East Gippsland

Flood and Storm Emergency Plan

A Sub-Plan of the Municipal Emergency Management Plan

For the East Gippsland Municipal Emergency Management Planning Committee
And
VICSES Bairnsdale, Bendoc, Bruthen, Buchan, Cann River, Mallacoota, Orbost and Tambo Valley Units

Version 1.2 November 2024

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Acknowledgment of Traditional Owners

The East Gippsland Municipal Emergency Management Planning Committee (MEMPC) respectfully acknowledges the Gunaikurnai, Monero and the Bidawel people as the Traditional Custodians of the land that encompasses East Gippsland Shire, and their enduring relationship with country.

The Traditional Custodians have cared and nurtured East Gippsland for tens of thousands of years. The agencies represented by the MEMPC today value their living culture and practices and their right to self-determination. We pay respect to all Aboriginal and Torres Strait Islander people living in East Gippsland, their Elders, past, present, and future.

Authority

The plan has been prepared in accordance with and complies with the requirements of the EM Act 2013 including having regard to the guidelines issued under section 77, *Guidelines for Preparing State, Regional and Municipal Emergency Management Plans* and was endorsed by the Gippsland Regional Emergency Management Planning Committee as a sub-plan to the State Emergency Management Plan and approved by the Emergency Management Commissioner.

Authorised and published by

Authorised and published by the Victorian Government Melbourne 09/04/2025.

Document information

Date of REMPC approval 28/02/2025

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Distribution of MFSEP

Once endorsed and signed the, MFSEP should be distributed to all MFSEP committee members, MEMPC Chair, council, MEMO, Deputy MEMO, Representatives from; BoM, CMA, DEECA, Parks Victoria, Ambulance Victoria, Department of Transport and Planning (VicRoads), DFFH, relevant utilities, MERC, RERC, Police station, VICSES Units, VICSES Regional office, FRV district office, FRV stations, CFA brigades, CFA regional office.

Document Transmittal Form / Amendment Certificate

This Municipal Flood and Storm Emergency Plan (MFSEP) will be amended, maintained, and distributed as required or every 3 years facilitated by VICSES in consultation with the Municipal Emergency Management Planning Committee (MEMPC)

Suggestions for amendments to this Plan should be forwarded to VICSES Regional Office via the Operations Officer Emergency Management at ust.gippsland@ses.vic.gov.au.

Amendments listed below have been included in this Plan and updated as a new version.

Amendment Number	Date of Amendment	Amendment Entered By	Summary of Amendment
1.1	08/04/2025	R. Nicolson	Update links and publishing date.
1.2	14/07/2025	R. Nicolson	Amendment to Mitchell R @ Glenaladale and Mitchell R @ Bairnsdale flood intelligence cards.

This Plan will be published on the East Gippsland Shire Council website at https://www.eastgippsland.vic.gov.au/community/emergency-management.

It will also be available on the VICSES website at www.ses.vic.gov.au/get-ready/your-local-flood-information, located with the associated local flood guides for East Gippsland.

List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in the Plan			
AAR	After Action Review	JSOP	Joint Standard Operations Procedure (as issued by the Emergency Management Commissioner)
AEP	Annual Exceedance Probability	LFG	Local Flood Guide
AHD	Australian Height Datum (the height of a location above mean sea level in metres)	LGA	Local Government Area
AIDR	Australian Institute of Disaster Resilience	LSIO	Land Subject to Inundation Overlay
AIIMS	Australasian Inter-service Incident Management System	MEMO	Municipal Emergency Management Officer
AoCC	Area of Operations Control Centre / Command Centre	MEMP	Municipal Emergency Management Plan
ARI	Average Recurrence Interval	MEMPC	Municipal Emergency Management Planning Committee
ARMCANZ	Agricultural & Resource Management Council of Australia & New Zealand	MEOC	Municipal Emergency Operations Centre
AV	Ambulance Victoria	MERC	Municipal Emergency Response Coordinator
BoM	Bureau of Meteorology	MERO	Municipal Emergency Resource Officer
CEO	Chief Executive Officer	MFSEP	Municipal Flood & Storm Emergency Plan
CERA	Community Emergency Risk Assessment	MFEPC	Municipal Flood Emergency Planning Committee
CFA	Country Fire Authority	MRM	Municipal Recovery Manager
CMA	Catchment Management Authority	PMF	Probable Maximum Flood
DEECA	Department of Energy, Environment and Climate Action	RAC	Regional Agency Commander
DFFH	Department of Families, Fairness and Housing	RC	Regional Controller
DH	Department of Health	RCC	Regional Control Centre

DJSIR	Department of Jobs, Skills, Industry and Regions	RDO	Regional Duty Officer
DTP	Department of Transport and Planning	RERC	Regional Emergency Response Coordinator
EMLO	Emergency Management Liaison Officer	RERCC	Regional Emergency Response Coordination Centre
EMT	Emergency Management Team	REMP	Regional Emergency Management Plan
EMV	Emergency Management Victoria	SAC	State Agency Commander
ERC	Emergency Relief Centre	SBO	Special Building Overlay
ERV	Emergency Recovery Victoria	SCC	State Control Centre
FO	Floodway Overlay	SDO	State Duty Officer
FRV	Fire Rescue Victoria	SEMP	State Emergency Management Plan
IC	Incident Controller	SEWS	Standard Emergency Warning Signal
ICC	Incident Control Centre	SOP	Standard Operating Procedure
IEMT	Incident Emergency Management Team	VicPol	Victoria Police
IIA	Initial Impact Assessment	VICSES	Victoria State Emergency Service
IMS	Incident Management System	ZC	Zone Controller
IMT	Incident Management Team		

Part 1. INTRODUCTION

1.1 Approval and Endorsement

The East Gippsland MEMPC is the owner of this Municipal Flood and Storm Emergency Plan (MFSEP), pursuant to Part 6A of the Emergency Management Act 2013 (as amended). If the certificate of assurance is signed and dated, then the Gippsland REMPC has approved this plan.

In accordance with its roles and responsibilities set out in the State Emergency Management Plan (SEMP), the Victoria State Emergency Service (VICSES) has prepared this plan in collaboration with the East Gippsland MEMPC.

This MFSEP is a sub plan to the East Gippsland Municipal Emergency Management Plan (MEMP). It is consistent with the SEMP and the Victorian Floodplain Management Strategy (2016).

The plan is also consistent with and subordinate to:

- SEMP Flood Sub-Plan, SEMP Storm Sub-Plan
- Gippsland Region Emergency Management Plan
- East (Gippsland) Region Emergency Response Plan - Flood Sub Plan, East (Gippsland) Region Emergency Response Plan – Storm Complementary Plan

This MEMPC prepared this plan in alignment with the Guidelines for Preparing State, Regional and Municipal Emergency Management Plans, including formal consultation and statement of assurance.

It also considers the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Municipal Emergency Management Planning Committee (MEMPC).

This MFSEP is a result of the cooperative efforts of the East Gippsland Planning Advisory Group (EGPAG), formerly the East Gippsland MEMPC All-Hazards Sub-Committee, and its member agencies.

This Plan requires the approval of the Gippsland Regional Emergency Management Planning Committee.

This Plan is endorsed by the East Gippsland MEMPC as a sub-plan to the MEMP.

East Gippsland MEMPC has consulted with the following people and organisations about the arrangements contained within this plan:

- Agriculture Victoria (AgVic)
- Ambulance Victoria (AV)
- Australian Red Cross
- Ausnet
- Bureau of Meteorology (BOM)
- Country Fire Authority (CFA)
- Department of Education (DE)
- Department of Environment, Energy & Climate Action (DEECA)
- Department of Families, Fairness and Housing (DFFH)

- Department of Health (DH)
- Department of Transport & Planning (DTP)
- East Gippsland Catchment Management Authority (EGCMA)
- East Gippsland Shire Council (EGSC)
- East Gippsland Water (EGW)
- Environmental Protection Authority (EPA)
- Gippsland Ports
- Gunaikurnai Land and Waters Aboriginal Corporation (GLAWAC)
- Life Saving Victoria (LSV)
- Mallacoota and District Recovery Association (MADRA)
- Omeo and District Recovery Association (ORCRA)
- Parks Victoria
- Snowy Safety Technical Advisory Group (SSTAG)
- Telecommunication Providers
- Victoria Police (VicPol)
- V/Line

1.2 Purpose and scope of this flood/storm emergency plan

The purpose of this MFSEP is to detail the arrangements for managing a flood emergency before, during and after it occurs or potentially occurs within the East Gippsland LGA.

As such, the scope of the Plan is to:

- Identify the local flood and storm risk.
- Support the implementation of mitigation and planning measures to minimise the causes and impacts of flooding.
- Detail emergency management arrangements.
- Identify linkages with local, regional and state emergency planning arrangements with a specific emphasis on those relevant to flood.

1.3 How to read this plan

This is a sub-plan and therefore should be read in conjunction with the:

- SEMP, SEMP flood Sub-plan and SEMP Storm Sub-plan
- Gippsland REMP
- East Gippsland MEMP

This plan should also be read in conjunction with the East Gippsland Municipal Landslide Emergency Sub-Plan (pending development). Landslides can result from the effects of floods and severe weather and have often occurred during these emergency events; however, there are other mechanisms that

cause slope failure. For this reason and due to the 2023 CERA identifying landslide as a high risk, a standalone sub-plan is intended for East Gippsland.

1.3.1 Linkages and hyperlinks

This plan refers to a range of existing resources relating to floods/storms, including documents and websites. This plan does not seek to duplicate the information contained in these resources and instead provides links to where the reader can obtain further information.

For more operational or sensitive information, a log-in may be required, such as for documents saved on the Emergency Management Common Operating Picture (EM-COP), including Joint Standard Operating Procedures (JSOPs).

Documents or resources that are referred to frequently throughout this plan (such as the SEMP) may not hyperlinked in each instance.

All hyperlinks were accurate at time of publication and currency of the linked content remains the responsibility of the host agency.

1.4 Requirements of EMP guidelines

Emergency Management Victoria has published guidelines for preparing emergency management plans including municipal plans. In accordance with section 2.8 (Legislated Requirements) this plan has been:

- Prepared collaboratively, efficiently and effectively (section 60AA(1))
- Is consistent with other existing in force EMPs and where possible not duplicate or conflict with those plans (section 60AC)1
- Has adopted an integrated, coordinated and comprehensive approach to emergency management (sections 60AD, 60ADA and 60ADB)
- Contain arrangements for mitigation, response, and recovery plus roles and responsibilities (section 60AE)
- Has been assured, approved and published every three years, or more frequently if required (sections 60AG, 60AH, and 60AI).

1.5 Municipal Flood Planning Committee (MFPC)

The East Gippsland Planning Advisory Group (EGPAG) assumes responsibility for flood planning on behalf of the East Gippsland MEMPC. Membership of the committee comprises representatives from the following agencies and organisations:

- Agriculture Victoria (AgVic)
- Ambulance Victoria (AV)
- Country Fire Authority (CFA) / Fire Rescue Victoria (FRV)
- Department of Energy, Environment and Climate Action (DEECA)
- Department of Families, Fairness and Housing (DFFH)
- Department of Health (DH)
- Department of Transport and Planning (DTP)

- East Gippsland Catchment Management Authority (EGCMA)
- East Gippsland Shire Council (EGSC)
- East Gippsland Water (EGW)
- Gippsland Ports (GipPorts)
- Victoria State Emergency Service (VicSES)
- Victoria Police (VicPol)

1.6 Responsibility for planning, review & maintenance of this plan

To remain effective and to place the community at centre of its planning, the MEMPC must ensure it maintains the MFSEP.

VICSES through the EGPAG has responsibility for facilitating the preparation, review, maintenance, and distribution of this plan.

The MEMPC will ensure that the EGPAG review the plan following any of the following:

- A new flood study.
- A significant change in flood mitigation measures.
- After the occurrence of a significant flood event within the municipality.
- Three years elapsing after the last review.

1.7 Consultation in developing or review of the plan

The MEMPC via the EGPAG has undertaken consultation on this plan via the following mechanisms:

- Direct engagement with specific community groups including:
  - Mallacoota and District Community Recovery Association – MADRA.
  - Local VICSES Units including: Bairnsdale, Bruthen, Buchan, Cann River, Mallacoota, Orbost and Tambo Valley.
- Direct engagement with agencies and organisations identified to have a role during flood & storm emergencies, and/or members of the EGPAG and MEMPC.

The consultation process occurred between Friday 21st June to Wednesday 7th August 2024 and was advertised by issue of a formal letter to agencies and community groups inviting feedback via email, engagement with a Microsoft Teams group where the plan was hosted, attendance at a facilitated session held at each of the VICSES Units during the consultation period, or by request of an additional meeting.

At conclusion of the consultation period, the MFSEP received 122 submissions and made 99 changes to reflect feedback that it received.

Part 2. BEFORE: PREVENTION / PREPAREDNESS ARRANGEMENTS

2.1 Community Awareness for all Types of Flooding and Storms

Upon formal adoption by the MEMPC the community will have access to the details of this MFSEP via:

- The Victora State Emergency Service (VICSES) website
- The East Gippsland Shire Council website

VICSES with the support of East Gippsland Shire Council and East Gippsland CMA will coordinate targeted community flood engagement programs within the council area.

2.2 Structural flood mitigation measures

Structural flood mitigation measures are any physical construction to reduce or avoid possible impacts of flood hazards, or the application of engineering techniques or technology to achieve flood hazard resistance and resilience in structures or systems[1].

Refer to Appendices A1 to A6 for information of structural flood mitigation measures.

2.3 Non-structural flood mitigation measures

Non-structural flood mitigation measures[1] are measures not involving physical construction which use knowledge, practice, or agreement to reduce disaster risks and impacts, through policies and laws, public awareness raising, training and education. The following are a summary of non-structural flood mitigation measures in the municipality.

2.3.1 Planning controls

The Municipal Planning Scheme (MPS) at clause 02 of the planning scheme operates in conjunction with the Planning Policy Framework (PPF) to provide the local policy context and direction for a planning scheme. It outlines the strategic direction for the municipality that has informed the preparation of the planning scheme.

The MPS is a succinct expression of the overarching strategic policy directions of the municipality, providing:

- The foundation for local policy based on a municipality's location, regional context, history, assets and strengths, key attributes and influences
- An understanding of the matters that are important to the municipality from a planning perspective
- The context for the local planning policies in the PPF

[1] United Nations Office of Disaster Risk Reduction

- An outline of what planning outcomes the municipality seeks to achieve, which are then implemented through controls and policy within the planning scheme.

The MPS changes over time in response to the changing needs of the municipality.

Part 12.03 – R of the Victorian Planning Provisions – Water Bodies and Wetlands Gippsland Strategy highlights the need for planning controls to:

- Minimise the impact of urban growth on high value water body assets such as the Gippsland Lakes, Corner Inlet, Anderson Inlet, Mallacoota Inlet and their source rivers.
- Identify land affected by flooding, including land inundated by the 1 in 100 year flood event (1 per cent Annual Exceedance Probability) or as determined by the floodplain management authority in planning schemes.
- Avoid intensifying the impact of flooding through inappropriately located use and development.
- Plan for the cumulative impacts of use and development on flood behaviour.
- Locate emergency and community facilities (including hospitals, ambulance stations, police stations, fire stations, residential aged care facilities, communication facilities, transport facilities, community shelters, childcare centres and schools) outside the 1 in 100 year (1 per cent Annual Exceedance Probability) floodplain and, where possible, at levels above the height of the probable maximum flood.
- Locate use and development that involve the storage or disposal of environmentally hazardous industrial and agricultural chemicals or wastes and other dangerous goods (including intensive animal industries and sewage treatment plants) outside floodplains unless site design and management is such that potential contact between such substances and floodwaters is prevented, without affecting the flood carrying and flood storage functions of the floodplain.
- Ensure land use on floodplains minimises the risk of waterway contamination occurring during floods and floodplains are able to function as temporary storage to moderate peak flows and minimise downstream impacts.

2.3.2 Exercising the plan

The MEMPC is responsible for arranging for the exercising of this plan, which should occur annually. Ideally, the MEMPC will schedule the exercise shortly prior to the highest risk period for flooding.

2.3.3 Flood intelligence

Flood intelligence supports decision making and planning for flooding by providing reliable and accurate information relating to:

- The expected level, depth, and velocity of floodwater and its consequences.
- Determination of actions to be undertaken in response to the identified consequences.

DEECA maintains the FloodZoom flood intelligence platform. Enquiries regarding FloodZoom access should be directed to accounts@floodzoom.vic.gov.au.

Specific flood intelligence is referenced in Appendices A1 to A6, under each river catchment.

2.3.4 Flood warning

The SEMP Flood Sub Plan and on the Bureau of Meteorology (BoM) website www.bom.gov.au, detail the arrangements for BoM issued Flood Watch and Flood Warning products.

Details on Warnings issued by VICSES through VicEmergency and VICSES channels are outlined in **Appendix C**.

2.3.5 Local knowledge

Local knowledge is a critical element of planning. The community and other organisations can provide valuable local information about hazards, incidents and how they may evolve. This information is commonly referred to as local knowledge. This plan aims to ensure that planners and responders capture appropriate local knowledge before, during and after incidents.[2]

People with experience of historic flood or storm events that have affected the municipality are a source of information. Events that have affected the municipality are included in the MEMP.

Field Observers provide local knowledge to VICSES and the Incident Control Centre regarding local insights and the potential impacts and consequences of an incident and may assist with the dissemination of information to community members.

As an incident escalates from local control to a larger incident management structure, it is essential that local knowledge capability is retained within the overall structure. This should include how local subject matter experts are embedded in to divisional and sector command structures.

Refer to Appendix A for details of the local knowledge arrangements for the municipality.

[2] VICSES Policy 10.02 Local Knowledge V4.0

Part 3. DURING: RESPONSE / RELIEF ARRANGEMENTS

3.1 Introduction

3.1.1 Activation of Response

VICSES may be notified of flood and storm incidents through several sources, but the most common source is calls received via 132 500 or if the emergency is life threatening, Triple Zero (000). Other sources are via other emergency management agencies and local government. In most cases, these events are of a small scale (a level 1 incident[3]), which local VICSES units manage without significant outside support.

In the case of more significant level 2 (regional level) or level 3 (an incident that has high complexity and may have statewide implications) flood and storm response arrangements may be activated by the Gippsland Regional Duty Officer (RDO) or Regional Agency Commander (RAC).

The VICSES Incident Controller (IC) will activate agencies as required as documented in the SEMP Flood Sub-Plan or SEMP Storm Sub-Plan.

3.1.2 Responsibilities

There are several agencies with specific roles that will act in support of VICSES and provide support to the community in the event of a serious flood or storm within East Gippsland. These agencies will be engaged through the IEMT.

The general roles and responsibilities of supporting agencies are as agreed within the East Gippsland MEMP, SEMP role statement and SEMP Flood Sub-Plan and Regional Flood Emergency Plan.

For flood events, agreed roles of supporting agencies for East Gippsland are detailed in the MEMP.

3.1.3 Municipal Emergency Operations Centre (MEOC)

If established, liaison with the emergency coordination centre will be through the established Division/Sector Command through Municipal involvement in the IEMT and in particular the Municipal Emergency Response Coordinator (MERC). The VICSES RDO will liaise with the centre directly if they have not established division or sector command arrangements.

The function, location, establishment, and operation of a Municipal Emergency Operations Centre if relevant will be as detailed in the MEMP.

3.1.4 Escalation

Many flood or storm incidents are of local concern and an appropriate response can usually be coordinated using local resources. However, when these resources are exhausted, the State arrangements provide for further resources to be made available, firstly from neighbouring municipalities (on a regional basis) and then on a state-wide basis.

[3] For a detailed definition of the levels of incidents, refer to Table 3 Levels of Incidents within the State Emergency Management Plan.

Resourcing and event escalation arrangements are described in the SEMP.

3.2 State Emergency Management priorities

The State Emergency Management Priorities shall form the basis of incident action planning processes.

3.3 Command control coordination consequences communication and community

Arrangements in this MFSEP must be consistent with the 6 C's detailed in SEMP, the State and Regional Flood Emergency Sub-Plans and the MEMP. For further information, refer to the Emergency management phases in the SEMP and a one page summary of the 6 C's.

3.3.1 Control

Sections 5(1)(b) and 5(1)(c) of the *Victoria State Emergency Service Act 2005* detail the authority for VICSES to plan for and respond to storms and floods.

The Role Statement within the SEMP identifies VICSES in its response functions as the Control Agency for flood and storm. It identifies DEECA as the Control Agency responsible for dam safety as well as reticulated water and wastewater (sewerage) service.

All flood and storm response activities within East Gippsland including those arising from a dam failure or retarding basin / levee bank failure incident will therefore be under the control of the appointed Incident Controller, or delegated representative.

3.3.2 Incident Controller (IC)

On the advice of the Bureau of Meteorology (BoM) or other reliable source, that a flood or storm event will occur or is occurring, VICSES as the control agency will appoint an Incident Controller (IC). Initially and during escalation the IC may be field-based or located at an Incident Control Point (ICP) reporting to the VICSES RAC. The principles for transfer to an ICC based IC are outlined in JSOP 03.15 - Transfer Of Control And IMT Relocation for Class 1 Emergencies. An ICC based IC is typically from VICSES but may be from another agency when resources are constrained.

The IC will lead and manage incident-tier response control including:

- Controlling the operational elements of the response
- Providing operational leadership during the incident at a static location or a dynamic incident, including the tactical resolution.

The IC responsibilities are as defined in the SEMP. While providing support to the IC, support agencies retain command of their own people.

3.3.3 Incident Control Centre (ICC)

The RAC in conjunction with the Regional Controller (RC) or Zone Controller (ZC) will determine the location of an ICC, however consideration should be given to the scale of the event and size of IMT required. JSOP 02.03 - Incident Management Team Readiness Arrangements should be referred to when planning for an ICC.

As required, the IC will establish an Incident Control Centre (ICC). The ICC is where they manage the incident response command and control functions from. The IC will make the decision to activate the ICC and when it should commence operations. The ICC may be activated in advance based on the severity of warnings and in accordance with VICSES readiness arrangements:

- VICSES readiness and activation levels - flood
- VICSES readiness and activation levels – severe weather

3.3.4 Divisions and Sectors

To ensure that effective Command and Control arrangements are in place, the IC may establish Divisions and sectors depending upon the complexity of the event and resource capacities.

The location of Divisions and Sectors are chosen based on their suitability for maintaining operations during a flood or storm event and may differ from those used in other types of emergencies. The IC may establish Divisions and Sectors at the following locations to assist with the management of flood and storm incidents within the Municipality:

Division	Sectors
Bairnsdale Divisional Command Point (DCP) VICSES Bairnsdale Unit 189 Macleod Street, Bairnsdale 3875	▪ Bairnsdale ▪ Bendoc ▪ Bruthen ▪ Buchan ▪ Cann River ▪ Mallacoota ▪ Orbost ▪ Tambo Valley

3.3.5 Maintenance of local knowledge and subject matter expertise in Divisions and Sectors

The plan recognises that personnel operating division and sector command points will often be from an agency that is not VICSES (the control agency) and may lack local knowledge associated with the nature of storms or flooding, and what resources are best deployed to certain types of requests for assistance.

To account for this, VICSES members will be assigned to work alongside Division/Sector command points where possible and/or the Unit members themselves may provide advice and local knowledge on VICSES protocols if requested.

A copy of relevant plans (Regional, Municipal and Local Flood Guides) as relevant to the DCP/Sector location will be readily available via the VICSES website.

3.3.6 Incident Management Team (IMT)

The Incident Controller will form an Incident Management Team (IMT) to support the IC in managing the incident-tier operational response to the emergency. This includes the functional areas of

planning, intelligence, public information, operations, investigation, logistics and finance functions. Where possible, the IMT will be joint-agency, pre-planned and include personnel with relevant local knowledge.

For more detail, refer to the SEMP on IMTs and Incident Management Systems (IMSs).

3.3.7 Incident Emergency Management Team (IEMT)

The IC will establish a multi-agency Incident Emergency Management Team (IEMT) to support the IC in managing the effects and consequences of the flood or storm emergency.

The IEMT consists of key personnel (with appropriate authority) from stakeholder agencies and relevant organisations who need to be informed of strategic issues related to incident control. They can provide the IC with high level strategic guidance and policy advice for consideration in developing incident management strategies.

Organisations, including East Gippsland Shire Council, who are part of the IEMT will provide an Emergency Management Liaison Officer (EMLO) to the ICC if and as required as well as other staff and / or resources identified as being necessary, within the capacity of the organisation.

East Gippsland Shire Council as part of the Municipal Emergency Operations Centre (MEOC) will provide the Council EMLO, either in person at the ICC or alternatively a virtual arrangement may be put in place.

For more detail refer to the SEMP for guidance on IEMTs.

3.3.8 On Receipt of a Flood Watch / Severe Weather Warning

VICSES SOP008 Severe Weather Notification and Activation Process and SES SOP009 Flood Notification and Activation Process outline in detail the actions that VICSES will undertake upon receipt of a Severe Weather Warning or Flood Watch/Flood Warning.

The following are links to the current VICSES readiness:

- VICSES readiness and activation levels - flood
- VICSES readiness and activation levels – severe weather

Additionally, the VICSES Regional Duty Officer (until an incident controller is appointed) or IC will undertake actions as defined within the flood intelligence cards (Appendices A1 to A6). General considerations by the IC/VICSES RDO will be as follows:

- Review flood intelligence to assess likely flood consequences.
- Monitor weather and flood information using the range of intelligence tools including– www.bom.gov.au.
- Assess Command and Control requirements.
- Review local resources and consider needs for further resources regarding personnel, property protection, flood rescue and air support. Consideration for the geographic extent of the warning area and the potential for resource constraints if there may be wide-ranging effects across the region or state.

- Notify and brief appropriate officers. This includes Regional Control Centre (RCC) (if established), State Control Centre (SCC) (if established), Council, other emergency services through the EMT.
- Assess ICC readiness (including staffing of IMT and IEMT) and open if required.
- Ensure flood warnings and community information is prepared and issued to the community where required.
- Flood (riverine and flash) warnings are managed by the RDO/RAC.
- Severe Weather/ Thunderstorm warnings are managed by SDO/SAC.
- Develop media and public information management strategy.
- Monitor watercourses and undertake reconnaissance of low-lying areas (consider field observers).
- Ensure flood mitigation works are being checked by owners.
- Develop and issue incident action plan, if required.
- Develop and issue situation report, if required.

3.3.9 On Receipt of the First and Subsequent Flood Warnings

VICSES RDO (until an Incident Controller is appointed) or IC will undertake actions as defined within the flood intelligence cards (Appendices A1 to A6). The IC/VICSES RDO will have general regard for the following considerations:

- Develop an appreciation of current flood levels and predicted levels. Are floodwaters rising, steady, peaking or falling?
- Review flood intelligence to assess likely flood consequences.
- Consider What areas may be at risk of:
    - Inundation
    - Isolation
    - Indirect affects as a consequence of:
        - Power
        - Gas
        - Water
        - Telephone
        - Internet
        - Sewerage
        - Health
        - Transport
        - Emergency service infrastructure interruption
- Consider the characteristics of the populations at risk.

- Determine what the ‘at-risk’ community need to know and do, as the flood develops.
- Warn the ‘at-risk’ community including ensuring that an appropriate warning and community information strategy is implemented including details of:
    - The current flood situation.
    - Flood predictions.
    - What the consequences of predicted levels may be.
    - Public safety advice.
    - Who to contact for further information.
    - Who to contact for emergency assistance.
- Liaise with relevant asset owners as appropriate (such as water, power utilities, telecommunications)
- Implement response strategies as required based upon flood consequence assessment.
- Continue to monitor the flood situation – www.bom.gov.au/vic/flood/.
- Continue to conduct reconnaissance of low-lying areas.
- Liaise with relevant flood mitigation infrastructure managers.

3.4 Community information and warnings including media comms

Guidelines for the distribution of community/public information and warnings are contained in the VICSES Gippsland Regional flood and storm emergency sub-plans and state flood and storm emergency sub-plans.

Refer to Appendix C for more details on public information and warnings for the municipality.

The IC, through the Public Information Unit established at the ICC, will manage media communication. If the ICC is not established, the VICSES RDO will manage all media communication. The East Gippsland Shire Council will work with the IC/VICSES RDO to assist with the dissemination of public messaging and/or warnings to ensure that consistent and timely messaging occurs.

3.5 Initial Impact assessment

In accordance with the SEMP and SEMP flood sub-plan (3.6.11 Initial impact assessment), the IC should initiate an initial impact assessment during the first 48 hours of an emergency. It should capture the nature and scale of the flood impact on people, community infrastructure, and the economic, natural, built and cultural environments, in order that emergency relief and early recovery activities can commence. This information may then be used to provide the basis for further needs assessment and recovery planning by East Gippsland shire Council, Emergency Recovery Victoria (ERV) and recovery agencies.

Agencies that typically support initial impact assessment in the municipality are:

- East Gippsland Shire Council

3.6 Preliminary deployments to flooding

When flooding is expected to be severe enough to cut access to towns and/or communities the IC will consult with relevant agencies to ensure that resources are in place if required to provide emergency response and relief. These resources may include but not limited to emergency service personnel, food items and non-food items such as medical supplies, shelter, community assembly areas, emergency relief centres.

3.7 Response to flash flooding

Flash flooding can be defined as flooding that occurs within six hours or less of the flood-producing rainfall within the affected catchment. This may result in isolation of individuals and communities as time to warn and respond to flash flooding is limited. The safest place to be in a flash flood is well away from the affected area. Pre-event planning for flash floods should commence with an assumption that evacuation is the most effective strategy, provided evacuation can be safely implemented.

Emergency management response to flash flooding should be consistent the SEMP Storm Sub-Plan.

When conducting pre-event planning for flash floods the following steps should be followed, and in the order as given:

- Determine if there are barriers to evacuation by considering warning time, safe routes and resources available.
- If evacuation is possible, then evacuation should be the adopted strategy and it must be supported by a public information capability and a rescue contingency plan.
- Where it is likely people will become trapped by floodwaters due to limited evacuation time or options the IC needs to ensure they provide safety advice to people at risk. This advice should advise people not to attempt to flee by entering floodwater. If people become trapped, it may be safer to seek the highest point within the building and to telephone 000 if they require rescue.
- Where this plan has identified buildings that are known to be structurally unsuitable, the plan needs to provide for an earlier evacuation trigger (return to step 1 of this cycle).
- If an earlier evacuation is not possible then the IC must make specific preparations to rescue occupants trapped in structurally unsuitable buildings either pre-emptively or as occupants call for help.
- Contact the East Gippsland MERC and MEMO at the earliest opportunity to allow for relief preparation to commence.

Due to the rapid development of flash flooding it will often be difficult, to establish relief centres ahead of actually triggering the evacuation. While this is normal practice it should not be used as a reason for not adopting evacuation.

Refer to Appendix B for response arrangements for flash flood events.

3.8 Evacuation for all flooding

Where practical, evacuation is the primary strategy for ensuring the safety of at-risk communities. The purpose of evacuation is for people to relocate temporarily from areas at risk of the consequences of flooding, to places of safety. It is essential to assess risks involved in undertaking

an evacuation, as evacuation may not always be the most appropriate action. This will ensure that people are not exposed to more hazardous environments because of their evacuation, for example, travelling through deep, fast-flowing floodwater[4].

Under the SEMP, Victoria Police (VicPol) has the responsibility for evacuation (Evacuation Manager) – in consultation with the control agency and other expert advice. EMV has developed a standardised procedure for evacuation under JSOP J03.12 - Evacuation for Major Emergencies.

The IC decides whether to warn people to evacuate within a specified timeframe or whether it is necessary to advise them to evacuate immediately. The IC must make this decision having regard for the requirements of the JSOP.

Once the IC makes a decision to recommend evacuation, VicPol's Evacuation Manager is responsible for the management of the evacuation process where possible. VICSES and other agencies will assist where practical. VICSES is responsible for the development and communication of evacuation warnings.

Once activated by Victoria Police, Red Cross is responsible for reconnecting family and friends through the operation of Register.Find.Reunite with voluntary registrations and enquiries made in relief centres, recovery hubs or online.

Except in limited circumstances, evacuation is not compulsory in Victoria[5]. Recent historic floods that were managed under current legislation and emergency management arrangements, demonstrated that some people will choose not to evacuate. Therefore, this plan must consider arrangements for managing these people in the event they require assistance or rescue.

Considerations include:

- Registering persons who intend not to evacuate.
- Providing additional information that may assist them in deciding to evacuate.
- Identifying vulnerable people who may be willing to evacuate if assisted.

3.9 Flood rescue

Under the SEMP Response table 9 the control agency for rescue from land and water is VicPol, which operates the Rescue Coordination Centre. VICSES is a support agency for search and rescue on land and water evacuations and incidents involving mass casualties.

VICSES may conduct flood rescues. Appropriately trained and equipped VICSES units or other agencies that have appropriate training, equipment and support may carry out rescues.

Rescue operations may be undertaken where voluntary evacuation is not possible, has failed or is considered too dangerous for an at-risk person or community. An assessment of available flood rescue resources (if not already done prior to the event) should be undertaken prior to the commencement of Rescue operations.

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[4] AUSTRALIAN DISASTER RESILIENCE HANDBOOK COLLECTION Flood Emergency Planning for Disaster Resilience - **First edition 2020**

[5] Powers to compel evacuation rely on the Minister making a declaration of a State of Disaster under section 23(2)(e) of the Emergency Management Act 1986. However, section 23(7) prevents these powers be used to compel a person to evacuate if they have a pecuniary interest in the land or building or goods or valuables on the land or in the building.

Rescue is considered a high-risk strategy to both rescuers and persons requiring rescue and should not be regarded as a preferred emergency management strategy. Rescuers should always undertake a dynamic risk assessment before attempting to undertake a flood rescue.

The Victoria Police Rescue Coordination Centre should be notified of any rescues that occur: (03) 9399 7500. On occasion, VicPol may opt to respond a field capability of its rescue coordination centre to a location near the emergency. It may also work with the Triple Zero Victoria to deploy its dispatch capability to the same location to enhance rescue coordination and dispatch. Details in this plan may assist VicPol and Triple Zero Victoria in undertaking this function in the field or from the primary rescue coordination centre.

The following resources are available within East Gippsland to assist with rescue operations:

Resource type	Location
Boat (semi-rigid)	VICSES Cann River Unit
Boat (semi-rigid)	VICSES Mallacoota Unit
Boat (rigid)	VICSES Mallacoota Unit
Boat (rigid)	VICSES Bairnsdale Unit
Boat (semi-rigid)	VICSES Bairnsdale Unit
Boat (rigid)	VICSES Orbost Unit
Land Based Swift Water Rescue Kit	VICSES Bairnsdale Unit

3.10 Aircraft management

Aircraft can be used for a variety of purposes during flood operations including evacuation, resupply, reconnaissance, intelligence gathering and emergency travel.

The IC controls the conduct of Air support operations. The IC is responsible for ensuring access to all required support including fuel for aircraft. Early requests for these resources are critical as storm and flood can occur outside the summer operating period for state fleet aircraft and support resources. In some cases up to 72 hours' notice may be required to activate aircraft or support.

The IC may request aircraft support through the State Air Desk located at the SCC. The Air Desk Supervisor will establish priorities.

Suitable airbase facilities are located at:

Airbase name	Type of facility (such as fixed/rotary wing capability)
Bairnsdale Airport	Fixed wing and rotary
Marlo Airport	Fixed wing and rotary
Mallacoota Airport	Fixed wing and rotary
Benambra Airport	Fixed Wing and rotary
DEECA Depot Swifts Creek	Rotary
DEECA Depot Cann River	Rotary
DEECA Depot Orbost	Rotary

3.11 Resupply

Communities, neighbourhoods, or households can become isolated during floods and in some cases, storms. This can be because of road closures or damage to roads, bridges, and causeways. Under such circumstances, the need may arise to resupply isolated communities/properties with essential items.

When predictions/intelligence indicates that communities, neighbourhoods and/or households may become isolated, VICSES will advise businesses and/or households that they should stock up on essential items.

After the impact, VICSES can support isolated communities through assisting with the transport of essential items to isolated communities and assisting with logistics functions.

Resupply operations are to be included as part of the emergency relief arrangements with VICSES working with the relief agencies to service communities that are isolated.

Communities or areas that are known to become isolated and have traditionally required resupply in a prolonged flood are listed in the table below.

Community / locality	Size/number of residences	Typical Isolation Period
Bemm River	Small, approx. 89 residences	From 24 hours to 3-4 days

3.12 Essential community infrastructure and property protection

Essential community infrastructure and property such as residences, businesses, roads and utilities, may be affected in the event of a flood.

The East Gippsland Shire Council maintains a small stock of sandbags with approximately 20,000 located in the Council depot at Bruce's Track, Kalimna. The VICSES Regional Headquarters at Bairnsdale holds approximately 40,000 sandbags, and VICSES Units across East Gippsland hold small quantities of sandbags and sand for local response as follows:

Unit	Sandbag Quantities
Bairnsdale	2,500
Bendoc	100
Bruthen	1,400
Buchan	3,000
Cann River	2,000
Mallacoota	2,000
Orbost	2,000
Tambo Valley	1,000

The IC will determine the priorities related to the use of sandbags, which will be consistent with the strategic priorities.

VICSES may set up sandbag collection points when required to assist preparing at-risk townships. At other times, community may be able to access sandbags from their local hardware store. Further

details around sandbag collection points and sandbag guidelines can be found at https://www.ses.vic.gov.au/plan-and-stay-safe/sandbag-guide.

The VICSES Operations Management Manual sets out the principles for sandbag use and allocation to the community. These principles do not apply to the use of sandbags by VICSES to construct and/or alter a levee. Refer to Sandbag filling and collection point guide and SOP036 Construction, Removal or Altering of Levee and Removal of Debris for further detail.

If VICSES sandbags are becoming limited in supply, then priority will be given to protection of essential community infrastructure. Other high priorities may include for example the protection of historical buildings.

Property may be protected by:

- Sandbagging to minimise entry of water into buildings.
- Encouraging businesses and households to lift or move contents.
- Construction of temporary levees in consultation with the CMA, LGA and VicPol and within appropriate approval frameworks.

The IC will ensure that owners of essential community infrastructure are kept advised of the flood situation. Essential community infrastructure providers must keep the IC informed of their status and ongoing ability to provide services.

3.13 Disruption to services

Disruption to services other than essential community infrastructure and property can occur in flood events. Refer to Appendix A for specific details of likely disruption to services and proposed arrangements to respond to service disruptions in East Gippsland.

3.14 Road closures

The East Gippsland Shire Council and Department of Transport and Planning (DTP) will carry out their formal functions of road closures including observation and placement of warning signs, road-blocks to its designated local and regional roads, bridges, walking/bike/shared trails. East Gippsland Shire Council staff should also liaise with and advise DTP as to the need or advisability of erecting warning signs and/or of closing roads and bridges under its jurisdiction. DTP are responsible for designated main roads and highways and councils are responsible for the designated local and regional road network.

DTP/VicRoads and East Gippsland Shire Council will provide community information direct to the public regarding road closures. Information will be updated on the VIC Traffic website: https://traffic.vicroads.vic.gov.au/

Refer to Appendices A1 to A6 for specific details of potential road closures.

3.15 Dam spilling/ failure

The Department of Energy, Environment and Climate Action (DEECA) is the control agency for dam safety incidents. This includes breach, failure or potential breach/failure of a dam. However, VICSES is the control agency for any resultant flooding.

Major dams with potential to cause structural and community damage within the municipality are described in Appendix A.

3.16 Wastewater related public health issues and critical sewerage assets

Inundation of critical sewerage assets including septic tanks and sewerage pump stations may result in water quality problems within the municipality. Where this is likely to occur or has occurred, the responsible agency for the critical sewerage asset should undertake the following:

- Advise VICSES of the security of critical sewerage assets to assist preparedness and response activities in the event of flood.
- Maintain or improve the security of critical sewerage assets.
- Check and correct where possible the operation of critical sewerage assets in times of flood.
- Advise the ICC in the event of inundation of critical sewerage assets.

The responsible agency/s for critical sewage assets in the municipality are East Gippsland Water.

It is the responsibility of the East Gippsland Shire Council Environmental Health Officer to inspect and report to the MEMO and the ICC on any water quality issues relating to flooding.

3.17 Access to technical specialists

VICSES manages contracts with private technical specialists who can provide technical assistance in the event of flood operations or geotechnical expertise. Refer to VICSES SOP061 Technical Specialists for the procedure to engage these specialists.

3.18 Relief

Relief is the provision of assistance to meet the essential needs of individuals, families and communities during and in the immediate aftermath of an emergency.

As per the role statement for municipal councils within the SEMP, municipal councils are responsible for municipal relief coordination.

3.19 Activation of emergency relief

The IC is responsible for activating relief arrangements through the Municipal Recovery Manager (MRM). The decision to recommend the opening of an emergency relief centre sits with the IC.

The range and type of emergency relief services to be provided in response to a flood event will be dependent upon the size, impact, and scale of the flood or storm.

Refer to the SEMP Roles and Responsibilities - Relief for more detail of services that may be provided and the responsible coordinating agencies.

Suitable relief facilities identified for use during floods are detailed in the MEMP.

Details of the relief arrangements are available in the MEMP.

3.20 Animal welfare

Matters relating to the welfare of livestock and companion animals (including feeding and rescue) are to be referred to Department of Energy, Environment and Climate Action (DEECA) - Agriculture Victoria.

Requests for emergency supply and/or delivery of fodder to stranded livestock or for livestock rescue are passed to DEECA - Agriculture Victoria.

Matters relating to the welfare of wildlife are also to be referred to DEECA who has developed the Victorian Emergency Animal Welfare Plan.

Part 4. AFTER: EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS

4.1 General

As per the role statement for municipal councils within the SEMP, municipal councils are responsible for coordinating local level recovery activities. They are also the lead agency to coordinate post emergency needs assessment to determine long term recovery needs (Post Emergency Needs Assessment).

Arrangements for recovery from a flood and/or storm event within East Gippsland is detailed in the MEMP.

4.2 Transition from response to recovery

The SEMP sets out the transition to recovery arrangements. During the response phase, the IC will ensure they develop a plan for transition from response to recovery. The IC at the municipal tier should take a lead role in facilitating transition to recovery, working with the MRM, as it marks the end of the response phase which the Controller leads and manages.

4.3 After Action Review (AAR) – Lessons management

Lessons management is the critical process of learning from how we worked before and during an event, to improve the system for next time.

Depending on the size and scale of the flood event, VICSES will normally coordinate a debrief or after action review of flood operations as soon as practical following an event. Under the VicPol SEMP role statement, it is the responsibility of the Municipal Emergency Response Coordinator (MERC) to ensure that this occurs.

When the flood is being managed as a level 3 event, it may be that Emergency Management Victoria in consultation with VICSES assumes responsibility for debriefing.

All agencies involved in the flood incident should be represented at the debrief or AAR.

APPENDIX A - FLOOD RISK & PLANNING OVERVIEW

General

Appendix A details the flood risks and planning arrangements for river catchments within the East Gippsland municipality. This section provides an overview of the structure and content for each catchment. Specific details and arrangements are then expanded on in the following sections.

- Appendix A1 – Bemm River Catchment
- Appendix A2 – Cann River Catchment
- Appendix A3 – Genoa River Catchment
- Appendix A4 – Snowy River Catchment
- Appendix A5 – Tambo & Nicholson River Catchment
- Appendix A6 – Mitchell River Catchment

The Gippsland Lakes form a large estuarine system, which extends between Sale in the west and Lakes Entrance in the east, situated in both East Gippsland and Wellington municipal areas. Information on flooding in this catchment is detailed in the East Gippsland Shire Flood Emergency Plan – Gippsland Lakes.

Riverine flooding

Within East Gippsland, large severe floods generally occur as a result of a moist warm airflow from northern Australia, or low-pressure weather systems off the NSW south coast (East Coast Lows) bringing moderate to heavy rainfall over a period of 12 hours or more following a prolonged period of general rainfall. The period of general rainfall “wets up” the catchments and (partially) fills both the on-stream dams and the natural floodplain storage. These combine to increase the runoff generated during the subsequent period of heavy rainfall.

Large but less severe floods result from sequences of cold fronts during winter and spring that progressively wet up the catchments and fill the on-stream dams and the natural floodplain storage. Prolonged moderate to heavy rain leads to major flooding.

Flash flooding and overland flows

Short duration, high intensity rainfall (usually associated with thunderstorms) can also cause localised flooding within the municipality, along overland flow paths when the local urban drainage system surcharges. Such events are mainly confined to the summer months. They do not generally create widespread flooding since they only last for a short time and affect limited areas. Flooding from these storms occurs with little warning and localised damage can be severe.

High intensity rainfall such as associated with thunderstorms giving average rainfall rates of more than 20mm/hour for an hour or more is likely to lead to flash flooding and / or overland flows, across the urbanised parts of the municipality.

Blocked or capacity impaired stormwater drains can also lead to overland flows and associated flooding: the drain surcharges and excess water flows above ground.

Tidal flooding and storm surges

Moderate to heavy rainfall, easterly winds and low pressure systems coupled with high or incoming tides can exacerbate flooding within coastal parts the municipality. Rising sea levels are also a contributing factor increasing the likelihood and severity of these events.

Due to the proximity of communities to the coastline and its flat terrain in these locations, tidal flows may reduce the capacity of the natural drainage network to discharge runoff back into the ocean, while extreme storm events can cause backflow to the point where water surcharges back above ground around the drainage pits and channels.

Description of major waterways and drains

The table below provides a snapshot of waterways, tributaries and any communities located along these in East Gippsland. Detailed descriptions of these waterways are contained within Appendices A1 to A6.

Major waterways	Communities	Tributaries & Outflows	Communities
Bemm River	Bemm River	Errinundra River	
		Combienbar River	
		Nixon Creek	
		Goolengook River	
		Pyramid Creek	
		Crabhole Creek	
		McKenzie River	
		Dinah Creek	
		Jungle Creek	
		Sumner Creek	
		Bellbird Creek	
Cann River	Cann River, Noorinbee North	Cann River West Branch (inc. Lock Creek, Ino Creek, Tennyson Creek, Buldah Creek, Kelly Creek)	
		Cann River East Branch (inc. Fiddlers Green Creek, Flat Rock Creek)	
		Katies Creek	
		Back Creek	
		Log Bridge Creek	
		Neilson Creek	
		Jim Walker Creek	
		Jimms Creek	
		Tonghi Creek	
		Reedy Creek	
		George Creek	
		Gibbs Creek	
		Peach Tree Creek	
		Bargsh Creek	
		Tamboon Inlet	

Major waterways	Communities	Tributaries & Outflows	Communities
Genoa River	Genoa, Gipsy Point, Mallacoota	Black Jack Gully	
		Yambulla Creek	
		Murmuring creek	
		Jones creek	
		Wangarabell Creek	
		Big Flat Creek	
		Maramingo Creek	
		Wallagaraugh River	Gipsy Point
		Little River	
		Dowell Creek	
		Mallacoota Inlet	Mallacoota
Snowy River	Orbost, Marlo	Suggan Buggan River	
		Bonang River	
		Deddick River	
		Rodger River (inc. Yalmy River)	
		Buchan River	Buchan
		Brodribb River (inc. Lake Curlip & Cabbage Tree Creek)	
		Lake Wat Wat & Lake Corringle	
Tambo River	Swifts Creek, Bruthen	Swifts Creek	
		Little River	
		Haunted Stream	
		Timbarra River	
		Lake King	*See Gippsland Lakes*
Nicholson River	Sarsfield	Lake King	*See Gippsland Lakes*
Mitchell River	Bairnsdale, Woodglen, Lindenow, Hillside	Watts Creek	
		Calajero Creek	
		Moilun creek	
		Skull Creek	Lindenow
		Flaggy Creek	
		Prospeer Creek	
		Clifton Creek	Clifton Creek, Eastwood, Bairnsdale
		Lake King	*See Gippsland Lakes*
Gippsland Lakes	Eagle Point, Paynesville, Raymond Island, Lakes Entrance, Metung	Lake King	Metung, Paynesville, Eagle Point

Table A1 – Waterways within the East Gippsland municipality.

Dam spilling or failure

Flooding resulting from spilling or failure of the following dams is likely to cause significant structural and community damage.

DEECA is the control agency for dam safety incidents in Victoria (such as breach, failure or potential breach/failure of a dam). In NSW Snowy Hydro has the responsibility to manage dam integrity and

releases into the Snowy River. VICSES is however the control agency for any resultant flooding occurring downstream in Victoria.

Snowy Hydro operates in NSW, with releases from the Jindabyne Dam entering the Snowy River which flows into Victoria and eventually out to sea. Snowy Hydro is required to make environmental releases each year, with a series of planned releases predetermined the year prior. These proceed with consultation from the Snowy Safety Technical Advisory Group (SSTAG) made up of key agencies including VICSES, East Gippsland Shire Council and the EGCMA as downstream stakeholders.

The Snowy Hydro Scheme is designed to cope with large inflows into the system. When the capacity of rivers downstream of the Snowy Scheme is exceeded, releases are limited to what the natural flows would have been if the Scheme did not exist. This prevents exacerbation of flooding downstream.

Location	Owner	Dam Height	Dam Capacity	Comments
Jindabyne Dam	Snowy Hydro	71.6 m	689,900 cubic metres	Located upstream of the Snowy River, NSW

Table A2 - Details of dams which may impact East Gippsland.

Typical flood peak travel times

Consideration needs to be given to the time of travel of the flood peak. A flood on a ‘dry’ waterway will generally travel more slowly than a flood on a ‘wet’ waterway (for example, the first flood after a dry period will travel more slowly than the second flood in a series of floods). Therefore, recent flood history, soil moisture and forecast weather conditions all need to be considered when using the following information to direct flood response activities.

Note that flooding will start some time ahead of the time indicated by the following travel times – these are the time between the flood peaks at respective sites.

Typical travel times have been collated from modelling and recorded historical events and are presented for each catchment in Appendices A1 to A6.

Overview of Flooding Consequences

An overview of the properties, infrastructure, tourism impacts and Government boundaries are provided in table format for each river catchment, under the relevant appendix. A selection of appropriate ARI data may be present where there is a known risk.

Warnings and Gauges

Flood class levels are used in the issuing of a flood warning and are based upon the effect of flooding for some distance upstream and downstream of each site. Flood class levels are categorised as Minor, Moderate or Major. Preceding these, a flood watch may also be issued. Refer to the Bureau of Meteorology (BoM) website for a detailed description of flood watches and flood class levels: http://www.bom.gov.au/australia/flood/knowledge-centre/about-warning-service.shtml.

The BOM currently provides flood watches for all river catchments in East Gippsland.

Flood class levels at key river height gauges for rivers posing a potential threat to life and property are detailed in the relevant river catchment Appendix (A1 to A6).

