Currawong) | Can be isolated by flooding for up to 5 days | Nil | Unknown |
| DELEGATE RIVER CATCHMENT | | | | |
| Browns Camp Road | Delegate River | Affected by flooding | Possibly North to Corrowong Road, or South to Delegate Road if not closed elsewhere. | Unknown |
| Balgownie Road | Balgownie Cattle yards | Affected by numerous creeks including Church Creek at Balgownie cattle yards and another at Alkoomie shearing shed. | Unknown | Unknown |
| Combens Road | Unknown | Can be affected by Church Creek | Unknown | Unknown |
| Quidong Road | Stephensons Crossing | Affected by the Delegate River at Stephensons Crossing and another creek at Inglewood homestead | Nil | Unknown Height. Quidong Gauge (No. 222008) |
| TOMBONG CREEK CATCHMENT | | | | |
| Tombong Road | Near "Red Hill" property approximately 9km from intersection with the Corrowong Road | Road is cut (possibly by Tombong Creek) | Nil | Unknown |

3.5 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

- 3.5.1 Generally creeks rise and fall quickly and result in only short term isolation in some areas of up to two days, however in more extreme events some rural areas may remain isolated for longer periods due to damaged roads or infrastructure. In the Bombala area during the June 2016 event the Cathcart Bridge was closed briefly due to unknown damage, however other access roads remained open to Cathcart. One property was also isolated for around one day near Creewah due to rising creeks cutting roads. In the Delegate area during this same event no issues were reported.
- 3.5.2 Refer also to Section 3.1 Bombala, subheading Isolation, Section 3.2 Delegate, subheading Isolation, and Section 3.4 Road Closures for further detail.

ANNEX 1: FACILITIES AT RISK OF FLOODING AND/OR ISOLATION

Bombala River Valley⁴

| Facility Name | Street | Suburb | Comment |
|--|---|---------|--|
| CBD / Retail / Residential | | | |
| Bombala CBD Retail Area, and surrounding Streets | Maybe Street (River side) Burton Street (Creek area) Mahratta Street (South) Therry Street Caveat Street Young Street Forbes Street | Bombala | An approx. 1% AEP (1 in 100 ARI) event of 10.63m at the gauge would impact many businesses on the river side of Maybe Street (between Burton and Young Streets). It would also impact a number of businesses and residences in the surrounding Streets between the river and Maybe Street. |
| Schools / Education Facilities | | | |
| None known to be affected | See Comments | Bombala | Nil showing within any available Extent Mapping at this time 2016. |
| Child Care Centres | | | |
| None known to be affected | See Comments | Bombala | Nil showing within any available Extent Mapping at this time 2016. |
| Facilities for the aged and/or infirm | | | |
| None known to be affected | See Comments | Bombala | Nil showing within any available Extent Mapping at this time 2016. |
| Utilities and infrastructure | | | |
| Bombala Water & Sewerage system | Monaro Hwy (Southern side of River) | | May be affected at approximately Moderate Flood Level (5m). |
| Bombala Swimming Pool | Therry Street | Bombala | May be affected at approximately Moderate Flood Level (5m). |
| Forbes Street Bridge | Forbes Street | Bombala | An approx. 1% AEP (1 in 100 ARI) event, 10.63m at the gauge would cut approaches to the Bridge. |
| Bombala Telephone Exchange | Therry Street | Bombala | |

⁴ This information is the result of comparing Satellite imagery against the Flood Extent Mapping shown in the 2010 Bombala Flood Study.

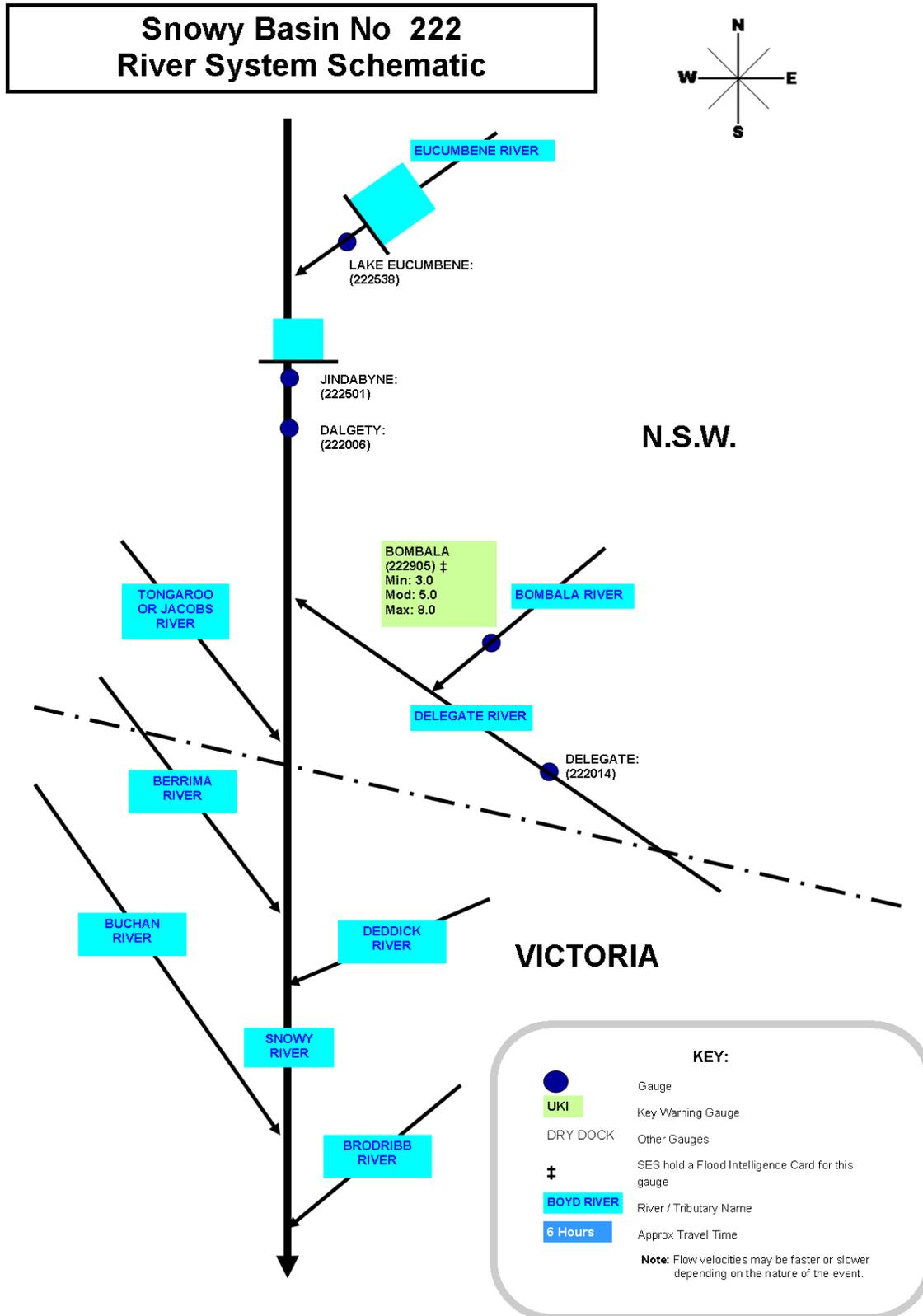
| | | | |
|---------------------------------------|--|---------|---|
| Camping Ground / Caravan Parks | | | |
| Bombala Caravan Park | Monaro Hwy (Northern side of River) | Bombala | May be affected at approximately Moderate Flood Level (5m). |

Delegate River Valley⁵

| Facility Name | Street | Suburb | Comment |
|--|--|----------|---|
| Schools | | | |
| None known to be affected | See Comments | Delegate | Nil showing within any available Extent Mapping at this time 2016. |
| Child Care Centres | | | |
| None known to be affected | See Comments | Delegate | Nil showing within any available Extent Mapping at this time 2016. |
| Facilities for the aged and/or infirm | | | |
| None known to be affected | See Comments | Delegate | Nil showing within any available Extent Mapping at this time 2016. |
| Utilities and infrastructure | | | |
| Delegate Water & Sewerage system | Delegate – Bombala Road | Delegate | May be affected by flooding. |
| Camping Ground / Caravan Parks | | | |
| Delegate Caravan Park | Campbell Street (off the North end) | Delegate | May be affected by flooding. Located Between the Showgrounds and River. |
| Delegate Showgrounds | Campbell Street | Delegate | May be affected by flooding. |

⁵ As not much information exists for reference, this information is the result of comparing Satellite imagery against flood history data in the 2008 Bombala Shire LFP, and information from Bombala SES Controller.

