Mitchell Shire

Flood Emergency Plan

A Sub-Plan of the Municipal Emergency Management Plan

For Mitchell Shire Council and
VICSES North East Region
Kilmore & Seymour Units

Version 5.0 November 2018

FloodSafe

MITCHELL SHIRE COUNCIL

VICTORIA State Government

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Preface and Acknowledgements

This Municipal Flood Emergency Sub Plan has been developed and compiled with assistance from Mitchell Shire staff.

VicSES gratefully acknowledges that this MFEP could not have been developed without the assistance of the Shire of Mitchell and its emergency management staff and that the quality of this plan is due to extensive knowledge and experience of its staff and the information provided in the Flood Management Planning process (FMP).

Much of the data in this plan has been obtained from field observations, flood studies and recordings made during flood events by the Shire, SES volunteers, staff and others.

This document will be subject to further development, users are encouraged to provide feedback to the MERO on the plans contents, ease of use and suitability for its designed purpose.

Distribution List

Copy No.	Issue To:		Date
	Position	Organisation	
Original	MEMP Committee Executive Officer	Shire of Mitchell	
1	Council Office Copy	Shire of Mitchell	
2	MEMP Committee Chairman	Shire of Mitchell	
3	MERO	Shire of Mitchell	
4	Deputy MERO Operations	Shire of Mitchell	
5	MRM	Shire of Mitchell	
6	MERC	Victoria Police Seymour	
7	RERC	Victoria Police	
8	REMI	Victoria Police	
9	ROEM	VICSES North East RHQ	
10	Controller	VICSES Seymour Unit	
11	Controller	VICSES Kilmore	
12		Goulburn Valley Water	
13		Coliban Water	
14	Team Leader Hydrology & Flood Warnings	Melbourne Water	
15	Catchment Management Authority	Goulburn Broken	
16	Flood Warning Manager	Bureau of Meteorology (Flood Warning)	
17	Regional Emergency Management Officer	VICROADS Seymour	
18	Benalla ICC	VICSES	
19	EM Unit	Ambulance Victoria	
20	Emergency Management	Dept of Education (DEECD)	
21	Emergency Management Coordinator	Department of Health & Human Services	
22	CFA District Officer	CFA Hume Region District 12 Headquarters - Seymour	
23	Manager	DELWP Seymour	
24	Manager	DELWP Alexandra	
25			
26			
27			
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Document Transmittal Form / Amendment Certificate

This Municipal Flood Emergency Plan (MFEP) will be amended, maintained and distributed as required by VICSES in consultation with the Mitchell Shire Council

Suggestions for amendments to this Plan should be forwarded to VICSES North East Headquarters, 64 Sydney Road, Benalla, Victoria, 3672 or by email to **northeast@ses.vic.gov.au**.

Amendments listed below have been included in this Plan and promulgated to all registered copyholders.

Amendment Number	Date of Amendment	Amendment Entered By	Summary of Amendment
Ver 2.0	March 2012	VicSES	Revised layout
Ver 2.1	May 2013	M Cawood	Initial entry of data
Ver 2.3	May 2013	A Barnard	Post meeting with Mitchell Shire additions
Ver 3.0	May 2013	A Barnard	Input from Local SES Units and Region, additional mapping
Ver 4.0	August 2017	M Cawood	Addition of flood intel etc for Kilmore post Flood Study
Ver 4.1	July 2018	J Newlands	Post meeting with SES & Mitchell Shire additions
Ver 5.0	Nov 2018	J Newlands	Final draft for approval by MEMPC

This Plan will be maintained on the Mitchell Shire Intranet, and an abridged version placed on the public website at www.mitchellshire.vic.gov.au at a later date.

List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in the Plan			
AAR	After Action Review	**IEMT**	Incident Emergency Management Team
AEP	Annual Exceedance Probability	**JSOP**	Joint Standard Operations Procedure
AHD	Australian Height Datum (the height of a location above mean sea level in metres)	**IMS**	Incident Management System
AIDR	Australian Institute of Disaster Resilience	**LSIO**	Land Subject to Inundation Overlay
AIIMS	Australasian Inter-service Incident Management System	**MECC**	Municipal Emergency Coordination Centre
AoCC	Area of Operations Control Centre / Command Centre	**MEMO**	Municipal Emergency Management Officer
ARI	Average Recurrence Interval	**MEMP**	Municipal Emergency Management Plan
ARMCANZ	Agricultural & Resource Management Council of Australia & New Zealand	**MEMPC**	Municipal Emergency Management Planning Committee
AV	Ambulance Victoria	**MEOC**	Municipal Emergency Operations Centre
BoM	Bureau of Meteorology	**MERC**	Municipal Emergency Response Coordinator
CEO	Chief Executive Officer	**MERO**	Municipal Emergency Resource Officer
CERA	Community Emergency Risk Assessment	**MFB**	Metropolitan Fire Brigade
CFA	Country Fire Authority	**MFEP**	Municipal Flood Emergency Plan
CMA	Catchment Management Authority	**MFEPC**	Municipal Flood Emergency Planning Committee
RERC	Regional Emergency Response Coordinator	**MRM**	Municipal Recovery Manager
RERCC	Regional Emergency Response Coordination Centre	**PMF**	Probable Maximum Flood
DHHS	Department of Health and Human Services	**RAC**	Regional Agency Commander
DEDJTR	Department of Economic Development, Jobs, Transport, Resources	**RCC**	Regional Control Centre
DELWP	Department of Environment, Land, Water and Planning	**RDO**	Regional Duty Officer
EMLO	Emergency Management Liaison Officer	**SAC**	State Agency Commander
EMMV	Emergency Management Manual Victoria	**SBO**	Special Building Overlay
EMT	Emergency Management Team	**SCC**	State Control Centre
ERC	Emergency Relief Centre	**SDO**	State Duty Officer
EO	Executive Officer	**SERP**	State Emergency Response Plan
FO	Floodway Overlay	**SEWS**	Standard Emergency Warning Signal
FWS	Flood Warning System	**SHERP**	State Health Emergency Response Plan
FZ	Floodway Zone	**SOP**	Standard Operating Procedure
IC	Incident Controller	**VicPol**	Victoria Police
ICC	Incident Control Centre	**VICSES**	Victoria State Emergency Service

Part 1. INTRODUCTION

1.1 Municipal Endorsement

This Municipal Flood Emergency Plan (MFEP) has been prepared by the Mitchell Shire Flood Planning Committee with the authority of the Mitchell Shire Municipal Emergency Management Planning Committee pursuant to Section 20 of the *Emergency Management Act 1986* (as amended).

The Mitchell Shire Flood Planning Committee has consulted with the Mitchell Shire community about the arrangements contained within this plan.

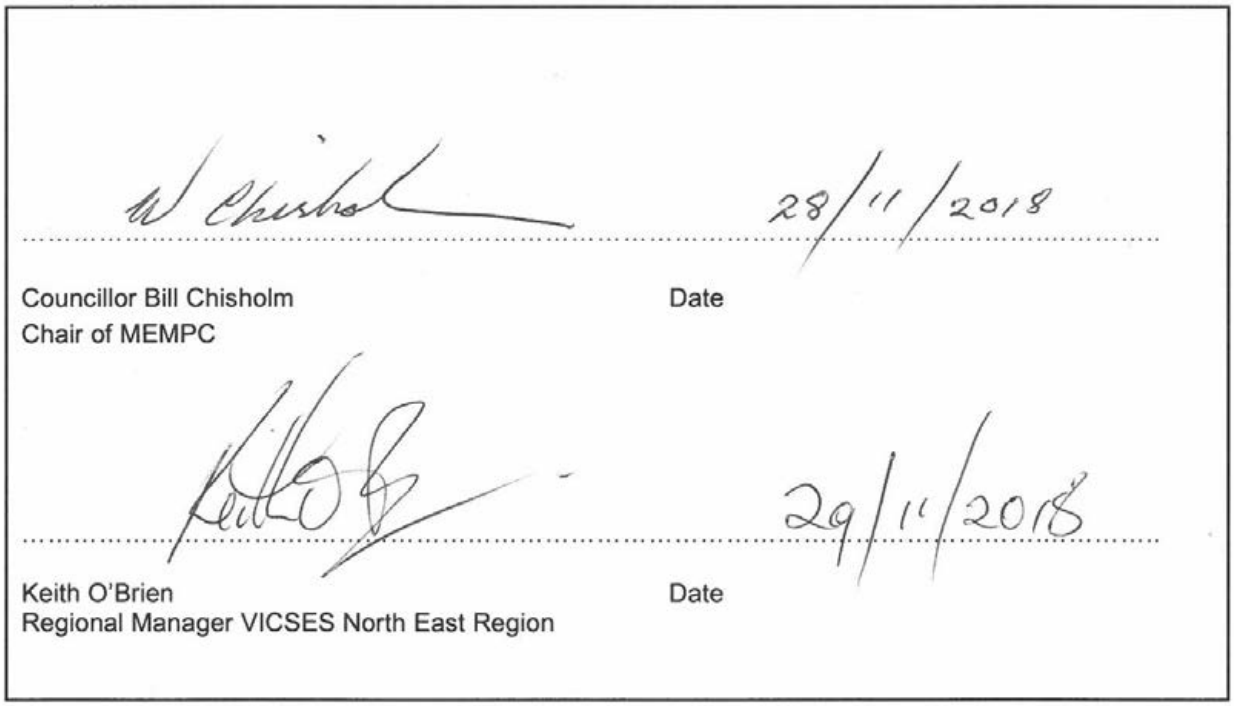
This MFEP is a sub plan to the Mitchell Shire Municipal Emergency Management Plan (MEMP), is consistent with the Emergency Management Manual Victoria (EMMV) and the Victoria Flood Management Strategy, and takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Mitchell Shire Municipal Emergency Management Planning Committee (MEMPC).

The Municipal Flood Emergency Plan is consistent with the Regional Flood Emergency Plan and the State Flood Emergency Plan.

This Municipal Flood Emergency Plan is a result of the cooperative efforts of the Mitchell Shire Flood Planning Committee (MFPC) and its member agencies.

This Plan is endorsed by the Mitchell Shire MEMPC as a sub-plan to the MEMP.

Endorsement



1.2 The Municipality

An outline of Mitchell Shire in terms of its location, demography and other general matters are provided in the MEMP. An outline of the flood threat is provided in Appendix A of this Plan.

1.3 Purpose and Scope of this Flood Emergency Plan

The purpose of this MFEP is to detail arrangements agreed to for the planning, preparedness / prevention, response and recovery from flood incidents within Mitchell Shire.

As such, the scope of the Plan is to:

- Identify the Flood Risk within Mitchell Shire;
- Support the implementation of measures to minimise the causes and impacts of flood incidents within Mitchell Shire;
- Detail Response and Recovery arrangements including preparedness, Incident Management, Command and Control;
- Identify linkages with Local, Regional and State emergency and wider planning arrangements with specific emphasis on those relevant to flood.

1.4 Municipal Flood Planning Committee (MFPC)

Membership of the Mitchell Shire Flood Planning Committee (MFPC) may comprise of the following representatives from the following agencies and organisations:

- VICSES – Regional Officer – Emergency Management **(Chair)**
- VICSES Kilmore Unit Controller
- VICSES Seymour Unit – Controller
- Mitchell Shire – Senior Investigations Engineer
- Mitchell Shire – Municipal Recovery Manager (MRM),
- Mitchell Shire – Manager Operations and MERO,
- Victoria Police (MERC),
- Goulburn Valley Water (as required)
- Coliban Water (as required)
- CFA Operations Officer,
- Goulburn Broken Catchment Management Authority (as required),
- North Central Catchment Management Authority (as required),
- Melbourne Water (as required),
- Others as required

1.5 Responsibility for Planning, Review & Maintenance of this Plan

This Municipal Flood Emergency Plan must be maintained in order to remain effective.

VICSES through the Flood Planning Committee has responsibility for preparing, reviewing, maintaining and distributing this plan.

The MFPC will meet at least once per year or as required.

The MFEP should be reviewed and arrangements and information contained in the Plan amended where necessary:

- Following any new flood study;
- Following a change in non-structural and / or structural flood mitigation measures;
- After the occurrence of a significant flood event within the Municipality.

1.6 Endorsement of the Plan

The MFEP will be circulated to MFPC members to seek acceptance of the draft plan.

Upon acceptance, the plan is forwarded to the MEMPC for endorsement with the recommendation to include the MFEP as a sub-plan of the MEMP.

Part 2. PREVENTION / PREPAREDNESS ARRANGEMENTS

2.1 Community Awareness for all Types of Flooding

Details of this MFEP will be released to the community through local media, the FloodSafe program, websites (VICSES and the Municipality) upon formal adoption by Mitchell Shire.

VICSES with the support of Mitchell Shire will coordinate community education programs for flooding within the council area. E.g. FloodSafe / StormSafe.

A Community Education Plan (CEP) to support this MFEP will be developed in conjunction with VICSES local units. VICSES local units will lead the delivery of the CEP with support from Mitchell Shire and VICSES Regions.

2.2 Structure in place Flood Mitigation Measures

There are no formal structural flood mitigation measures on streams within Mitchell Shire although levees are currently being planned for construction at Seymour. The alignment of the new levee at Seymour will be generally along Whiteheads Creek, the Goulburn River and land southwest of Seymour to the 100-year ARI (1% AEP) flood level plus freeboard.

2.3 Non-structural Flood Mitigation Measures

2.3.1 Exercising the Plan

Arrangements for exercising this Plan will be at the discretion of the MEMPC. This Plan should be exercised regularly, preferably on an annual basis. Refer to section 4.7 of the EMMV for guidance.

2.3.2 Flood Warning

Arrangements for flood warning are contained within the State Flood Emergency Plan and the EMMV (Part 3.7) and on the BoM website http://www.bom.gov.au.

Specific details of local flood warning system arrangements are provided in Appendix E.

2.3.3 Local Knowledge

Community 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.

Specific details of arrangements to capture local knowledge are provided in Appendix G.

Part 3. RESPONSE ARRANGEMENTS

3.1 Introduction

3.1.1 Activation of Response

Flood response arrangements may be activated by the Regional Duty Officer (RDO) VICSES North East Region or Incident Controller.

The Incident Controller / RDO VICSES will activate agencies as required and documented in the State Flood Emergency Plan.

3.1.2 Responsibilities

There are a number of agencies with specific roles that will act in support of VICSES and provide support to the community in the event of a serious flood within Mitchell Shire. These agencies will be engaged through the Incident EMT.

The general roles and responsibilities of supporting agencies are as agreed within the Mitchell Shire MEMP, EMMV (Part 7 'Emergency Management Agency Roles'), State Flood Emergency Plan and Regional Flood Emergency Plan.

3.1.3 Escalation

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

Resourcing and event escalation arrangements are described in the EMMV ('State Emergency Response Plan' – section 3.6).

3.2 Strategic Control Priorities

To provide guidance to the Incident Management Team (IMT), the following strategic control priorities shall form the basis of incident action planning processes:

1. Protection and preservation of life is paramount - this includes:
    a. Safety of emergency services personnel, and;
    b. Safety of community members including vulnerable community members and visitors / tourist located within the incident area.
2. Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.;
3. Protection of critical infrastructure and community assets that supports community resilience;
4. Protection of residential property as a place of primary residence;
5. Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability

6. Protection of environmental and conservation values that considers the cultural, biodiversity, and social values of the environment;

Circumstances may arise where the Incident Controller is required to vary these priorities, with the exception being that the protection of life should remain the highest priority. This shall be done in consultation with the State Controller and relevant stakeholders based on sound incident predictions and risk assessments.

3.3 Command, Control & Coordination

The Command, Control and Coordination arrangements in this Municipal Flood Emergency Plan must be consistent with those detailed in State and Regional Flood Emergency Plans. For further information, refer to sections 3.3, 3.4, 3.5 & 3.6 of the EMMV.

The specific details of the Command, Control and Coordination arrangements for this plan are to be provided in Appendix C.

3.3.1 Control

Functions 5(a), 5(b) and 5(c) at Part 2 of *the Victoria State Emergency Service Act 1986 (as amended)* detail the authority for VICSES to plan for and respond to flood.

Part 7.1 of the EMMV prepared under the *Emergency Management Act 1986 (as amended)*, identifies VICSES as the Control Agency for flood. It identifies DELWP as the Control Agency responsible for "*dam safety, water and sewerage asset related incidents*" and other emergencies

All flood response activities within Mitchell Shire including those arising from a dam failure or retarding basin / levee failure incident will therefore be under the control of the appointed Incident Controller, or his / her delegated representative.

3.3.2 Incident Controller (IC)

An Incident Controller (IC) will be appointed by the VICSES (as the Control Agency) to Command and Control available resources in response to a flood event on the advice of the Bureau of Meteorology (or other reliable source) that a flood event will occur or is occurring. The Incident Controller responsibilities are as defined in Part 3.5 of the EMMV

3.3.3 Incident Control Centre (ICC)

As required, the Incident Controller will establish an Incident Control Centre (ICC) from which to initiate incident response command and control functions. The decision as to when the ICC should be activated rests with the Control Agency (i.e. VICSES).

There are a number of ICC's in the Hume Region with the following two locations have been identified as the primary locations for Level 3 ICC's for flooding in the Goulburn Broken Catchment Management Authority area.

Location	Owner	Address
Shepparton	CFA District 22	195-205 Numurkah Road, Shepparton
Seymour	CFA District 12	39 McIntyre Street, Seymour

The following Level 2 ICC may also be utilised for more localised flooding events within the Shire.

Location	Owner	Address
Benalla	VICSES NE Region (Hume)	64 Sydney Road, Benalla

3.3.4 Divisions and Sectors

To ensure that effective Command and Control are in place, the Incident Controller may establish Divisions and Sectors depending upon the complexity of the event and resource capacities.

The following Divisions and Sectors maybe established to assist with the management of flooding within the Municipality:

Division (pre-determined Divisional Command locations)	**Sectors** (Pre-determined Sector Command locations)
Seymour Urban Fire Station, Gordon Crescent, Seymour	**Seymour SES**, 115 Wimble Street, Seymour
	In some circumstances, Seymour may require splitting into 2 sectors East and West to manage the number of affected properties. In this scenario, the Field Operations Vehicle is deployed at the discretion of the Incident Controller. Seymour LHQ would be East Sector, and the FOV the West sector
	Kilmore SES, Cnr Green and White Streets, Kilmore

3.3.5 Incident Management Team (IMT)

The Incident Controller will form an Incident Management Team (IMT).

Refer to Part 3.5 of the EMMV for guidance on IMTs and Incident Management Systems (IMSs).

3.3.6 Emergency Management Team (EMT)

The Incident Controller will establish a multi-agency Emergency Management Team (EMT) to assist the flood response. The EMT will consist of key personnel (with appropriate authority) from stakeholder agencies and relevant organisations who need to be informed of strategic issues related to incident control and who are able to provide high level strategic guidance and policy advice to the Incident Controller for consideration in developing incident management strategies.

Organisations, including Mitchell Shire Council, required within the EMT 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.

Refer to 3.5 of the EMMV for guidance on EMTs.

3.3.7 Coordination

The Municipal Emergency Response Coordinator (MERC) for Mitchell Shire will ensure that the Coordination function is undertaken. The Incident Controller / RDO will ensure that communications are established with the MERC and that regular situational updates are provided. This may be undertaken through the Division / Sector Commander where appointed.

3.3.8 Municipal Emergency Coordination Centre (MECC)

If a MECC is established, liaison with the MECC will be through the established Division / Sector Command and through Municipal involvement in the Incident EMT, in particular the Municipal Emergency Response Coordinator (MERC). The VICSES RDO / ICC will liaise with the MECC directly if no Division / Sector Command is established.

The function, location, establishment and operation of the MECC is as detailed in the Mitchell Shire MEMP.