At these sites, the BoM will issue flood warnings if levels reach those classified. Warnings will be placed on the Bureau's website (bom.gov.au/vic/warnings/index.shtml?ref=hdr) and the VicEmergency website https://emergency.vic.gov.au/.

These gauges may provide some warning of expected flooding. The Bureau of Meteorology's website also links a number of these gauges at: http://www.bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60078.html and the VicEmergency website https://emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Further details on public information and warnings are detailed in Appendix C.

Properties at Flood Risk

Properties at risk of flood within each river catchment are detailed within the flood intelligence cards. As more intelligence becomes available, these lists may change. The tables have been populated based on modelling work as part of relevant flood studies.

The information is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it.

What areas are affected?

Where appropriate, Appendices A1 to A6 expand on what areas are affected, including but not limited to the following information:

- Caravan parks likely to be affected.
- How many properties?
- How much warning time?
- Impacts on essential community infrastructure.
- Isolation risks.
- Major road closures.
- Locations where evacuation difficulties may occur.

Flood mitigation

There are no riverine or estuarine flood mitigation systems/procedures/works e.g. levees in East Gippsland that are currently managed or maintained by the EGCMA. There are a small number of legacy works that exist, all of which are deemed 'at risk of failure' during flood events and should not be relied on for mitigation purposes. As such, details of these are omitted from this plan.

Flood impacts and required actions

Flood intelligence cards are provided for each river catchment and are populated using all available intelligence from flood studies, modelling, historical events, and local knowledge.

Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Institute of Disaster Resilience (AIDR) Handbook series on managing the Floodplain.

Note: In Flash Flood areas without gauges, it will only be possible to provide a general description of likely flood impacts.

Flood evacuation arrangements

Phase 1 - Decision to Evacuate

Under the SEMP, Victoria Police (VicPol) has the responsibility for evacuation (Evacuation Manager) – in consultation with the control agency and other expert advice. EMV has developed a standardised procedure for evacuation under JSOP J03.12 - Evacuation for Major Emergencies.

The IC decides whether to warn people to evacuate within a specified timeframe or whether it is necessary to advise them to evacuate immediately. The IC must make this decision having regard for the requirements of the JSOP.

Once the IC decides to recommend evacuation, VicPol's Evacuation Manager is responsible for the management of the evacuation process where possible. VICSES and other agencies will assist where practical. VICSES is responsible for the development and communication of evacuation warnings.

VicPol and/or Australian Red Cross may take on the responsibility of registering people affected by a flood emergency including those who have been evacuated. This will be through Register.Find.Reunite.

The Incident Controller may make the decision to evacuate an at-risk community under the following circumstances:

- Properties are likely to become inundated.
- Properties are likely to become isolated and occupants are not suitable for isolated conditions.
- Public health is at threat because of flooding and the IC considers that evacuation is the most effective risk treatment. The AV health commander is responsible for supporting the evacuation of vulnerable people. Refer to the State Health Emergency Response Plan (SHERP) for details).
- Essential services have been damaged and are not available to a community, therefore the IC considers evacuation is the most effective risk treatment.

The following should be considered when planning for evacuation:

- Anticipated flood consequences and their timing and reliability of predictions.
- Size and location of the community to be evacuated.
- Likely duration of evacuation.
- Forecast weather.
- Flood models.

- Predicted timing of flood consequences.
- Time required and available to conduct the evacuation.
- Evacuation priorities and evacuation planning arrangements.
- Access and egress routes available and their potential flood liability.
- Current and likely future status of essential infrastructure.
- Is cross border assistance required or evacuation to another municipality relief centre?
- Resources required and available to conduct the evacuation.
- Shelter including emergency relief centres, assembly areas.
- Vulnerable people and facilities.
- Transportation.
- Registration.
- People of cultural or linguistically diverse background and transient populations.
- Safety of emergency service personnel.
- Different stages of an evacuation process.

The decision to evacuate is to be made by the IC in consultation with the MERC, MEMO, DFFH, Health Commander and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

When planning evacuation, the IC will consider triggers for evacuation. For example, specific flood heights are predicted.

Phase 2 – Warning

Warnings may include a warning to 'prepare to evacuate' and a warning to 'evacuate now'. Once the IC has made the decision to evacuate, the at-risk community will be warned to evacuate. Evacuation warnings should be disseminated via methods listed in Part 3 and Appendix C of this plan.

Phase 3 – Withdrawal

VicPol is the responsible agency for evacuation. In accordance with the J03.12 - Evacuation for Major Emergencies, The VicPol Evacuation Manager will consult with the IC and IEMT on the most appropriate relief options. When preparing the schedule 2 Evacuation Recommendation as per JSOP03.12, it is important to ensure that the recommended routes and specified relief centres are accessible to the relevant community. This is to ensure a community does not receive advice about a relief centre that may not be accessible to them due to road closures and flooding.

VICSES, CFA, AV and Local Government will provide resources where available to support VicPol/DTP-VicRoads with route control and may assist VicPol in arranging evacuation transportation.

VicPol will control security of evacuated areas.

Evacuees will be encouraged to move using their own transport where possible. Transport for those without vehicles or other means will be arranged by the Incident Controller / ICC if a need is determined.

Vulnerable persons register and people with special needs

Local Government oversees the Vulnerable Persons Register (VPR) on behalf of the Department of Families, Fairness and Housing (DFFH). The VPR operates across Victoria and provides 24x7 access to data by VicPol during an emergency. The system can be accessed via most web enabled devices and includes locality aware functions for mobile devices.

The information in the VPR can be filtered, mapped, and where necessary exported to reports for authorised purposes, according to the role and access rights of each organisation.

Additionally, special needs persons will be/are identified in the Police Seniors Register. This can be done through VicPOL Seniors Register East Gippsland.

Phase 4 – Emergency Shelter

Emergency Relief Centres and/or Community Assembly Areas which cater for people's basic needs for floods may be established to meet the immediate needs of people affected by flooding. VicPol in consultation with VICSES will liaise with Local Government and DFFH (where regional coordination is required) via the relevant control centre to plan for the opening and operation of Emergency Relief Centres. This can best be achieved though the Emergency Management Team (EMT).

Maps and Schematics

Inundation maps are provided for each river catchment Appendix (A1 to A6) detailing likely affected areas during a 1% and 10% AEP flood event.

Digital Twin Victoria is platform bringing together many datasets into a single online place that anyone can use. The 1% AEP flood extents can also be viewed using this. For East Gippsland this data set can be accessed by loading the EGCMA 1% AEP (100 year ARI) regional flood extent layer from the data catalogue under the water and flood mapping tabs. The platform allows the user to zoom in to see localised flood extents and can be accessed at: https://digitaltwin.vic.gov.au/public/.

Local knowledge arrangements

As control agency for flood in Victoria, VICSES is committed to ensuring the incorporation of local knowledge in decision making before, during and after incidents. This is guided by the VICSES Policy 10.02 Local Knowledge.

Information from community sources including but not limited to observations, historical information and information about current and possible consequences of an incident may be utilised to help inform the process of incorporating local knowledge into decision making during an incident. Field observers, Local Information Officers (LIOs) and other agency networks identified and recorded in EM-COP will help support this process.

Field Observers

Field Observers may support:

- The monitoring and reporting on observations of incidents. For example, during a flood event a field observer may be regularly taking photos via mobile phone or app technology (see Snap Send Solve below) of the local stream gauge board if it is safe to do so.
- The provision of local advice regarding the consequences of incidents.

- Establishing linkages with key groups within local communities during emergency management planning and operational response. During operational response, this may be through an lio or direct to the intelligence cell. In some circumstances it may also be through a community liaison officer if one is in place within the public information unit or via a community field officer.
- The provision of authorised information to community members where requested.

Local Information Officers

LIOs operating out of sectors or divisions provide a key communication interface to field observers and other sources of local knowledge. LIOs may be community members, VICSES members or other agency contacts.

Where LIOs and field observers have been established, their details are recorded in EM-COP under the Flood Observation Resources in the Intelligence section (Desktop tab).

Other agency networks identified for local knowledge are:

- East Gippsland Catchment Management Authority
- East Gippsland Shire Council MEMO/MRM

Intelligence gathering system - Snap Send Solve

VICSES has teamed up with Snap Send Solve to create a flood/storm and other VICSES hazard observation App and Portal.

Snap Send Solve is an existing app currently available to the community to notify local councils and other authorities of issues that need addressing such as cracked pavements, parking problems, dumped rubbish and graffiti.

The existing functionality of the smartphone app has been adapted for VICSES in a well presented and user-friendly way. The app is used to capture field observations during an event such as a flood, by filling in a simple form on a smartphone and using the camera to upload photos. This information is then displayed through an administration portal to collate and view the data.

The app component will be made available to trusted field observers in the community, and their observations will be visible via EMCOP where Intelligence personnel in Incident Management Teams can access them during events. The intent is that better access to local knowledge will add to information sources to maximise public information communications and response efforts.

Trusted field observers include both internal and external stakeholders (community members, ESOs such as CFA/VicPol). They can be activated and deployed by the VICSES RDO to use the app during an event and to report on valuable information with a level of accuracy.

The portal has been successfully integrated with EMCOP and eMap, both platforms are available to use in an IMT. The Snap Send Solve logo also appears within the intelligence section on the EM-COP desktop for easy access to the portal.

Important Notes

These arrangements do not give field observers and existing agency networks any responsibility for operational decisions. Nor does it permit field observers and existing agency networks to direct operational activity, including the management of flood levees.

Information provided from sources of local knowledge must be processed and validated before it can become intelligence to inform decision making.

Local flood information

Local Flood Guides aim to provide flood prone communities with detailed information about their risk. These guides contain important information about how to prepare, respond and what to do after a flood. The guides include localised information such as:

- Description of historical floods in the area.
- Map showing different flood levels and what areas will be affected.
- Information on river gauges and warnings.
- List of local contacts and emergency broadcasters.

Local Flood Guides include the following general information:

- How to prepare for floods.
- What to do if flooding is likely
- What to do during a flood

These may be accessed via the VICSES website; www.ses.vic.gov.au/get-ready/your-local-flood-information. Specific flood guides for each river catchment are detailed within the relevant appendix.

Regional and State Flood Emergency Sub-Plans are also available on the VICSES website. https://www.ses.vic.gov.au/about-us/state-and-regional-emergency-plans.

The East Gippsland CMA (https://egcma.com.au/) provides management over 2.2 million hectares of land, lakes and coastal waters within East Gippsland. There is a wealth of knowledge around flooding across the river catchments, as well as mitigation strategies that will assist with management of these areas and a reduction in flooding consequences.

FloodZoom is an interactive mapping system and database utilised by the CMAs, VICSES and supporting agencies to identify modelled floods and areas at risk. It can be utilised to help inform localised community warnings and evacuation advice. The system also contains information on current plans and flood studies relevant to river catchments across Victoria.

APPENDIX A1 – FLOOD INFORMATION FOR THE BEMM RIVER CATCHMENT

Catchment Description

The Bemm River begins at the confluence of the Errinundra and Combienbar Rivers, which originate on the southern slopes of the Errinundra Plateau. Much of the catchment is public land and forested, however the river system passes through two small farming communities, Combienbar and Club Terrace, before discharging to Sydenham Inlet near the small coastal township of Bemm River.

It should be noted that water levels in lower Bemm River and Bemm River township will be strongly influenced by the water level in Sydenham Inlet, and the wind induced movement of that water.

Warnings and Gauges

The Bureau of Meteorology does not currently provide flood forecasts for the Bemm River. When possible, the BoM will provide generalised warnings. These warnings contain generalised statements advising that flooding is expected and may include forecast trend (rising or falling).

Gauges for the catchment area are detailed in table A1.1 below.

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge
Bemm River @ Princes Highway	221212	-37.607°S 148.902°E (WGS84)	✓	
Bemm River U/S Pumphouse	221225	-37.730°S 148.951°E (WGS84)	✓	
Combienbar R @ Combienbar	221211	-37.440°S 148.983°E (WGS84)	✓	
Errinundra R @ Errinundra	221207	-37.447°S 148.915°E (WGS84)	✓	
Aws-Combienbar Aws	084143	-37.342°S 149.023°E (WGS84)		✓

Table A1.1 – Gauges within the Bemm River catchment within East Gippsland.

These Gauges may provide some warning of expected flooding. It is advised that residents monitor the Bureau of Meteorology's website http://www.bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website https:/emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Flood Peak Travel Times

There is currently insufficient data to construct flood peak travel times for the Bemm River, however past incidents suggest there is a time delay of 6-8 hours from the peak at the Bemm River @ Princes Highway gauge to the Bemm River town (Bemm River U/S Pumphouse gauge).

During small floods one or more roads may be cut for 3-4 hours before water recedes on Sydenham Inlet Road. During larger flooding events the town may be isolated for 3-4 days before this access is drivable.

Flood Consequences

Riverine Flood Risk

Bemm River township is a significant community on the Bemm River. The highest risk for Bemm River is the closure of Sydenham Inlet Road, which is the only access road to the township.

Properties at Flood Risk

Properties with a flood risk are identified in the Flood Intelligence Card following. For privacy reasons exact addresses are omitted from this plan, however this information is available to the IC through FloodZoom for the purpose of community notification and evacuation advice as required.

As more intelligence becomes available, the identified properties may change and will be updated in future revisions of this plan.

Flood Intelligence Card

A summary of flood consequences for the Bemm River is provided in the flood intelligence card (table A1.2) following.

Maps and Schematics

Maps showing the inundation expected at Bemm River during a 1% (Map 1a) and 10% (Map 1b) AEP flood event are supplied following the flood intelligence card.

A catchment schematic has not been produced for this river system.

Local flood information

A Local Flood Guide has been produced for the Bemm River town. This can be found at www.ses.vic.gov.au/get-ready/your-local-flood-information

FLOOD INTELLIGENCE CARD – BEMM RIVER @ PRINCES HIGHWAY 221212

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it. ***Scan the QR code for the current levels for this gauge.***

LOCATION:	25km upstream of Bemm River township, access via Princess Highway near Club Terrace Loop Road
CURRENT LEVEL:	BOM
STREAM:	Bemm River
GAUGE NUMBER:	221212
GAUGE ZERO:	55.59m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	
MINOR:	**Not Established**
MODERATE:	**Not Established**
MAJOR:	**Not Established**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**18.39 m (June 1998)**

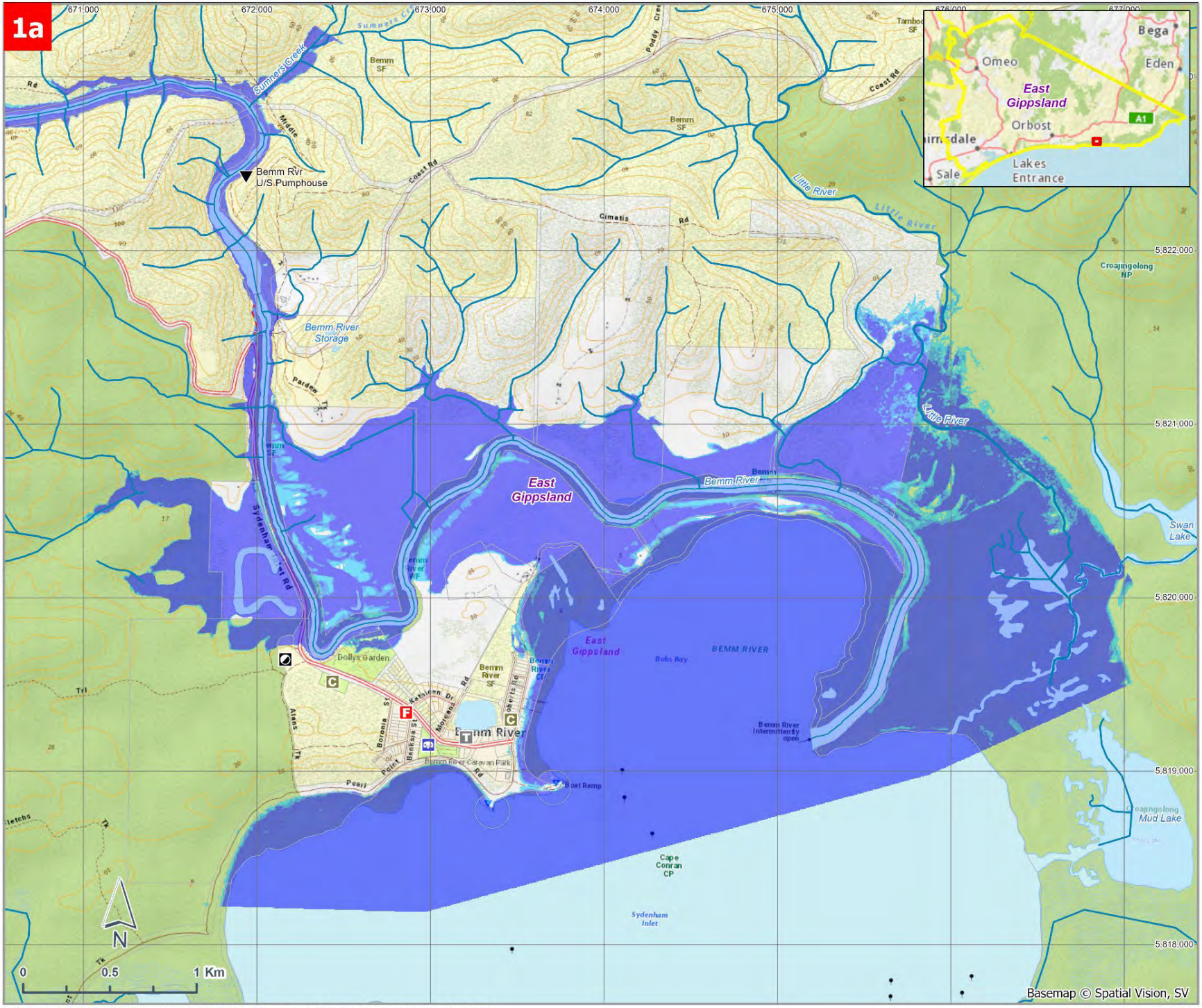
Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
13.10m	June 2011 Flood Level Peak		
14.26m# **(46,000 ML/d)**	10% AEP Flood Level	**Properties likely impacted** **2 properties in total** • Downstream of Coast Road Bridge flood waters spread into the floodplain where the Bemm River meanders into Sydenham Inlet Road. • Access to one property at the end of Sydenham Parade is inundated. Waters exceeding 1.2m in depth isolate this property, with flow velocity between 0-1m/s. A low hazard category is identified for this property. • One property 900m south of Coast Road Bridge is isolated. Flood waters up to 1.2m inundate this property's access track. Flow velocity is negligible, and a low hazard category is prescribed. **Roads inundated** • Access to Bemm River township via Sydenham Inlet Road is inundated. Flow velocity is between 0-1m/s, but a high hazard exists for parts of this road close to Coast Road Bridge. Inundation occurs approximately 400m south of the bridge. • Access to Pearl Road Point boat ramp is inundated by flood depths up to 0.3m. Flow velocity is negligible and a low hazard level is identified. • Significant inundation of Sydenham Parade is observed. Flood depths exceed 1.2m, while flow velocity is negligible. A high hazard category occurs on sections of this road.	**Assistance may be required for:** • Homeowners on Sydenham Inlet Road and Sydenham Parade **Road closure signs provided by the road authority for:** • Coast Road Bridge • Sydenham Inlet Road • Sydenham Parade

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
18.39m **(80,000 ML/d)**	June 1998 Flood Level Peak	**Event summary** • Recorded peak flow of close to 80,000 ML/d • Most likely between a 2% and 1% AEP event • Appears to have inundated locations which remain unaffected in modelled 1% AEP scenario • Bemm River Hotel observed to have floodwater around it	
>19.40m#^ **(90,800 ML/d)**	1% AEP Flood Level	**Properties likely impacted** **2 properties in total** • Downstream of Coast Road Bridge flood waters spread into the floodplain where the Bemm River meanders into Sydenham Inlet. • Access to one property at the end of Sydenham Parade is inundated, with flood waters isolating the property. Inundation does not appear to reach the building footprint. Flood water up to 0.8m over external areas of this property, with a low hazard level immediately surrounding it. • Access to one property 900m south of Bemm River Bridge is inunated – this property's elevation prevents inundation of the building footprint. Surrounding flood waters are in excess of 1.2m and an extreme hazard category occurs on the Sydenham Inlet Road side. **Roads inundated** • Access to Bemm River township via Sydenham Inlet Road is inundated. Flood depths are in excess of 1.2m and extend for approximately 400m south of the bridge. Velocity reaches 3 m/s along minor sections of this road, however the velocity is mostly between 1-2 m/s. An extreme hazard level exists along the 400m section. • Access to Pearl Road Point boat ramp is inundated by flood water with depths between 0-0.3m. Flow velocity is maintained between 0-1 m/s. Low hazard category flooding occurs. • Access to Sydenham Road is cut off, with flood depths between 0.5-0.8m inundation the road. Flow velocity is maintained between 0-1 m/s. Low hazard category flooding occurs. • Velocities of outbreaks inundation Sydenham Inlet Road peaked at 2.5 m/s near the southern end of the floodplain. High hazard category flooding occurs. • Much of Sydenham Parade is inundated with flow depths reaching >1.2m. Flow velocities reach 1-2 m/s along some sections of road. Extreme hazard category flooding occurs along much of this road.	**Assistance may be required for:** • Homeowners on Sydenham Inlet Road and Sydenham Parade **Road closure signs provided by the road authority for:** • Coast Road Bridge • Sydenham Inlet Road • Sydenham Parade **Sandbagging may be required for:** • Sandbagging provided to one property at the end of Sydenham Parade which is completed surrounded by flood water

Table A1.2 – Breakdown of likely consequences at various Bemm River @ Princes Hwy gauge level heights along Bemm River with operational considerations

 # Event gauge height estimated based on WMIS rating table. Discharges are taken from 2017 Bemm River Flood Risk Report.

^ Estimated, beyond upper limit of rating table.



LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Property Boundary
- Building
- Waterbody
- Municipal / Shire Boundary
- Waterway
- Bicycle / Walking Trail
- Community Venue
- Fire Station
- Telephone Exchange
- Tip / Recycling
- Caravan Park
- Water Level

1% AEP Flood Depth

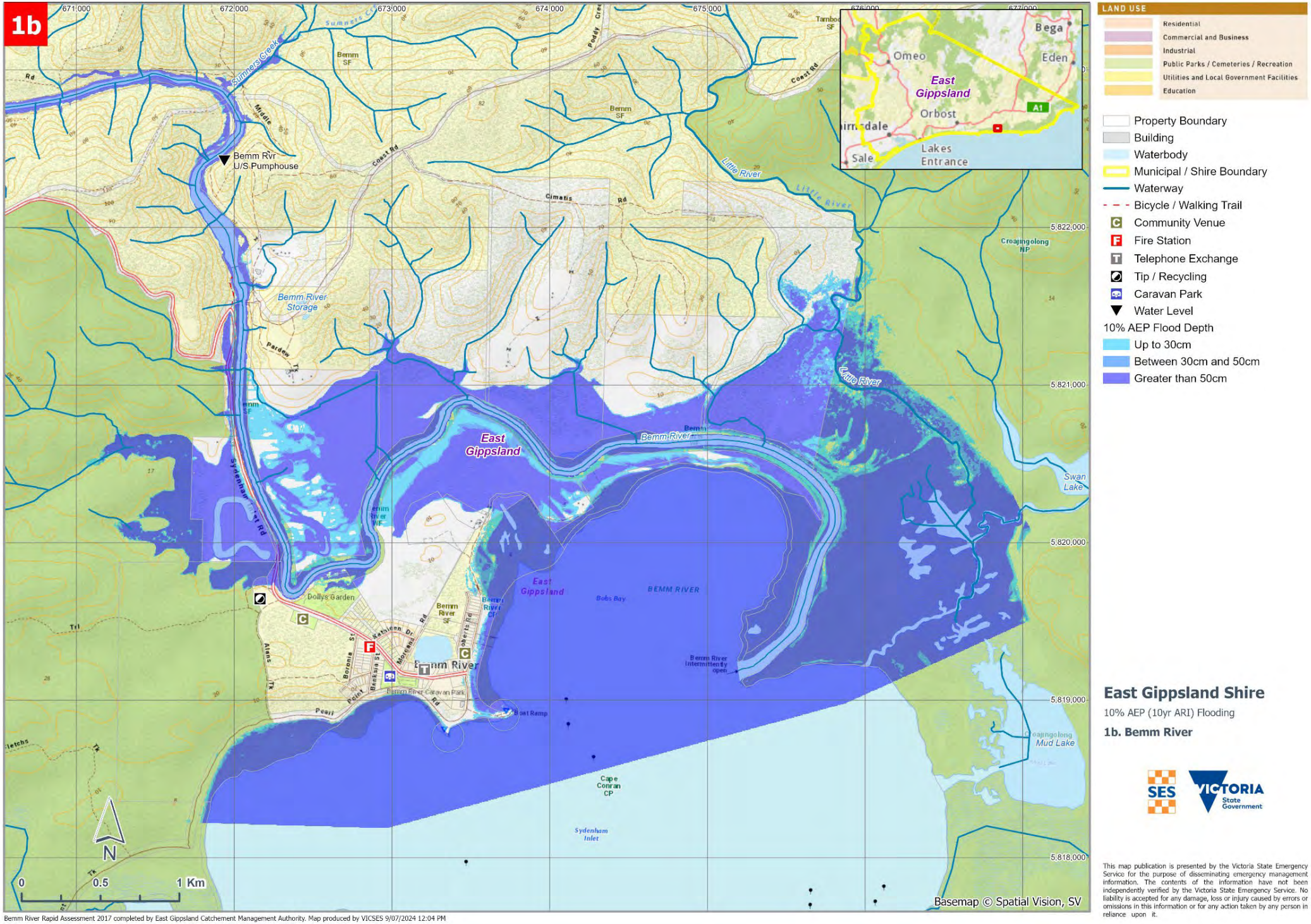
- Up to 30cm
- Between 30cm and 50cm
- Greater than 50cm

East Gippsland Shire

1% AEP (100yr ARI) Flooding

1a. Bemm River

Bemm River Rapid Assessment 2017 completed by East Gippsland Catchement Management Authority. Map produced by VICSES 9/07/2024 12:04 PM



LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Property Boundary
- Building
- Waterbody
- Municipal / Shire Boundary
- Waterway
- Bicycle / Walking Trail
- C Community Venue
- F Fire Station
- T Telephone Exchange
- Tip / Recycling
- Caravan Park
- Water Level

10% AEP Flood Depth

- Up to 30cm
- Between 30cm and 50cm
- Greater than 50cm

East Gippsland Shire

10% AEP (10yr ARI) Flooding

1b. Bemm River

SES VICTORIA State Government

Bemm River Rapid Assessment 2017 completed by East Gippsland Catchement Management Authority. Map produced by VICSES 9/07/2024 12:04 PM

APPENDIX A2 – FLOOD INFORMATION FOR THE CANN RIVER CATCHMENT

Catchment Description

The Cann River catchment (1,167 km^2) comprises the forested upland areas on the Victorian and New South Wales border, the cleared agricultural land on the Cann floodplain around Noorinbee and Cann River township and the Tamboon Inlet on the lower reaches of the river.

The river is formed at the confluence of two streams - the East and West branches of the Cann at Weeragua. The Cann River flows into Tamboon Inlet, a coastal lagoon that is intermittently open to the ocean. Lake Furnell is also located on the lowland reach of the river.

Public land in the catchment includes sections of Coopracambra and Croajingolong National Parks. These remote areas support several ecosystems including eucalypt forests, heathlands, rainforests, granite peaks and coastal headlands. These ecosystems support a diversity of flora and fauna, including 328 fauna and 1000 flora species recorded in the Croajingolong National Park.

The fertile Cann River floodplain mainly supports dairying and beef cattle grazing. The small township of Cann River, located at the junction of the Princes and Monaro Highways, is a rest stop for travellers and a starting point for visitors to the Coopracambra and Croajingolong National Parks.

Historical flood records indicate that it is not unusual to have multiple flood events in any single year, once the catchment is wet.

Catchment Schematic

Figure A2.1 provides a schematic of the river system, main tributaries, and gauge locations.

Flood mitigation

The Bluenose levee is designed to protect rural land to the west of the river however it has not had any significant monitoring or maintenance for many years. Should the levee fail during a flood event, increased flows would occur in Blue Nose Creek. This would cause increased flooding in the creek, particularly where it crosses the Princes Highway, and increased risk of erosion at the highway crossing.

Flood Peak Travel Times

There is currently insufficient data to construct flood peak travel times for the Cann River.

Warnings and Gauges

The Bureau of Meteorology currently provides flood forecasts for the Cann River via the Cann River @ Weeragua (Cann River West Branch) and Cann River @ Chandlers Creek (Cann River East Branch) river gauges (Table A2.1).

Additional gauges for the catchment area are detailed in table A2.2.

Gauge	River/creek flood class level		
	Minor	Moderate	Major
Cann River (West Branch) @ Weeragua	3.0 m	3.5 m	4.0 m
Cann River (East Branch) @ Weeragua	2.0 m	2.3 m	2.8 m

Table A.2.1 – Gauges with established Flood Class Levels within the Cann River Catchment

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge
Cann River (West Branch) @ Weeragua	221201	- 37.373°S 149.199°E (WGS84)	✓	
Cann River (East Branch) @ Weeragua	221209	-37.355°S 149.207°E (WGS84)	✓	✓
Cann River @ U/S Cann R Offtake	221224	-37.539°S 149.157°E (WGS84)	✓	

Table A2.2 – Gauges within the Cann River catchment within East Gippsland.

These Gauges may provide some warning of expected flooding. It is advised that residents monitor the Bureau of Meteorology's website http://www.bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website https:/emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Flood Consequences

Riverine Flood Risk

Cann River township is a significant community on the Cann River. The Cann River Caravan Park is located on the floodplain and needs early evacuation.

Rural areas around Noorinbee North, Noorinbee, Cann River and Tonghi Creek are at risk of flooding.

Properties at Flood Risk

Properties with a flood risk are identified in the Flood Intelligence Card following. For privacy reasons exact addresses are omitted from this plan, however this information is available to the IC through FloodZoom for the purpose of community notification and evacuation advice as required.

As more intelligence becomes available, the identified properties may change and will be updated in future revisions of this plan.

Flood Intelligence Card

A summary of flood consequences for the Cann River is provided in the flood intelligence card (table A2.3) following.

Maps and Schematics

Maps showing the inundation expected at Cann River during a 1% (Map 2a) and 10% (Map 2b) AEP flood event are supplied following the flood intelligence card.

Local flood information

During consultation additional local knowledge for the Cann River catchment was captured. Where this does not align with the flood intelligence cards, this information is summarised below.

- WB Line (a popular tourist track) north of the East Branch flood gauge can be inundated around a moderate flood level.
- Flooding of the Chandlers Creek bridge results in a 1-hour detour only accessible via 4WD bush tracks.
- Farm land adjacent to Bennet Street can hold water near the highway during flood events.

FLOOD INTELLIGENCE CARD – CANN RIVER @ U/S CANN RIVER OFFTAKE, 221224

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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LOCATION:	EGW station located between properties at 297 Monaro Hwy and 299 Monaro Hwy.
CURRENT LEVEL:	BOM
STREAM:	Cann River
GAUGE NUMBER:	221224
GAUGE ZERO:	94.535m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR:	**N/A**
MODERATE:	**N/A**
MAJOR:	**N/A**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**5.972m (June 2011)**

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
4.24m*	20% AEP Flood Level	**Roads inundated** • Humphreys Road inundated at the end closest the Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s.	**Road closure signs provided for:** • Humphreys Road
5.35m*	10% AEP Flood Level	**Properties likely impacted (4 properties in total)** • 3 properties directly opposite the Cann River Police Station (9-15 Monaro Highway) observe minor inundation at the rear. Flood depths are generally between 0-0.3m, with one small pocket reaching 0.8m. Flow velocity is negligible, and low hazard category flooding occurs. **Tourism/recreation likely impacted** • Minor inundation of the Cann River Caravan Park. Flood depths between 0-0.3m with flow velocities between 0-1 m/s. Low hazard category flooding occurs. • The Cann River Recreation Reserve is inundated with inundation flood depths reaching 0.3m. This inundation tends to be static, with velocities between 0-1 m/s. Low hazard category flooding occurs. **Roads inundated** • Humphreys Road inundated at the end closest to Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s. Low hazard category flooding occurs.	**Assistance may be required for:** • Cann River Caravan Park • Cann River Recreation Reserve **Sandbagging may be required for:** • Three properties opposite the Cann River Police Station **Road closure signs provided by the road authority for:** • Humphreys Road

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
6.37m#	5% AEP Flood Level	**Properties likely impacted (5 properties in total)** • Four properties directly opposite the Cann River Police Station (5-17 Monaro Highway) observe minor inundation at the rear. Flood depths reach 0.8m, with one small area reaching 1.2m. Flow velocity is negligible. • Minor inundation at the front of one property at 29 Tamboon Road. May result in isolation or reduced access. Flood depths maintained between 0-0.3m. Low hazard category flooding occurs. **Tourism/recreation likely impacted** • The Cann River Recreation Reserve is inundated with flood depths reaching 1.2m. Flow velocities reach 2m/s in some areas of the Reserve. • Minor inundation of the Cann River Caravan Park. Flood depths up to 0.5m are observed, with flow velocities between 0-1 m/s. **Roads inundated** • Humphreys Road inundated at the end nearest to Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s.	**Assistance may be required for:** • One property at 29 Tamboon Road • Cann River Caravan Park • Cann River Recreation Reserve **Sandbagging may be required for:** • Four properties opposite the Cann River Police Station **Road closure signs provided by the road authority for:** • Humphreys Road
6.63m#	2% AEP Flood Level	**Properties likely impacted (6 properties in total)** • Four properties directly opposite the Cann River Police Station (5-17 Monaro Highway) become inundated. Flood depths reach 1.2m in some areas. It is unknown whether building FFLs are exceeded. Flow velocity is negligible. • Minor inundation at the front of one property at 29 Tamboon Road. May result in isolation or reduced access. Flood depths reach 0.8m. • Flood depths of up to 0.3m reach boundary of home at 299 Monaro Highway. It is unknown whether flooding is above floor level. Flow velocity is negligible. **Tourism/recreation likely impacted** • The Cann River Recreation Reserve is inundated with inundation flood depths reaching 1.2m. Flow velocities reach 2m/s in some areas of the Reserve. • Minor inundation of the Cann River Caravan Park. Flood depths up to 0.8m are observed, with flow velocities between 0-1 m/s. **Roads inundated (roads in bold red are DTP operated roads)** • Humphreys Road inundated at the end nearest the Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s. • **Minor inundation of Princes Highway leading into Cann River. Flow depths up to 0.3m pond within the road shoulders. Speed reduction signs appropriate.**	**Assistance may be required for:** • One property at 29 Tamboon Road • One property at 299 Monaro Highway • Cann River Caravan Park • Cann River Recreation Reserve **Sandbagging may be required for:** • Four properties opposite the Cann River Police Station **Road closure signs provided by the road authority for:** • Humphreys Road **Speed reduction signs provided by the road authority for:** • Princes Highway
6.75m#	1% AEP Flood Level	**Properties likely impacted (12 properties in total)** • Four properties directly opposite the Cann River Police Station (5-17 Monaro Highway) become inundated. Flood depths reach 1.2m in some areas. It is unknown whether building FFLs are exceeded. Flow velocity is negligible. • Minor inundation at the front of one property at 29 Tamboon Road. May result in isolation or reduced access. Flood depths maintained between 0-0.3m.	**Assistance may be required for:** • One property at 29 Tamboon Road • Cann River Caravan Park • Cann River Recreation Reserve • Four properties on Angey Lane

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• 299 Monaro Highway is inundated up to 0.5m. Inundation covers access track, with inundation depths up to 0.3m. It is unknown whether flooding is above floor level, but access will be impacted. Flow velocity is negligible and a moderate hazard category occurs across parts of this property. • Two buildings at 297 Monaro Highway are inundated. Flood depths up to 0.3m overtop this property's driveway and reach buildings. It is unknown whether flood depths exceed building levels. Flow velocity is negligible and low hazard flooding occurs. • Four buildings on Angey Lane are isolated, with flood depths reaching 0.3m. Flow velocity is negligible and a low hazard flooding occurs. **Tourism/recreation likely impacted** • The Cann River Recreation Reserve is inundated with inundation flood depths reaching 1.2m. Flow velocities reach 2m/s in some areas of the Reserve. A moderate hazard level is identified in some parts. • Minor inundation of the Cann River Caravan Park. Flood depths up to 1.2m are observed, with flow velocities between 0-1 m/s. Low hazard flooding occurs. **Roads Inundated (roads in bold red are DTP operated roads)** • Humphreys Road inundated at the end nearest the Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s. A low hazard level is identified. • **Minor inundation of Princes Highway leading into Cann River. Flow depths up to 0.3m pool within the road shoulders.** • Angey Lane becomes inundated, with flood waters reaching 0.3m. Flow velocity is between 0-1m/s and a low hazard category is identified.	**Sandbagging may be required for:** • Four properties opposite the Cann River Police Station • One property at 299 Monaro Highway • Two buildings at 297 Monaro Highway **Road closure signs provided by the road authority for:** • Humphreys Road • Angey Lane **Speed reduction signs provided by the road authority for:** • Princes Highway

Table A2.3 – Breakdown of likely consequences at various Cann River Offtake gauge level heights along Cann River with operational considerations

* Estimated based on available WMIS rating curve.

Estimated based on available WSE layers presented in FloodZoom.

FLOOD INTELLIGENCE CARD – CANN RIVER (WEST BRANCH) @ WEERAGUA, 221201

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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LOCATION:	Approx. 100m west of confluence between east and west Cann River branches
CURRENT LEVEL:	BOM
STREAM:	Cann River West Branch
GAUGE NUMBER:	221201
GAUGE ZERO:	153.956m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR:	**3.0m**
MODERATE:	**3.5m**
MAJOR:	**4.0m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**4.680m**

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
N/A*	20% AEP Flood Level	**Roads inundated** • Humphreys Road inundated at the end closest the Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s.	**Road closure signs provided by the road authority for:** • Humphreys Road
N/A*	10% AEP Flood Level	**Properties likely impacted (4 properties in total)** • 3 properties directly opposite the Cann River Police Station (9-15 Monaro Highway) observe minor inundation at the rear. Flood depths are generally between 0-0.3m, with one small pocket reaching 0.8m. Flow velocity is negligible, and low hazard category flooding occurs. **Tourism/recreation likely impacted** • Minor inundation of the Cann River Caravan Park. Flood depths between 0-0.3m with flow velocities between 0-1 m/s. Low hazard category flooding occurs. • The Cann River Recreation Reserve is inundated with inundation flood depths reaching 0.3m. This inundation tends to be static, with velocities between 0-1 m/s. Low hazard category flooding occurs. **Roads inundated** • Humphreys Road inundated at the end closest to Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s. Low hazard category flooding occurs. •	**Assistance may be required for:** • Cann River Caravan Park • Cann River Recreation Reserve **Sandbagging may be required for:** • Three properties opposite the Cann River Police Station **Road closure signs provided by the road authority for:** • Humphreys Road

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
N/A*	5% AEP Flood Level	**Properties likely impacted (5 properties in total)** • Four properties directly opposite the Cann River Police Station (5-17 Monaro Highway) observe minor inundation at the rear. Flood depths reach 0.8m, with one small area reaching 1.2m. Flow velocity is negligible. • Minor inundation at the front of one property at 29 Tamboon Road. May result in isolation or reduced access. Flood depths maintained between 0-0.3m. Low hazard category flooding occurs **Tourism/recreation likely impacted** • The Cann River Recreation Reserve is inundated with flood depths reaching 1.2m. Flow velocities reach 2m/s in some areas of the Reserve. • Minor inundation of the Cann River Caravan Park. Flood depths up to 0.5m are observed, with flow velocities between 0-1 m/s. **Roads inundated** • Humphreys Road inundated at the end nearest to Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s.	**Assistance may be required for:** • One property at 29 Tamboon Road • Cann River Caravan Park • Cann River Recreation Reserve **Sandbagging may be required for:** • Four properties opposite the Cann River Police Station **Road closure signs provided by the road authority for:** • Humphreys Road
N/A*	2% AEP Flood Level	**Properties likely impacted (6 properties in total)** • Four properties directly opposite the Cann River Police Station (5-17 Monaro Highway) become inundated. Flood depths reach 1.2m in some areas. It is unknown whether building FFLs are exceeded. Flow velocity is negligible. • Minor inundation at the front of one property at 29 Tamboon Road. May result in isolation or reduced access. Flood depths reach 0.8m. • Flood depths of up to 0.3m reach boundary of home at 299 Monaro Highway. It is unknown whether flooding is above floor level. Flow velocity is negligible. **Tourism/recreation likely impacted** • The Cann River Recreation Reserve is inundated with inundation flood depths reaching 1.2m. Flow velocities reach 2m/s in some areas of the Reserve. • Minor inundation of the Cann River Caravan Park. Flood depths up to 0.8m are observed, with flow velocities between 0-1 m/s. **Roads inundated (roads in bold red are DTP operated roads)** • Humphreys Road inundated at the end nearest the Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s. • **Minor inundation of Princes Highway leading into Cann River. Flow depths up to 0.3m pond within the road shoulders. Speed reduction signs appropriate.**	**Assistance may be required for:** • One property at 29 Tamboon Road • One property at 299 Monaro Highway • Cann River Caravan Park • Cann River Recreation Reserve **Sandbagging may be required for:** • Four properties opposite the Cann River Police Station **Road closure signs provided by the road authority for:** • Humphreys Road **Speed reduction signs provided by the road authority for:** • Princes Highway
N/A*	1% AEP Flood Level	**Properties likely impacted (12 properties in total)** • Four properties directly opposite the Cann River Police Station (5-17 Monaro Highway) become inundated. Flood depths reach 1.2m in some areas. It is unknown whether building FFLs are exceeded. Flow velocity is negligible. • Minor inundation at the front of one property at 29 Tamboon Road. May result in isolation or reduced access. Flood depths maintained between 0-0.3m.	**Assistance may be required for:** • One property at 29 Tamboon Road • Cann River Caravan Park • Cann River Recreation Reserve • Four properties on Angey Lane

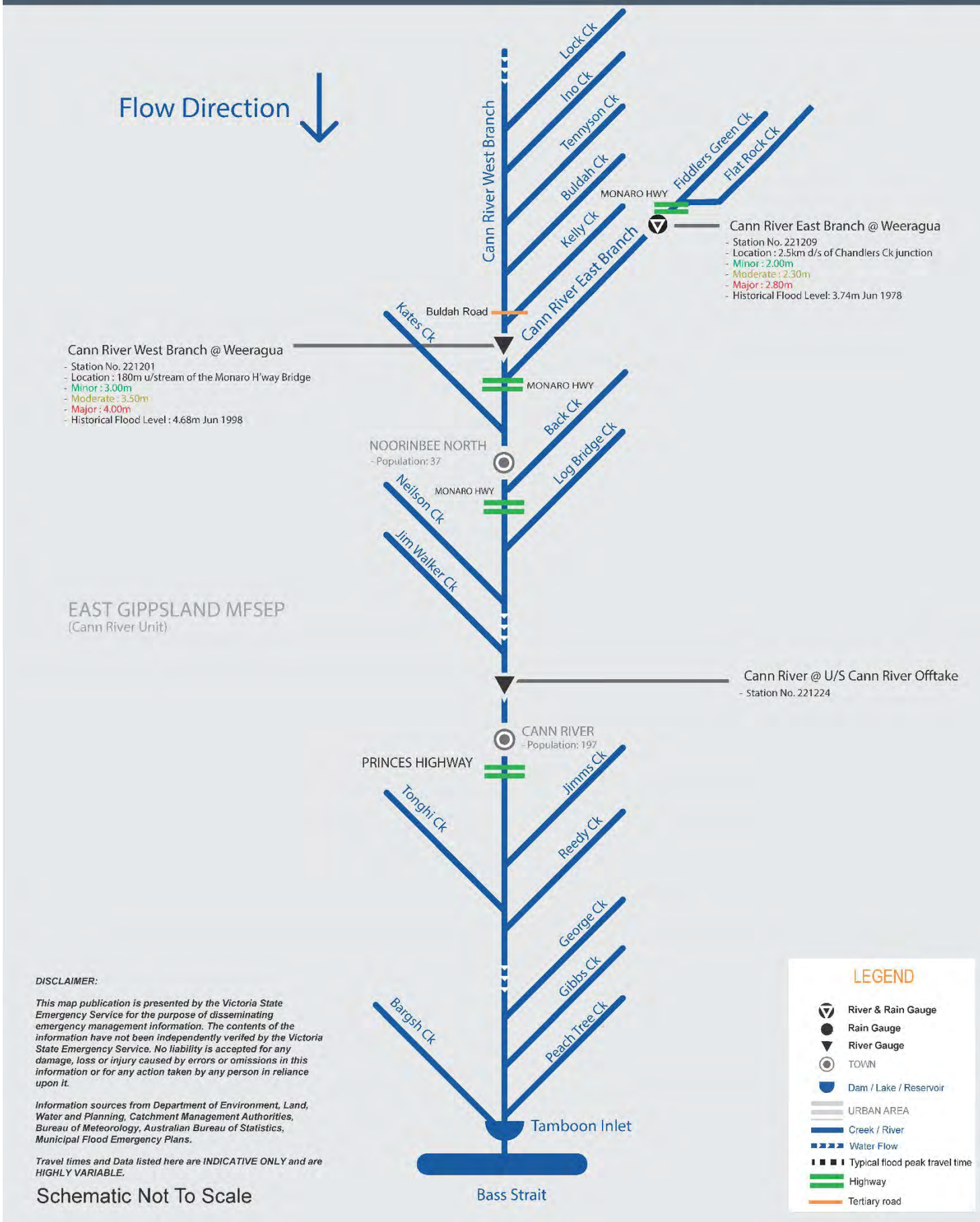
Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• 299 Monaro Highway is inundated up to 0.5m. Inundation covers access track, with inundation depths up to 0.3m. It is unknown whether flooding is above floor level, but access will be impacted. Flow velocity is negligible and a moderate hazard category occurs across parts of this property. • Two buildings at 297 Monaro Highway are inundated. Flood depths up to 0.3m overtop this property's driveway and reach buildings. It is unknown whether flood depths exceed building levels. Flow velocity is negligible and low hazard flooding occurs. • Four buildings on Angey Lane are isolated, with flood depths reaching 0.3m. Flow velocity is negligible and a low hazard flooding occurs. **Tourism/recreation likely impacted** • The Cann River Recreation Reserve is inundated with inundation flood depths reaching 1.2m. Flow velocities reach 2m/s in some areas of the Reserve. A moderate hazard level is identified in some parts. • Minor inundation of the Cann River Caravan Park. Flood depths up to 1.2m are observed, with flow velocities between 0-1 m/s. Low hazard flooding occurs. **Roads Inundated (roads in red are DTP operated roads)** • Humphreys Road inundated at the end nearest the Cann River. Flood depths up to 1.2m across the road, with velocities up to 2 m/s. A low hazard level is identified. • **Minor inundation of Princes Highway leading into Cann River. Flow depths up to 0.3m pool within the road shoulders.** • Angey Lane becomes inundated, with flood waters reaching 0.3m. Flow velocity is between 0-1m/s and a low hazard category is identified.	**Sandbagging may be required for:** • Four properties opposite the Cann River Police Station • One property at 299 Monaro Highway • Two buildings at 297 Monaro Highway **Road closure signs provided by the road authority for:** • Humphreys Road • Angey Lane **Speed reduction signs provided by the road authority for:** • Princes Highway

Table A2.4 – Breakdown of likely consequences at various Weeragua (West Branch) gauge level heights along Cann River with operational considerations

* Not available – design events can arise from different combinations in East and West branch. No primary gauge.

Cann River Catchment Schematic

Version 3 - October 2024



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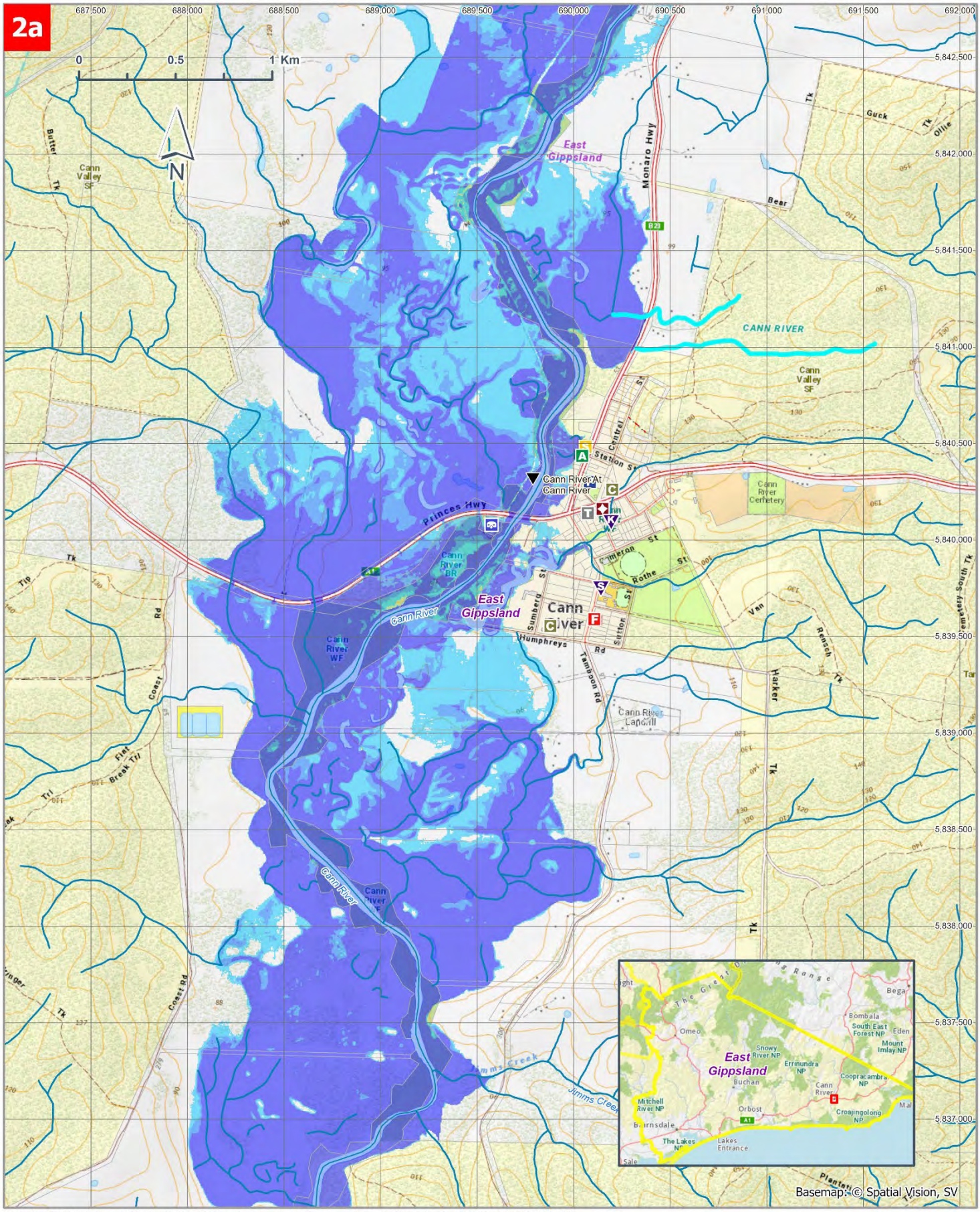
Information sources from Department of Environment, Land, Water and Planning, Catchment Management Authorities, Bureau of Meteorology, Australian Bureau of Statistics, Municipal Flood Emergency Plans.

Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE.

Schematic Not To Scale



Cann River Rapid Assessment 2015. Completed by East Gippsland Catachment Management Authortiy. Map produced by VICSES: 10/07/2024 10:01 AM

East Gippsland Shire

1% AEP (100yr ARI) Flooding

2a. Cann River

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

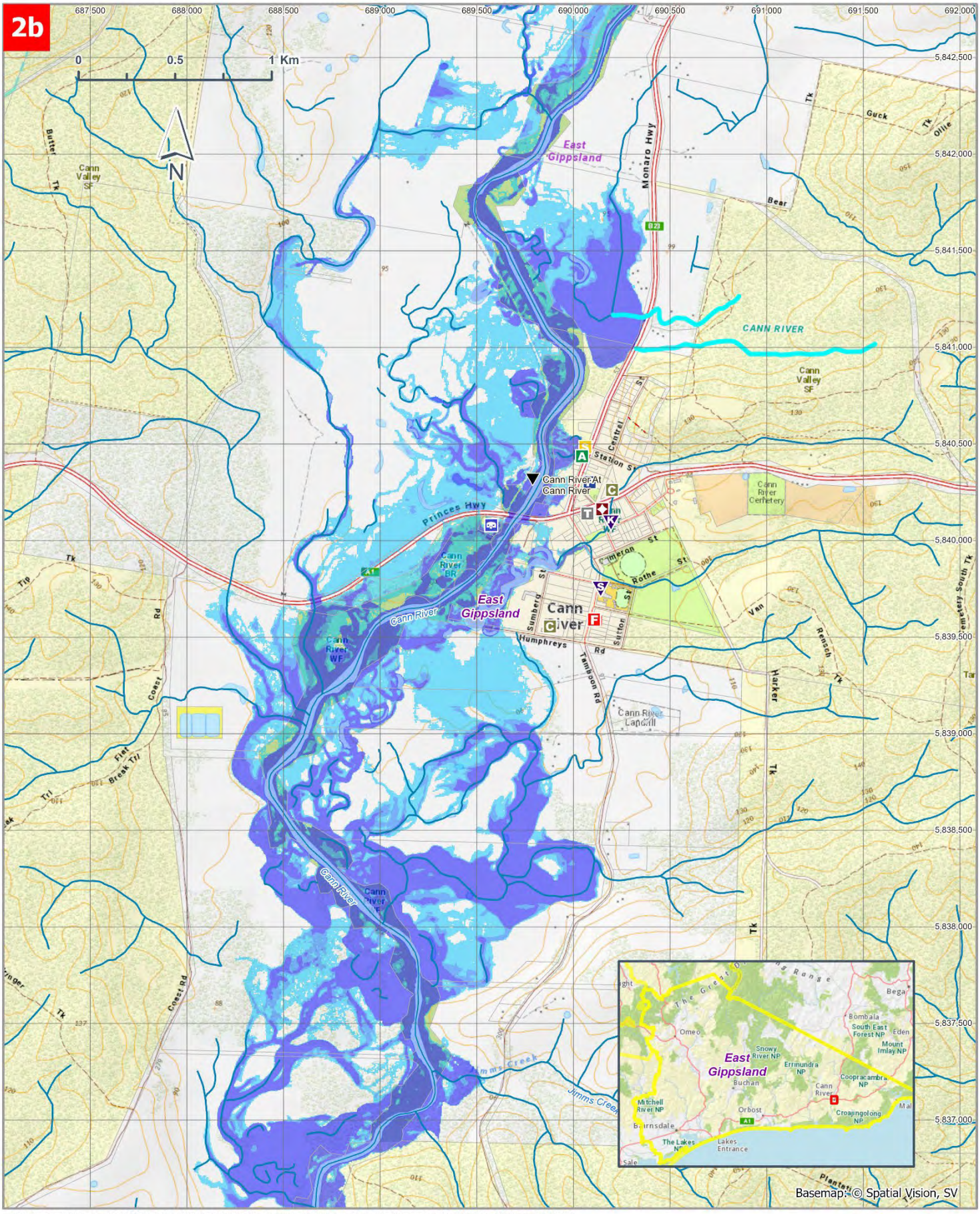
- Property Boundary
- Waterbody
- Municipal / Shire Boundary
- Waterway
- Bicycle / Walking Trail
- Bureau of Meteorology Gauge
- Water Level
- A Ambulance Station
- Child Care / Kindergarten
- C Community Venue
- Education Facility
- F Fire Station
- Place Of Worship
- P Police Station
- P Quarantine Facility
- S SES Unit
- T Telephone Exchange
- Caravan Park
- Building

1% AEP Flood Depth

- Up to 30cm
- Between 30 and 50cm
- Greater than 50cm

SES

VICTORIA State Government



Cann River Rapid Assessment 2015. Completed by East Gippsland Catachment Management Authortiy. Map produced by VICSES: 10/07/2024 10:01 AM

East Gippsland Shire

10% AEP (10yr ARI) Flooding

2b. Cann River

LAND USE
- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Property Boundary
- Waterbody
- Municipal / Shire Boundary
- Waterway
- Bicycle / Walking Trail
- Bureau of Meteorology Gauge
- Water Level
- Ambulance Station
- Child Care / Kindergarten
- Community Venue
- Education Facility
- Fire Station
- Place Of Worship
- Police Station
- Quarantine Facility
- SES Unit
- Telephone Exchange
- Caravan Park
- Building

10% AEP Flood Depth
- Up to 30cm
- Between 30cm and 50cm
- Greater than 50cm

SES

VICTORIA State Government

APPENDIX A3 – FLOOD INFORMATION FOR THE GENOA RIVER CATCHMENT

Catchment Description

The Genoa River originates in New South Wales on the southern slopes of the Monaro Plateau. It flows south into Victoria and joins with the Wallagaraugh River before flowing into the Mallacoota Inlet and exiting into the Bass Strait at Mallacoota.

The Upper Genoa River is listed as a heritage river based on the geological/geomorphological significance of the Genoa River gorge, scenic landscapes, and sites of botanical significance. The catchment is predominantly public land with small townships and little freehold land.

Catchment Schematic

Figure A2.1 provides a schematic of the river system, main tributaries, and gauge locations.

Flood Peak Travel Times

There is currently insufficient data to construct flood peak travel times for the Genoa River.

Warnings and Gauges

The Bureau of Meteorology currently provides flood forecasts for the Genoa River via the Genoa River @ The Gorge river gauge (Table A3.1).

Additional gauges for the catchment area are detailed in table A3.2 below.

Gauge	River/creek flood class level		
	Minor	Moderate	Major
Genoa River @ The Gorge	1.9 m	2.2 m	4.0 m

Table A.3.1 – Gauges with established Flood Class Levels within the Genoa River Catchment

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge
Genoa River @ The Gorge	221210	-37.416°S 149.520°E (WGS84)	✓	✓
Genoa River @ Wangarabell	221202	-37.382°S 149.487°E (GDA94)	✓	
Bombala AWS	070328	-37.00°S 149.23°E (unspecified)		✓

Table A3.2 – Gauges within and/or relevant to the Genoa River catchment within East Gippsland.

These Gauges may provide some warning of expected flooding. It is advised that residents monitor the Bureau of Meteorology's website http://www.bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website https:/emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Flood Consequences

Riverine Flood Risk

There are two significant communities on the Genoa River; Genoa and Mallacoota. Both are impacted by riverine floods, the most significant impact being the closure of the Mallacoota-Genoa Road isolating Gipsy Point and Mallacoota. This road is the key reference for locals to know if they are isolated.

Other road detours may be required including residents near the Wangarabell Bridge, which can be inundated when the Wangarabell Creek is in flood.

Flash flood risk

Flash flooding has been identified as a risk around Wallagaraugh Road, near Black Creek

Properties at Flood Risk

Properties with a flood risk are identified in the Flood Intelligence Card following. For privacy reasons exact addresses are omitted from this plan, however this information is available to the IC through FloodZoom for the purpose of community notification and evacuation advice as required.

As more intelligence becomes available, the identified properties may change and will be updated in future revisions of this plan.

Flood Intelligence Card

A summary of flood consequences for the Cann River is provided in the flood intelligence card (table A3.3) following.

Maps and Schematics

Maps showing the inundation expected at Cann River during a 1% (Map 3a) and 10% (Map 3b) AEP flood event are supplied following the flood intelligence card.

Local flood information

A Local Flood Guide for the Genoa Valley is available at https://www.ses.vic.gov.au/plan-and-stay-safe/flood-guides

During consultation additional local knowledge for the Genoa River catchment was captured. Where this does not align with the flood intelligence cards, this information is summarised below.

- Around 10 rural properties near the Wangarabell Bridge are subject to a detour as the bridge can become inundated when the Wangarbell Creek is in flood.
- Properties around low-lying areas of Maramingo Creek can become isolated during floods.
- Timbilica (NSW) may provide early indication that flooding will occur downstream.
- During large flood events many of the Jettys become inundated so boat moorings, or boats stored onshore e.g. near the Karbathong boat ramp can be at risk.
- Lower areas of the foreshore Caravan Park and Lakeside Drive have flooded in recent years despite the mouth being open.

FLOOD INTELLIGENCE CARD – GENOA RIVER @ THE GORGE, 221210

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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LOCATION:	400m downstream of the Dinner Creek junction, access via Wangarabell Road
CURRENT LEVEL:	BOM
STREAM:	Genoa River
GAUGE NUMBER:	221210
GAUGE ZERO:	81.736m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR:	**1.9m**
MODERATE:	**2.2m**
MAJOR:	**4.0m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**4.84m (1978)**

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
1.9m	**Minor Flood Level**		
2.2m	**Moderate Flood Level**		
3.51m# **(74,400 ML/d)**	10% AEP Flood Level	**Properties Likely Impacted** **10 properties in total** • One property northwest of the Genoa township (north of Genoa River and west of Princes Highway) is isolated, with flood depths in excess of 1.2m overtopping the property's access track. Flow velocity is negligible, and a low hazard category is identified. • Four buildings in Bass Court will have reduced street access due to overtopping of Alexanders Road. Flood depths up to 0.8m will restrict vehicle access. • Four buildings south of the Genoa River bridge observe inundation up to 0.5m, with flow velocity between 0-1m/s. Low hazard category flooding occurs around these buildings. • One property on Mallacoota-Genoa Road (north of Mangan Creek) becomes isolated due to inundation of its access road. Flood depths exceed 1.2m. Flow velocity is negligible, and a low hazard flooding occurs.	**Assistance may be required for:** • One property northwest of Genoa • Four properties in Bass Court • One property on Mallacoota-Genoa Road **Road closure signs provided by the road authority for:** • Alexanders Road/Bass Court • Mallacoota-Genoa Road • Peisleys Road • Anglers Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads Inundated (roads in bold red are DTP operated roads) • Inundation across Alexanders Road at Alexanders Road/Bass Court intersection. Flow depth exceeds 1.2m in some parts. Velocity is maintained between 0-1m/s, and a high hazard category occurs in one section along Alexanders Road. • **Minor breakout flow observed at the intersection between Mallacoota-Genoa Road and Black Creek. Flow velocity is between 0-1m/s and low hazard category flooding occurs.** • **Inundation across Mallacoota-Genoa Road at its intersection with Mangan Creek. Flood depths exceed 1.2m, with flow velocity reaching 3m/s across one part of the road. Extreme hazard flooding occurs.** • A large section of Peisleys Road is inundated to the west of Gipsy Point for approximately 5km. Flood depths exceed 1.2m in many parts, while negligible flow velocity is found. Moderate hazard category flooding occurring on many sections of this road. • Anglers Drive becomes inundated with flood waters in excess of 1.2m. Flow velocity is between 0-1m/s, and an extreme hazard category is identified for the section of this road which runs perpendicular to Gipsy Point Road.	**Sandbagging may be required for:** • Four properties south of the Genoa River bridge
4.0m	**Major Flood Level**		
5.23m# **(154,000 ML/d)**	1% AEP Flood Level	**Properties Likely Impacted** **11 properties in total** • One property northwest of the Genoa township (north of Genoa River and west of Princes Highway) is inundated by flood waters, with flood depths up to 1.2m reaching buildings on the property. It is unknown whether such inundation exceeds the buildings floor level. Flow velocity reaches 2m/s adjacent to the property, and an extreme hazard level occurs on the river side. • Four buildings in Bass Court will have reduced street access due to overtopping of Alexanders Road. Flood depths in excess of 1.2m will restrict vehicle access to Bass Court. Flow velocity and hazard are low within Bass Court, although a small (5m) section of Alexanders Road (close to the intersection) is given an extreme hazard category. • Four buildings south of the Genoa River bridge observe inundation in excess of 1.2m, with flow velocity between 0-1m/s. A high hazard category is identified close to these buildings. It is unknown whether flood depths exceed building floor levels. • One property on Mallacoota-Genoa Road (north of Mangan Creek) becomes inundated. Flood depths in excess of 1.2m reach buildings, and a high hazard category is identified. It is unknown whether flood depths exceed building flood levels. • One property along Anglers Drive becomes isolated due to overtopping of Anglers Drive. Flood depths in excess of 1.2m isolate the property's access track, but do appear to encroach on the building. Extreme hazard flooding occurs on this property. **Community Infrastructure Likely Impacted** • Genoa Hotel becomes isolated, with flood water up to 0.5m reaching the property boundary. A low hazard category is identified for this building. **Tourism / Recreation Likely Impacted** • Genoa Camp Park Recreational Reserve observes significant inundation, with flood depths in excess of 1.2m covering the campgrounds. Flow velocities between 0-1m/s are observed, and an extreme hazard category is identified for much of the reserve.	**Assistance may be required for:** • Four properties in Bass Court • One property along Anglers Drive • Genoa Hotel • Genoa Camp Park Recreational Reserve **Road closure signs provided by the road authority for:** • Alexanders Road/Bass Court • Mallacoota-Genoa Road • Peisleys Road • Anglers Road • Macdonald Street • Park Road **Sandbagging may be required for:** • Four properties south of the Genoa River bridge • One property northwest of Genoa • One property on Mallacoota-Genoa Road

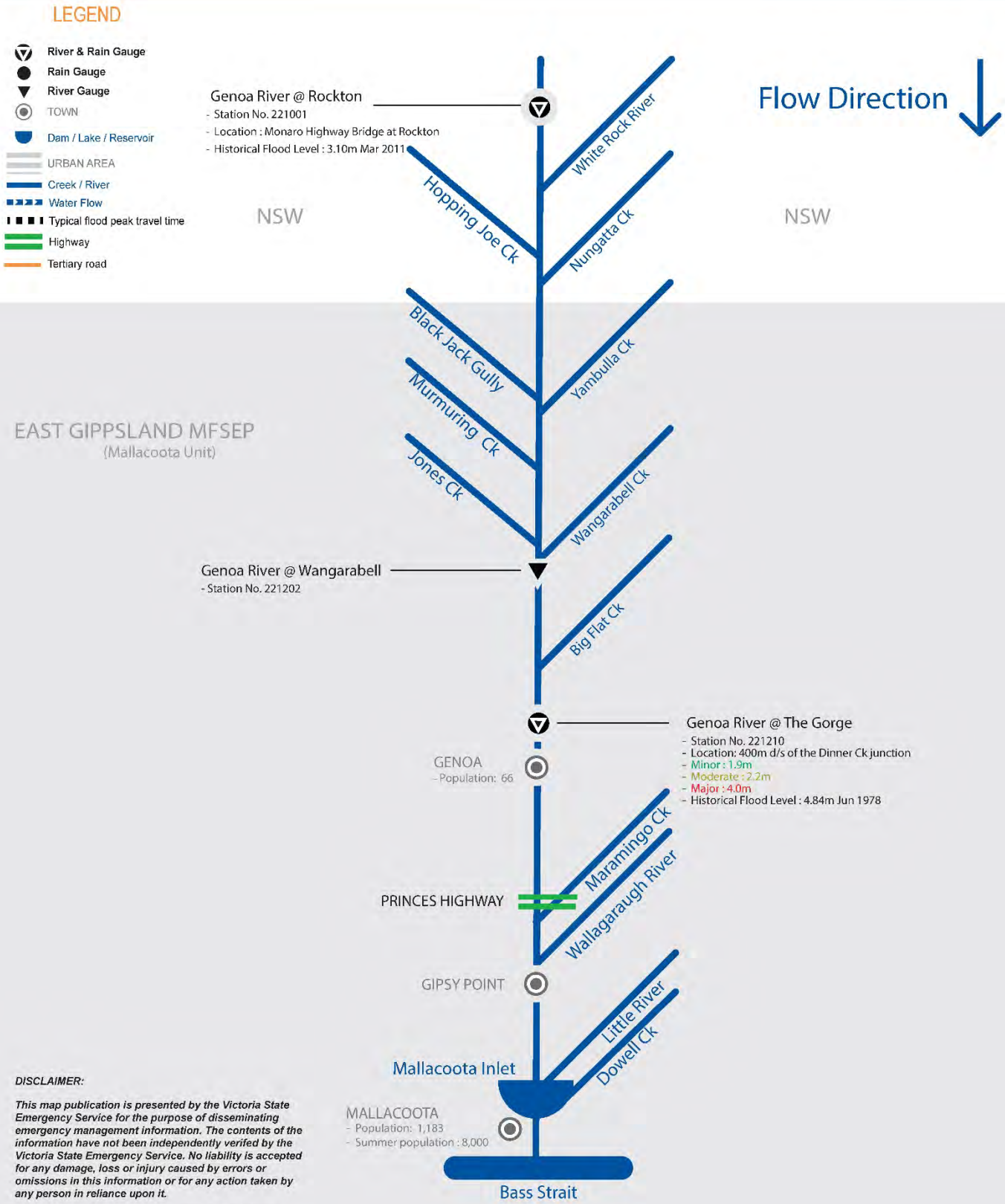
Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads Inundated (roads in bold red are DTP operated roads) • Alexanders Road is overtopped over a 500m section near Bass Court and the main Genoa township. Flow depth exceeds 1.2m over the road. Velocity is maintained between 0-1m/s, and a high hazard category is identified for one part of Alexanders Road close to Bass Court. • **Minor breakout flow observed at the intersection between Mallacoota-Genoa Road and Black Creek. Flow velocity is between 0-1m/s and a low hazard category is identified.** • **Inundation across Mallacoota-Genoa Road at its intersection with Mangan Creek. Flood depths exceed 1.2m, with flow velocity reaching 3m/s across one part of the road. Extreme hazard category flooding occurs.** • A large section of Peisleys Road is inundated to the west of Gipsy Point for approximately 5km. Flood depths exceed 1.2m in many parts, while negligible flow velocity is found. Moderate hazard category flooding occurs for many parts of this road. • Anglers Drive becomes inundated with flood waters in excess of 1.2m. Flow velocity is between 0-1m/s, and extreme hazard category flooding occurs for the section of this road which runs perpendicular to Gipsy Point Road. • Macdonald Street (nearest the river) observes flood depths in excess of 1.2m. Extreme hazard category flooding occurs. • Park Road is completely overtopped between the Genoa River bridge at Princes Highway intersection. Flow velocity up to 3m/s is observed for much of this road, with extreme hazard category flooding occurring.	

Table A3.3 – Breakdown of likely consequences at various Genoa River gauge level heights along The Gorge with operational considerations

 # Gauge heights estimated from WMIS rating tables with discharges adopted from 2017 Flood Risk Report – Genoa Valley (Water Technology).

Genoa River Catchment Schematic

Version 4 - October 2024



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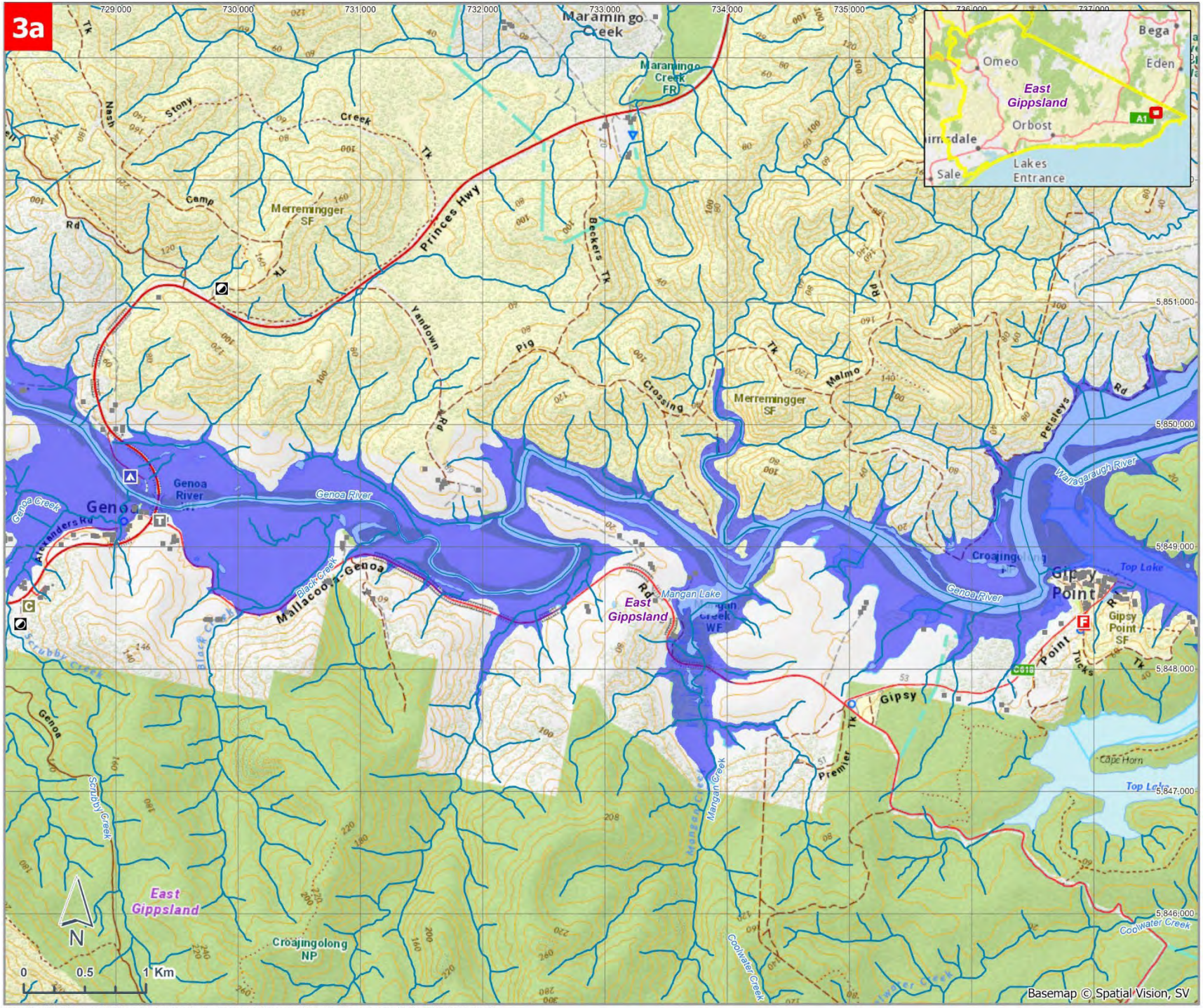
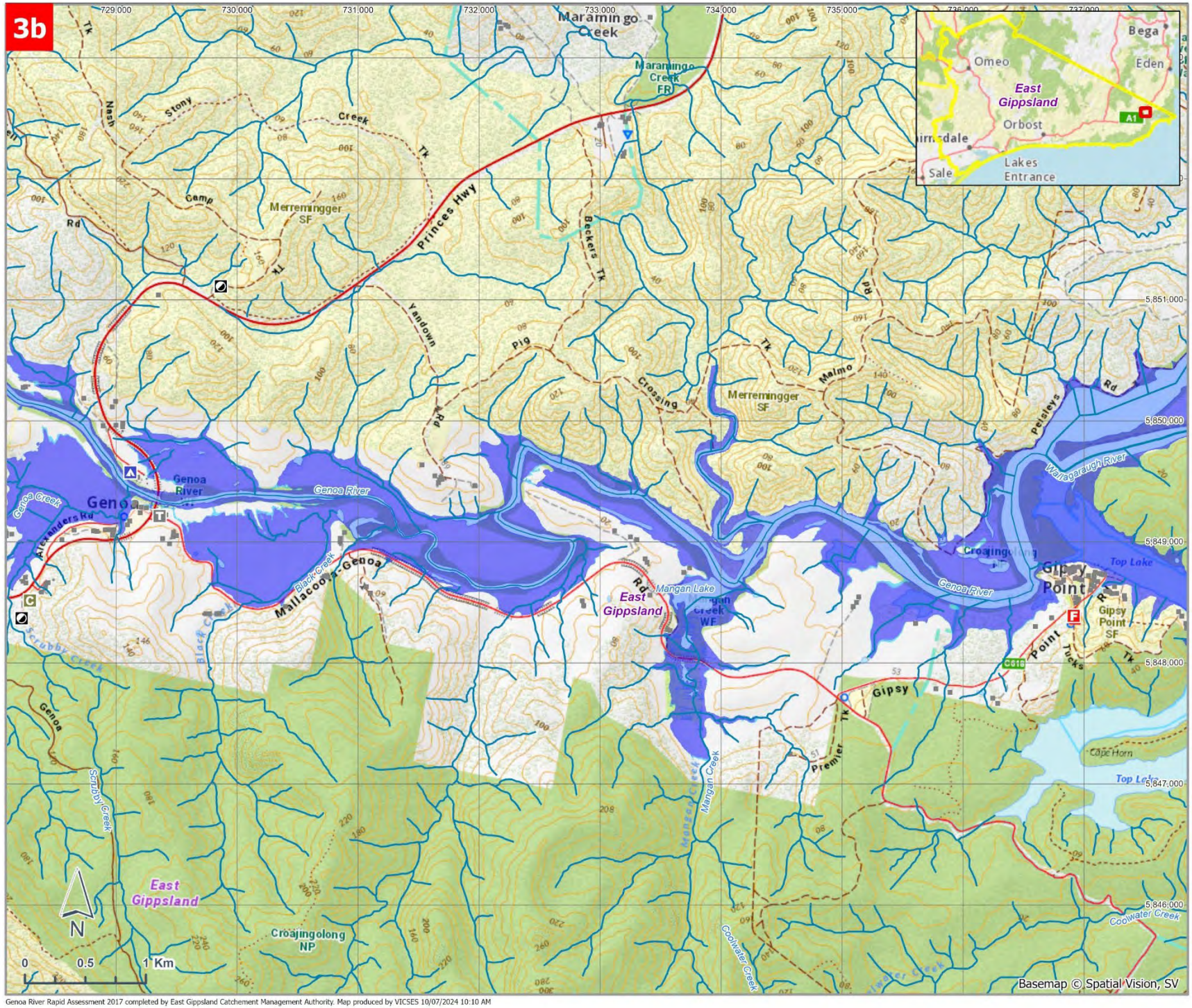
Schematic Not To Scale



Genoa River Rapid Assessment 2017 completed by East Gippsland Catchement Management Authority. Map produced by VICSES 10/07/2024 10:10 AM



Genoa River Rapid Assessment 2017 completed by East Gippsland Catchement Management Authority. Map produced by VICSES 10/07/2024 10:10 AM

East Gippsland Shire

10% AEP (10yr ARI) Flooding

3b. Genoa River

APPENDIX A4 – FLOOD INFORMATION FOR THE SNOWY RIVER CATCHMENT

Catchment Description

Originating on the slopes of Mount Kosciuszko, the Snowy River has a catchment of nearly 16,000 km2, drops approximately 1840 m over its total 403 km length and has more than 50 tributaries. The Snowy River makes its way from the Alps through three major dams and relatively inaccessible national parks and private land in both NSW and Victoria before breaking out into floodplains near Orbost in Victoria and joining Bass Strait at Marlo.

The Snowy can be broadly divided into five parts:

- Mountain Rivers (NSW)
- Lake Jindabyne (NSW)
- Monaro Reach (NSW)
- The Escarpment; and
- Lower Snowy Floodplain.

Mountain Rivers (NSW)

The Mountain Rivers section (headwaters to Lake Jindabyne) begins in the Kosciuszko National Park where the highest annual rainfall (up to 3,800 mm) occurs on the mountain peaks in the form of winter snow. The main tributaries in this section are Eucumbene, Thredbo, Gungarlin & Mowamba Rivers and Wullwye Creek. Almost all the water that would normally flow to the coast is collected and stored by the Snowy Mountains Hydroelectric Scheme and then diverted via trans-mountain tunnels and power stations and released into the Murray and Murrumbidgee Rivers.

Lake Jindabyne (NSW)

Under natural conditions the Snowy River experienced several floods each year that could occur at any time, although more frequent in the spring when rainfall coincided with snowmelt. After the construction of the Snowy Scheme completed in 1974, flows were reduced to 1% of normal flow at Jindabyne. In 2006 a new spillway was constructed to allow for planned releases into the Snowy below Jindabyne to mimic the snow melt season.

The Monaro Reach (NSW)

The Monaro reach (between Jindabyne Dam and upstream of the Delegate River) is in a rain shadow and experiences a mean annual rainfall of 500 mm, increasing to 800 mm at the coast. The main contributing tributary in the Monaro reach is the Maclaughlin River which includes Cooma Airport and The Hut rainfall gauges.

The Escarpment

Major floods in the lower Snowy are generated in this zone.

The Escarpment (large tract of land stretching between the Delegate River to upstream of the Buchan River) is thinly populated and mainly covered in forest reserves and National Parks. The main tributaries in this zone are Delegate, Suggan Buggan, Deddick and Rodger Rivers.

The Delegate River (2,687km^2 catchment) contributes approximately 30% of the current mean annual flow to the Snowy. It rises on the northern slopes of the Errinundra Plateau in Victoria and flows north into NSW, receiving water from several tributaries including Haydens Bog Creek (Bendoc) and the Bombala River (Bombala) before travelling through Delegate and heading south, joining the Snowy River from the east.

The Suggan Buggan River rises in a wilderness area near the NSW / Victoria border before flowing through Suggan Buggan and joining the Snowy River from the west, downstream of Willis.

The Bonang River runs through Bonang before joining the Deddick River which flows through Tubbut and joins the Snowy River from the east, upstream of McKillops Bridge.

The Rodger River and its tributary the Yalmy River join the Snowy River from the east below McKillops Bridge.

Lower Snowy Floodplain

In the lower reaches of the Snowy River catchment (Buchan River to the river mouth) the larger tributaries have a distinctly different flow regime to the snow melt rivers of the alps. They are dominated by winter rainfall with peak flows being experienced June through July and are far more variable and unpredictable. The main tributaries in this section are the Buchan and Brodribb Rivers and Ewings Marsh.

The Buchan River (1214km^2 catchment - including Murrindal River) travels through the township of Buchan before joining the Snowy River from the west downstream from Basin Creek. The BoM operates a flood warning service for the Buchan River.

Downstream of the Buchan River, the Snowy changes from riverine to estuarine as it passes through the rural areas of Jarrahmond and Orbost and makes its way towards the confluence with the Brodribb River.

The Brodribb River rises in the Errinundra National Park, through the town of Goongerah, crosses the Princes Highway 10kms east of Orbost, travels through Lake Curlip and joins the Snowy from the east.

Below the confluence with the Brodribb River, the river forms an intermittently closed and open coastal lagoon which is subject to tidal inflow and inputs from Lake Corringle and Ewings Marsh to the west.

Ewings Marsh (415km^2 catchment) has four tributaries (Hartland River and Hospital, Dinner and Simpsons Creeks) and flows into Lake Corringle via Corringle Creek. It can contribute significant flows to the Snowy.

During moderate to major flood events floodwater can back up along Corringle Creek to affect Ewing Marsh. The nature of flooding in the lower snowy river is very dependent upon where the main rainfall occurs within the different catchments.

There are many natural levees along the banks of the river which have been built by the preferential deposition of river sediment in past flood events. Gulches are low points in these levees where flows leave the river channel. Many are protected with rock to reduce erosion.

Catchment Schematic

Figure A4.1 provides a schematic of the river system, main tributaries, and gauge locations.

Flood Peak Travel Times

Typical travel times have been collated from recorded historical events and presented in table A4.1.

Location from	Location to	Typical travel time	Flood class level	Comments
Waterway name				
Snowy River at McKillops Bridge	Snowy River at downstream of Basin Creek	Approximately 3.5 hours	Minor Flood at D/S Basin creek	
			Moderate Flood at D/S Basin creek	
			Major Flood at D/S Basin creek	
Snowy River at downstream of Basin Creek	Snowy River at Jarrahmond	Between 1 and 2 hours	Minor Flood at Jarrahmond	Inflows from the Buchan River are likely to impact travel times to Jarrahmond & Orbost
		Between 1 and 2 hours	Moderate Flood at Jarrahmond	
		Between 1 and 2 hours	Major Flood at Jarrahmond	
Snowy River at Jarrahmond	Snowy River at Orbost (Princes Highway)	Approximately 4 hours	Minor Flood at Orbost	
			Moderate Flood at Orbost	
			Major Flood at Orbost	
Snowy River at Orbost (Princes Highway)	Snowy River at Icy Creek	Between 1 and 2 hours	Minor Flood	
		Between 1 and 2 hours	Moderate Flood	
		Between 1 and 2 hours	Major Flood	

Table A4.1 - Typical flood peak travel times for the Snowy River Catchment.

Warnings and Gauges

The Bureau of Meteorology currently provides flood forecasts for the Bombala (NSW), Snowy & Buchan Rivers via the river gauges detailed in Table A4.2 below.

Additional gauges for the catchment area are detailed in table A4.3.

Gauge	River/creek flood class level		
	Minor	Moderate	Major
Bombala River @ Bombala (NSW)	3.0 m	5.0 m	8.0 m
Snowy River @ D/S of Basin Creek	3.5 m	5.5 m	6.6 m
Snowy River @ Jarrahmond	4.1 m	7.4 m	8.9 m
Buchan River @ Buchan	3.7 m	4.9 m	5.3 m

Table A.4.2 – Gauges with established Flood Class Levels within the Snowy River Catchment

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge
Bombala River @ Bombala (NSW)	222019	-36.910°S 149.239°E (GDA94)	✓	
Delegate R @ Quidong (NSW)	222008	-36.904°S 149.035°E (GDA94)	✓	✓
Snowy River @ Dalgety Weir (NSW)	222026	-36.505°S 148.829°E (GDA94)	✓	✓
Snowy River @ Burnt Hut (NSW)	222013	-36.840°S 148.933°E (GDA94)	✓	✓
Rain Gauge (Delegate R) @ Mt Delegate (Cbm)	222800	-37.112°S 148.897°E (AGD66)		✓
Suggan Buggan River @ Suggan Buggan	222213	-36.955°S 148.327°E (WGS84)	✓	
Snowy River @ Mckillop Bridge	222209	-37.084°S 148.413°E (WGS84)	✓	✓
Snowy River @ D/S Of Basin Creek	222219	-37.499°S 148.274°E (WGS84)	✓	✓
Buchan River @ Egw Offtake	222221	-37.470°S 148.175°E (WGS84)	✓	
Buchan River @ Buchan	222206	-37.496°S 148.173°E (WGS84)	✓	✓
Snowy River @ Jarrahmond	222200	-37.661°S 148.361°E (WGS84)	✓	
Snowy River @ Orbost	222201	-37.707°S 148.451°E (WGS84)	✓	
Brodribb River @ U/S Lake Curlip	222223	-37.727°S 148.543°E (Unspecified)	✓	
Brodribb River @ Sardine Creek	584027	(Unspecified)	✓	

Table A4.3 – Gauges within the Snowy River catchment within East Gippsland.

These Gauges may provide some warning of expected flooding. It is advised that residents monitor the Bureau of Meteorology's website http://www.bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website https:/emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Flood Consequences

Riverine Flood Risk

Primary towns at risk of riverine flooding within the Snowy River catchment include Orbost, Marlo (Snowy River) and Buchan (Buchan River).

Low-lying rural areas surrounding Orbost, Deddick Valley, Wulgulmerang East, Bete Bolong North, Jarrahmond, Newmerella (Snowy River), Suggan Buggan (Suggan Buggan River), Wulgulmerang West and Buchan (Buchan River) are also impacted to varying degrees when rivers are in flood.

Tidal flooding and storm surges

The Snowy River downstream of Orbost can be influenced by tide, storm surge and entrance conditions. These factors are also likely to influence flood levels in the lower sections of the Snowy and Brodribb Rivers.

Properties at Flood Risk

Properties with a flood risk are identified in the Flood Intelligence Card following. For privacy reasons exact addresses are omitted from this plan, however this information is available to the IC through FloodZoom for the purpose of community notification and evacuation advice as required.

As more intelligence becomes available, the identified properties may change and will be updated in future revisions of this plan.

Flood Intelligence Card

A summary of flood consequences for the Buchan River is provided in the flood intelligence card (table A4.4) following.

A summary of flood consequences for the Snowy River is provided in the flood intelligence card (table A4.5) following.

Maps and Schematics

Maps showing the inundation expected for the Buchan River at Buchan during a 1% (Map 4a) and 10% (Map 4b) AEP flood event are supplied following the flood intelligence cards.

Maps showing the inundation expected for the Lower Snowy River reaches 1%, 10% and 20% (Map 4c) AEP flood event is supplied following the flood intelligence cards.

Local flood information

Local Flood Guides for the Snowy and Buchan Rivers have been produced for Bete Bolong, Orbost, Buchan and Murrindal, and are available at https://www.ses.vic.gov.au/plan-and-stay-safe/flood-guides

During consultation additional local knowledge for the Buchan River was captured. Where this does not align with the flood intelligence cards, this information is summarised below.

- Buchan River heights over 3m result in unsafe conditions for paddlers and will impact recreational river activities.
- Local references for heavy rainfall and associated flooding of the Buchan River include:
  - Heavy rainfall around Gelantipy usually indicates a large flood.

- Heavy rainfall in the W Tree often results in flooding though not as severe.

- Rainfall which becomes trapped in the old Buchan River watercourse can cause flooding of two houses which back up to the hill along the Buchan-Orbost Road, across from the Rec Reserve. This may occur when the river reaches 4.6m and causes water to travel back up the stormwater drains.
- On occasion the Unit has sandbagged across the front of the Neighbourhood house building starting at the Butter Factory to redirect water. This has been successful on holding flood waters back off this area.
- Rainfall on Mt Johnson and Mt Elizabeth can cause flooding in Buchan River, Boggy Creek, Yellow Water Holes Creek and Spring Creek.

During consultation additional local knowledge for the Snowy River was captured. Where this does not align with the flood intelligence cards, this information is summarised below.

- When the Snowy River @ Orbost gauge (222201) reached 3.7m the B Drain begins to run backwards.
- The Brodribb River affects how the lower end of the Snowy River floods and can slow the drainage, causing backup into the flood plain.
- King Tides can affect the Snowy and Brodribb Rivers, holding water in place rather than letting it drain.
- Woods Point campground has limited signal for tourists to receive emergency warnings.
- Petmans Beach tourist spot can become isolated if the Snowy is in flood.

FLOOD INTELLIGENCE CARD – BUCHAN RIVER @ BUCHAN 222206

Version 1 – October 2024

Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Cards publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it. ***Scan the QR code for the current levels for this gauge.***

LOCATION:	40 metres upstream of the Bruthen Road bridge
CURRENT LEVEL:	BOM
STREAM:	Buchan River
GAUGE NUMBER:	222206
GAUGE ZERO:	74.850 mAHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR:	**3.7m**
MODERATE:	**4.9m**
MAJOR:	**5.3m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**4.46m (1978)**

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
3.7m	Minor Flood Level		
3.94m[#] (20,200 ML/d)	10% AEP Flood Level	**Properties likely Impacted - 11 Properties in Total** • Two private buildings located on upstream of Main Road, (both appear to be sheds) which are located within the flood extent with flooding above 0.30m. Flow velocity is between 0-1 m/s and is identified as a low hazard level. • One property located at the Davidson St, which is also on the upstream of Main Road, is located within the flood extent. The water depths exceed 0.30m on this property, with flow velocity between 0-1 m/s, and is identified as a low hazard level. • Another two properties on the Saleyards Road, is located within the flood extent with flooding up to 0.3m. The flood velocity is between 0-1m/s and is identified as a low hazard level. • Three properties downstream of the Main Road and upstream of the Centre Road including the Buchan Neighbourhood House are identified within the flood extent on the downstream of Main Road, with a flood depth up to 0.3m. It is noticeable that the south side of the Buchan Neighbourhood House is likely to experience a water exceeding 0.5m under the 10% AEP event. Flood velocity is within 0-1m/s. The hazard level in this area is identified as low. • A property located at the downstream the Buchan River after it passes the Mian Road in a south-westerly direction is impacted. The flood waters up to 1.2m block the property's access track. Flow velocity is 0-1m/s. The hazard level in this area is identified as low.	**Assistance may be required for:** • Affected homeowners in Buchan Township, particularly those upstream of the Main Road, as well as rural residents living along the Buchan River. **Road closure signs provided by the road authority for:** • Sunny Point Road • Saleyard and Lousadas Road just upstream of town • Lanes Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• A large proportion of the Buchan Recreation Reserve and Sports Ground are within the flood extent with flooding above 1.2m. Flow velocity is between 0-1m/s. The hazards levels in this area are identified as medium to high. **Roads Inundated (Roads in bold red are DTP operated roads)** • Sunny Point Road, (3 km north of the township) is likely to cut off by flood depths up to 1.2m, with flood velocity over the road of above 1 m/s. The hazards levels on parts of the road ranges from medium to extreme. • Lanes Road (3 km east of the township) is likely to be overtopped by flood depths above 1.2m with velocity above 1 m/s. An extreme hazard category is prescribed for parts of this road. • Lousadas Road (1km northwest of the township), is likely to be overtopped by flood depths above 1.2m with velocity between 0.50 to 1 m/s. The hazard levels on parts of the road range from medium to extreme.	
4.61m[#] (47,500 ML/d)	1% AEP Flood Level	**Properties likely Impacted *(provide detail on how properties are included eg. above floor, depth of flooding on property, within flood extent, isolated etc.)* (Refer to property table in this appendix for more detail)** **36 Properties in Total** • 23 buildings within 1 km of Buchan township, primarily situated along Lousadas Road, Saleyard Road, and Davidson Street, are anticipated to face substantial flooding with water depths exceeding 0.30 meters. The flood velocity ranges from 0 to 1 m/s, and the hazard levels in this area vary from medium to high. • One building located at the Sunny Point Road, 2km north of the town is located within the flood extent, is expected to have a depth of flood above 0.3m. Flood velocity is within 0-1m/s. The hazard level in this area is identified as medium. • Another 12 buildings are within the flood extent with flood depths below 0.30m. Flood velocity is within 0-1m/s. The hazard level in this area is identified as low. • *Local knowledge has indicated that 2 houses backing onto the hill along the Buchan-Orbost Road will flood when the water backs up stormwater drains opposite the recreation reserve. Sandbagging over the stormwater drains may prevent these houses from flooding.* **Roads Inundated (Roads in bold red are DTP operated roads)** • Sunny Point Road, (3 km north of the township) is likely to have large areas inundated with flood depths up to 1.2m, with flood velocity over the road of above 1 m/s. Extreme hazard category flooding occurs along parts of this road. • Saleyard Road upstream of the town is likely to cut off by a significant overtop with flood depths up to 1.2m, the flood velocity over the road is between 0-1m/s. Flood hazard categories range from medium to high along sections of this road. • Lanes Road (3 km east of the township) is likely to be overtopped by both north and south of the Buchan River with flood depths above 1.2m and velocity above 1 m/s. Extreme hazard category flooding occurs along parts of this road. • **Main Road at Buchan, on the northern side of the river, is likely to be overtopped with flood depths over 1.2m, flood velocity over the road is above 1m/s. Flood hazard categories range from low to extreme along this road.**	**Assistance may be required for:** • Affected homeowners in Buchan Township, particularly those upstream of the Main Road, as well as rural residents living along the Buchan River. **Road closure signs provided by the road authority for:** • Sunny Point Road • Saleyard and Lousadas Road just upstream of town • Lanes Road appears to be overtopped on both northern and southern side of the Buchan River. • Main Road at Buchan, on the northern side of the River, the Main Road is overtopped • Centre Road, immediately downstream of the Main Road bridge at Buchan • Buchan-Orbost Road downstream of the Main Road at Buchan

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Centre Road, immediately downstream of the Main Road bridge, located within the flood extent with a flood depth of over 1.2m. The flood velocity is likely to reach 1 m/s. Flood hazard categories range from low to extreme across this road. • Lousadas Road (1km northwest of the township), is likely to be inundated significantly by flood depths above 1.2m with velocity between 0.50 to 1 m/s. Flood hazard categories range from medium to extreme along sections of this road.	
4.9m	Moderate Flood Level		
5.3m	Major Flood Level		

Table A4.4 – Breakdown of likely consequences at various Buchan River @ Buchan gauge level heights along Buchan River with operational considerations

 # Event gauge height estimated based on WMIS rating table. Discharges are taken from 2017 Buchan River Flood Risk Report

FLOOD INTELLIGENCE CARD – SNOWY RIVER @ JARRAHMOND GAUGE, 222200

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

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LOCATION:	Upstream of Jarrahmond. Access via Williams Track.
CURRENT LEVEL:	BOM
STREAM:	Snowy River
GAUGE NUMBER:	222200
GAUGE ZERO:	3.670m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR FLOOD LEVEL:	**4.1m**
MODERATE FLOOD LEVEL:	**7.4m**
MAJOR FLOOD LEVEL:	**8.9m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**11.80m**