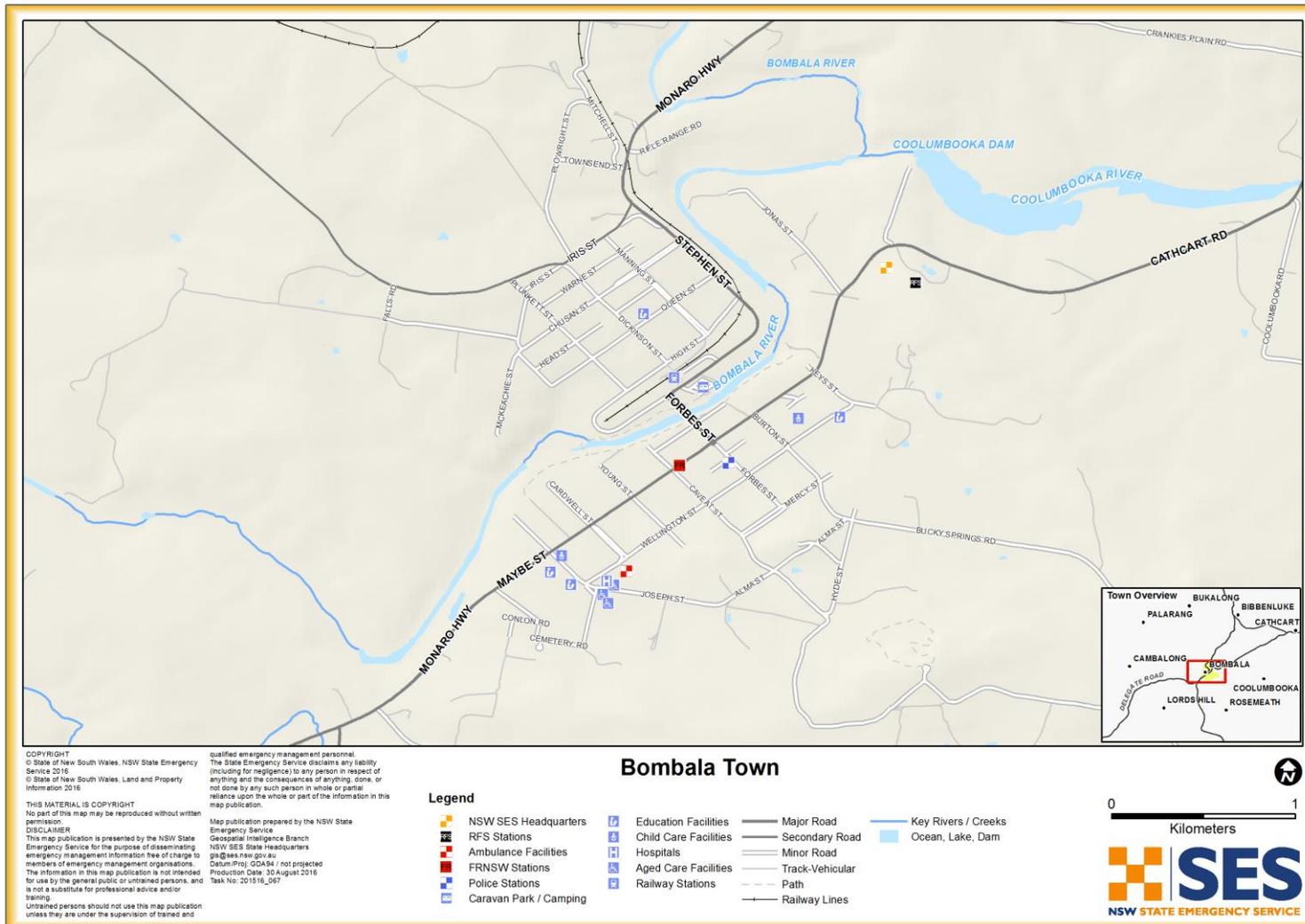
ANNEX 2: SNOWY RIVER SYSTEM SCHEMATIC



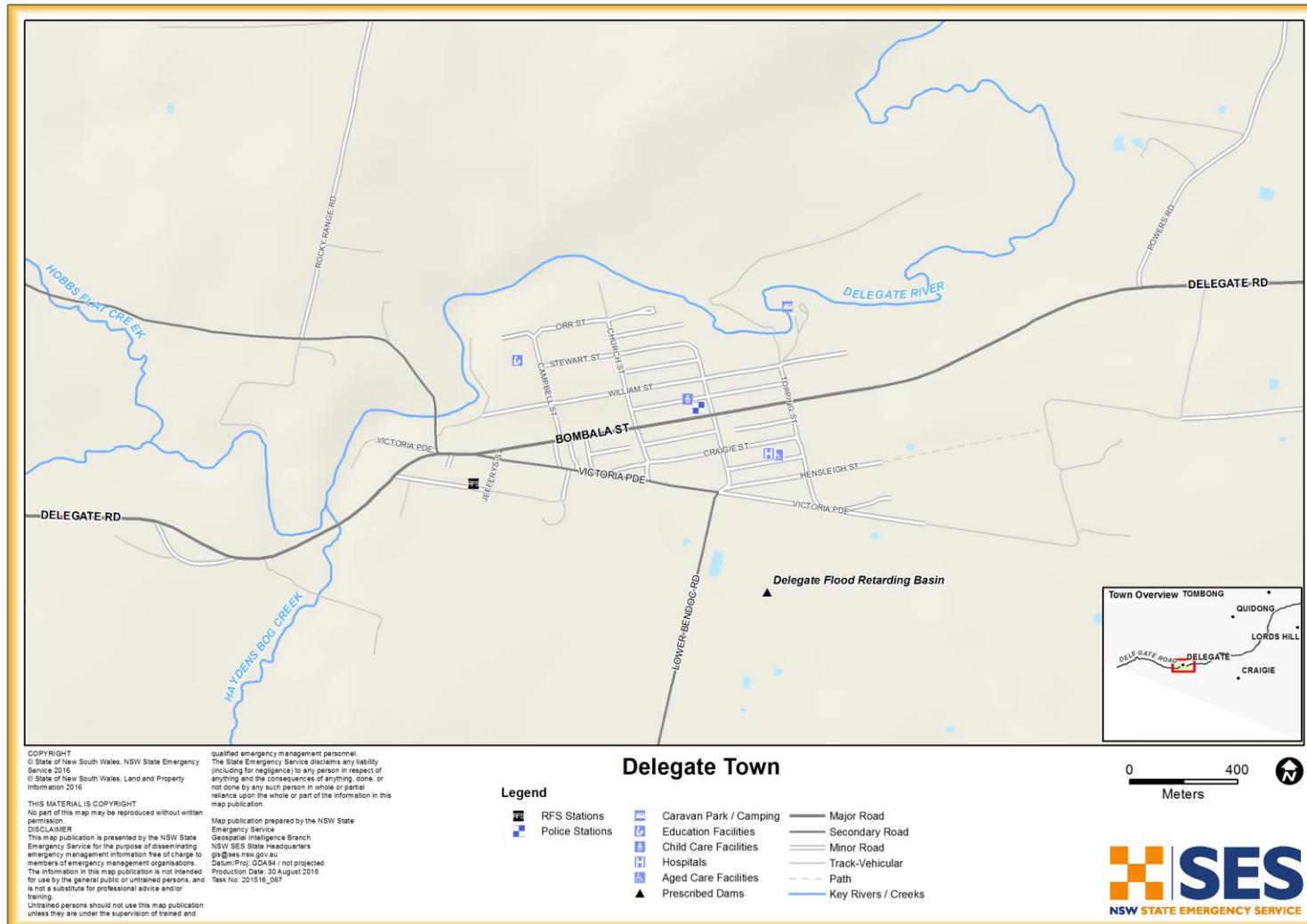
MAP 1: SNOWY RIVER BASIN



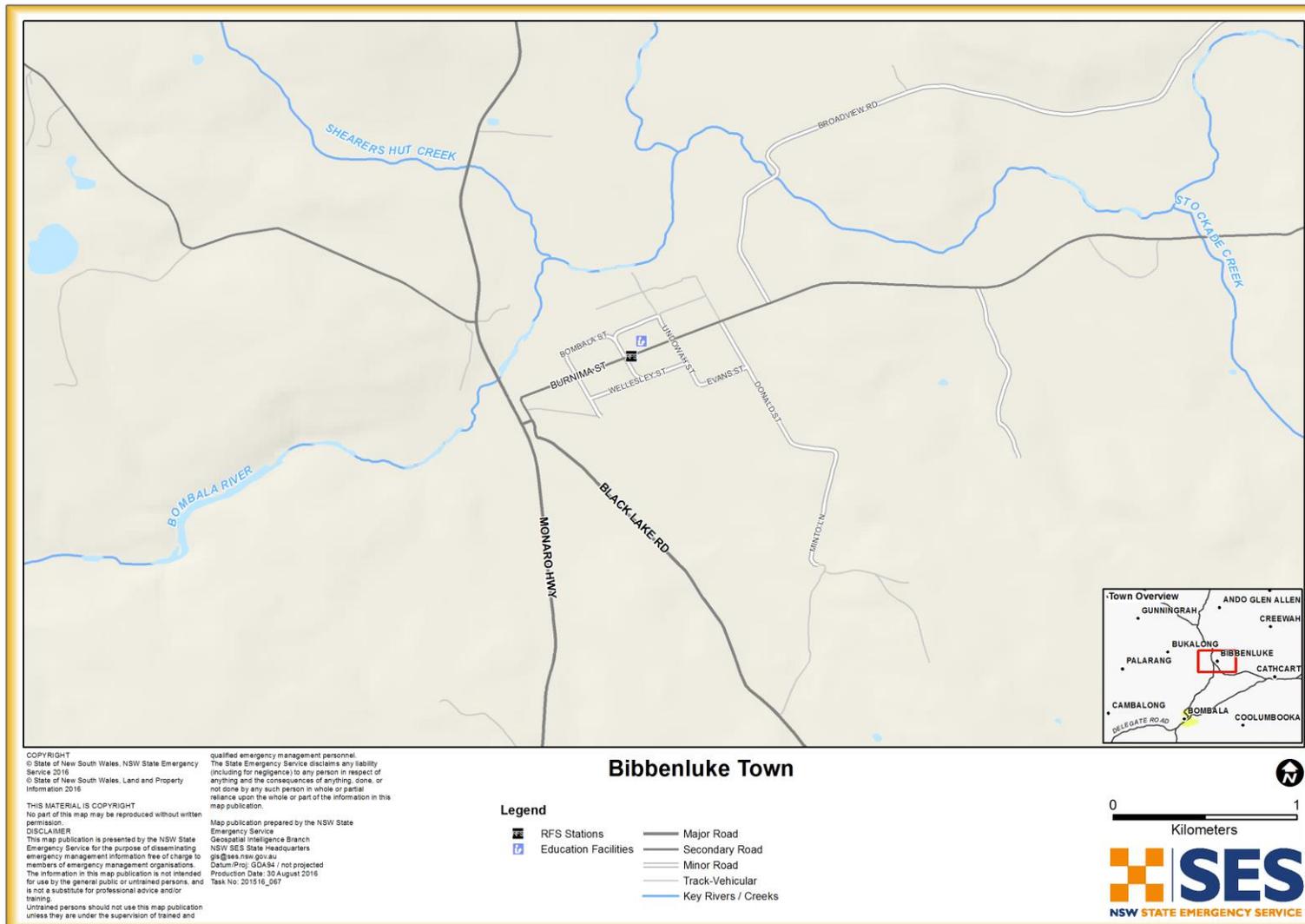
MAP 2: BOMBALA TOWN MAP



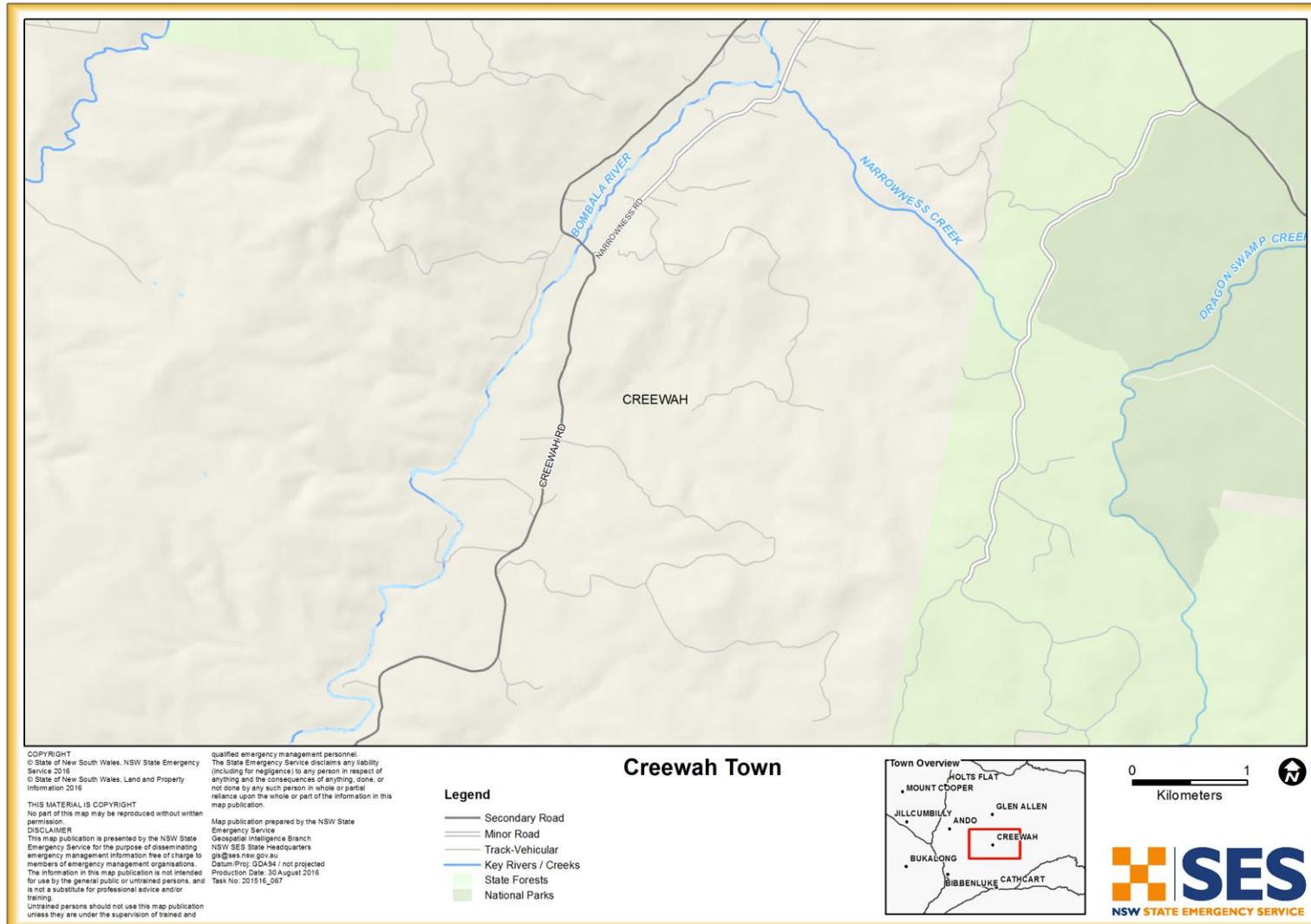
MAP 3: DELEGATE TOWN MAP



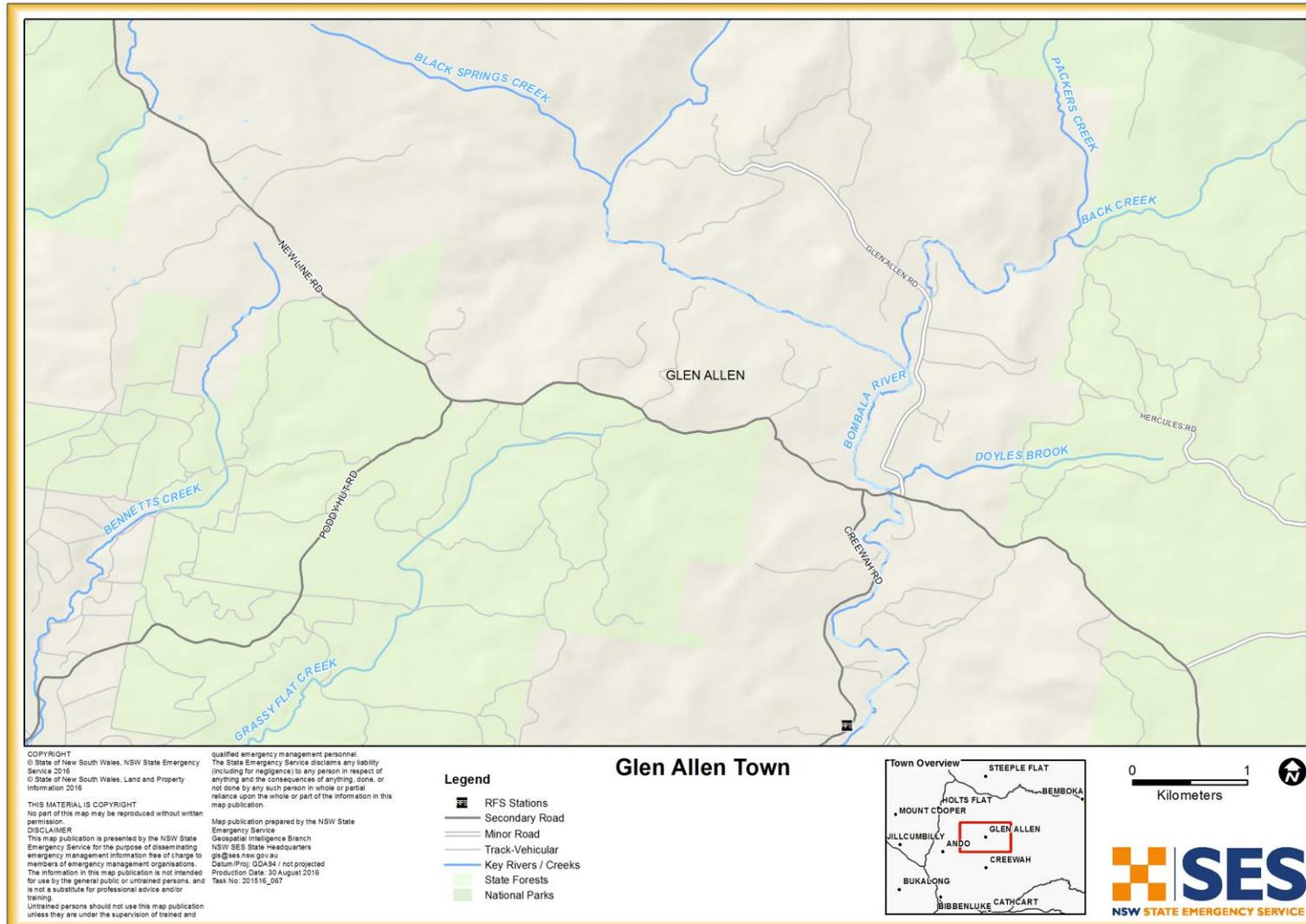
MAP 4: BIBBENLUKE TOWN MAP



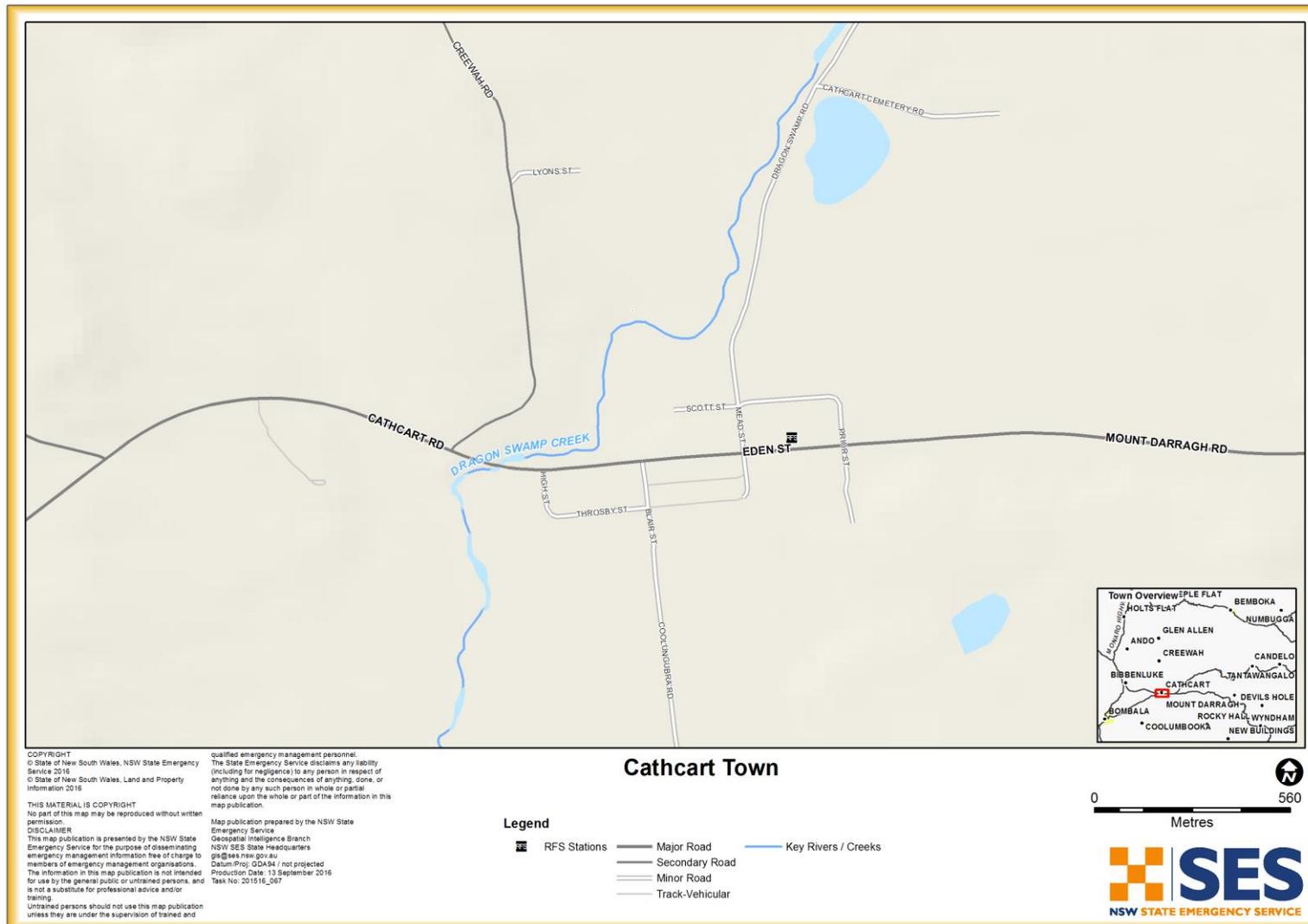
MAP 5: CREEWAH TOWN MAP



MAP 6: GLEN ALLEN TOWN MAP



MAP 7: CATHCART TOWN MAP



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HAZARD AND RISK IN THE FORMER COOMA-MONARO LGA

Volume 2 of the Snowy Monaro Regional Local Flood Plan

Last Update: July 2017

AUTHORISATION

The Hazard and Risk in the former Cooma-Monaro LGA has been prepared by the NSW State Emergency Service (NSW SES) as part of a comprehensive planning process. The information contained herein has been compiled from the latest available technical studies.

Approved



Manager Emergency Risk Management

Date: 1/3/17

Approved



NSW SES Southern Highlands Region Controller

Date: 10/7/17.

Tabled at LEMC

Date: 16 August 2017

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VERSION LIST

The following table lists all previously approved versions of this Volume.

| Description | Date |
|---|---------------|
| Cooma Monaro Local Flood Plan – Annexes A and B | November 2010 |
| | |
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| | |

AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

The Snowy Monaro Local Controller/s

NSW State Emergency Service

Geebung Street

Cooma NSW 2630

Amendments promulgated in the amendments list below have been entered in this Volume.

| Amendment Number | Description | Updated by | Date |
|------------------|-------------|------------|------|
| | | | |
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Document Issue: Version 2.0

1 THE FLOOD THREAT

1.1 OVERVIEW

1.1.1 The former Cooma Monaro Shire is located in the uppermost reaches of the Murrumbidgee River catchment. Flooding within the former council area can emanate from the Murrumbidgee River or its tributaries including Cooma Creek, Cooma Back Creek, Bredbo River, and the Numeralla River. These streams are discussed below. Cooma and Cooma Back Creeks are the only streams in the former LGA where flooding can have major effects on the community inundating roads and properties in Cooma. The effects of flooding of other streams within the former council area are minor, resulting in the isolation of a small number of properties, road closures and inundation of low-lying farmland adjacent to streams. Map 1 details the Murrumbidgee River Basin (1).

1.2 LANDFORMS AND RIVER SYSTEMS

Murrumbidgee River Basin

1.2.1 The **Murrumbidgee River** rises in the heart of the Snowy Mountains east of the Fiery Range (Map 1). The river originally flows southward into Tantangara Reservoir, being joined by the tributaries of Peppercorn, McPhersons, Boundary, Dairymans, Tantangara, Nungar and Carrolls Creeks. Downstream of Tantangara Reservoir the river flows further south, traversing steep gorge terrain, with small pockets of floodplain. East of the rivers confluence with Slacks Creek the river turns northward and joins the Numeralla River. Major tributaries along this reach include: Goorudee Rivulet and Jones, Yaouk and Slacks Creeks. North of the confluence with the Numeralla River, the river continues flowing north into the Australian Capital Territory (ACT), being joined by the Bredbo River, Michelago Creek, Ingelara Creek and the Naas River along the way. There are no large expansive floodplains along any of these reaches (1).

1.2.2 **Cooma Creek** rises south of Cooma in the foothills of the Monaro Range. Cooma Creek is joined by numerous small tributaries including Brothers Creek, before flowing through Cooma and joining Cooma Back Creek in the northern section of the town. From this confluence the creek continues to flow north eventually joining the Numeralla River. The catchment is relatively steep and small with its size totalling 103 square kilometres at its confluence with Cooma Back Creek. Map 2 details both Cooma and Cooma Back Creek catchments (1).

1.2.3 **Cooma Back Creek** rises to the south of Cooma and to the west of Cooma Creek. The creek flows through foothills passing through the western parts of Cooma before joining Cooma Creek in the northern section of the town. The catchment is relatively steep and small with its size totalling 100 square kilometres at its confluence with Cooma Creek (1).

- 1.2.4 **Bredbo River** rises in the Badja State Forest, east of Bredbo and flows west before joining the Murrumbidgee River close to the village of Bredbo (1).
- 1.2.5 **Numeralla River** begins near Kybeyan close to Nimmitabel. The river flows northwards to Numeralla then west to its junction with the Murrumbidgee River. The rivers main tributaries are the Kybeyan River, Rock Flat Creek, Big Badja River, Tom Groggins Creek and Cooma Creek (1).

1.3 STORAGE DAMS

- 1.3.1 There are seven Prescribed Dams within the Snowy-Monaro LGA including Tantangra, Cowarra Creek Tailings, Eucambyne, Guthega, Island Bend, Jindabyne and Delegate Flood Retarding Basin.
- 1.3.2 However of these, only Tantangra Dam and Cowarra Creek Tailings Dam lie within the former Cooma-Monaro LGA.
- 1.3.3 Dam locations are shown on MAP 1 – Murrumbidgee River Basin.