3.3.9 VICSES actions on receipt of a Flood Watch / Severe Weather Warning

The Incident Controller or VICSES RDO (until an Incident Controller is appointed) will undertake actions as defined within the flood intelligence cards (Appendix C). General considerations by the Incident Controller / VICSES RDO will be as follows:

- Review flood intelligence to assess likely flood consequences
- Monitor weather and flood information – 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
- 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 EMT) and open if required
- Ensure flood bulletins and community information are prepared and issued to the community
- Monitor watercourses and undertake reconnaissance of low-lying areas
- Develop media and community information management strategy
- Ensure flood mitigation works are being checked by owners
- Develop and issue incident action plan, if required
- Develop and issue situation report, if required

3.3.10 On receipt of the First and Subsequent Flood Warnings

The Incident Controller / VICSES RDO (until an Incident Controller is appointed) will undertake actions as defined within the flood intelligence cards (Appendix C). General considerations by the Incident Controller / VICSES RDO will be as follows:

- Develop an appreciation of current flood levels and predicted levels. Are floodwaters, rising, peaking or falling?
- Review flood intelligence to assess likely flood consequences. Consider:
    - What areas may be at risk of inundation
    - What areas may be at risk of isolation
    - What areas may be at risk of indirect affects as a consequence of power, gas, water, telephone, sewerage, health, transport or emergency service infrastructure interruption
    - 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 (i.e. water and power utilities)
- 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

3.4 Community Information and Warnings

Guidelines for the distribution of community information and warnings are contained in the State Flood Emergency Plan.

Community information and warnings communication methods available include:

- Emergency Alert;
- Phone messages (including SMS);
- Radio and Television;
- Two-way radio;
- Mobile and fixed public address systems;
- Verbal Messages (i.e. Doorknocking);
- Agency Websites;
- VICSES Flood Storm Information Line;
- Variable Message Signs (i.e. road signs);
- Community meetings;
- Newspapers;
- Email;
- Community Flood Wardens;
- Newsletters;
- Letter drops;
- Social media and / or social networking sites (i.e. Twitter and / or Facebook).

Refer to Appendix C and E for specific details of how community information and warnings are to be provided.

The release of flood bulletins and information with regard to response activities at the time of a flood event is the responsibility of VICSES, as the Control Agency.

Council has the responsibility to assist VICSES to warn individuals within the community including activation of flood warning systems, where they exist. Responsibility for public information, including media briefings, rest with VICSES as the Control Agency.

Other agencies such as CFA, DEDJTR, DELWP and VICPOL may be requested to assist VICSES with the communication of community flood warnings.

In cases where severe flash flooding is predicted, dam failure is likely or flooding necessitating evacuation of communities is predicted, the Incident Controller may consider the use of the Emergency Alert System and Standard Emergency Warning System (SEWS).

Department of Health will coordinate information regarding public health and safety precautions.

3.5 Media Communication

The Incident Controller through the Information Unit established at the ICC will manage Media communication. If the ICC is not established the VICSES RDO will manage all media communication.

Mitchell Shire Council will work with the Incident Controller to ensure that consistent and timely messaging occurs.

3.6 Impact Assessment

An impact assessment can be conducted in accordance with part 3 of the EMMV to assess and record the extent and nature of damage caused by flooding. This information may then be used to provide the basis for further needs assessment and recovery planning by DHHS, Local Government and recovery agencies.

3.7 Preliminary Deployments

When flooding is expected to be severe enough to cut access to towns, suburbs and / or communities the Incident Controller will consult with relevant agencies to ensure that resources are in place if required to provide emergency response. These resources might include emergency service personnel, food items and non-food items such as medical supplies, shelter, assembly areas, relief centres etc.

3.8 Response to Flash Flooding

Emergency management response to flash flooding should be consistent with the guideline for the emergency management of flash flooding contained within the State Flood Emergency Plan.

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

1. Determine if there are barriers to evacuation by considering warning time, safe routes, resources available and etc;

2. 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;

3. Where it is likely that people will become trapped by floodwaters due to limited evacuation options, safety advice needs to be provided to people at risk. Advising them not to attempt to flee by entering floodwater if they become trapped, and that it may be safer to seek the highest point within the building and to telephone 000 if they require rescue. This advice needs to be provided even when evacuation may be possible, due the likelihood that not all community members will evacuate.

4. For buildings known to be structurally un-suitable, an earlier evacuation trigger will need to be established (return to step 1 of this cycle).

5. If an earlier evacuation is not possible then specific preparations must be made to rescue occupants trapped in structurally unsuitable buildings either pre-emptively or as those people call for help.

During a flash flood, it will often be difficult, due to the rapid development of flooding, to establish evacuation (relief) centres ahead of actually triggering the evacuation as is normal practice but this is insufficient justification for not adopting evacuation.

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

Refer to VICROADS website for road closures http://alerts.VICROADS.vic.gov.au.

3.9 Evacuation

In Victoria, evacuation is largely voluntary. However, in particular circumstances, legislation provides some emergency services with authority to remove people from areas or prohibit their entry.

The decision to recommend or warn people to prepare to evacuate or to evacuate immediately rests with the Incident Controller.

It is the choice of individuals as to how they respond to this recommendation.

Once the decision is made, VICPOL are 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.

Refer to Section 3.8 of the EMMV and the Evacuation Guidelines for guidance of evacuations for flood emergencies.

Refer to Appendix D of this Plan for detailed evacuation arrangements for Mitchell Shire.

There are currently no detailed evacuation arrangements for Mitchell Shire.

3.10 Flood Rescue

VICPOL as the designated Control Agency for water rescue coordinates rescues undertaken during flood events.

In order to activate water rescue services, VICSES as Control Agency for overall flood response, will identify areas at risk of requiring rescue and notify the Officer in Charge of the Water Police Search and Rescue Squad to request pre-deployment of rescue resources to these areas.

In conducting rescues, VICPOL may require assistance of appropriately trained and equipped personnel. In these circumstances, appropriately trained and equipped VICSES units or other agencies 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.

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 following resources are available within Mitchell Shire to assist with rescue operations:

- VICSES Seymour and Kilmore Units – general rescue capability
- CFA Brigades with high clearance vehicles.

VICPOL and VICSES can access rescue boats, but there is a lead-time required to get them on-site within the Shire.

There are no known high-risk areas / communities where rescues might be required on a large scale, but experience has shown (e.g. January 2011) that property isolations can occur quickly in some rural areas, as well as stranded person(s) in vehicles trapped in floodwaters. Both of these types of events may require specialist rescue.

3.11 Animal Welfare

Animal management guidelines are provided in the MEMP along with the location and contact details for appropriate animal welfare entities.

Matters relating to the welfare of livestock and companion animals (including feeding and rescue) are to be referred to DEDJTR. This includes requests for emergency supply and / or delivery of fodder to stranded livestock or for livestock rescue.

Matters relating to the welfare of wildlife are to be referred to DEDJTR.

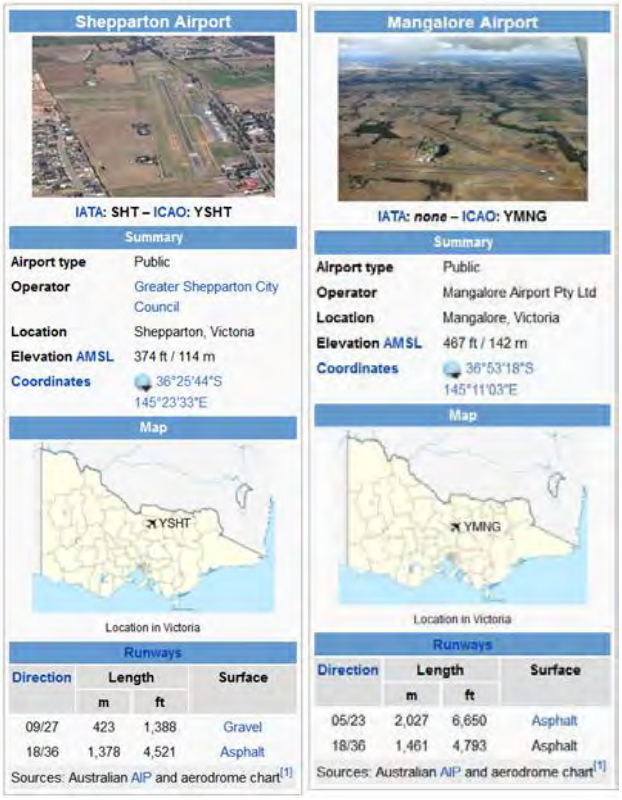
3.12 Aircraft Management

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

Air support operations will be conducted under the control of the Incident Controller.

The Incident Controller may request aircraft support through the State Air Desk located at the State Control Centre who will establish priorities.

Suitable airbase facilities are located at Mangalore Airport.



Shepparton Airport

IATA: SHT – ICAO: YSHT

Summary	
Airport type	Public
Operator	Greater Shepparton City Council
Location	Shepparton, Victoria
Elevation AMSL	374 ft / 114 m
Coordinates	36°25'44"S 145°23'33"E

Map

Location in Victoria

Runways

Direction	Length		Surface
	m	ft	
09/27	423	1,388	Gravel
18/36	1,378	4,521	Asphalt

Sources: Australian AIP and aerodrome chart[1]

Mangalore Airport

IATA: *none* – ICAO: YMNG

Summary	
Airport type	Public
Operator	Mangalore Airport Pty Ltd
Location	Mangalore, Victoria
Elevation AMSL	467 ft / 142 m
Coordinates	36°53'18"S 145°11'03"E

Map

Location in Victoria

Runways

Direction	Length		Surface
	m	ft	
05/23	2,027	6,650	Asphalt
18/36	1,461	4,793	Asphalt

Sources: Australian AIP and aerodrome chart[1]

3.13 Resupply

Communities, neighbourhoods or households can become isolated during floods as a consequence 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.

Red Cross now have arrangements in place with Foodbank Victoria, around Relief Packs for isolated communities. Requests need to come through Red Cross for processing by the Foodbank. They then rely on agencies to get these packs out to the affected community.

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.

3.14 Essential Community Infrastructure and Property Protection

Essential Community Infrastructure and Property (e.g. residences, businesses, roads, power supply etc.) may be affected in the event of a flood.

The Incident Controller will ensure that owners of Essential Community Infrastructure are kept advised of the flood situation. Essential Community Infrastructure providers must keep the Incident Controller informed of their status and ongoing ability to provide services.

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 or Melbourne Water, Local Government and VICPOL and within appropriate approval frameworks.

Priorities for sandbags

Consistent with the Strategic Control Priorities within the State Emergency Flood Plan, sandbags will be issued in priority order of protecting:

1. Community Critical Infrastructure identified:
   (a) in the MEMP or this MFEP; or
   (b) by the Incident Management Team

2. Residential properties identified in the potential flood area

3. Commercial properties identified in the potential flood area

4. Environmental and conservation areas identified in the potential flood area

Any properties identified as being outside the potential flood area will be referred to an alternative source of sandbags (e.g. local hardware store or sandbag supplier).

Quantities

As a guide, 25 sandbags are reasonable to supply to residents to allow for coverage of doorways, blocking vents, drains and toilets. Additional sandbags may be provided on a case-by-case basis having an understanding of individual issues and local priorities identified by the Incident Management Team.

The Mitchell Shire maintains a very small stock of sandbags at each of the three works depots (Seymour, Broadford and Wallan).

The Kilmore and Seymour VICSES Units will also maintain sandbag stocks.

SES facility	Number of Sandbags	Quantity of Sand
Seymour LHQ	30,000 approximately	10 m^3 approximatively
Kilmore LHQ	5,000 approximately	Nil

Additional supplies are available through the VICSES Regional Headquarters to supplement local stocks.

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

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.

Refer to Appendix C for further specific details of essential infrastructure requiring protection and location of sandbag collection point(s).

3.15 Disruption to Services

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

3.16 Levee Management

Levee owners / operators are responsible for the maintenance, operation and monitoring of their levees.

Levee owners / operators must keep the Incident Controller informed of levee status and be prepared to provide expert advice to the Incident Controller about the design and construction of their levees.

In accordance with the strategic control priorities, the Incident Controller may assist levee owners to coordinate resources, both technical and physical, to provide advice and affect temporary repairs to or augmentation of levees.

Levees will only be raised by sandbagging or earthworks with the approval of the responsible authority (owner and / or managing authority) and then only after careful consideration and consultation, if time permits, with the Control Agency (VICSES), Council, CMA or Melbourne Water and / or the Department of Environment and Primary Industries.

3.17 Road Closures

Mitchell Shire Council and VICROADS are responsible for road closures including observation and placement of warning signs, roadblocks etc. to the road network, bridges and walking and bike trails. Mitchell Shire Council staff may also liaise with and advise VICROADS as to the need for warning signs and / or of closing roads and bridges under VICROADS' jurisdiction. VICROADS are responsible for designated main roads and highways and Councils are responsible for the designated local and regional road network.

VICROADS and Mitchell Shire will distribute community information regarding road closures.

Within Mitchell Shire, there are a number of roads that are impacted by floodwater. For details of the highways and arterial roads affected, see the Flood Intelligence Cards for each stream in Appendix C.

3.18 Dam Failure

DELWP is the Control Agency for dam safety incidents (e.g. breach, failure or potential breach / failure of a dam), however VICSES is the Control Agency for any flooding that may result.

Major dams with potential to cause structural and community damage within the Municipality are listed in Appendix A. The owner / operators of these dams are required to develop and maintain emergency plans in case of failure.

3.19 Waste Water 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 agency responsible 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.

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

3.20 After Action Review

VICSES will coordinate the after action review arrangements of flood operations as soon as practical following an event.

All agencies involved in the flood incident should be represented at the after action review.

Part 4. EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS

4.1 General

Arrangements for recovery from a flood incident within Mitchell Shire are detailed in the Mitchell Shire MEMP and / or the Recovery Sub-Plan.

4.2 Emergency Relief

The decision to recommend the opening of an emergency relief centre rests with the Incident Controller. Incident Controllers are responsible for ensuring that relief arrangements have been considered and implemented where required under the State Emergency Relief and Recovery Plan (Part 4 of the EMMV).

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. Refer to 4.4 of the EMMV for details of the range of emergency relief services that may be provided.

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

Details of the relief arrangements are available in the MEMP.

4.3 Animal Welfare

Matters relating to the welfare of livestock and companion animals (including feeding and rescue) are to be referred to DEDJTR.

Requests for emergency supply and / or delivery of fodder to stranded livestock or for livestock rescue are to be passed to DEDJTR.

Matters relating to the welfare of wildlife are to be referred to DEDJTR.

Disposal of dead stock

This work is to be undertaken in accordance with the EPA Industrial Waste Resource Guideline:

- *Environment Protection (Industrial Waste Resource) Regulations 2009*. Publication IWRG641 — June 2009.

4.4 Transition from Response to Recovery

VICSES as the Control Agency is responsible for ensuring effective transition from response to recovery. This transition will be conducted in accordance with existing arrangements as detailed in Part 3 Section 3.10 of the EMMV and the Mitchell Shire MEMP.

ACCURACY & CONFIDENTIALITY

The information in the following Appendices provides a guide to the likelihood and possible effects of a flood. The information is based on estimates of rainfall rates and depths and on flood behaviours at particular heights or flows following actual flood events and / or hydrologic and hydraulic modelling. However, as all floods are different, those behaviours and effects may occur as a result of different rainfalls and / or heights and flows. They may also occur at different heights in different floods.

This document may contain sensitive information about the effects of flooding on private property. Specific reference to private addresses or businesses may be made directly to owners or other emergency services but should not be made public via broadcast or print media unless authorised specifically by the Incident Controller.

APPENDIX A – FLOOD THREATS FOR MITCHELL SHIRE

1. General

Mitchell Shire is located to the north of Melbourne and extends from Kalkallo in the south to just south of Heathcote, Graytown and Avenel in the north. The Shire is bounded by the City of Greater Bendigo and the Shire of Strathbogie to the north, the Shire of Murrindindi to the east, the Cities of Whittlesea and Hume to the south and the Shires of Macedon Ranges and Mount Alexander to the west. The Shire boundary runs along a small section of the Campaspe River upstream of Redesdale to the west. A short section of Boyd Creek and a longer section of Deep Creek (both tributaries of the Maribyrnong River) form part of the southwest boundary while a short section of Merri Creek forms the southeast boundary. Short sections of the Goulburn River downstream from Kerrisdale and between about Mangalore and Mitchellstown are also on the boundary. Hughes Creek forms part of the northeast boundary.

The southern boundary of the Shire is essentially the Great Dividing Range from Kinglake West at the eastern extremity, to its crossing of the Lancefield Tooborac Road in the west. A significant component of the municipality straddles the Great Dividing Range from approximately Mount Disappointment to about 5 km west of Bylands, and extends south to a line nearly 2km north of Kalkallo. This area contains the headwaters of Darebin Creek and Merri Creek and the eastern tributaries of the Maribyrnong River and includes the communities of Wallan, Upper Plenty and Beveridge.

The greater part of Mitchell Shire lies north of the Great Dividing Range and is a varied landscape sculptured by the Goulburn River and its tributaries. The Goulburn River enters the Municipality upstream of Trawool and leaves it a little upstream of Mitchellstown.

The Goulburn tributaries rise in the steeper cleared slopes and foothills on the northern face of the Great Dividing Range. Response is usually quite quick under heavy rain conditions. The thin sandy soils in the upper reaches have a limited capacity to retain water, and after heavy rain, sheet flows and downstream flooding can occur in streams such as Whiteheads Creek, Dabyminga Creek, Sunday Creek, Sugarloaf Creek, Kilmore Creek, Major Creek and Hughes Creek.

The majority of the Shire's population reside in several large towns including Seymour, Kilmore, Wallan and Broadford while much of the remainder of the Shire is farmland or bushland. Smaller towns include Pyalong, Tallarook, Reedy Creek and Tooborac as well as Wandong, Heathcote Junction, Clonbinane, Waterford Park and Beveridge. The extension of the Urban Growth Boundary in the south of the Shire has seen a growth in population and development in towns such as Beveridge and Wallan.

The Shire is traversed by several major road including the Hume, Northern and Goulburn Valley Highways. The main Melbourne-Sydney rail line passes through the municipality and a branch line extends from Seymour to the Goulburn Valley.

Quarries - Floodplain Mining Risks

(Extract from Summary of Jacobs Review of floodplain mining and risk.)

- Homewood (Yea Sand & Gravel, WA45)
- Switzerland (Switzerland Quarry, WA516)

Sand and gravel extraction from the floodplain can have major impacts if, during flooding, the stream creates a new channel through the pit. If the river captures the quarry pit the physical impacts can include river bed degradation and aggradation, bank erosion and channel widening. These physical

impacts may extend many kilometres away from the pit. Infrastructure such as bridges, culverts and services that lie within the area of physical impact may also be damaged or destroyed.

Three main risk scenarios have been identified that have the potential to result in pit capture. These are:

- Lateral migration of the river channel into the pit
- Sub-surface piping into pits and subsequent failure of pit walls
- Flow of water into and through the pit

The likelihood of a pit capture occurring via one of these three risk scenarios is a function of a number of variables. Hydrology is a key variable that influences likelihood, as it is the flow of water into a pit from the river that leads to its capture. Local hydraulic effects are also important such as the flow velocity adjacent to erodible floodplain and bank material. Other variables that are important are the proximity of the pit to a waterway and the depth of the pit relative to the channel. Pits in close proximity to a waterway and where extraction has continued to a depth lower than the bed of the adjacent waterway pose a greater risk than pits that are positioned further away from the waterway where extraction does not extend below the bed of the river.

The consequences of pit capture depend on the relative scale of the mining operations and the river and the infrastructure that is located in the impact area. The larger and deeper the captured pit, the greater the potential change is to the river. The physical processes of pit capture have been well documented from case studies, incision upstream and downstream of the pit are expected, with bed adjustments continuing until the river establishes a new equilibrium and grade. Any infrastructure which traverses the impacted area is at risk of being damaged during this period of adjustment.