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
4.1m	**Minor Flood Level**	**Properties likely impacted** • Inundation may affect farming properties as water backs up drains and irrigation channels, spreading on to paddocks and fields (low-lying areas next to watercourses including creeks, irrigation channels and drains are likely to be filling). • Water tends to back up B Drain and spill on to the Orbost/Jarrahmond floodplain. Low areas directly north of Huxters Rd, and further west in Bete Bolong (near Reeves Rd) may see the start of flooding; removal of stock and equipment may be required. • Caution is required around the floodplain below the Lynn's and Gilbert's gulches as rising waters will lead to a breakout **Roads inundated (roads in red are DTP operated roads)** • B Road may be flooded west of Bouchers Road intersection. Other roads may start to see flooding including Birkins Road, James Road and other local access roads. **Tourism/recreation likely impacted** • Access to cycling and walking trails may be impacted.	**Road closure signs provided by the road authority for:** • B Road • Birkins Road • James Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
5.7m		**Properties likely impacted (2 properties in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard. • Significant inundation into farmland west of Orbost – no buildings are directly impacted. Negligible flow velocity observed, low hazard. **Roads inundated (roads in bold red are DTP operated roads)** • Significant inundation between 0.3-1.2m on Griebenows Road. Flow velocities between 0-1m/s. Occurs first at the road's intersection with a creek 100m north of Gargans Lane. Also occurs further south down Griebenows Road, close to lot 202. Flood depths and velocities as previously described. A low hazard category is identified. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation varies between 0.3-1.2m in depth, with flow velocity maintained between 0-1m/s. A low hazard category is identified. • Flood depths between up to 0.5m observed at B Road close to the Bouchers Lane end. Flow velocities are observed between 0-1m/s. A low hazard category is identified. • Minor inundation up to 0.3m identified along a 500m stretch of Birkins Road. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated as a result of the creek. Depths range from 0-1.2m with negligible flow velocity. • Flood waters approach Huxters Road due to low-lying adjacent farmland. No inundation observed. • James Road is inundated from approximately 800m south of Princes Highway. Flood depths range from 0.3-1.2m. Negligible flow velocity observed, low hazard identified. • Buchan-Orbost Road is inundated at its intersection with Bete Bolong Road. Flood depths up to 0.5m are observed with no flow velocity. A low hazard is identified.	**Assistance may be required for:** • Owners of farmland at Bete Bolong and Orbost. **Road closure signs provided by the road authority for:** • Griebenows Road • Corringle Road • B Road • Birkins Road • Healeys Road • Huxters Road • James Road • Buchan-Orbost Road
6.9m	**20% AEP**	**Properties likely impacted (4 properties in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard identified. • Significant inundation into farmland west of Orbost – no buildings are directly impacted. Negligible flow velocity observed, low hazard identified. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. **Roads Inundated (roads in red are DTP operated roads)** • Gargans Lane is slightly flooded. Flow depths over 0.5m are observed at the east part of the road. Flow velocity is negligible, and an overall low hazard. • Griebenows Road is completely flooded. Flow depths up to 0.8m are observed over much of the road reserve, with a small part depth up to 1.2m. Flow velocity is negligible, low hazard is identified. • James Road is inundated from approximately 700m south of Princes Highway. Flood depths are reaching 0.8m in most inundated parts. Negligible flow velocity observed, low to medium hazard for children and adults. • Sandy Flat Road is inundated with flood depths up to 0.3m, with negligible flood velocity. Low hazard for both adults and children.	**Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane • Buchan - Orbost Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road • Healeys Road • Huxters Road • Jarrahmond Road • James Road • Lochend Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 0.3m, low hazard for both adults and children despite the significant flood depths. An inundation is also found 800m south of Webbs Track. Flood depths reach up to 0.8m, with negligible flow velocity. Low hazard is identified. • A few parts of B Road (close to the Bouchers Lane) are inundated with flow depths over 1.2m. Flow velocity maintained between 0-1m/s in most parts, with a higher flood velocity (1-2m/s) around Nixons Road. A medium hazard is identified. • A small section along the Jarrahmond Road is inundated (northern section facing towards Spring Creek) with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • An inundation up to 0.8m is identified along west reach of the Birkins Road down the hills. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults. • Buchan-Orbost Road is inundated on a few parts of it. With serious inundation occurs at the intersection with Bete Bolong Road with a flood depth of 0.8m. Negligible flood velocity observed. A low hazard is identified for adults and children. • Lochend Road is partly inundated with up to 0.3m flood depths. The flood velocity is negligible. Low hazard is identified along the road. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated because of the creek. Depths reaching 1.2m with negligible flow velocity. Low hazard is identified. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation has a flood 0.8m in depth, with flow velocity maintained between 0-1m/s. A low hazard for children and adults. • Marlo Road is partly inundated with up to 0.3 water depths in most parts of the Road with negligible flow velocity and low hazard. However, an up to 0.8m water depths is identified at the section that run across the Brodribb River. The velocity is negligible with low to medium hazard is identified for adults and children. • Beach Road is inundated with up to 0.3m flood depths. The flood velocity is negligible. A low hazard is identified along the road. • Old Marlo Road is inundated with up to 0.3m flood depths. The flood velocity is negligible. A low hazard is identified along the road. **General Floodplain Behaviour:** • The floodplain areas begin to be inundated by local inflows around 9 hours after the start of event, before the river overtops its banks. • The Brodribb River begins to overtop its banks from around 8 hours after the start of event. • Backflow from the B drain at Orbost into the Jarrahmond floodplain is the first location of riverine flooding, which begins around 10 hours after the start of event.Lynn's and Gilbert's Gulches both begin to overtop 12 hours after the start of event. • The Jarrahmond floodplain is flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. Flood levels peak around 28 hours after the start of event and Lynn's Gulch stops overtopping at 73 hours after the start of event. • The Bete Bolong and Jarrahmond levees do not overtop, and the Bete Bolong and Gunn's Creek floodplains are affected by local inflows only. • Paten's floodplain fills from local inflows then overtops the Orbost-Buchan Road into the Snowy River from 37 hours after the start of event. • Flow occurs across the meander neck from 22 to 36 hours after the start of event.	• Marlo Road • Old Marlo Road • Sandy Flat Road • Tabbara Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Watts and Ashby's Gulches do not overtop in the 20% AEP event. The Jarrahmond floodplain is inundated by local inflows, and overflows from the Snowy River at its downstream end, from 21 hours until about 43 hours after the start of event. • Overflow occurs over the Snowy Riverbank into the Icy Creek floodplain from 18 hours until around 73 hours after the start of event. • The Young's Creek floodplain fills initially from local inflows, then from Gilbert's Gulch overflows from 10 hours, then from general overtopping of the Snowy Riverbank from 22 hours after the start of event. The flood level peaks at 28-30 hours after the start of event in the western Young's Creek floodplain (near Gilbert's Gulch) and around 40 hours after the start of event in the eastern Young's Creek floodplain. General overbank flow continues until around 49 hours after the start of event, and overtopping of Gilbert's Gulch until around 75 hours after the start of event. • The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 50 hours after the start of event.	
7.4m	**Moderate Flood Level**	**Properties likely impacted (4 properties in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard identified. • Significant inundation into farmland west of Orbost – no buildings are directly impacted. Negligible flow velocity observed, low hazard identified. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. **Roads Inundated (roads in red are DTP operated roads)** • Significant inundation between 0.3-1.2m on Griebenows Road. Flow velocities between 0-1m/s. Occurs first at the road's intersection with a creek 100m north of Gargans Lane. Also occurs further south down Griebenows Lane, close to lot 202. Flood depths and velocities as previously described. A low hazard category is identified. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation varies between 0.3-1.2m in depth, with flow velocity maintained between 0-1m/s. Low hazard identified. • Flood depths between up to 1.2m observed at B Road close to the Bouchers Lane end. Further inundation observed 500m west closer to Nixons Road. Flow velocities are observed between 0-1m/s. Low hazard. • B Road (close to Mcleod Street – west of the stockyards) is inundated, with flood depths reaching 1.2m. Negligible flow velocity is observed, rendering a low hazard. • Minor inundation up to 0.3m identified along a 500m stretch of Birkins Road. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated as a result of the creek. Depths range from 0-1.2m with negligible flow velocity. • Flood waters approach Huxters Road due to low-lying adjacent farmland. No inundation observed. • James Road is inundated from approximately 800m south of Princes Highway. Flood depths range from 0.3-1.2m. Negligible flow velocity observed, low hazard.	**Assistance may be required for:** • Owners of farmland at Bete Bolong and Orbost. **Road closure signs provided by the road authority for:** • Griebenows Road • Corringle Road • B Road • Birkins Road • Healeys Road • Huxters Road • James Road • Buchan-Orbost Road • Nixons Road • Tabbara Road **Sandbagging may be required for:** • 453 Buchan-Orbost Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Nixons Road is inundated. Flood depths up to 0.8m observed, flow velocity is restricted between 0-1m/s. A moderate flood hazard is identified. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 0.3m, with negligible flow velocity. Low hazard is identified. • Buchan-Orbost Road is inundated at its intersection with Bete Bolong Road. Flood depths up to 0.5m are observed with no flow velocity. A low hazard is identified. • Buchan-Orbost Road is inundated approximately 1,400m southeast of its intersection with Bete Bolong Road. Flood depths up to 0.3m are identified and flow velocity is negligible. A low hazard is identified.	
7.7m **(207,360 ML/d^)**	**10% AEP**	**Properties likely impacted (16 properties in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard category identified. • Significant inundation into farmland west of Orbost – no buildings are directly impacted. Negligible flow velocity observed, low hazard. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. • One property 300m east of Griebenows Road on Lochend Road becomes indundated. Depths up to 0.3m are observed over the property, with negligible flood velocity. A low hazard is identified for adults and children. • One property 1,950m east of Griebenows Road on Lochend Road becomes inundated. Depths up to 0.3m are observed over the property, with negligible flood velocity. A low hazard is identified for adults and children. • One property 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 0.3m are observed with negligible flow velocity. A low hazard is identified for adults and children. • Eight properties along at the north bank of the Snowy River on Marlo Road are likely to be inundated by a flood with depths up to 0.3m. The velocity is negligible, and a low hazard is identified. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. A moderate hazard is identified for a small section of this park. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is negligible, with a low hazard identified for both adults and children. **Roads Inundated (roads in red are DTP operated roads)** • Gargans Lane is partly flooded. Flow depths over 1.2m are observed at the east part of the road. Flow velocity is negligible, and an overall low hazard. Flow velocity is generally within 0 -1 m/s range, low to medium hazard is identified. • Griebenows Road is completely flooded. Flow depths over 1.2m are observed over much of the road reserve. Flow velocity is negligible, low hazard is identified. • James Road is inundated from approximately 700m south of Princes Highway. Flood depths are reaching 1.2m in most inundated parts. Negligible flow velocity observed, low to medium hazard for children and adults.	**Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane Buchan - Orbost Road • Burn Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road • Gunns Road • Healeys Road • Huxters Road Jarrahmond Road • James Road • Lochend Road Marlo Road • Nicholson Street • Nixons Road • Old Marlo Road • Sandy Flat Road • Tabbara Road • Watt Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Sandy Flat Road is inundated with flood depths up to 0.8m, with negligible flood velocity. Low hazard for both adults and children. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 0.8m, low hazard for both adults and children despite the significant flood depths. An inundation is also found 800m south of Webbs Track. Flood depths reach up to 1.2m, with negligible flow velocity. Low hazard is identified. • A few parts of B Road are inundated with flow depths over 1.2m. Flow velocity maintained between 0-1m/s in most parts, with a higher flood velocity (1-2m/s) around Nixons Road. A medium to high hazard is identified. • Nixons Road is inundated. Flood depths up to 0.8m is observed, flow velocity is restricted between 0-1m/s. A low flood hazard for adults is identified. • Jarrahmond Road is inundated (northern section facing towards Spring Creek) with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • A small section on Gunns Road close to Jarrahmond Road is inundated with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • Significant inundation up to 1.2m identified along west reach of the Birkins Road down the hills. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults. • Buchan-Orbost Road is inundated on a few parts of it. With serious inundation occurs at the intersection with Bete Bolong Road. Negligible flood velocity observed. A low hazard is identified for adults and children. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 0.8 m are observed with flow velocity in between 0-1m/s. A low to high hazard is identified. • Watt Road is inundated (south of Orbost connecting with Buchan-Orbost Road). Flood depths reach 0.8m with flood velocity in between 1-2m/s. A low to medium hazard is identified for adults and children. • Nicholson Street, Forest Road and Lochiel Street are inundated (at the very north end of Nicholson Street) with up to 0.8m flood depths. The flood velocity is negligible with low to high hazard identified. • Lochend Road is partly inundated with up to 0.5m flood depths. The flood velocity is negligible. Low hazard is identified along the road. With higher flood velocity up to 1-2m/s down to the boat launch, where is identified as high hazard for adults and children. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated because of the creek. Depths reaching 1.2m with negligible flow velocity. Low to medium hazard. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation has a flood 1.2m in depth, with flow velocity maintained between 0-1m/s. A low hazard for children and adults. • Mario-Cabbage Tree Road (section crossing over the Emu Creek) is inundated. Depths up to 0.8m is observed on the bridge, with negligible velocity. This bridge section is identified as low hazard to adults and children. • Marlo Road is partly inundated with up to 0.3 water depths in most parts of the Road with negligible flow velocity and low hazard. However, an up to 1.2m water depths is identified at the section that run across the Brodribb River. The velocity is in between 1-2m/s on the section running towards the Brodribb River with medium to extreme hazard is identified for adults and children. • Beach Road is inundated with up to 0.5m flood depths. The flood velocity is negligible. A low hazard is identified along the road. • Old Marlo Road is inundated with up to 0.8m flood depths. The flood velocity is negligible. A low to medium hazard is identified along the road.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		General Floodplain Behaviour: • The floodplain areas begin to be inundated by overflow over Lynn's Gulch and Gilbert's Gulch and backflow from the B Drain from 6 hours after the start of event. The Brodribb River begins to overflow from around 7 hours after the start of event. Local inflows begin to affect the floodplains around 9 hours after the start of event. • The Jarrahmond floodplain is flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. General overbank flows also occur from the Snowy River to the south from around 18 hours after the start of event. Flood levels peak around 24 hours after the start of event and Lynn's Gulch stops overtopping at 75 hours after the start of event. • The Bete Bolong and Jarrahmond levees do not overtop, and the Bete Bolong and Gunn's Creek floodplains are affected by local inflows only. • Flood waters overtop the Orbost-Buchan Road into Paten's floodplain from 18 hours after the start of event. • Flow occurs across the meander neck from 17 to 55 hours after the start of event. • Watts and Ashby's Gulches begin to overtop around 19 hours after the start of event and continue until 40 hours after the start of event. The Jarrahmond floodplain also receives local inflows, and overflows from the Snowy River at its downstream end (beginning around 16 hours after the start of event), until about 75 hours after the start of event. Flood levels peak at around 33 hours after the start of event. • Overflow occurs over the Snowy River bank into the Icy Creek floodplain from 11 hours until over 77 hours after the start of event. • The Young's Creek floodplain fills from Gilbert's Gulch overflows from 7 hours, then from general overtopping of the Snowy River bank from 18 hours after the start of event. The flood level peaks at 25 hours after the start of event in the western Young's Creek floodplain (near Gilbert's Gulch) and around 40 hours after the start of event in the eastern Young's Creek floodplain. General overbank flows and overtopping of Gilbert's Gulch continue until over 77 hours after the start of event. • The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 47 hours after the start of event.	
8.4m **(135,500 ML/d^)**	**5% AEP**	**Properties likely impacted (27 in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard category identified. • Significant inundation into farmland west of Orbost. One property at lot 55 with several small properties become inundated by a flood depth up to 0.3m. Flood water along the property's driveway will cause the property to become isolated. Low hazard is identified. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified. • One property on 275 Buchan-Orbost Road is inundated. Flood depths up to 0.3m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified.	**Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane • Buchan - Orbost Road • Burn Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• One property on 213 Buchan-Orbost Road is inundated. Flood depths up to 0.3m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified. • One property on 28 Watt Road is inundated. Flood depths up to 0.3m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified. • Two properties at the intersection of Griebenows Road and Lochend Road become inundated. Depths up to 0.3m are observed over both properties, with negligible flood velocity. A low hazard is identified for adults and children. • One property 1,950m east of Griebenows Road on Lochend Road becomes inundated. Depths up to 0.3m are observed over the property, with negligible flood velocity. A low hazard is identified for adults and children. • Ten properties along at the north bank of the Snowy River on Marlo Road are likely to be inundated by a flood with depths up to 0.3m. The velocity is negligible, and a low hazard is identified. • Three properties at the south bank of the Snowy River along Lochend Road till Lake Wat Wat are likely to be inundated, with flood depths up to 0.3m, with negligible flood velocity and low risk. • One property 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 0.5m are observed with negligible flow velocity. A low hazard is identified for adults and children. • One property on 100m west of Forest Road on B Road is inundated. Flood depths up to 0.8m with negligible flow velocity. A low hazard is observed. • Two properties located at the intersection of Nicholson Street and Lochiel Street are likely to be inundated by flood with depths up to 0.8. Negligible velocity and low hazard are identified. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. Low to extreme hazard is identified for this park. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is reaching 1m/s, with a medium to extreme hazard identified for both adults and children. • The edge of the Lochiel Streetreet Reserve becomes inundated, but is mostly covered by shrubs and trees, with up to 1.2m water depths. Flow velocity reaches 2m/s at the edge of the southern edge of the reserve. Low to extreme hazard is identified. **Roads Inundated (roads in bold red are DTP operated roads)** • Gargans Lane is completely flooded. Flow depths over 1.2m are observed at the east part of the road. Flow velocity is negligible, and an overall low hazard. Flow velocity is generally within 0 -1 m/s range, low to medium hazard is identified. • Griebenows Road is completely flooded. Flow depths over 1.2m are observed over much of the road reserve. Flow velocity is negligible, low hazard is identified. • James Road is inundated from approximately 700m south of Princes Highway. Flood depths are reaching 1.2m in most inundated parts. Negligible flow velocity observed, low to medium hazard for children and adults.	• Gunns Road • Healeys Road • Huxters Road • Jarrahmond Road • James Road • Lochend Road • Lochiel Street • Marlo Road • Nicholson Street • Nixons Road • Old Marlo Road • Sandy Flat Road • Tabbara Road • Watt Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Sandy Flat Road is inundated with flood depths up to 0.8m, with negligible flood velocity. Low hazard for both adults and children. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 0.8m, low hazard for both adults and children despite the significant flood depths. An inundation is also found 800m south of Webbs Track. Flood depths reach up to 1.2m, with negligible flow velocity. Low hazard is identified. • A few parts of B Road are inundated with flow depths over 1.2m. Flow velocity maintained between 0-1m/s in most parts, with a higher flood velocity (1-2m/s) around Nixons Road. A medium to high hazard is identified. • Nixons Road is inundated. Flood depths up to 0.8m is observed, flow velocity is restricted between 0-1m/s. A low flood hazard for adults and children is identified. • Jarrahmond Road is inundated (northern section facing towards Spring Creek) with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • A small section on Gunns Road close to Jarrahmond Road is inundated with up to 0.8m flood depths. The flood velocity is negligible with a low hazard identified. • Significant inundation up to 1.2m identified along west reach of the Birkins Road down the hills. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults. • Buchan-Orbost Road is inundated on a few parts of it. With serious inundation occurs at the intersection with Bete Bolong Road. Negligible flood velocity observed. A medium to high hazard is identified for adults and children. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 1.2m is observed with flow velocity in between 0-1m/s. A low to high hazard is identified. • Watt Road is inundated (south of Orbost connecting with Buchan-Orbost Road). Flood depths reach 0.8m with flood velocity in between 1-2m/s. A medium to high hazard is identified for adults and children. • Pinces Highway (the section that passes across the Snowy River to 2km south of Orbost) is inundated with flood depths up to 1.2m. The flood velocity at this section is high to reach 3m/s on the bridge, with extreme hazard identified at this section. • Nicholson Street, Forest Road and Lochiel Street are inundated (at the very north end of Nicholson Street) with up to 0.8m flood depths. The flood velocity is negligible with low to high hazard identified. • Lochend Road is partly inundated with up to 0.5m flood depths. The flood velocity is negligible. Low hazard is identified along the road. With higher flood velocity up to 1-2m/s down to the boat launch, where is identified as high hazard for adults and children. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated because of the creek. Depths reaching 1.2m with negligible flow velocity. Low to high hazard. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation has a flood 1.2m in depth, with flow velocity maintained between 0-1m/s. A low hazard for children and adults. • Mario-Cabbage Tree Road (section crossing over the Emu Creek) is inundated. Depths up to 0.8m is observed on the bridge, with negligible velocity. This bridge section is identified as low to medium hazard to adults and children. • Marlo Road is partly inundated with up to 0.3 water depths in most parts of the Road with negligible flow velocity and low hazard. However, an up to 1.2m water depths is identified at the section that run across the Brodribb River. The velocity is in between 1-2m/s on the section running towards the Brodribb River with medium to extreme hazard is identified for adults and children.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Beach Road is inundated with up to 0.8m flood depths. The flood velocity is negligible. A low hazard is identified along the road. • Old Marlo Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. A medium to high hazard is identified along the road. **General Floodplain Behaviour:** • The floodplain areas begin to be inundated by overflow over Lynn's Gulch and backflow from the B Drain from 4 hours, and Gilbert's Gulch from 5 hours after the start of event. The Brodribb River begins to overflow from around 7 hours after the start of event. Local inflows begin to affect the floodplains around 9 hours after the start of event. • The Jarrahmond floodplain is rapidly flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. General overbank flows also occur from the Snowy River to the south from around 15-16 hours after the start of event. Flood levels peak around 22 hours after the start of event and Lynn's Gulch stops overtopping at 75 hours after the start of event. • The Bete Bolong levee does not overtop, and the Bete Bolong floodplain is affected by local inflows only. The Jarrahmond levee just begins to overtop at 21 hours after the start of event but doesn't cause major inundation. • Flood waters overtop the Orbost-Buchan Road into Paten's floodplain from 16 hours after the start of event. • Flow occurs across the meander neck from 14 to 75 hours after the start of event. • Watts and Ashby's Gulches begin to overtop around 16 hours after the start of event and continue until 59 hours after the start of event. The Jarrahmond floodplain also receives local inflows, and widespread overflows from the Snowy River (beginning around 12 hours after the start of event), until over 77 hours after the start of event. Flood levels peak at around 27 hours after the start of event. • Overflow occurs over the Snowy River bank into the Icy Creek floodplain from 7 hours until over 77 hours after the start of event. • The Young's Creek floodplain fills from Gilbert's Gulch overflows from 5 hours, then from general overtopping of the Snowy River bank from 14 hours after the start of event. The flood level peaks at 23 hours after the start of event in the western Young's Creek floodplain (near Gilbert's Gulch) and around 36 hours after the start of event in the eastern Young's Creek floodplain. General overbank flows and overtopping of Gilbert's Gulch continue until over 77 hours after the start of event. • The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 43 hours after the start of event.	
8.7m **(148,000 ML/d^)**	2% AEP	**Properties likely impacted (32 in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard category identified. • One property on Nixons Road is inundated. Flood depths up to 0.8m are identified, with flow velocity remaining negligible. A moderate hazard is identified for some parts of this property. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified.	**Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane • Buchan - Orbost Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• One property on 275 Buchan-Orbost Road is inundated. Flood depths up to 0.3m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified. • One property on 213 Buchan-Orbost Road is inundated. Flood depths up to 0.3m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified. • One property on 28 Watt Road is inundated. Flood depths up to 0.3m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low hazard is identified. • Three properties along Lochend Road are inundated between Princes Highway and Lake Road. Flood depths reach 0.3 m along some sections, with a low hazard still identified for both adults and children. • 10 properties along Marlo Road (between Princes Highway and Brodribb River) are inundated. Flood depths reach 0.8m for some of these properties, with flow velocities between 1-2m/s in some parts. A low hazard is identified for both adults and children. • One property on 100m west of Forest Road on B Road is inundated. Flood depths up to 0.8m with negligible flow velocity. A low hazard is observed. • One property located at 2 Birkins Road is likely to be inundated with flow depths up to 0.3m., with negligible velocity and low hazard. • One property at 40 Huxters Road is inundated with flood depths up to 0.5m. The velocity is negligible. A low hazard is observed. • Two property 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 0.5m are observed with negligible flow velocity. A low hazard is identified for adults and children. • Two properties along Gargans Lane become inundated, with flood depths greater than 1.2m observed. An extreme hazard is identified for both of these properties. • One property near the junction between Jarrahmond Road and Duggans Road becomes inundated. Flow depths up to 0.8m are identified, while flow velocity remains negligible. A low hazard is identified for both adults and children. • Four properties located at the intersection of Nicholson Street and Lochiel Street are likely to be inundated by flood with depths up to 0.8m. Negligible velocity and low hazard are identified. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. Low to extreme hazard is identified for this park. • The edge of the Lochiel Street Reserve becomes inundated, but is mostly covered by shrubs and trees, with up to 1.2m water depths. Flow velocity reaches 2m/s at the edge of the southern edge of the reserve. Low to extreme hazard is identified. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is reaching 1m/s, with a medium to extreme hazard identified for both adults and children. **Roads Inundated (roads in bold red are DTP operated roads)** • Gargans Lane is completely flooded. Flow depths over 1.2m are observed at all parts of the road. Flow velocity is negligible, and an overall low hazard. Flow velocity is generally within 0 -1 m/s range, with a	• Burn Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road • Gunns Road • Healeys Road • Huxters Road • Jarrahmond Road • James Road • Lochend Road • Lochiel Street • Lynns Road • Marlo - Cabbage Tree Road • Marlo Road • Nicholson Street • Nixons Road • Old Marlo Road • Old Station Road • Sandy Flat Road • Tabbara Road • Watt Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		small section south down the Princes Highway with a high velocity up to 2-3m/s. High to extreme hazard is identified. • Griebenows Road is completely flooded. Flow depths over 1.2m are observed over much of the road reserve. Flow velocity is negligible, and high to extreme hazard is identified. • James Road is inundated from approximately 700m south of Princes Highway. Flood depths are reaching 1.2m in most inundated parts. Negligible flow velocity observed, medium to high hazard for children and adults. • Sandy Flat Road is inundated with flood depths up to 1.2m, with negligible flood velocity. Low to high hazard for both adults and children. • Majority of the B Road are inundated with flow depths over 1.2m. Flow velocity maintained between 0-1m/s in most parts, with a higher flood velocity (1-2m/s) around Nixons Road. A medium to high hazard is identified. • Nixons Road is inundated. Flood depths up to 0.8m is observed, flow velocity is restricted between 0-1m/s. A low to medium flood hazard for adults is identified. • Flood waters overtop Huxters Road due to low-lying adjacent farmland. Flood depths up to 1.2m are observed, majority parts of the road are with flow velocity between 1-2m/s, with only a small section has a flow velocity between 2-3m/s. Extreme hazard is daintified for both adults and children. • Jarrahmond Road is inundated (northern section facing towards Spring Creek) with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • A small section on Gunns Road close to Jarrahmond Road is inundated with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • Significant inundation up to 1.2m identified along west reach of the Birkins Road down the hills. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults. • Buchan-Orbost Road is inundated on most part of it. With serious inundation occurs from its intersection from 1600m north of its intersection with Bete Bolong Road till 1400m southeast of the intersection along the Snowy River. Negligible flood velocity observed. A high to extreme hazard is identified for adults and children. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 1.2m are observed with flow velocity in between 1-2m/s. A high to extreme hazard is identified. • Watt Road is inundated (south of Orbost connecting with Buchan-Orbost Road). Flood depths reach 0.8m with flood velocity in between 1-2m/s. A medium to high hazard is identified for adults and children. • Pinces Highway (the section that passes across the Snowy River to 2km south of Orbost) is inundated with flood depths up to 1.2m. The flood velocity at this section is high to reach 3m/s on the bridge, with extreme hazard identified at this section. • Nicholson Street, Forest Road and Lochiel Street are inundated (at the very north end of Nicholson Street) with up to 1.2m flood depths. The flood velocity is between 1-2m/s with extreme hazard identified. • Lochend Road is partly inundated with up to 0.5m flood depths. The flood velocity is negligible. Low to medium hazard are identified along the road. With higher flood velocity up to 2-3m/s down to the boat launch, where is identified as extreme hazard for adults and children. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated because of the creek. Depths reaching 1.2m with negligible flow velocity. High to extreme hazard. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation has a flood 1.2m in depth, with flow velocity maintained between 0-1m/s. A low hazard for children and adults.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Mario-Cabbage Tree Road (section crossing over the Emu Creek) is inundated. Depths range from 0.8-1.2m, with 1-2m/s velocity. This bridge section is identified as medium hazard to adults and children. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 1.2m, low hazard for both adults and children despite the significant flood depths. An inundation is also found 800m south of Webbs Track. Flood depths reach up to 1.2m, with negligible flow velocity. Low hazard is identified. • Marlo Road is partly inundated with up to 0.3-0.5m water depths in most parts of the Road with negligible flow velocity and low hazard. However, an up to 1.2m water depths is identified at the section that run across the Brodribb River. The velocity is in between 1-2m/s on the section running towards the Brodribb River with medium to extreme hazard is identified for adults and children. • Beach Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Old Marlo Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Old Station Road is inundated with up to 0.8m flood depths. The flood velocity is negligible. A low hazard is identified along the road. **General Floodplain Behaviour:** • The floodplain areas begin to be inundated by overflow over Lynn's Gulch from 3 hours, backflow from the B Drain from 4 hours, and Gilbert's Gulch from 5 hours after the start of event. The Brodribb River begins to overflow from around 7 hours after the start of event. Local inflows begin to affect the floodplains around 9 hours after the start of event. • The Jarrahmond floodplain is rapidly flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. General overbank flows also occur from the Snowy River to the south from around 11 hours after the start of event. Flood levels peak around 22 hours after the start of event and Lynn's Gulch stops overtopping at 76 hours after the start of event. • The Bete Bolong levee just begins to overtop at 20 hours after the start of event but doesn't cause major inundation. The Jarrahmond levee overtops from 17 to 31 hours after the start of event. Flood waters overtop the Orbost-Buchan Road into Paten's floodplain from 13 hours after the start of event. • Flow occurs across the meander neck from 10 to over 77 hours after the start of event. • Watts and Ashby's Gulches begin to overtop around 12 hours after the start of event and continue until 74 hours after the start of event. The Jarrahmond floodplain also receives local inflows, and widespread overflows from the Snowy River (beginning around 9 hours after the start of event), until over 77 hours after the start of event. Flood levels peak at around 24 hours after the start of event. • Overflow occurs over the Snowy River bank into the Icy Creek floodplain from 6 hours until over 77 hours after the start of event. • The Young's Creek floodplain fills from Gilbert's Gulch overflows from 5 hours, then from general overtopping of the Snowy River bank from 10 hours after the start of event. The flood level peaks at 23 hours after the start of event in the western Young's Creek floodplain (near Gilbert's Gulch) and around 34 hours after the start of event in the eastern Young's Creek floodplain. General overbank flows and overtopping of Gilbert's Gulch continue until over 77 hours after the start of event. • The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 38 hours after the start of event.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
8.9m **(160,000 ML/d^)**	**Major Flood Level**	**Properties likely impacted (3 new at level; 6 properties in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard category identified. • Significant inundation into farmland west of Orbost – no buildings are directly impacted. Negligible flow velocity observed, low hazard. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. • One property 300m east of Griebenows Road on Lochend Road becomes indundated. Depths up to 0.3m are observed over the property, with negligible flood velocity. A low hazard is identified for adults and children. • One property 1,950m east of Griebenows Road on Lochend Road becomes inundated. Depths up to 0.3m are observed over the property, with negligible flood velocity. A low hazard is identified for adults and children. • One property 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 0.5m are observed with negligible flow velocity. A low hazard is identified for adults and children. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. A moderate hazard is identified for a small section of this park. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is negligible, with a low hazard identified for both adults and children. **Roads Inundated (roads in red are DTP operated roads)** • Griebenows Road is completely flooded. Flow depths up to 1.2m are observed over much of the road reserve. Flow velocity is negligible, and an overall low hazard to adults and children is identified despite the significant flooding. • Gargans Lane is mostly flooded. Flow depths up to 1.2m are observed over much of the road reserve. Flow velocity is negligible, and an overall low hazard to adults and children is identified despite the significant flooding. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation varies between 0.3-1.2m in depth, with flow velocity maintained between 0-1m/s. Low hazard for children and adults. • Flood depths between up to 1.2m observed at B Road close to the Bouchers Lane end. Further inundation observed 500m west closer to Nixons Road. Flow velocities are observed between 0-1m/s. Low hazard for children and adults. • B Road and Bouchers Lane are inundated, with flood depths reaching 1.2m. Negligible flow velocity is observed, rendering a low hazard for adults and children. • Minor inundation up to 0.3m identified along a 500m stretch of Birkins Road. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated as a result of the creek. Depths range from 0-1.2m with negligible flow velocity.	**Assistance may be required for:** • Owners of farmland at Bete Bolong and Orbost. • Forest Park • Orbost Snowy Caravan Park **Road closure signs provided by the road authority for:** • Griebenows Road • Corringle Road • B Road • Birkins Road • Healeys Road • Huxters Road • James Road • Buchan-Orbost Road • Nixons Road • Tabbara Road • Bouchers Road • Gargans Lane • Burn Road • Watt Road • Forest Road **Sandbagging may be required for:** • 453 Buchan-Orbost Road • Two properties on Griebenows Road • One property on Huxters Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Flood waters overtop Huxters Road due to low-lying adjacent farmland. Flood depths up to 0.5m are observed, with a flow velocity up to 2m/s shown over a small portion approx. 500m north east of B Road. Moderate hazard is daintified for both adults and children. • James Road is inundated from approximately 800m south of Princes Highway. Flood depths range from 0.3-1.2m. Negligible flow velocity observed, low hazard for children and adults. • Nixons Road is inundated. Flood depths up to 0.8m observed, flow velocity is restricted between 0-1m/s. A moderate flood hazard for adults is identified. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 0.3m, with negligible flow velocity. Low hazard is identified for both adults and children despite the significant flood depths. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 0.5m are observed with negligible flow velocity. A low hazard to adults and children is identified. • Buchan-Orbost Road is inundated at its intersection with Bete Bolong Road and at a section 300m further north. Flood depths up to 0.5m are observed with no flow velocity. A low hazard is identified for adults and children. • Buchan-Orbost Road is inundated approximately 1,400m south east of its intersection with Bete Bolong Road. Flood depths up to 0.3m are identified and flow velocity is negligible. A low hazard is identified for both adults and children. • Watt Road is inundated (south of Orbost). Flood depths reach 0.8m in some areas, with negligible flow velocity. A low hazard is identified for adults and children. • Forest Road is inundated with flood depths up to 1.2m and negligible flow velocity. A moderate hazard is identified for both adults and children.	
9.0m **(509,760 ML/d)^**	1% AEP	**Properties likely impacted (40 properties in total)** • Inundation up to 1.2m deep within farmland at Bete Bolong. Negligible flow velocity observed, low hazard for children and adults. • One property on Nixons Road is inundated. Flood depths up to 0.8m are identified, with flow velocity remaining negligible. A moderate hazard is identified for some parts of this property. • Five properties along Huxters Road are inundated, with flood depths reaching 1.2m. Flow velocity is observed to be between 2-3m/s over several of these properties, with a high hazard identified for adults and children. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. • Four properties along Lochend Road are inundated between Princes Highway and Lake Road. Flood depths reach 1.2m along some sections, with a low hazard still identified for both adults and children. • 13 properties along Marlo Road (between Princes Highway and Brodribb River) are inundated. Flood depths reach 1.2m for some of these properties, with flow velocities between 2-3m/s in some parts. A high hazard is identified for both adults and children. • One property on 100m west of Forest Road on B Road is inundated. Flood depths up to 0.8m with negligible flow velocity. A low hazard is observed. • One property located at 2 Birkins Road is likely to be inundated with flow depths up to 0.3m, with negligible velocity and low hazard. • Two properties along Gargans Lane become inundated, with flood depths greater than 1.2m observed. An extreme hazard is identified for both of these properties.	**Assistance may be required for:** • Owners of farmland at Bete Bolong and Orbost. • Forest Park • Orbost Snowy Caravan Park • Lochiel Street Reserve **Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane • Buchan - Orbost Road • Burn Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road • Gunns Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Two properties 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 0.8m are observed with negligible flow velocity. A low hazard is identified for adults and children. • One property near the junction between Jarrahmond Road and Duggans Road becomes inundated. Flow depths up to 1.2m are identified, while flow velocity remains negligible. A low hazard is identified for both adults and children. • Four properties located at the intersection of Nicholson Street and Lochiel Street are likely to be inundated by flood with the highest depths up to 1.2m. Negligible velocity and low to high hazard are identified. • One property on 275 Buchan-Orbost Road is inundated. Flood depths up to 0.5m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 1-2m/s. Low to medium hazard is identified. • One property on 213 Buchan-Orbost Road is inundated. Flood depths up to 0.8m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 2-3m/s. Low to extreme hazard is identified. • One property on 28 Watt Road is inundated. Flood depths up to 0.5m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 1-2m/s. Low to high hazard is identified. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. A moderate hazard is identified for a small section of this park. • The Lochiel Street Reserve becomes partially inundated with flood depths reaching 0.3m. Flow velocity is negligible, and a low hazard is identified for both adults and children. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is negligible, with a low hazard identified for both adults and children. **Roads Inundated (roads in bold red are DTP operated roads)** • Griebenows Road is completely flooded. Flow depths up to 1.2m are observed over much of the road reserve. Flow velocity is negligible, and an overall low hazard to adults and children is identified despite the significant flooding. • Gargans Lane is mostly flooded. Flow depths up to 1.2m are observed over much of the road reserve. Flow velocity is negligible, and an overall low hazard to adults and children is identified despite the significant flooding. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation varies between 0.3-1.2m in depth, with flow velocity maintained between 0-1m/s. Low hazard for children and adults. • Flood depths between up to 1.2m observed at B Road close to the Bouchers Lane end. Further inundation observed 500m west closer to Nixons Road. Flow velocities are observed between 0-1m/s. Low hazard for children and adults. • B Road and Bouchers Lane are inundated, with flood depths reaching 1.2m. Negligible flow velocity is observed, rendering a low hazard for adults and children. • Minor inundation up to 0.3m identified along a 500m stretch of Birkins Road. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults.	• Healeys Road • Huxters Road • Jarrahmond Road • James Road • Lochend Road • Lochiel Street • Lynns Road • Marlo - Cabbage Tree Road • Marlo Road • Nicholson Street • Nixons Road • Old Marlo Road • Old Station Road • Princes Highway • Sandy Flat Road • Tabbara Road **Sandbagging may be required for:** • 453 Buchan-Orbost Road • Two properties on Griebenows Road • Five properties on Huxters Road • One property on Nixons Road • Two properties on B Road • Four properties along Lochend Road • 13 properties along Marlo Road • Two properties on Gargans Lane • One property near the junction between Jarrahmond Road and Duggans Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Healeys Road (at intersection with Cabbage Tree Creek) is inundated as a result of the creek. Depths range from 0-1.2m with negligible flow velocity. • Flood waters overtop Huxters Road due to low-lying adjacent farmland. Flood depths up to 0.5m are observed, with a flow velocity up to 2m/s shown over a small portion approx. 500m northeast of B Road. Moderate hazard is daintified for both adults and children. • James Road is inundated from approximately 800m south of Princes Highway. Flood depths range from 0.3-1.2m. Negligible flow velocity observed, low hazard for children and adults. • Nixons Road is inundated. Flood depths up to 0.8m observed, flow velocity is restricted between 0-1m/s. A moderate flood hazard for adults is identified. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 0.3m, with negligible flow velocity. Low hazard is identified for both adults and children despite the significant flood depths. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 0.5m are observed with negligible flow velocity. A low hazard to adults and children is identified. • Buchan-Orbost Road is inundated at its intersection with Bete Bolong Road and at a section 300m further north. Flood depths up to 0.5m are observed with no flow velocity. A low hazard is identified for adults and children. • Buchan-Orbost Road is inundated approximately 1,400m southeast of its intersection with Bete Bolong Road. Flood depths up to 0.3m are identified and flow velocity is negligible. A low hazard is identified for both adults and children. • Watt Road is inundated (south of Orbost). Flood depths reach 0.8m, with negligible flow velocity. A low hazard is identified for adults and children. • Forest Road is inundated with flood depths up to 1.2m and negligible flow velocity. A moderate hazard is identified for both adults and children. • Bete Bolong Road is partly inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Beach Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Old Marlo Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified at north side of the road. • Old Station Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. A low hazard is identified along the rd. **Additional Floodplain Behaviour:** • The floodplain areas begin to be inundated by overflow over Lynn's Gulch from 3 hours, backflow from the B Drain and Gilbert's Gulch from 4 hours after the start of event. The Brodribb River begins to overflow from around 7 hours after the start of event. Local inflows begin to affect the floodplains around 9 hours after the start of event. • The Jarrahmond floodplain is rapidly flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. General overbank flows also occur from the Snowy River to the south from around 9 hours after the start of event. Flood levels peak around 22 hours after the start of event and Lynn's Gulch stops overtopping at 76 hours after the start of event. • The Bete Bolong levee begins to overtop at 18 hours and continues until 27 hours after the start of event, contributing to inundation in the Bete Bolong floodplain. The Jarrahmond levee overtops from 16 to 34 hours after the start of event.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Flood waters overtop the Orbost-Buchan Road into Paten's floodplain from 10 hours after the start of event. • Flow occurs across the meander neck from 9 to over 77 hours after the start of event. • Watts and Ashby's Gulches begin to overtop around 10 hours after the start of event and continue until 75 hours after the start of event. The Jarrahmond floodplain also receives local inflows, and widespread overflows from the Snowy River (beginning around 8 hours after the start of event), until over 77 hours after the start of event. Flood levels peak at around 23 hours after the start of event. • Overflow occurs over the Snowy River bank into the Icy Creek floodplain from 5 hours until over 77 hours after the start of event. • The Young's Creek floodplain fills from Gilbert's Gulch overflows from 4 hours, then from general overtopping of the Snowy River bank from 9 hours after the start of event. The flood level peaks at around 23 to 34 hours after the start of event in the Young's Creek floodplain. General overbank flows and overtopping of Gilbert's Gulch continue until over 77 hours after the start of event. The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 36 hours after the start of event.	
9.1m	0.5% AEP	**Properties likely impacted (41 in total)** • Inundation over 1.2m deep within farmland at Bete Bolong. 2-3m/s flow velocity observed north side of the farmland, extreme hazard for children and adults. • One property on Nixons Road is inundated. Flood depths up to 0.8m are identified, with flow velocity remaining negligible. A medium hazard is identified for some parts of this property. • Five properties along Huxters Road are inundated, with flood depths reaching 1.2m. Flow velocity is observed to be between 2-3m/s over several of these properties, with a high hazard identified for adults and children. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. The highest flood velocity identified in this area is between 1-2m/s. • Four properties along Lochend Road are inundated between Princes Highway and Lake Road. Flood depths reach 1.2m along some sections, with a low hazard still identified for both adults and children. • 13 properties along Marlo Road (between Princes Highway and Brodribb River) are inundated. Flood depths reach 1.2m for some of these properties, with flow velocities between 2-3m/s in some parts. A high hazard is identified in some area for both adults and children. • Two properties along Gargans Lane become inundated, with flood depths greater than 1.2m observed. An extreme hazard is identified for both of these properties. • Two properties 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 1.2m are observed with negligible flow velocity. A medium hazard is identified for adults and children. • One property near the junction between Jarrahmond Road and Duggans Road becomes inundated. Flow depths up to 1.2m are identified, while flow velocity remains negligible. A low hazard is identified for both adults and children. • One property on 100m west of Forest Road on B Road is inundated. Flood depths up to 0.8m with negligible flow velocity. A low hazard is observed.	**Assistance may be required for:** • Owners of farmland at Bete Bolong and Orbost. • Forest Park • Orbost Snowy Caravan Park • Lochiel Street Reserve **Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane • Buchan - Orbost Road • Burn Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road • Gunns Road • Healeys Road • Huxters Road • Jarrahmond Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Four properties located at the intersection of Nicholson Street and Lochiel Street are likely to be inundated by flood with the highest depths over 1.2m. Negligible velocity and low to high hazard are identified. • One property on 275 Buchan-Orbost Road is inundated. Flood depths up to 0.5m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 1-2m/s. Medium hazard is identified. • One property on 213 Buchan-Orbost Road is inundated. Flood depths up to 1.2m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 2-3m/s. High to extreme hazard is identified. • One property on 28 Watt Road is inundated. Flood depths up to 0.5m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 1-2m/s. Low to high hazard is identified. • One property located at 2 Birkins Road is likely to be inundated with flow depths up to 1.2m., with negligible velocity and low hazard. • One property at 512 B Road is inundated with flood up to 1.2m. The velocity is up negligible. A low hazard is observed. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. A moderate hazard is identified for a small section of this park. • The Lochiel Street Reserve becomes partially inundated with flood depths reaching 0.3m. Flow velocity is negligible, and a low hazard is identified for both adults and children. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is negligible, with a low hazard identified for both adults and children. **Roads Inundated (roads in bold red are DTP operated roads)** • Gargans Lane is completely flooded. Flow depths over 1.2m are observed at all parts of the road. Flow velocity is negligible, and an overall low hazard. Flow velocity is generally within 0 -1 m/s range, with a small section south down the Princes Highway with a high velocity up to 2-3m/s. Extreme hazard is identified. • Griebenows Road is completely flooded. Flow depths over 1.2m are observed over much of the road reserve. Flow velocity is negligible, and an overall extreme hazard is identified. • Corringle Road (at the Marlo Coast Rev boat ramp and back 7.5km) is inundated at various locations. Inundation varies between 0.3-1.2m in depth, with flow velocity maintained between 0-1m/s. A medium hazard for children and adults. • B Road (the section closes to Bouchers Lane) and Bouchers Lane are inundated, with flood depths reaching 1.2m. Negligible flow velocity is observed, rendering an extreme hazard for adults and children. • B Road (the section closes to Snowy River Water Frontage are inundated, with flood depths reaching 1.2m. Negligible flow velocity is observed, low hazard for adults and children. • Significant inundation up to 1.2m identified along most of the Birkins Road. Flood waters pool in this area but cause restricted access. Negligible flow velocity observed, low hazard for children and adults. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated because of the creek. Depths reaching 1.2m with negligible flow velocity. High to extreme hazard.	• James Road • Lochend Road • Lochiel Street • Lynns Road • Marlo - Cabbage Tree Road • Marlo Road • Nicholson Street • Nixons Road • Old Marlo Road • Old Station Road • Princes Highway • Sandy Flat Road • Tabbara Road • Watt Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Mario-Cabbage Tree Road (section crossing over the Emu Creek) is inundated. Depths range from 0.8-1.2m, with 1-2m/s velocity. This section is identified as extreme hazard to adults and children. • Flood waters overtop Huxters Road due to low-lying adjacent farmland. Flood depths up to 1.2m are observed, with flow velocity between 1-2m/s. Extreme hazard is daintified for both adults and children. • James Road is inundated from approximately 700m south of Princes Highway. Flood depths are reaching 1.2m in most inundated parts. Negligible flow velocity observed, low to high hazard for children and adults. • Sandy Flat Road is inundated with flood depths up to 1.2m, with negligible flood velocity. Low hazard for both adults and children. • South part of the Nixons Road is inundated. Flood depths up to 0.8m is observed, flow velocity is restricted between 0-1m/s. A low to medium flood hazard for adults is identified. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 1.2m, low hazard for both adults and children despite the significant flood depths. An inundation is also found 800m south of Webbs Track. Flood depths reach up to 1.2m, with negligible flow velocity. Low hazard is identified. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 1.2m are observed with flow velocity in between 1-2m/s. A medium to high hazard is identified. • Buchan-Orbost Road is inundated on most part of it. With serious inundation occurs from its intersection from 1600m north of its intersection with Bete Bolong Road till 1400m southeast of the intersection along the Snowy River. Flood depths up to 1.2m are observed with a velocity reaches 1-2m/s. A low to extreme hazard is identified for adults and children. • Watt Road is inundated (south of Orbost connecting with Buchan-Orbost Road). Flood depths reach 0.8-1.2m with flood velocity in between 1-2m/s. A medium to high hazard is identified for adults and children. • Pinces Highway (the section that passes across the Snowy River to 2km south of Orbost) is inundated with flood depths up to 1.2m. The flood velocity at this section is high to reach 3m/s on the bridge, with extreme hazard identified at this section. • Marlo Road is partly inundated with up to 0.3-0.5m water depths in most parts of the Road, however, an up to 1.2m water depths is identified at the section that run across the Brodribb River. The velocity is negligible, medium to extreme hazard is identified for adults and children. • Jarrahmond Road is inundated (northern section facing towards Spring Creek) with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • Nicholson Street, Forest Road and Lochiel Street are inundated (at the very north end of Nicholson Street) with up to 1.2m flood depths. The flood velocity is between 1-2m/s with extreme hazard identified. • Lochend Road is partly inundated with up to 0.5m flood depths. The flood velocity is negligible. Low to extreme hazard are identified along the road. • Bete Bolong Road is partly inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Beach Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Old Marlo Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified at north side of the road. • Old Station Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. A low hazard is identified along the rd.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		General Floodplain Behaviour: • The floodplain areas begin to be inundated by overflow over Lynn's Gulch from 2 hours, backflow from the B Drain at 3 hours and Gilbert's Gulch from 4 hours after the start of event. The Brodribb River begins to overflow from around 7 hours after the start of event. Local inflows begin to affect the floodplains around 9 hours after the start of event. • The Jarrahmond floodplain is rapidly flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. General overbank flows also occur from the Snowy River to the south from around 8 hours after the start of event. Flood levels peak around 21 hours after the start of event and Lynn's Gulch stops overtopping at 76 hours after the start of event. • The Bete Bolong levee begins to overtop at 17 hours and continues until 30 hours after the start of event, contributing to inundation in the Bete Bolong floodplain. The Jarrahmond levee overtops from 14 to 38 hours after the start of event. • Flood waters overtop the Orbost-Buchan road into Paten's floodplain from 8 hours after the start of event. • Flow occurs across the meander neck from 7 to over 77 hours after the start of event. • Watts and Ashby's Gulches begin to overtop around 8 hours after the start of event and continue until 75 hours after the start of event. The Jarrahmond floodplain also receives local inflows, and widespread overflows from the Snowy River (beginning around 7 hours after the start of event), until over 77 hours after the start of event. Flood levels peak at around 22 hours after the start of event. • Overflow occurs over the Snowy River bank into the Icy Creek floodplain from 5 hours until over 77 hours after the start of event. • The Young's Creek floodplain fills from Gilbert's Gulch overflows from 4 hours, then from general overtopping of the Snowy River bank from 8 hours after the start of event. The flood level peaks at around 23 to 34 hours after the start of event in the Young's Creek floodplain. General overbank flows and overtopping of Gilbert's Gulch continue until over 77 hours after the start of event. • The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 36 hours after the start of event.	
9.4m	0.2% AEP	**Properties likely impacted (45 in total)** • Inundation up to 1.2m deep within the entire farmland at Bete Bolong. Up to 3m/s flow velocity observed, high to extreme hazard identified at the northwestern side for children and adults. • Two properties on Nixons Road are inundated. Flood depths up to 0.8m are identified, with flow velocity remaining negligible. A medium hazard is identified for some parts of this property. • Five properties along Huxters Road to Jarrahmond Road are inundated, with flood depths reaching 1.2m. Flow velocity is observed to be between 2-3m/s over several of these properties, with a high hazard identified for adults and children. • One property on 100m west of Forest Road on B Road is inundated. Flood depths up to 1.2m with negligible flow velocity. A low hazard is observed. • Two buildings on 453 Buchan-Orbost Road are inundated. Flood depths up to 1.2m are observed to inundate the buildings, while the primary residence remains out of the flood extent. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 0-1m/s. Low to medium hazard is identified. • Four properties along Lochend Road are inundated between Princes Highway and Lake Road. Flood depths reach 1.2m along some sections, with a low to high hazard identified for both adults and children.	**Assistance may be required for:** • Owners of farmland at Bete Bolong and Orbost. • Forest Park • Orbost Snowy Caravan Park • Lochiel Street Reserve **Road closure signs provided by the road authority for:** • B Road • Beach Road • Bete Bolong Road • Birkins Road • Bouchers Lane

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• 13 properties along Marlo Road (between Princes Highway and Brodribb River) are inundated. Flood depths reach 1.8m for some of these properties, with flow velocities between 2-3m/s in some parts. An extreme hazard is identified for both adults and children. • Two properties along Gargans Lane become inundated, with flood depths greater than 1.2m observed. An extreme hazard is identified for both of these properties. • Two properties 1,100m northwest of Huxters Road on B Road is inundated. Flood depths up to 1.2m are observed with negligible flow velocity. A medium to high hazard is identified for adults and children. • One property near the junction between Jarrahmond Road and Duggans Road becomes inundated. Flow depths up to 1.2m are identified, while flow velocity remains negligible. A low hazard is identified for both adults and children. • Four properties located at the intersection of Nicholson Street and Lochiel Street are likely to be inundated by flood with depths up to 1.2m. Negligible velocity is found. Medium to extreme hazard is identified. • One property on 275 Buchan-Orbost Road is inundated. Flood depths up to 0.8m are observed to inundate the buildings. Flow velocities are maintained between 1-2m/s. Medium to high hazard is identified. • One property on 213 Buchan-Orbost Road is inundated. Flood depths up to 0.8m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 2-3m/s. Medium to extreme hazard is identified. • One property on 28 Watt Road is inundated. Flood depths up to 0.8m are observed to inundate the buildings. Flood water along this property's driveway mean it will become isolated. Flow velocities are maintained between 2-3m/s. Low to high hazard is identified. • Two properties along the Birkins Road are likely to be inundated with flow depths up to 1.2m., with negligible velocity and low to medium hazard. • One property at 512 B Road is inundated with flood up to 1.2m. The velocity is up negligible. A low hazard is observed. • Two properties south of the Princes Highway close to the Irvines Road are inundated with flood depths up to 1.2m. The flood velocity is negligible and low hazard is identified. **Community infrastructure likely impacted** • Forest Park is inundated, with flood depths reaching up to 1.2m and negligible flow velocity. A moderate hazard is identified for a small section of this park. • The Lochiel Street Reserve becomes partially inundated with flood depths reaching 0.3m. Flow velocity is negligible, and a low hazard is identified for both adults and children. **Tourism/recreation likely impacted** • The Orbost Snowy Caravan Park becomes inundated, with flood depths reaching 1.2m. Flow velocity is negligible, with a low hazard identified for both adults and children. **Roads Inundated (roads in bold red are DTP operated roads)** • Gargans Lane is completely flooded. Flow depths over 1.2m are observed at all parts of the road. Flow velocity is negligible, and an overall low hazard. Flow velocity is generally within 0 -1 m/s range, with a small section south down the Princes Highway with a high velocity up to 2-3m/s. Extreme hazard is identified. • Griebenows Road is completely flooded. Flow depths over 1.2m are observed over much of the road reserve. Flow velocity is negligible, and an overall extreme hazard is identified.	• Buchan - Orbost Road • Burn Road • Corringle Road • Forest Road • Gargans Lane • Griebenows Road • Gunns Road • Healeys Road • Huxters Road • Jarrahmond Road • James Road • Lochend Road • Lochiel Street • Lynns Road • Marlo - Cabbage Tree Road • Marlo Road • Nicholson Street • Nixons Road • Old Marlo Road • Old Station Road • Princes Highway • Sandy Flat Road • Tabbara Road • Watt Road

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Corringle Road (at the Marlo Coast Reserve boat ramp and back 7.5km) is largely inundated. Inundation with flood depths up to 1.2m in depth, with flow velocity maintained between 0-1m/s. A medium hazard for children and adults. • All roads on the west farmland to Orbost are inundated with up to 1.2m flood depths. Including B Road, Trewin Lane, Bouchers Lane, Nixons Road and Huxters Road are found with high flood velocity in between 1-2m/s, with other roads flood velocity less than 1m/s. Medium to extreme hazard is identified in this area. • Birkins Road is completely inundated. Flood waters pool in this area with flood depths up to 1.2m. Negligible flow velocity observed, medium hazard for children and adults. • Healeys Road (at intersection with Cabbage Tree Creek) is inundated because of the creek. Depths reaching 1.2m with negligible flow velocity. High to extreme hazard. • Mario-Cabbage Tree Road (section crossing over the Emu Creek) is inundated. Depths range from 0.8-1.2m, with 1-2m/s velocity. This section is identified as extreme hazard to adults and children. • James Road is inundated from approximately 700m south of Princes Highway. Flood depths are reaching 1.2m in most inundated parts. Negligible flow velocity observed, high to extreme hazard for children and adults. • Sandy Flat Road is inundated with flood depths up to 1.2m, with negligible flood velocity. Low hazard for both adults and children. • Tabbara Road (300m north of Webbs Track) is inundated. Flood depths reach 1.2m, low hazard for both adults and children despite the significant flood depths. An inundation is also found 800m south of Webbs Track. Flood depths reach up to 1.2m, with negligible flow velocity. Low hazard is identified. • Burn Road is inundated just north of the East Gippsland Rail Trail. Flood depths up to 1.2m are observed with flow velocity in between 1-2m/s. A medium to high hazard is identified. • Buchan-Orbost Road is inundated on most part of it. With serious inundation occurs from its intersection from 1600m north of its intersection with Bete Bolong Road till 1400m southeast of the intersection along the Snowy River. Flood depths up to 1.2m are observed with a velocity reaches 1-2m/s. A low to extreme hazard is identified for adults and children. • Watt Road is inundated (south of Orbost connecting with Buchan-Orbost Road). Flood depths reach 0.8-1.2m with flood velocity in between 1-2m/s. A medium to high hazard is identified for adults and children. • Pinces Highway (the section that passes across the Snowy River to 2km south of Orbost) is inundated with flood depths up to 1.2m. The flood velocity at this section is high to reach 3m/s on the bridge, with extreme hazard identified at this section. • Marlo Road is partly inundated with up to 0.3-0.5m flood depths in upstream section, however, an up to 1.2m water depths is identified at the 5km downstream Orbost to the section that runs across the Brodribb River. The velocity is 1-2m/s in the most seriously impacted section, high to extreme hazard is identified for adults and children. • Part of the Jarrahmond Road and Gunns Road are inundated (northern section facing towards Spring Creek) with up to 1.2m flood depths. The flood velocity is negligible with a low hazard identified. • Nicholson Street, Forest Road and Lochiel Street are inundated (at the very north end of Nicholson Street) with up to 1.2m flood depths. The flood velocity is between 1-2m/s with extreme hazard identified. • Lochend Road is partly inundated with up to 0.8m flood depths. The flood velocity is negligible. Low to extreme hazard are identified along the road. • Bete Bolong Road is partly inundated with up to 1.2m flood depths. The flood velocity is negligible. A low hazard is identified along the road.	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Beach Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified along the road. • Old Marlo Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. An extreme hazard is identified at north side of the road. • Old Station Road is inundated with up to 1.2m flood depths. The flood velocity is negligible. A low hazard is identified along the road. **General Floodplain Behaviour:** • The floodplain areas begin to be inundated by overflow over Lynn's Gulch from 2 hours, backflow from the B Drain at 3 hours and Gilbert's Gulch from 4 hours after the start of event. The Brodribb River begins to overflow from around 7 hours after the start of event. Local inflows begin to affect the floodplains around 9 hours after the start of event. • The Jarrahmond floodplain is rapidly flooded from both directions (Lynn's Gulch and B Drain) while receiving local inflows from Major, Spring and Wall Creeks. General overbank flows also occur from the Snowy River to the south from around 4 hours after the start of event. Flood levels peak around 21 hours after the start of event and Lynn's Gulch remains overtopping until more than 63 hours after the start of event. • The Bete Bolong levee begins to overtop at 16 hours and continues until 48 hours after the start of event, contributing to inundation in the Bete Bolong floodplain. The Jarrahmond levee overtops from 12 to 44 hours after the start of event. • Flood waters overtop the Orbost-Buchan road into Paten's floodplain from 5 hours after the start of event. • Flow occurs across the meander neck from 6 to over 63 hours after the start of event. • Watts and Ashby's Gulches begin to overtop around 7 hours after the start of event and continue until over 63 hours after the start of event. The Jarrahmond floodplain also receives local inflows, and widespread overflows from the Snowy River (beginning around 6 hours after the start of event), until over 63 hours after the start of event. Flood levels peak at around 22 hours after the start of event. • Overflow occurs over the Snowy River bank into the Icy Creek floodplain from 5 hours until over 63 hours after the start of event. • The Young's Creek floodplain fills from Gilbert's Gulch overflows from 4 hours, then from general overtopping of the Snowy River bank from 7 hours after the start of event. The flood level peaks at around 23 to 34 hours after the start of event in the Young's Creek floodplain. General overbank flows and overtopping of Gilbert's Gulch continue until over 63 hours after the start of event. • The floodplain areas to the east of Young's Creek are affected by flood flows from Young's Creek as well as the Brodribb River and local inflows. • The estuarine floodplain areas experience flooding due to the backwater effect of the ocean water level and narrow entrance channel. The peak water level occurs at Marlo around 36 hours after the start of event.	
11.80m @ Jarrahmond#	1978 Flood Level Peak	**Event summary** • Estimated to be a 1% AEP event, the 1978 flood caused significant overland flooding and saw much of the land west of Orbost completely inundated. Southern parts of the Orbost township were inundated, including Forest Park and the Orbost Snowy River Caravan Park. The vast majority of the roads listed in the Major and 1% AEP flood classes were inundated during this event. • Many properties along the Snowy River (including those along Lochend Road and Marlo Road) became inundated, with flood water reaching 1.2m in some cases. Much of Corringle Road was inundated, and the	

Gauge Height (m)	Flood Class or Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		boat ramp leading into Marlo Coast Reserve became inaccessible. Key infrastructure within the Orbost and Marlo townships remained dry. • The Princes Highway was inundated along several sections between Newmerella and Orbost. Buchan-Orbost Road was also mostly inundated past this road's intersection with Bete Bolong Road. This effectively restricted access to Orbost from the south.	