Table 1: Prescribed Dams in the former Cooma-Monaro LGA; Summary of Information about each Storage.

| Tantangra Dam | |
|----------------------------------|---|
| Owner / Operator | Snowy Hydro Ltd (SHL) |
| Dam Safety Emergency Plan (DSEP) | Snowy Hydro Limited – Dam Safety Emergency Plan Tantangara Dam – Issue Date: 7 th March 2014 (2). |
| Description of Dam | Concrete gravity structure approximately 216m long at the crest and 45m high. Dam crest level is a RL 1,233.83m (SMA datum). It has a free overfall spillway located centrally in the dam which has capacity for flows up to 900m ³ /s. Capacity at normal operating Fully Supply Level (FSL) is approx. 254 GL. |
| Location | Located on the Murrumbidgee River in the Kosciuszko National Park. |
| Communities Downstream | Downstream, the Murrumbidgee River passes through farming country and approaches the outskirts of Cooma before turning north towards Canberra. Yaouk Valley and Dog Plain, north and east of Adaminaby and in the Kissops Flat/Birchgrove area. Part of the Kosciuszko National Park. |
| Monitoring System | SHL advises Storage Level real time monitoring is in place. |
| Warning System | SHL advises Nil as at 2016. |
| Other | No flow timelines are shown in the current Dam Safety Emergency Plan (DSEP) 2014 as at 2016 (2). |

| Cowarra Creek Tailings Dam | |
|-----------------------------------|---|
| Owner / Operator | NSW Crown Lands |
| Dam Safety Emergency Plan (DSEP) | Note: No current DSEP, NSW Public Works refers to the following: Cowarra Creek Mine Tailings Dam – 2015 Surveillance Report (Inspection Date 16th June 2015). Report Number: DC15137 July 2015 (3). |
| Description of Dam | Earth/rock fill embankment with partial geofabric lining. Embankment Length 110m and Height 24.5m. Crest Level RL 854.1m AHD. Full Supply Level (FSL) 52ML. Spillway overflow is ungated channel in meta-sedimentary rocks. |
| Location | Located approximately 15 km East of Bredbo on a tributary of Cowarra Creek. The Coppawidgee Trail passes in the vicinity to the West. |
| Communities Downstream | No nearby inhabitants: Population at Risk (PAR) <1 |
| Monitoring System | Visual inspection every 2.5yrs (inactive but still prescribed dam in 'care and maintenance' status). |
| Warning System | Nil |
| Other | This site is managed under the Derelict Mines Program and is in a state of 'Care and Maintenance'. Visually inspected, assessed, and reported on in 2015. Reported as being designed to withstand at least up to a 1% AEP (1 in 100 ARI) (3). |

1.4 WEATHER SYSTEMS AND FLOODING

1.4.1 Floods within the former Cooma Monaro council area can be caused by the following types of weather systems (1):

- a. Sequences of southern air masses (frontal systems) coming from the Antarctic region and moving in a north easterly direction over the catchment. This is the principal flood producing mechanism and operates primarily between the months of April and October (1).
- b. Low-pressure systems located over the east coast of Australia and causing moist airflows over the Monaro district and Snowy Mountains (1).
- c. Short duration, high intensity convective thunderstorms that occur over small areas during summer. These may cause town drainage systems to surcharge and the Cooma and Cooma Back creeks to rise rapidly. Such thunderstorms do not cause mainstream riverine flooding on larger streams such as the Murrumbidgee River. However, may cause rises in small tributaries (1).

1.5 CHARACTERISTICS OF FLOODING

Characteristics of Flooding in the LGA

- 1.5.1 Flood warning times are typically short, with streams both rising and falling quickly. The main exception to this is the Murrumbidgee River, which can stay in flood for up to a week at a time with minor impacts to rural communities and transport routes (1).
- 1.5.2 Flooding in catchments tends to occur simultaneously because it results from rainfall along the Great Dividing Range (1).
- 1.5.3 The highest rainfalls generally occur in the period from December to February, with another peak in June. However, floods can occur at any time of year (1).

Characteristics of Flooding on Cooma Creek and Cooma Back Creeks

- 1.5.4 Cooma Creek and Cooma Back Creeks are both relatively steep and free of dense vegetation. Storm rainfalls in the area are typically of short duration but of moderate to high intensity. As a consequence floods on Cooma and Cooma Back creeks are characterised by flash flooding. Flash flooding is generally described as flooding which occurs within six hours of the rain that causes it. In Cooma the time to flooding from Cooma Creek and Cooma Back Creek can be as little as 30 minutes to two hours from the onset of heavy rain (1).
- 1.5.5 During an event reaching 2.38m on the SMEC Sharp Street gauge (No. 410902) or 4.4m on the Koolaroo gauge (No. 410081), which equates to a 5% AEP (20 year ARI) event, the floodplains adjacent to the creeks could be inundated by flood waters one metre or more deep and flowing at one metre per second or more (4). Such velocities would be sufficient to damage fences and structures, wash vehicles from causeways and pose serious danger to persons attempting to wade or swim through flood waters. Mainstream velocities may reach up to three metres per second (1).
- 1.5.6 Flood waters typically contain large amounts of debris, which frequently lodge on structures and trees in floodway areas, causing a reduction in flood capacity. During the 1991 flood, such a build up at Sharp Street resulted in increased flooding in the area (1).
- 1.5.7 It could be expected that peaks in both creeks could occur at the same time, leading to an exacerbation of flooding at their confluence (1).

Table 2: Indicative Flow Travel Time for the Cooma Creek and Cooma Back Creek

| Locations | Travel Time |
|-----------|---|
| Cooma | As little as 30 minutes, up to two hours, from when Creeks begin to flow (dependent on rainfall) (1). |

Flash Flood Alerts

1.5.8 The Australian Bureau of Meteorology (BOM) monitors rain gauges in the Cooma Town area and provides Flash Flood Alerts to external authorities such as Local Government and the NSW SES. These alerts are sent to the various authorities nominated Flash Flood phones. The BOM advises that all Cooma rain Gauges have three set thresholds for the purpose of flash flood prediction and alerts. The three thresholds are:

- Threshold 1 – equates to 30mm in 30 minutes
(broadly based on the 1hr/10 year ARI for Cooma)
- Threshold 2 – equates to 40mm in 60 minutes
(Indicates a sustained event)
- Threshold 3 – equates to 70mm in 3 hours
(Generally leads to major flooding)

IMPORTANT NOTE:

The BOM advises that should any authority receive two calls in quick succession on their nominated Flash Flood phone, then that authority may need to take drastic action (5).

1.6 FLOOD HISTORY

- 1.6.1 Cooma Creek has a history of flooding. Flood events include March 1956, March 1961, December 1966, March 1969, June 1978, July 1991, January 1992 and February 2012. The flood of record is the 1956 flood (prior to construction of the Cooma levee) which was equivalent to a 1 in 17 year flood event (1).
- 1.6.2 In comparison the 1991 flood is estimated to have been 1.84m on the SMEC Sharp Street gauge (No. 410902) and 3.65m on the Koolaroo gauge (No. 410081). This 1991 flood event is estimated to have been equivalent to a 10% AEP (1 in 10 ARI) flood (1).
- 1.6.3 In January 2007 a localised severe thunderstorm generated about 40mm of rainfall and runoff caused Cooma Creek to reach the top of the levee, which equates to 2.38m on the SMEC Sharp Street gauge (No. 410902) or 4.4m on the Koolaroo gauge (No. 410081), a 5% AEP (1 in 20 ARI) flood. Several weeks

later this was repeated when another thunderstorm generated about 75mm of rain (1).

- 1.6.4 Since 1964 significant floods on the Murrumbidgee River have been recorded in 1974, 1976, 1978, 1991, 1992 and 2011 and on the Numeralla River in 1974, 1975, 1976 and 1991 (1).
- 1.6.5 It is important to note that floods can occur on the tributaries and headwaters of the Murrumbidgee River without any significant flooding of the Murrumbidgee River (1).

Table 3: Flood History from Koolaroo, Cooma Creek Gauge (410081) – Top 10 floods

| Date | Peak Height (m) |
|------------|-----------------|
| 30/12/1966 | 3.05 |
| 29/03/1969 | 3.19 |
| 24/05/1974 | 2.66 |
| 14/06/1978 | 2.79 |
| 26/11/1988 | 2.66 |
| 03/04/1989 | 2.74 |
| 10/07/1991 | 3.65 |
| 12/07/1991 | 3.04 |
| 09/01/1992 | 2.94 |
| 03/02/2011 | 2.63 |

1.7 FLOOD MITIGATION SYSTEMS

- 1.7.1 A system of levees protects the urban areas of Cooma (6). The initial sections of the system were constructed in 1960 and are mostly earthen with a concrete section between Massie and Egan Streets. The design height of the levee is 2.38m on the SMEC Sharp Street gauge (No. 410902) or 4.4m on the Koolaroo gauge (No. 410081), equating to a 5% AEP (1 in 20 ARI) flood. The levee system has been extended and some sections remediated since construction in the 1960s (6).
- 1.7.2 The levee system includes the following levees:
- From Sharp Street to Egan Street along the north eastern side of Cooma Creek (built in the 1960s).
 - Extensions from Campbell St to Massie St (built 2002).
 - Cooma Back Creek/Mulach Street section of the levee starts in vicinity of the Barrack Street intersection (built 1983, raised late 1990s) (1).
- 1.7.3 Each levee is further described within Part 3 - Specific Risk Areas.
- 1.7.4 Levee locations are shown on MAP 2 – Cooma Town.

Location and sequence of inundation

- 1.7.5 An area near Sharp Street behind the Cooma levee has in the past flooded from local runoff resulting in the inundation of some commercial premises. Council has since implemented works to address this problem. Flooding due to local runoff is expected to occur prior to overtopping of the levee (1).
- 1.7.6 High ground is located behind the levee above the Probable Maximum Flood (PMF) that allows for evacuation within Cooma (1).

Levee Integrity

- 1.7.7 Erosion has occurred near the Cooma Creek and Cooma Back Creek confluence. Council has pursued works to remediate this, however to date this has not yet occurred. Refer to Part 3 - Specific Risk Areas for further detail (1).
- 1.7.8 Material used for construction of older sections of the levees is unknown (1).

1.8 EXTREME FLOODING

- 1.8.1 Flooding above the flood of record is possible. Extreme floods above 4.06m on the SMEC Sharp Street gauge (No. 410902) or 5.7m on the Koolaroo gauge (No. 410081), equating to a 1% AEP (1 in 100 ARI) flood are characterised by fast rising, deep and fast flowing floodwaters, with the horizontal extent of flooding across the topography increasing in magnitude (1). Map 3 shows the modelled 1% AEP flood extent in Cooma.
- 1.8.2 The PMF would inundate large parts of Cooma with deep, high velocity, debris laden flood water. During a PMF the water depth in the channel would exceed 7m (1). A map showing the PMF and 1 in 500 year design floods at Cooma can be found in the SMEC 1994 Cooma Floodplain Management Study Final Report (7). The maps show that even with extreme flooding there is still a large portion of Cooma that is flood free (high ground above the PMF) (1) (7).

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

2.1.1 The population of the Cooma Urban Area was 7,428 at the last Census in 2011. Included in this figure was a small indigenous community of 234, a small community of 31 who do not speak English well, and 419 people aged over 65. There are approximately 459 residents in the Cooma Urban Area who may require assistance due to illness or disability during an event. Table 4 below provides further detailed analysis (8).

Table 4: Census of Housing and Population data (2011) (8)

| Census Description | Former Cooma-Monaro LGA | Cooma | Nimmitabel |
|--|-------------------------|--------------|------------|
| Total Persons | 9,772 | 7,428 | 528 |
| Aged 0-4 yrs | 606 | 468 | 35 |
| Aged 5-14 yrs | 1,273 | 931 | 75 |
| Aged 65 + yrs | 1,769 | 1,412 | 106 |
| Of Indigenous Origin | 263 | 234 | 12 |
| Who do not speak English well | 31 | 31 | 0 |
| Have a need for assistance (profound/severe disability) | 545 | 459 | 31 |
| Living alone (Total) | 1,167 | 959 | 66 |
| Living alone (Aged 65+) | 487 | 419 | 24 |
| Residing in caravans, cabins or houseboats or improvised dwellings | 34 | 12 | 12 |
| Occupied Private Dwellings (Households) | 3,828 | 2,967 | 220 |
| No Motor Vehicle | 287 | 280 | 13 |
| Caravan, cabin, houseboat or improvised dwell | 21 | 5 | 3 |
| Rented via State or Housing Authority | 94 | 96 | 0 |
| Rented via Housing Co-Op or Community Church Group | 25 | 20 | 0 |
| No Internet Connection | 978 | 817 | 66 |
| Unoccupied Private Dwellings | 910 | 510 | 122 |
| Average persons per occup dwelling | 2.3 | 2.3 | 2.4 |
| Average vehicles per occup dwelling | 1.7 | 1.6 | 1.8 |

3 SPECIFIC RISK AREAS - FLOOD

3.1 COOMA

3.1.1 Cooma is the only urban area within the former Cooma-Monaro LGA with a known significant flood problem (Maps 2 and 3). Flooding can either be direct flooding from Cooma Creek, Cooma Back Creek, or a combination of both (1). Flooding of other streams within the former LGA can result in the isolation of properties, road closures, inundation of low-lying farmland, and the potential evacuation of some areas adjacent to creeks (1).

Characteristics of Flooding

3.1.2 Flooding in Cooma occurs with little warning time and can be deep and fast flowing, posing a significant hazard to life (1). Flooding on Cooma Creek and Cooma Back Creek is considered to be Flash Flooding (1).

Classification of Floodplain

3.1.3 Using the DECC Floodplain Risk Management Guideline 2007 (9), the Cooma Town is classified as having 'Rising Road Access' (RRA). These are areas where access roads exist and rise steadily in an uphill direction away from rising floodwater. Cooma Town cannot be completely isolated even in a PMF (9).

3.1.4 Cooma Town contains low-lying areas that people would need to be progressively evacuated from to higher ground as floodwaters rise (9).

3.1.5 Evacuation is possible by vehicle or on foot using these access roads as floodwaters rise. People should not become trapped in homes unless their decision to evacuate their properties is delayed. An example of this is potentially occupants of multiple storey buildings who initially thought they would stay, but later wished to leave when their evacuation route may already have been cut off (9).

Inundation

3.1.6 Cooma is affected by the flooding of the Cooma and Cooma Back Creeks. Areas at risk of flooding during the 5% and 1% AEP events are shown in Map 3 and include Cooma's central business district and residential areas adjacent to the creeks (1).

3.1.7 Low-lying farmland located adjacent to rivers and creeks can also be flooded with farmers needing to relocate livestock and equipment to higher ground. It is considered unlikely that farm houses would be inundated (1).

3.1.8 The 1991 flood which reached 1.84m on the SMEC Sharp Street gauge (No. 410902) and 3.8m on the Koolaroo gauge (No. 410081) (10% AEP or 1 in 10 ARI) caused flood damage to 43 residences and 10 businesses. Eighteen of those residential properties experienced over floor flooding, as did seven of the commercial properties (Table 5) (1).

It is unclear from the SMEC 1994 Cooma Floodplain Management Study whether these properties were affected due to localised flooding inside the levee (ponding), or if they were located outside the levee. As the property locations are not listed it is also uncertain if these properties are now protected by the levee. In 1991 the Sharp St to Egan St levee was in place as was limited leveeing in the Cooma Back Creek / Mulach Street area. Since 1991 the levee system has been extended and raised in several places (7).

- 3.1.9 During floods greater than 4.06m on the SMEC gauge (No. 410902) or 5.7m on the Koolaroo gauge (No. 410081) (1% AEP or 1 in 100 ARI), the Cooma TAFE and the former Cooma Monaro Shire Council basement and car park may be flooded (1).
- 3.1.10 During a PMF large parts of Cooma would be inundated with deep, high velocity, debris laden flood waters. However even in such an extreme event the mapping from the SMEC 1994 Cooma Floodplain Management Study shows that large portions of Cooma would still remain flood free with high ground available above the PMF (7).
- 3.1.11 Snowy Monaro Shire Council engineering staff advise that council is seeking funds to conduct further flood modelling of the Cooma Town and surrounding rural areas.

Table 5: Estimated number of properties inundated above floor level and over ground in Cooma related to the SMEC gauge (No. 410902).

| Gauge Name/Number Gauge Height (m) | % AEP (? in Yr.) | Range of Over Floor Depths (m) | No. Properties with Over floor Flooding | No. Properties with Over-ground Flooding |
|---|----------------------|--------------------------------------|--|---|
| SMEC gauge No. 410902 (1.84m) and Koolaroo gauge No. 410081 (3.8m) | 10% AEP (1 in 10) | Unknown | 18 residences 7 businesses (in 1991 event ¹) | 43 residences 10 businesses (in 1991 event ¹ , inclusive of figures from previous column) |
| SMEC gauge No. 410902 (2.38m) and Koolaroo gauge No. 410081 (4.4m) | 5% AEP (1 in 20) | Unknown | Nil ¹ | Nil ¹ – but beyond this height low lying areas may experience inundation |
| SMEC gauge No. 410902 (4.06m) and Koolaroo gauge No. 410081 (5.7m) | 1% AEP (1 in 100) | Unknown | Unknown | 30-40 residences ² 20 businesses ² Cooma TAFE and Cooma Monaro Shire Council basement and carpark may be flooded. |

¹Note: there is a discrepancy between the affected property figures for the 10% AEP in 1991 and the 5% AEP figures (not dated). Since 1991 further levee works have occurred that may be reflected in these figures.

²Note: the Draft Cooma Creek FIC at SHR indicates that ground truthing by NSW SES members in 2009 identified likely affected property figures within the 1% AEP extent (10).

Isolation

- 3.1.12 Generally creeks rise and fall quickly and result in only short term isolation in some rural areas of up to two days, however in more extreme events some rural areas may remain isolated for up to one week. Such isolation is due to flooded roads. A small number of properties in the former Cooma Monaro Shire located on the Numeralla, Kydra, Badja, Bredbo, Tuross and Murrumbidgee Rivers can be isolated for up to a week (1).
- 3.1.13 Smiths Road 'The Angle' NSW, is a small dispersed rural community along Smiths Road which may become isolated for short periods due to several small creeks rising along Naas Road between Tharwa (ACT) and Smiths Road properties within NSW. The Smiths Road area is part of the former Cooma Monaro LGA. However, by way of agreement between SES Units this community is serviced by NSW SES Queanbeyan Unit due its closer proximity. Further detail regarding this area is found in the Queanbeyan – Palerang Local Flood Plan, under Section 1.6 Cross Border Assistance Arrangements (11).
- 3.1.14 See Section 3.3 Summary of Isolated Communities and Properties for further detail. For road closures refer to Section 3.2.

Flood Mitigation Systems

- 3.1.1 Cooma is protected by a system of levee banks up to the level of 2.38m on the SMEC Sharp Street gauge (No. 410902) or 4.4m on the Koolaroo gauge (No. 4100815). This is equivalent to a 5% AEP (1 in 20) flood event. Up to this point the levee provides protection for approximately 30 properties. After this point low-lying parts of Cooma begin to experience inundation (1). A summary of information regarding levee systems in Cooma and the potential numbers of threatened properties is provided in Table 6. These levees are also shown on Map 2.
- 3.1.2 Low-set properties adjacent to the creeks in Bombala, Campbell, Albert, Victoria, Dension, Egan, Murray, Commissioner, Sharp, Massie, Amos, Vale, Barrack, Kerwan, Tumut, Lambie, Boundary, Vulcan, Mulach streets and Church Road are protected by the levee system and would be susceptible to varying degrees of flooding once the levee is overtopped (1).