A number of methods exist to prevent floodplain mining impacting on the river. None of these options can be relied upon, in that even if designed to the highest standard they can still fail. They may also generate problems elsewhere. Levees can be constructed to keep flood waters out of the pit, however by limiting flooding in one area this may result in greater flooding in another area.

Pit capture and associated changes in channel alignment are a genuine concern in the Goulburn Valley. The scale of the operations and their positioning relative to the river and key infrastructure indicate that significant physical and infrastructure impacts will occur in the future.

2. Major Waterways

The **Goulburn River** rises to the southeast of the Shire in the Victorian Alps and has a catchment area to Seymour of around is 4,840km^2. It travels the length of the municipality in a generally northerly direction. It enters the Shire 19km upstream of Trawool near King Parrot Creek, passes through Seymour where it is joined by Sunday Creek and Whiteheads Creek and leaves the Shire just upstream of Mitchellstown. It flows on to Goulburn Weir near Nagambie, from there to Shepparton and then to the Murray upstream of Echuca. The river is heavily regulated at Lake Eildon and Goulburn Weir.

Dabyminga Creek has a catchment area of approximately 180km^2 and flows into the Goulburn River a short distance upstream of Seymour after flowing through Tallarook.

Sunday Creek is a major tributary of the Goulburn River and joins it to the immediate west (downstream) of Seymour. The creek rises near Mt Disappointment in the Kinglake National Park and flows down steep forested areas onto flatter agricultural plains through Clonbinane, Waterford Park and Broadford. Its tributary **Dry Creek** also flows through Broadford with the confluence on the north side of town. Sunday Creek is regulated at Sunday Creek Reservoir, situated just upstream of Broadford. The reservoir provides

potable water to Broadford, Kilmore, Wallan, Wandong and Heathcote Junction. The catchment area to Tallarook is 337km^2 .

Mollison Creek flows to the northeast through Pyalong to join **Sugarloaf Creek** which flows into Sunday Creek immediately upstream of its confluence with the Goulburn River downstream of Seymour. There are no significant urban centres along Sugarloaf Creek. The catchment area to Ash Bridge is 609km^2.

Kilmore Creek starts near Kilmore East at an elevation of 368m and drops just over 100m over its 14.1km length. It joins **Kurkurac Creek**, which rises near Willowmavin and is a tributary to Sugarloaf Creek. Other tributaries include **Pound Creek** and **Smokey Creek**.

Major Creek, Gardiner Creek and **Hawker Creek** drain to the northeast and join the Goulburn River a short distance upstream of Mitchellstown, outside the Shire boundary.

Whiteheads Creek and its tributaries (North Spur, Back Creek and Deep Creek) drain the hills to the east of Seymour and flow to the west along the northeastern edge town to join the Goulburn River just downstream of where Sunday Creek flows in. Gradients are steep and flow velocities are high. The catchment responds quickly to thunderstorms / heavy rain.

Hughes Creek forms part of the Shire boundary with the catchment extending into Strathbogie Shire. The only significant urban centre in the catchment is Avenel and it is located in the Shire of Strathbogie. The main tributary is **Bunding Creek**.

Merri Creek rises to the east of Heathcote Junction at the southern end of the Shire and travels further south towards Melbourne, through Wallan. Two intermittent tributaries, **Wallan Creek** and **Taylors Creek**, also flow through Wallan from the east. Merri Creek is joined by **Kalkallo Creek** upstream of Craigieburn and flows into the Yarra River near the Johnston Street Bridge to then discharge into Port Phillip Bay.

McIvor Creek and **Wild Duck Creek** drain the western part of the Shire. Both creeks flow into Lake Eppalock on the Campaspe River.

Melbourne Water has several important assets including open cut channels, natural waterways and main drains within the Mitchell Shire including:

- Pretty Sally Drive Drain
- Mittagong Creek
- Strathaird Creek
- Taylors Creek
- Wallan Creek
- Kalkallo Creek

3. Flood Risks

The Mitchell Shire experiences riverine flooding associated with the Goulburn River and the larger creeks, flash flooding along the shorter and steeper waterways and stormwater flooding in urban areas.

Much of the Shire consists of thin sandy soils which have a limited capacity to retain water with the result that after heavy rain, sheet flows and downstream flooding can and does occur.

Lake Eildon plays an important role in reducing flooding in the Goulburn River downstream of Eildon Weir as it provides significant attenuation of flows. For example, in October 1993, the Lake reduced the peak discharge from 170,000ML/d inflow to 46,630ML/d peak outflow, a 73% reduction (HydroTechnology, 1995).

Seymour is regularly exposed to flooding from both the Goulburn River and the flash prone Whiteheads Creek and has a long history of experience. The most recent flood occurred in January 2011.

Sugarloaf Creek flows can have a significant effect on flooding at Seymour. A minor flood down the Goulburn River coinciding with a major flood down Sugarloaf Creek and Sunday Creek will flood a considerable portion of Seymour.

The western edge of the Dabyminga Creek floodplain at Tallarook is well defined by an escarpment but less well defined on the eastern side as ground levels rise gradually. A house on the west bank of the creek is known to have flooded up to 2m above floor-level.

The majority of drainage related issues within Mitchell Shire are confined to Seymour, Wallan, Kilmore, Broadford and Beveridge. The issues vary from ageing drainage assets through development / urban infill within a floodplain or overland flow path, to changed hydrology due to development (i.e. increased impervious areas) within the catchment.

Several towns within the Shire have seen historical development within overland flow paths. Towns such as Kilmore, Broadford and Wallan exhibit infill development where overland flow paths have been converted to pit and pipe systems beneath the surface and the overland flow paths filled to allow construction. This presents a significant flooding risk during prolonged heavy rain events.

Increased development towards the southern end of the Shire around Wallan and Beveridge presents one of the major flooding issues for Mitchell Shire. Increased residential development is traditionally associated with a change in the hydrology of an undeveloped catchment. It can become more 'flashier' due to increased impervious surfaces and increase the problems associated with stormwater runoff in developed areas. Further, much of the land being developed lies within overland flow paths or on traditional floodplains. These areas are often flat and low-lying.

Urban consolidation typically increases runoff and can either create new drainage problems or intensify existing problems. For example, when drain and creek corridors are obstructed and flood conveyance capacity is not preserved, flooding will result.

Mitchell Shire Council is responsible for over 14km of the Goulbourn River High Country Rail Trail between Tallarook and Trawool in the east of the municipality. Much of the trail follows the Goulburn River and is within the floodplain. This poses a potential risk to public safety during a flooding event.

4. Riverine Flooding

Generally, a wet catchment and a period of heavy rain are required to produce riverine flooding within the municipality. The more severe riverine floods generally occur as a result of:

- Moist warm airflow from northern or north western Australia (perhaps from a decaying tropical cyclone such as occurred in January 2011) bringing heavy rainfall over a period of 12 hours or more following a period of general rainfall. The initial period of general rainfall "wets up" the catchments and (partially) fills the on- and off-stream dams and the natural floodplain storage. These combine to increase the runoff generated during the subsequent period of heavy rainfall.
- Successive cold fronts, often during winter and spring, that bring prolonged periods of rain that wet up the catchments and prime them for flooding from a further front or complex low pressure system that is perhaps slow moving and brings heavy rainfall.
- A low-pressure system with a good moisture feed stalled or moving slowly over southern Victoria or slightly to the south (i.e. directing moisture over central Victoria) as a result of a (complex) blocking pattern to the east.

5. Flash Flooding, Overland Flows and Stormwater Flooding

Short duration, high intensity rainfall (usually associated with severe thunderstorms or small scale weather systems that are locally intense and slow moving) can also cause flash flooding across the Shire. Such events are mainly confined to the summer months, 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.

High intensity rainfall such as associated with thunderstorms giving average rainfall rates of typically more than 30 mm/hour sustained over a period of 30 minutes (i.e. 15mm of rain) or so is likely to lead to high flows in the local creeks and / or overland flows, even on a dry catchment. This amount of rain on a wet catchment could result in more severe flooding. Whiteheads Creek in Seymour is particularly susceptible to this type of event with 30 mm of rain in an hour on top of moderate flooding from the Goulburn River being enough to cause extensive flash flooding in the East Seymour area.

6. Dam Failure Flood Risk

All dams have a risk of failure. All major dams are subject to rigorous dam safety management programs implemented by the managing entity and are the subject of individual Dam Safety Emergency Management Plans (DSEPs). DSEPs identify possible dam failure scenarios and provide direction on the order and detail of the necessary communications and incident management tasks to be initiated. They also refer to intelligence and maximum inundation extent mapping arising from detailed dam break analyses. Intelligence can include travel times to key locations, maximum depths and velocities and the time to reach those maxima at those key locations, as well as other information that would inform the response effort. Close communication with the dam manager is essential in the event of a dam safety incident.

The following Dam is located upstream of Seymour on the Goulburn River.

Location	Owner	Dam Height	Dam Capacity	Comments
Lake Eildon is located on the Goulburn River in its upper catchment, immediately below the junction with the Delatite River.	Goulburn Murray Water	84.5m Embankment Dam	3,390,000 ML	Has Hydroelectricity operated by AGL

Eildon Dam

A view of the impounded Lake Eildon, in 2011

Location of the Eildon Dam in Victoria

Country	Australia
Location	Victorian Alps, Victoria
Coordinates	37°11′34″S 145°53′49″E[1]
Purpose	Water supply Irrigation Hydroelectricity
Status	Operational
Construction began	1915
Opening date	1929 1935 (modifications) 1955 (enlarged)
Operator(s)	Goulburn–Murray Water

7. Water Storages

The only storage of significance within the Shire is Sunday Creek Reservoir located just upstream of Broadford. It is owned and operated by Goulburn Valley Water (GVW) and has a capacity of 1,650ML at full supply level (FSL).

There are two other much smaller GVW storages in the municipality: Broadford #3 Reservoir (117ML) and Pyalong Reservoir (40ML).

8. Health and Environmental Risks

There are many septic tanks within the Shire that may be inundated by floodwaters. Further, chemicals and fuel may be stored in farm sheds and tanks on floodplains.

9. Properties at Risk

While information on property floor levels and the likelihood of over-floor flooding is available for Seymour (see Appendix C1 and WBM, 2001) similar information is not currently available for other locations within the Shire.

10. Infrastructure at Risk

10.1 Overview

Major infrastructure within the municipality affected by flooding includes:

- Major transport corridors (e.g. Hume Highway, Northern Highway, Goulburn Valley Highway);
- Railway lines (e.g. main Melbourne – Sydney rail line and branch line from Seymour to the Goulburn Valley)
- Facilities in Seymour.

10.2 Major Roads

Dependant on flood magnitude the following roads may be inundated.

- Many roads in and around Seymour including Hanna, Tierney, Edward, Tallarook, Eliza, Station, Tristan, Butler, Wallis, High, Victoria, and Oak streets, Quarry Road and the Goulburn Valley Highway.
- Roads in and around Broadford, including High Street, Burgess Lane and the Broadford – Wallan Road. Perhaps also the Broadford – Sugarloaf Creek Road.
- Roads in Avenel including Henry, Mitchell, Wedge, Ash, Shelton, Kent and Queens streets and Vearings Road.
- Roads in and around Tallarook including Hedleys Lane.
- Roads in and around Wallan including the Wallan – Whittlesea Road and the Northern Highway.

During heavy and / or prolonged rain events, many minor roads are also likely to be inundated across the municipality.

10.3 Other Infrastructure

Wastewater treatment plant – unlikely to be flooded.

Sewer pump stations – unknown.

Water treatment plant – unlikely to be flooded.

Potable water pump stations – unknown.

Mobile network telephone towers – none known.

Electrical power kiosks / zone sub-stations (cabinets) – none known.

Community facilities at Seymour – significant disruption including the shopping centre and commercial centre of town, the Police Station and possibly the VICSES Unit headquarters.

Caravan Parks – in Broadford and Seymour.

11. Flooding Hotspots

Below is a list of flood hotspots as identified in a workshop run by Water Technology with the Shire, Melbourne Water and related agencies on 28th February 2013 as part of the Flood Management Plan development process. Generic locations such as along the Goulburn River, etc are excluded from the list.

Sunday Creek

- Riverine flooding in the lower reaches.
- The ford floods at Waterford Park (upstream of Broadford).
- **In Broadford**
  - Development pressure in High Street but no overland path.
  - Under capacity drainage infrastructure.
  - Issues at the ford.

Whiteheads Creek

- Flash flooding. Whiteheads Creek in Seymour is particularly susceptible to this type of event with

30mm of rain in an Hour on top of moderate flooding from the Goulburn River being enough to cause flash flooding in the East Seymour particularly around Alfred Street, Batten Street and Upton Street. The Seymour SES LHQ is also vulnerable during these events and will require sandbag protection.

Seymour

- Significant flooding issues with many properties at risk of over-floor flooding.

Kilmore

- Subject to flash flooding.
- Many in-stream structures (e.g. culvert, bridges) susceptible to blockages which results in upstream ponding and possible road overtopping.
- Development across overland flow paths – industrial estates at the northern end of town and either side of the Northern Highway at the southern south of town and recent residential development southeast of town.
- Stormwater drainage system issues – very low level of service – frequent nuisance flooding.

Wallan / Wandong / Beveridge

- Development on overland flow paths.
- Multiple retarding basins and increasing peak flows due to development (e.g. at Spring Ridge).
- Retarding basin failure at Hidden Valley.
- Regular flooding of the Northern Highway at Wallan South.
- Wallara Estate at Wallan.

12. Flood Mitigation Measures within the Municipality

There are no formal structural flood mitigation measures on streams within Mitchell Shire although levees are currently being planned for construction at Seymour. The levee will provide protection to 540 properties within Seymour between the railway line, Whiteheads Creek and the Goulburn River. The alignment of the levee will be generally along Whiteheads Creek, the Goulburn River and land southwest of Seymour to the 100-year ARI (1% AEP) flood level plus freeboard.

13. Historic Floods

Significant flood events occurred within Mitchell Shire in 1906, 1916, 1917, 1921, December 1934, 1952, 1973, 1974 and 1993. The 1916 and 1917 floods saw severe flooding of the then Seymour business centre in Emily Street, forcing the move towards Station Street as a result of repeated flood damage. These floods preceded the construction of Eildon dam which first filled in 1956 and its forerunner, Sugarloaf Reservoir, which was constructed sometime between 1915 and 1922.

1973 saw an approximate 100-year ARI in Whiteheads Creek which caused significant damage to Seymour. It occurred very quickly, flooded extensive areas in and around the town, swept a house away and left one person drowned.

Major flooding occurred in Sunday Creek in 1906. Further large floods occurred in July 1987 (approx 7% AEP) and in 1974 (approx 2% AEP). The 1974 flood is considered one of the largest floods in the Goulburn catchment, with major flooding from the Sunday Creek catchment severely affecting Seymour. Nearly 200 properties were directly affected by flooding along with many smaller rural towns downstream of Eildon Weir (approx 30-year ARI event). The Ash Bridge gauging station on Sugarloaf Creek was washed away.

Flooding in September and October 1993 saw flooding throughout much of North East Victoria including at Seymour. Lake Eildon substantially mitigated the October 1993 flood, reducing flows from around 170,000ML/d to 46,630ML/d.

The most recent flooding at Seymour occurred in January 2011.

While floods have occurred along Hughes Creek and within the Merri Creek catchment, details are obscure and historic data is not available.

Site	Highest flood since gauge installed	Next highest flood	Third highest flood
Goulburn River @ Trawool (405201)	December 1934 9.083m <1% AEP	August 1939 7.62m ~3% AEP	July 1952 7.58m ~3% AEP
Goulburn River @ Seymour (405202	May 1974 7.57m ~3% AEP	September 1975 7.01m ~7% AEP	October 1974 6.97m ~7% AEP
Sunday Creek @ Tallarook (405212)	May 1974 5.25m ~4% AEP	July 1987 4.80m ~7% AEP	November 1971 4.81m ~7% AEP

14. River Gauges

Refer to the list in Appendix E.

15. Flood Inundation Mapping

A complete set of maps for the length of the Goulburn River detailing the 1% AEP flood extents and water surface elevations are available from GBCMA. More detailed maps are also available for towns and river confluences.

More specifically, flood extent mapping is available for:

- Taylors Creek
- Merri Creek (1%, 2% and 10% AEP)
- Goulburn River (1% AEP)
- Wallan Creek (1% AEP)
- Kalkallo Creek (1% AEP)
- Wallan Street Drain (1% AEP)
- Tallarook (1% AEP)
- Hughes Creek at Avenel
  - Areas of Avenel inundated by 1993 floodwaters
  - Approximate extent of inundation for the 1% AEP flood
  - Estimated 1% AEP flood extent for Hughes Creek from Avenel to the Goulburn River.

Flood inundation maps have been produced by WBM (March 2001) for Seymour for ten (10) gauge heights ranging 6.30m to 8.90m at the Goulburn River at Seymour gauging station. These maps are included in this MFEP at Appendix F.

The Mitchell Planning Scheme shows areas along watercourses likely to be inundated by a 1% AEP (100-year ARI) flood event where detailed flood mapping has been completed, as LSIO. While it is not practical to reproduce the LSIO as an attachment to this Plan, hard copies are available from the Municipality. They are also available in hard copy form and as PDF digital copies at the MECC and in digital form at the DEDJTR website www.dpcd.vic.gov.au/planningschemes.

Coarse flood extent maps were also developed in 2000 as part of a state-wide Flood Data Transfer Project (FDTP) (DNRE, 2000). However, coverage within Mitchell Shire is not extensive. Although this flood extent mapping has a low level of accuracy, the maps can be a useful guide to highlight areas subject to flooding where detailed mapping is not yet available. The associated reports provide guidance on likely accuracies and associated confidence in delineations.

16. Digital Flood Extent Datasets and Flood Photography

FloodZoom and the Victorian Flood Data (VFD) datasets (available from GBCMA and NCCMA) contain a significant quantity of flood information. For the waterways within Mitchell Shire this includes a number of surveyed flood levels.

Melbourne Water also maintains a quantity of flood related data in GIS format.

A number of ground level still photographs are available from GBCMA and NCCMA.

The GBCMA, NCCMA, Melbourne Water, Goulburn Valley Water, Coliban Water and the Shire hold a variety of other datasets that include:

- Contour and survey information, including LiDAR data.
- Drainage and road infrastructure data.
- Digital cadastral information.
- Flood and non-flood aerial photography.

In addition to the above, the following data are also available:

Watercourse	Flood photos	Flood levels	Other information
Goulburn River	1974	1916, 1917, 1934, 1974 & 1993 and other flood levels near Seymour.	Interpreted 1973 flood extent on non-flood photography and planning scheme maps.
			1974 flood photography at Seymour.
			1993 flood photography.
			1% flood information for Seymour.
Whiteheads Creek		1980 & 1% AEP	Surveyed (1% AEP) flood extent. Interpreted flood extent on plan and planning scheme maps. 1973 flood extent map.
Sunday Creek / Dry Creek		1987	Interpreted flood extent on planning scheme maps near Broadford.
Hughes Creek & Dabyminga Creek			Interpreted 1% AEP flood extent maps at Avenel and Tallarook.
Merri Creek			Interpreted 1% AEP flood extent maps in and near Wallan.
Kilmore			Aerial photography from Mitchell Shire Council.

17. Flood Intelligence Cards – see Appendix C

All 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 and provide practical guidance on appropriate flood response actions.

Note: That at the time of publication travel times and specific details of flood behaviour are not available. These will be added as the information becomes available.