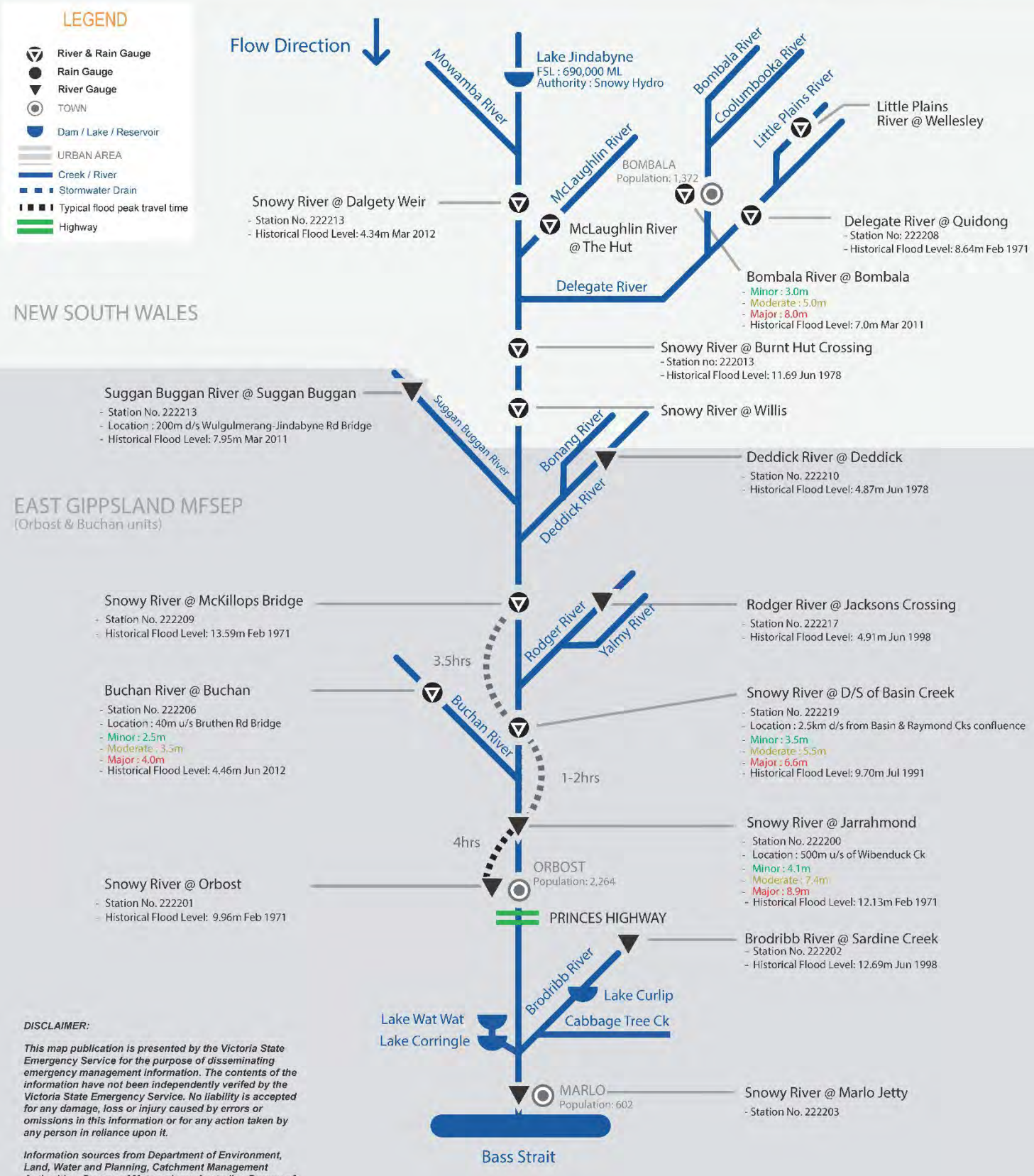
Table A4.5 – Breakdown of likely consequences at various Jarrahmond gauge level heights along Snowy River with operational considerations

 # Event gauge height estimated based on rating table from WMIS. Discharge taken from 2017 Snowy River Flood Risk Report.

^ *Based on discharge from 2017 Snowy River Flood Risk Report.*

Snowy River Catchment Schematic

Version 4 - October 2024



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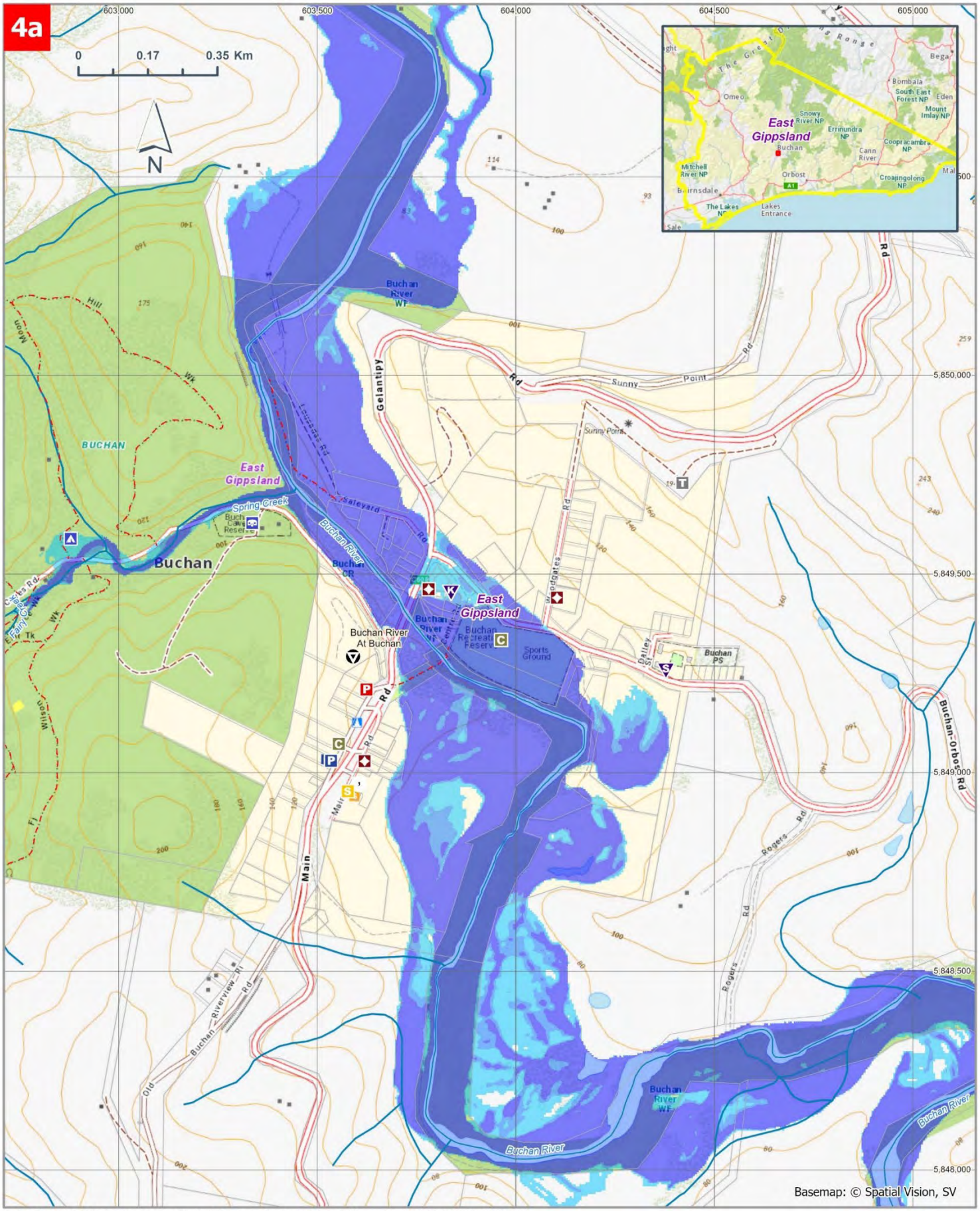
Information sources from Department of Environment, Land, Water and Planning, Catchment Management Authorities, Bureau of Meteorology, Australian Bureau of Statistics, Municipal Flood Emergency Plans.

Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE.

Schematic Not To Scale



Buchan River Study 2017. Completed by East Gippsland Catachment Management Authortiy. Map produced by VICSES: 10/07/2024 9:48 AM

East Gippsland Shire

1% AEP (100yr ARI) Flooding

4a. Buchan River

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Property Boundary
- Waterbody
- Municipal / Shire Boundary
- Waterway
- Bicycle / Walking Trail

Bureau of Meteorology Gauge

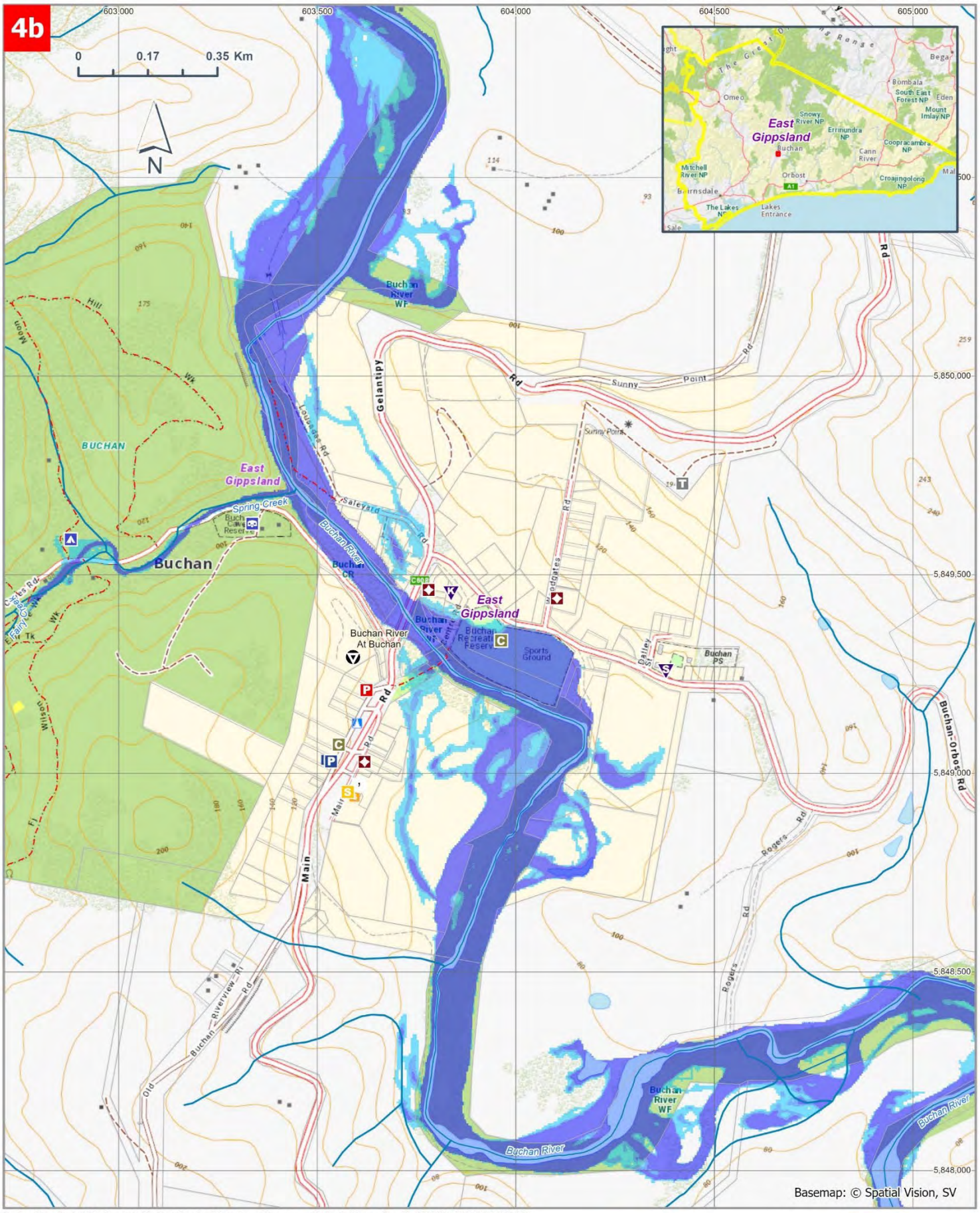
- Water Level & Rain
- Camp Ground
- Child Care / Kindergarten
- Community Venue
- Education Facility
- Emergency Coordination Centre
- Fire Station
- Place Of Worship
- Police Station
- Quarantine Facility
- SES Unit
- Telephone Exchange
- Caravan Park
- Building

1% AEP Flood Depth

- Up to 30cm
- Between 30cm and 50cm
- Greater than 50cm

SES

VICTORIA State Government



Buchan River Study 2017. Completed by East Gippsland Catachment Management Authortiy. Map produced by VICSES: 10/07/2024 9:48 AM

East Gippsland Shire

10% AEP (10yr ARI) Flooding

4b. Buchan River

LAND USE

- Residential
- Commercial and Business
- Industrial
- Public Parks / Cemeteries / Recreation
- Utilities and Local Government Facilities
- Education

- Property Boundary
- Waterbody
- Municipal / Shire Boundary
- Waterway
- Bicycle / Walking Trail

Bureau of Meteorology Gauge

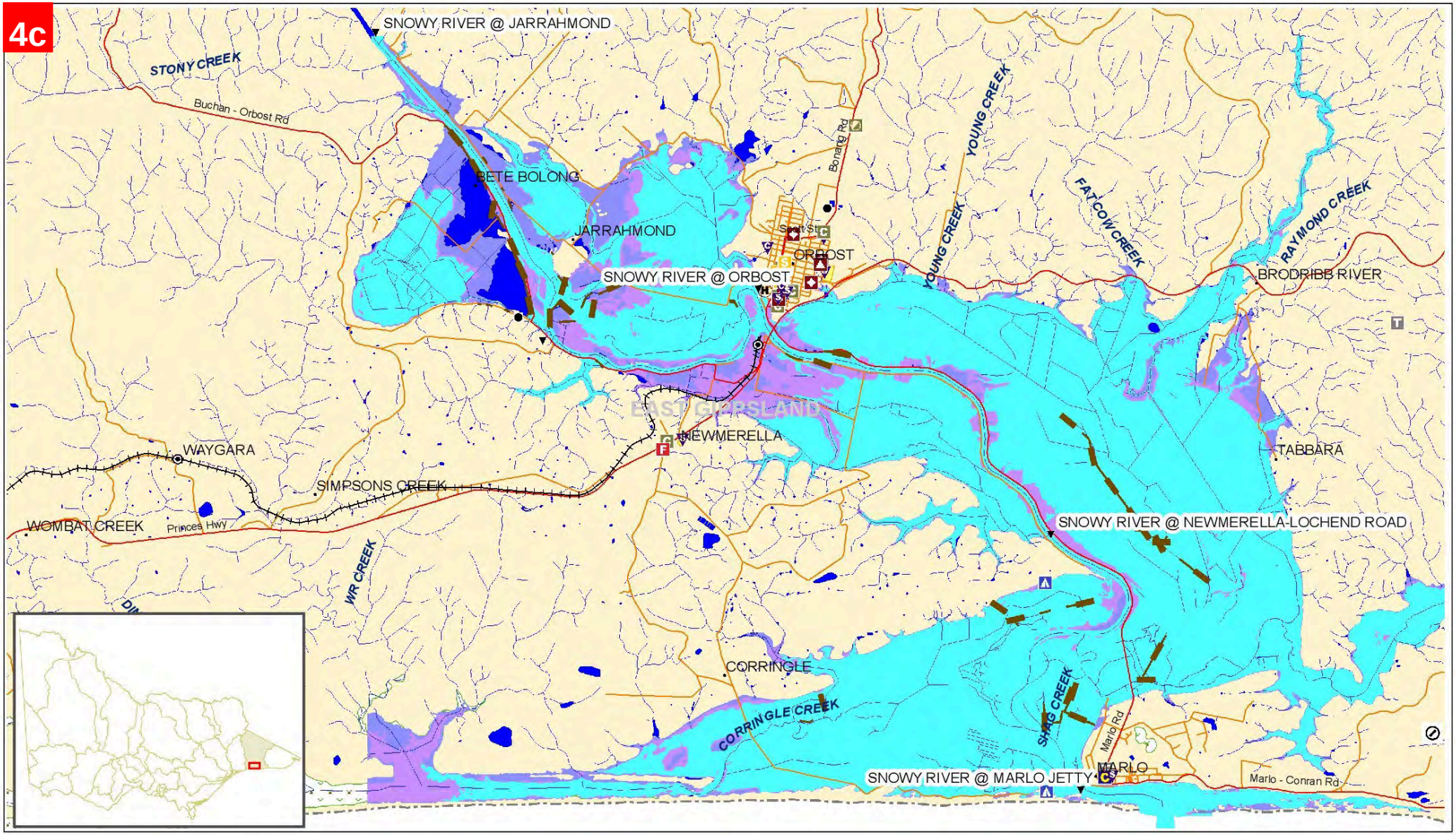
- Water Level & Rain
- Camp Ground
- Child Care / Kindergarten
- Community Venue
- Education Facility
- Emergency Coordination Centre
- Fire Station
- Place Of Worship
- Police Station
- Quarantine Facility
- SES Unit
- Telephone Exchange
- Caravan Park
- Building

10% AEP Flood Depth

- Up to 30cm
- Between 30cm and 50cm
- Greater than 50cm

SES

VICTORIA State Government



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APPENDIX A5 – FLOOD INFORMATION FOR THE TAMBO and NICHOLSON RIVER CATCHMENT

Catchment Description

Tambo River

The Tambo Valley includes the entirety of the Tambo Basin, including the Tambo River, Nicholson River and Boggy Creek, along with the communities of Omeo and Benambra who are part of the Tambo Valley community and East Gippsland Shire, but are situated in the Livingstone Creek and Mitta Mitta River catchments in the Upper Murray Basin.

The Tambo River starts on the southern slopes of the Great Dividing Range about 20 km east of Benambra and flows south into Lake King, part of the Gippsland Lakes, and then into Bass Strait.

Initially there are two branches of the river – one beginning in the Bowen Mountains and the other (called the South Branch) on the slopes of Mt Bindi. Around Bindi where the Tambo River @ Bindi BoM gauge is located, the river channel is about 5 m in width.

From the junction of the two branches, the river flows from the mountains north of Swifts Creek and flows generally south through the Tambo Valley to Bruthen. In the Swifts Creek and Ensay region, the river is up to 12 m wide, with deep pools of up to 140 cm.

The Tambo Valley from the locality of Bindi to just south of Ensay is relatively open and flat, however it closes into steep forested mountains then opens out once more into fertile river flats north of Bruthen. In the steep forest sections between Ensay and Bruthen, the channel width is up to 20 m. Between Bruthen and Tambo Upper the channel width exceeds 25 m, but with a summer depth typically less than 50 cm.

Beyond the flood plain at Bruthen, the river narrows and deepens and is confined by sandstone escarpments. Below Swan Reach, the river enters the coastal plain, eventually flowing into Lake King in the Gippsland Lakes system.

The Tambo River has a number of significant tributaries, with the two largest being the Little River which enters the Tambo from the north at Ensay, and the Timbarra River which enters the Tambo from the east, south-east of Tambo Crossing The Tambo River South Branch, which originates on the Nunniong Plains in the hills east of Bindi, flows north to join the main river near its origin The Tambo also has a number of more seasonal creeks entering along its length, including Swifts Creek which enters from the west at the town of Swifts Creek, Haunted Stream which enters from the west to the north of Tambo Crossing, with other minor tributaries including Junction Creek, Deep Creek and Dead Horse Creek.

Nicholson River

The Nicholson River lies between the Mitchell and the Tambo Rivers. It has a length of 72.5 kms. The Nicholson River begins in the Angora Range at Marthavale west of Ensay. It flows south-east passing through the Nicholson River Reservoir, and the small town of Nicholson before passing through the estuarine reach and entering Lake King at Jones Bay.The Nicholson River catchment has an area of approximately 450 km^2.

Six tributaries flow into the Nicholson River: - Barmouth Creek, Navigation Creek, Store Creek, Black Snake Creek, Nicholson Creek and Yahoo Creek.

Catchment Schematic

Figure A5.1 provides a schematic of the river system, main tributaries, and gauge locations.

Flood Peak Travel Times

Flood peaks along the Tambo and Nicholson River catchments are complex and there may be multiple peaks experienced, due to the inflows of tributaries and location of rainfall concentration. A 2016 study undertaken by Water Technology (Hof, Tate. & Cook) captures historical and modelled data, which has been summarised into the information tables following.

Typical travel times

Location from	Location to	Typical travel time	Flood class level	Comments
Timbarra River				
Timbarra River @ Downstream Wilkinson Creek	Tambo River @ Downstream Ramrod Creek	Between 3 and 7 hours	Unspecified larger flood events	
Tambo River				
Tambo River @ Swifts Creek	Tambo River @ Downstream Ramrod Creek	Between 4 and 7 hours	Unspecified larger flood events	

Table A5.1 – Typical flood peak travel times for the Tambo & Nicholson River Catchment.

Historical travel times

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class
Tambo River				
June 1998	Tambo River @ Swifts Creek	Tambo River @ D/S Ramrod Creek	0.5 hrs	1.2% AEP
October 1993			8 hours	-
November 1988			2.5 hours	3.3% AEP
2012			5.25 hours	

Table A5.2 – Historical flood peak travel times for the Tambo & Nicholson River Catchment.

General descriptions and timings during large flood events

Event description	Timings
Start of rain to the start of flooding on the floodplain	10-15 hours
Start of rain to peak flood level	24-30 hours
Time between high flows being detected at the Timbarra River @ Downstream Wilkinson Creek gauge and the first signs of flooding within the floodplain	5-8 hours
Travel time from just upstream of Bruthen to the first areas of the floodplain to be flooded	< 1 hour
Flood levels in the Tambo River just upstream of Bruthen, due to contributions from the catchment downstream of Swifts Creek	Peak earlier or same time as Swifts Creek
Water quickly begins to pool in the downstream floodplain with increased flood depth and inundation extent extending northwards into the floodplain because once capacity of the Tambo River at Tambo Upper is exceeded, the extent and depth of flooding experienced in the lower floodplain is controlled by the volume of the flood event rather than the peak flow.	

Event description	Timings
The river remains confined in the reaches between Tambo Upper and Swan Reach.	
Downstream of Swan Reach, low lying areas on either side of the river are inundated. Many of these areas lie below the Lake King 5% AEP flood level and are also likely to be inundated from high water levels within Lake King.	
Mossiface Road floods approximately 8 hours following the peak at the Tambo River @ Battens Landing gauge.	8 hours

Table A5.3 – General flood descriptions and timings during large flood events in the Tambo & Nicholson River Catchment.

Relative flood peaks

This table should be read from left to right, e.g. in 2007 the Timbarra River @ Downstream Wilkinson Creek river gauge peaked 4 hours before the Tambo River @ Swifts Creek gauge OR in July 2011 the Tambo River @ Downstream Ramrod Creek gauge peaked 6 hours 30 minutes after the Haunted Stream @ Hells Gate gauge.

Flood Event	Reference (gauge)	Timing of peak	Relative to (gauge)	Flood Class
Timbarra River				
1998	Timbarra River @ Downstream Wilkinson Creek	-4 hours 18 mins	Tambo River @ Swifts Creek	1.2% AEP
2007		-4 hours		
July 2011		-7 hours		
August 2011		4 hours 15 minutes		
2012		-5 hours 15 minutes		
Haunted Stream				
1998	Haunted Stream @ Hells Gate	6 hours 31 minutes	Timbarra River @ Downstream Wilkinson Creek	1.2% AEP
2007		-15 minutes		
July 2011		45 minutes		
August 2011		-30 minutes		
2012		3 hours		
1998	Haunted Stream @ Hells Gate	2 hours 13 minutes	Tambo River @ Swifts Creek	1.2% AEP
2007		-4 hours 15 minutes		
July 2011		-6 hours 15 minutes		
August 2011		-45 minutes		
2012		-2 hours 15 minutes		
Ramrod creek				
1998	Tambo River @ Downstream Ramrod Creek	22 minutes	Tambo River @ Swifts Creek	1.2% AEP
2007		-1 hours 15 minutes		
July 2011		15 minutes		
August 2011		4 hours 45 minutes		
2012		1 hours 30 minutes		
1998	Tambo River @ Downstream Ramrod Creek	4.67 hours	Timbarra River @ Downstream Wilkinson Creek	1.2% AEP
2007		2 hours 45 minutes		
July 2011		7 hours 15 minutes		
August 2011		30 minutes		

Flood Event	Reference (gauge)	Timing of peak	Relative to (gauge)	Flood Class
2012		6 hours 45 minutes		
1998	Tambo River @ Downstream Ramrod Creek	-1 hours 52 minutes	Haunted Stream @ Hells Gate	1.2% AEP
2007		3 hours		
July 2011		6 hours 30 minutes		
August 2011		5 hours 30 minutes		
2012		3 hours 45 minutes		

Table A5.4 – Relative flood peaks for the Tambo & Nicholson River Catchment.

Warnings and Gauges

The Bureau of Meteorology currently provides flood forecasts for the Tambo River via the Tambo River @ D/S Of Ramrod Creek gauge (Table A5.5).

Additional gauges for the catchment area are detailed in table A5.6.

Gauge	River/creek flood class level		
	Minor	Moderate	Major
Tambo River @ D/S Of Ramrod Creek	4.1 m	6.9 m	10.0 m

Table A.5.5 – Gauges with established Flood Class Levels within the Tambo River Catchment

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge
Tambo River @ U/S Of Smith Creek	223214	-36.955 °S 147.928 °E (WGS84)	✓	✓
Tambo River @ Bindi (Near Junction Creek)	223208	-37.160°S 147.774°E (AGD66)	✓	✓
Tambo River @ Swifts Creek	223202	-37.269°S 147.729°E (WGS84)	✓	✓
Tambo River @ D/S Of Ramrod Creek	223205	-37.673°S 147.870°E (WGS84)	✓	
Tambo River @ Battens Landing	223209	-37.757°S 147.849°E (WGS84)	✓	
Rain Gauge (Tambo River) @ Mt Elizabeth Helipad	223801	-37.486°S 147.926°E (WGS84)		✓
Timbarra River @ D/S Of Wilkinson Creek	223212	-37.446°S 148.063°E (WGS84)	✓	
Nicholson River @ Pump House	223217	-37.751°S 147.727°E (GDA94)	✓	

Table A5.6 – Gauges within and relevant to the Tambo River catchment within East Gippsland.

These Gauges may provide some warning of expected flooding. It is advised that residents monitor the Bureau of Meteorology's website http://www.bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website https:/emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Flood mitigation

There are several limited public levees constructed on the Lower Tambo floodplain however, it is noted that ownership and maintenance information is unknown. As they do not hold a formal flood mitigation role, they cannot be relied upon to provide mitigation during larger flood events.

There are no known levees or flood works along the Nicholson River.

Flood improvement works have been undertaken around Lakes Entrance, including dredging and aqueduct installation which aims to improve flooding by reducing the frequency of floods.

Flood Consequences

Riverine Flood Risk

Floods are a regular occurrence on the Tambo River flats, with minor events occurring every year or so, but sometimes more frequently. During these minor events, a large part of the low-lying area surrounding the river is inundated with floodwater spreading across the floodplain to Mossiface at the site of the former river course. This can isolate rural properties. Major events usually result from heavy rain across the whole catchment and are less frequent but can occur.

Areas around Nowa Nowa on Boggy Creek are subject to inundation including the Recreation Reserve and the boat ramp and carpark.

Road closures do not pose a threat of isolation to the towns in the area due to the availability of alternate routes except in extreme circumstances although the Great Alpine Road between Bruthen and Omeo can be cut due to riverine flooding or landslip.

Flash Flooding

Omeo, Benambra, Cassilis, Brookville, and Swifts Creek are identified as having a flash flood risk due to rapid river rises that can occur after significant rainfall in the upper catchments.

Properties at Flood Risk

Properties with a flood risk are identified in the Flood Intelligence Card following. For privacy reasons exact addresses are omitted from this plan, however this information is available to the IC through FloodZoom for the purpose of community notification and evacuation advice as required.

As more intelligence becomes available, the identified properties may change and will be updated in future revisions of this plan.

Flood Intelligence Card

A summary of flood consequences for the Tambo River is provided in the flood intelligence card (table A5.7) following.

Maps and Schematics

Maps showing the inundation expected in the Lower Tambo River catchment during a 1% and 10% (Map 5a) AEP flood event is supplied following the flood intelligence card.

Local flood information

A Local Flood Guide for Mossiface through to Swan Reach is available at https://www.ses.vic.gov.au/plan-and-stay-safe/flood-guides

During consultation additional local knowledge for the Tambo River was captured. Where this does not align with the flood intelligence cards, this information is summarised below.

- Storm surges in conjunction with strong southerly winds can prevent the river flowing out.
- Stevensons Road at the Fred Albert Bridge can be subject to long term impacts from scouring and damage to culverts during sustained major flooding.

FLOOD INTELLIGENCE CARD – TAMBO RIVER @ D/S RAMROD CREEK GAUGE, 223205

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it. ***Scan the QR code for the current levels for this gauge.***

LOCATION:	Access via 200m down Evans Track off Great Alpine Road
CURRENT LEVEL:	BOM
STREAM:	Tambo River
GAUGE NUMBER:	223205
GAUGE ZERO:	15.452m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**N/A**
MINOR:	**4.1m**
MODERATE:	**6.9m**
MAJOR:	**10.0m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**11.96m (June 1998)**

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
4.1m	**Minor Flood Level**		
6.9m	**Moderate Flood Level**		
9.15m **(77,800 ML/d)**	10% AEP Flood Level	**Properties likely impacted (12 properties in total)** • One property at the Curtis Lane perpendicular turn is isolated. Flood waters in excess of 1.2m inundate farm land and access roads surrounding the property. Extreme hazard flooding occurs on this property. • One property off Sardine Flat Road is inundated. Flood depths up to 0.8m reach buildings on this property. It is unknown whether these depths excess the building floor levels. Negligible flow velocity is identified and an overall low hazard level occur. • Two properties off Reynolds Road are inundated. These are the two properties closest to the Tambo River delta with Lake King. Flood depths up to 1.2m are identified with medium hazard flooding occurring. It is unknown whether above floor flooding occurs. • Eight properties at the intersection between Reynolds Road, Tambo Boulevard and Linton Way become inundated. Flood depths up to 0.8m are identified, with negligible flow velocity shown. Low flood hazard occurs. It is unknown whether this inundation exceeds the buildings floor level. **Community infrastructure likely impacted** • Swan Reach Primary School observes minor inundation of school grounds along the south western boundary. Flood depths reach 1.2m, with negligible flow velocity identified. A low hazard level is shown.	**Sandbagging may be required for:** • One property off Sardine Flat Road • Two properties off Reynolds Road • Eight properties at the intersection between Reynolds Road, Tambo Boulevard and Linton

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads inundated (roads in bold red are DTP operated roads) • **Great Alpine Road is inundated 375m east of Station Road with flood depths reaching 0.3m. Flow velocity is negligible and low hazard flooding occurs.** • Curtis Lane and Hoffmans Lane are both mostly inundated with flood depths in excess of 1.2m. Flow velocity is between 0-1m/s, and extreme hazard flooding occurs. Several buildings along these roads are inundated/isolated as a result. • Swan Reach Road is inundated approximately 150m north of Baines Road. Flood waters are in excess of 1.2m, with flow velocity up to 3m/s in one area. Extreme hazard flooding occurs along this section of the road. • Stephenson Road and Tambo Upper Road experience inundation at their intersection. Flood depths up to 1.2m are identified, with flow velocity in excess of 3m/s and an extreme flood hazard level occurs on Stephenson Road. A further section of Stephenson Road is inundated approx. 400m from this intersection. • Tambo Upper Road experiences significant inundation between Stephenson Road and Kelly Creek, with flood depths in excess of 1.2m highlighted for much of this section. Flow velocity reaches 2m/s for some parts of this road, with extreme hazard flooding occurring. A 900m section of this road becomes inundated north of Princes Highway. • Metung Road is inundated between Princes Highway and Neals Road. Flood depths up to 1.2m are shown, with flow velocities up to 2m/s. High hazard flooding occurs. • Sardine Flat Road is mostly inundated. Flood depths are in excess of 1.2m, with negligible flow velocity identified. High hazard flooding occurs.along this road. • The northern-most part of Punt Road is inundated. Flood depths up to 1.2m are identified with negligible flow velocity. Low hazard flooding occurs. • Reynolds Road is inundated at its intersection with Tambo Boulevard. Minor flood depths up to 0.3m are identified with negligible flow velocity. Low hazard flooding occurs.	**Road closure signs provided by the road authority for:** • Great Alpine Road • Curtis Lane • Hoffmans Lane • Swan Reach Road • Stephensons Road • Tambo Upper Road • Metung Road • Sardine Flat Road • Punt Road • Reynolds Road
9.52m **(24.97m AHD*)** **(105,400 ML/d)**	5% AEP Flood Level	**Properties likely impacted (19 properties in total)** • One property at the Curtis Lane perpendicular turn is inundated. Flood waters in excess of 1.2m inundate buildings, with negligible flow velocity observed. Low hazard flooding occurs on this property. Farm land and access roads surrounding the property are also inundated. Extreme hazard flooding occurs on the surrounding land. It is unknown whether flood water is above floor level. • One property off Sardine Flat Road is inundated. Flood depths up to 1.2m reach buildings on this property. It is unknown whether these depths exceed the floor level. Negligible flow velocity is identified and overall low hazard category flooding occurs. • Five properties off Reynolds Road are inundated. These are properties closest to the Tambo River delta with Lake King. Flood depths up to 1.2m are identified with overall medium hazard flooring occurring. It is unknown whether flooding exceeds the floor level. • Ten properties at the intersection between Reynolds Road, Tambo Boulevard and Linton Way become inundated. Flood depths up to 0.8m are identified, with negligible flow velocity shown. A low flood hazard level is prescribed. It is unknown whether this inundation exceeds the buildings floor level. • One property on Great Alpine Road (opposite Bowie Street) is inundated with flood depths up to 0.3m. Flow velocity is negligible and a low hazard level is identified. • One property at near the intersection of Old Orbost Road and School Road is threatened with flood waters in excess of 1.2m reaching the property boundary. **Community infrastructure likely impacted** • Swan Reach Primary School observes minor inundation of school grounds along the southern boundary. Flood depths reach 1.2m, with negligible flow velocity identified. Low hazard flooding occurs.	**Sandbagging may be required for:** • One property at the Curtis Lane perpendicular turn • One property off Sardine Flat Road • Five properties off Reynolds Road • Ten properties at the intersection between Reynolds Road, Tambo Boulevard and Linton • One property on Great Alpine Road (opposite Bowie Street)

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads inundated (roads in bold red are DTP operated roads) • **Great Alpine Road is inundated, with a 300m section east of Station Road reaching 0.3m. Flow velocity is negligible and low hazard flooding occurs.** • Curtis Lane and Hoffmans Lane are both mostly inundated with flood depths in excess of 1.2m. Flow velocity is between 0-1m/s, and extreme hazard flooding occurs. Several buildings along these roads are inundated/isolated as a result. • Swan Reach Road is inundated approximately 150m north of Baines Road. Flood waters are in excess of 1.2m over a 500m section, with flow velocity up to 3m/s in one area. An extreme flood hazard exists for this section of the road. • Stephenson Road and Tambo Upper Road experience inundation at their intersection. Flood depths in excess of 1.2m are identified, with flow velocity in excess of 3m/s and an extreme hazard level identified for Stephenson Road. A further section of Stephenson Road is inundated approx. 400m from this intersection. • Tambo Upper Road experiences significant inundation between Stephenson Road and Kelly Creek, with flood depths in excess of 1.2m highlighted for much of this section. Flow velocity reaches 2m/s for some parts of this road, with an extreme flood hazard level identified. A 900m section of this road becomes inundated north of Princes Highway. • **Metung Road is inundated between Princes Highway and Neals Road. Flood depths up to 1.2m are shown, with flow velocities up to 2m/s. A high flood hazard level is identified.** • Sardine Flat Road is mostly inundated. Flood depths are in excess of 1.2m, with negligible flow velocity identified. A high hazard level exists for this road. • The northern-most part of Punt Road is inundated on the southern side of Tambo River. Flood depths up to 1.2m are identified with negligible flow velocity. An overall low hazard level is identified. Similar flooding is observed at the section of Punt Road on the opposite side of the river. • Reynolds Road is inundated at its intersection with Tambo Boulevard. Flood depths up to 0.8m are identified with negligible flow velocity. Low hazard flooding occurs.	**Road closure signs provided by the road authority for:** • Great Alpine Road • Curtis Lane • Hoffmans Lane • Swan Reach Road • Stephensons Road • Tambo Upper Road • Metung Road • Sardine Flat Road • Punt Road • Reynolds Road
10.0m	**Major Flood Level**	*Local knowledge indicated the Bruthen Caravan Park will flood at the Major flood level.*	**Assistance may be required for*:*** • *Bruthen Caravan Park*
10.99m **(26.44m AHD*)** **(140,700 ML/d)**	2% AEP Flood Level	**Properties likely impacted (24 properties in total)** • One property at the Curtis Lane perpendicular turn is inundated. Flood waters in excess of 1.2m inundate buildings, with negligible flow velocity observed. A low hazard level is provided for this property. Farm land and access roads surrounding the property are also inundated. An extreme hazard level exists for the surrounding land. It is unknown whether flood water exceeds floor levels. • One property off Sardine Flat Road is inundated. Flood depths up to 1.2m reach buildings on this property. It is unknown whether these depths excess the buildings' FFLs. Negligible flow velocity is identified and overall low hazard flooding occurs. • Nine properties off Reynolds Road are inundated. These are properties closest to the Tambo River delta with Lake King. Flood depths up to 1.2m are identified with medium hazard flooding occurring. It is unknown whether the flooding exceeds building floor levels.. • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton Way become inundated. Flood depths up to 0.8m are identified, with negligible flow velocity shown. Low hazard flooding occurs. It is unknown whether this inundation exceeds the buildings floor level. • One property on Great Alpine Road (opposite Bowie Street) is inundated with flood depths up to 0.3m. Flow velocity is negligible and low hazard flooding occurs. • One property at near the intersection of Old Orbost Road and School Road is threatened with flood waters, with depths in excess of 1.2m occurring at the property boundary.	**Assistance may be required for:** • Bruthen Recreation Reserve **Sandbagging may be required for:** • One property at the Curtis Lane perpendicular turn • One property off Sardine Flat Road • Nine properties off Reynolds Road • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton • One property on Great Alpine Road (opposite Bowie Street) • Bruthen Recreational Reserve

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Community infrastructure likely flooded • Swan Reach Primary School observes minor inundation of school grounds along the southern boundary. Flood depths reach 1.2m, with negligible flow velocity identified. A low hazard level is shown. • Bruthen Recreation Reserve (including the oval and netball facilities) is inundated with flood depths up to 0.8m. Negligible flow velocity is shown and a low hazard category is shown. **Roads Inundated (roads in bold red are DTP operated roads)** • **Great Alpine Road is inundated, with a 300m section east of Station Road reaching 0.3m. Flow velocity is negligible and a low hazard flooding occurs.** • Curtis Lane and Hoffmans Lane are both mostly inundated with flood depths in excess of 1.2m. Flow velocity is between 0-1m/s, but an extreme hazard level is identified. Several buildings along these roads are inundated/isolated as a result. • Swan Reach Road is inundated approximately 150m north of Baines Road. Flood waters are in excess of 1.2m over a 500m section, with flow velocity up to 3m/s in one area. An extreme flood hazard exists for this section of the road. • Stephenson Road and Tambo Upper Road experience inundation at their intersection. Flood depths in excess of 1.2m are identified, with flow velocity in excess of 3m/s and an extreme hazard level identified for Stephenson Road. A further section of Stephenson Road is inundated approx. 400m from this intersection. • Tambo Upper Road experiences significant inundation between Stephenson Road and Kelly Creek, with flood depths in excess of 1.2m highlighted for much of this section. Flow velocity reaches 2m/s for some parts of this road, with an extreme flood hazard level identified. A 900m section of this road becomes inundated north of Princes Highway. • **Metung Road is inundated between Princes Highway and Neals Road. Flood depths up to 1.2m are shown, with flow velocities up to 2m/s. High hazard flooding occurs.** • Sardine Flat Road is mostly inundated. Flood depths are in excess of 1.2m, with negligible flow velocity identified. High hazard flooding occurs on this road. • The northern-most part of Punt Road is inundated on the southern side of Tambo River. Flood depths up to 1.2m are identified with negligible flow velocity. An overall low hazard level is identified. Similar flooding is observed at the section of Punt Road on the opposite side of the river. • Reynolds Road is inundated at its intersection with Tambo Boulevard. Flood depths up to 0.8m are identified with negligible flow velocity. Low hazard flooding occurs.	**Road closure signs provided by the road authority for:** • Great Alpine Road • Curtis Lane • Hoffmans Lane • Swan Reach Road • Stephensons Road • Tambo Upper Road • Metung Road • Sardine Flat Road • Punt Road • Reynolds Road
11.96m **(147,600 ML/d)**	1998 Flood Level Peak	**Event summary** • The largest flood on record at the gauge (predicted 1.2% AEP) • Great Alpine Road was severely impacted with numerous sections undermined and completely closed to traffic. • Downstream of Bruthen, the floodplain was completely inundated and large volumes of sediment were released into the sea. • The highest amount of rainfall was shown to occur east of Bruthen. • Waterway management has been highlighted by the community as a primary concern when this flood occurred.	
11.96m **(27.41m AHD*)** **(165,700 ML/d)**	1% AEP Flood Level	**Properties likely impacted (28 properties in total)** • One property at the Curtis Lane perpendicular turn is inundated. Flood waters in excess of 1.2m inundate buildings, with negligible flow velocity observed. A low hazard level is provided for this property. Farm land	**Assistance may be required for:** • Bruthen Recreation Reserve

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		and access roads surrounding the property are also inundated. An extreme hazard level exists for the surrounding land. It is unknown whether flood water exceeds floor levels. • One property off Sardine Flat Road is inundated. Flood depths in excess of 1.2m reach buildings on this property. It is unknown whether these depths excess the buildings' FFLs. Negligible flow velocity is identified, with an overall high hazard category shown. • Nine properties off Reynolds Road are inundated. These are properties closest to the Tambo River delta with Lake King. Flood depths in excess of 1.2m are identified with an overall high hazard level identified. It is unknown whether these flood depths inundate the buildings. • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton Way become inundated. Flood depths up to 0.8m are identified, with negligible flow velocity shown. A low flood hazard level is prescribed. It is unknown whether this inundation exceeds the buildings' FFL. • One property on Great Alpine Road (opposite Bowie Street) is inundated with flood depths up to 0.3m. Flow velocity is negligible, and a low hazard level is identified. • One property at near the intersection of Old Orbost Road and School Road is threatened, with flood waters in excess of 1.2m reaching the property boundary. • Four properties on Main Street in Bruthen (24-38) are inundated. Flow depths up to 0.8m are shown for one property, while the remaining properties observe minor flooding up to 0.3m. Much of this flooding may only affect the backyards of these properties. It is unknown whether flood levels exceed FFLs. Negligible flow velocity is identified, and a low hazard category is shown. • Three properties along School Road in Swan Reach are inundated with flood depths up to 0.8m reaching backyards. Flow velocity is between 0-1m/s and an overall low hazard category is identified. **Community infrastructure likely impacted** • Swan Reach Primary School observes minor inundation of school grounds along the southern boundary. Flood depths reach 1.2m, with negligible flow velocity identified. A low hazard level is shown. • Bruthen Recreation Reserve (including the oval and netball facilities) is inundated with flood depths up to 0.8m. Negligible flow velocity is shown and a low hazard category is identified. **Roads inundated (roads in bold red are DTP operated roads)** • **Great Alpine Road is inundated between Station Road and Main Street, with flow depths reaching 0.8m. Flow velocity is negligible and a low hazard level is identified.** • Curtis Lane and Hoffmans Lane are both mostly inundated with flood depths in excess of 1.2m. Flow velocity is between 0-1m/s, but an extreme hazard level is identified. Several buildings along these roads are inundated/isolated as a result. • Swan Reach Road is inundated approximately 150m north of Baines Road. Flood waters are in excess of 1.2m over a 500m section, with flow velocity up to 3m/s in one area. An extreme flood hazard exists for this section of the road. • Stephenson Road and Tambo Upper Road experience inundation at their intersection. Flood depths in excess of 1.2m are identified, with flow velocity in excess of 3m/s and an extreme hazard level identified for Stephenson Road. A further section of Stephenson Road is inundated approx. 400m from this intersection. • Tambo Upper Road experiences significant inundation between Stephenson Road and Kelly Creek, with flood depths in excess of 1.2m highlighted for much of this section. Flow velocity reaches 2m/s for some parts of this road, with an extreme flood hazard level identified. A 900m section of this road becomes inundated north of Princes Highway.	**Sandbagging may be required for:** • One property at the Curtis Lane perpendicular turn • One property off Sardine Flat Road • Nine properties off Reynolds Road • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton • One property on Great Alpine Road (opposite Bowie Street) • Bruthen Recreational Reserve • Four properties on Main Street in Bruthen (24-38) • Three properties along School Road **Road closure signs provided by the road authority for:** • Great Alpine Road • Curtis Lane • Hoffmans Lane • Swan Reach Road • Stephensons Road • Tambo Upper Road • Metung Road • Sardine Flat Road • Punt Road • Reynolds Road • Bruthen-Nowa Nowa • Princes Highway