Table 6: Levees in Cooma; summary of information

| Cooma Town Levee System | |
|---|--|
| Locations | Sharp Street to Egan Street Campbell to Massie Street Cooma Back Creek/Mulach Street |
| Type of Levee (ring etc) | A 'Levee System' incorporating the three locations described above. |
| Owner | Snowy Monaro Council |
| Design Height and freeboard | Levee design height and recommended works from SMEC 1994 Cooma Floodplain Management Study (7) were for 2.38m on the SMEC gauge (No. 410902), and 4.4m on the Koolaroo gauge (No. 410081), a 5% AEP with 0.5m freeboard. Works have since been undertaken, but height is not confirmed. |
| Overtopping Height | Varies, and will be identified further in planned remodel for 2017. |
| No. of properties protected | Approximately 43 residences and 10 businesses. |
| Known low points | Since 1994 the former Cooma-Monaro Council has undertaken works to address low points. |
| Location and sequence of inundation | This detail is unclear, however Snowy Monaro Council is currently seeking funding to review their flood modelling as it has not been done since approximately 2000. |
| Consequences of levee overtopping or failure | In the 1991 (10% AEP) flood event 43 residences and 10 businesses experienced over-ground flooding. Of those, 18 residences and 7 businesses experienced over-floor flooding (1). Since 1991 however the Levee System has been extended. Cooma has a flood classification of Rising Road Access (RAA) and in the event of an evacuation there is high ground located behind the levee that is above PMF level (9). |
| List any deficiencies | This detail is unclear at this time, however Snowy Monaro Council is currently seeking funding to review their flood modelling as it has not been done since approximately 2000. |

Dams

Tantangara Dam - Consequences of dam failure for the former Cooma Monaro LGA

- 3.1.3 There is limited information available with regard to Tantangara Dam design flood specifications, however Snowy Hydro Limited are reviewing the specifications of this dam at this time. Updated information is likely to be released in future versions of the DSEP (2).
- 3.1.4 Snowy Hydro Limited advises that the storage level of Tantangara is generally around 20% full. Tantangara is a shallow dam and once storage levels reach 20-25%, diversions to Lake Eucumbene commence as part of Snowy Hydro's evaporation minimisation efforts (12).

- 3.1.5 Downstream of Tantangara Dam, the Murrumbidgee River passes through the Kosciuszko National Park which contains a number of walking trails and camping grounds. The river then travels through predominantly farming lands before it then turns north towards Canberra. This area contains isolated dwellings, huts and sheds adjacent to the river. Small settlement clusters exist in Yaouk Valley and Dog Plain to the North and East of Adaminaby, and in the Kissops Flat/Birchgrove area. Many properties along the river are used as holiday homes in summer (2).
- 3.1.6 Flood inundation downstream of Tantangara Dam is generally through narrow steep valleys, broadening out along the floodplains of Yaouk, Second Flat, and East of Adaminaby. The largest flooded area is East of Adaminaby where the Murrumbidgee River is joined by the Goorudee Rivulet, Long Corner Creek and Back Creek (2).
- 3.1.7 The Tanangara Dam, Dam Safety Emergency Plan indicates dam failure scenarios having a maximum flood extent which reach parts of the Snowy Mountains Highway, Adaminaby Racecourse and Boboyan Road adjacent to Long Corner Creek. Refer to the DSEP for further detail (2).

At Risk Facilities

- 3.1.8 During floods greater than 4.06m on the SMEC Sharp Street gauge (No. 410902) or 5.7m on the Koolaroo gauge (No. 410081) (1% AEP or 1 in 100 ARI) flood event, the Cooma TAFE and the former Cooma Monaro Shire Council basement and car park may be flooded. TAFE have an evacuation plan that will be implemented upon advice from the NSW SES or other emergency services officer (1).
- 3.1.9 The Cooma Hospital in Bombala St is not expected to flood even during a PMF event (1).
- 3.1.10 Based on the information available, no schools or campgrounds in the Local Government Area are expected to be inundated due to riverine flooding (1).
- 3.1.11 Satellite imagery comparison against the flood extent mapping identifies:
- a. Cooma TAFE Campus in Commissioner Street, Caltex Service Station in Sharp Street, and Region Service Station in Bombala Street could all be impacted in an event reaching 2.38m on the SMEC Sharp Street gauge (No. 410902) or 4.4m on the Koolaroo gauge (No. 4100815) which equates to a 5% AEP (1 in 20 ARI) event. The Cooma Bowling Club in Mawson Street is just outside the 5% AEP extent but may also be impacted (13) (1).
 - b. Similarly, the Cooma Universities Centre in Bombala Street, Cooma Lambie Street Preschool, Caltex Cooma in Sharp Street and the Cooma Bowling Club could be impacted in an event reaching 4.06m on the SMEC Sharp Street gauge (No. 410902) or 5.7m on the Koolaroo gauge (No. 410081) which equates to a 1% AEP (1 in 100 ARI) event. The Sir William Hudson Memorial Centre in Fachin Street is just outside the 1% AEP Extent but may also be impacted (13) (1).

- 3.1.12 For further detail refer to Annex 1 - facilities at risk of flooding and/or isolation within the former Cooma Monaro LGA. Note: This list is not necessarily comprehensive.

Surrounding Villages

- 3.1.13 As earlier stated, Cooma Town is the only urban area within the former LGA that has a significant flood problem. Surrounding villages may however be affected by short term road closures. The Snowy Monaro Shire Council is seeking funding to conduct a new flood study that may include greater reference to surrounding villages such as Michelago, Bredbo, and Nimmittabel. Maps of these villages have been included in this plan as they may assist in locating potential road closure points referenced within Section 3.2 Road Closures (See Maps 4, 5, and 6) (1).

ROAD CLOSURES AND ISOLATED COMMUNITIES

3.2 ROAD CLOSURES

3.2.1 Many rural roads as well as a major highway within the LGA are susceptible to flooding from local creeks, with low level crossings closed by fast flowing flood waters. Excluding closure of the highway, the major impact from rural road closures is to prevent rural residents from leaving or returning to their properties. Generally the creeks rise and fall quite quickly (periods of several hours). However in a prolonged widespread flood event, the duration of floods closing these rural roads may run into days (1).

3.2.2 The following roads can experience flooding resulting in their closure:

- a. The **Monaro Highway** can be closed for periods up to a day by Cooma Creek at Bunyan. The RTA closes and signposts this location. It can also be closed by local creek flooding at Colinton for between two and three hours at a time. While local alternate routes are available, these are via unsealed roads which may also be affected by flooding of local creeks, and are not suitable for heavy vehicles. Major alternate routes are the Princess Highway to the East and the Hume Highway to the West.
- b. **Tinderry Road** to the West of Michelago village at Michelago Creek isolating rural residents along Tinderry Road. Access is unlikely from the Jerangle Road due flooding by other creeks and the Queanbeyan River crossing.
- c. The low level causeway across the Murrumbidgee River on **Bumbalong Road** can be cut isolating about five properties. There is no alternate access to the West, however the community is self-sufficient for at least 48 hours.
- d. **Billingara Road** can be cut by the Murrumbidgee River, although access remains open to the West through to Shannons Flat.
- e. **Peak View Road** can be cut at:
 - The Bredbo River causeway.
 - The Cowra Creek causeway.
 - At Frog's Hole Creek.
- f. **Cowra Creek Road** can be cut at the Bredbo River.
- g. **Rose Valley Road** can be cut by Rock Flat Creek and by the Numeralla River at 'Rose Valley' station (1).

3.2.3 A number of roads and property access roads can be cut in the area East of Cooma, South of Numeralla and North of Nimmitabel. However the rivers and creeks generally rise and fall quite quickly (matter of several hours) and there is only a minor impact to the community. These roads include:

- a. **Numeralla/Carlaminda area** along the Numeralla River.

- b. **Kybean Road, The Old Bega Road** at Steeple Flat and near 'Woodlands'
 - c. **Tom Groggin Road**
 - d. **Nimmitabel to Bobundara Road**
 - e. **Numeralla Road** at Rock Flat Creek.
 - f. **Dry Plains Road** at the Slacks Creek low-lying causeway (1).
- 3.2.4 **Smiths Road** 'The Angle' NSW - rural properties along Smiths Road may also be isolated for short periods due to several small creeks rising and cutting the Naas Road between Tharwa (ACT) and Smiths Road properties within NSW (1).
- 3.2.5 Four low-level causeways cross Cooma Creek (**Massie and Commissioner Streets** and **Banksia Lane**) and Cooma Back Creek (**Barrack Street**) and may be flooded in relatively small floods, requiring their closure. Council closes these causeways when they are overtopped or in flood. Larger floods may affect traffic over the **Sharp St Bridge**. Access to Cooma is maintained via Polo Flat Road and the southern part of the Monaro Highway (1).

3.3 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

- 3.3.1 Generally the creeks rise and fall quite quickly (periods of several hours) however in a prolonged widespread flood event, the duration of floods closing rural roads may run into days causing inconvenience and some isolations (1).
- 3.3.2 Refer also to Section 3.1 Cooma, subheading Isolation, and Section 3.2 Road Closures for further detail.

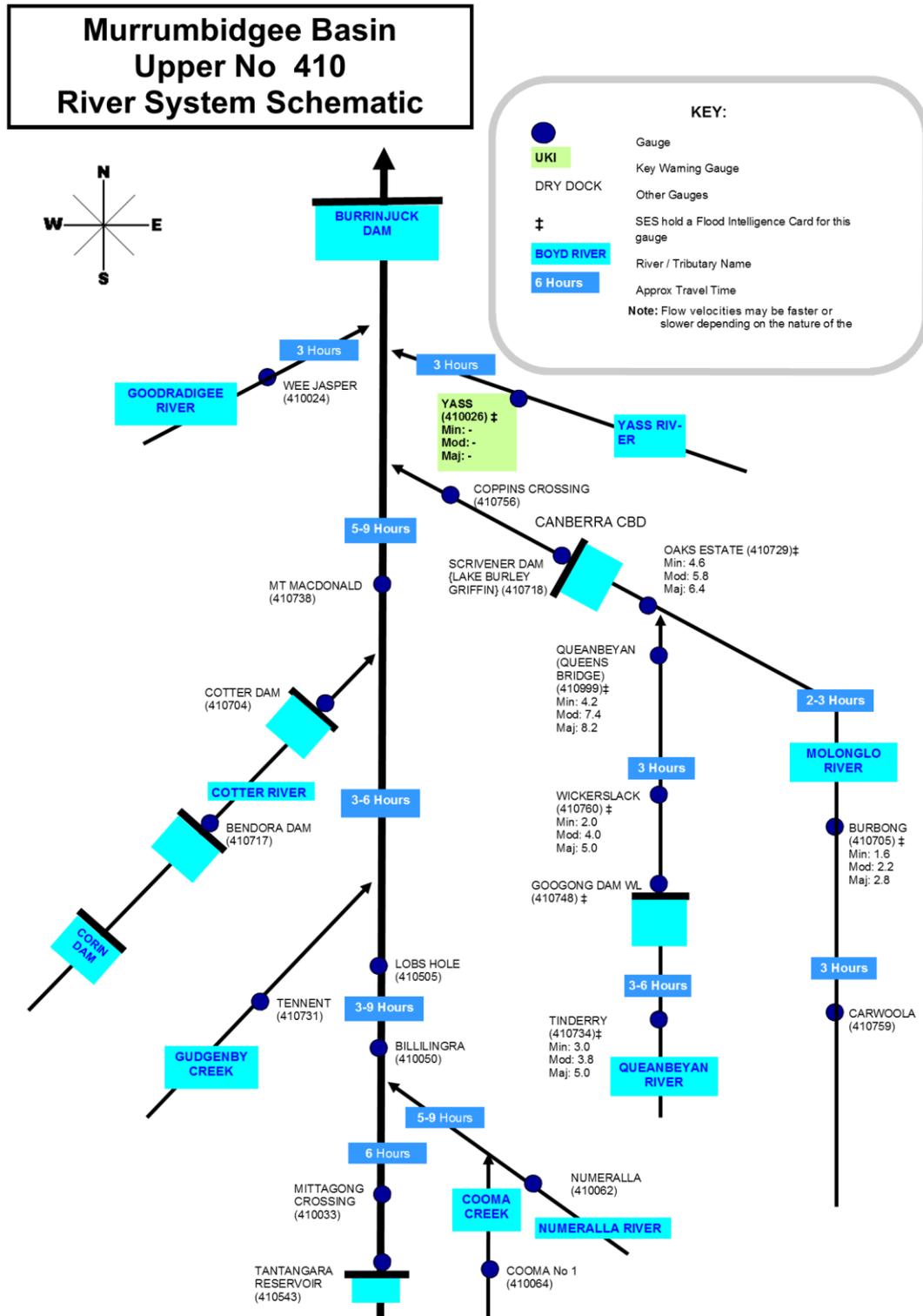
ANNEX 1: FACILITIES AT RISK OF FLOODING AND/OR ISOLATION

Former Cooma Monaro LGA

| Facility Name | Street | Suburb | Comment (based on modelled flood extents) |
|--|------------------------|--------|--|
| Schools / Education Facilities | | | |
| TAFE Illawarra – Cooma Campus | 66 Commissioner Street | Cooma | Lies within the 5% AEP (1 in 20 ARI) Extent and would be impacted in such an event. Equates to 2.38m on the SMEC Sharp Street gauge (No. 410902), 4.4m on the Koolaroo gauge (No. 4100815). |
| Cooma Universities Centre | 38 Bombala Street | Cooma | May be impacted in 1% AEP (1 in 100 ARI) event, as is just on the edge of this flood extent. Equates to 4.06m on the SMEC Sharp Street gauge (No. 410902), 5.7m on the Koolaroo gauge (No. 410081). |
| Child Care Centres | | | |
| Cooma Lambie Street Pre-school Inc. | 3/5 Lambie Street | Cooma | May be impacted in 1% AEP (1 in 100 ARI) event, as is just outside of this flood extent. Equates to 4.06m on the SMEC Sharp Street gauge (No. 410902), 5.7m on the Koolaroo gauge (No. 410081). |
| Facilities for the aged and/or infirm | | | |
| Sir William Hudson Memorial Centre | 8 Fachin Street | Cooma | May be impacted in 1% AEP (1 in 100 ARI) event, as is just outside of this flood extent. Equates to 4.06m on the SMEC Sharp Street gauge (No. 410902), 5.7m on the Koolaroo gauge (No. 410081). |
| Correctional Facilities | | | |
| Cooma Community Corrections Office | 27A Vulcan Street | Cooma | May be isolated in 1% AEP (1 in 100 ARI) event, as is just on edge of this flood extent. Equates to 4.06m on the SMEC Sharp Street gauge (No. 410902), 5.7m on the Koolaroo gauge (No. 410081). |

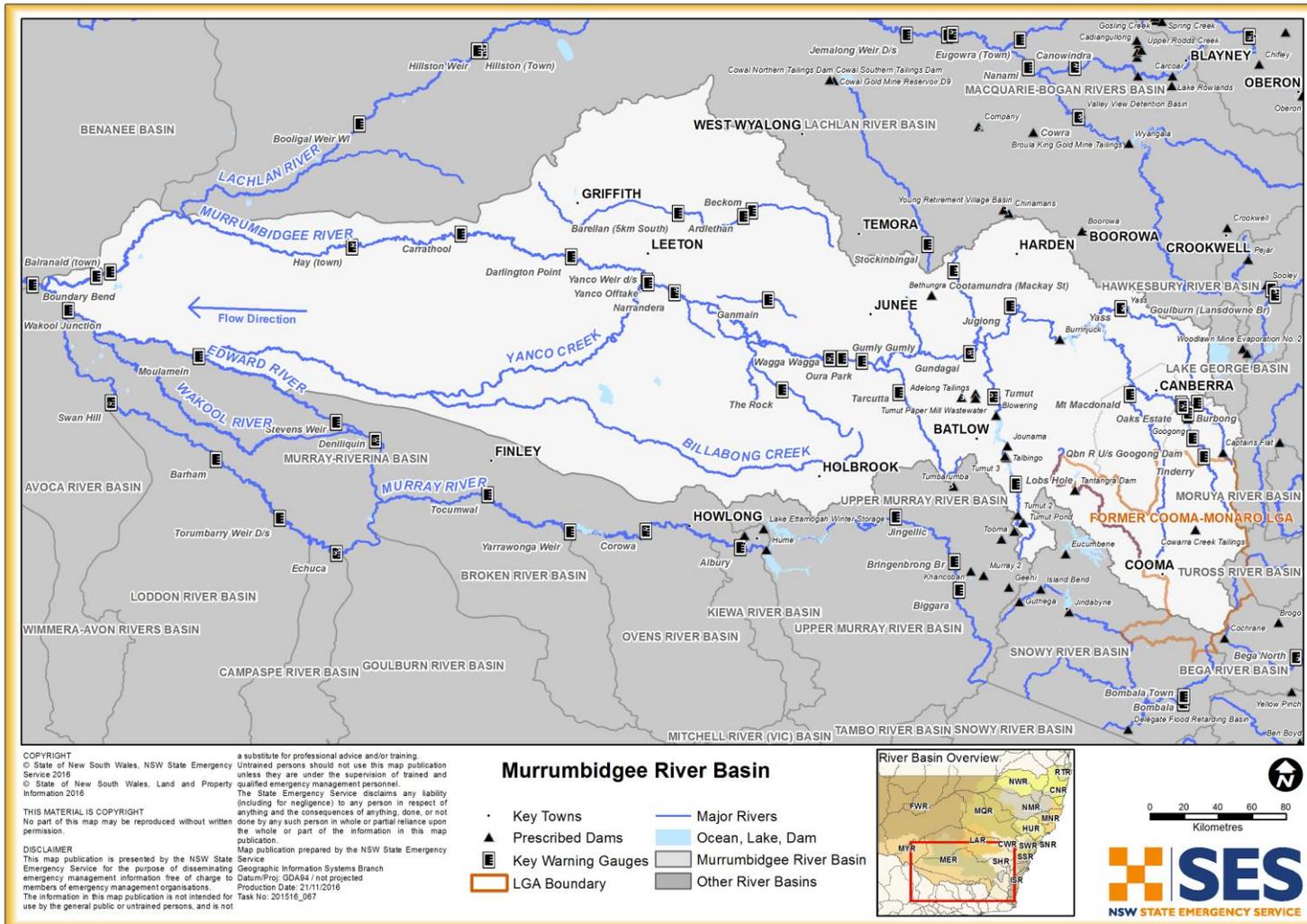
| Facility Name | Street | Suburb | Comment (based on modelled flood extents) |
|-------------------------------------|--------------------------------|--------|---|
| Community Facilities | | | |
| Cooma Bowling Club | Mawson Street | Cooma | Lies within the 1% AEP (1 in 100 ARI) extent and would be impacted in such an event. Equates to 4.06m on the SMEC Sharp Street gauge (No. 410902), 5.7m on the Koolaroo gauge (No. 410081). May also be impacted in the 5% AEP (1 in 20 ARI) event, as is just on edge of this flood extent. Equates to 2.38m on the SMEC Sharp Street gauge (No. 410902), 4.4m on the Koolaroo gauge (No. 4100815). |
| Utilities and infrastructure | | | |
| See comments | See comments | Cooma | Nil showing within any available extent mapping at this time 2016 |
| Other | | | |
| Caltex Service Station | Cnr Massie and Bombala Streets | Cooma | Lies within the 5% AEP (1 in 20 ARI) extent and is expected to be impacted in such an event. Equates to 2.38m on the SMEC Sharp Street gauge (No. 410902), 4.4m on the Koolaroo gauge (No. 4100815). |
| Region Service Station | 51/53 Sharp Street | Cooma | Lies within the 5% AEP (1 in 20 ARI) extent and is expected to be impacted in such an event. Equates to 2.38m on the SMEC Sharp Street gauge (No. 410902), 4.4m on the Koolaroo gauge (No. 4100815). |
| Caltex Cooma | 41 Sharp Street | Cooma | May be impacted in 1% AEP (1 in 100 ARI) event, as is just on edge of this extent. Equates to 4.06m on the SMEC Sharp Street gauge (No. 410902), 5.7m on the Koolaroo gauge (No. 410081). |