APPENDIX B – TYPICAL FLOOD RISE, RECESSION AND PEAK TRAVEL TIMES

Definitive information on the time it takes flash flooding (i.e. resulting from heavy rainfall associated with severe weather or thunderstorm activity) to develop (i.e. to arrive at a location) following the start of heavy rain and the time it takes for the maximum water depth / extent to be reached is not available. **Timing is however likely to be short: of order 30 minutes to an hour for Whiteheads Creek and 6 hours or more for Sunday Creek and Dry Creek around Broadford.**

In the case of riverine flooding, the time of travel of a flood peak will be influenced by antecedent conditions. A flood on a 'dry' watercourse will generally travel more slowly than a flood on a 'wet' watercourse (e.g. the first flood after a dry period will travel more slowly than the second flood in a series of floods) and big floods tend to travel faster than small floods. Hence, the size of the flood, recent flood history, soil moisture and forecast weather conditions all need to be considered when using the following information to direct flood response activities.

Location From	Location To	Typical Travel Time	Comments
RIVERINE FLOODING – Goulburn River			
Floods are characterised by steady rises, peaks that extend for a number of hours and recessions that are around one-half to one-third the rate of rise. The further down the catchment the longer the peak and the slower the recession. A second flood on the creek will travel faster than a flood on a dry creek and a big flood will in general travel faster than a small flood.			
Start of rainfall	Seymour	12 hours	To start of rise due to increased flows in the creeks between Eildon and Seymour.
Start of rainfall	Seymour	48 hours	From Eildon, assuming that Eildon is at or near FSL. Initial rise likely to be driven by local flows.
		72 hours	To peak.
Eildon	Seymour	40-48 hours	The bigger the flood the closer travel time will be to the quickest travel time.
Seymour	Trawool	9 hours	Note, the Sunday and Sugarloaf Creeks system can cause the Seymour gauge to peak prior to Trawool gauge on the Goulburn River.
			The above timings are approximate. The Goulburn and Broken Rivers Regional Flood Study will revise these travel times (study commenced November 2017).
RIVERINE FLOODING – other watercourses			

Location From	Location To	Typical Travel Time	Comments
FLASH FLOODING – Sunday Creek and Dry Creek			
Floods are characterised by rapid rises and falls. A wet catchment will reduce response times – everything will happen quicker and flooding will be more severe for similar rainfalls.			
Start of rainfall	Broadford	6 to 10 hours	To start of rise, assuming that Sunday Creek Reservoir is at or near FSL.
		9 to 15 hours	To peak
	Seymour	12 hours	To start of rise, assuming that Sunday Creek Reservoir is at or near FSL.
		18 to 24 hours	To peak
Broadford	Seymour	6 hours	
			The above timings are approximate. The Sunday and Sugarloaf Creek Flood Study will revise these travel times (study commencing September 2018).
FLASH FLOODING – Sugarloaf Creek and Kilmore Creek			
	Kilmore KILMORE CREEK (34.2km^2)	45 to 60 minutes	To start of rise, assuming catchment is wet and the many local farm dams are full. A little slower if dry.
		3 to 6 hours	From start of rise to peak, assuming catchment is wet and the many local farm dams are full. A little slower if dry. Bigger floods take longer to reach peak.
		3 to 6 hours	Recession time - from peak to near normal flows.
	Kilmore HAMILTON CREEK (9.2km^2)		Begins to rise around the same time as Kilmore Creek assuming a wet catchment. Slower if dry. Peak occurs within about 60 to 90 minutes of the start of rise. Slow recession. Peak flow is about 35% of the peak flow in Kilmore Creek.
	Kilmore RYANS CREEK (12.4km^2)		Begins to rise around the same time as Kilmore Creek assuming a wet catchment. Slower if dry. Peak flow occurs at around the same time as Kilmore Creek. Peak flow is about 35% of the peak flow in Kilmore Creek.
	Ash Bridge	8 to 12 hours	To start of rise.
		12 to 16 hours	To peak

Location From	Location To	Typical Travel Time	Comments
Ash Bridge	Seymour	5 to 6 hours	
			The above timings for Ash Bridge/Sugarloaf Creek are approximate. The Sunday and Sugarloaf Creek Flood Study will revise these travel times (study commencing September 2018).
FLASH FLOODING – Whiteheads Creek			
Start of rainfall	Telegraph Road	30 to 60 minutes	To start of rise.
		45 to 90 minutes	To peak
			The above timings are approximate. The Whiteheads Creek Flood Study may revise these travel times.
FLASH FLOODING – Dabyminga Creek			
Start of rainfall	Tallarook	3 to 6 hours	To peak (estimate based on the potential time of concentration for the catchment)
FLASH FLOODING – Hughes Creek			
Start of rainfall	Avenel	TBA	To start of rise.
		TBA	To peak
FLASH FLOODING – Merri Creek, Wallan Creek, Taylors Creek and Kalkallo Creek			
Start of rainfall	Wallan	TBA	To start of rise.
		TBA	To peak
	Beveridge	TBA	To start of rise.
		TBA	To peak
FLASH FLOODING – Wallan Creek, Dabyminga Creek			
Start of rainfall	Tallarook	TBA	To start of rise.
		TBA	To peak
FLASH FLOODING – McIvor Creek and Wild Duck Creek			
Start of rainfall	Tallarook	TBA	To start of rise.

Location From	Location To	Typical Travel Time	Comments
		TBA	To peak
STORMWATER FLOODING			
Start of rainfall			

APPENDIX C1 – SEYMOUR
COMMUNITY FLOOD EMERGENCY MANAGEMENT PLAN

1. Overview

Seymour is located approximately 100km north of Melbourne. The town is located on the Goulburn River floodplain near its confluence with Sunday Creek and Whiteheads Creek and has a history of flooding. The upstream catchment area is 4,840km^2.

Sunday Creek joins the Goulburn River downstream from Seymour from the west while Whiteheads Creek flows from the east along the northeastern edge of town and into the Goulburn River. Gradients along Whiteheads Creek are steep and flow velocities are high. The catchment responds quickly to thunderstorms / heavy rain.

Goulburn River flooding at Seymour can be the result of outflows from Lake Eildon and contributions from the tributaries that drain the northern slopes of the Great Dividing Range between Seymour and Eildon, either acting individually or in combination. Lake Eildon plays an important role in reducing flooding in the Goulburn River at Seymour as it provides significant attenuation of flows. For example, in October 1993, the Lake reduced the peak discharge from 170,000ML/d inflow to 46,630ML/d peak outflow, a 73% reduction (HydroTechnology, 1995).

Flooding from the Sunday Creek system usually coincides with high or flood flows in the Goulburn. Sunday Creek system flows can have a significant effect on flooding at Seymour. A minor flood down the Goulburn River coinciding with a major flood down Sugarloaf Creek and Sunday Creek will flood a considerable portion of north Seymour (i.e. around Emily Street and to the north). However, Goulburn River flows dominate. A 100-year ARI Goulburn River flood that coincides with a 100-year ARI Sunday Creek flood will be only around 100mm higher at the Seymour gauge than if the Sunday Creek flood was a 20-year ARI or similar flood.

Whiteheads Creek and its tributaries (North Spur, Back Creek and Deep Creek) drain the hills to the east of Seymour and flow west to the Goulburn River. The catchment is small at 118km^2. Land use includes farming as well as rural residential and some urban areas towards the bottom end of the catchment. Flooding occurs quickly and only lasts an hour or so, unlike flooding from the Goulburn River which is generally of greater magnitude and typically last from 1 to 3 days.

Floods in Whiteheads Creek affect the eastern part of Seymour near its confluence with the Goulburn River.

Goulburn River flooding affects areas to the north and west of Eliza Street and Station Street as well as the floodplain upstream and downstream of the town towards Ekbergs Road and as far west as Northwood Road.

At around 6.1m on the Goulburn River at Seymour gauge, the Goulburn River begins to break out and flow across the floodplain above and below the town and into the area between the Hume Freeway and the Goulburn Valley Highway to the north of Emily Street.

At around 6.3m, 12 properties in Edward, Emily, Hanna and Tierney streets are affected by flooding.

At 6.6m, properties are affected in Alexander, Butler, Edward, Emily, Hanna, High, Tierney, Tallarook and Wallis streets with over-flooding of 5 houses in Butler and Emily streets. Kings Park and the swimming pool in Lesley Street are also affected. Access to the Police Station is severely compromised.

At around 7.0m, the Goulburn Valley Highway is likely to be closed due to flooding.

Above 7.4m, the extent of flooding does not increase significantly but the number of buildings likely to experience over-floor flooding and the depth of flooding increases steadily.

At a gauge height of around 7.64 m, residential and commercial areas in North Seymour are likely to be inundated.

In a really big flood (e.g. 8.9m on the Seymour gauge), 243 buildings would be flooded over-floor and water would be up to 1.5m deep across the Goulburn Valley Highway.

Flood behaviour is characterised by the following key observations:

- During a flood, the Goulburn River backwaters into the area behind the Royal Hotel;
- Further into the event and if the river gets high enough, the river breaks its banks downstream of the railway crossing;
- During large events, water flows across the floodplain downstream of the railway line towards the swimming pool, through Kings Park and into Tallarook Street; and
- High flows in Sunday Creek force water from the Goulburn to spill out onto the floodplain between the railway line and the Emily Street (old Hume Highway) Bridge.

2. Overview of Flooding Consequences

2.1 Warning Times

The flood warning time for Seymour is of order 30 to 60 minutes for flooding from Whiteheads Creek, up to around 12 hours for flooding as a result of backflow from Sunday Creek and its tributaries including Sugarloaf Creek, and around 12 to 24 hours or more for Goulburn River flooding. The longer time applies either when the majority of the flow originates from around or upstream of Lake Eildon or flood forecasts are based on rainfall rather than flood levels achieved at upstream gauges. Indeed in 1981, State Rivers determined that the most frequently occurring rain event for the Goulburn catchment above Seymour had a duration of 48 hours.

2.2 Areas Affected

Maps at Appendix F provide guidance on where flooding is likely to occur.

2.3 Properties Affected

2.3.1 Summary

In very broad terms, properties in the area between the Hume Freeway and the Goulburn Valley Highway to the north of Emily Street are currently (pre-levee conditions) most at risk of flooding. Commercial properties fronting Wallis Street are also subject to deep flooding with initial flooding beginning around 6.5m.

Below around 6.3m there are no properties flooded over-floor within Seymour. Between around 7.4m and 8.0m, the number of properties subject to over-floor flooding increased substantially, from around 20% of those on the floodplain to around 75%. At the same time, while the flood extent does not change very much, floodwaters do become deeper.

With the exception of localised flooding in October 1993 when the gauge reached 6.1m and in September 2010 when the river peaked at 6.21m and 5 properties were impacted, the May 1974 event is the most recent large flood at Seymour. The peak height in 1974 was 7.57m and nearly 200 buildings were damaged. The 1916 flood was considerably higher than the 1974 event and is considered to be the most severe in the town's history.

Around 550 properties are at risk of inundation during a severe flood with 288 at risk of over-floor flooding.

A summary of the number of properties likely to be flooded at Seymour and the number likely to be inundated over-floor is provided in Section 6 of this Appendix.

The Goulburn Caravan Park maybe affected from around the minor flood level (4.0m)

2.3.2 Detailed List

A list of these properties along with the expected depth of over-ground flooding and the likely depth of over-floor inundation is provided as a separate attachment to this MFEP**. It is strongly recommended that the list is used in conjunction with the flood inundation maps (see Appendix F).**

2.3.3 Update of List of Properties Likely to be Flooded

The list of properties likely to be flooded (with corresponding levels and indication of over-floor flood depth) should be updated within twelve (12) weeks of a flood. Update should occur with information collected as part of post-flood information recording activities and as may be collected as a consequence of the event debrief. Information on the collective experience of the IMT should also be gathered and utilised.

2.4 Isolation

The main access roads for Seymour are the:

- Hume Highway to the south and northeast;
- Goulburn Valley Highway to the north and southwest.

Access to

- The Hume Highway begins to be compromised from around 6.5m when Emily Street begins to flood to depth;
- Seymour from the Hume Highway and Goulburn Valley Highway is likely to be lost from around 7.0m;
- Seymour from the south (Goulburn Valley Highway) is unlikely to be lost unless the tributary creeks (e.g. King Parrot Creek, Yea River, etc) overtop the road.

All roads affected are listed for each gauge increment modelled and mapped as part of the Floodplain Mapping Study for Seymour in 2001.

2.5 Essential Infrastructure

Essential infrastructure affected by flooding at Seymour is limited to the Hume Highway and the Goulburn Valley Highway.

Access to the Police Station in Tallarook Street is severely compromised from around 6.6m.

Note that commercial properties fronting Wallis Street are subject to deep flooding with initial flooding beginning around 6.5m.

3. Flood Mitigation

3.1 General

Flood intelligence MUST have regard for changes within the catchment that modify likely flood behaviour (e.g. mitigation works that reduce the severity of flood risk).

3.2 Flood Protection Levees

Levees are currently being planned for construction at Seymour. The levee will provide protection to 540 properties within Seymour between the railway line, Whiteheads Creek and the Goulburn River. The alignment of the levee will be generally along Whiteheads Creek, the Goulburn River and land southwest of Seymour to the 100-year ARI (1% AEP) flood level plus freeboard.

3.3 Drainage Works

There are currently no specific drainage works aimed at alleviating flooding within Seymour.

4. Flood Impacts and Required Actions

Refer to the following Flood Intelligence Card.

Flow magnitude	Key Flow behaviour characteristics
20 year event	Flows are generally confined a narrow floodplain extending approximately 200m eith side of the Goulburn River centreline until south of the Seymour township, a breako occurs towards Ekbergs Rd. Substantial inundation occurs through the western side of the Seymour township and between the Hume Freeway and the Goulburn Valley Highway. Inundation reaches as far as Northwood Rd to the west in the clearly defined low lands
50 year event	Inundation is very similar to that of the 20 year event but with additional inundation through the western portions of Seymour with a general increase in depth and coverage of water
100 year event	Inundation is very similar to that of the 50-year event but with additional inundation through the western sections of Seymour with a general increase in depth and coverage of water.

5. Command, Control and Coordination

The Command, Control and Coordination arrangements in this MFEP will be as detailed in the EMMV.

All flood response activities within Mitchell Shire will be under the Control of the VICSES Regional Duty Officer / Incident Controller.

An EMT may be established by the Incident Controller in accordance with the EMMV.

An ICC will be established by the Control Agency (i.e. VICSES) for the command and control functions in response to any flood event within the Municipality. It will be operated in accordance with VICSES arrangements.

The ICC for Mitchell Shire and any Divisional or Sector Commands will be located as detailed in the VICSES North East Region Flood Emergency Plan.

6. Flood Intelligence Card and Property Inundation List

6.1 Introduction

While flood intelligence cards provide guidance on the relationship between flood magnitude and flood consequences, 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. Further, the hydrologic and hydraulic modelling that underpins much of the intell detailed below is informed by a number of assumptions and approximations that are unlikely to be replicated exactly during a flood event. Actual impacts under similar rainfall conditions are therefore expected to be similar but may not be exactly the same: there are likely to be some differences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series at http://www.ema.gov.au and in particular in Manual 20 "Flood Preparedness".

All levels, impacts and actions listed in the following flood intelligence card may need to be adjusted to better reflect experience.

6.2 Flood Intelligence Card

Water level at Seymour (m) (mAHD)	Flow (m^3/sec)	AEP of flood (%)	Consequence / Impact	Actions may include (but not limited to) evacuation, closure of roads, sandbagging, issue of warnings and who is responsible
USING THIS INTELLIGENCE CARD. Based on BoM flood forecasts for Seymour, determine the approximate flood severity. Consider the appropriate flood inundation map and refer to the list of properties and roads likely to be flooded. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that that some actions may need to be initiated in an order that is different from their relative placement in this table.				
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERO at Mitchell Shire. Note time available – see below.				
Note that: ➢ Flooding from the Sunday Creek system usually coincides with high or flood flows in the Goulburn. A minor flood down the Goulburn River coinciding with a major flood down Sugarloaf Creek and Sunday Creek will flood a considerable portion of north Seymour (i.e. around Emily Street and to the north). ➢ Goulburn River flows dominate and flooding typically last from 1 to 3 days. A 100-year ARI Goulburn River flood that coincides with a 100-year ARI Sunday Creek flood will be only around 100mm higher at the Seymour gauge than if the Sunday Creek flood was a 20-year ARI or similar flood. ➢ Floods in Whiteheads Creek affect the eastern part of town near its confluence with the Goulburn River. Flooding occurs quickly and only lasts an hour or so. ➢ The effects of flooding from Whiteheads Creek or from the Sunday Creek system have not been captured to this Flood Intelligence Card.				
4.00 134.24			**MINOR FLOOD LEVEL** Localised flooding along the river frontage between Kings Park and the old Hume Highway. Goulburn Caravan Park starts to flood. Warning linked to Ghin Ghin gauge.	o Monitor rainfall and water levels.
5.2 135.44			**MODERATE FLOOD LEVEL** Stormwater backup flow into Emily Street. Kings Park flooding.	o Continue to monitor rainfall and water levels. o

Water level at Seymour (m) (mAHD)	Flow (m^3/sec)	AEP of flood (%)	Consequence / Impact	Actions may include (but not limited to) evacuation, closure of roads, sandbagging, issue of warnings and who is responsible
USING THIS INTELLIGENCE CARD. Based on BoM flood forecasts for Seymour, determine the approximate flood severity. Consider the appropriate flood inundation map and refer to the list of properties and roads likely to be flooded. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that that some actions may need to be initiated in an order that is different from their relative placement in this table.				
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERO at Mitchell Shire. Note time available – see below.				
5.33 135.57			December 2010 flood level. Shops along ANZAC Avenue flooded, 1 house inundated	
6.0 136.24			Bus routes along Goulburn River frontage are affected. Flooding along Emily Street, Kings Park, Tierney Street, High Street, Wallis Street and Winery area in Seymour.	
6.08 136.32			January 2011flood level 1 home affected, 2 residents evacuated	
6.1 136.34		25% AEP (4-yr ARI)	1993 flood level. Limited inundation of the floodplain although breakouts are starting to occur both up and downstream of town and into the area between the Hume Freeway and the Goulburn Valley Highway to the north of Emily Street. Flow predominantly in-bank.	
6.11 136.35			October 1993 flood level.	
6.21 136.45			September 2010 flood level. 5 properties impacted along with Emily Street, ANZAC Avenue, Kings Park, Tierney Street, High Street and Wallis Street	
6.3 136.54		15% AEP (6-yr ARI)	Below around 6.3m, there are no properties flooded over-floor within Seymour. At around 6.3m, 12 properties in Edward, Emily, Hanna and Tierney streets are affected by flooding.	o Continue to monitor rainfall and water levels.
6.4 136.64			Caravan Park flooding	o Liaise with Caravan Park regarding Park Emergency Plan

Water level at Seymour (m) (mAHD)	Flow (m^3/sec)	AEP of flood (%)	Consequence / Impact	Actions may include (but not limited to) evacuation, closure of roads, sandbagging, issue of warnings and who is responsible
USING THIS INTELLIGENCE CARD. Based on BoM flood forecasts for Seymour, determine the approximate flood severity. Consider the appropriate flood inundation map and refer to the list of properties and roads likely to be flooded. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that that some actions may need to be initiated in an order that is different from their relative placement in this table.				
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERO at Mitchell Shire. Note time available – see below.				
6.6 136.84		12.5%AEP (8-yr ARI)	Properties are affected in Alexander, Butler, Edward, Emily, Hanna, High, Tierney, Tallarook and Wallis streets with over-flooding of 5 houses in Butler and Emily streets. Kings Park and the swimming pool in Lesley Street are also affected. Access to the Police Station is severely compromised.	o Continue to monitor rainfall and water levels.
6.66 136.90	814		September 1993 flood level. Goulburn River Caravan Park was inundated. Traffic disruptions with some roads reduced to one lane. Houses in Emily Street area are isolated and surrounding area is inundated.	o
7.0 137.24		7% AEP (14-yr ARI)	MAJOR FLOOD LEVEL. Goulburn Valley Highway is likely to be closed due to flooding. North Seymour residential and commercial area flooding.	o
7.01 137.25	949	7% AEP (14-yr ARI)	1975 flood level. Some floodplain inundation and out of bank flows.	o Continue to monitor rainfall and water levels. o
7.4 137.64		4.5% AEP (22-yr ARI)	Between around 7.4m and 8.0m, the number of properties subject to over-floor flooding increased substantially, from around 20% of those on the floodplain to around 75%. At the same time, while the flood extent does not change very much, floodwaters do become deeper.	o
7.57 137.81	1034	3.3% AEP (30-yr ARI)	1974 flood level. Extensive flooding on the floodplain and through town. Nearly 200 buildings damaged.	o Continue to monitor rainfall and water levels. o .
7.6 137.84		3.3% AEP (30-yr ARI)		o .