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• **Metung Road is inundated between Princes Highway and Neals Road. Flood depths up to 1.2m are shown, with flow velocities up to 2m/s. A high flood hazard level is identified.** • Sardine Flat Road is mostly inundated. Flood depths are in excess of 1.2m, with negligible flow velocity identified. A high hazard level exists for this road. • The northern-most part of Punt Road is inundated on the southern side of Tambo River. Flood depths up to 1.2m are identified with negligible flow velocity. An overall low hazard level is identified. Similar flooding is observed at the section of Punt Road on the opposite side of the river. • Reynolds Road is inundated at its intersection with Tambo Boulevard. Flood depths up to 0.8m are identified with negligible flow velocity. Low hazard flooding occurs.. • Bruthen-Nowa Nowa Road is minorly inundated at the Bruthen Recreation Reserve, with depths up to 0.3m observed. Flow velocity is negligible along this 50m stretch of road, and an overall low hazard category is identified. • **Princes Highway is minorly inundated south of Swan Reach Primary School, with depths up to 0.3m observed. Flow velocity is negligible, and a low hazard category is identified.**	
12.80m **(28.25m AHD*)** **(189,000 ML/d)**	0.5% AEP Flood Level	**Properties likely impacted (28 properties in total)** • One property at the Curtis Lane perpendicular turn is inundated. Flood waters in excess of 1.2m inundate buildings, with negligible flow velocity observed. A low hazard level is provided for this property. Farm land and access roads surrounding the property are also inundated. An extreme hazard level exists for the surrounding land. It is unknown whether flood levels exceed floor level. • One property off Sardine Flat Road is inundated. Flood depths in excess of 1.2m reach buildings on this property. It is unknown whether these depths exceeds the building floor level. Negligible flow velocity is identified, with an overall extreme hazard category shown. • Nine properties off Reynolds Road are inundated. These are properties closest to the Tambo River delta with Lake King. Flood depths in excess of 1.2m are identified with an overall high hazard level identified. It is unknown whether flooding is above floor in these buildings. • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton Way become inundated. Flood depths up to 0.8m are identified, with negligible flow velocity shown. A low flood hazard level is prescribed. It is unknown whether this inundation exceeds floor levels. • One property on Great Alpine Road (opposite Bowie Street) is inundated with flood depths up to 1.2m. Flow velocity reaches 2m/s in some parts, and a high hazard level is identified. • One property at near the intersection of Old Orbost Road and School Road is threatened, with flood waters in excess of 1.2m reaching the property boundary. • Four properties on Main Street in Bruthen (24-38) are inundated. Flow depths up to 0.5m are shown for all properties. This flooding extends on to the road. It is unknown whether flood levels exceed FFLs. Flow velocity is between 0-1m/s and a low hazard category is identified. • Three properties along School Road in Swan Reach are inundated with flood depths up to 0.8m reaching backyards. Flow velocity is between 0-1m/s and an overall low hazard category is identified. **Community infrastructure likely impacted** • Swan Reach Primary School observes minor inundation of school grounds along the southern boundary. Flood depths are in excess of 1.2m, with negligible flow velocity identified. Low hazard flooding occurs. • Bruthen Recreation Reserve (including the oval and netball facilities) is inundated with flood depths up to 1.2. Negligible flow velocity is shown and high hazard flooding occurs in some parts of the facility.	**Assistance may be required for:** • Bruthen Recreation Reserve **Sandbagging may be required for:** • One property at the Curtis Lane perpendicular turn • One property off Sardine Flat Road • Nine properties off Reynolds Road • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton • One property on Great Alpine Road (opposite Bowie Street) • Bruthen Recreational Reserve • Four properties on Main Street in Bruthen (24-38) • Three properties along School Road **Road closure signs provided by the road authority for:** • Great Alpine Road • Curtis Lane • Hoffmans Lane • Swan Reach Road • Stephensons Road

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads inundated (roads in bold red are DTP operated roads) • **Great Alpine Road is inundated between Station Road and Main Street, with flow depths reaching 1.2m. Flow velocity is negligible and low hazard flooding occurs.** • Curtis Lane and Hoffmans Lane are both completely inundated with flood depths in excess of 1.2m. Flow velocity reaches 2m/s in some parts, and an extreme hazard level is identified. Several buildings along these roads are flooded as a result. • Swan Reach Road is inundated approximately 150m north of Baines Road. Flood waters are in excess of 1.2m over a 500m section, with flow velocity up to 3m/s in one area. An extreme flood hazard exists for this section of the road. • Stephenson Road and Tambo Upper Road experience inundation at their intersection. Flood depths in excess of 1.2m are identified, with flow velocity in excess of 3m/s and an extreme hazard level identified for Stephenson Road. A further section of Stephenson Road is inundated approx. 400m from this intersection. • Tambo Upper Road experiences significant inundation between Stephenson Road and Kelly Creek, with flood depths in excess of 1.2m highlighted for much of this section. Flow velocity reaches 2m/s for some parts of this road, with an extreme flood hazard level identified. A 900m section of this road becomes inundated north of Princes Highway. • **Metung Road is inundated between Princes Highway and Neals Road. Flood depths up to 1.2m are shown, with flow velocities up to 2m/s. A high flood hazard level is identified.** • Sardine Flat Road is mostly inundated. Flood depths are in excess of 1.2m, with negligible flow velocity identified. An extreme hazard level exists for this road. • The northern-most part of Punt Road is inundated on the southern side of Tambo River. Flood depths up to 1.2m are identified with negligible flow velocity. An extreme hazard level is observed on either side of the river. Similar flooding is observed at the section of Punt Road on the opposite side of the river. • Reynolds Road is inundated at its intersection with Tambo Boulevard. Flood depths up to 1.2m are identified with negligible flow velocity. A high hazard level is identified for one small area near the intersection. • Bruthen-Nowa Nowa Road is minorly inundated at the Bruthen Recreation Reserve, with depths up to 0.5m observed. Flow velocity is negligible along this 50m stretch of road, with a moderate hazard level shown for one small section. • **Princes Highway is minorly inundated south of Swan Reach Primary School, with depths up to 0.5m observed. Flow velocity is negligible, and a low hazard category is identified.**	• Tambo Upper Road • Metung Road • Sardine Flat Road • Punt Road • Reynolds Road • Bruthen-Nowa Nowa • Princes Highway
35.07m **(50.52m AHD*)**	PMF	**Properties likely impacted (150 properties in total)** • One property at the Curtis Lane perpendicular turn is inundated. Flood waters in excess of 1.2m inundate buildings, with negligible flow velocity observed. A low hazard level is provided for this property. Farm land and access roads surrounding the property are also inundated. An extreme hazard level exists for the surrounding land. It is unknown whether flood water enter buildings. • One property on Great Alpine Road (opposite Bowie Street) is inundated with flood depths up to 1.2m. Flow velocity reaches 2m/s in some parts, and a high hazard level is identified. • Three properties along School Road in Swan Reach are inundated with flood depths up to 0.8m reaching backyards. Flow velocity is between 0-1m/s and an overall low hazard category is identified. • Two properties on Pilgrims Road are inundated by depths exceeding 1.2m. At the peak of the event, six properties are isolated by flood depths over Pilgrims Road by depths up to 1.2m, velocities up to 2m/s, and high hazard.	**Assistance may be required for:** • Bruthen Recreation Reserve **Sandbagging may be required for:** • One property at the Curtis Lane perpendicular turn • One property off Sardine Flat Road • Nine properties off Reynolds Road • 11 properties at the intersection between Reynolds Road, Tambo Boulevard and Linton • One property on Great Alpine Road (opposite Bowie Street)

Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• 43 properties in the centre of Bruthen are now subject to inundation, inundating blocks between Main Street to King Street, with depths exceeding 1.2m. High hazard levels are noted, with velocities up to 2m/s. • 24 properties on Bruthen-Nowa Nowa Road are inundated by depths up to 1.2m. High hazard levels are noted within the area, with velocities up to 2 m/s. • Inundation breaks out of the Tambo River to the North over Great Alpine road inundating Station Road, Mill Street, Donelly Street, Stock Street, Brooks Road, and Philip street, inundating 24 properties, isolating properties within the area with no road access or egress. Depth reach exceeding 1.2m, with high hazard levels on access routes. • Tambo River breaks out into Wiseleigh, inundating Dawson Street, Barkly Street, Giles Street, and MacAlister Street, inundating 17 properties with depths up to 1.2m. One property is on MacAllister Street is isolated from inundation crossing MacAllister Street reaching exceed 1.2m. High hazard levels are noted within the area. • 2 properties on Curtis Lane at the intersection of Curtis Lane and Swan Reach Road is inundated by depths that exceed 1.2, and two properties are inundated on Swan Reach Road by depths exceeding 1.2m. Furthermore, as this inundation extends across Swan Reach Road, 29 additional properties are isolated as access routes are impacted by depths exceeding 1.2m, with velocities up to 3m/s and high hazard levels. • Two properties on Jennings Road experience flood depths exceeding 1.2m, with velocities from 1-2m/s. • Tambo Upper Road is inundated by depths exceeding 1.2m from the intersection of Tambo Upper Road and Cunningham Road to the intersection of Tambo Upper Road and Bruthen-Nowa Nowa. 8 Properties near the intersection of Tambo Upper Road and Jennings Road, 2 properties near Birdie Creek, and 9 properties immediately south of Tambo Upper Primary School. Four additional properties are inundated by depths that exceed 1.2m near Cunningham Court. • The Tambo River breaks its banks over Killarney Dr with depths that exceed 1.2m, inundating 7 properties on Limestone View, and 2 properties on McMeekins Road. This inundation additionally isolates the 21 properties within the area, as depths exceed 1.2m, velocities that exceed 4m/s, with high hazard levels that impact access routes via Tambo Upper Road. • At the crossing of Princes Highway over Tambo River, inundation breaks out to the west and east with depths up to that exceed 1.2m. 5 properties on Old Orbost Road, 11 Properties on School Road, 8 properties on Redenbach Ct, 10 properties on Princes Highway, 2 property on Georges Terrace, and 2 properties on Duffy Street. • From the intersection of Metung Road and Sardine Flat Road to the intersection of Princes Highway and Metung Road, inundation impacts Metung Road with depths that exceed 1.2m, impacting 11 properties, and isolating a further 6 properties as depths exceeding 1.2m, velocities up to 2m/s, and high hazard levels impacting access and egress routes. • 4 properties on Howlers Lane are isolated by depths that exceed 1.2m on Princes Highway, with velocities up to 3-4m/s and high hazard levels • One property off Cornwalls Road near Stock Creek is isolated by depths that exceed 1.2m on Cornwalls Road, noting high hazard levels. • Tambo River breaks out into Johnsonville with depths that exceed 1.2m, inundating 5 properties on Punt Road, 6 properties on Clues Road, and 5 properties on Bolding Ct. • South of Johnsonville, the tambo river breaks out and crosses northeast to southwest following Punt Road, Reynolds Road, and Tambo Boulevard, with inundation that exceeds 1.2m, velocities up to 4m/s, and high hazard levels. 5 properties on Punt Road, 17 properties on Reynolds Road, 6 properties on Linton Way, 37 properties on Tambo Boulevard. While not directly inundated, an additional 3 properties on Reynolds Road, and 12 properties on Punt Road are isolated.	• Bruthen Recreational Reserve • Four properties on Main Street in Bruthen (24-38) • Three properties along School Road • One property on Stephenson Road. • Ten properties on Swan Reach Road • Ten properties on Upper Tambo Road • Four properties on Redenbach Court • Four properties on Old Orbost Road **Road closure signs provided by the road authority for:** • Great Alpine Road • Curtis Lane • Hoffmans Lane • Swan Reach Road • Stephenson Road • Tambo Upper Road • Metung Road • Sardine Flat Road • Punt Road • Reynolds Road • Bruthen-Nowa Nowa • Princes Highway • Station Road • Brooks Road • Donelly Street • Mill Street • Station Road • Stock Street • Phillip Street • Kennedy Court • Deep Creek Road • Dawson Street • Barkly Street • Gils Street • Old Orbost Road • Duffy Street • Normans Road • Tambo Boulevard • Deep Creek Road

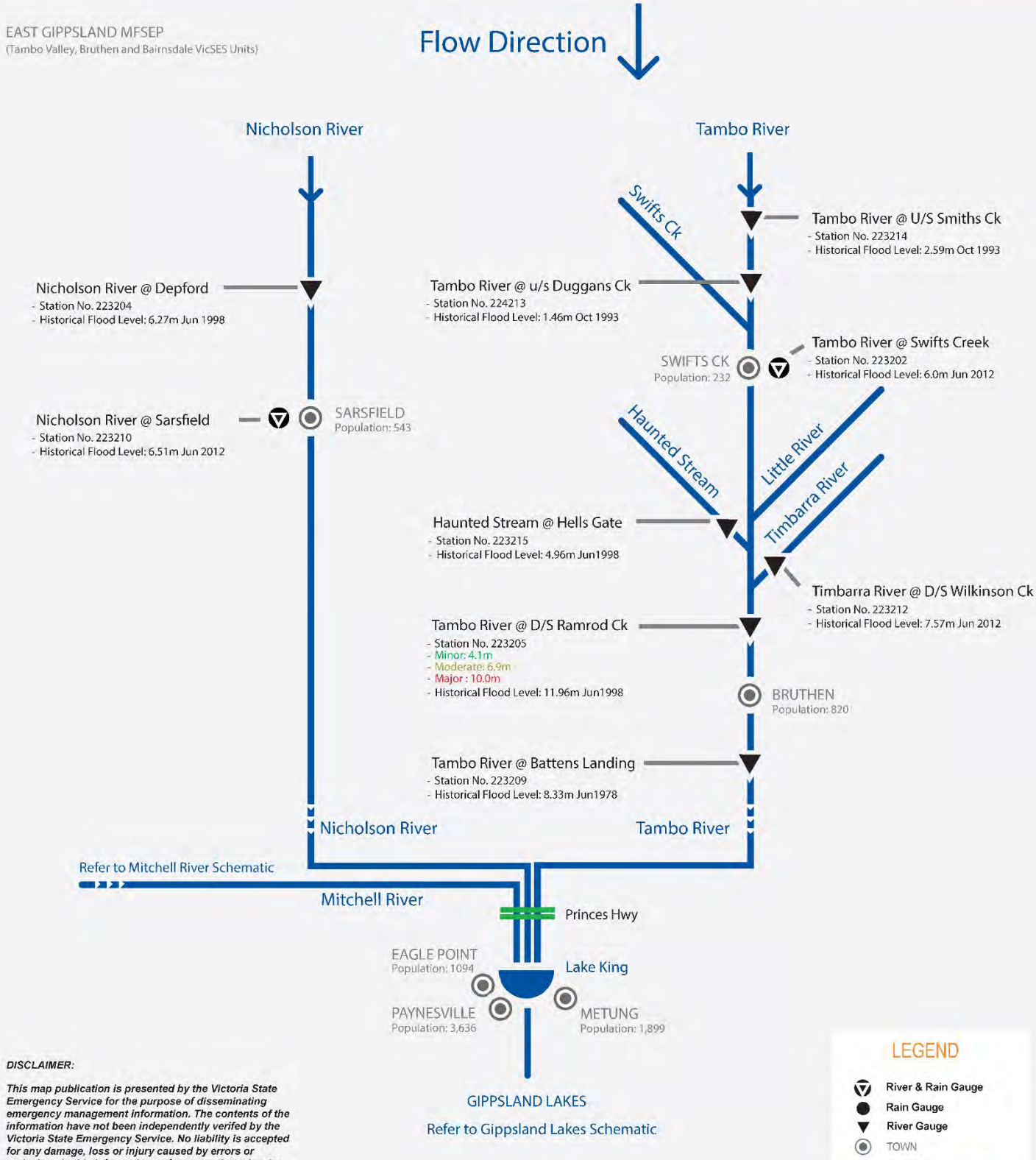
Gauge Height (m)	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Community infrastructure likely impacted • Swan Reach Primary School observes high inundation, with flood depths are in excess of 1.2m, with negligible flow velocity identified. A high hazard level is shown. • Bruthen Recreation Reserve (including the oval and netball facilities) is inundated with flood depths that exceed 1.2m. Negligible flow velocity is shown and a high hazard is identified. • Tambo Upper Primary School is updated by depths that exceed 1.2m, and is isolated from road and walking access, velocities from 1-2m/s, and high hazard levels. • Swan Reach Recreation Reserve is completely inundated by depths that exceed 1.2m, with flows up to 2m/s, and high hazard **Roads inundated (roads in bold red are DTP operated roads)** • **Great Alpine Road is inundated between Station Road and Main Street, with flow depths reaching 1.2m. Flow velocity is negligible and a low hazard level is identified.** • Curtis Lane and Hoffmans Lane are both completely inundated with flood depths in excess of 1.2m. Flow velocity reaches 2m/s in some parts, and an extreme hazard level is identified. Several buildings along these roads are flooded as a result. • Swan Reach Road is inundated approximately 150m north of Baines Road. Flood waters are in excess of 1.2m over a 500m section, with flow velocity up to 3m/s in one area. An extreme flood hazard exists for this section of the road. • Stephenson Road and Tambo Upper Road experience inundation at their intersection. Flood depths in excess of 1.2m are identified, with flow velocity in excess of 3m/s and an extreme hazard level identified for Stephenson Road. A further section of Stephenson Road is inundated approx. 400m from this intersection. • Tambo Upper Road experiences significant inundation between Stephenson Road and Kelly Creek, with flood depths in excess of 1.2m highlighted for much of this section. Flow velocity reaches 2m/s for some parts of this road, with an extreme flood hazard level identified. A 900m section of this road becomes inundated north of Princes Highway. • **Metung Road is inundated between Princes Highway and Neals Road. Flood depths up to 1.2m are shown, with flow velocities up to 2m/s. A high flood hazard level is identified.** • Sardine Flat Road is mostly inundated. Flood depths are in excess of 1.2m, with negligible flow velocity identified. An extreme hazard level exists for this road. • The northern-most part of Punt Road is inundated on the southern side of Tambo River. Flood depths up to 1.2m are identified with negligible flow velocity. An extreme hazard level is observed on either side of the river. Similar flooding is observed at the section of Punt Road on the opposite side of the river. • Reynolds Road is inundated at its intersection with Tambo Boulevard. Flood depths up to 1.2m are identified with negligible flow velocity. A high hazard level is identified for one small area near the intersection. • Bruthen-Nowa Nowa Road is minorly inundated at the Bruthen Recreation Reserve, with depths that exceed 1.2m is observed. Flow velocity is negligible along this 50m stretch of road, with a a high hazard level shown. • **Princes Highway is minorly inundated south of Swan Reach Primary School, with depths up to 0.5m observed. Flow velocity is negligible, and a low hazard category is identified.**	• Church Street • Bowie Street

Table A5.7 – Breakdown of likely consequences at various Ramrod gauge level heights along Tambo River with operational considerations

** Gauge levels are extracted directly from Lower Tambo WSE grids at the gauge location.*

Tambo & Nicholson River Catchment Schematic

Version 3 - October 2024



DISCLAIMER:

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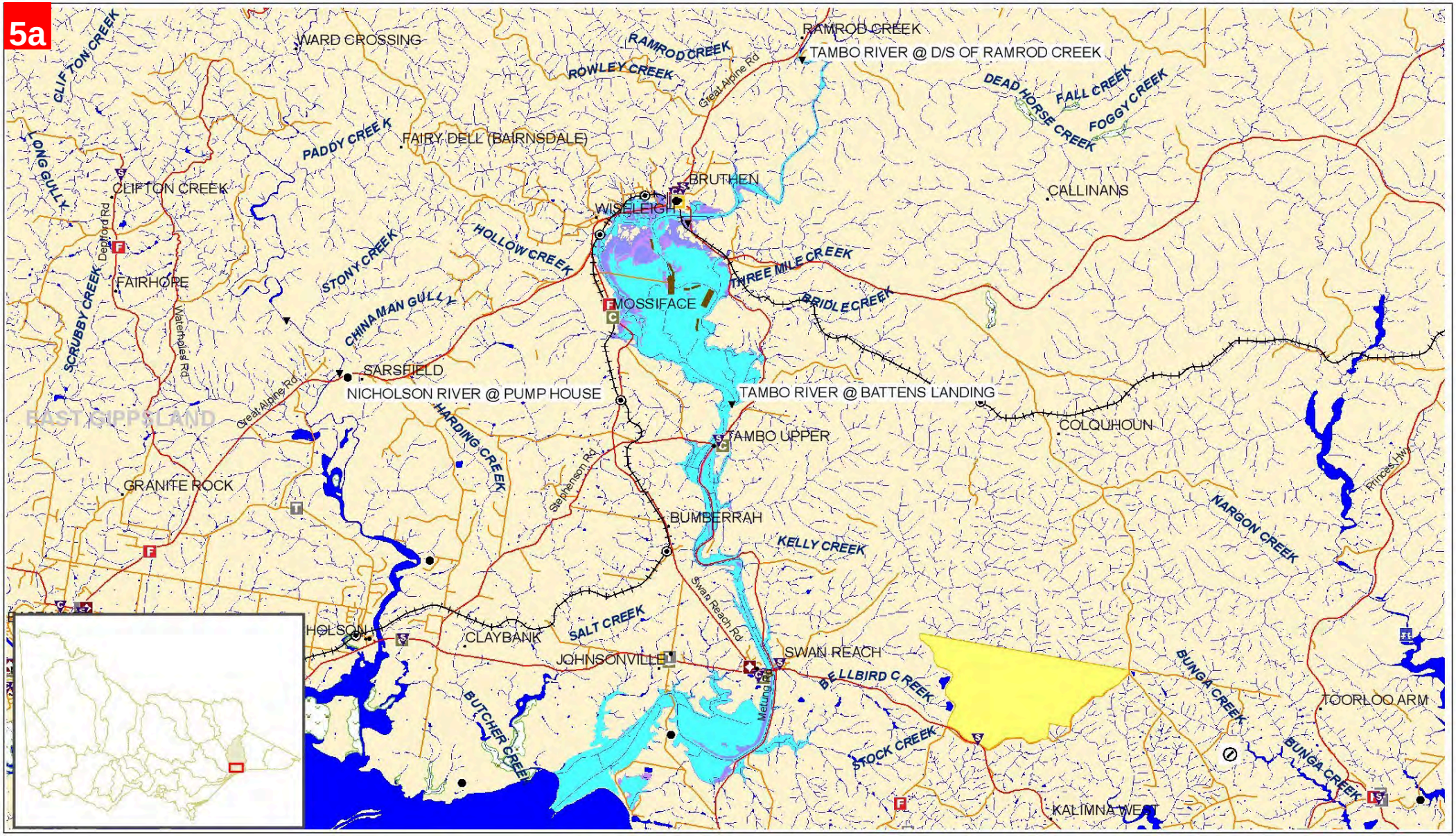
Information sources from Department of Environment, Land, Water and Planning, Catchment Management Authorities, Bureau of Meteorology, Australian Bureau of Statistics, Municipal Flood Emergency Plans.

Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE.

Schematic Not To Scale



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APPENDIX A6 – FLOOD INFORMATION FOR THE MITCHELL RIVER CATCHMENT

Catchment Description

The Mitchell River has a large catchment of approximately 4,500 km^2 and flows south from the Great Dividing Range near Mt Hotham to the Gippsland Lakes downstream of Bairnsdale. The main tributaries in the upper reaches of the basin are the Wonnangatta River originating near Mt Howitt; the Dargo, Crooked & Wongungarra Rivers originating at Mt Hotham; & the Moroka River originating at Mt Wellington.

The Upper-mid reaches of the catchment flow through the Wellington Shire LGA.

Upper Catchment (Wellington LGA)

Areas above the confluence of the Wonnangatta & Dargo Rivers are generally public land, steep and mountainous with water travelling long distances with a good flow rate. Apart from the township of Dargo on the Dargo River, the area is sparsely populated.

There are no river gauges upstream of the township of Dargo (on the Dargo River) or the locality of Crooked River (on the Wonnangatta River) and there is no warning of impending flooding available to the people in and around Dargo. Dargo flooding is based on rainfall at Mt Hotham, much of which may fall into the catchment of the Ovens, Kiewa or Mitta Mitta Rivers rather than the Mitchell River catchment.

Mid Catchment

The Wentworth River is an unmonitored tributary which joins the Mitchell upstream of Glenaladale. There are several sizable creeks, also unmonitored, downstream from Glenaladale (e.g. Iguana, Boggy, Clifton, Flaggy, Prospect & Stony Creeks). In widespread severe rain events, or when heavy rain affects the floodplain, these can rise quickly causing localised flooding & considerable contribution to Mitchell River flows.

Just north of Glenaladale, the river breaks out into the expansive floodplain spreading out into river flats around Lindenow. Floodwaters travel slowly with large gullies traversing the floodplain having a major influence on the distribution of floodwaters. The township of Lindenow is raised above the floodplain but there are many rural landholdings and houses on the floodplain itself. For upper catchment rain, there is capacity to provide around 15 hrs warning time to these areas although farmers are generally well versed in when to move their irrigation infrastructure and stock. Any warning of flooding caused by rainfall in the mid-catchment tributaries can only be achieved by monitoring the Bullumwaal rainfall gauge.

Lower Catchment

Downstream of Lindenow, through to Bairnsdale the edge of the floodplain is very clearly defined by a steep escarpment and in significant events, floodwaters inundate most of the floodplain.

At Bairnsdale the floodplain contracts and the river winds around the town and flows under the Princes Highway near Howitt Park, covering many low-lying roads and paths. The natural narrowing of the floodplain, together with the Princes Highway and railway bridge embankments form a major constriction to the floodplain. There is a high velocity to floodwaters around this area during flood events, which causes substantial infrastructure damage during significant floods.

Immediately downstream of Bairnsdale, the flow patterns are controlled by high natural levees with adjacent natural surface levels being considerably lower. When the river capacity is exceeded, flows break out at a high velocity across the natural levees to the low ground beyond into Macleods Morass to the west and the headwaters of Jones Bay to the East.

Catchment Schematic

Figure A6.1 provides a schematic of the river system, main tributaries, and gauge locations.

Flood Peak Travel Times

A 2019 study undertaken by Water Technology captures historical and modelled data, which has been summarised into the information tables following.

Typical travel times

Location from	Location to	Typical travel time	Flood class level	Comments
Wonnangatta River				
Wonnangatta River @ Waterford	Mitchell River @ Glenaladale	Approximately 10 hours	Unspecified	
Dargo River				
Dargo River @ Lower Dargo Rd	Mitchell River @ Glenaladale	Between 8 and 10 hours	Unspecified	
Mitchell River				
Mitchell River @ Glenaladale	Mitchell River @ Bairnsdale (Pumphouse)	Between 6 and 10 hours	Unspecified	There can be significant variance in the timing of downstream peak levels influenced by the rainfall distribution.

Table A6.1 – Typical flood peak travel times for the Mitchell River Catchment.

Warnings and Gauges

The Bureau of Meteorology currently provides flood forecasts for the Mitchell River via the Wonnangatta R @ Waterford, Mitchell R @ Glenaladale and Mitchell R @ Bairnsdale gauges (Table A6.2).

Additional gauges for the catchment area are detailed in table A6.3 below. Note the shaded gauges fall into the Wellington LGA.

Gauge	River/creek flood class level		
	Minor	Moderate	Major
Wonnangatta River @ Waterford	3.5 m	4.5 m	6.5 m
Mitchell River @ Glenaladale	3.0 m	4.5 m	5.5 m
Mitchell River @ Bairnsdale	5.6 m	6.5 m	6.8 m

Table A.3.1 – Gauges with established Flood Class Levels within the Mitchell River Catchment

Gauge	Station No.	Location	Stream Level & Flow Gauge	Rain Gauge
Wonnangatta River @ Crooked River	224206	-37.407°S 147.089°E (WGS84)	✓	✓
Wonnangatta River @ Waterford	224201	-37.490°S 147.166°E (WGS84)	✓	✓
Dargo River @ Lower Dargo Rd	224213	-37.495°S 147.269°E (WGS84)	✓	✓
Mitchell River @ Glenaladale	224203	-37.764°S 147.375°E (WGS84)	✓	✓
Mitchell River @ Rosehill	224217	-37.815°S 147.572°E (WGS84)	✓	✓
Mitchell River @ Bairnsdale	224200	-37.826°S 147.594°E (WGS84)	✓	✓

Table A6.3 – Gauges within and relevant to the Mitchell River catchment within East Gippsland.

These Gauges may provide some warning of expected flooding. It is advised that residents monitor the Bureau of Meteorology's website http://www.bom.gov.au/vic/warnings/index.shtml?ref=hdr and the VicEmergency website https:/emergency.vic.gov.au/ for any thunderstorm, flood or severe weather warnings present for their area.

Flood Consequences

Riverine Flood Risk

Floods are a regular occurrence on the Mitchell River flats, with minor events occurring every year or so, but sometimes more frequently. During these minor events, a large part of the low-lying area surrounding the river is inundated with floodwater either from the mainstream or one of its tributaries. Major events usually result from heavy rain across the whole catchment and are less frequent but can occur.

Throughout the Mitchell River catchment there several areas that have a significant rural flood risk. Though these areas are not highly populated, rural properties are susceptible to isolation or inundation. Areas at risk include: Wonnangatta, Crooked River (Wonnangatta River); Dargo (Dargo River), Iguana Creek, Wuk Wuk, Calulu, Ellaswood, Lower Mitchell River floodplain, Hillside, Broadlands, East Bairnsdale, Eastwood and Lindenow (Mitchell River); Walpa and Lindenow (Skull Creek).

Bairnsdale is a major town and regional shopping, industrial and medical centre for north and east Gippsland residents. The Princes Highway passes through the town and may be cut at the Mitchell River during significant floods, which splits the town in two and cuts all east/west traffic for the duration with no alternative access.

Lake King water levels and the rate of rise in the Gippsland Lakes during a significant flood event do have an impact on the lower reaches of the Mitchell River. They are not expected to be significant during a 1% AEP event with riverine flooding being the dominant factor, however there may be an increase to the lakes effect during smaller flood events (Water Technology, 2019).

Flash flood risk

Bairnsdale is prone to flash flooding when large rain events overwhelm the storm water drains impacting internal roadways and some major roadways where the storm water outfalls are located near the river e.g. Pound Swamp Hill Road.

Eastwood, Wy Yung, Lucknow and Broadlands to the north and northeast of Bairnsdale are impacted by flash flooding where local creeks are overloaded e.g. Goose Gully & Clifton Creek, Middle Creek and overland flows, which drain directly to Jones' Bay.

Rural areas to the south and southwest of Bairnsdale around Forge Creek Road, Glenaladale Road, Humphreys Road, and the airport are also subject to flash flooding and overland flows.

Areas around Lindenow and Hillside are prone to flash flooding as the deep gullies that transverse the floodplain are overwhelmed with local run off and channelled by rail and road infrastructure.

Properties at Flood Risk

Properties with a flood risk are identified in the Flood Intelligence Card following. For privacy reasons exact addresses are omitted from this plan, however this information is available to the IC through FloodZoom for the purpose of community notification and evacuation advice as required.

As more intelligence becomes available, the identified properties may change and will be updated in future revisions of this plan.

Flood Intelligence Card

A summary of flood consequences for the Mitchell River is provided in the flood intelligence cards (Table A6.4 and Table 6.5) following.

Maps and Schematics

A map showing the inundation expected in the Mitchell River lower catchment during a 1%, 10% and 20% (Map 6a) is supplied following the flood intelligence cards.

Local flood information

Local Flood Guides for Bairnsdale, Woodglen, Lindenow and Hillside are available at https://www.ses.vic.gov.au/plan-and-stay-safe/flood-guides

FLOOD INTELLIGENCE CARD – Mitchell River @ GLENALADALE GAUGE, 224203

Version 1 – October 2024

Note: Flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it. ***Scan the QR code for the current levels for this gauge.***

LOCATION:	Access via Ravdells Road, 200m from Lindenow-Glenaladale Road intersection.
CURRENT LEVEL:	BOM
STREAM:	Mitchell River
GAUGE NUMBER:	224203
GAUGE ZERO:	28.951m AHD
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR:	**3.0m**
MODERATE:	**4.5m**
MAJOR:	**5.5m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**8.26m(1990, 2007)**

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
3.0m	**Minor Flood Level**		
3.90m	50% AEP Flood Level	**Roads Inundated (roads in bold red are DTP operated roads)** • Bairnsdale-Dargo Road becomes inundated at the intersection with Lindenow-Glenaladale Road. Flood depths up to 0.3m are observed, with negligible flow velocity. A low hazard category is identified for this road.	**Road closure signs provided by the road authority for:** • Bairnsdale-Dargo Road • Lindenow-Glenaladale Road
4.5m	**Moderate Flood Level**		
5.38m	20% AEP Flood Level	**Roads Inundated (roads in bold red are DTP operated roads)** • Soldiers Road is inundated for approximately 400m north after its crossover with Three Mile Creek. Flow depths reach 0.8m at parts of the road nearest the creek, while flow velocity remains negligible. Low hazard is identified for adults and children. • Hansfords Lane is inundated at its intersection with Three Mile Creek. Flow depths reach 1.2m at parts of the road nearest the creek, while flow velocity remains negligible. Low hazard is identified for adults and children. • Lindenow-Glenaladale Road is inundated 100m south of Calulu Bridge. Flood depths up to 0.8m are observed over a 20m section, with negligible flow velocity. Low hazard is observed for adults and children.	**Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane • Lindenow-Glenaladale Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
5.5m	**Major Flood Level**		
6.43m	10% AEP Flood Level	**Properties likely impacted (5 properties in total)** • Two properties on Bulmers Road (adjacent Skull Creek) are isolated. Flood depths up to 0.5m overtop access roads, but negligible flow velocity is identified. A low hazard level occurs. • One property on Settlement Road (close to Windmill Road) is isolated, with flood depths up to 0.3 inundation Settlement Road on either side. A low hazard level is identified. • A property at the end of Bashfords Road is isolated as a result of 0.3m flood depths. Flow velocity is negligible and a low hazard level is identified. • One property at the end of Thatchers Lane is isolated, with flow depths reaching 1.2m along this road. Flow velocity is between 1-2m/s for some parts of the access track, and a medium hazard level is identified. **Roads inundated (roads in bold red are DTP operated roads)** • Soldiers Road is inundated for approximately 400m north after its crossover with Three Mile Creek. Flow depths reach 0.8m at parts of the road nearest the creek, while flow velocity remains negligible. Low hazard is identified for adults and children. • Hansfords Lane is inundated at its intersection with Three Mile Creek. Flow depths reach 1.2m at parts of the road nearest the creek, with inundation continuing for approximately 400m north. Flow velocity remains negligible. Low hazard is identified for adults and children. • Lindenow-Glenaladale Road is inundated 100m south of Calulu Bridge and 350m north of its intersection with Bairnsdale-Dargo Road. Flood depths up to 0.8m are observed over a 20m section, with negligible flow velocity. Low hazard is observed for adults and children. • Bulmers Lane becomes inundated with flood depths reaching 0.8m. No flow velocity is identified and a low hazard category occurs. • Windmill Road becomes partly inundated with depths reaching 0.8m in some sections. No flow velocity is identified and a low hazard category occurs. • Settlement Road and Bashfords Road become partly inundated with depths reaching 1.2m in some sections. No flow velocity is identified and a low hazard category occurs.	**Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane • Lindenow-Glenaladale Road • Bulmers Lane • Windmill Road • Settlement Road • Bashfords Road
7.32m	5% AEP Flood Level	**Properties likely impacted (5 properties in total)** • Two properties on Bulmers Road (adjacent Skull Creek) are isolated. Flood depths up to 0.8m overtop access roads, but negligible flow velocity is identified. A low hazard level is identified. • One property on Settlement Road (close to Windmill Road) is inundated, with flood depths up to 0.3 approaching buildings on the property. It is unknown whether this flooding is above the buildings' floor levels. • A property at the end of Bashfords Road is isolated as a result of 0.3m flood depths. Flow velocity is negligible and a low hazard level is identified. • One property at the end of Thatchers Lane is isolated, with flow depths reaching 1.2m along this road. Flow velocity is between 1-2m/s for some parts of the access track, and a medium hazard level is identified. **Roads inundated (roads in bold red are DTP operated roads)** • Soldiers Road is mostly inundated. Flow depths reach 1.2m at parts of the road nearest the creek, while flow velocity remains negligible. A moderate hazard level is identified for parts of this road near the creek.	**Sandbagging may be required for:** • 1 property on Settlement Road (close to Windmill Road) **Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane • Lindenow-Glenaladale Road • Bulmers Lane • Windmill Road • Settlement Road • Bashfords Road • Bon Accord Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Hansfords Lane is mostly inundated. Flow depths reach 1.2m. Flow velocity remains negligible. Moderate to high hazard is now identified for this road. • Lindenow-Glenaladale Road is inundated 100m south of Calulu Bridge and 350m north of its intersection with Bairnsdale-Dargo Road. Flood depths up to 0.8m are observed over a 20m section, with negligible flow velocity. Low hazard is observed for adults and children. • Bulmers Lane becomes inundated with flood depths reaching 0.8m. No flow velocity is identified and a low hazard category occurs. • Windmill Road becomes partly inundated with depths reaching 0.8m in some sections. No flow velocity is identified and a low hazard category occurs. • Settlement Road, Bashfords Road, Rivermouth Road and Riverbank East Road become partly inundated with depths reaching 1.2m in some sections. No flow velocity is identified and a low hazard category occurs. • Bon Accord Road becomes inundated just south of Mitchell River. A 100m section observes flood depths between 0.5-1.2m. Negligible flow velocity is identified, with a moderate hazard level prescribed.	
8.36m	2% AEP Flood Level	**Properties likely Impacted (5 properties in total)** • Two properties on Bulmers Road (adjacent Skull Creek) are inundated. Flood depths up to 0.3m reach properties, with flow velocity reaching 2m/s on access roads. A low hazard level is identified. • One property on Settlement Road (close to Windmill Road) is inundated, with flood depths up to 0.8m approaching buildings on the property. It is unknown whether this flooding is above the buildings' floor levels. • A property at the end of Bashfords Road is inundated with flood depths up to 0.8m. Flow velocity reaches 2m/s on some parts of the property and a high hazard level is identified along the Bashfords Road access track. • One property at the end of Thatchers Lane is isolated, with flow depths reaching 1.2m along this road. Flow velocity is between 1-2m/s for some parts of the access track, and a medium hazard level is identified around trafficable areas. **Roads inundated (roads in bold red are DTP operated roads)** • Soldiers Road is mostly inundated. Flow depths reach 1.2m at parts of the road nearest the creek, while flow velocity remains negligible. A moderate hazard level is identified for parts of this road near the creek. • Hansfords Lane is mostly inundated. Flow depths reach 1.2m. Flow velocity remains negligible. An extreme hazard level is identified for the southern part of this road. • Lindenow-Glenaladale Road is inundated south of Calulu Bridge and 350m north of its intersection with Bairnsdale-Dargo Road. Flood depths up to 1.2m are observed over a 100m section, with negligible flow velocity. An extreme hazard is identified just south of the bridge. • Bulmers Lane becomes inundated with flood depths reaching 0.8m. No flow velocity is identified and a low hazard category occurs. • Windmill Road becomes partly inundated with depths reaching 0.8m in some sections. No flow velocity is identified and a low hazard category occurs. • Settlement Road, Bashfords Road, Rivermouth Road and Riverbank East Road become partly inundated with depths reaching 1.2m in some sections. No flow velocity is identified and a low hazard category occurs. • Bon Accord Road becomes inundated just south of Mitchell River. A 100m section observes flood depths between 0.5-1.2m. Negligible flow velocity is identified, with a moderate hazard level prescribed.	**Sandbagging may be required for:** • 2 properties on Bulmers Road (adjacent to Skull Creek) • 1 property on Settlement Road (close to Windmill Road) • 1 property at the end of Bashfords Road **Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane • Lindenow-Glenaladale Road • Bulmers Lane • Windmill Road • Settlement Road • Bashfords Road • Bon Accord Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
9.25m	1% AEP Flood Level	**Properties likely Impacted (5 properties in total)** • Two properties on Bulmers Road (adjacent Skull Creek) are inundated. Flood depths up to 0.3m reach properties, with flow velocity reaching 2m/s on access roads. A low hazard level is identified. • One property on Settlement Road (close to Windmill Road) is inundated, with flood depths up to 0.8m approaching buildings on the property. It is unknown whether this flooding is above the buildings' floor levels. • A property at the end of Bashfords Road is inundated with flood depths up to 0.8m. Flow velocity reaches 2m/s on some parts of the property and a high hazard level is identified along the Bashfords Road access track. • One property at the end of Thatchers Lane is isolated, with flow depths reaching 1.2m along this road. Flow velocity is between 1-2m/s for some parts of the access track, and a medium hazard level is identified around trafficable areas. **Roads inundated (roads in bold red are DTP operated roads)** • Soldiers Road is mostly inundated. Flow depths reach 1.2m at parts of the road nearest the creek, while flow velocity remains negligible. A moderate hazard level is identified for parts of this road near the creek. • Hansfords Lane is mostly inundated. Flow depths reach 1.2m. Flow velocity remains negligible. An extreme hazard level is identified for the southern part of this road. • Lindenow-Glenaladale Road is inundated south of Calulu Bridge and 350m north of its intersection with Bairnsdale-Dargo Road. Flood depths up to 1.2m are observed over a 100m section, with negligible flow velocity. An extreme hazard is identified just south of the bridge. • Bulmers Lane becomes inundated with flood depths reaching 1.2m. No flow velocity is identified and a moderate hazard category occurs. • Windmill Road becomes partly inundated with depths reaching 0.8m in some sections. No flow velocity is identified and a low hazard category occurs. • Settlement Road, Bashfords Road, Rivermouth Road and Riverbank East Road become partly inundated with depths reaching 1.2m in some sections. No flow velocity is identified and a low hazard category occurs. • Bon Accord Road becomes inundated just south of Mitchell River. A 100m section observes flood depths between 0.5-1.2m. Negligible flow velocity is identified, with a moderate hazard level prescribed. • Woodglen Road and Marshall Road are both inundated. Flood depths reach 0.8m, with flow velocity reaching 2m/s. A low hazard is identified for these roads.	**Sandbagging may be required for:** • 2 properties on Bulmers Road (adjacent to Skull Creek) • 1 property on Settlement Road (close to Windmill Road) • 1 property at the end of Bashfords Road **Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane • Lindenow-Glenaladale Road • Bulmers Lane • Windmill Road • Settlement Road • Bashfords Road • Bon Accord Road • Woodglen Road • Marshall Road
9.95m	0.5% AEP Flood Level	**Properties likely Impacted (12 properties in total)** • Two properties on Bulmers Road (adjacent Skull Creek) are inundated. Flood depths up to 0.8m reach properties, with flow velocity reaching 2m/s on access roads. A low hazard level is identified. • One property on Settlement Road (close to Windmill Road) is inundated, with flood depths up to 1.2m approaching buildings on the property. It is unknown whether this flooding is above the buildings' floor levels. • A property at the end of Bashfords Road is inundated with flood depths up to 1.2m. Flow velocity reaches up to 2m/s on some parts of the property and a high hazard level is identified along the Bashfords Road access track. • Two properties at the end of Thatchers Lane are isolated, with flow depths exceeding 1.2m along this road. Flow velocities approach 3 m/s for some parts of the access track, and high hazard levels block off the properties sourced from Skull Creek. • Six commercial buildings on Bon Accord Road are inundated with flood depths reaching 0.8m.	**Sandbagging may be required for:** • 2 properties on Bulmers Road (adjacent to Skull Creek) • 1 property on Settlement Road (close to Windmill Road) • 1 property at the end of Bashfords Road • 6 commercial buildings on Bon Accord Road **Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads inundated (roads in bold red are DTP operated roads) • Soldiers Road is mostly inundated. Flow depths reach 1.2m at parts of the road nearest the creek, while flow velocity remains negligible. A moderate hazard level is identified for parts of this road near the creek. • Hansfords Lane is mostly inundated. Flow depths reach 1.2m. Flow velocity remains negligible. An extreme hazard level is identified for the southern part of this road. • Lindenow-Glenaladale Road is inundated south of Calulu Bridge and 350m north of its intersection with Bairnsdale-Dargo Road. Flood depths up to 1.2m are observed over a 100m section, with negligible flow velocity. An extreme hazard is identified just south of the bridge. • Bulmers Lane becomes inundated with flood depths reaching 1.2m. No flow velocity is identified and a moderate hazard category occurs. • Windmill Road becomes partly inundated with depths reaching 0.8m in some sections. No flow velocity is identified and a low hazard category occurs. • Settlement Road, Bashfords Road, Rivermouth Road and Riverbank East Road become partly inundated with depths reaching 1.2m in some sections. No flow velocity is identified and a low hazard category occurs. • Bon Accord Road becomes inundated just south of Mitchell River. A 100m section observes flood depths between 0.5-1.2m. Negligible flow velocity is identified, with a moderate hazard level prescribed. • Woodglen Road and Marshall Road are both inundated. Flood depths reach 0.8m, with flow velocity reaching 2m/s. A low hazard is identified for these roads. • Bairnsdale-Dargo Road is inundated in spots over a 4 km section between Lindenow and Lucas Creek. Depths reach up to 1.2m. • Wallers Lane is inundated by depths up to 0.5m, with moderate hazard identified.	• Lindenow-Glenaladale Road • Bulmers Lane • Windmill Road • Settlement Road • Bashfords Road • Bon Accord Road • Woodglen Road • Marshall Road • Wallers Lane
10.32m	0.2% AEP Flood Level	**Properties likely Impacted (30 properties in total)** • Two properties on Bulmers Road (adjacent Skull Creek) are inundated. Flood depths up to 0.8m reach properties, with flow velocity reaching 3m/s on access roads. A low hazard level is identified. • One property on Settlement Road (close to Windmill Road) is inundated, with flood depths up to 1.2m approaching buildings on the property. It is unknown whether this flooding is above the buildings' floor levels. • A property at the end of Bashfords Road is inundated with flood depths up to 1.2m. Flow velocity reaches up to 2m/s on some parts of the property and a high hazard level is identified along the Bashfords Road access track. • Two properties at the end of Thatchers Lane are isolated, with flow depths exceeding 1.2m along this road. Flow velocities approach 3 m/s for some parts of the access track, and high hazard levels block off the properties sourced from Skull Creek. • Six commercial buildings on Bon Accord Road are inundated with flood depths reaching 0.8m. • Four properties are isolated around Glenaladale due to Iguana Creek and Moilun Creek breaking their banks. • Three properties on Woodglen road near the intersection Woodglen and Marshalls Road are isolated by depths up to 0.8m on each roadway. • One property at the end of Hands Lane is isolated by flood depths up to 0.3m, cutting off access from Lindenow-Glenaladale Road, low velocities are noted. • Seven properties are inundated by depths exceeding 1.2m on Lubys Road and is completely isolated by inundation to the north and south. High levels of hazard and velocities surround the waterways crossing Lubys Road. • Three properties are inundated by depths up to 1.2m on Bairnsdale-Dargo Road	**Sandbagging may be required for:** • 2 properties on Bulmers Road (adjacent to Skull Creek) • 1 property on Settlement Road (close to Windmill Road) • 1 property at the end of Bashfords Road • 6 commercial buildings on Bon Accord Road • 2 properties along Bairnsdale-Dargo Road • 7 properties on Lubys Road **Road closure signs provided by the road authority for:** • Soldiers Road • Hansfords Lane • Lindenow-Glenaladale Road • Bulmers Lane • Windmill Road • Settlement Road • Bashfords Road • Bon Accord Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Community infrastructure likely impacted • Glenaladale Cemetery is impacted by inundation with depths up to 0.5m **Roads inundated (roads in bold red are DTP operated roads)** • Soldiers Road is mostly inundated. Flow depths reach 1.2m at parts of the road nearest the creek, while flow velocity remains negligible. A moderate hazard level is identified for parts of this road near the creek. • Hansfords Lane is mostly inundated. Flow depths reach 1.2m. Flow velocity remains negligible. An extreme hazard level is identified for the southern part of this road. • Lindenow-Glenaladale Road is inundated south of Calulu Bridge and 350m north of its intersection with Bairnsdale-Dargo Road. Flood depths up to 1.2m are observed over a 100m section, with negligible flow velocity. An extreme hazard is identified just south of the bridge. • Bulmers Lane becomes inundated with flood depths reaching 1.2m. No flow velocity is identified and a moderate hazard category occurs. • Windmill Road becomes partly inundated with depths reaching 0.8m in some sections. No flow velocity is identified and a low hazard category occurs. • Settlement Road, Bashfords Road, Rivermouth Road and Riverbank East Road become partly inundated with depths reaching 1.2m in some sections. No flow velocity is identified and a low hazard category occurs. • Bon Accord Road becomes inundated just south of Mitchell River. A 100m section observes flood depths between 0.5-1.2m. Negligible flow velocity is identified, with a moderate hazard level prescribed. • Woodglen Road and Marshall Road are both inundated. Flood depths reach 0.8m, with flow velocity reaching 2m/s. A low hazard is identified for these roads. • Bairnsdale-Dargo Road is inundated in spots over a 4 km section between Lindenow and Lucas Creek. Depths reach up to 1.2m. • Wallers Lane is inundated by depths up to 0.5m, with low hazard.	• Woodglen Road • Marshall Road • Wallers Lane • Fernbank-Glenaladale Road

Table A6.4 – Breakdown of likely consequences at various Glenaladale gauge level heights along Mitchell River with operational considerations.