ANNEX 2: MURRUMBIDGEE RIVER BASIN SCHEMATIC

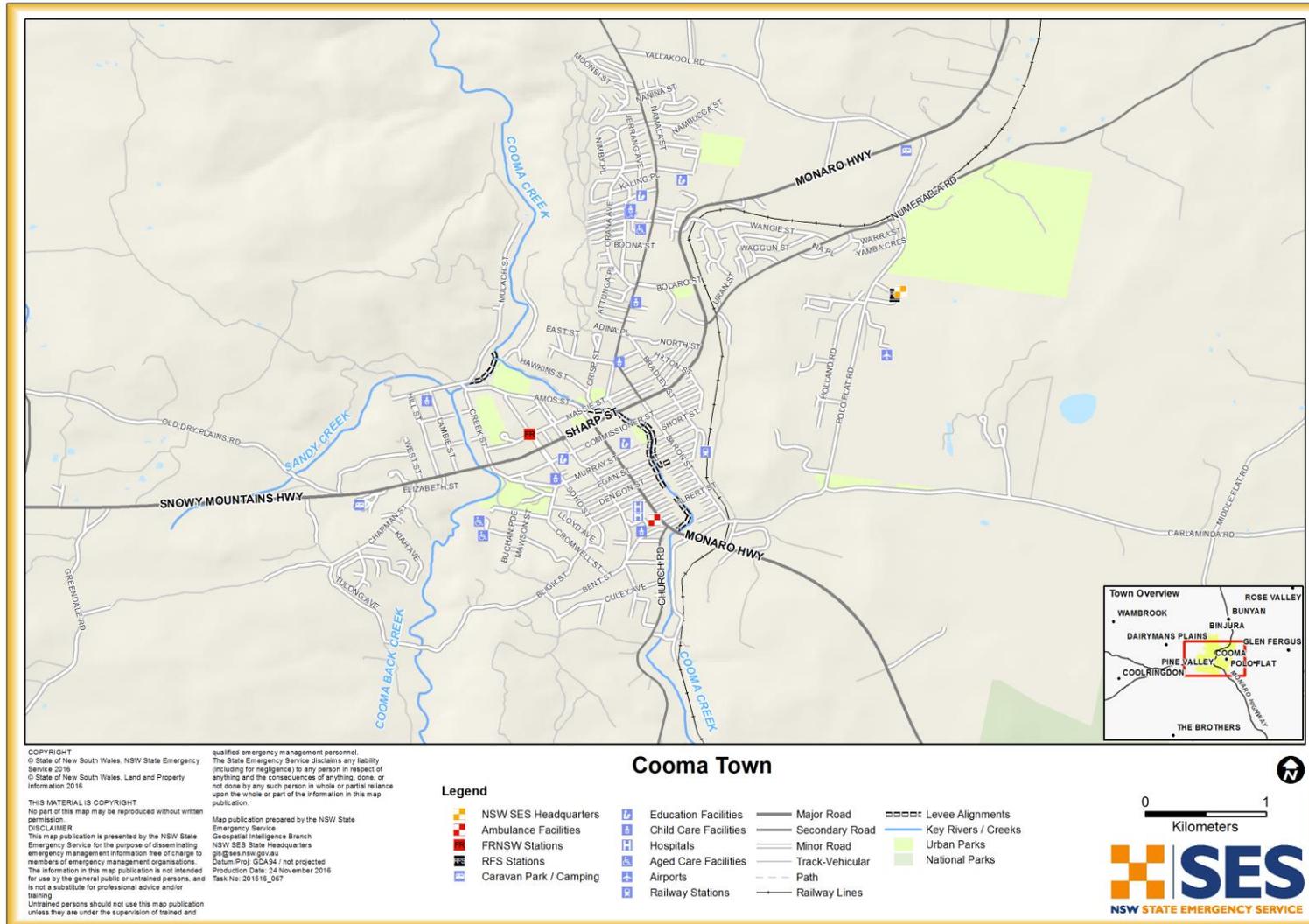


Source: Bureau of Meteorology— NSW Flood Warning Centre 2011

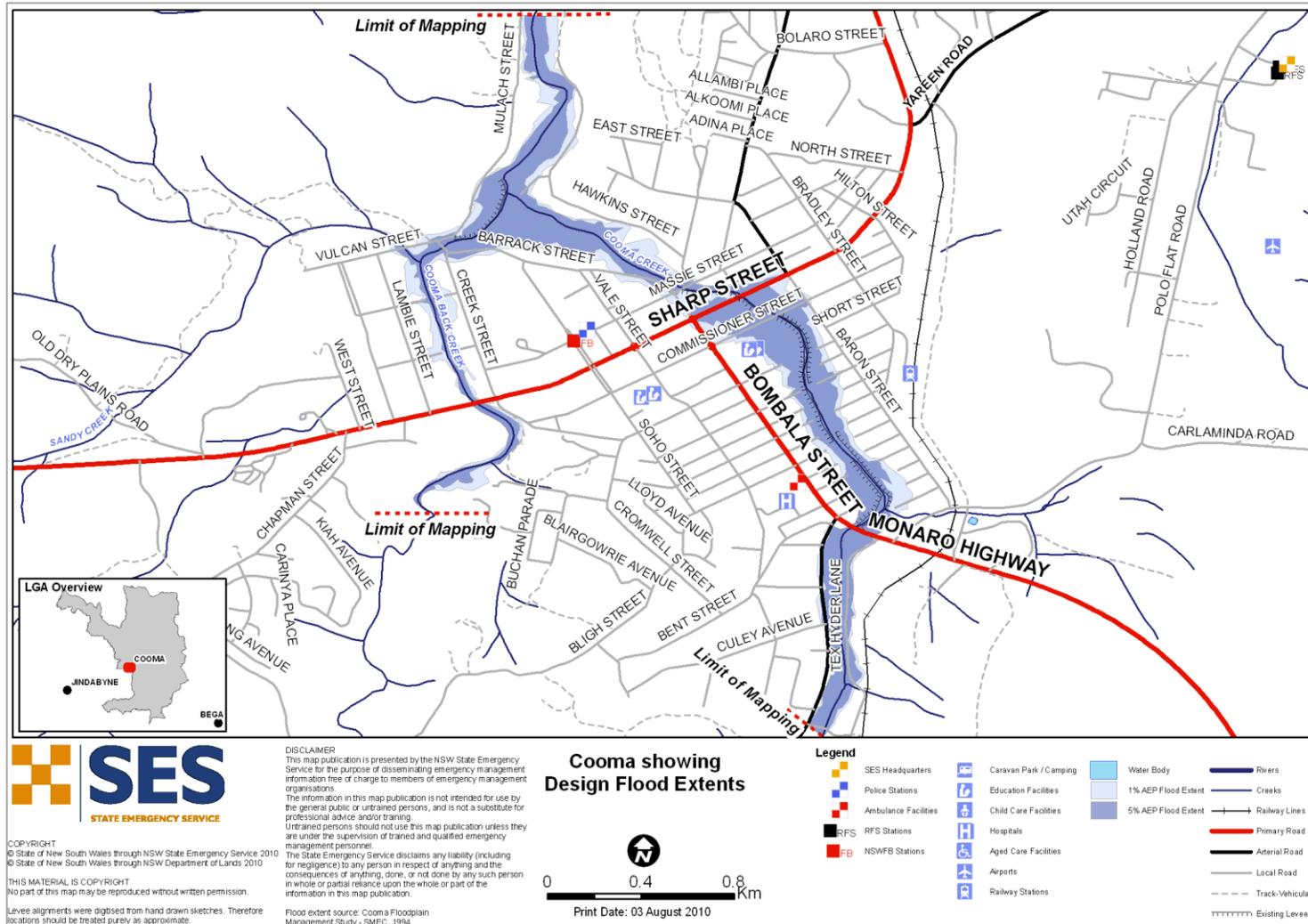
MAP 1 - MURRUMBIDGEE RIVER BASIN



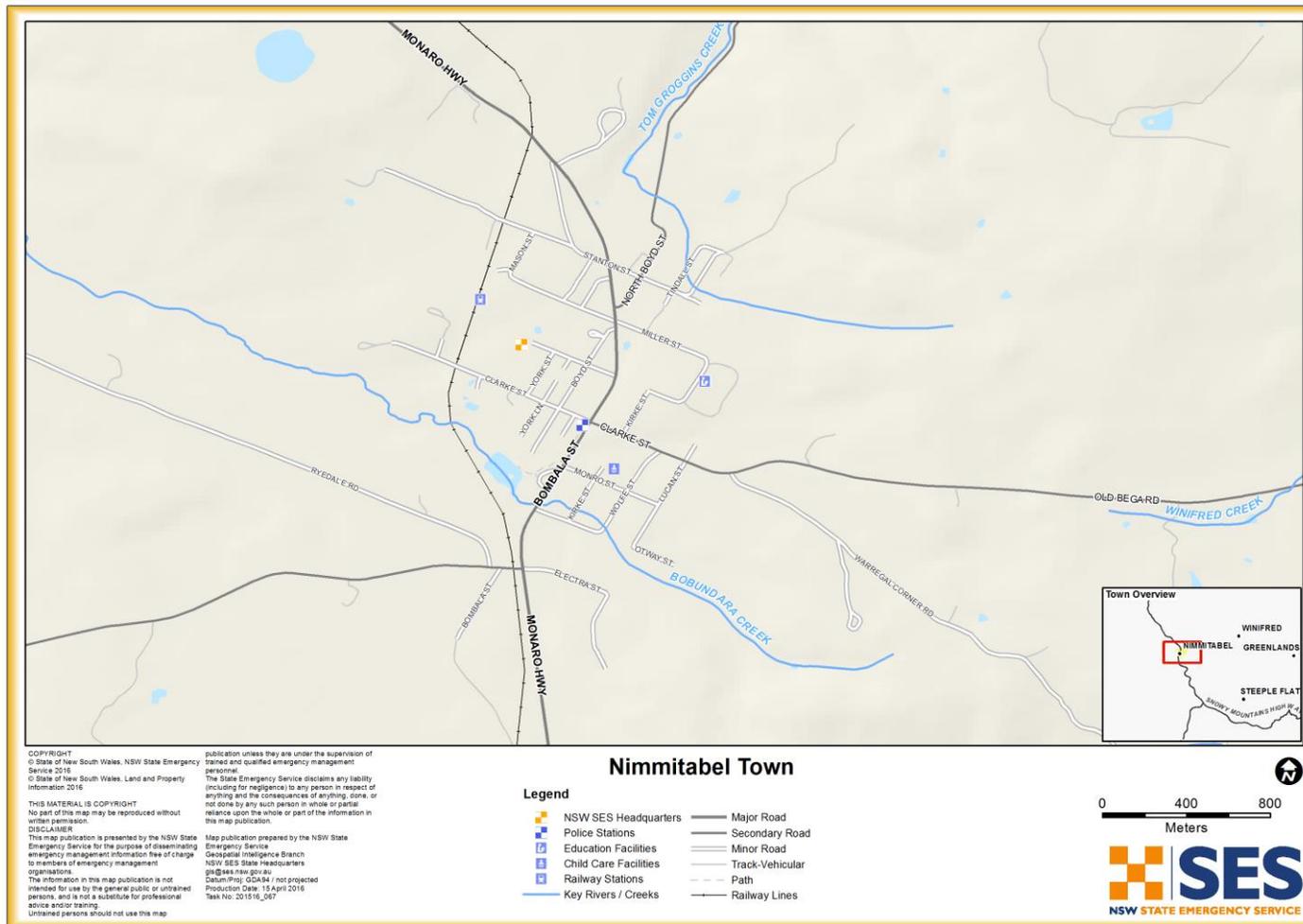
MAP 2 - COOMA TOWN MAP



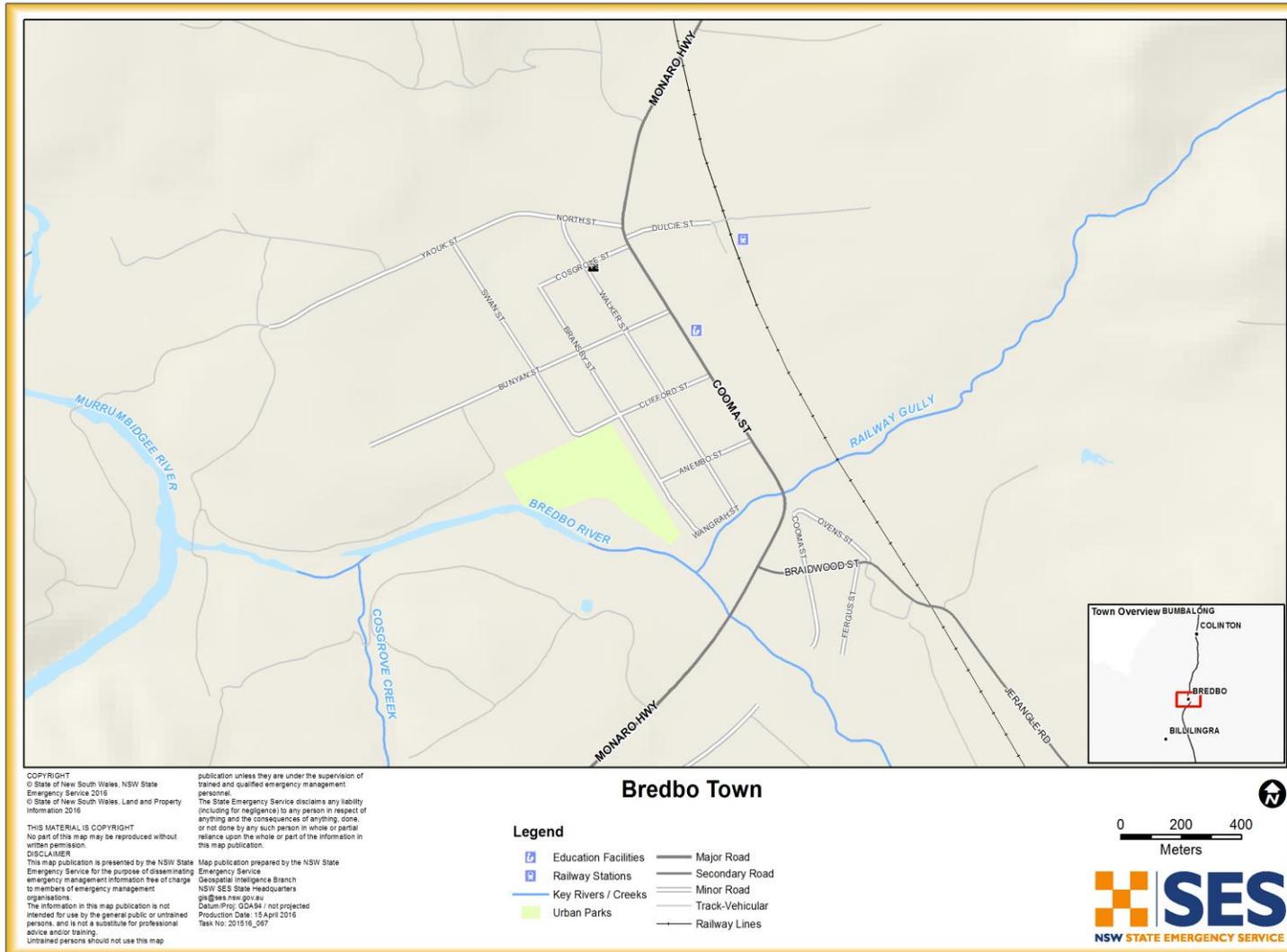
MAP 3 - COOMA DESIGN FLOOD EXTENTS MAP



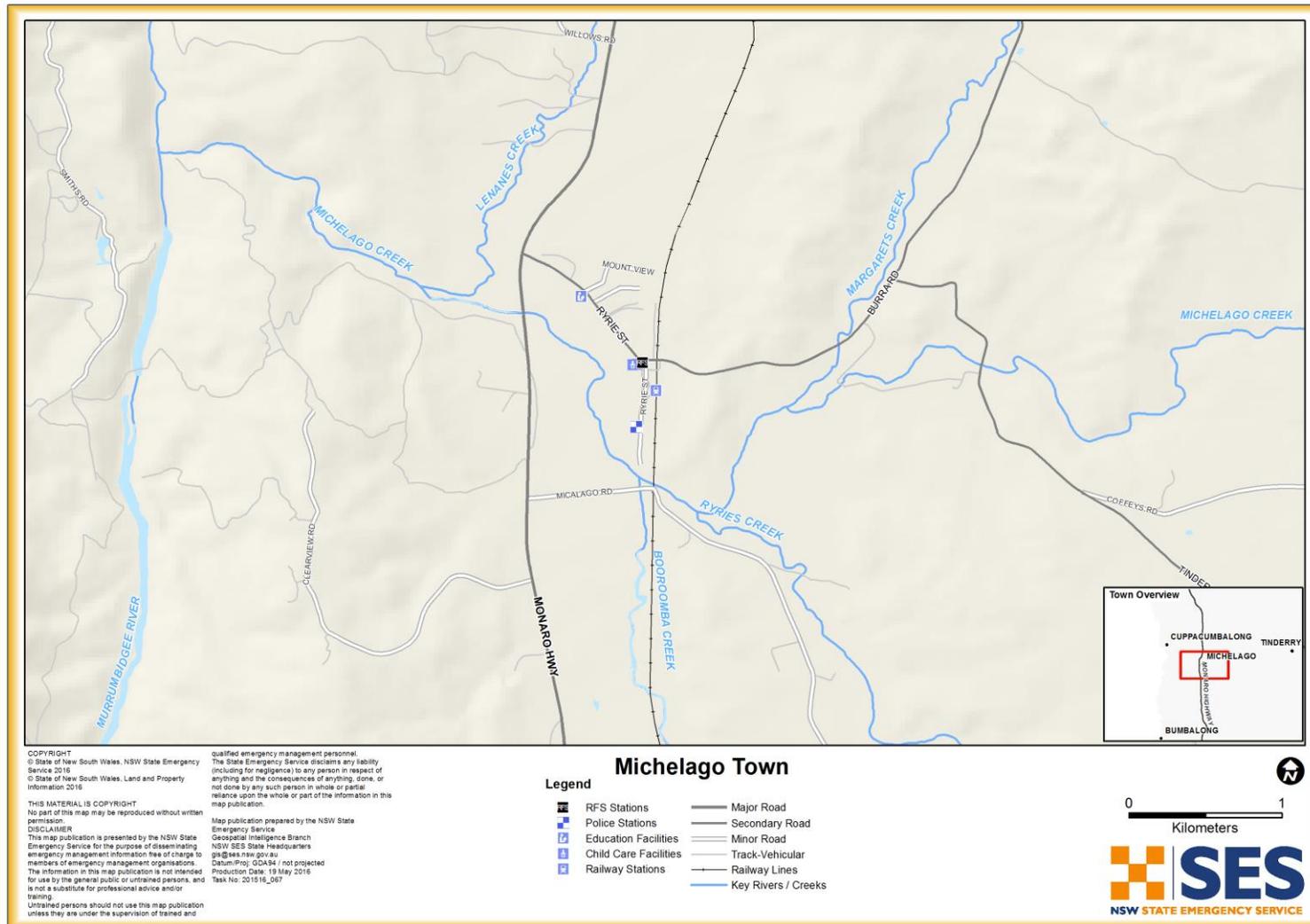
MAP 4 - NIMMITABEL TOWN MAP



MAP 5 - BREDBO TOWN MAP



MAP 6 - MICHELAGO TOWN MAP



LIST OF REFERENCES

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3. **Samios, G.** *Cowarra Creek Mine Tailings Dam 2015 Surveillance Report.* Sydney : NSW Department of Finance, Services & Innovation 2015, 2015.
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SES RESPONSE ARRANGEMENTS FOR THE FORMER BOMBALA SHIRE LGA