Water level at Seymour (m) (mAHD)	Flow (m^3/sec)	AEP of flood (%)	Consequence / Impact	Actions may include (but not limited to) evacuation, closure of roads, sandbagging, issue of warnings and who is responsible
USING THIS INTELLIGENCE CARD. Based on BoM flood forecasts for Seymour, determine the approximate flood severity. Consider the appropriate flood inundation map and refer to the list of properties and roads likely to be flooded. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that that some actions may need to be initiated in an order that is different from their relative placement in this table.				
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERO at Mitchell Shire. Note time available – see below.				
7.64 137.88			Residential and commercial areas in North Seymour likely to be inundated.	o
7.8 138.04		2.5% AEP (40-yr ARI)		o
8.0 1238.24		1.9% AEP (53-yr ARI)		o Continue to monitor rainfall and water levels. o
8.2 138.44		1.3% AEP (75-yr ARI)		o Continue to monitor rainfall and water levels. o
8.35 138.59	1875	1% AEP (100-yr ARI)		o
8.6 138.84		0.7% AEP (145-yr ARI)		o
8.9 139.14		0.4% AEP (240-yr ARI)	243 buildings likely to be flooded over-floor and water would be up to 1.5m deep across the Goulburn Valley Highway.	o
14.15 144.39		PMF	Flooding through town around 7m deep.	

6.3 Summary of Properties Flooded

Summary of number of flood affected properties in Seymour EXISTING CONDITIONS – NO LEVEES										
Level at Seymour gauge, Goulburn River	6.3	6.6	7.0	7.4	7.6	7.8	8.0	8.2	8.6	8.9
Equivalent level in mAHD	136.54	136.84	137.24	137.64	137.84	138.04	138.24	138.44	138.84	139.14
Number of properties flooded above floor		5	47	115	149	178	201	215	233	243
Number of properties flooded below floor only	12	63	140	103	76	54	35	27	10	2
Total number of flooded properties	12	68	187	218	225	232	236	242	243	245

6.4 Detailed List of Properties Flooded

ATTACHMENT to the Mitchell Shire Flood Emergency Plan

A Sub-Plan of the Municipal Emergency Management Plan

This document comprises lists of properties flooded over-ground and over-floor together with lists of roads flooded for ten (10) gauge heights at Seymour between 6.3m and 8.9m. The depth of flooding at each road and each property is also provided. Properties within 100mm of experiencing over-floor flooding are also identified.

Information in this document should be used in conjunction with the Flood Intelligence Card and the flood inundation mapping prepared for Seymour and contained in the MFEP.

This information has been extracted from Seymour Floodplain Mapping Study deliverables (WBM, 2001) and was prepared on 6 May 2013.

Gauge Height = 6.3m

Refer Flood Map 540207-1

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
10	EMILY	136.51	137.24	136.84	**0.33**	
10	EMILY	136.53	137.24	136.83	**0.30**	
12	EMILY	136.76	137.48	136.83	**0.07**	
8B	EMILY	136.67	137.56	136.72	**0.05**	
7	EMILY	136.67	137.05	136.97	**0.30**	within 100mm
11	EMILY	136.60	138.41	136.98	**0.37**	
25	EMILY	137.00	137.13	137.13	**0.13**	within 100mm
7	HANNA	135.80	136.62	135.84	**0.04**	
2	TIERNEY	136.19	137.43	137.08	**0.90**	
4	TIERNEY	136.77	137.39	137.08	**0.31**	
NA	EDWARD	137.12	137.92	137.13	**0.00**	
NA	TIERNEY	137.07	137.56	137.12	**0.05**	

NOTES: - "NA" indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding

Street	Depth Of Inundation (m)
Alexander St	
Bolton St	0.3
Edward St	1.4
Elizabeth St	
Emily St East	0.1
Emily St West	
Goulburn Valley Highway	
High St	
Lesley St	
Moody St	
Robert St	0.1
Station St	
Tallarook St	
Tierney St	0.4
Wallis St	
William St	

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 6.6m

Refer Flood Map 540207-2

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
7	EMILY	136.67	137.05	137.09	0.42	0.04
25	EMILY	137.00	137.13	137.27	0.28	0.15
35	EMILY	136.45	136.75	136.86	0.41	0.11
35	BUTLER	135.96	136.08	136.16	0.20	0.08
1-3	EMILY	137.21	137.14	137.35	0.13	0.20
54-56	EMILY	136.09	136.31	136.20	0.12	
41	TALLAROOK	136.62	136.94	136.77	0.14	
17	HIGH	136.33	137.37	136.56	0.23	
11-13	HIGH	136.36	137.00	136.60	0.25	
11-13	HIGH	136.36	137.13	136.58	0.23	
8	HIGH	136.40	137.26	136.53	0.13	
8	HIGH	136.40	137.34	136.50	0.10	
21	HIGH	136.34	136.84	136.51	0.16	
19	HIGH	136.34	137.26	136.53	0.19	
52	TALLAROOK	136.82	137.32	136.85	0.03	
WINERY	EMILY	136.75	137.15	136.87	0.12	
10	EMILY	136.51	137.24	136.97	0.46	
10	EMILY	136.53	137.24	136.96	0.43	
12	EMILY	136.76	137.48	136.97	0.21	
8B	EMILY	136.67	137.56	136.95	0.28	
11	EMILY	136.60	138.41	137.10	0.49	
13	EMILY	136.99	138.03	137.11	0.12	
13	EMILY	136.99	137.27	137.13	0.14	
17	EMILY	137.21	137.75	137.23	0.02	
21	EMILY	136.91	137.57	137.25	0.33	
41	EMILY	136.68	137.60	136.69	0.01	
57	EMILY	136.07	137.37	136.18	0.11	
55	EMILY	136.32	137.18	136.47	0.15	
53	EMILY	136.43	136.95	136.45	0.03	
47	EMILY	136.49	136.89	136.64	0.15	
23	HIGH	136.39	137.16	136.49	0.10	
60 POLICE	TALLAROOK	136.56	137.35	136.70	0.14	
58	TALLAROOK	136.67	137.04	136.79	0.12	
56	TALLAROOK	136.83	137.07	136.84	0.01	
10	HIGH	136.28	136.73	136.47	0.19	
28	HIGH	136.04	137.77	136.31	0.27	
30	HIGH	136.24	136.82	136.28	0.04	
7	HANNA	135.80	136.62	136.06	0.26	
70	EMILY	136.05	136.22	136.05	0.00	
80	EMILY	135.96	136.77	136.02	0.06	
5	HANNA	136.02	136.55	136.19	0.17	
86-90	EMILY	135.85	136.22	135.98	0.13	
34	HIGH	135.90	136.57	136.26	0.36	
39	HIGH	135.82	136.45	136.25	0.43	
38	HIGH	135.82	136.62	136.21	0.39	
43	HIGH	136.19	136.65	136.23	0.05	
45	HIGH	136.17	136.76	136.22	0.05	
45	HIGH	136.08	136.86	136.21	0.13	
43	WALLIS	135.95	136.53	136.16	0.21	
44	HIGH	135.80	136.46	136.16	0.36	

42	HIGH	135.93	137.21	136.14	**0.21**	
43	EMILY	136.59	137.01	136.71	**0.11**	
43	EMILY	136.60	137.01	136.72	**0.12**	
29	HIGH	136.22	136.84	136.35	**0.12**	
26	ALEXANDER	136.70	137.69	136.86	**0.16**	
32	ALEXANDER	136.49	137.40	136.86	**0.37**	
34	ALEXANDER	136.54	137.40	136.86	**0.32**	
36	ALEXANDER	136.60	138.18	136.86	**0.26**	
31	HIGH	136.06	136.37	136.15	**0.08**	
4	HIGH	136.40	137.09	136.63	**0.23**	
25	EMILY	137.12	137.99	137.32	**0.20**	
2	TIERNEY	136.19	137.43	137.31	**1.12**	
4	TIERNEY	136.77	137.39	137.32	**0.55**	within 100mm
NA	EDWARD	137.18	137.91	137.30	**0.12**	
NA	EDWARD	137.12	137.92	137.29	**0.17**	
SWIMMING P	LESLEY	136.53	136.97	136.86	**0.33**	
Kings	Park	136.58	137.41	136.82	**0.24**	
NA	TIERNEY	137.07	137.56	137.33	**0.26**	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	0.5
Bolton St	0.6
Edward St	1.7
Elizabeth St	0.4
Emily St East	0.3
Emily St West	0.2
Goulburn Valley Highway	
High St	0.5
Lesley St	0.3
Moody St	
Robert St	0.4
Station St	
Tallarook St	0.2
Tierney St	0.7
Wallis St	0.3
William St	

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 7.0m

Refer Flood Map 540207-3

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
1-3	EMILY	137.21	137.14	137.62	0.41	0.47
NA	TIERNEY	137.07	137.56	137.56	0.49	0.00
4	TIERNEY	136.77	137.39	137.54	0.77	0.15
2	TIERNEY	136.19	137.43	137.53	1.35	0.10
25	EMILY	137.00	137.13	137.37	0.37	0.25
7	EMILY	136.67	137.05	137.33	0.66	0.28
13	EMILY	136.99	137.27	137.32	0.33	0.05
SWIMMING P	LESLEY	136.53	136.97	137.17	0.64	0.20
35	EMILY	136.45	136.75	137.15	0.70	0.40
34	TALLAROOK	136.80	137.07	137.11	0.31	0.04
36	TALLAROOK	136.85	136.89	137.11	0.26	0.22
42	TALLAROOK	136.79	137.04	137.10	0.31	0.06
44	TALLAROOK	136.78	136.84	137.10	0.32	0.26
56	TALLAROOK	136.83	137.07	137.10	0.28	0.04
30	TALLAROOK	136.83	136.85	137.07	0.24	0.22
58	TALLAROOK	136.67	137.04	137.05	0.37	0.01
41	TALLAROOK	136.62	136.94	137.03	0.40	0.08
28	TALLAROOK	136.81	136.83	137.02	0.21	0.18
8	TALLAROOK	136.68	136.77	136.99	0.31	0.22
5	WALLIS	136.63	136.81	136.99	0.36	0.18
38	EMILY	136.85	136.80	136.96	0.10	0.16
47	EMILY	136.49	136.89	136.90	0.40	0.01
29	WALLACE	136.13	136.67	136.83	0.70	0.16
12	HIGH	136.28	136.73	136.81	0.53	0.07
10	HIGH	136.28	136.73	136.80	0.52	0.07
32	WALLACE	135.95	136.54	136.78	0.83	0.24
32	WALLIS	135.95	136.54	136.78	0.83	0.24
34	HIGH	135.90	136.57	136.72	0.82	0.16
NA	ELIZABETH	136.00	136.70	136.72	0.72	0.02
37	WALLIS	135.99	136.32	136.72	0.73	0.40
36A	HIGH	135.82	136.45	136.71	0.89	0.26
39	HIGH	135.82	136.45	136.70	0.89	0.25
35	BUTLER	135.96	136.08	136.70	0.74	0.62
43	WALLIS	135.95	136.53	136.70	0.75	0.17
38	HIGH	135.82	136.62	136.70	0.88	0.08
44	HIGH	135.80	136.46	136.70	0.90	0.24
43	HIGH	136.19	136.65	136.70	0.51	0.04
31	HIGH	136.06	136.37	136.68	0.62	0.31
45	WALLIS	135.76	136.27	136.67	0.91	0.40
45	WALLIS	135.81	136.27	136.66	0.85	0.39
45	WALLIS	135.73	136.23	136.65	0.92	0.43
45	WALLIS	135.77	136.23	136.62	0.84	0.38
63	EMILY	135.95	136.51	136.56	0.61	0.05
54-56	EMILY	136.09	136.31	136.52	0.44	0.21
70	EMILY	136.05	136.22	136.47	0.43	0.26
82	EMILY	136.03	136.16	136.35	0.32	0.19
86-90	EMILY	135.85	136.22	136.33	0.48	0.10
24	EMILY	136.94	137.10	137.10	0.16	within 100mm
11	HIGH	136.70	136.87	136.80	0.10	within 100mm
25	EMILY	137.12	137.99	137.54	0.42	

NA	EDWARD	137.18	137.91	137.50	0.31	
NA	EDWARD	137.12	137.92	137.45	0.33	
17	EMILY	137.21	137.75	137.37	0.16	
21	EMILY	136.91	137.57	137.34	0.43	
11	EMILY	136.60	138.41	137.32	0.72	
13	EMILY	136.99	138.03	137.32	0.33	
8B	EMILY	136.67	137.56	137.22	0.56	
10	EMILY	136.51	137.24	137.20	0.69	within 100mm
MARGO	ELIZA	136.60	138.32	137.20	0.59	
KINGS	PARK	136.51	137.44	137.20	0.69	
10	EMILY	136.53	137.24	137.20	0.66	within 100mm
12	EMILY	136.76	137.48	137.18	0.42	
24	ALEXANDER	136.77	137.54	137.17	0.39	
36	ALEXANDER	136.60	138.18	137.17	0.57	
26	ALEXANDER	136.70	137.69	137.17	0.46	
22	ALEXANDER	136.86	137.35	137.16	0.30	
32	ALEXANDER	136.49	137.40	137.16	0.68	
34	ALEXANDER	136.54	137.40	137.16	0.63	
20	ALEXANDER	136.88	137.48	137.16	0.28	
18	ALEXANDER	136.89	137.59	137.16	0.27	
16	ALEXANDER	136.88	137.38	137.15	0.27	
WINERY	EMILY	136.75	137.15	137.15	0.40	within 100mm
14	ALEXANDER	137.13	137.45	137.15	0.02	
12	ALEXANDER	137.13	138.24	137.14	0.01	
23	TALLAROOK	136.92	137.40	137.14	0.22	
50	TALLAROOK	136.80	137.48	137.13	0.33	
35	TALLAROOK	136.92	137.35	137.13	0.22	
23	TALLAROOK	136.92	137.49	137.13	0.21	
33	TALLAROOK	136.97	137.28	137.13	0.17	
39	TALLAROOK	136.84	137.48	137.13	0.29	
52	TALLAROOK	136.82	137.32	137.13	0.31	
23	TALLAROOK	136.92	137.40	137.13	0.20	
23	TALLAROOK	136.92	137.49	137.13	0.20	
8	ALEXANDRA	137.10	137.86	137.13	0.03	
29	TALLAROOK	136.95	137.65	137.13	0.18	
27	TALLAROOK	136.97	137.58	137.12	0.16	
6	ALEXANDER	136.84	137.87	137.12	0.28	
23	TALLAROOK	136.92	137.42	137.12	0.20	
23	TALLAROOK	136.92	137.51	137.12	0.19	
23	TALLAROOK	136.92	137.41	137.11	0.19	
37-39	EMILY	137.04	137.33	137.11	0.06	
38B	TALLAROOK	136.76	137.15	137.10	0.34	within 100mm
54	TALLAROOK	136.77	137.35	137.09	0.33	
21	TALLAROOK	136.89	138.07	137.09	0.20	
32	TALLAROOK	136.81	137.13	137.08	0.28	within 100mm
19	TALLAROOK	136.91	137.65	137.08	0.17	
Kings	Park	136.58	137.41	137.08	0.50	
32	EMILY	137.05	137.52	137.08	0.03	
17	TALLAROOK	136.85	137.37	137.07	0.22	
15	TALLAROOK	136.79	137.61	137.07	0.28	
11	TALLAROOK	136.70	137.14	137.07	0.37	within 100mm
18	TALLAROOK	136.74	137.09	137.07	0.33	within 100mm
32	TALLAROOK	136.81	137.43	137.06	0.25	
34	EMILY	137.02	137.43	137.05	0.04	
9	TALLAROOK	136.72	137.14	137.05	0.34	within 100mm
36	EMILY	136.98	137.28	137.05	0.07	
3-7	WALLACE	136.67	137.13	137.03	0.36	within 100mm
14	TALLAROOK	136.69	137.20	137.03	0.34	
3-7	TALLAROOK	136.68	137.13	137.03	0.35	within 100mm

2	EMILY	136.58	137.62	137.02	0.44	
41	EMILY	136.68	137.60	137.02	0.34	
14	TALLAROOK	136.70	137.20	137.02	0.32	
14	TALLAROOK	136.72	137.20	137.01	0.30	
12	TALLAROOK	136.71	137.07	137.01	0.30	within 100mm
5	WALLIS	136.71	137.13	137.00	0.29	
8	TALLAROOK	136.68	137.09	136.99	0.31	within 100mm
43	EMILY	136.60	137.01	136.99	0.39	within 100mm
118	STATION	136.78	137.04	136.98	0.20	within 100mm
116	STATION	136.90	137.13	136.97	0.07	
43	EMILY	136.59	137.01	136.97	0.38	within 100mm
114	STATION	136.95	137.19	136.96	0.01	
60 POLICE	TALLAROOK	136.56	137.35	136.95	0.39	
38	EMILY	136.91	137.24	136.95	0.04	
5	WALLIS	136.49	137.18	136.94	0.44	
5	WALLIS	136.49	137.68	136.92	0.43	
12	WALLIS	136.55	137.11	136.91	0.36	
12	WALLIS	136.55	137.28	136.91	0.36	
84	Station	136.70	137.38	136.91	0.21	
80 (Rear)	Station	136.78	137.31	136.91	0.12	
44	EMILY	136.71	136.98	136.89	0.18	within 100mm
Opposite 1	EMILY	136.86	137.54	136.89	0.03	
4	HIGH	136.40	137.09	136.88	0.48	
11-13	HIGH	136.36	137.00	136.85	0.49	
50	EMILY	136.83	137.45	136.84	0.01	
8	HIGH	136.40	137.26	136.84	0.45	
11-13	HIGH	136.36	137.13	136.83	0.48	
8	HIGH	136.40	137.34	136.83	0.43	
17	HIGH	136.33	137.37	136.82	0.48	
30	WALLIS	136.03	137.04	136.82	0.79	
54-56	EMILY	136.79	137.02	136.81	0.02	
19	HIGH	136.34	137.26	136.80	0.45	
54-56	EMILY	136.79	137.08	136.79	0.00	
21	HIGH	136.34	136.84	136.78	0.44	within 100mm
23	HIGH	136.39	137.16	136.77	0.38	
34	WALLIS	136.31	137.24	136.76	0.45	
37	TRISTAN	136.33	137.69	136.75	0.42	
36	WALLIS	135.92	137.27	136.74	0.83	
35	TRISTAN	136.43	137.86	136.74	0.31	
34	WALLIS	136.31	137.06	136.74	0.43	
33	TRISTAN	136.52	137.33	136.74	0.22	
28	HIGH	136.04	137.77	136.74	0.70	
34	TRISTAN	136.31	137.87	136.74	0.43	
32	TRISTAN	136.23	136.92	136.74	0.51	
32	TRISTAN	136.42	136.90	136.74	0.32	
30	TRISTAN	136.44	137.07	136.73	0.29	
38	WALLACE	136.01	136.74	136.73	0.72	within 100mm
30	HIGH	136.24	136.82	136.73	0.49	within 100mm
29	HIGH	136.22	136.84	136.73	0.51	
39	WALLIS	136.03	137.26	136.71	0.68	
27	BUTLER	136.57	137.36	136.71	0.13	
29	BUTLER	136.30	137.12	136.71	0.41	
37	HIGH	136.26	137.11	136.71	0.45	
41	WALLIS	136.03	137.27	136.71	0.67	
31	BUTLER	136.19	137.21	136.71	0.51	
33	BUTLER	136.11	136.87	136.70	0.59	
45	HIGH	136.17	136.76	136.70	0.53	within 100mm
36	BUTLER	136.59	136.92	136.69	0.10	
42	HIGH	135.93	137.21	136.69	0.77	