FLOOD INTELLIGENCE CARD – Mitchell River @ BAIRNSDALE GAUGE, 224200

Version 1 – October 2024

Note: flood intelligence records are approximations. This is because no two floods at a location, even if they peak at the same height, will have identical impacts. Flood intelligence cards detail the relationship between flood magnitude and flood consequences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series.

This Flood Intelligence Card publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by the Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it. ***Scan the QR code for the current levels for this gauge.***

LOCATION:	Located at the East Gippsland Water Depot on Jennings Street. Gauges are located down the embankment and a key is required for access
CURRENT LEVEL:	BOM
STREAM:	Mitchell River
GAUGE NUMBER:	224200
GAUGE ZERO:	N/A
GAUGE TYPE:	Streamflow Gauge

MAP REFERENCE:	**TBC**
MINOR:	**5.6m**
MODERATE:	**6.5m**
MAJOR:	**6.8m**
LEVEE HEIGHT:	**N/A**
HIGHEST RECORDED FLOOD:	**7.75m (1998)**

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
5.32m	50% AEP Flood Level	**Roads Inundated (roads in bold red are DTP operated roads)** • Rivermouth Road becomes inundated at Eagle Point. Flood depths up to 0.3m are observed. The flow velocity is negligible, and a low hazard category is identified.	**Road closure signs provided by the road authority for:** • Rivermouth Road
5.6m	**Minor Flood Level**		
6.14m	20% AEP Flood Level	**Community infrastructure likely inundated:** • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with flood depths reaching 1.2m at some parts of the oval. Flow velocity is negligible, and a low hazard level is identified. Flood waters do not reach the clubrooms. • Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but a moderate hazard level is defined for both adults and children. • The western portion of Howitt Park is inundated, with flood depths ranging from 0.3-0.8m. Flow velocity is negligible, and a low hazard level is identified.	**Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive • Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		Roads Inundated (roads in bold red are DTP operated roads) • Pippin Drive, Yeates Drive and Cole Road are all inundated, with flood depths up to 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads. • Lindenow-Glenaladale Road is inundated 100m south of Calulu Bridge. Flood depths up to 0.8m are observed over a 20m section, with negligible flow velocity. Low hazard is observed for adults and children. • Bullumwaal Road is inundated over a 300m section adjacent the Bullumwaal Road Reserve. Flood depths up to 0.8m are observed, with negligible flow velocity. A low hazard is identified for both adults and children. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, a high hazard level is identified across some parts of these roads.	
6.47m	10% AEP Flood Level	**Properties likely impacted (38 properties in total)** • Approx. 30 properties along Eagle Point may become isolated from inundation on Rivermouth Road. Flood depths reach 0.5m, with negligible flow velocity. A low hazard category is identified. Several of these properties also experience inundation up to 0.3m. Sandbagging may be required depending on building levels. • 8 properties between Riverine Street and Mitchell Port Road are inundated. Flood waters approach the yards of these properties, but do not seem to inundate buildings. Some properties may become isolated as the water depth exceeds 1.2m. **Community infrastructure likely impacted** • Two commercial buildings on Paynesville Road (either side of Macleod Street) are inundated, with flood depths reaching 0.8m. Flow velocity is between 0-1m/s, and a high hazard level is identified for some sections of Macleod Street. • Davison Oval and the Bairnsdale Skate Park experience flood depths up to 1.2m. Flow velocity is negligible and a low hazard category is identified. • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with the entire reserve and its building experiencing depths greater than 1.2m. Flow velocity is negligible. A moderate hazard category is identified for the eastern portion of the reserve. It is likely that the clubrooms are now flooded. • Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but a moderate hazard level is defined for both adults and children. • Howitt Park is completely inundated, with flood depths ranging from 0.3-1.2m. Flow velocity is negligible and a low hazard level is identified. **Tourism/recreation likely impacted** • Mitchell Gardens Caravan Park is inundated with flood depths up to 0.3m. A low hazard level is defined. **Roads inundated (roads in bold red are DTP operated roads)** • Pippin Drive, Yeates Drive and Cole Road are all completely inundated, with flood depths in excess of 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads. • Bullumwaal Road is inundated over a 600m section adjacent the Bullumwaal Road Reserve. Flood depths in excess of 1.2m are observed, with negligible flow velocity. In some section south of Mitchell River, an extreme hazard level exists for this road. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, an extreme hazard level is identified across some parts of these roads.	**Sandbagging may be required for:** • 8 inundated properties between Riverine Street and Mitchell Port Road • Properties along Eagle Point • 2 commercial buildings on Paynesville Road (either side of Macleod Street) **Assistance may be required for:** • Mitchell Gardens Caravan Park **Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive • Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road • Rivermouth Road • Riverbank East Road • Suding Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Robb Street is minorly inundated, experiencing flood depths up to 0.3m. No flow velocity is identified. A low hazard category is identified. • Suding Road becomes inundated with flood depths reaching 1.2m in some parts. No flow velocity is identified and a low hazard category occurs.	
6.5m	**Moderate Flood Level**		
6.8m	**Major Flood Level**		
6.81m	5% AEP Flood Level	**Properties likely impacted (45 properties in total)** • Approx. 30 properties along Eagle Point may become isolated as a result of inundation on Rivermouth Road. Flood depths reach 0.5m, with negligible flow velocity. A low hazard category is identified. Several of these properties also experience inundation up to 0.3m. Sandbagging may be required depending on building levels. • 8 properties between Riverine Street and Mitchell Port Road are inundated. Flood waters approach the yards of all these properties, with two buildings being inundated by flood depths up to 0.3m. Some properties may become isolated as the water depth exceeds 1.2m. • 5 properties along Paynesville East Road may experience isolation or inundation as flood depths of 0.3m approach from Macleods Morass Wildlife Reserve. Flow velocity is negligible and a low hazard level is identified. • 2 properties on Suding Road may become isolated. Flood depths up to 1.2m are identified adjacent to the properties. Flow velocity is negligible and a low hazard category is identified. **Community Infrastructure Likely Impacted** • Two commercial buildings on Paynesville Road (either side of Macleod Street) are inundated, with flood depths reaching 0.8m. Flow velocity is between 0-1m/s, and a high hazard level is identified for some sections of Macleod Street. • Davison Oval and the Bairnsdale Skate Park experience flood depths up to 1.2m. Flow velocity is negligible and a low hazard category is identified. • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with the entire reserve and its building experiencing depths greater than 1.2m. Flow velocity is negligible. An extreme hazard category is identified for the eastern portion of the reserve. It is likely that the clubrooms are now flooded. • Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but an extreme hazard level is identified on the outside of the reserve. • Howitt Park is completely inundated, with flood depths ranging from 0.5-1.2m. Flow velocity is negligible and a low hazard level is identified. **Tourism/recreation likely impacted** • Mitchell Gardens Caravan Park is inundated with flood depths up to 0.8m. A low hazard level is defined. **Roads inundated (roads in bold red are DTP operated roads)** • Pippin Drive, Yeates Drive and Cole Road are all completely inundated, with flood depths in excess of 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads.	**Sandbagging may be required for:** • 8 inundated properties between Riverine Street and Mitchell Port Road • Properties along Eagle Point • 5 properties along Paynesville East Road • 2 properties on Suding Road • 2 commercial buildings on Paynesville Road (either side of Macleod Street) **Assistance may be required for:** • Mitchell Gardens Caravan Park **Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive • Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road • Rivermouth Road • Riverbank East Road • Suding Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Bullumwaal Road is inundated over a 600m section adjacent the Bullumwaal Road Reserve. Flood depths in excess of 1.2m are observed, with negligible flow velocity. In some section south of Mitchell River, an extreme hazard level exists for this road. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, an extreme hazard level is identified across some parts of these roads. • Robb Street is minorly inundated, experiencing flood depths up to 0.3m. No flow velocity is identified. A low hazard category is identified. • Suding Road becomes inundated with flood depths reaching 1.2m in some parts. No flow velocity is identified and a low hazard category occurs.	
7.36m	2% AEP Flood Level	**Properties likely Impacted (45 properties in total)** • Approx. 30 properties along Eagle Point may become isolated as a result of inundation on Rivermouth Road. Flood depths reach 0.5m, with negligible flow velocity. A low hazard category is identified. Several of these properties also experience inundation up to 0.3m. Sandbagging may be required depending on building levels. • 8 properties between Riverine Street and Mitchell Port Road are inundated. Flood waters are in excess of 1.2m, with flow velocity reaching 3m/s in some parts. A high hazard level is identified for these properties. • 5 properties along Paynesville Road may experience isolation or inundation as flood depths of 0.8m approach from Macleods Morass Wildlife Reserve. Flow velocity is negligible and a low hazard level is identified. • 2 properties on Suding Road may become isolated. Flood depths up to 1.2m are identified adjacent to the properties. Depths of 0.5m are likely to overtop Suding Road. Flow velocity reaches 3m/s around some parts of these properties. An extreme hazard level is identified to the southeast. **Community infrastructure likely flooded** • Two commercial buildings on Paynesville Road (either side of Macleod Street) are inundated, with flood depths reaching 0.8m. Flow velocity reaches 3m/s, with an extreme hazard level identified for some sections of Macleod Street. • Davison Oval and the Bairnsdale Skate Park experience flood depths up to 1.2m. Flow velocity is negligible and a low hazard category is identified. • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with the entire reserve and its building experiencing depths greater than 1.2m. Flow velocity is negligible. An extreme hazard category is identified for the entire reserve. It is likely that the clubrooms will be flooded. • Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but an extreme hazard level is identified on the outside of the reserve. • Howitt Park is completely inundated, with flood depths ranging from 0.5-1.2m. Flow velocity is negligible and a low hazard level is identified. **Tourism/recreation likely impacted** • Mitchell Gardens Caravan Park is inundated with flood depths up to 1.2m. A low hazard level is defined. **Roads inundated (roads in bold red are DTP operated roads)** • Pippin Drive, Yeates Drive and Cole Road are all completely inundated, with flood depths in excess of 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads.	**Sandbagging may be required for:** • Properties along Eagle Point • 8 inundated properties between Riverine Street and Mitchell Port Road • 5 properties along Paynesville East Road • 2 properties on Suding Road • 2 commercial buildings on Paynesville Road (either side of Macleod Street) **Assistance may be required for:** • Mitchell Gardens Caravan Park **Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive • Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road • Rivermouth Road • Riverbank East Road • Suding Road

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Bullumwaal Road is inundated over a 600m section adjacent the Bullumwaal Road Reserve. Flood depths in excess of 1.2m are observed, with negligible flow velocity. In some section south of Mitchell River, an extreme hazard level exists for this road. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, an extreme hazard level is identified across some parts of these roads. • Robb Street is minorly inundated, experiencing flood depths up to 0.3m. No flow velocity is identified. A low hazard category is identified. • Suding Road becomes inundated with flood depths reaching 1.2m in some parts. Flow velocities between 1-2m/s are identified for some parts of this road, and a low hazard category occurs. • The intersection between Short Street and Mceacharn Street becomes inundated, with flood depths reaching 0.3m. No flow velocity is shown and a low hazard level is identified.	
7.85m	1% AEP Flood Level	**Properties likely Impacted (45 properties in total)** • Approx. 30 properties along Eagle Point may become isolated as a result of inundation on Rivermouth Road. Flood depths reach 0.5m, with negligible flow velocity. A low hazard category is identified. Several of these properties also experience inundation up to 0.3m. Sandbagging may be required depending on building levels. • 8 properties between Riverine Street and Mitchell Port Road are inundated. Flood waters are in excess of 1.2m, with flow velocity reaching 3m/s in some parts. A high hazard level is identified for these properties. • 5 properties along Paynesville Road may experience isolation or inundation as flood depths of 0.8m approach from Macleods Morass Wildlife Reserve. Flow velocity is negligible and a low hazard level is identified. • 2 properties on Suding Road may become isolated. Flood depths up to 1.2m are identified adjacent to the properties. Depths of 0.5m are likely to overtop Suding Road. Flow velocity reaches 3m/s around some parts of these properties. An extreme hazard level is identified to the southeast. • Four properties are inundated by depths up to 0.5m on Riverbank E Road with these properties completely isolated. **Community infrastructure likely impacted** • Two commercial buildings on Paynesville Road (either side of Macleod Street) are inundated, with flood depths reaching 0.8m. Flow velocity reaches 3m/s, with an extreme hazard level identified for some sections of Macleod Street. • Davison Oval and the Bairnsdale Skate Park experience flood depths up to 1.2m. Flow velocity is negligible and a low hazard category is identified. • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with the entire reserve and its building experiencing depths greater than 1.2m. Flow velocity is negligible. An extreme hazard category is identified for the entire reserve. It is likely that the clubrooms will be flooded. • Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but an extreme hazard level is identified on the outside of the reserve. • Howitt Park is completely inundated, with flood depths ranging from 0.5-1.2m. Flow velocity is negligible and a low hazard level is identified. **Roads inundated (roads in bold red are DTP operated roads)** • Pippin Drive, Yeates Drive and Cole Road are all completely inundated, with flood depths in excess of 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads.	**Sandbagging may be required for:** • Properties along Eagle Point • 8 inundated properties between Riverine Street and Mitchell Port Road • 5 properties along Paynesville East Road • 2 properties on Suding Street • 2 commercial buildings on Paynesville Road (either side of Macleod Street) • 4 properties on Riverbank E Road. **Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive • Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road • Rivermouth Road • Riverbank East Road • Suding Road • Princes Highway (at Bairnsdale)

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Bullumwaal Road is inundated over a 600m section adjacent the Bullumwaal Road Reserve. Flood depths in excess of 1.2m are observed, with negligible flow velocity. In some section south of Mitchell River, an extreme hazard level exists for this road. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, an extreme hazard level is identified across some parts of these roads. • Robb Street is minorly inundated, experiencing flood depths up to 0.3m. No flow velocity is identified. A low hazard category is identified. • Suding Road becomes inundated with flood depths reaching 1.2m in some parts. Flow velocities between 1-2m/s are identified for some parts of this road, and a low hazard category occurs. • The intersection between Short Street and Mceacharn Street becomes inundated, with flood depths reaching 0.3m. No flow velocity is shown and a low hazard level is identified. • **Princes Highway becomes inundated at its meeting with Mitchell River in Bairnsdale. Flood depths of 0.3m are noted, with flow velocities up to 2m/s. A low hazard level is identified.**	
8.68m	0.5% AEP Flood Level	**Properties likely Impacted (75 properties in total)** • Approximately 45 properties in Eagle Point may become isolated as a result of inundation on Rivermouth Road. Flood depths reach 0.5m, with negligible flow velocity. A low hazard category is identified. Several of these properties also experience inundation up to 0.8m. Sandbagging may be required depending on building levels. • Eleven properties between Riverine Street and Mitchell Port Road are inundated. Flood waters are in excess of 1.2m, with flow velocity reaching 3m/s in some parts. A high hazard level is identified for these properties. • Seven properties along Paynesville Road may experience isolation or inundation as flood depths of 0.8m approach from Macleods Morass Wildlife Reserve. Flow velocity is negligible and a low hazard level is identified. As floodwater extends from Paynesville Road up Macleod Street, six properties additional properties are inundated by depths exceeding 1.2m, with a medium hazard level identified. • Two properties on Suding Road may become isolated. Flood depths up to 1.2m are identified adjacent to the properties. Depths of 0.5m are likely to overtop Suding Road. Flow velocity reaches 3m/s around some parts of these properties. An extreme hazard level is identified to the southeast. • As the inundation in Howitt Park rises, three additional commercial properties are inundated by depths up to 0.8m, including the Bairnsdale Rowing Club and Howitt Park facilities. • 23 properties are inundated along Howitt Avenue and Lorimer Drive from breakout of Clifton Creek, with depths reaching up to 0.5m • Four properties are inundated by depths up to 0.5m on Riverbank E Road with these properties completely isolated. **Community infrastructure likely impacted** • Two commercial buildings on Paynesville Road (either side of Macleod Street) are inundated, with flood depths reaching 0.8m. Flow velocity reaches 3m/s, with an extreme hazard level identified for some sections of Macleod Street. • Davison Oval and the Bairnsdale Skate Park experience flood depths up to 1.2m. Flow velocity is negligible and a low hazard category is identified. • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with the entire reserve and its building experiencing depths greater than 1.2m. Flow velocity is negligible. An extreme hazard category is identified for the entire reserve. It is likely that the clubrooms will be flooded.	**Sandbagging may be required for:** • Properties along Eagle Point • 8 inundated properties between Riverine Street and Mitchell Port Road • 5 properties along Paynesville East Road • 2 properties on Suding Road • 2 commercial buildings on Paynesville Road (either side of Macleod Street) **Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive • Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road • Rivermouth Road • Riverbank East Road • Suding Road • Princes Highway (at Bairnsdale) • Riverbank E Road

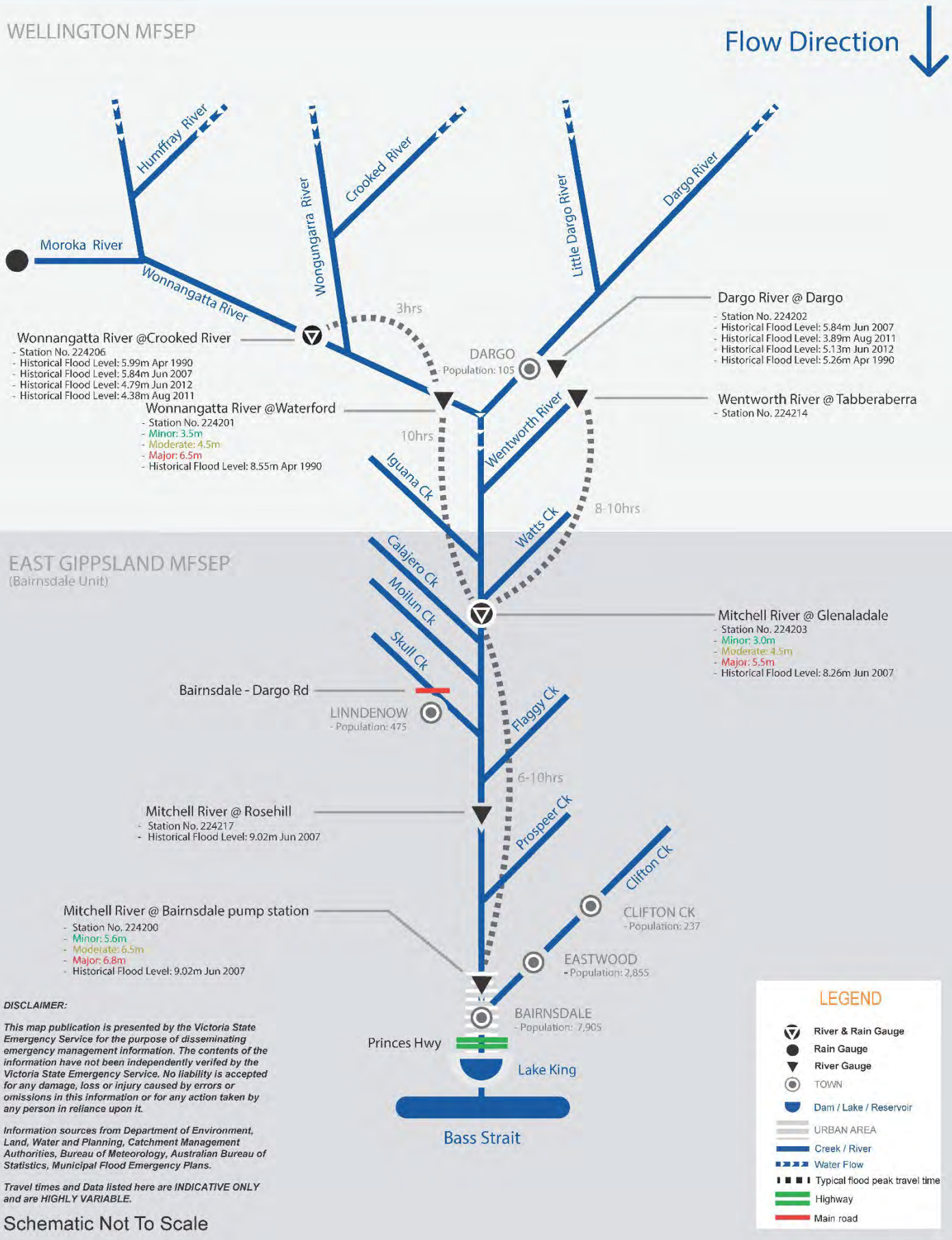
Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but an extreme hazard level is identified on the outside of the reserve. • Howitt Park is completely inundated, with flood depths exceeding 1.2m. Flow velocity is negligible and a low hazard level is identified. **Roads inundated (roads in bold red are DTP operated roads)** • Pippin Drive, Yeates Drive and Cole Road are all completely inundated, with flood depths in excess of 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads. • Bullumwaal Road is inundated over a 600m section adjacent the Bullumwaal Road Reserve. Flood depths in excess of 1.2m are observed, with negligible flow velocity. In some section south of Mitchell River, an extreme hazard level exists for this road. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, an extreme hazard level is identified across some parts of these roads. • Robb Street is minorly inundated, experiencing flood depths up to 0.3m. No flow velocity is identified. A low hazard category is identified. • Suding Road becomes inundated with flood depths reaching 1.2m in some parts. Flow velocities between 1-2m/s are identified for some parts of this road, and a low hazard category occurs. • The intersection between Short Street and Mceacharn Street becomes inundated, with flood depths reaching 0.3m. No flow velocity is shown and a low hazard level is identified. • Riverbank E Road is inundated by depths up to 0.8m, with moderate hazard identified. • **Princes Highway becomes inundated at its meeting with Mitchell River in Bairnsdale. Flood depths exceeding 1.2m are noted, with flow velocities up to 2m/s. A low hazard level is identified.**	
8.99m	0.2% AEP Flood Level	**Properties likely Impacted (73 properties in total)** • Approximately 45 properties in Eagle Point may become isolated as a result of inundation on Rivermouth Road. Flood depths reach 0.5m, with negligible flow velocity. A low hazard category is identified. Several of these properties also experience inundation up to 0.8m. Sandbagging may be required depending on building levels. • Eleven properties between Riverine Street and Mitchell Port Road are inundated. Flood waters are in excess of 1.2m, with flow velocity reaching 3m/s in some parts. A high hazard level is identified for these properties. • Seven properties along Paynesville Road may experience isolation or inundation as flood depths of 0.8m approach from Macleods Morass Wildlife Reserve. Flow velocity is negligible and a low hazard level is identified. As floodwater extends from Paynesville Road up Macleod Street, six properties additional properties are inundated by depths exceeding 1.2m, with a medium hazard level identified. • Two properties on Suding Road may become isolated. Flood depths up to 1.2m are identified adjacent to the properties. Depths of 0.5m are likely to overtop Suding Road. Flow velocity reaches 3m/s around some parts of these properties. An extreme hazard level is identified to the southeast. • As the inundation in Howitt Park rises, three additional commercial properties are inundated by depths up to 0.8m, including the Bairnsdale Rowing Club and Howitt Park facilities. • 23 properties are inundated along Howitt Avenue and Lorimer Drive from breakout of Clifton Creek, with depths reaching up to 0.8m • Three properties are inundated along The Grange by depths up to 0.5m • Fifteen properties are inundated by depths up to 0.8m on McKenzie Street	**Sandbagging may be required for:** • Properties along Eagle Point • 8 inundated properties between Riverine Street and Mitchell Port Road • 5 properties along Paynesville East Road • 7 properties on Suding Road • 2 commercial buildings on Paynesville Road (either side of Macleod Street) • 3 properties along The Grange • 5 properties on Maria Place • 6 properties along the Billabong • 10 properties along Morton Drive • 15 properties on McKenzie Street • 4 properties on Bay Road • 3 properites on Yalca Mews **Road closure signs provided by the road authority for:** • Pippin Drive • Yeates Drive

Gauge Height	Annual Exceedance Probability (% AEP)	Expected Inundation and Consequences	Operational Considerations
		• Four properties are inundated by depths up to 1.2m on Riverbank E Road with these properties completely isolated. The road is cut off by moderate hazard on southern and northern access routes. • Four properties on Bay Road are inundated by depths up to 0.8m. Low Hazard is noted in the area. • Three properties on Yalca Mews are inundated by depths exceeding 1.2m. Low Hazard is noted in the area. **Community infrastructure likely impacted** • Two commercial buildings on Paynesville Road (either side of Macleod Street) are inundated, with flood depths reaching 0.8m. Flow velocity reaches 3m/s, with an extreme hazard level identified for some sections of Macleod Street. • Davison Oval and the Bairnsdale Skate Park experience flood depths up to 1.2m. Flow velocity is negligible and a low hazard category is identified. • Bullumwaal Road Reserve (Wy Yung Sporting Ground) is inundated, with the entire reserve and its building experiencing depths greater than 1.2m. Flow velocity is negligible. An extreme hazard category is identified for the entire reserve. It is likely that the clubrooms will be flooded. • Picnic Point Reserve becomes inundated with flood depths reaching 1.2m. Flow velocity is negligible, but an extreme hazard level is identified on the outside of the reserve. • Howitt Park is completely inundated, with flood depths exceeding 1.2m. Flow velocity is negligible and a low hazard level is identified. **Roads inundated (roads in bold red are DTP operated roads)** • Pippin Drive, Yeates Drive and Cole Road are all completely inundated, with flood depths in excess of 1.2m and flow velocities up to 2m/s. An extreme hazard level is identified for parts of these roads. • Bullumwaal Road is inundated over a 600m section adjacent the Bullumwaal Road Reserve. Flood depths in excess of 1.2m are observed, with negligible flow velocity. In some section south of Mitchell River, an extreme hazard level exists for this road. • Pound Swamp Hill Road and Webbs Road are significantly inundated, with flood depths reaching 1.2m. While the flow velocity is negligible, an extreme hazard level is identified across some parts of these roads. • Robb Street is minorly inundated, experiencing flood depths up to 0.3m. No flow velocity is identified. A low hazard category is identified. • Suding Road becomes inundated with flood depths reaching 1.2m in some parts. Flow velocities between 1-2m/s are identified for some parts of this road, and a low hazard category occurs. • The intersection between Short Street and McEacharn Street becomes inundated, with flood depths reaching 0.3m. No flow velocity is shown and a low hazard level is identified. • Wallers Lane is inundated by depths up to 0.5m, with low hazard. • Forge Creek Road is inundated by depths up to 1.2m, with low hazard. • Riverbank E Road is inundated by depths up to 1.2m, with low hazard. • **Princes Highway becomes inundated at its meeting with Mitchell River in Bairnsdale. Flood depths of 0.8m are noted, with flow velocities up to 2m/s. A low hazard level is identified.**	• Cole Road • Bullumwaal Road • Pound Swamp Hill Road • Webbs Road • Rivermouth Road • Riverbank East Road • Suding Road • Princes Highway (at Bairnsdale) • Wallers Lane • Forge Creek Road • Riverbank E Road

Table A6.5 – Breakdown of likely consequences at Bairnsdale along the Mitchell River with operational consideration

Mitchell River Catchment Schematic

Version 3 - October 2024



DISCLAIMER:

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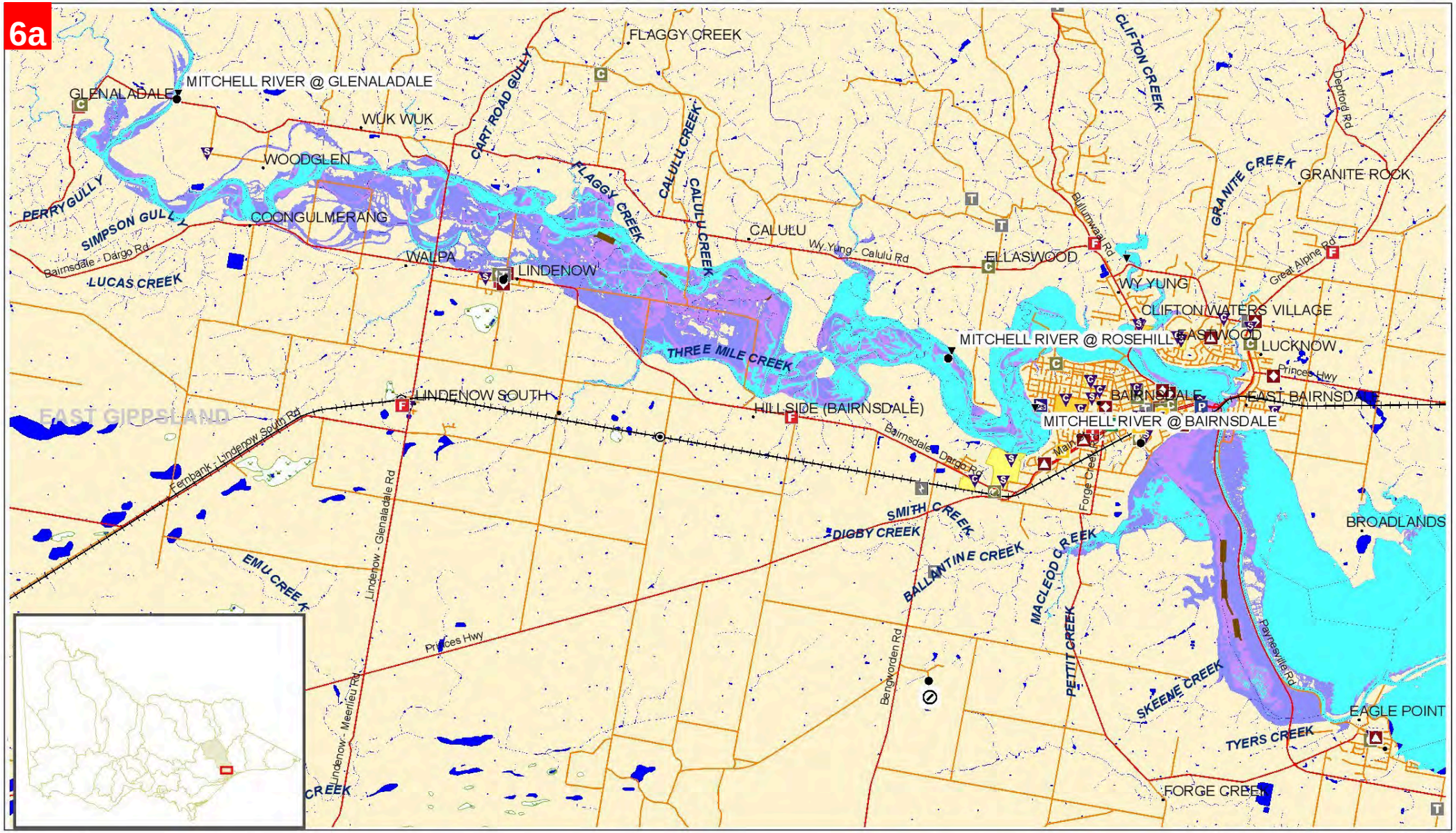
Information sources from Department of Environment, Land, Water and Planning, Catchment Management Authorities, Bureau of Meteorology, Australian Bureau of Statistics, Municipal Flood Emergency Plans.

Travel times and Data listed here are INDICATIVE ONLY and are HIGHLY VARIABLE.

Schematic Not To Scale



N

Kilometers
0 1 2 3

Scale at A4 1:115,000

- VICSES Unit
- CFA / MFB Fire Station
- Police Station
- Ambulance
- Coastguard
- Hospital
- School / College
- Kindergarten / Child Care
- Community Centre
- Nursing Home / Aged Care
- Place of Worship
- Municipal Building
- Municipal Depot
- Telephone Exchange
- Drainage Pumping Station
- Caravan Park
- Camping Ground
- Picnic Area
- Mine
- Rain Gauge
- River Gauge
- Levee / Embankment
- Electric Substation/Power Station
- Helipad
- Airport/Airfield
- Railway Station
- Railway Line
- Main Road
- Secondary Road
- Tertiary Road
- River/Creek/Open Channel
- 20% AEP Flood (G'dale GH: 5.4m)
- 10% AEP Flood (G'dale GH: 6.3m)
- 1% AEP Flood (G'dale GH: 9.3m)
- Swamp/Natural Wetland
- Waterbody
- Local Government Boundary

WATER TECHNOLOGY

EAST GIPPSLAND CATCHMENT MANAGEMENT AUTHORITY

SES

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This map publication is presented by the Victoria State Emergency Service for the purpose of disseminating emergency management information. The State Emergency Service disclaims any liability (including for negligence) to any person in respect of anything and the consequences of anything, done, or not done of any kind including damages, costs, interest, loss of profits or special loss or damage, arising from any error, inaccuracy, incompleteness or other defect in this information. by any such person in whole or partial reliance upon the whole or part of the information in this map publication. Flood information is provided by East Gippsland CMA, 2020. VicMap data is sourced from Department ofEnvironment, and, Water and Planning, May 2020.

APPENDIX B – SEVERE WEATHER AND THUNDERSTORMS

General

East Gippsland is susceptible to severe weather events year-round. The area is geographically diverse and includes exposed coastal areas and elevated alpine and sub-alpine peaks which can be naturally more exposed to the weather.

There are several climate influences summarised in Table B1 which influence severe weather in the southeastern part of Australia. Further information on these influences can be found at the BoM webpage on Australian Climate Influences.

Climate Influence	Associated Conditions
East coast lows	Strong, gusty winds, high seas
Cut-off lows	Strong, gusty winds, high seas
Frontal system	Heavy rainfall which can intensify with stronger systems
Sub-tropical ridge	Cool season cold fronts associated with showery conditions and colder south westerly winds
Upper-level trough	Widespread rain, can interact with other systems to intensify cut-off lows and frontal systems

Table B1 – Climate influences and associated conditions that may influence severe weather in East Gippsland (BoM).

Future climate trends

Climate change models typically project drier winter and spring rainfall; however, they do also predict with a high confidence that there will be an increase to the frequency and intensity of localised rain events in the future (CSIRO, 2019). These intense microbursts are likely to have a high impact to urban areas and small catchments that run through and close to settlements.

Bureau of Meteorology weather districts

The municipality falls within the weather district of East Gippsland for land-based forecasts.

For coastal areas these are covered by parts of the Gippsland Lakes Local Waters, East Gippsland Coastal Waters, and Central Gippsland Coastal Waters forecast areas.

As the municipality incorporates part of the Alpine region the BoM alpine weather warnings apply to Omeo.

Figure B2 details the BoM forecast districts mentioned above.

Figure B2 - BoM forecast districts.

Consequences of severe weather and thunderstorms

Consequences of severe weather and thunderstorms can range from being isolated to widespread, depending on the nature of the event. To assist with understanding potential impacts, a Potential Impact Report is available to the RDO, RAC and IC via the eMap Bushfire Viewer application on EM-COP. A report can be generated for the East Gippsland LGA, detailing information such as campgrounds, caravan parks, care facilities, community venues and more.

Local Knowledge

During consultation, local knowledge around severe weather and severe thunderstorm impacts was captured and has been included under the relevant sections following. As no two storm or severe weather events are the same, this information is provided as a guide to inform possible impacts and help inform decision making.

Severe thunderstorms

Severe thunderstorms and its associated weather conditions such as a tornado or microburst may have the same effect on the community and the natural environment. The difference is likely to be in terms of the geographic expanse. A severe thunderstorm can move over a large part of the land mass whereas in Victoria, a tornado or microburst is likely to be heavily concentrated in a small geographic area affecting one or two localities.

Predicting when and where severe thunderstorms will occur can be difficult, so initial warnings are more generalised. Some severe thunderstorms can happen with little warning.

Consequences of storm damage typically involve the following:

- Wind damage to residence and buildings
- Fallen trees damaging buildings and blocking roadways
- Flooding
- Road damage and road closures
- Power outages (prolonged events and/or power dependant people including heating for the elderly)
- Telecommunications outages
- Impacts on a wide range of critical infrastructure
- Entrapment of people in vehicles or in homes
- Livestock losses

Severe weather

Severe weather can result in a broad range of conditions, with similar impacts to severe thunderstorms. Associated conditions and impacts are discussed below.

Flash Flooding

Typically, urbanised areas where rainfall is more likely to run overland rather than soak into the ground from an increase in tarmac and concrete from road networks and development are more susceptible to flash flooding. This occurs when the rate of rainfall is sufficient to overwhelm the local drainage system.

Communities close to urban creeks and steep rural creeks in the headwaters of river catchments can also experience riverine flash flooding as creeks rise quickly in response to heavy rainfall.

Following intense bushfires there can be increased runoff of debris and materials during the initial rainfall events. Where these intersect with urban environments, this can cause blockages of the local drainage networks and can result in flash flooding until drains can be cleared.

Within this plan it is recognised that upper tributaries to the Mitta Mitta River sit within the East Gippsland LGA and are subject to flash flooding with consequences. These include the Livingstone Creek (and tributaries of Reedy Creek, Wilson Creek, Jim & Jack Creek and Butcher Creek), Victoria River, Bundarra River, Cobungra River and other minor tributaries. Flash flood consequences in this upper catchment are captured in Table B2. Downstream flooding consequences for the Mitta Mitta River are covered in the Towong Shire Flood & Storm Emergency Plan.

Waterway / Locality	Flash Flood Consequences
Livingstone Creek	Flooding of the Omeo Caravan Park and Omeo Golf Club (also has residents) with damage to infrastructure and relocation of residents required. Overtopping of low-lying bridges along and adjacent to the watercourse. Overtopping of Conneleys Road near the Omeo Golf Course. *Flash flood mitigation works are currently being undertaken around Livingstone Park, Omeo to reduce future flood occurrences.*
Haunted Stream	Overtopping of the Great Alpine Road bridge near Hells Gate.
Buchan River	Faster occurrence of the flood consequences detailed in Appendix A4.
Mitta Mitta River	Hinomunjie Bridge campground
Boggy Creek	Boggy Creek area which consists of a series of water holes and swampy like conditions is prone to flash flooding including flooding of the Bruthen-Buchan Road.
Cann River	Flash flooding up to 250mm over the Monaro Highway near Rifle Range Track and overtopping at Poddys Creek.
Paynesville	Stormwater drainage can become overwhelmed south off the old fire station.
Bairnsdale & surrounds	Stormwater drainage can become overwhelmed in several areas including Broadlands, Eastwood, Dargo Road, Bengworden Road Bengworden Road at Toms Creek, Bengworden Road between Princes Hwy and Goon Nure, Beeks Road, Lower Goon Road, O'Brien Street near the Secondary College, Wallace Street Units, MacLeod Court, Kollmorgan Place, Lanes Road Lucknow, and the Main Street Bairnsdale near APCO and Toyworld.
Eagle Point	Stormwater drainage can become overwhelmed
Bellbird Creek	Flash flooding can undercut and damage the highway in Orbost.
Bruthen, Lakes Entrance & Surrounds	Eastern Creek (downhill from Lake Bunga) can overflow and run into Lakes Entrance residences. Other flash flooding has occurred at Swan Reach Caravan Park, Eastern Beach Road at Lakes Entrance and the Drs Surgery in Jamieson.

Table B2 – Areas of known flash flooding and consequences in East Gippsland.

Coastal / Storm Surge

Elevated winds can increase lake levels by up to 50cm, and high astronomical tides can push water levels above the high tide mark. This puts coastal and lakeside communities such as Bemm River, Eagle Point, Lakes Entrance, Mallacoota, Marlo, Paynesville, and Raymond Island at risk of flooding associated with strong winds and storm surges. These can be further exacerbated if there is riverine flooding also occurring in the environment.

Consideration should be given to any essential coastal infrastructure that may be impacted, such as sewage stations along Lakeside Drive, Mallacoota.

Winds

Damaging and sometimes destructive winds can be widespread with low pressure weather systems crossing most of Victoria, or highly localised resulting from storm cells. Coastal or elevated areas in the alpine and sub-alpine regions may be more exposed to elevated wind speeds.

Incident trends suggest that for inland areas, westerly to north westerly winds show correlation with an increased amount of damage and requests for assistance.
Contrastingly, coastal communities have indicated more damage associated with Easterly winds and weather systems.

Communities should be aware of an increase in trees over roads and private property in areas where intense bushfires have occurred. This is due to damaged or dead trees no longer holding strength.

Alpine blizzards and the snow season

Alpine and sub-alpine areas are subject to snowfall and blizzard conditions, particularly during the winter months. These events can be isolated, or manifest because of a larger severe weather system affecting the wider area.

Snow down to an elevation of 600m above sea level will reach Omeo. Coupled with storms these conditions increase the chance of trees over roads, power outages and dangerous driving conditions on the Omeo Highway and local roads. Local knowledge has indicated the weather reference gauge most relevant to Omeo is the BOM Hunters Hill station (ID 082139).

Vehicles entering Alpine Resorts during the declared snow season are required to carry and fit Diamond Pattern Wheel Chains as directed either by signage or road management. This requirement for wheel chains does not extend beyond the Alpine Resort boundary, however residents and travellers should consider carrying them in the surrounding areas where blizzards and snow can create dangerous road conditions. There have been past incidents along the Omeo Highway where traffic has become isolated due to a change in road conditions.

Seasonal road closures made during the winter months may have an impact on access to remote towns during storm and flood events. This may impact tourists who often shelter in Omeo if the Great Alpine Road and Omeo Highway are impassable. For prolonged events, there are limited food and accommodation options within the town and consideration should be given to opening the local relief centre. This can be actioned through the East Gippsland MERC and/or the East Gippsland Shire Council MEMO.

Isolation

Isolation of communities with single or limited road access can occur during severe weather and thunderstorm or blizzard events where the number of requests for assistance delays response times or impacts the transport network. Communities vulnerable to this include Mallacoota (single access via the Mallacoota-Genoa Road), Bemm River (single access route via the Sydenham Inlet Road), Cann River (if both Monaro and Princes Highway are impacted), Omeo (blizzard conditions can create impassable conditions on the Great Alpine Road, or combined with seasonal road closures) and Raymond Island (reliance on Ferry and water taxi).

Isolation can also occur on remote education centres, 4WD, camping, hiking and recreation spots where access routes have been impacted by flash flooding and/or fallen trees. Consideration is needed for the time of year an event occurs to determine who and what may be impacted. For example the remote Marshmead Methodist Ladies College bush campus hosts year 9 students and staff during Term 1.

Power Outages

SP Ausnet is the registered service provider for electricity in East Gippsland. Depending on the scale of the event, power outages can last from hours to days, sometimes weeks if the damage is extensive enough.

An extended loss of power can cause issues across multiple services which rely on it such as:

- Mobile and radio communication towers including EAS paging services.
- Internet.
- Hospitals and care facilities.
- Water and sewage treatment sites.
- Access to fuel.
- V/Line level crossing barriers.

The loss of communication can impede situational awareness for the responding services, RDO, RAC and IC.

Summary of impacts and consequences from severe weather and severe thunderstorms

Table B3 details considerations for broader impacts and consequences of severe weather events presented across the pillars of social, environment, economy, public administration, and community resilience. It should be noted that no two weather events are the same and impacts will be dependent on the scale and severity of the weather system.

Considerations in a Severe Weather and/or Storm Event in East Gippsland	
Social	
Impacts to People	Loss of life, injury and loss or damage of personal property. Loss of basic functions such as cooking and heating.
Built	
Community Infrastructure	e.g. mountain bike trails.
Essential Infrastructure	Damage to the power distribution network and associated effects such as loss of communication (mobile, internet, radio, EAS paging). Damage to transport networks e.g. road and rail.
Economic	
Recovery Costs	Cost of repair and clean-up works.
Economic activity	Decline or loss of income for the affected area. Is this short-term or long term?
Environment	
Landscapes	Damage to the natural landscape e.g. from flash flooding and/or landslides.
Ecosystems	Loss of or damage to habitat, species and environmental value.
Recreation	Impacts to tourism short and long-term. Consideration for who may be located in recreational areas e.g. campgrounds, 4WD spots, canyoning and rock climbing, kayaking etc when incidents occur.
Public Administration	
Government Services	Disruptions to government services e.g. schools, care facilities, doctors, hospitals resulting from damage, travel disruptions and power or communications outages.
Resupply	Alternative resupply arrangements may be needed from NSW or adjacent LGA's. Fuel supply can impact community and businesses.
Community Resilience	
Wellbeing	Increasing disaster fatigue impacting East Gippsland communities due to successive emergencies e.g. COVID19, 2019-2020 bushfires, multiple flood events, blue-green algae.
Social Networks	Social isolation from communication issues. Physical isolation from road and rail disruptions.
Heritage	Damage to culturally significant sites.

Table B3 – Broad impacts and considerations for storms and severe weather in East Gippsland.

Locations of historic storm damage

The following map displays VICSES requests for assistance for storm events across East Gippsland from the last 10 years. Note that while the map is based on historic data, a severe storm can affect any location.

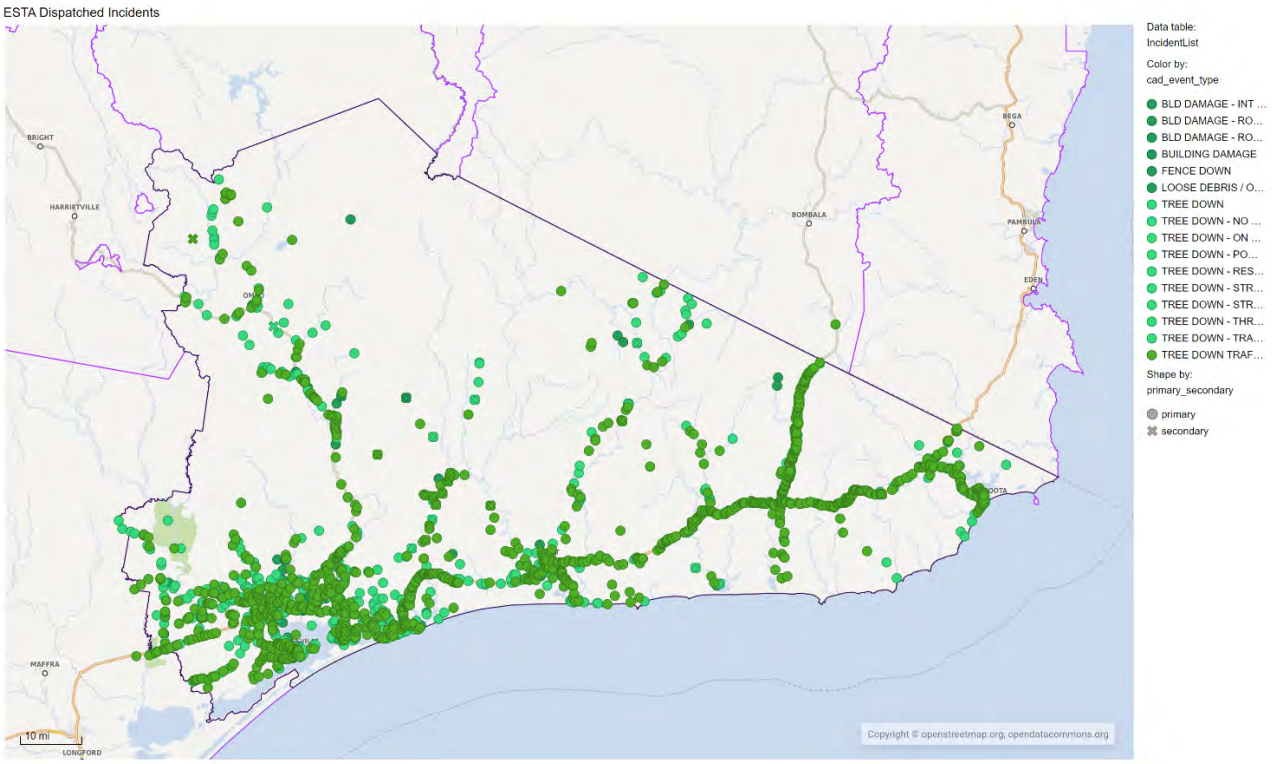


Figure B1 - Map showing requests for assistance to storm related incidents in East Gippsland from 2014 to 2024. Incidents include tree down, building damage, fence down, loose debris and objects, and flash flooding.

Significant storm events that have impacted East Gippsland over the last 10 years include:

Buchan Caves Reserve Flash Flooding

The Buchan Caves reserve has seen several instances of flash flooding, which can occur with little warning and cause significant damage. In December 2023 an intense microburst deposited over 110 mm of rain, with 60+ mm falling within half an hour. The Spring Creek and Fairy Creek catchments were overwhelmed, causing rapid river rises resulting in two fatalities, significant damage and temporary closure to the Buchan Caves Reserve.

Omeo Flash Flooding

The Livingstone Creek runs through Omeo and is susceptible to rapid river rises from heavy rainfall in the catchment. In January 2022 114 mm of rain fell, causing minor flooding and significant damage to the Omeo caravan park and relocation of residents and guests.

Storm specific community education programs

VICSES provides standard community education material on what to do during a storm on its public website.

APPENDIX B2 – SEVERE WEATHER AND STORM DAMAGE SPECIFIC RESPONSE ARRANGEMENTS

In the initial response phase, managing the response to widespread property damage resulting from a severe thunderstorm involves the coordinated assignment of resources to individual requests for assistance. It is akin to a fire service suddenly having to respond to a widespread outbreak of individual domestic house fires at the same time.

This is different to the approach taken for some other hazards such as riverine flooding or bushfire, where there is more likely to be a need to undertake common tasks around building defensive structures or control lines.

After the initial response phase, and in the most severe cases, relief and recover may take on a more familiar look to other natural hazards. However, there may be unique aspects that vary from planning associated with riverine flooding.

An example of this may be assisting vulnerable people. In a flood, the plans typically identify the areas subject to inundation, whereas in a storm, the damage may occur anywhere. As such, there may be high risk premises such as aged care or medical facilities that need assistance after a severe storm but are not identified as at risk from riverine flooding.

In the example of the 2021 cyclogenesis windstorm event that affected the Dandenong Ranges, parts of Gippsland, Macedon Ranges and other localities, the effect on the community lasted weeks with access and power restoration taking weeks to achieve. In the aftermath of that event the community gained value from the sector establishing early on, relief centres and community hubs, however, their establishment was hindered due to the consequences of the flood and storm event.

In addition, initial welfare calls made to community members by the Department of Families, Fairness and Housing (DFFH) and AusNet due to being listed as a power dependent customer or experiencing prolonged power outages were generally appreciated.

Incident Control Centres and Divisional/Sector command points

Incident Control Centres, Divisional Command Points and Sectors are detailed previously in this plan under Part 3 – During Response / Relief Arrangements, section 3.3.3.

It is important to note the nature of severe storm damage may preclude one of the specified locations from being used as intended due to factors such as road blockages (trees down), damage to its infrastructure or loss of mains power.

Response planning and escalation

In the initial response phase, units will receive requests for assistance (RFA's) direct from Triple Zero Victoria and will typically respond in a business-as-usual mode, typically attending events in order of receipt or priority. This is in accordance with the VICSES Operations Management Manual.