Volume 3 of the Snowy Monaro Regional Local Flood Plan

Last Update: August 2008

ANNEX C - GAUGES MONITORED BY THE BOMBALA SES UNIT

| Gauge Name | Type | AWR C No | Stream | Flood Classification | | | Reading Arrangements | Owner |
|---------------|-----------|-------------|--------------------------|----------------------|------|------|---|-------|
| | | | | Min | Mod | Maj | | |
| Bombala * † ‡ | Telemeter | 222019 | Bombala River | 3.00 | 5.00 | 8.00 | Read staff gauge on bridge, check with DNR reading on website. | DNR |
| Coolumbooka | Staff | | Coolumb ooka River | | | | Coolumbooka Bridge, Cathcart Road | |

Notes:

1. The Bureau of Meteorology provides flood warnings for the gauges marked with an asterisk (*).
2. SES Local Flood Advices are provided for the gauges marked with a single cross (†).
3. The SES holds a Flood Intelligence Card for the gauges marked with a double cross (‡).

ANNEX D - DISSEMINATION OF SES FLOOD BULLETINS

The Southern Highlands SES Region Headquarters distributes SES Flood Bulletins and other flood related information (including Flood Warnings) to the following regional media outlets:

Television Stations:

| Station | Location |
|---------|----------|
| CAPITAL | Canberra |
| WIN | Canberra |
| PRIME | Canberra |
| ABC | Canberra |

Radio Stations:

| Station | Location |
|----------------------------|--------------------|
| 2XL /Snow FM | Cooma (AM 918) |
| ABC Regional South East | Bombala (FM 94.1) |
| 2MNO | Bombala (FM 103.7) |

Newspapers:

| Name | Location |
|---------------|----------|
| Bombala Times | Bombala |

ANNEX E - TEMPLATE EVACUATION WARNING & ORDER MESSAGES FOR BOMBALA TOWNSHIP

Evacuation Warning



Southern Highlands Region Headquarters

56 – 58 Knox Street
Goulburn NSW 2580

Telephone: (02) 4828 5555

Fax: (02) 4828 5570

Email: shr.ops@ses.nsw.gov.au

Issued [day] [date] at [time in civilian format (am,pm)]

Radio stations are asked to immediately read this message to listeners and repeat it often.

Evacuation Warning for Bombala Township

Authorised By: []

The Bureau of Meteorology has predicted a flood level of 8 metres at the Bombala River Gauge adjacent to the bridge at [] (*time*). This means that the area including Maybe Street between Cardwell and Stephen Streets, and the Bombala Caravan park may be flooded at [] (*time*).

The State Emergency Service encourages residents within these areas to maintain a vigilant watch on the situation and to prepare to evacuate [enter time if necessary].

The State Emergency Service is monitoring the situation and will advise you when it will be necessary to leave your property.

If flooding does occur in your area, remaining within your home or business will be dangerous and you may need to be rescued. Even if your home or business is raised it may become a refuge for vermin, snakes and spiders. There may be no water, sewerage, power, telephone or other services and you may be unable to call for help in an emergency.

Evacuation centres will be established at [] (*specify route if appropriate*). At these centres assistance will be available to meet your needs including, temporary accommodation, financial help, personal support, refreshments and meals, clothing and personal needs and help in contacting friends and family. You may also choose to go to a friends or relatives house.

Special transport can be provided on request if necessary, telephone [] .

To prepare for possible evacuation you should:

- Raise belongings by placing them on tables, beds and benches. Put electrical items on top. You may be able to place light weight items in the roof space.
- Collect together medicines, personal and financial documents, mementos and photos
- If possible, check to see whether your neighbours need help
- Make arrangements for care of pets or other animals, you may take your pets with if you when you evacuate

If you have to evacuate:

- Turn off the electricity and water.
- Take three days' supply of clothes, medicines, documents, mementos and photos with you
- Continue to listen to a local radio station for updates

Don't walk or drive through floodwaters – this is the main cause of death and injury during flooding

If you require assistance contact the SES on 132 500

End _____

This Evacuation Warning remains current until [time, date] when an updated Evacuation Warning will be issued.

For further information contact:

Evacuation Order



Southern Highlands Region Headquarters

56 – 58 Knox Street
Goulburn NSW 2580

Telephone: (02) 4828 5555

Fax: (02) 4828 5570

Email: shr.ops@ses.nsw.gov.au

Issued [day] [date] at [time in civilian format (am,pm)]

Radio stations are asked to immediately read this message to listeners and repeat it often.
Please use the Standard Emergency Warning Signal with this message

Evacuation Order for [Enter locations]

Authorised By: **Region Controller**

The Bureau of Meteorology has predicted a flood level of 8 metres at The Bombala Bridge river gauge (*place*) at [] (*time*). This means that areas including Maybe Street between Cardwell and Stephen Streets as well as the Bombala Caravan Park will become flooded.

The State Emergency Service instructs residents within these areas to evacuate within the next [] hours. If you delay your evacuation, roads may be congested or closed and you could become trapped and need to be rescued. Remaining in flooded areas is dangerous.

When you evacuate you may go to the house of a friend or relative. Alternatively, if you go to an evacuation centre, accommodation and other assistance can be arranged for you.

If you do not attend an evacuation centre it is important to inform the State Emergency Service of your location by calling Bombala Unit on 6458 3765

You can drive to an evacuation centre located at [] (*specify route if appropriate*).

Special transport can be provided on request if necessary, telephone 6458 3765.

Before evacuating, you should prepare yourself and your property for flooding:

- Raise belongings by placing them on tables, beds and benches. Put electrical items on top. You may be able to place some light-weight items in the roof space.

- Collect together essential medicines, important documents, mementos and photos to take these with you.
- If possible, check to see whether your neighbours need help.
- Make arrangements for care of pets or other animals or take pets with you to an evacuation centre.
- Turn off the electricity and gas.
- Take three days' supply of clothes with you.
- Do not drive or walk through floodwater
- Continue to listen to a local radio station for updates

End _____

This Evacuation Order remains current until cancelled

For further information contact:

*The worst in nature
the best in us*

ANNEX F - EVACUATION ARRANGEMENTS FOR THE BOMBALA COUNCIL AREA

Background

1. Evacuations may be required when the Bombala River is likely to inundate the area of Bombala township on the river side of Maybe Street, between Young and Burton Streets, and prior to inundation of the Caravan park.

Arrangements

2. **Control.** During floods evacuations will be controlled by the NSW SES. Small-scale evacuations will be controlled by the Bombala SES Local Controller. Should the evacuations operations escalate beyond the capabilities of local resources control may be handed over to the Southern Highlands Region SES Region Controller.
3. **Conduct.** Evacuations will be controlled by the SES and conducted in four phases:
 - a. Phase 1 - Warning.
 - b. Phase 2 – Withdrawal.
 - c. Phase 3 – Shelter.
 - d. Phase 4 – Return.

Phase 1 – Decision to Evacuate

4. The decision to evacuate. The responsibility for issuing any general evacuation order during flooding rests with the Bombala SES Local Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989. However, the decision to evacuate will usually be made after consultation with the Local Emergency Operations Controller and the Southern Highlands Region SES Region Controller.
5. When evacuation should occur. As far as possible, evacuation will be carried out before inundation occurs.
6. Self-motivated evacuation. Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport. These evacuees will be advised, via the media, to inform the Police or SES of their evacuation and their temporary address.
7. **Evacuation triggers.**

When the river height reaches 5 meters at the Bombala Bridge gauge, evacuations of the Caravan Park should commence.

When the river height reaches 8 meters, evacuations of low lying areas of town should be considered.

Phase 2 – Warning

8. **Evacuation warnings.** On the receipt of flood warnings predicting peak heights of 5 metres and above at the Bombala Bridge gauge; the Bombala SES Local Controller will consult as necessary to determine the level of the threat and the need to consider evacuations. As soon as possible after the decision to evacuate is made, the Bombala SES Local Controller will issue evacuation warnings to the ‘at risk’ residents, indicating what people should do before evacuating and when actually doing so.
9. **Content of Evacuation Warnings.** A template guide to the content of evacuation warning messages is at Annex E. These are disseminated via:
 - The radio and TV stations listed in Annex D.
 - Door-knocks by emergency service personnel.
 - Public address systems from emergency service vehicles.
 - Telephone.
 - Two-way radio.
 - Direct access to Community Radio Station 2MNO Bombala
 - SES Flood Bulletins.

Phase 3 – Withdrawal

10. **Introduction.** Withdrawal involves the actual removal of the community/individuals from dangerous or potentially dangerous areas to safer areas.
11. **Movement.** Evacuees are to be encouraged to move using their own transport where possible. The Bombala SES Local Controller will arrange transport for those people without their own vehicles.
12. **Evacuation routes.** Evacuation routes will be determined by the Controller at the time of issuing evacuation orders. The Controller will take into account which roads and bridges have been or may be cut by flood waters. In Bombala, evacuation routes will generally be to higher ground away from the river.
13. **Special Needs Groups.** None have been identified.
14. **Animals.** Assistance animals (guide dogs, hearing assistance animals, etc) will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres etc. Due to safety restrictions, it may not be possible to allow companion animals to accompany their owners

when being transported via aircraft or flood rescue boats. Department of Primary Industries will make separate arrangements for the evacuation and care of companion animals.

15. **Doorknocking.** Field teams conducting doorknocks will record and report back the following information back to the Operations Centre:
 - Addresses and locations of houses doorknocked and/or evacuated.
 - The number of occupants.
 - Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
 - Details of residents who refuse to comply with the evacuation order.
16. **Refusal to evacuate.** Field teams should not waste time dealing with people who are reluctant or refuse to comply with any evacuation order. These cases should be referred to the Local Emergency Management Operations Controller who will arrange for Police to ensure their evacuation.
17. **Security.** The NSW Police Force will provide security for evacuated areas.
18. **Transport and storage.** Transport and storage of furniture from flood threatened properties will be arranged as time and resources permit.

Phase 4 – Shelter

19. **Evacuation centres.** The usual purpose of evacuation centres is to meet the immediate needs of victims, not to provide them with accommodation. Evacuees will be advised to go to or be taken to the nearest accessible evacuation centre, which may initially be established at the direction of the Bombala SES Local Controller but managed as soon as possible by the Department of Community Services. Either of the following sites may be used as evacuation centres:
 - a. Multi-Purpose Hall
 - b. Bombala High School.
20. **Action on arrival.** On arrival, evacuees will be:
 - a. registered;
 - b. medically checked, if necessary; and
 - c. provided with their immediate welfare needs.
21. **Registration.** The NSW Police will ensure that all evacuees are registered on arrival at the designated evacuation centres.

22. Animal shelter compounds. Animal shelter compounds will be set up for the domestic pets and companion animals of evacuees. These facilities will be operated by Bombala Council.

Phase 5 – Return

23. Once it is considered safe to do so, the Bombala SES Local Controller will authorise the return of evacuees to their normal or alternative place of residence. This decision will be made in consultation with appropriate officers in regard to matters such as the electrical safety of buildings.
24. The return will be controlled by the Bombala SES Local Controller and may be conducted, at his/her request, by DoCS.

ANNEX G - ARRANGEMENTS FOR THE EVACUATION OF CARAVAN PARKS AND THE RELOCATION OF CARAVANS

General

1. The following caravan parks are flood liable:
 - a. Bombala Caravan Park
 - b. Delegate Caravan Park

Advising Procedures

2. Bombala Council as the Caravan Park proprietors will ensure that the owners and occupiers of caravans are:
 - a. Made aware that the caravan park is flood liable by:
 - Handing a printed notice to occupiers taking up residence. The notice will indicate that the caravan park is liable to flooding and outline the evacuation and van relocation arrangements as detailed in this Annex.
 - Displaying this notice prominently in each van.
 - b. Made aware that if they are expecting to be absent from their vans for extended periods, they must:
 - Provide the manager with a key; in a sealed envelope; to the van.
 - Provide a contact address and telephone number.
 - Inform the manager if a vehicle will be required to relocate the van during flood time.
 - Leave any mobile van in a condition allowing it to be towed in an emergency (i.e. tyres inflated, jacks wound up, personal effects secured and annexes and lines for water, sewer, electricity and gas readily detachable).
 - c. Informed when a flood is rising. At this time, occupiers will be advised to:
 - Ensure that they have spare batteries for their radios.
 - Listen to a local radio station for updated flood information.
 - Prepare for evacuation and van relocation.

3. The Bombala SES Local Controller will ensure that the managers of caravan parks are advised of flood warnings and the details of any evacuation order.

Evacuation of Occupants and Relocation of Vans

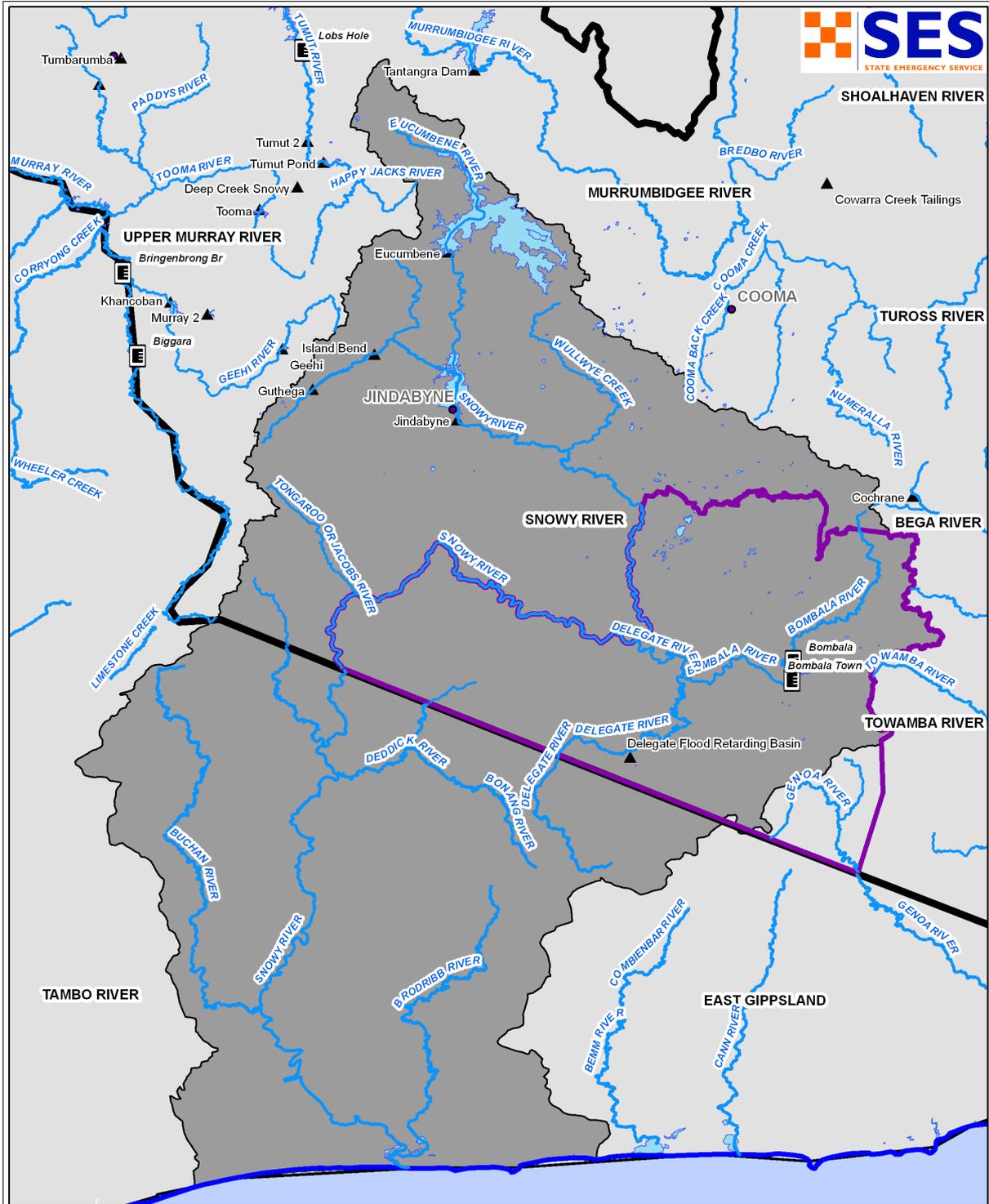
4. Caravan park proprietors will be encouraged to install flood depth indicators and road alignment markers within their caravan parks.
5. When an evacuation order is given:
 - a. Occupiers of non-movable vans should:
 - Secure their vans by tying them down to prevent flotation.
 - Isolate power to their vans.
 - Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.
 - Lift the other contents of their vans as high as possible within the van.
 - Move to a designated evacuation centre in Bombala or Delegate (as appropriate) if they have their own transport, or move to the caravan office to await transport.
 - b. Where possible, vans that can be moved will be relocated by their owners. Park managers will arrange for the relocation of mobile vans whose owners do not have a vehicle. Council and SES personnel will assist if required and may be able to provide additional vehicles. Vans are to be moved to the following locations:
 - The High Street side of the disused Railway Yard in Bombala
 - To the Delegate Showgrounds in Delegate.
6. Caravan park managers will be encouraged to:
 - a. Ensure that their caravan park is capable of being evacuated within the timeframe required by the Bombala SES Local Controller.
 - b. Advise the Bombala SES Local Controller of:
 - The number of people requiring transport.
 - Details of any medical evacuations required.
 - Whether additional assistance is required to effect the evacuation.
 - c. Check that no people remain in non-removable vans that are likely to be inundated.