45	HIGH	136.08	136.86	136.69	0.61	
52	HIGH	136.31	136.73	136.69	0.37	within 100mm
2	HANNA	136.64	137.44	136.68	0.05	
73	HIGH	136.28	137.76	136.68	0.39	
6	INDUSTRIAL	136.24	136.70	136.66	0.42	within 100mm
7	INDUSTRIAL	136.11	136.67	136.66	0.55	within 100mm
50	WALLIS	136.02	137.19	136.65	0.64	
55	EMILY	136.32	137.18	136.65	0.33	
51	EMILY	136.43	137.46	136.64	0.22	
53	EMILY	136.43	136.95	136.63	0.21	
52	WALLIS	136.05	137.35	136.62	0.58	
55	EMILY	136.32	136.73	136.55	0.23	
57	EMILY	136.07	137.37	136.55	0.47	
4	JUBILEE	136.38	136.64	136.53	0.15	
5	HANNA	136.02	136.55	136.51	0.50	within 100mm
70	EMILY	135.92	136.61	136.46	0.54	
72	EMILY	136.33	136.61	136.42	0.09	
7	HANNA	135.80	136.62	136.37	0.57	
80	EMILY	135.96	136.77	136.36	0.40	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	0.8
Bolton St	0.9
Edward St	1.9
Elizabeth St	0.8
Emily St East	0.5
Emily St West	0.4
Goulburn Valley Highway	0.1
High St	1.0
Lesley St	0.6
Moody St	0.5
Robert St	0.7
Station St	
Tallarook St	0.4
Tierney St	0.9
Wallis St	1.0
William St	0.6

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 7.4m

Refer Flood Map 540207-4

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	136.84	0.76	0.53
41	TALLAROOK	136.62	136.94	137.27	0.64	0.32
24	EMILY	137.10	136.94	137.28	0.18	0.34
11-13	HIGH	136.36	137.00	137.07	0.71	0.07
11	HIGH	136.87	136.70	136.99	0.12	0.29
38B	TALLAROOK	136.76	137.15	137.38	0.62	0.23
34	TALLAROOK	136.80	137.07	137.38	0.59	0.31
21	HIGH	136.34	136.84	137.02	0.68	0.18
52	TALLAROOK	136.82	137.32	137.37	0.55	0.05
WINERY	EMILY	136.75	137.15	137.52	0.77	0.37
10	EMILY	136.51	137.24	137.45	0.94	0.21
10	EMILY	136.53	137.24	137.44	0.91	0.21
7	EMILY	136.67	137.05	137.55	0.88	0.50
13	EMILY	136.99	137.27	137.53	0.54	0.26
25	EMILY	137.00	137.13	137.52	0.53	0.40
14	EMILY	137.20	137.23	137.34	0.14	0.11
22	ALEXANDER	136.86	137.35	137.46	0.59	0.11
44	TALLAROOK	136.78	136.84	137.37	0.59	0.53
42	TALLAROOK	136.79	137.04	137.38	0.58	0.34
28	TALLAROOK	136.81	136.83	137.33	0.53	0.50
30	TALLAROOK	136.83	136.85	137.37	0.54	0.52
35	EMILY	136.45	136.75	137.39	0.94	0.64
44	EMILY	136.71	136.98	137.12	0.40	0.14
38	EMILY	136.85	136.80	137.18	0.33	0.38
55	EMILY	136.32	136.73	136.75	0.43	0.02
47	EMILY	136.49	136.89	137.11	0.62	0.22
58	TALLAROOK	136.67	137.04	137.29	0.61	0.25
56	TALLAROOK	136.83	137.07	137.34	0.52	0.28
10	HIGH	136.28	136.73	137.05	0.77	0.32
30	HIGH	136.24	136.82	137.00	0.76	0.18
60	EMILY	136.74	136.84	136.88	0.14	0.04
7	HANNA	135.80	136.62	136.70	0.91	0.09
70	EMILY	136.05	136.22	136.75	0.70	0.53
70	EMILY	135.92	136.61	136.74	0.82	0.13
72	EMILY	136.33	136.61	136.72	0.40	0.11
82	EMILY	136.03	136.16	136.67	0.64	0.51
5	HANNA	136.02	136.55	136.83	0.81	0.27
86-90	EMILY	135.85	136.22	136.65	0.81	0.43
34	HIGH	135.90	136.57	136.99	1.09	0.43
NA	ELIZABETH	136.00	136.70	137.00	1.00	0.30
36A	HIGH	135.82	136.45	136.98	1.16	0.53
14	TALLAROOK	136.72	137.20	137.36	0.64	0.16
14	TALLAROOK	136.70	137.20	137.36	0.66	0.16
14	TALLAROOK	136.69	137.20	137.37	0.68	0.17
12	TALLAROOK	136.71	137.07	137.36	0.65	0.29
5	WALLIS	136.71	137.13	137.36	0.65	0.23
8	TALLAROOK	136.68	137.09	137.35	0.67	0.26
8	TALLAROOK	136.68	136.77	137.35	0.67	0.58
39	HIGH	135.82	136.45	136.97	1.15	0.52
63	EMILY	135.95	136.51	136.70	0.76	0.19

96	STATION	137.21	137.32	137.32	0.11	0.00
12	WALLIS	136.55	137.28	137.32	0.77	0.05
12	WALLIS	136.55	137.11	137.31	0.76	0.20
114	STATION	136.98	137.17	137.33	0.35	0.16
114	STATION	136.95	137.19	137.34	0.39	0.15
100	STATION	137.10	137.24	137.33	0.23	0.09
32	WALLACE	135.95	136.54	137.11	1.16	0.58
30	WALLIS	136.03	137.04	137.17	1.14	0.13
38	HIGH	135.82	136.62	136.98	1.15	0.36
116	STATION	136.90	137.13	137.34	0.44	0.21
118	STATION	136.78	137.04	137.34	0.56	0.31
43	HIGH	136.19	136.65	136.97	0.78	0.31
45	HIGH	136.17	136.76	136.97	0.80	0.21
45	HIGH	136.08	136.86	136.96	0.88	0.10
5	WALLIS	136.63	136.81	137.35	0.72	0.54
5	WALLIS	136.49	137.18	137.32	0.83	0.14
29	WALLACE	136.13	136.67	137.20	1.07	0.53
37	WALLIS	135.99	136.32	137.03	1.04	0.71
43	WALLIS	135.95	136.53	136.99	1.03	0.45
32	WALLIS	135.95	136.54	137.11	1.16	0.57
38	WALLACE	136.01	136.74	137.04	1.03	0.30
44	HIGH	135.80	136.46	136.98	1.17	0.51
32	TRISTAN	136.42	136.90	137.05	0.63	0.15
32	TRISTAN	136.23	136.92	137.05	0.82	0.13
4	JUBILEE	136.38	136.64	136.73	0.35	0.09
36	BUTLER	136.59	136.92	136.97	0.38	0.05
52	HIGH	136.31	136.73	136.96	0.65	0.23
25	BUTLER	136.92	136.88	137.00	0.07	0.12
33	BUTLER	136.11	136.87	136.99	0.88	0.12
43	EMILY	136.59	137.01	137.20	0.61	0.18
43	EMILY	136.60	137.01	137.22	0.62	0.20
29	HIGH	136.22	136.84	136.99	0.77	0.15
35	BUTLER	135.96	136.08	136.99	1.03	0.91
18	TALLAROOK	136.74	137.09	137.38	0.64	0.29
35	TALLAROOK	136.92	137.35	137.41	0.49	0.06
33	TALLAROOK	136.97	137.28	137.41	0.44	0.13
17	TALLAROOK	136.85	137.37	137.40	0.55	0.03
11	TALLAROOK	136.70	137.14	137.40	0.70	0.26
9	TALLAROOK	136.72	137.14	137.39	0.67	0.25
3-7	WALLACE	136.67	137.13	137.38	0.71	0.25
3-7	TALLAROOK	136.68	137.13	137.38	0.70	0.25
14	ALEXANDER	137.13	137.45	137.46	0.33	0.01
16	ALEXANDER	136.88	137.38	137.46	0.58	0.08
32	ALEXANDER	136.49	137.40	137.45	0.96	0.05
34	ALEXANDER	136.54	137.40	137.45	0.91	0.05
36	TALLAROOK	136.85	136.89	137.38	0.54	0.50
32	TALLAROOK	136.81	137.13	137.37	0.56	0.24
23	TALLAROOK	136.92	137.40	137.42	0.50	0.02
23	TALLAROOK	136.92	137.40	137.43	0.51	0.03
31	HIGH	136.06	136.37	136.94	0.87	0.56
4	HIGH	136.40	137.09	137.11	0.71	0.02
12	HIGH	136.28	136.73	137.07	0.80	0.34
45	WALLIS	135.76	136.27	136.94	1.17	0.66
45	WALLIS	135.81	136.27	136.92	1.11	0.65
45	WALLIS	135.73	136.23	136.91	1.17	0.68
45	WALLIS	135.77	136.23	136.85	1.08	0.62
6	INDUSTRIAL	136.24	136.70	136.91	0.67	0.21
7	INDUSTRIAL	136.11	136.67	136.91	0.80	0.24
1-3	EMILY	137.21	137.14	137.84	0.63	0.70

2	TIERNEY	136.19	137.43	137.74	1.55	0.31
4	TIERNEY	136.77	137.39	137.75	0.98	0.36
SWIMMING P	LESLEY	136.53	136.97	137.46	0.94	0.49
KINGS	PARK	136.51	137.44	137.48	0.97	0.04
NA	TIERNEY	137.07	137.56	137.78	0.71	0.22
5	PRESIDENT	137.06	137.89	137.92	0.86	0.03
NA	BISHOP	136.27	137.56	137.24	0.97	
21	ALEXANDER	137.17	138.18	137.48	0.31	
MARGO	ELIZA	136.60	138.32	137.53	0.93	
17	HIGH	136.33	137.37	137.05	0.71	
11-13	HIGH	136.36	137.13	137.06	0.70	within 100mm
8	HIGH	136.40	137.26	137.08	0.68	
8	HIGH	136.40	137.34	137.07	0.67	
50	TALLAROOK	136.80	137.48	137.37	0.57	
19	HIGH	136.34	137.26	137.03	0.69	
54	TALLAROOK	136.77	137.35	137.32	0.56	within 100mm
Opposite 1	EMILY	136.86	137.54	137.31	0.45	
2	EMILY	136.58	137.62	137.29	0.71	
2	HANNA	136.64	137.44	137.04	0.41	
12	EMILY	136.76	137.48	137.39	0.63	within 100mm
8B	EMILY	136.67	137.56	137.46	0.79	within 100mm
11	EMILY	136.60	138.41	137.54	0.94	
13	EMILY	136.99	138.03	137.53	0.54	
17	EMILY	137.21	137.75	137.56	0.35	
21	EMILY	136.91	137.57	137.54	0.63	within 100mm
14-16	EMILY	137.16	137.48	137.37	0.21	
20	EMILY	137.21	137.84	137.27	0.06	
22	EMILY	137.24	137.84	137.27	0.03	
20	ALEXANDER	136.88	137.48	137.46	0.58	within 100mm
32	TALLAROOK	136.81	137.43	137.36	0.55	within 100mm
41	EMILY	136.68	137.60	137.26	0.58	
32	EMILY	137.05	137.52	137.29	0.24	
28	EMILY	137.13	137.79	137.27	0.14	
57	EMILY	136.07	137.37	136.73	0.66	
55	EMILY	136.32	137.18	136.87	0.56	
53	EMILY	136.43	136.95	136.87	0.44	within 100mm
51	EMILY	136.43	137.46	136.88	0.45	
50	EMILY	136.83	137.45	137.07	0.23	
48	EMILY	136.90	137.26	137.11	0.21	
23	HIGH	136.39	137.16	137.01	0.62	
60 POLICE	TALLAROOK	136.56	137.35	137.17	0.61	
28	HIGH	136.04	137.77	137.00	0.96	
22	EMILY	137.15	137.84	137.31	0.15	
37-39	EMILY	137.04	137.33	137.31	0.27	within 100mm
54-56	EMILY	136.79	137.02	136.94	0.15	within 100mm
54-56	EMILY	136.79	137.08	136.92	0.13	
64-68	EMILY	136.73	137.06	136.76	0.02	
80	EMILY	135.96	136.77	136.69	0.73	within 100mm
NA		136.02	137.86	137.17	1.15	
37	HIGH	136.26	137.11	136.97	0.71	
84	Station	136.70	137.38	137.30	0.60	within 100mm
90	STATION	137.29	137.48	137.32	0.03	
92	STATION	137.20	137.64	137.32	0.12	
Safeway Ca	WALLACE	136.72	137.58	137.29	0.57	
5	WALLIS	136.49	137.68	137.31	0.82	
39	WALLIS	136.03	137.26	137.01	0.98	
41	WALLIS	136.03	137.27	136.99	0.96	
36	WALLIS	135.92	137.27	137.06	1.14	
34	WALLIS	136.31	137.24	137.08	0.77	

34	WALLIS	136.31	137.06	137.06	0.75	within 100mm
31	TRISTAN	136.97	137.48	137.06	0.08	
33	TRISTAN	136.52	137.33	137.06	0.54	
35	TRISTAN	136.43	137.86	137.06	0.63	
37	TRISTAN	136.33	137.69	137.07	0.74	
Safeway	WILLIAM	136.95	137.47	137.21	0.26	
88	STATION	137.29	137.85	137.32	0.03	
88	STATION	137.29	137.75	137.32	0.03	
88	STATION	137.29	137.82	137.32	0.02	
80 (Rear)	Station	136.78	137.31	137.30	0.51	within 100mm
30	TRISTAN	136.44	137.07	137.05	0.61	within 100mm
34	TRISTAN	136.31	137.87	137.05	0.74	
50	WALLIS	136.02	137.19	136.91	0.89	
52	WALLIS	136.05	137.35	136.86	0.82	
73	HIGH	136.28	137.76	136.95	0.66	
34	BUTLER	136.96	137.49	136.97	0.01	
54	HIGH	136.81	137.35	136.96	0.14	
54	HIGH	136.81	136.98	136.96	0.14	within 100mm
42	HIGH	135.93	137.21	136.97	1.04	
27	BUTLER	136.57	137.36	137.00	0.42	
29	BUTLER	136.30	137.12	137.00	0.69	
31	BUTLER	136.19	137.21	136.99	0.80	
NA	GV Highway	136.39	136.92	136.41	0.01	
21	CALLEN	136.59	137.02	136.66	0.06	
1-5	GV Highway	136.13	136.87	136.28	0.15	
8	ALEXANDRA	137.10	137.86	137.46	0.36	
38	EMILY	136.91	137.24	137.15	0.24	within 100mm
36	EMILY	136.98	137.28	137.23	0.25	within 100mm
34	EMILY	137.02	137.43	137.24	0.23	
39	TALLAROOK	136.84	137.48	137.40	0.56	within 100mm
29	TALLAROOK	136.95	137.65	137.40	0.46	
27	TALLAROOK	136.97	137.58	137.40	0.44	
21	TALLAROOK	136.89	138.07	137.40	0.51	
19	TALLAROOK	136.91	137.65	137.40	0.49	
15	TALLAROOK	136.79	137.61	137.40	0.61	
6	ALEXANDER	136.84	137.87	137.46	0.61	
12	ALEXANDER	137.13	138.24	137.46	0.33	
18	ALEXANDER	136.89	137.59	137.46	0.57	
24	ALEXANDER	136.77	137.54	137.46	0.68	within 100mm
26	ALEXANDER	136.70	137.69	137.45	0.75	
36	ALEXANDER	136.60	138.18	137.45	0.85	
23	TALLAROOK	136.92	137.41	137.40	0.48	within 100mm
23	TALLAROOK	136.92	137.42	137.41	0.49	within 100mm
23	TALLAROOK	136.92	137.51	137.40	0.48	
23	TALLAROOK	136.92	137.49	137.41	0.49	within 100mm
23	TALLAROOK	136.92	137.49	137.42	0.50	within 100mm
25	EMILY	137.12	137.99	137.73	0.61	
NA	EDWARD	137.18	137.91	137.70	0.51	
NA	EDWARD	137.12	137.92	137.65	0.53	
Kings	Park	136.58	137.41	137.32	0.74	within 100mm

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	1.1
Bolton St	1.2
Edward St	2.1
Elizabeth St	1.1
Emily St East	0.7
Emily St West	0.6
Goulburn Valley Highway	0.2
High St	1.3
Lesley St	0.9
Moody St	0.8
Robert St	1.0
Station St	0.2
Tallarook St	0.7
Tierney St	1.1
Wallis St	1.2
William St	1.0

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 7.6m

Refer Flood Map 540207-5

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	137.02	0.93	0.70
41	TALLAROOK	136.62	136.94	137.39	0.76	0.44
24	EMILY	137.10	136.94	137.42	0.31	0.47
11-13	HIGH	136.36	137.00	137.19	0.83	0.19
11-13	HIGH	136.36	137.13	137.18	0.82	0.05
11	HIGH	136.87	136.70	137.11	0.24	0.40
38B	TALLAROOK	136.76	137.15	137.51	0.75	0.37
34	TALLAROOK	136.80	137.07	137.52	0.72	0.45
21	HIGH	136.34	136.84	137.15	0.80	0.31
50	TALLAROOK	136.80	137.48	137.49	0.69	0.01
52	TALLAROOK	136.82	137.32	137.49	0.67	0.17
54	TALLAROOK	136.77	137.35	137.44	0.68	0.09
Opposite 1	EMILY	136.86	137.54	137.54	0.68	0.00
WINERY	EMILY	136.75	137.15	137.74	0.99	0.59
10	EMILY	136.51	137.24	137.58	1.07	0.35
10	EMILY	136.53	137.24	137.58	1.05	0.34
12	EMILY	136.76	137.48	137.55	0.79	0.07
8B	EMILY	136.67	137.56	137.60	0.93	0.04
7	EMILY	136.67	137.05	137.67	1.00	0.62
13	EMILY	136.99	137.27	137.65	0.66	0.38
21	EMILY	136.91	137.57	137.68	0.76	0.10
14-16	EMILY	137.16	137.48	137.53	0.36	0.05
25	EMILY	137.00	137.13	137.64	0.64	0.51
14	EMILY	137.20	137.23	137.51	0.30	0.27
20	ALEXANDER	136.88	137.48	137.60	0.72	0.12
22	ALEXANDER	136.86	137.35	137.60	0.73	0.25
44	TALLAROOK	136.78	136.84	137.51	0.73	0.67
42	TALLAROOK	136.79	137.04	137.51	0.72	0.47
32	TALLAROOK	136.81	137.43	137.50	0.69	0.07
28	TALLAROOK	136.81	136.83	137.48	0.68	0.65
30	TALLAROOK	136.83	136.85	137.52	0.69	0.67
35	EMILY	136.45	136.75	137.50	1.05	0.75
44	EMILY	136.71	136.98	137.25	0.53	0.27
38	EMILY	136.85	136.80	137.30	0.45	0.50
55	EMILY	136.32	136.73	136.91	0.59	0.18
53	EMILY	136.43	136.95	137.00	0.58	0.06
47	EMILY	136.49	136.89	137.22	0.73	0.34
58	TALLAROOK	136.67	137.04	137.40	0.73	0.36
56	TALLAROOK	136.83	137.07	137.47	0.64	0.40
10	HIGH	136.28	136.73	137.17	0.90	0.45
30	HIGH	136.24	136.82	137.13	0.89	0.31
37-39	EMILY	137.04	137.33	137.42	0.38	0.09
54-56	EMILY	136.79	137.02	137.08	0.29	0.06
60	EMILY	136.74	136.84	137.03	0.28	0.18
7	HANNA	135.80	136.62	136.87	1.07	0.26
70	EMILY	136.05	136.22	136.91	0.86	0.69
70	EMILY	135.92	136.61	136.90	0.98	0.29
72	EMILY	136.33	136.61	136.89	0.56	0.28
82	EMILY	136.03	136.16	136.83	0.80	0.67
80	EMILY	135.96	136.77	136.85	0.89	0.08