As a unit begins to receive a volume of RFAs, it is important that it shifts focus to efficient use of resources through the application of:

- Ensuring it has geographic situational awareness through visualising the location and spread of RFAs via EM-COP situation map or if unable to login, via the public access Emergency.vic.gov.au incidents and warnings page. This will prevent unnecessary travel

times and can assist in allocating resources to manage a number of RFAs located in nearby streets.

- Triaging RFAs including call-backs to residents where appropriate to clarify needs and priority
- Seeking support via the RDO and escalation of response arrangements as appropriate (transfer of control from level 1 to level 2 response arrangements).
- Potential deployment of field observers and intelligence gathering via Snap Send Solve to assess areas where the storm impacted as in many cases, there will be unreported cases of damage that requires assistance from the community

Support arrangements – other agencies assistance

While VICSES units provide the initial response to storm damage, this section details the local arrangements for events where VICSES will require support from local emergency services and government departments/agencies to manage a large number of requests for assistance from the community.

For agencies that are likely to provide regular assistance such as CFA brigades, it is strongly encouraged that these organisations promote to its responders the benefit of completing the E-learn Maintain safety at storm and flood operations. This E-Learn is accessible via the EMV intranet site EM-Learning.

In the municipality, the following agencies typically provide immediate support to assist VICSES units in responding to RFAs.

- East Gippsland Shire Council (including contractors under their control)
- CFA
- Forest Fire Management Victoria (DEECA, Parks Victoria)
- DTP (Vicroads)
- Panel of contractors

Where an ICC is established, it is encouraged that agency EMLOs attend to discuss operational needs with the IC. If an ICC is not established, these arrangements should be discussed between the VICSES RDO/RAC and relevant agency RAC.

The following headings details each agency, the resources that it typically has within the municipality and operational region within first response distance, and the types of tasks its crews are authorised and trained to be tasked with when supporting VICSES storm operations.

East Gippsland Shire Council

- Maintain effective liaison with responding agency
- Manage the coordination of municipal owned resources
- Manage the coordination of Council contractors
- Manage road closures to Council roads
- Support the provision of relief and recovery for impacted communities

- Establish Emergency Relief Centre upon request from the IC/MERC
- Coordinate and facilitate community meetings
- Establish priorities for the restoration of community services and needs
- Assist with collation of initial and secondary impact assessments
- Coordinate media releases and ensure One Source One Message (OSOM) applies
- Coordinate and implement Recovery processes for impacted communities including Emergency Recovery Centre

Other potential services that can be provided by agreement:

- Identify appropriate sand bagging facility sites
- Access local networks to provide local intel and historical knowledge

Country Fire Authority

CFA brigades in the municipality are made up of a mix of urban and rural brigades.

Brigades may have personnel trained to assist with chainsaw, traffic management, Safe Work at Heights (SWAHs), pumping, and lighting.

DEECA

DEECA personnel are trained in a variety of roles and may be able to provide assistance with;

- Plant & equipment
- Chainsaw
- Incident management roles
- Notification and warnings to campers

In East Gippsland, DEECA has two operational districts; Snowy and Tambo. Readiness and Response Plans have been created for the Snowy and Tambo districts, which also contain local knowledge contacts. DEECA may be able to assist with sharing of local knowledge through these identified sources.

External panel of contractors

The Victorian Government has established a panel of contractors that are approved to provide services in emergencies without the need for quote or tender processes.

Power utilities

In the event of a severe storm, significant loss of mains electricity/power is highly likely. Ensuring there is effective coordination between the power distribution network operators and the Incident Control Centre will enhance community information and assist with elements of relief such as ensuring vulnerable people that require medical / or other life sustaining equipment remains functional.

Early liaison with the distribution networks may assist in establishing priorities for power restoration, identifying areas of outages and matching this with any known vulnerable premises such as aged care, medical facilities.

Considerations for operating with other agencies

As other agencies are deployed to assist the IC should consider the following actions:

- Establish a communications plan to enable the tasking of other agency resources. This may include:
  - Use of other agency portable radios at the Sector/Division command point
  - Embedding an CFA member in the comms team so that they can page allocated tasks via EAS/VIPER direct to its brigade resources
  - Embedding an EMLO from other assisting agencies at the sector/Division command point for comms purposes
  - Use of mobile phones or sat phones to communicate
- Determining an agreed response to downed powerlines as this is often a predominant hazard for storm events
- Ensuring other agency personnel who are undertaking EMLO roles have access to EM-COP
- Preparing a briefing to support in-coming other agency resources to identify:
  - staging area location and any safety issues with accessing it (closed roads/powerlines down)
  - resources available such as re-supply of consumables (tarps/sandbags)
  - welfare arrangements
  - duty time limitations (these should be consistent with VICSES SOP 003 Fatigue Management and Duty Time Limitations

Consideration for operating with cross border arrangements

Depending on the extent of a severe weather or severe thunderstorm event, resupply arrangements such as fuel and food may need to be sourced from New South Wales (NSW), particularly if northern communities such as Mallacoota, Bendoc or Cann River are isolated from other parts of East Gippsland.

Situational awareness of cross border conditions such as road closures should be maintained to determine the logistics of supply requests.

APPENDIX C – PUBLIC INFORMATION AND WARNINGS

Introduction

Flood and storm warning products and Flood Class Levels can be found on the BoM and VicEmergency websites. Flood and storm warning products include Severe Thunderstorm Warnings, Severe Weather Warnings, Flood Watches and Flood Warnings.

VICSES uses VicEmergency EMCOP Public Publishing and Emergency Alert Telephone warnings to distribute riverine and flash flood (and other hazards) warnings in Victoria.

The EMCOP platform enables simultaneous publishing to the VicEmergency app, website, hotline (1800 226 226) and Emergency Broadcasters. Communities can also access this information through EMV and VICSES social media channels (VicEmergency, Victoria State Emergency Service on Facebook and VICSES News on X and so forth) and emergency broadcasters, such as Sky News TV, ABC Gippsland and various other local emergency broadcaster radio stations (current list available via the EMV website).

During some emergencies, VICSES may alert communities by sounding a local siren (where this exists) or via media broadcasters by the use of SEWS, or by using the Emergency Alert (EA) platform to send an SMS to mobile phones or a voice message to landlines. EMCOP Public Publishing Business Rules for Riverine Flood, Flash Flood and Severe Weather / Thunderstorm are available in the Public Information tab of the IMT Toolbox, providing further guidance on specific triggers, roles and responsibilities. VICSES SOP057 and JSOP 04.01 provide further guidance.

Flood Warning Products

VICSES Regional staff (typically the RDO) or ICCs where established lead the issuing of warnings for riverine flood events when pre-determined triggers are met (issuing of a BOM Flood Watch or Warning), and share locally relevant and tailored information via VicEmergency (all hazards platform hosted by EMV) and standard VICSES communication channels (VICSES social media, traditional media, web and face to face). These activities are coordinated by the VICSES RDO and approved by the VICSES RAC, or the PIO and IC respectively (when an ICC is active).

If verified reports are received of flash flooding posing, or resulting in, a significant threat to life or property, VICSES Regions (or ICCs) will issue a flash flood warning product via EM-COP.

VICSES distributes flood emergency information to the media through “Flood Watches and Warnings”. Flood watches and warnings provide BoM flood warning information combined with other relevant sources of intelligence to provide communities information regarding possible flood consequences and safety advice, that is not contained in BoM flood warning products.

Flood watch and warning products should refer to the warning title within the Bulletin header, for example Flood Bulletin for Major Flood Warning on Yarra River.

VICSES Flood Warnings should follow the following structure by describing:

- Critical details: including what the current and predicted flood situation is
- Action Statement: An action statement that is consistent with the Australian Warnings System (AWS) https://www.australianwarningsystem.com.au/
- What you should do: what the community should do in response to flood warnings
- Potential Impacts: what flood consequences are or the likely flood consequences

More Information: including where the community should go to seek further information and who the community should call if they require emergency assistance.

It is important that the description of the predicted flood situation is consistent with and reflects the relevant BoM Flood Warning and is tailored and made relevant to at risk communities using a range of intelligence sources.

In areas covered by a Total Flood Warning System (TFWS) VICSES Flood Watches should be issued for a whole river catchment. Additionally, VICSES flood Warnings should be issued at the pre-determined sub-catchment level focused on specific gauge reference areas. These are the area in which flood consequences specifically relate to the relevant flood gauge.

There may also be a need to issues warnings for areas not covered by the TFWS using available intelligence. The issue of these warnings is guided by the likely or observed impacts of the floodwater with guidance provided in the VICSES Riverine Flood Business Rules.

VICSES Flood Warnings should be prepared and issued after receipt of each Flood Watch and Flood Warning from the BoM, or after Severe Weather or Thunderstorm Warnings indicating potential for severe flash flooding.

To ensure VICSES flood warnings are released in a timely manner much of the relevant information is built into warnings templates in EMCOP, including a range of pre-development statements that can be ‘dragged and dropped’ into messages as relevant.

Riverine Flood Warning Example

An example riverine flood warning issued by the BOM is provided in Figure C1.

The Bureau of Meteorology

IDV36120

Australian Government Bureau of Meteorology

Moderate Flood Warning for the Buchan River and Snowy River

Issued at 1:42 pm EST on Monday 20 May 2024

Flood Warning Number: 2

MODERATE FLOODING POSSIBLE AT D/S BASIN CREEK AND JARRAHMOND DURING SATURDAY

Rainfall over the last few days has caused river level rises and flooding in the Snowy River Catchment. Further rainfall is forecast during Friday and over the weekend which will extend the flooding and potentially cause renewed river levels.

Please note that flood class levels at Jarrahmond, McKillops Bridge, Buchan, and Orbost have been updated to better reflect flood impacts along the Snowy River. Please refer to Victorian Flood Class Levels South of Divide for current flood class levels:
http://www.bom.gov.au/vic/flood/brochures/VIC_SLS_current.pdf

Bombala River:

River levels are easing along the Bombala River.

The Bombala River at Bombala peaked at 3.40 metres (minor flooding) around 09:00 pm Thursday 30 November and is currently at 2.57 metres and falling, below the minor flood level. The Bombala River at Bombala is expected to remain below the minor flood level (3.00 m) during Friday.

Buchan River:

Moderate flooding is occurring along the Buchan River.

The Buchan River at Buchan peaked at 3.70 metres around midnight Thursday into Friday and is currently at 3.51 metres and falling, with moderate flooding. The Buchan River at Buchan will fall below the moderate flood level (3.50 m) Friday morning. The river level is likely to remain above the minor flood level (2.50 m) overnight Friday into Saturday.

Snowy River downstream of McKillops Bridge:

Moderate flooding may occur along the Snowy River downstream of McKillops Bridge.

The Snowy River D/S Basin Ck is currently at 4.40 metres and steady, with minor flooding. The Snowy River D/S Basin Ck may reach the moderate flood level (5.50 m) during Saturday.

The Snowy River at Jarrahmond is currently at 5.54 metres and steady, with minor flooding. The Snowy River at Jarrahmond may reach the moderate flood level (6.20 m) during Saturday.

Flood Safety Advice:

SES advises that all community members should:

Never walk, ride or drive through floodwater,
Never allow children to play in floodwater,
Stay away from waterways and stormwater drains during and after heavy rain,
Keep well clear of fallen power lines
Be aware that in fire affected areas, rainfall run-off into waterways may contain debris such as ash, soil, trees and rocks, and heavy rainfall increases the potential for landslides and debris across roads.

Figure C1 - Example riverine flood warning.

Severe Weather Warning Products

VICSES at the state tier (or SCC Public Information Section) issue all severe weather, thunderstorm and damaging surf warnings as these are rarely confined to a single region or area and also play an important role in sharing riverine and flash flood information via state-based standard communication channels.

Severe Weather Warning Example

An example severe warning issued by the BOM is provided in Figure C2a and C2b.

Severe Thunderstorm Warning Example

An example severe weather warning issued by the BOM is provided in Figure C3a and C3b.

Coastal Hazard Warning Example

An example coastal hazard warning issued by the BOM is provided in Figures C4a and C4b.

IDV21038
Australian Government Bureau of Meteorology

TOP PRIORITY FOR IMMEDIATE BROADCAST

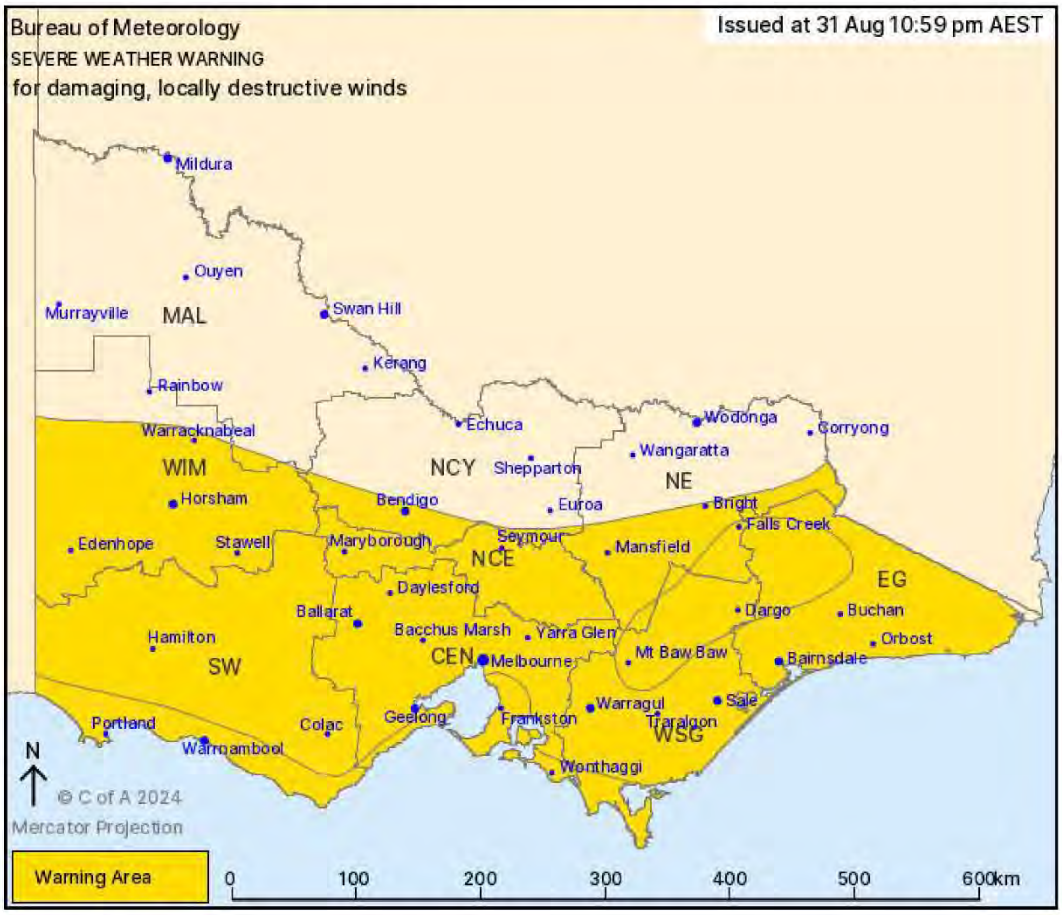
Severe Weather Warning

for DAMAGING, LOCALLY DESTRUCTIVE WINDS

For people in Central, East Gippsland, South West, North Central, West and South Gippsland, Wimmera and parts of Northern Country, North East and Mallee Forecast Districts.

Issued at 10:59 pm Saturday, 31 August 2024.

Damaging winds continuing with DESTRUCTIVE WINDS developing about coastal and alpine areas late Sunday.



Weather Situation: A vigorous west to northwesterly airstream is bringing damaging winds to parts of the state, easing slightly overnight. Winds are expected to strengthen again Sunday afternoon, ahead of a strong cold front. Conditions are expected to ease throughout the state on Monday morning.

DESTRUCTIVE WEST TO NORTHWESTERLY WINDS with peak gusts of up to 130 km/h are possible from Sunday evening at coastal locations from the South Australian border to Bellarine Peninsula, southeastern Melbourne suburbs, and Mornington Peninsula to Wilsons Promontory, primarily in showers.

FOR CENTRAL VICTORIA INCLUDING MELBOURNE METROPOLITAN: DAMAGING WEST TO NORTHWESTERLY WINDS averaging 50 to 65 km/h with peak gusts of around 100 km/h are possible from late Sunday afternoon.

FOR WESTERN VICTORIA, THE GEELONG AREA, THE MORNINGTON PENINSULA, GIPPSLAND: DAMAGING WEST TO NORTHWESTERLY WINDS averaging 50 to 65 km/h with peak gusts of around 100 km/h are possible about coastal areas this evening, extending throughout western districts on Sunday, and Gippsland during Sunday evening.

Figure C2a - Example Severe Weather Warning.

FOR THE NORTHEAST RANGES: DAMAGING WEST TO NORTHWESTERLY WINDS averaging 60 to 70 km/h with peak gusts to 100 km/h are possible throughout the weekend. DESTRUCTIVE WIND GUSTS up to 130 km/h are possible from Sunday evening.

A Coastal Hazard Warning is also current for the Victorian coastline. Please refer to http://www.bom.gov.au/vic/warnings/

Locations which may be affected include Horsham, Warrnambool, Bendigo, Seymour, Maryborough, Ballarat, Geelong, Melbourne, Traralgon and Bairnsdale.

Significant wind observations in the 6 hours to 10:50PM AEST Saturday include:

113 km/h wind gust was recorded at Mount Hotham Airport.

102 km/h wind gust was recorded at Mount Buller.

102 km/h wind gust was recorded at Mount William.

102 km/h wind gust was recorded at Aireys Inlet.

95 km/h wind gust was recorded at Avalon Airport.

91 km/h wind gust was recorded at Yarram Airport.

The State Emergency Service advises that people should:

* If driving conditions are dangerous, safely pull over away from trees, drains, low-lying areas and floodwater. Avoid travel if possible.

* Stay safe by avoiding dangerous hazards, such as floodwater, mud, debris, damaged roads and fallen trees.

* Be aware - heat, fire or recent storms may make trees unstable and more likely to fall when it's windy or wet.

* Check that loose items, such as outdoor settings, umbrellas and trampolines are safely secured. Move vehicles under cover or away from trees.

* Stay indoors and away from windows.

* If outdoors, move to a safe place indoors. Stay away from trees, drains, gutters, creeks and waterways.

* Stay away from fallen powerlines - always assume they are live.

* Be aware that in fire affected areas, rainfall run-off into waterways may contain debris such as ash, soil, trees and rocks. Heavy rainfall may also increase the potential for landslides and debris across roads.

* Stay informed: Monitor weather warnings, forecasts and river levels at the Bureau of Meteorology website, and warnings through VicEmergency website/app/hotline.

The next Severe Weather Warning will be issued by 5:00 am AEST Sunday.

Warnings are also available through TV and Radio broadcasts, the Bureau's website at www.bom.gov.au or call 1300 659 210. The Bureau and State Emergency Service would appreciate warnings being broadcast regularly.

Figure C2b - Example coastal hazard warning.

IDV21033
Australian Government Bureau of Meteorology

TOP PRIORITY FOR IMMEDIATE BROADCAST

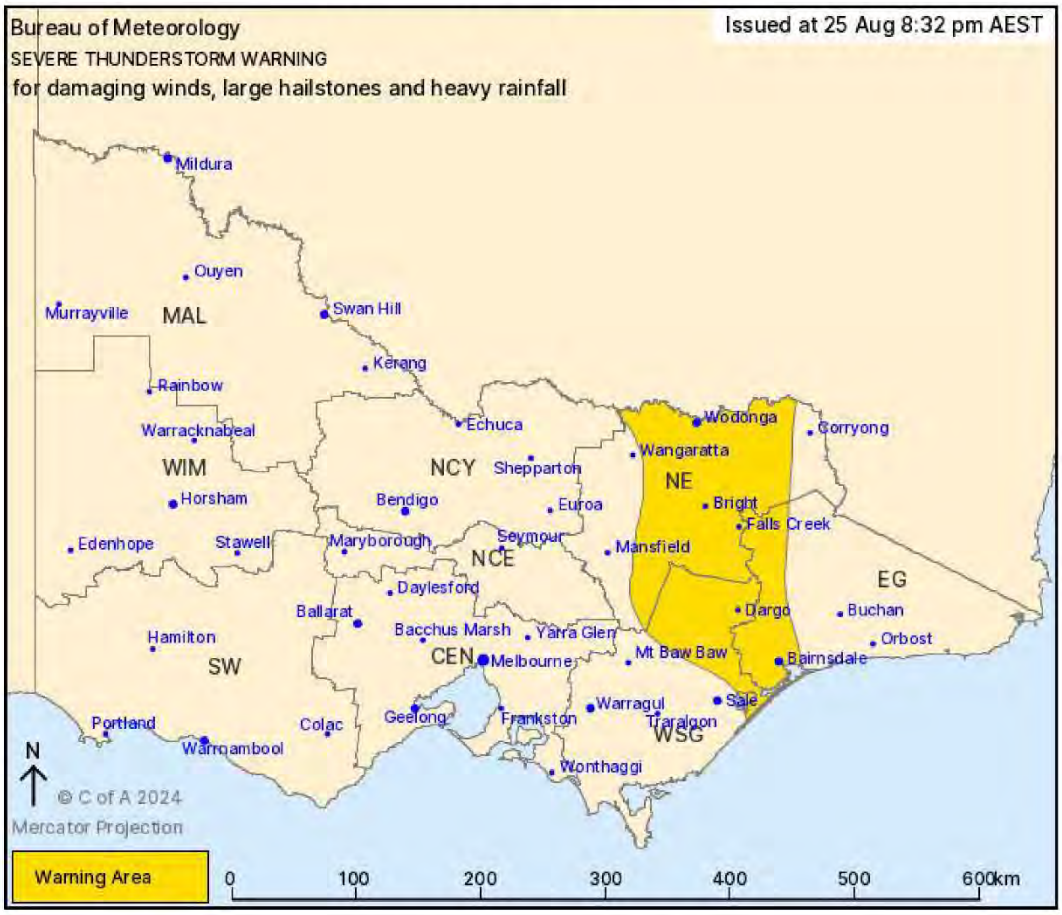
Severe Thunderstorm Warning

for DAMAGING WINDS, LARGE HAILSTONES and HEAVY RAINFALL

For people in parts of East Gippsland, North East, West and South Gippsland and Northern Country Forecast Districts.

Issued at 8:32 pm Sunday, 25 August 2024.

Severe thunderstorms persisting into the evening, clearing from the west.



Weather Situation: a strong cold front with strong associated upper-level winds is crossing the state. This high-instability, high-shear environment is producing conditions conducive to severe thunderstorm development, unusual for this time of year. Thunderstorms will be fast moving towards the southeast and are likely to continue throughout the afternoon and into the evening.

Severe thunderstorms are likely to produce damaging winds, large hailstones and heavy rainfall that may lead to flash flooding in the warning area over the next several hours. Locations which may be affected include Wodonga, Bright, Bairnsdale, Falls Creek, Mt Buller and Omeo.

Severe thunderstorms are no longer occurring in the Central and North Central districts and the warning for these districts is CANCELLED.

Figure C3a - Example Severe Thunderstorm Warning.

3 to 6 cm hail observed near Bendigo earlier this afternoon.

98 km/h wind gust was recorded at Horsham at 4:13 pm.

93 km/h wind gust was recorded at Warracknabeal Airport at 4:34 pm.

91 km/h wind gust was recorded at Ben Nevis at 4:41 pm.

98 km/h wind gust was recorded at Hopetoun Airport at 4:42 pm.

100 km/h wind gust was recorded at Mount Hotham at 4:57 pm.

104 km/h wind gust was recorded at Mount Buller at 5:22 pm.

150 km/h wind gust was recorded at Mount Buller around 6pm.

The State Emergency Service advises that people should:

* If driving conditions are dangerous, safely pull over away from trees, drains, low-lying areas and floodwater. Avoid travel if possible.

* Stay safe by avoiding dangerous hazards, such as floodwater, mud, debris, damaged roads and fallen trees.

* Be aware - heat, fire or recent storms may make trees unstable and more likely to fall when it's windy or wet.

* Check that loose items, such as outdoor settings, umbrellas and trampolines are safely secured. Move vehicles under cover or away from trees.

* Stay indoors and away from windows.

* If outdoors, move to a safe place indoors. Stay away from trees, drains, gutters, creeks and waterways.

* Stay away from fallen powerlines - always assume they are live.

* Be aware that in fire affected areas, rainfall run-off into waterways may contain debris such as ash, soil, trees and rocks. Heavy rainfall may also increase the potential for landslides and debris across roads.

* Stay informed: Monitor weather warnings, forecasts and river levels at the Bureau of Meteorology website, and warnings through VicEmergency website/app/hotline.

The next warning is due to be issued by 11:35 pm.

Warnings are also available through TV and Radio broadcasts, the Bureau's website at www.bom.gov.au or call 1300 659 210. The Bureau and State Emergency Service would appreciate warnings being broadcast regularly.

Figure C3b - Example Severe Thunderstorm Warning.

IDV21137
Australian Government Bureau of Meteorology

TOP PRIORITY FOR IMMEDIATE BROADCAST

Coastal Hazard Warning

for ABNORMALLY HIGH TIDES and DAMAGING SURF

For people in parts of Central, East Gippsland, South West and West and South Gippsland Forecast Districts.

Issued at 10:44 pm Monday, 2 September 2024.

Damaging surf and elevated sea levels along exposed coasts, easing by Tuesday morning.

Weather Situation: A vigorous westerly airstream across the south of the state is expected to persist following a series of cold fronts. This is leading to large and powerful waves along the South West and exposed parts of the Central coasts until early Tuesday morning. Tides are expected to be near or higher than the highest tide of the year.

ABNORMALLY HIGH TIDES, which may cause sea water flooding of low lying areas, are possible along the Gippsland coasts until early Tuesday morning. Abnormally High Tides leading to inundation at low lying coasts are also occurring about Western Port and other parts of the Central coasts until early Tuesday morning.

DAMAGING SURF conditions are occurring over southwest and central coastal parts of the state between the SA/VIC border and Cape Otway and between Blairgowrie and Wilsons Promontory, particularly about exposed west and south-facing coasts. The largest waves peaked during Monday morning and afternoon and will be abating during early Tuesday morning. These conditions may produce localised damage and coastal erosion. Beach conditions in these areas will be dangerous and people should stay well away from the surf and surf exposed area.

Locations which may be affected by abnormally high tides include Mallacoota, Lakes Entrance, Port Albert, and surrounds of Western Port. Locations which may be affected by damaging surf include Warrnambool, Portland, Nelson, and southern parts of Mornington Peninsula and Phillip Island.

A peak significant wave height of 8.4 m was recorded at Cape Bridgewater at 03:00 am Monday.

The Victoria State Emergency Service and Life Saving Victoria advise that people should be aware of the following:

* Potential impacts could include strong ocean currents, dangerous waves, instability to cliff areas, and flooding in low-lying coastal areas.

* Damaging surf conditions are dangerous to swimmers, surfers and rock fishers. Stay away from impacted coastal areas until conditions subside.

* Boats in harbours, estuaries and shallow coastal areas should return to shore. Secure your boat and move away from the waterfront.

* When in doubt, don't go out.

* Do not walk, ride or drive through flood waters.

* Stay away from beaches, tidal rivers and creeks.

Figure C4a - Example Coastal Hazard Warning.

* If you have a boat or water craft, haul out if possible or check your moorings are secure.

* Keep away from flooded drains, rivers, streams and waterways.

* Stay informed - monitor weather warnings and forecasts at the Bureau of Meteorology website, and warnings through VicEmergency app, website and hotline (1800 226 226).

The next Coastal Hazard Warning will be issued by 5:00 am AEST Tuesday.

Warnings are also available through TV and Radio broadcasts, the Bureau's website at www.bom.gov.au or call 1300 659 210. The Bureau and State Emergency Service would appreciate warnings being broadcast regularly.

Figure C4b - Example Coastal Hazard Warning.

APPENDIX D – VICSES SPECIFICATIONS FOR MUNICIPAL FLOOD AND STORM EMERGENCY SUBPLANS AND LOCAL FLOOD GUIDES

Overview

Victoria State Emergency Service (VICSES) had developed this specification to provide guidance to the preparers of information that contributes to flood investigations and flood management studies. It is specifically for information that will be used as a direct input into municipal flood and storm emergency sub-plans (MFSEPs) and/or Local Flood Guides (LFGs).

The information within these sub-plans and guides is used to inform emergency management efforts before, during and after flood events and to increase community resilience through awareness and engagement of local flood risks.

MFSEPs are developed to assist emergency management agency personnel in their planning for the preparation, response and recovery from local flood and storm events. LFGs are the community facing guides used to identify their local risks, sources of information and how they should prepare for potential flooding.

To promote a consistent and robust approach for the development of MFSEPs and LFGs across Victoria, VICSES have developed an MFSEP Template, an LFG template and tools and resources to support the development and socialisation of MFSEPs and LFGs. This appendix is an attachment to the MFSEP template.

The VICSES Emergency Management Planning team encourage Innovation in relation to the process for developing MFSEPs and LFGs. You can send your suggestions via email for improvement or innovation to the standard process, or any other queries you may have to: emp@ses.vic.gov.au.

Key Considerations

Where a provider/consultant is preparing a product or output as part of a flood investigation that VICSES will be including in either an MFSEP or LFG, they should consider the following:

- Is there an existing MFSEP or LFG that relates to the area(s) defined in the scope of the flood investigation?
- If yes, how will the outputs of the study integrate with the existing MFSEP and/or LFG?
- Based upon the outcomes of the flood investigation, are there any amendments which VICSES should be making to the MFSEP/LFG?
- Which communities and/or catchment areas will be covered within the MFSEP and LFG outputs?

Text to include in body of flood study project brief (if possible)

The consultant shall prepare the flood intelligence and mapping for the municipal flood and storm emergency sub-plan and the local flood guide in accordance with the Victoria State Emergency Service's Specifications for municipal Flood and storm emergency sub-plans (MFSEPs) and Local Flood Guides (LFGs).

Table 1 – Desired municipal flood and storm emergency sub-plan outputs

Note – Please see MFSEP template for examples of how the following information could be formatted/represented.

Section of MFSEP	Floodplain manager and flood consultant output	Notes
Appendix A – 'flood threats for municipality	Information required: ▪ Overview of flood risks including catchments and communities prone to flooding. ▪ Historic flooding information. ▪ Overview of main flood impacts including to infrastructure. ▪ Identification of major dams, waterways, drains and any water storage failure risks, including properties and communities likely to be impacted. ▪ Identification of significant flood mitigation works, (eg levees etc)	*- It should be determined whether the 'Flood Intelligence' outputs will be limited to those that relate to the area defined in the scope of the flood investigation or provided for the whole Municipality.* *- Where there are multiple catchments being covered within a Municipality each may be separated by the catchment or river system they apply to using a logical title structure (e.g. A1, A2, A3 etc.)*
Appendix A – typical flood peak travel times	Information required: ▪ Waterway(s) and relevant gauges that relate to the area(s) defined in the scope of the flood investigation. ▪ Typical travel times from one key location to another and any relevant comments/additional information. ▪ Include when there are steep rises before the peak arrives (when damages occur) to define how much time is available before damages occur.	*The table may make reference to typical travel times for historic or design events and use datum (RL or AHD) that is consistent with what is used in the local flood warning service.*
Appendix A – East Gippsland Flood Emergency Plan	Information required for community/township flood emergency plans that relate to the area(s) defined in the scope of the flood investigation including: ▪ Overview of flooding risks and consequences ▪ Description of significant flood mitigation systems and measures ▪ Flood impacts and required actions ▪ Information for Flood Intelligence Cards, including consequence and impact information that relate to river height derived in the relevant datum in use. If river height data is not available, AEP/ARI events or river flow (ML/d) and a rainfall based simulation may be used (mm/hour). ▪ If relevant, summarise the existing flood warning system arrangements in place for the community/ township.	*- Where there are multiple Community Flood Emergency Plans needed each community / township should have its own plan and be separated by using a logical title structure (e.g. Appendix C1, C2, C3 etc.)* *- The datum used (RL or AHD) should be consistent with what is used in the local flood warning service.* *- For column 4, under the 'Actions' heading of the Flood Intelligence Card template, please provide suggested input if possible and highlight any text added to this section.*

Appendix A – flood evacuation arrangements	Where relevant and where flood intelligence is available, the following information is required: ▪ Areas likely to require evacuation ▪ Time available for evacuation ▪ Suitable evacuation routes and closure of evacuation routes ▪ Suitable predicted trigger heights for evacuation ▪ Evacuation trigger points for any essential infrastructure or vulnerable facilities e.g. nursing homes, hospitals and caravan parks.	*Where there are multiple Flood Evacuation Plans needed each community / township should have its own plan and be separated by using a logical title structure (e.g. Appendix D1, D2, D3 etc.).*
Appendix A – maps and schematics	Maps that relate to the area defined in the scope of the flood investigation. May include: ▪ Township Map ▪ Catchment Map ▪ Damages Map ▪ Schematics If data is available maps should be produced related to a river gauge. If not, the flood extent should be shown to relevant historical flood extent(s) and/or design AEP/ARI event(s) as specified. Where data is available maps should be developed to show flood depths and velocities. Please see the 'VICSES Map Specifications for MFSEPs and LFGs' and 'VICSES Flood Mapping Symbol Set' attached here for guidance on content and format. The specifications include a **standard disclaimer note** to be added to each map, see text below. *This map publication is presented by Victoria State Emergency Service for the purpose of disseminating emergency management information. The contents of the information have not been independently verified by Victoria State Emergency Service. No liability is accepted for any damage, loss or injury caused by errors or omissions in this information or for any action taken by any person in reliance upon it. Flood information is provided by <CMA name>.* Maps should be scaled A1 and A4 size.	*Where there are multiple maps, each map should be separated into sections (for example, catchment areas, townships /communities and so forth.) and a logical title structure should be used (for example, Appendix F1, F2, F3).*

Table 2 – Desired local flood guide outputs

Note – Please see the attached local flood guide template for formatting and contextual considerations.

Section of LFG	Floodplain manager & flood consultant output
Township map	Flood extent map that relates to the area defined in the scope of the flood investigation including a 'township' scale map for the targeted community in accordance with VICSES standard format for LFGs maps. Please see the 'VICSES Map Specifications for MFSEPs and LFGs' and 'VICSES Flood Mapping Symbol Set' attached here for guidance on content and format. Maps should be scaled A4 size for the document and A1 for an online version.
Flood gauge table	*See Local Flood Guide Template for a blank example.* A flood gauge table needs to include flood impact and consequence information that relates to at least 3 river heights (m) on the gauge. When no gauge heights are available, relevant historical flood events and/or AEP/ARI modelled events can be used in place. The impact and consequence information should relate to Flood Class Levels where they exist. Where Flood Class Levels don't exist, impact and consequence information should relate to relevant historical flood events and AEP/ARI modelled events. Information in this table should be easy for the general community to understand and include practical information such as road closures, property and above floor flood inundation risks and likely services disrupted. The table should not include actions for emergency services to undertake at that time or any tactical planning information.
Local Flood Information	Brief, community focussed summary information that relates to the area defined in the scope of the flood investigation including: ▪ Information about the types of flooding that may occur in the town and why. For example, riverine, flash or overland flows from surrounding areas. ▪ Summary of historic floods, the flood heights and known flood impacts and consequences including houses inundated, road closures, impacts to essential services. ▪ Specific information that affects flooding in the town, such as levees.

Attachment 1 - VICSES map specifications for municipal flood emergency plans and local flood guides

Data Quality Hierarchy for MFSEP and LFG inundation Maps	MFSEP township	MFSEP catchment	MFSEP building damages	LFG township	Schematics
					Note: no data hierarchy applicable
	Map				
Riverine 1. Flood class levels (minor, moderate, major) 2. Historical extent(s) 3. Modelled extent(s) **Flash flood** 1. Historical extent(s) 2. Modelled extent(s)	Railways Roads **waterways Levees River gauges, rain gauges & combined gauges Cadastre *Features of interest Markers and directions for neighbouring towns and gauge locations	Railways Roads **waterways River gauges, rain gauges & combined gauges Cadastre * Features of interest Markers and directions for neigbouring towns and gauge locations	Railways Road Roads impacted by flooding **Waterways Levees River gauges, rain gauges & combined gauges Cadastre Flood model extent(s) Buildings flooded above floor buildings isolated Land parcel boundary *Features of interest Markers and directions for neighbouring towns and gauge locations	• Spatial Vision base map includes roads and waterways. • Small scale map default features of interest: Ambulance Station, Camp Ground, Coast Guard, Fire Station, Hospital (Emergency), Hospital / Day Procedure, Lifesaving Club, Mine / Quarry, Municipal Office / Civic Centre, Police Station, SES Unit, Caravan Park, Group Camp, Helipad, Airport / Airfield. • Large scale map (under 50k scale) default features of interest: Aged Care / Disability Support, Ambulance Station, Camp Ground, Childcare/Kindergarten, Coast Guard, Community Venue, Education Facility, Fire Station, Hospital (Emergency), Hospital / Day Procedure, Lifesaving Club, Mine / Quarry, Municipal Office / Civic Centre, Place of Worship, Museum, Police Station, SES Unit, Caravan Park, Group Camp, Retirement Village, Helipad, Airport / Airfield. • Drainage infrastructure (to be included at any scale if available and within map boundary): River gauge, rain gauge, river and rain gauge, levees, retarding basins. • Cadastre: Only where it doesn't impact the overall ease of interpreting the map, generally most suitable to zoomed in maps, (likely scale range 1-24k). • Markers and directions for neighbouring towns and gauge locations. Used for regional maps to limit the extent of the map but show an item of detail (eg. Broken River @ Doggetts Bridge gauge, 2km or 10km to Echuca)	River gauges, rain gauges & combined gauges Flood class levels **waterways Towns Population data Typical food peak travel times Major highways Local Government names SES unit names Summary flood risk information Property damage historical or AEP/ARI

	Map references				
	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer	SES, CMA Council logo Legend Title, Scale md North Reference VICSES disclaimer	SES, CMA and Council logo Legend Title, Scale and north reference VICSES disclaimer	• Legend including map title. • Scale • North reference Included within the document, but not the map itself: Logos of VICSES, CMA, LGA and the map disclaimer.	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer Flow direction
	Flood extend and overlays				
	Flood extent overlay(s). Up to 3 extents per map include 1% AEP/I in 100 yr ARI	Flood extent 0verlay (1 % AEP preferred)	Up to 5 model events represented per map, each showing properties impacted in a different colour.	• The default is generally 1% AEP or Minor, Moderate and Major where flood extents for these levels exist. • The inclusion of both the 1% AEP and Minor, Moderate and Major flood extents should only be included only where there is a noticeable difference between the overlays. • 5% AEP and/or 20% AEP can also be included with the 1% AEP where this information exists but should only be used where there is a noticeable difference between the overlays.	

Data Quality Hierarchy for MFEP and LFG inundation maps	MFEP - Township	MFEP – Catchment	MFEP - Building Damages	LFG - Township	Schematics *Note: No data heirarchy applicable*
	Map				
RIVERINE **1.** Flood class levels (minor, moderate, major) 2. Historical extent(s) 3. Modelled extent(s) (AEP/ARI - up to 3 extents per map) **FLASH FLOOD** 1. Historical extent(s) 2. Modelled extent(s) (AEP/ARI - up to 3 extents per map)	Railways Roads **Waterways Levees River gauges, rain gauges & combined gauges Cadastre *Features of interest Markers and directions for neighbouring towns and gauge locations	Railways Roads **Waterways Levees River gauges, rain gauges & combined gauges Cadastre *Features of interest Markers and directions for neighbouring towns and gauge locations	Railways Roads Roads impacted by flooding **Waterways Levees River gauges, rain gauges & combined gauges Cadastre Flood Model Extent(s) Buildings flooded above floor Buidings isolated Land parcel boundary *Features of interest Markers and directions for neighbouring towns and gauge locations	Flood extent (1% AEP/1 in 100 yr ARI) Flood Model Extent (if required) RailwaysRoads **Waterways Levees River gauges, rain gauges & combined gauges Cadastre *Features of interest (ONLY Police, Schools, Hospital, Ambulance, Community Centres, CFA, VICSES) Markers and directions for neighbouring towns and gauge locations (eg 'xxkm to Echuca')	River gauges, rain gauges & combined gauges Flood class levels **Waterways Towns Population data Typical flood peak travel times Major Highways Local Government names SES unit names Summary flood risk information Property damage historical or AEP/ARI
	Map References				
	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer	SES, CMA and Council logo Legend Title, Scale and North Reference VICSES disclaimer Flow Direction
	Flood Extents and Overlays				
	Flood extent overlay(s). Up to 3 extents per map, include 1% AEP/1 in 100 yr ARI	Flood extent overlay (1% AEP preferred)	Up to 5 model events represented per map, each showing properties impacted in a different colour.	1% AEP/1 in 100 ARI unless otherwise required.	

* Features of interest Includes:

VICSES units, VICSES regional offices, fire stations, police stations, ambulance, coastguard, hospitals, education facilities, kindergarden / childcare, community centres, aged care facilities, retirement villages, places of worship, municipal building, municipal depot, electrical sub-station / power station, telephone exchange, drainage pumping station, sewerage pumping station, caravan park, camping ground, picnic area, helipad, airport, mine, law court, lifesaving club, museum, prison / justice facility, tip / recycling.

**Waterways Includes:

river, stream/creek, dam/reservoir/lake, drain/channel, swamp/natural wetland

NOTES:

- **Flood depth overlays** are to be provided for the following 3 classifications; 0.05m- 0.3m Low, 0.3m-0.6m Moderate, 0.6m+ High-Extreme.
- **Flood hazard class overlays** where available are to be classified into 6 categories (H1 – H6) in accordance with the Australian Rainfall and Runoff 2019 Guidelines (http://book.arr.org.au.s3-website-ap-southeast-2.amazonaws.com/, Book 6, Chapter 7). They are described as:

Table 6.7.3. Combined Hazard Curves - Vulnerability Thresholds (Smith et al., 2014)

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings.
H2	Unsafe for small vehicles.
H3	Unsafe for vehicles, children and the elderly.
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Specifications for each classification are as follows.

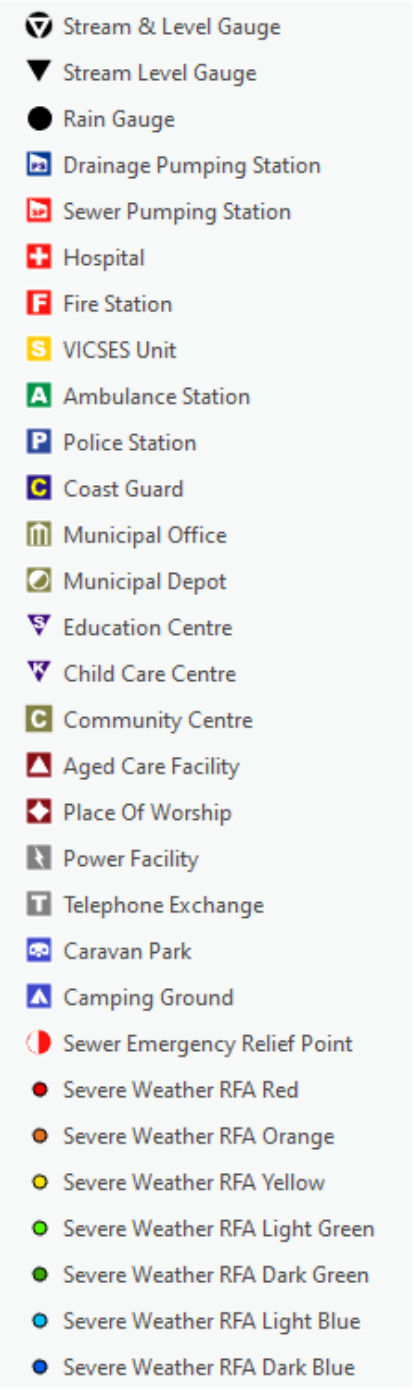
Table 6.7.4. Combined Hazard Curves - Vulnerability Thresholds Classification Limits (Smith et al., 2014)

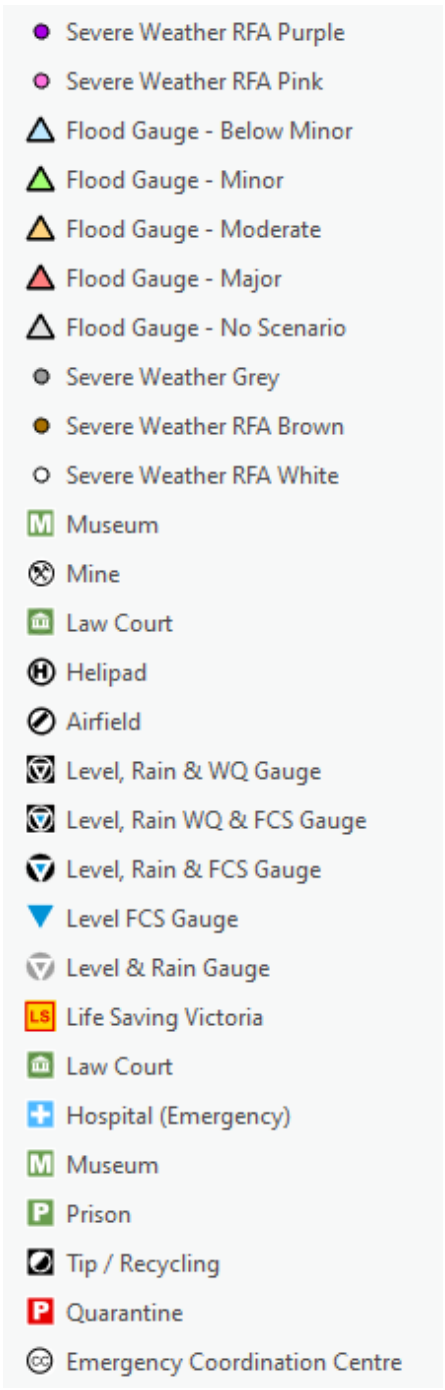
Hazard Vulnerability Classification	Classification Limit (D and V in combination)	Limiting Still Water Depth (D)	Limiting Velocity (V)
H1	D*V ≤ 0.3	0.3	2.0
H2	D*V ≤ 0.6	0.5	2.0
H3	D*V ≤ 0.6	1.2	2.0
H4	D*V ≤ 1.0	2.0	2.0
H5	D*V ≤ 4.0	4.0	4.0
H6	D*V > 4.0	-	-

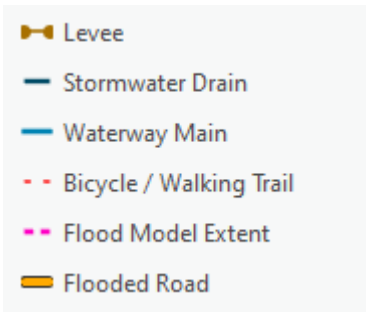
- Symbol colours for each Hazard Vulnerability Classification are contained within the VICSES flood mapping symbol set specification sheet as per attachment 2.
- The preference is for *Flood Hazard Class Mapping*. However where information is only available for flood depth and not flood velocity, *Depth Class Mapping* should be developed.
- Where appropriate and the data is available, maps should be developed for events greater than the major flood level and greater than the 1% AEP/1 in 100 yr ARI flood level.
- All extents used in maps should provide the applicable river gauge height on the map where this information is available.

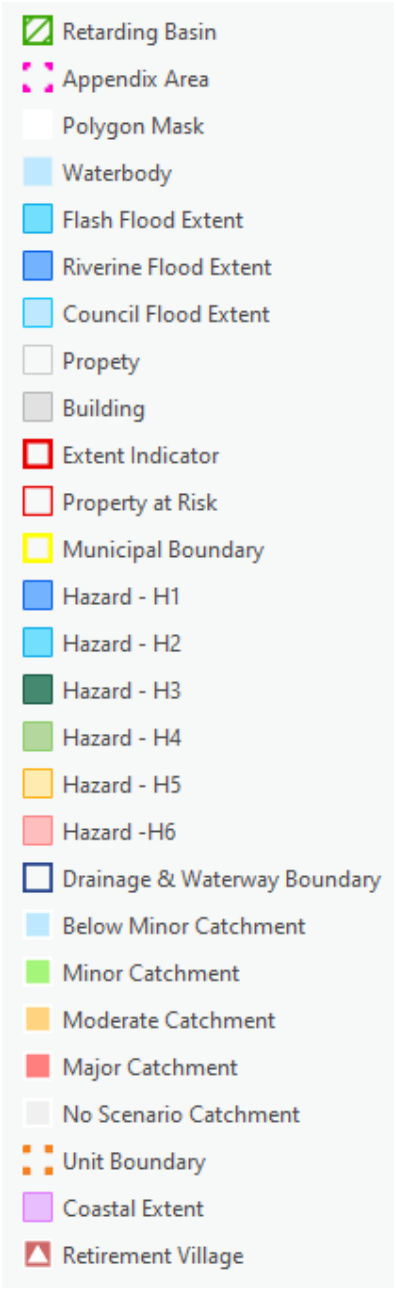
Attachment 2 – VICSES flood mapping symbol set

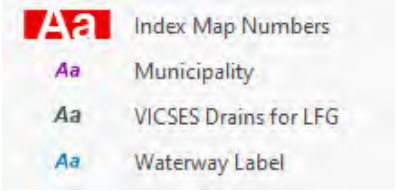
Version 6 January 2024











Obtaining the symbol set for use in ArcGIS

The symbols shown above and their specifications reside within a .stylx file maintained by VICSES. The consultant preparing a flood study should add this stylx file into ArcGIS to easily apply symbology to MFSEP & LFG Mapping projects.

Application of the Spatial Vision Mapscape Basemap.

The consultant shall use colour and greyscale basemaps makes, which make map creation easier and more consistent. These basemaps replace previously used vector layer files needed for roads and polygon infrastructure.

The Mapscape Basemap licence for VICSES covers usage for printed and pdf mapping outputs which covers both MFSEP & LFG mapping products.

The following copyright label needs to be applied to each map:

Preferable formats for deliverables

- The MFSEP and LFG outputs should if possible be delivered as ‘stand-alone’ documents.
- Information presented in MFSEPs and LFGs should be consistent yet cater to the two distinct audiences and formats. For example, the flood gauge table should be consistent with the flood consequence and historical information provided within flood intelligence cards.
- There are many different ways of presenting the information in the MFSEPs and LFGs. For example, photos may be used. In MFSEPs tables and graphs may be used to present information (i.e. road closure information table, cumulative rainfall/consequence scenario graph).
- Reference to stage (m) and discharge (ML/d) are often made when describing design flood events and historic flood events. Where the information is available, stage (i.e. elevation of a river level measured to a particular datum) is preferred over the use of discharge (ML/d) (i.e. river flow rates) as it typically provides better links with flood warning systems and flood preparedness activities.