- d. Inform the Bombala SES Local Controller when the evacuation of the caravan park has been completed.
- e. Provide the Bombala SES Local Controller with a register of people that have been evacuated.

Return of Occupants and Vans

- 7. The Bombala SES Local Controller, using council resources as necessary, will advise when it is safe for the caravan parks to be re-occupied.
- 8. Vans will be towed back to the caravan park(s) by van owners or by vehicles and drivers arranged by the park managers. Council and SES personnel will assist if available.

MAP 1 - SNOWY RIVER BASIN



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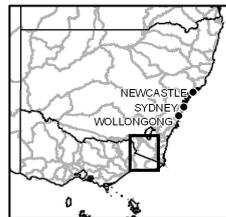
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Map publication prepared by the NSW State Emergency Service
 SES State Headquarters

Snowy River Basin



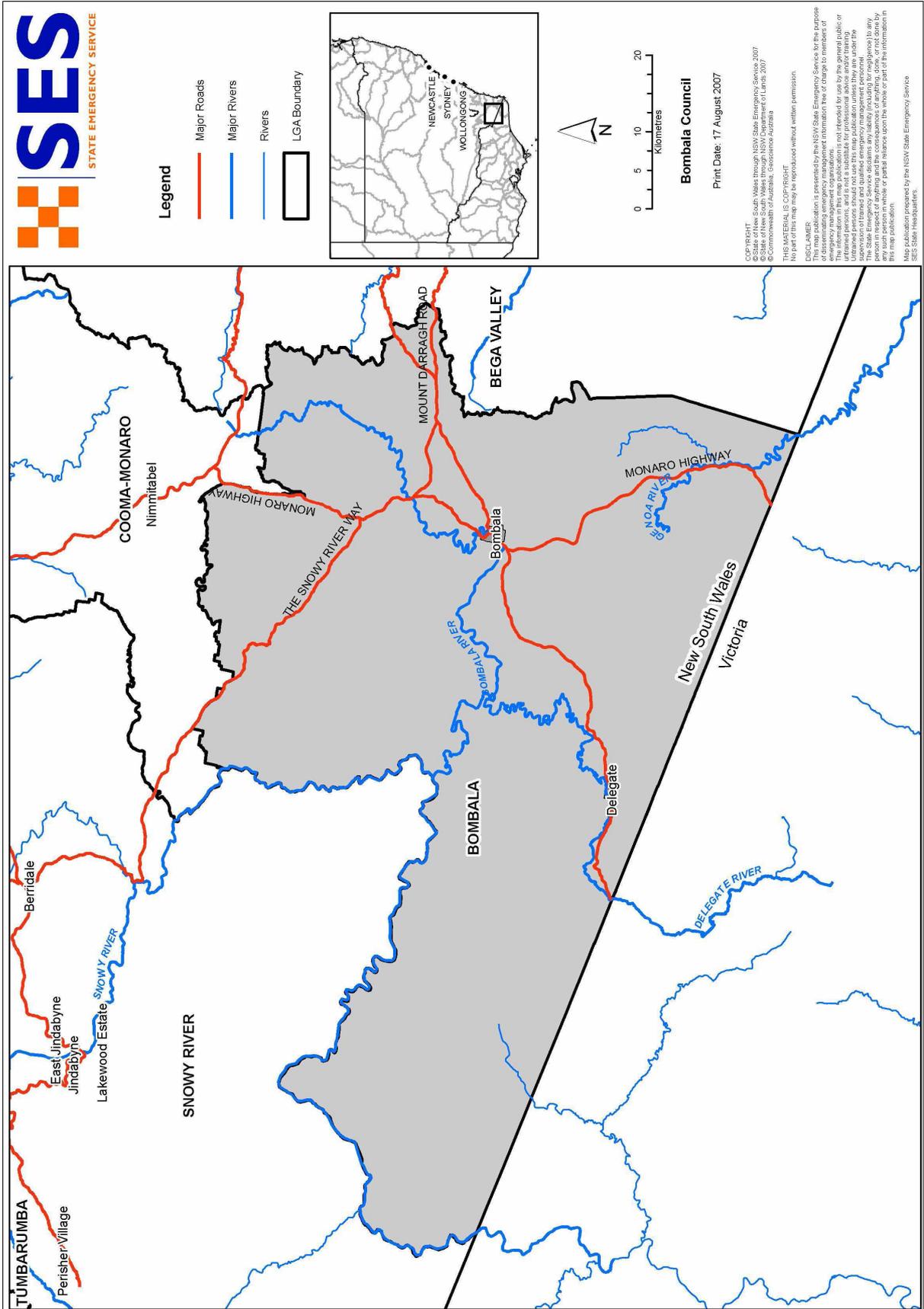
Print Date: 1 May 2008



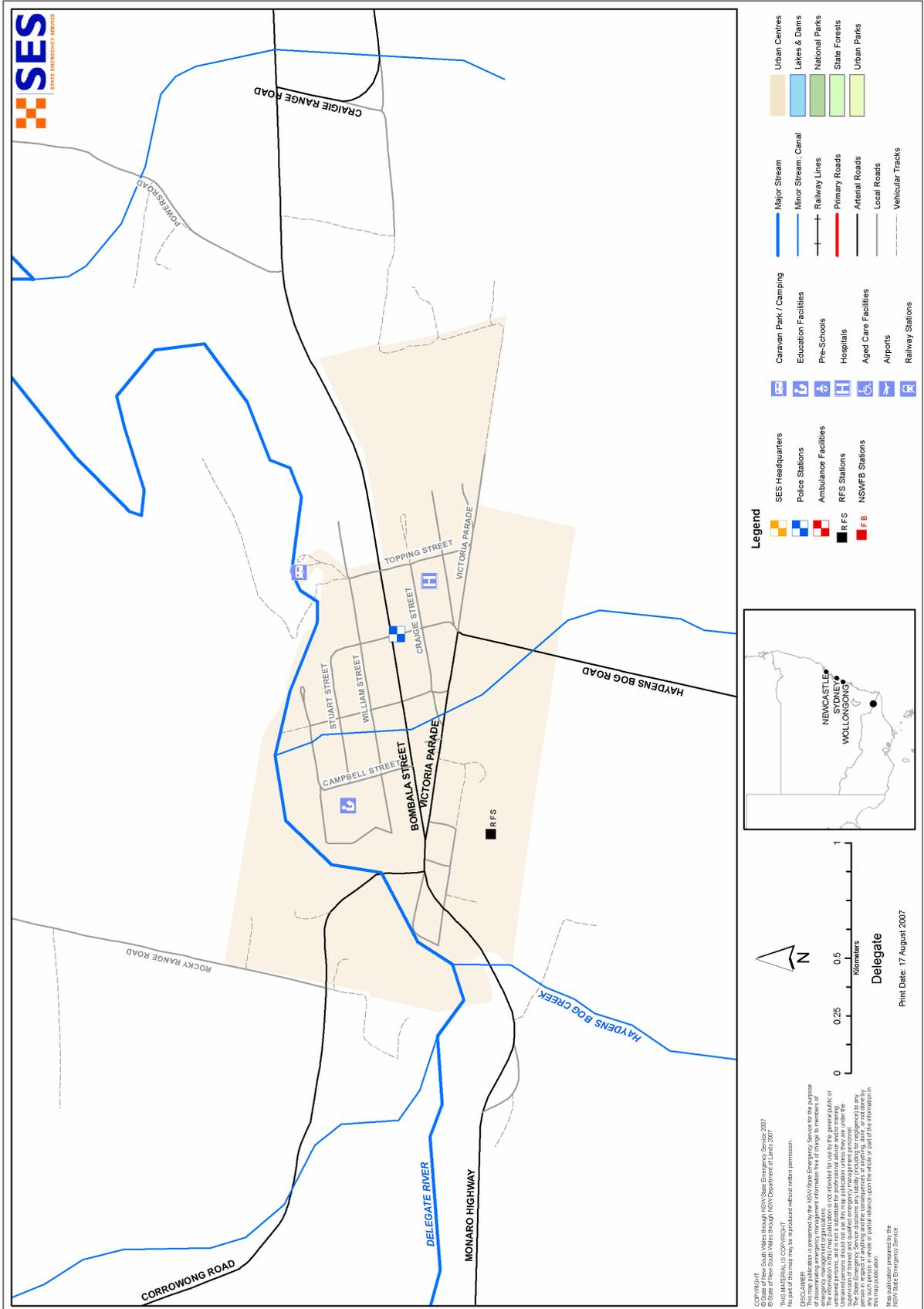
Legend

-  Warning Gauges
-  Dams
-  Major Rivers
-  Bombala LGA
-  Snowy River Basin

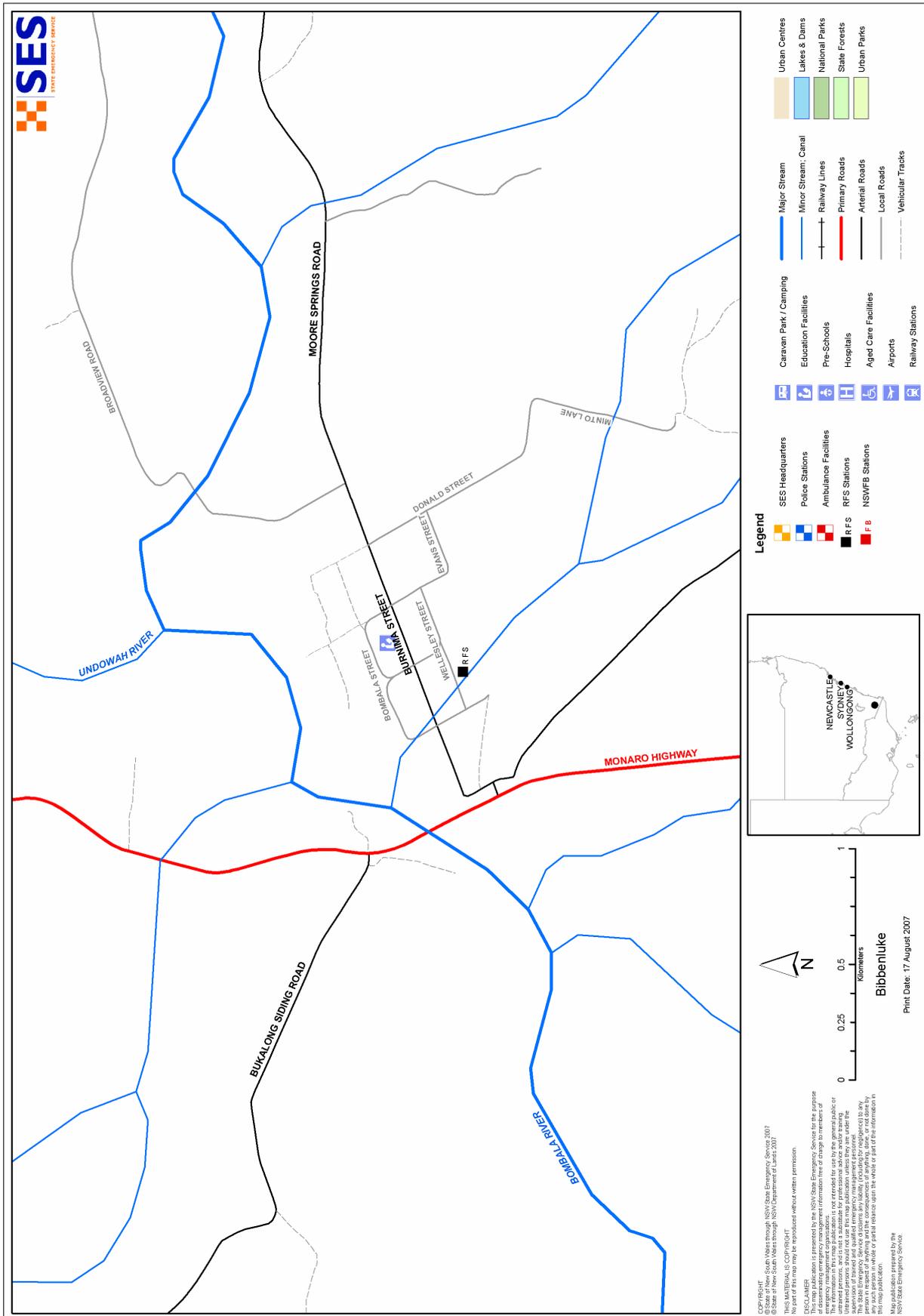
MAP 2 - BOMBALA COUNCIL AREA



MAP 4 - DELEGATE TOWN AREA



MAP 5 - BIBBENLUKE AREA



SES RESPONSE ARRANGEMENTS FOR THE FORMER COOMA- MONARO LGA

Volume 3 of the Snowy Monaro Regional Local Flood Plan

Last Update: Nov 2010

ANNEX C - GAUGES MONITORED BY THE COOMA MONARO SES LOCAL HEADQUARTERS

| Gauge Name / Read By | Type | AWRC No | Stream | Flood Classification | | |
|---------------------------------|------------------|---------|--------------------|----------------------|-----|-----|
| | | | | Min | Mod | Maj |
| Bolaro / Adaminaby RFS | Manual | 410514 | Murrumbidgee River | | | |
| Tantangara Reservoir | Manual | 410543 | Murrumbidgee River | | | |
| Tantangara Reservoir (Upstream) | Manual | 410535 | Murrumbidgee River | | | |
| The Peaks | Manual | 410140 | Murrumbidgee River | | | |
| Mittagang Crossing [^] | Telemeter | 410033 | Murrumbidgee River | | | |
| Numeralla [^] | Telemeter | 410062 | Numeralla River | | | |
| Billilingra [^] | Telemeter | 410050 | Murrumbidgee River | | | |
| Kybeyan / Numeralla RFS | Manual | 410075 | Kybeyan River | | | |
| SEMC (Sharp St)* | Telemeter | 410902 | Cooma Back Creek | | | 1.8 |
| Koolaroo* | Telemeter | 410081 | Cooma Creek | 0.5 | | 3.8 |

Notes:

1. The BoM provides flood warnings for the gauges marked with an asterisk (*).
2. SES Local Flood Advices are provided for the gauges marked with a single cross (†).
3. Daily average levels are available on-line at <http://atlas.canri.nsw.gov.au> for gauges marked with a (^)
4. The SES holds a Flood Intelligence Card for the gauges marked with a double cross (‡).

ANNEX D - DISSEMINATION OF SES FLOOD BULLETINS

The Southern Highlands SES Region Headquarters distributes SES Flood Bulletins and other flood related information (including Flood Warnings) to the following regional media outlets:

Television Stations:

| Station | Location |
|----------------|-----------------|
| Capital | Canberra |
| WIN | Canberra |
| Prime | Canberra |

Radio Stations:

| Station | Location | Frequency | Modulation |
|------------------------|-----------------|------------------|-------------------|
| 2XL | Cooma | AM | 918 |
| ABC Bega | Bega | AM | 1602 |
| ABC 666 | Canberra | AM | 666 |
| Snow FM | Cooma | FM | 97.7 |
| 2MNO | Cooma | FM | 90.5 |
| Monaro Community Radio | | | 93.3 |

Newspapers:

| Name | Location |
|----------------------|-----------------|
| Cooma Monaro Express | Cooma |
| Monaro Post | Cooma |

ANNEX E - TEMPLATE EVACUATION WARNING AND EVACUATION ORDER MESSAGES

Evacuation Warning



[####] Region Headquarters

Telephone: (02) [#####]

[Enter Address]

Fax: (02) [#####]

Issued [day] [date] at [time in civilian format (am,pm)]

Email: [#####]

Radio stations are asked to immediately broadcast this message and repeat it.

Use of the Standard Emergency Warning Signal (SEWS) with this message is authorised

Flood Evacuation Warning for [Enter location/s]

Authorised By: [(operational position title)]

As a result of the flood level predicted by the Bureau of Meteorology for [location] at [date/time] the State Emergency Service recommends that residents within the nominated areas should prepare to evacuate within the next [number] hours.

Residents should monitor the situation and be prepared to evacuate when instructed to do so. A Flood Evacuation Order will be issued by the SES if evacuation is required.

Evacuation centres will be established at [location/s] where you can obtain temporary accommodation and other help. You can also choose to go to friends or relatives.

To prepare for possible evacuation you should:

- Raise belongings by placing them on tables, beds and benches. Put electrical items on top. You may be able to place light weight items in the roof space.
- Collect together medicines, personal and financial documents, mementos and photos
- If possible, check to see if your neighbours need help
- Make arrangements for care of pets or other animals, or take your pets with you when you evacuate
- Take three days' supply of clothing and medicines
- Find out where to turn off the electricity and gas
- Continue to listen to a local radio station for updates

Don't walk, ride or drive through floodwaters – this is the main cause of death and injury during floods

For emergency assistance telephone the SES on 132 500

Web site: www.ses.nsw.gov.au

End SES Flood Evacuation Warning _____

[enter update and currency details]

For further information contact:

*The worst in nature
the best in us*

Evacuation Order



[###] Region Headquarters

[Enter Address]

Issued [day] [date] at [time in civilian format (am,pm)]

Telephone: (02) [#####]

Fax: (02) [#####]

Email: [#####]

Radio stations are asked to immediately broadcast this message and repeat it.