5	HANNA	136.02	136.55	137.00	0.98	0.44
86-90	EMILY	135.85	136.22	136.81	0.96	0.59
34	HIGH	135.90	136.57	137.13	1.23	0.56
NA	ELIZABETH	136.00	136.70	137.14	1.14	0.44
36A	HIGH	135.82	136.45	137.12	1.30	0.67
14	TALLAROOK	136.72	137.20	137.51	0.79	0.31
14	TALLAROOK	136.70	137.20	137.51	0.81	0.31
14	TALLAROOK	136.69	137.20	137.51	0.82	0.31
12	TALLAROOK	136.71	137.07	137.51	0.80	0.44
5	WALLIS	136.71	137.13	137.51	0.80	0.38
8	TALLAROOK	136.68	137.09	137.50	0.82	0.42
8	TALLAROOK	136.68	136.77	137.50	0.82	0.73
39	HIGH	135.82	136.45	137.11	1.29	0.66
63	EMILY	135.95	136.51	136.85	0.90	0.34
84	Station	136.70	137.38	137.45	0.75	0.06
96	STATION	137.21	137.32	137.47	0.26	0.16
12	WALLIS	136.55	137.28	137.48	0.93	0.20
12	WALLIS	136.55	137.11	137.46	0.91	0.35
114	STATION	136.98	137.17	137.49	0.51	0.32
114	STATION	136.95	137.19	137.49	0.54	0.30
100	STATION	137.10	137.24	137.48	0.38	0.24
32	WALLACE	135.95	136.54	137.26	1.31	0.72
30	WALLIS	136.03	137.04	137.32	1.29	0.28
38	HIGH	135.82	136.62	137.11	1.29	0.49
116	STATION	136.90	137.13	137.49	0.59	0.36
118	STATION	136.78	137.04	137.50	0.72	0.46
43	HIGH	136.19	136.65	137.10	0.92	0.45
45	HIGH	136.17	136.76	137.10	0.94	0.35
45	HIGH	136.08	136.86	137.10	1.02	0.24
5	WALLIS	136.63	136.81	137.50	0.87	0.69
5	WALLIS	136.49	137.18	137.47	0.98	0.29
29	WALLACE	136.13	136.67	137.35	1.22	0.68
37	WALLIS	135.99	136.32	137.17	1.19	0.85
43	WALLIS	135.95	136.53	137.13	1.17	0.59
32	WALLIS	135.95	136.54	137.26	1.31	0.72
34	WALLIS	136.31	137.06	137.21	0.89	0.14
38	WALLACE	136.01	136.74	137.18	1.17	0.45
44	HIGH	135.80	136.46	137.12	1.31	0.65
80 (Rear)	Station	136.78	137.31	137.44	0.66	0.13
30	TRISTAN	136.44	137.07	137.20	0.76	0.12
32	TRISTAN	136.42	136.90	137.20	0.78	0.29
32	TRISTAN	136.23	136.92	137.20	0.97	0.28
4	JUBILEE	136.38	136.64	136.87	0.49	0.23
36	BUTLER	136.59	136.92	137.11	0.52	0.19
54	HIGH	136.81	136.98	137.09	0.28	0.11
52	HIGH	136.31	136.73	137.10	0.78	0.37
25	BUTLER	136.92	136.88	137.14	0.22	0.26
29	BUTLER	136.30	137.12	137.14	0.84	0.02
33	BUTLER	136.11	136.87	137.13	1.02	0.26
43	EMILY	136.59	137.01	137.31	0.72	0.30
43	EMILY	136.60	137.01	137.33	0.73	0.32
38	EMILY	136.91	137.24	137.29	0.38	0.05
36	EMILY	136.98	137.28	137.35	0.37	0.07
29	HIGH	136.22	136.84	137.12	0.90	0.28
35	BUTLER	135.96	136.08	137.13	1.17	1.05
18	TALLAROOK	136.74	137.09	137.52	0.78	0.44
39	TALLAROOK	136.84	137.48	137.54	0.70	0.06
35	TALLAROOK	136.92	137.35	137.54	0.63	0.20
33	TALLAROOK	136.97	137.28	137.54	0.58	0.27

17	TALLAROOK	136.85	137.37	137.54	0.69	0.17
11	TALLAROOK	136.70	137.14	137.54	0.84	0.41
9	TALLAROOK	136.72	137.14	137.54	0.82	0.40
3-7	WALLACE	136.67	137.13	137.53	0.86	0.40
3-7	TALLAROOK	136.68	137.13	137.53	0.85	0.40
14	ALEXANDER	137.13	137.45	137.60	0.47	0.16
16	ALEXANDER	136.88	137.38	137.60	0.72	0.22
18	ALEXANDER	136.89	137.59	137.60	0.71	0.01
24	ALEXANDER	136.77	137.54	137.60	0.82	0.06
32	ALEXANDER	136.49	137.40	137.59	1.10	0.19
34	ALEXANDER	136.54	137.40	137.59	1.05	0.19
36	TALLAROOK	136.85	136.89	137.52	0.67	0.63
32	TALLAROOK	136.81	137.13	137.51	0.70	0.38
23	TALLAROOK	136.92	137.41	137.54	0.62	0.13
23	TALLAROOK	136.92	137.42	137.55	0.63	0.13
23	TALLAROOK	136.92	137.40	137.56	0.64	0.16
23	TALLAROOK	136.92	137.51	137.54	0.62	0.03
23	TALLAROOK	136.92	137.49	137.55	0.63	0.06
23	TALLAROOK	136.92	137.49	137.56	0.64	0.07
23	TALLAROOK	136.92	137.40	137.57	0.65	0.17
31	HIGH	136.06	136.37	137.07	1.01	0.69
4	HIGH	136.40	137.09	137.23	0.83	0.14
12	HIGH	136.28	136.73	137.21	0.93	0.48
45	WALLIS	135.76	136.27	137.07	1.31	0.80
45	WALLIS	135.81	136.27	137.05	1.24	0.78
45	WALLIS	135.73	136.23	137.04	1.31	0.81
45	WALLIS	135.77	136.23	136.98	1.21	0.75
6	INDUSTRIAL	136.24	136.70	137.04	0.80	0.34
7	INDUSTRIAL	136.11	136.67	137.04	0.93	0.37
1-3	EMILY	137.21	137.14	137.94	0.73	0.80
2	TIERNEY	136.19	137.43	137.86	1.67	0.43
4	TIERNEY	136.77	137.39	137.87	1.10	0.48
SWIMMING P	LESLEY	136.53	136.97	137.60	1.08	0.63
KINGS	PARK	136.51	137.44	137.62	1.11	0.18
Kings	Park	136.58	137.41	137.44	0.85	0.02
NA	TIERNEY	137.07	137.56	137.90	0.83	0.34
80	Station	137.31	137.45	137.91	0.60	0.46
5	PRESIDENT	136.89	137.05	137.06	0.17	0.01
3	PRESIDENT	137.03	137.07	137.12	0.09	0.05
15-17	CALLEN	136.76	136.80	137.08	0.32	0.28
NA	BISHOP	136.27	137.56	137.39	1.12	
21	ALEXANDER	137.17	138.18	137.63	0.46	
MARGO	ELIZA	136.60	138.32	137.68	1.08	
17	HIGH	136.33	137.37	137.17	0.84	
8	HIGH	136.40	137.26	137.20	0.81	within 100mm
8	HIGH	136.40	137.34	137.19	0.80	
19	HIGH	136.34	137.26	137.16	0.81	
2	EMILY	136.58	137.62	137.52	0.94	
2	HANNA	136.64	137.44	137.23	0.60	
11	EMILY	136.60	138.41	137.66	1.06	
13	EMILY	136.99	138.03	137.66	0.67	
17	EMILY	137.21	137.75	137.69	0.47	within 100mm
20	EMILY	137.21	137.84	137.42	0.21	
22	EMILY	137.24	137.84	137.42	0.18	
29	EMILY	137.45	137.63	137.53	0.08	within 100mm
41	EMILY	136.68	137.60	137.37	0.69	
32	EMILY	137.05	137.52	137.39	0.34	
28	EMILY	137.13	137.79	137.38	0.25	
26	EMILY	137.41	137.52	137.46	0.04	within 100mm

57	EMILY	136.07	137.37	136.90	0.82	
55	EMILY	136.32	137.18	137.01	0.69	
51	EMILY	136.43	137.46	137.02	0.59	
50	EMILY	136.83	137.45	137.19	0.36	
48	EMILY	136.90	137.26	137.23	0.33	within 100mm
23	HIGH	136.39	137.16	137.14	0.75	within 100mm
60 POLICE	TALLAROOK	136.56	137.35	137.28	0.72	within 100mm
28	HIGH	136.04	137.77	137.14	1.10	
22	EMILY	137.15	137.84	137.42	0.27	
54-56	EMILY	136.79	137.08	137.06	0.27	within 100mm
64-68	EMILY	136.73	137.06	136.92	0.19	
NA		136.02	137.86	137.32	1.30	
37	HIGH	136.26	137.11	137.11	0.85	within 100mm
90	STATION	137.29	137.48	137.47	0.18	within 100mm
92	STATION	137.20	137.64	137.47	0.27	
Safeway Ca	WALLACE	136.72	137.58	137.44	0.72	
5	WALLIS	136.49	137.68	137.46	0.97	
39	WALLIS	136.03	137.26	137.15	1.12	
41	WALLIS	136.03	137.27	137.14	1.10	
36	WALLIS	135.92	137.27	137.20	1.29	within 100mm
34	WALLIS	136.31	137.24	137.23	0.92	within 100mm
31	TRISTAN	136.97	137.48	137.22	0.24	
33	TRISTAN	136.52	137.33	137.21	0.69	
35	TRISTAN	136.43	137.86	137.21	0.78	
37	TRISTAN	136.33	137.69	137.22	0.89	
Safeway	WILLIAM	136.95	137.47	137.36	0.41	
88	STATION	137.29	137.85	137.47	0.18	
88	STATION	137.29	137.75	137.47	0.18	
88	STATION	137.29	137.82	137.47	0.18	
34	TRISTAN	136.31	137.87	137.20	0.89	
7	PRESIDENT	136.98	137.49	137.03	0.04	
50	WALLIS	136.02	137.19	137.04	1.03	
52	WALLIS	136.05	137.35	137.00	0.95	
75	HIGH	136.96	137.71	137.08	0.12	
73	HIGH	136.28	137.76	137.08	0.80	
34	BUTLER	136.96	137.49	137.12	0.16	
54	HIGH	136.81	137.35	137.09	0.28	
42	HIGH	135.93	137.21	137.11	1.18	within 100mm
27	BUTLER	136.57	137.36	137.14	0.56	
31	BUTLER	136.19	137.21	137.13	0.94	within 100mm
NA	LBURN VALLEY HIGH	136.39	136.92	136.55	0.16	
21	CALLEN	136.59	137.02	136.78	0.19	
1-5	LBURN VALLEY HIGH	136.13	136.87	136.42	0.29	
8	ALEXANDRA	137.10	137.86	137.60	0.50	
34	EMILY	137.02	137.43	137.36	0.34	within 100mm
29	TALLAROOK	136.95	137.65	137.54	0.60	
27	TALLAROOK	136.97	137.58	137.54	0.58	within 100mm
21	TALLAROOK	136.89	138.07	137.54	0.65	
19	TALLAROOK	136.91	137.65	137.54	0.63	
15	TALLAROOK	136.79	137.61	137.54	0.75	within 100mm
6	ALEXANDER	136.84	137.87	137.60	0.76	
12	ALEXANDER	137.13	138.24	137.60	0.47	
26	ALEXANDER	136.70	137.69	137.59	0.89	within 100mm
36	ALEXANDER	136.60	138.18	137.59	0.99	
25	EMILY	137.12	137.99	137.84	0.72	
NA	EDWARD	137.18	137.91	137.81	0.63	within 100mm
NA	EDWARD	137.12	137.92	137.77	0.64	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	1.2
Bolton St	1.4
Edward St	2.2
Elizabeth St	1.2
Emily St East	0.9
Emily St West	0.8
Goulburn Valley Highway	0.3
High St	1.4
Lesley St	1.0
Moody St	0.9
Robert St	1.2
Station St	0.4
Tallarook St	0.9
Tierney St	1.2
Wallis St	1.4
William St	1.2

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 7.8m

Refer Flood Map 540207-6

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	137.18	1.09	0.86
41	TALLAROOK	136.62	136.94	137.50	0.88	0.56
24	EMILY	137.10	136.94	137.54	0.44	0.60
11-13	HIGH	136.36	137.00	137.32	0.96	0.32
11-13	HIGH	136.36	137.13	137.31	0.95	0.18
11	HIGH	136.87	136.70	137.24	0.37	0.54
38B	TALLAROOK	136.76	137.15	137.64	0.88	0.49
34	TALLAROOK	136.80	137.07	137.65	0.85	0.58
8	HIGH	136.40	137.26	137.33	0.94	0.07
21	HIGH	136.34	136.84	137.28	0.94	0.44
50	TALLAROOK	136.80	137.48	137.61	0.81	0.13
19	HIGH	136.34	137.26	137.29	0.94	0.02
52	TALLAROOK	136.82	137.32	137.61	0.79	0.29
54	TALLAROOK	136.77	137.35	137.56	0.80	0.21
Opposite 1	EMILY	136.86	137.54	137.74	0.87	0.20
WINERY	EMILY	136.75	137.15	137.95	1.20	0.80
2	EMILY	136.58	137.62	137.68	1.11	0.06
10	EMILY	136.51	137.24	137.73	1.22	0.49
10	EMILY	136.53	137.24	137.72	1.19	0.49
12	EMILY	136.76	137.48	137.70	0.94	0.22
8B	EMILY	136.67	137.56	137.74	1.07	0.19
7	EMILY	136.67	137.05	137.80	1.13	0.75
13	EMILY	136.99	137.27	137.79	0.79	0.51
17	EMILY	137.21	137.75	137.81	0.60	0.06
21	EMILY	136.91	137.57	137.80	0.89	0.23
14-16	EMILY	137.16	137.48	137.69	0.52	0.21
16	EMILY	137.59	137.59	137.63	0.03	0.03
25	EMILY	137.00	137.13	137.75	0.75	0.62
14	EMILY	137.20	137.23	137.67	0.47	0.44
20	ALEXANDER	136.88	137.48	137.73	0.85	0.25
22	ALEXANDER	136.86	137.35	137.73	0.87	0.38
29	EMILY	137.45	137.63	137.64	0.20	0.01
44	TALLAROOK	136.78	136.84	137.63	0.85	0.79
42	TALLAROOK	136.79	137.04	137.64	0.84	0.60
32	TALLAROOK	136.81	137.43	137.63	0.83	0.21
28	TALLAROOK	136.81	136.83	137.62	0.81	0.78
30	TALLAROOK	136.83	136.85	137.65	0.82	0.80
35	EMILY	136.45	136.75	137.62	1.17	0.87
44	EMILY	136.71	136.98	137.38	0.67	0.41
38	EMILY	136.85	136.80	137.43	0.58	0.63
26	EMILY	137.41	137.52	137.56	0.15	0.04
55	EMILY	136.32	136.73	137.06	0.74	0.33
53	EMILY	136.43	136.95	137.15	0.72	0.20
47	EMILY	136.49	136.89	137.35	0.86	0.46
48	EMILY	136.90	137.26	137.37	0.46	0.11
23	HIGH	136.39	137.16	137.27	0.88	0.11
60 POLICE	TALLAROOK	136.56	137.35	137.41	0.84	0.06
58	TALLAROOK	136.67	137.04	137.52	0.84	0.48
56	TALLAROOK	136.83	137.07	137.58	0.76	0.52
10	HIGH	136.28	136.73	137.31	1.03	0.58

30	HIGH	136.24	136.82	137.27	1.03	0.45
37-39	EMILY	137.04	137.33	137.54	0.50	0.21
54-56	EMILY	136.79	137.02	137.21	0.42	0.19
54-56	EMILY	136.79	137.08	137.20	0.41	0.12
60	EMILY	136.74	136.84	137.17	0.43	0.33
64-68	EMILY	136.73	137.06	137.08	0.35	0.03
7	HANNA	135.80	136.62	137.03	1.23	0.41
70	EMILY	136.05	136.22	137.06	1.01	0.84
70	EMILY	135.92	136.61	137.05	1.14	0.45
72	EMILY	136.33	136.61	137.04	0.71	0.43
82	EMILY	136.03	136.16	136.97	0.95	0.82
80	EMILY	135.96	136.77	137.00	1.04	0.23
5	HANNA	136.02	136.55	137.16	1.14	0.60
86-90	EMILY	135.85	136.22	136.95	1.11	0.73
34	HIGH	135.90	136.57	137.26	1.36	0.70
NA	ELIZABETH	136.00	136.70	137.28	1.27	0.58
36A	HIGH	135.82	136.45	137.25	1.43	0.80
14	TALLAROOK	136.72	137.20	137.65	0.93	0.45
14	TALLAROOK	136.70	137.20	137.65	0.95	0.45
14	TALLAROOK	136.69	137.20	137.65	0.96	0.45
12	TALLAROOK	136.71	137.07	137.65	0.93	0.58
5	WALLIS	136.71	137.13	137.64	0.93	0.51
8	TALLAROOK	136.68	137.09	137.64	0.96	0.55
8	TALLAROOK	136.68	136.77	137.64	0.96	0.87
39	HIGH	135.82	136.45	137.24	1.42	0.79
37	HIGH	136.26	137.11	137.24	0.98	0.13
63	EMILY	135.95	136.51	136.99	1.04	0.48
84	Station	136.70	137.38	137.58	0.88	0.20
90	STATION	137.29	137.48	137.61	0.31	0.13
96	STATION	137.21	137.32	137.61	0.40	0.29
12	WALLIS	136.55	137.28	137.61	1.06	0.34
12	WALLIS	136.55	137.11	137.60	1.05	0.49
114	STATION	136.98	137.17	137.62	0.64	0.45
114	STATION	136.95	137.19	137.63	0.68	0.44
100	STATION	137.10	137.24	137.62	0.52	0.38
32	WALLACE	135.95	136.54	137.40	1.45	0.86
30	WALLIS	136.03	137.04	137.46	1.43	0.42
38	HIGH	135.82	136.62	137.25	1.42	0.63
116	STATION	136.90	137.13	137.63	0.73	0.50
118	STATION	136.78	137.04	137.63	0.85	0.59
43	HIGH	136.19	136.65	137.24	1.05	0.58
45	HIGH	136.17	136.76	137.24	1.07	0.48
45	HIGH	136.08	136.86	137.23	1.15	0.37
5	WALLIS	136.63	136.81	137.64	1.01	0.83
5	WALLIS	136.49	137.18	137.61	1.12	0.43
29	WALLACE	136.13	136.67	137.49	1.36	0.82
37	WALLIS	135.99	136.32	137.31	1.32	0.99
39	WALLIS	136.03	137.26	137.29	1.26	0.03
43	WALLIS	135.95	136.53	137.26	1.31	0.73
32	WALLIS	135.95	136.54	137.39	1.45	0.86
36	WALLIS	135.92	137.27	137.34	1.42	0.07
34	WALLIS	136.31	137.24	137.37	1.05	0.13
34	WALLIS	136.31	137.06	137.35	1.03	0.28
38	WALLACE	136.01	136.74	137.32	1.31	0.58
44	HIGH	135.80	136.46	137.25	1.45	0.79
33	TRISTAN	136.52	137.33	137.35	0.83	0.02
Safeway	WILLIAM	136.95	137.47	137.49	0.54	0.02
80 (Rear)	Station	136.78	137.31	137.57	0.79	0.26
30	TRISTAN	136.44	137.07	137.34	0.90	0.26