Use of the Standard Emergency Warning Signal (SEWS) with this message is authorised

Flood Evacuation Order for [Enter locations]

Authorised By: [*(name & operational position title)*]

As a result of the flood level predicted by the Bureau of Meteorology for [*location*] at [*date/time*] the State Emergency Service is directing residents within the nominated areas to evacuate within the next [*number*] hours.

Do not delay your evacuation. Roads will be congested or closed. You could become trapped and need rescue. Remaining in flooded areas is dangerous and may place your life at risk.

Evacuation centres will be established at [*location/s*] where you can obtain temporary accommodation and other help. You can also choose to go to friends or relatives.

If you don't go to an evacuation centre please telephone [*telephone number*] to report your safety.

Delete as required {If you don't have a car, buses may operate where possible on normal routes. Special transport can also be provided on request if necessary, telephone [*telephone number*]}

As you evacuate you should:

- Take your important documents, mementos and photos
- Take your spare clothing and medicines
- If possible, check to see if your neighbours need help
- Turn off the electricity and gas
- Do not walk ride or drive through floodwater
- Continue to listen to a local radio station for updates

For emergency assistance telephone the SES on 132500

SES web site: www.ses.nsw.gov.au

End SES Flood Evacuation Order _____

This Evacuation Order remains current until the All Clear has been issued

For further information contact:

*The worst in nature
the best in us*

ANNEX F - EVACUATION ARRANGEMENTS FOR THE COOMA MONARO COUNCIL AREA

Background

1. A system of levee banks protects urban areas of Cooma from flooding up to a level of the 5% AEP flood (2.38m on the SMEC gauge 410902, 4.4m on the Koolaroo gauge 410081⁶). Flooding in excess of this level is likely to require evacuations from low lying properties near Cooma Creek and Cooma Back Creek.
2. As the flood risk is generally characterised as flash flooding, warning times are short and there may be only 1 – 2 hours notice of impending evacuations.

Arrangements

3. **Control.** During floods evacuations will be controlled by the NSW SES. Small-scale evacuations will be controlled by the Cooma Monaro SES Local Controller. Should the evacuations escalate beyond the capabilities of local resources control may be handed over to the SES Region Controller.
4. **Conduct.** Evacuations will be controlled by the SES and conducted in four phases:
 - Phase 1 - Warning.
 - Phase 2 – Withdrawal.
 - Phase 3 – Shelter.
 - Phase 4 – Return.

Decision to Evacuate

5. The decision to evacuate. The responsibility for issuing any general evacuation order during flooding rests with the Cooma Monaro SES Local Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989. However, the decision to evacuate will usually be made after consultation with the Local Emergency Operations Controller and the Southern Highlands Region SES Region Controller.
6. When evacuation should occur. As far as possible, evacuation will be carried out before inundation occurs.
7. Self-motivated evacuation. Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport. These evacuees will be advised, via the media, to inform the Police or SES of their evacuation and their temporary address.

⁶ Design flood heights have been sourced from the 2007 Cooma Creek Flood Warning Directive produced by the Bureau of Meteorology.

Note - SMEC (Sharp St) gauge (AWRC 410902): no official ratings table exist for Cooma Back Creek. River levels are taken from the SMEC Flood Study and are estimated by computer hydraulic simulation.

Note - Koolaroo gauge (AWRC 410081): Official DLWC rating is limited to 6m at Koolaroo.

8. **Evacuation triggers.** The following evacuation triggers should be used as guide when deciding to evacuate.
 - **Flood Warning Prediction.** Prediction of potential major flooding may indicate conditions where evacuations are necessary for Cooma Creek and Cooma Back Creek:
 - **Major Flood Level:** 3.8 m at Koolaroo (Cooma Creek), 1.8 m at SMEC (Cooma back Creek)
 - **Failure of Essential Services.** The failure of essential services such as sewerage, power, telephones and water may pose a significant health risk to residents on the floodplain. In the event of any or all of these systems failing; the need for an evacuation will be discussed with the relevant utility provider.
9. When evacuations are possible, the Cooma Monaro SES Local Controller will advise relevant Welfare Services personnel so that evacuation centres and welfare support can be set up in timely fashion.
10. The topography of Cooma is such that in the case of flooding within the town evacuees would simply be moved from the lower sections of town to the higher sections.
11. Field teams conducting doorknocks will record the following details and report back to the Operations Centre:
 - Addresses and locations of houses doorknocked and/or evacuated.
 - Number of occupants.
 - Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
12. The NSW Police will provide security for evacuated areas.
13. Evacuees will be taken to or advised to go to the nearest accessible evacuation centre, which will be managed by representatives of the Welfare Services functional area. Any or all of the following sites may be used as evacuation centres:
 - Monaro High School, Mittagang Road, Cooma
 - St Patrick's Parish School, Murray Street, Cooma
 - Cooma Multifunction Centre, Cromwell St, Cooma
 - Cooma Ex-Serviceman's Club, Vale Street, Cooma

Phase 1 – Warning

14. **Evacuation warnings.** On the receipt of flood warnings predicting Major flooding the Cooma Monaro SES Local Controller will determine the level of the threat and the need for evacuations. As soon as possible after the decision to evacuate is made, the Cooma Monaro SES Local Controller will issue evacuation warnings to the 'at risk' residents, indicating what people should do before evacuating and when actually doing so.

15. **Content of Evacuation Warnings.** A template guide to the content of evacuation warning messages is at Annex E. These are disseminated via:
 - The radio and TV stations listed in Annex D.
 - Door-knocks by emergency service personnel.
 - Public address systems from emergency service vehicles.
 - Telephone.
 - Included in SES Flood Bulletins.

Phase 2 – Withdrawal

16. **Introduction.** Withdrawal involves the actual removal of the community/individuals from dangerous or potentially dangerous areas to safer areas.
17. **Movement.** Evacuees are to be encouraged to move using their own transport where possible. The Cooma Monaro SES Local Controller will coordinate transport for those people without their own vehicles.
18. **Evacuation routes.** Evacuation routes will not access roads and structures already closed or likely to be closed by floodwaters and will be advised in media bulletins.
19. **Animals.** Assistance animals (guide dogs, hearing assistance animals, etc) will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres etc. Due to safety restrictions, it may not be possible to allow companion animals to accompany their owners when being transported via aircraft or flood rescue boats. Industry and Investment NSW will make separate arrangements for the evacuation and care of companion animals.
20. **Doorknocking.** Field teams conducting doorknocks will record and report back the following information back to the Operations Centre:
 - Addresses and locations of houses doorknocked and/or evacuated.
 - The number of occupants.
 - Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
 - Details of residents who refuse to comply with the evacuation order.
21. **Refusal to evacuate.** Field teams should not waste time dealing with people who are reluctant or refuse to comply with any evacuation order. These cases should be referred to the Local Emergency Management Operations Controller who will arrange for Police to ensure their evacuation.
22. **Security.** The NSW Police Force will provide security for evacuated areas.
23. **Transport and storage.** Transport and storage of furniture from flood threatened properties will be arranged as time and resources permit.

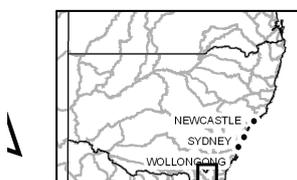
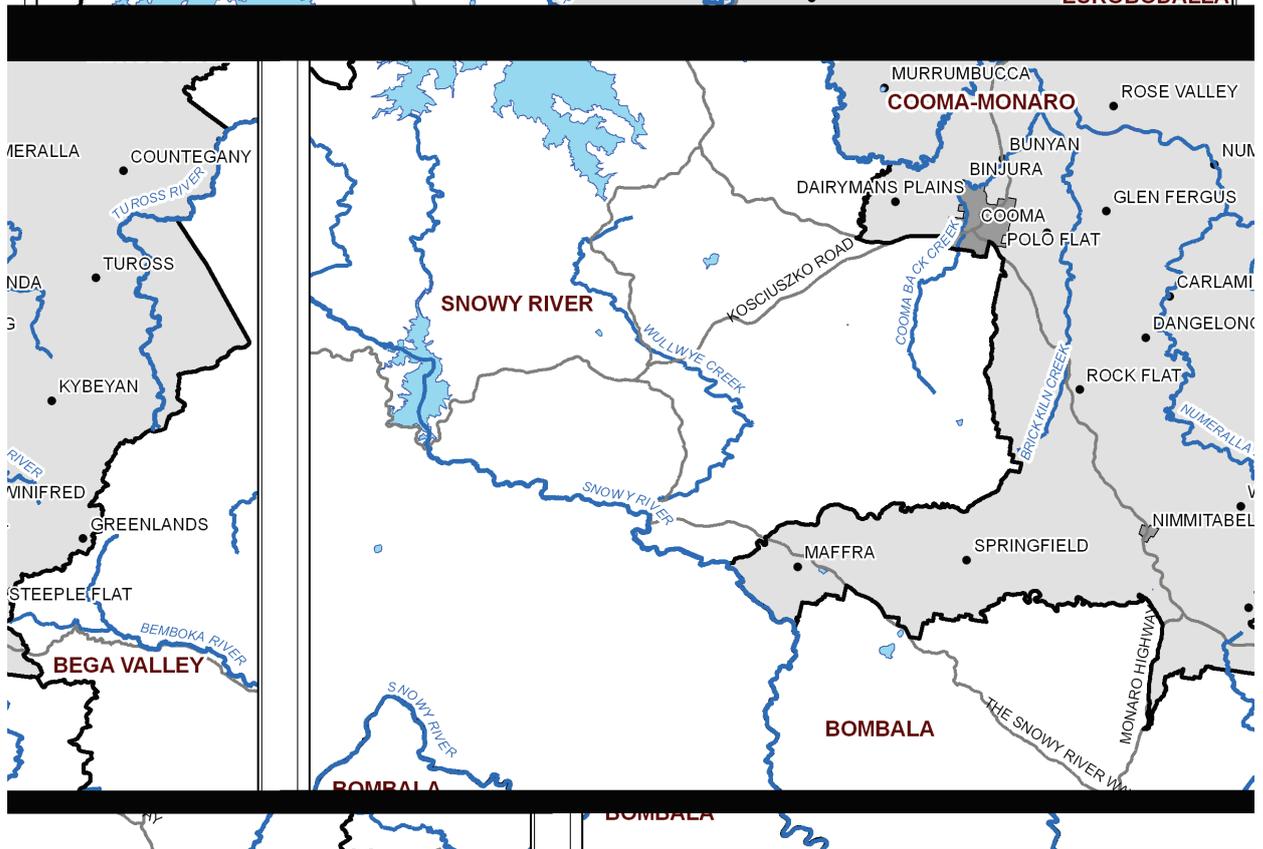
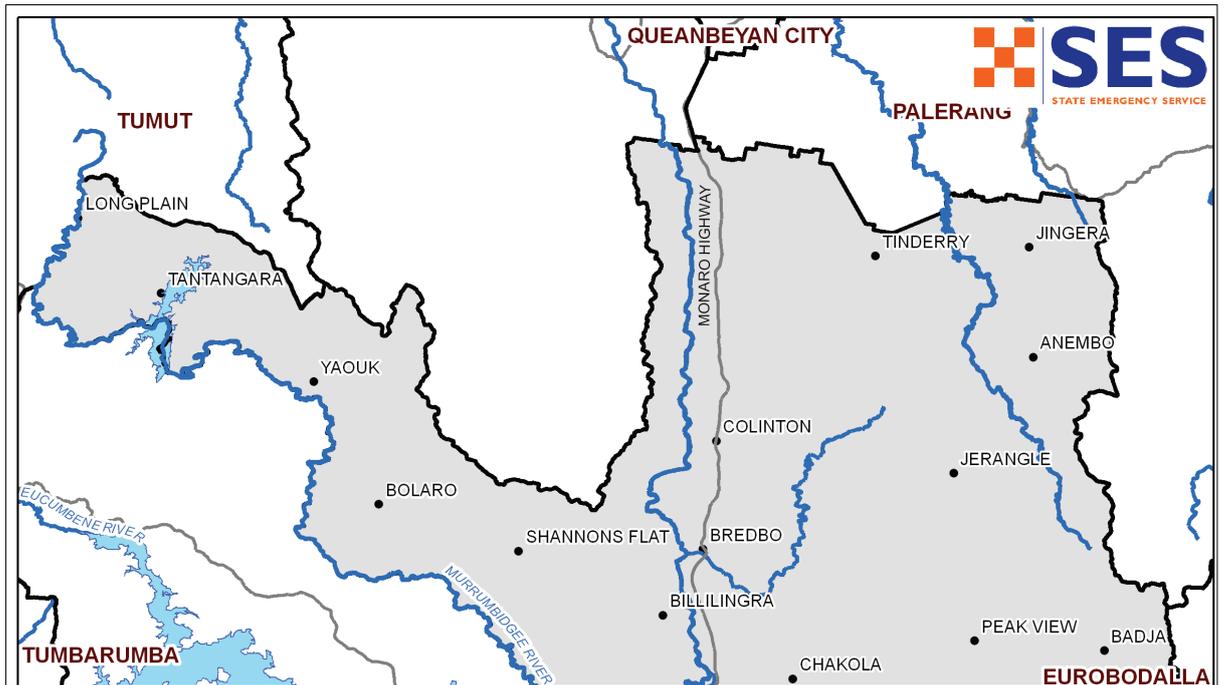
Phase 3 – Shelter

24. **Evacuation centres.** The usual purpose of evacuation centres is to meet the immediate needs of victims, not to provide them with accommodation. Evacuees will be advised to go to or be taken to the nearest accessible evacuation centre, which may initially be established at the direction of the Cooma Monaro SES Local Controller but managed as soon as possible by the Community Services. Locations of Evacuation Centres will be determined and advertised to the community via the media and in Evacuation Warning messages.
25. **Action on arrival.** On arrival, evacuees will be:
 - registered;
 - medically checked, if necessary; and
 - provided with their immediate welfare needs.
26. **Registration.** The NSW Police Force will ensure that all evacuees are registered on arrival at the designated evacuation centres.
27. **Animal shelter compounds.** Animal shelter compounds will be set up for the domestic pets and companion animals of evacuees. These facilities will be operated by Industry and Investment NSW and identified in Evacuation Warnings and other media bulletins.

Phase 4 – Return

28. Once it is considered safe to do so, the Cooma Monaro SES Local Controller will authorise the return of evacuees to their normal or alternative place of residence. This decision will be made in consultation with appropriate officers in regard to matters such as the safety of dwellings, roads and the provision of services.
29. The return will be controlled by the Cooma Monaro SES Local Controller and may be coordinated by the LEOCON.

Map 1 Cooma Monaro Council Area



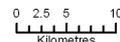
- Legend**
- Towns
 - Major Rivers
 - Major Roads

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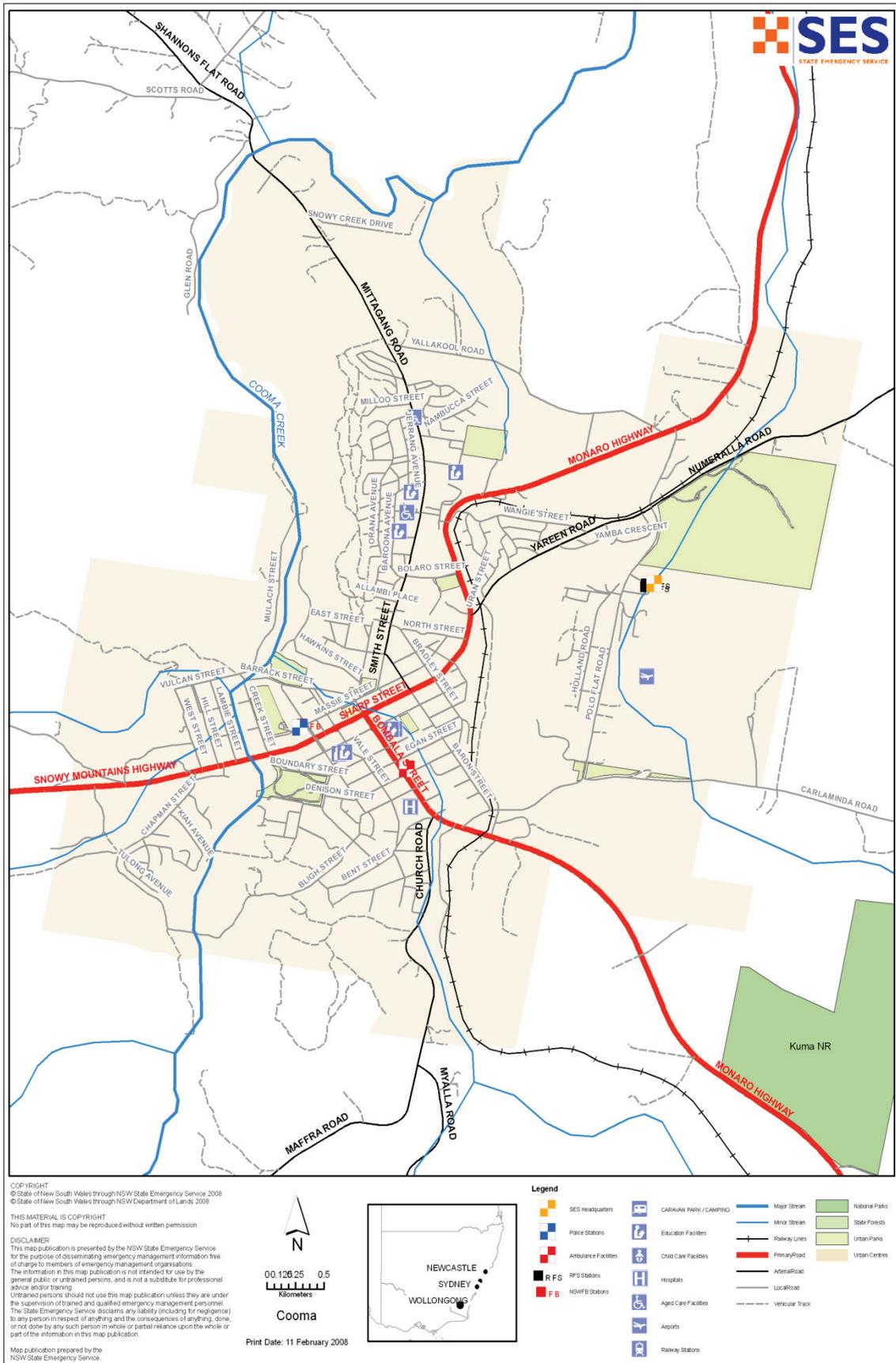
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**Cooma-Monaro
 Shire Council**



Map 2 Cooma Town Area



Map 4 Cooma Creek And Cooma Back Creek Catchments