32	TRISTAN	136.42	136.90	137.34	0.92	0.43
32	TRISTAN	136.23	136.92	137.34	1.11	0.42
4	JUBILEE	136.38	136.64	137.01	0.62	0.36
5	PRESIDENT	137.06	136.89	137.18	0.11	0.28
3	PRESIDENT	137.12	137.03	137.19	0.07	0.16
36	BUTLER	136.59	136.92	137.25	0.66	0.33
54	HIGH	136.81	136.98	137.23	0.41	0.24
52	HIGH	136.31	136.73	137.23	0.92	0.51
42	HIGH	135.93	137.21	137.24	1.32	0.04
25	BUTLER	136.92	136.88	137.28	0.35	0.39
29	BUTLER	136.30	137.12	137.28	0.97	0.15
31	BUTLER	136.19	137.21	137.27	1.08	0.06
33	BUTLER	136.11	136.87	137.27	1.16	0.40
43	EMILY	136.59	137.01	137.44	0.84	0.42
43	EMILY	136.60	137.01	137.45	0.85	0.44
38	EMILY	136.91	137.24	137.42	0.51	0.18
36	EMILY	136.98	137.28	137.48	0.50	0.20
34	EMILY	137.02	137.43	137.48	0.47	0.05
29	HIGH	136.22	136.84	137.26	1.03	0.41
35	BUTLER	135.96	136.08	137.27	1.30	1.19
18	TALLAROOK	136.74	137.09	137.66	0.92	0.57
39	TALLAROOK	136.84	137.48	137.66	0.83	0.19
35	TALLAROOK	136.92	137.35	137.67	0.76	0.33
33	TALLAROOK	136.97	137.28	137.67	0.71	0.40
29	TALLAROOK	136.95	137.65	137.67	0.73	0.02
27	TALLAROOK	136.97	137.58	137.67	0.71	0.09
19	TALLAROOK	136.91	137.65	137.68	0.76	0.03
17	TALLAROOK	136.85	137.37	137.68	0.83	0.31
15	TALLAROOK	136.79	137.61	137.68	0.89	0.06
11	TALLAROOK	136.70	137.14	137.68	0.98	0.54
9	TALLAROOK	136.72	137.14	137.67	0.95	0.53
3-7	WALLACE	136.67	137.13	137.67	1.00	0.54
3-7	TALLAROOK	136.68	137.13	137.67	0.98	0.54
14	ALEXANDER	137.13	137.45	137.74	0.61	0.30
16	ALEXANDER	136.88	137.38	137.73	0.85	0.36
18	ALEXANDER	136.89	137.59	137.73	0.85	0.15
24	ALEXANDER	136.77	137.54	137.73	0.96	0.19
26	ALEXANDER	136.70	137.69	137.73	1.02	0.04
32	ALEXANDER	136.49	137.40	137.72	1.23	0.32
34	ALEXANDER	136.54	137.40	137.72	1.18	0.32
36	TALLAROOK	136.85	136.89	137.65	0.80	0.76
32	TALLAROOK	136.81	137.13	137.64	0.83	0.51
23	TALLAROOK	136.92	137.41	137.68	0.75	0.27
23	TALLAROOK	136.92	137.42	137.69	0.77	0.27
23	TALLAROOK	136.92	137.40	137.69	0.77	0.29
23	TALLAROOK	136.92	137.51	137.68	0.75	0.17
23	TALLAROOK	136.92	137.49	137.69	0.76	0.19
23	TALLAROOK	136.92	137.49	137.69	0.77	0.21
23	TALLAROOK	136.92	137.40	137.70	0.78	0.30
31	HIGH	136.06	136.37	137.20	1.14	0.83
4	HIGH	136.40	137.09	137.36	0.96	0.27
12	HIGH	136.28	136.73	137.34	1.06	0.61
45	WALLIS	135.76	136.27	137.20	1.44	0.93
45	WALLIS	135.81	136.27	137.19	1.37	0.91
45	WALLIS	135.73	136.23	137.17	1.44	0.95
45	WALLIS	135.77	136.23	137.11	1.34	0.88
6	INDUSTRIAL	136.24	136.70	137.17	0.93	0.47
7	INDUSTRIAL	136.11	136.67	137.17	1.07	0.51
1-3	EMILY	137.21	137.14	138.04	0.82	0.89

2	TIERNEY	136.19	137.43	137.97	1.78	0.54
4	TIERNEY	136.77	137.39	137.98	1.22	0.59
NA	EDWARD	137.18	137.91	137.93	0.75	0.03
SWIMMING P	LESLEY	136.53	136.97	137.74	1.21	0.77
KINGS	PARK	136.51	137.44	137.75	1.24	0.31
Kings	Park	136.58	137.41	137.55	0.97	0.14
NA	TIERNEY	137.07	137.56	138.02	0.95	0.46
80	Station	137.31	137.58	137.91	0.60	0.33
15-17	CALLEN	136.76	136.93	137.08	0.32	0.15
15	CALLEN	136.90	136.93	137.11	0.21	0.18
NA	BISHOP	136.27	137.56	137.50	1.23	within 100mm
21	ALEXANDER	137.17	138.18	137.77	0.60	
MARGO	ELIZA	136.60	138.32	137.83	1.22	
17	HIGH	136.33	137.37	137.30	0.96	within 100mm
8	HIGH	136.40	137.34	137.32	0.93	within 100mm
2	HANNA	136.64	137.44	137.41	0.78	within 100mm
11	EMILY	136.60	138.41	137.79	1.19	
13	EMILY	136.99	138.03	137.79	0.80	
20	EMILY	137.21	137.84	137.57	0.36	
22	EMILY	137.24	137.84	137.56	0.32	
5	ELIZABETH	136.86	137.76	137.58	0.72	
41	EMILY	136.68	137.60	137.49	0.81	
32	EMILY	137.05	137.52	137.52	0.47	within 100mm
28	EMILY	137.13	137.79	137.51	0.38	
57	EMILY	136.07	137.37	137.04	0.96	
55	EMILY	136.32	137.18	137.14	0.82	within 100mm
51	EMILY	136.43	137.46	137.16	0.73	
50	EMILY	136.83	137.45	137.33	0.49	
28	HIGH	136.04	137.77	137.28	1.24	
22	EMILY	137.15	137.84	137.56	0.41	
NA		136.02	137.86	137.45	1.43	
92	STATION	137.20	137.64	137.61	0.41	within 100mm
Safeway Ca	WALLACE	136.72	137.58	137.57	0.85	within 100mm
5	WALLIS	136.49	137.68	137.60	1.11	within 100mm
41	WALLIS	136.03	137.27	137.27	1.24	within 100mm
31	TRISTAN	136.97	137.48	137.35	0.38	
35	TRISTAN	136.43	137.86	137.35	0.92	
37	TRISTAN	136.33	137.69	137.36	1.03	
88	STATION	137.29	137.85	137.61	0.31	
88	STATION	137.29	137.75	137.61	0.31	
88	STATION	137.29	137.82	137.61	0.31	
86	Station	137.53	137.70	137.60	0.07	within 100mm
34	TRISTAN	136.31	137.87	137.34	1.03	
9	PRESIDENT	136.97	137.59	137.07	0.09	
9	PRESIDENT	136.97	137.76	137.05	0.07	
7	PRESIDENT	136.98	137.49	137.15	0.17	
50	WALLIS	136.02	137.19	137.17	1.16	within 100mm
52	WALLIS	136.05	137.35	137.13	1.08	
75	HIGH	136.96	137.71	137.22	0.25	
73	HIGH	136.28	137.76	137.21	0.93	
34	BUTLER	136.96	137.49	137.25	0.29	
54	HIGH	136.81	137.35	137.23	0.41	
27	BUTLER	136.57	137.36	137.27	0.70	within 100mm
NA	GV Highway	136.39	136.92	136.70	0.30	
19	CALLEN	136.84	137.53	136.91	0.07	
21	CALLEN	136.59	137.02	136.90	0.31	
1-5	GV Highway	136.13	136.87	136.47	0.34	
8	ALEXANDRA	137.10	137.86	137.74	0.64	
21	TALLAROOK	136.89	138.07	137.68	0.79	

6	ALEXANDER	136.84	137.87	137.74	0.90	
12	ALEXANDER	137.13	138.24	137.74	0.61	
36	ALEXANDER	136.60	138.18	137.72	1.12	
25	EMILY	137.12	137.99	137.95	0.83	within 100mm
NA	EDWARD	137.12	137.92	137.89	0.77	within 100mm

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	1.3
Bolton St	1.5
Edward St	2.3
Elizabeth St	1.4
Emily St East	1.0
Emily St West	0.9
Goulburn Valley Highway	0.5
High St	1.5
Lesley St	1.1
Moody St	1.0
Robert St	1.3
Station St	0.5
Tallarook St	1.0
Tierney St	1.3
Wallis St	1.5
William St	1.3

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 8.0m

Refer Flood Map 540207-7

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	137.34	1.26	1.03
41	TALLAROOK	136.62	136.94	137.64	1.01	0.69
NA	BISHOP	136.27	137.56	137.62	1.35	0.06
24	EMILY	137.10	136.94	137.70	0.60	0.76
17	HIGH	136.33	137.37	137.44	1.11	0.07
11-13	HIGH	136.36	137.00	137.46	1.11	0.46
11-13	HIGH	136.36	137.13	137.45	1.10	0.33
11	HIGH	136.87	136.70	137.39	0.52	0.69
38B	TALLAROOK	136.76	137.15	137.78	1.02	0.63
34	TALLAROOK	136.80	137.07	137.79	0.99	0.72
8	HIGH	136.40	137.26	137.48	1.08	0.22
8	HIGH	136.40	137.34	137.47	1.08	0.13
21	HIGH	136.34	136.84	137.43	1.08	0.59
50	TALLAROOK	136.80	137.48	137.74	0.94	0.26
19	HIGH	136.34	137.26	137.43	1.09	0.17
52	TALLAROOK	136.82	137.32	137.74	0.92	0.42
54	TALLAROOK	136.77	137.35	137.69	0.93	0.34
Opposite 1	EMILY	136.86	137.54	137.94	1.07	0.40
WINERY	EMILY	136.75	137.15	138.14	1.39	0.99
2	EMILY	136.58	137.62	137.86	1.29	0.24
2	HANNA	136.64	137.44	137.59	0.95	0.15
10	EMILY	136.51	137.24	137.88	1.37	0.65
10	EMILY	136.53	137.24	137.88	1.35	0.64
12	EMILY	136.76	137.48	137.86	1.10	0.38
8B	EMILY	136.67	137.56	137.90	1.23	0.34
7	EMILY	136.67	137.05	137.95	1.28	0.90
13	EMILY	136.99	137.27	137.93	0.94	0.66
17	EMILY	137.21	137.75	137.94	0.72	0.18
21	EMILY	136.91	137.57	137.94	1.02	0.36
14-16	EMILY	137.16	137.48	137.84	0.68	0.37
16	EMILY	137.59	137.59	137.79	0.20	0.20
25	EMILY	137.00	137.13	137.89	0.89	0.76
14	EMILY	137.20	137.23	137.83	0.63	0.60
20	ALEXANDER	136.88	137.48	137.88	1.00	0.40
22	ALEXANDER	136.86	137.35	137.88	1.01	0.53
29	EMILY	137.45	137.63	137.79	0.34	0.16
44	TALLAROOK	136.78	136.84	137.77	0.99	0.93
42	TALLAROOK	136.79	137.04	137.77	0.98	0.73
32	TALLAROOK	136.81	137.43	137.77	0.97	0.34
28	TALLAROOK	136.81	136.83	137.76	0.95	0.93
30	TALLAROOK	136.83	136.85	137.79	0.96	0.94
41	EMILY	136.68	137.60	137.63	0.95	0.03
35	EMILY	136.45	136.75	137.76	1.31	1.01
44	EMILY	136.71	136.98	137.53	0.82	0.56
38	EMILY	136.85	136.80	137.58	0.72	0.78
32	EMILY	137.05	137.52	137.66	0.61	0.14
26	EMILY	137.41	137.52	137.72	0.30	0.20
55	EMILY	136.32	137.18	137.29	0.98	0.12
55	EMILY	136.32	136.73	137.21	0.90	0.48
53	EMILY	136.43	136.95	137.30	0.87	0.35

47	EMILY	136.49	136.89	137.49	1.00	0.61
50	EMILY	136.83	137.45	137.47	0.64	0.02
48	EMILY	136.90	137.26	137.51	0.61	0.26
23	HIGH	136.39	137.16	137.42	1.03	0.26
60 POLICE	TALLAROOK	136.56	137.35	137.55	0.98	0.20
58	TALLAROOK	136.67	137.04	137.65	0.98	0.61
56	TALLAROOK	136.83	137.07	137.71	0.89	0.65
10	HIGH	136.28	136.73	137.45	1.18	0.73
30	HIGH	136.24	136.82	137.42	1.18	0.60
37-39	EMILY	137.04	137.33	137.68	0.64	0.35
54-56	EMILY	136.79	137.02	137.37	0.58	0.34
54-56	EMILY	136.79	137.08	137.35	0.56	0.28
60	EMILY	136.74	136.84	137.33	0.58	0.48
64-68	EMILY	136.73	137.06	137.24	0.51	0.19
7	HANNA	135.80	136.62	137.19	1.39	0.57
70	EMILY	136.05	136.22	137.22	1.17	1.00
70	EMILY	135.92	136.61	137.21	1.29	0.60
72	EMILY	136.33	136.61	137.20	0.87	0.58
82	EMILY	136.03	136.16	137.13	1.10	0.97
80	EMILY	135.96	136.77	137.15	1.19	0.38
5	HANNA	136.02	136.55	137.32	1.31	0.77
86-90	EMILY	135.85	136.22	137.10	1.26	0.88
34	HIGH	135.90	136.57	137.41	1.51	0.85
NA	ELIZABETH	136.00	136.70	137.45	1.44	0.75
36A	HIGH	135.82	136.45	137.40	1.58	0.95
14	TALLAROOK	136.72	137.20	137.79	1.07	0.59
14	TALLAROOK	136.70	137.20	137.79	1.09	0.59
14	TALLAROOK	136.69	137.20	137.79	1.10	0.59
12	TALLAROOK	136.71	137.07	137.79	1.08	0.72
5	WALLIS	136.71	137.13	137.79	1.08	0.66
8	TALLAROOK	136.68	137.09	137.78	1.10	0.70
8	TALLAROOK	136.68	136.77	137.78	1.10	1.01
39	HIGH	135.82	136.45	137.39	1.57	0.94
37	HIGH	136.26	137.11	137.39	1.13	0.28
63	EMILY	135.95	136.51	137.14	1.19	0.63
84	Station	136.70	137.38	137.72	1.02	0.34
90	STATION	137.29	137.48	137.75	0.46	0.27
96	STATION	137.21	137.32	137.76	0.54	0.44
92	STATION	137.20	137.64	137.75	0.55	0.11
12	WALLIS	136.55	137.28	137.76	1.21	0.48
12	WALLIS	136.55	137.11	137.74	1.19	0.63
114	STATION	136.98	137.17	137.77	0.79	0.60
114	STATION	136.95	137.19	137.77	0.82	0.58
100	STATION	137.10	137.24	137.76	0.66	0.52
Safeway Ca	WALLACE	136.72	137.58	137.71	0.99	0.13
32	WALLACE	135.95	136.54	137.54	1.60	1.01
30	WALLIS	136.03	137.04	137.60	1.57	0.56
38	HIGH	135.82	136.62	137.40	1.57	0.78
116	STATION	136.90	137.13	137.77	0.88	0.64
118	STATION	136.78	137.04	137.78	1.00	0.74
43	HIGH	136.19	136.65	137.39	1.20	0.73
45	HIGH	136.17	136.76	137.39	1.22	0.63
45	HIGH	136.08	136.86	137.38	1.30	0.52
5	WALLIS	136.63	136.81	137.78	1.15	0.97
5	WALLIS	136.49	137.18	137.76	1.26	0.57
5	WALLIS	136.49	137.68	137.75	1.25	0.06
29	WALLACE	136.13	136.67	137.63	1.50	0.96
37	WALLIS	135.99	136.32	137.46	1.47	1.14
39	WALLIS	136.03	137.26	137.44	1.41	0.18

41	WALLIS	136.03	137.27	137.42	1.39	0.15
43	WALLIS	135.95	136.53	137.41	1.46	0.88
32	WALLIS	135.95	136.54	137.54	1.59	1.00
36	WALLIS	135.92	137.27	137.49	1.57	0.22
34	WALLIS	136.31	137.24	137.51	1.20	0.27
34	WALLIS	136.31	137.06	137.49	1.18	0.43
38	WALLACE	136.01	136.74	137.47	1.46	0.73
44	HIGH	135.80	136.46	137.40	1.60	0.94
31	TRISTAN	136.97	137.48	137.50	0.53	0.02
33	TRISTAN	136.52	137.33	137.50	0.98	0.17
Safeway	WILLIAM	136.95	137.47	137.63	0.68	0.16
88	STATION	137.29	137.75	137.75	0.46	0.00
86	Station	137.53	137.70	137.75	0.22	0.05
80 (Rear)	Station	136.78	137.31	137.71	0.93	0.40
30	TRISTAN	136.44	137.07	137.49	1.04	0.41
32	TRISTAN	136.42	136.90	137.49	1.07	0.58
32	TRISTAN	136.23	136.92	137.49	1.26	0.56
4	JUBILEE	136.38	136.64	137.16	0.77	0.51
50	WALLIS	136.02	137.19	137.32	1.30	0.12
5	PRESIDENT	137.06	136.89	137.31	0.24	0.41
3	PRESIDENT	137.12	137.03	137.33	0.21	0.30
36	BUTLER	136.59	136.92	137.40	0.81	0.48
54	HIGH	136.81	137.35	137.37	0.56	0.03
54	HIGH	136.81	136.98	137.37	0.56	0.39
52	HIGH	136.31	136.73	137.38	1.07	0.66
42	HIGH	135.93	137.21	137.39	1.47	0.19
25	BUTLER	136.92	136.88	137.42	0.50	0.54
27	BUTLER	136.57	137.36	137.42	0.85	0.06
29	BUTLER	136.30	137.12	137.43	1.12	0.30
31	BUTLER	136.19	137.21	137.42	1.23	0.21
33	BUTLER	136.11	136.87	137.42	1.31	0.55
21	CALLEN	136.59	137.02	137.03	0.44	0.01
8	ALEXANDRA	137.10	137.86	137.89	0.79	0.03
43	EMILY	136.59	137.01	137.57	0.98	0.56
43	EMILY	136.60	137.01	137.59	0.99	0.58
38	EMILY	136.91	137.24	137.57	0.66	0.33
36	EMILY	136.98	137.28	137.62	0.64	0.34
34	EMILY	137.02	137.43	137.63	0.61	0.20
29	HIGH	136.22	136.84	137.41	1.18	0.56
35	BUTLER	135.96	136.08	137.42	1.45	1.34
18	TALLAROOK	136.74	137.09	137.80	1.06	0.71
39	TALLAROOK	136.84	137.48	137.80	0.97	0.33
35	TALLAROOK	136.92	137.35	137.81	0.90	0.47
33	TALLAROOK	136.97	137.28	137.81	0.85	0.54
29	TALLAROOK	136.95	137.65	137.82	0.87	0.16
27	TALLAROOK	136.97	137.58	137.82	0.85	0.23
19	TALLAROOK	136.91	137.65	137.82	0.91	0.17
17	TALLAROOK	136.85	137.37	137.82	0.97	0.45
15	TALLAROOK	136.79	137.61	137.82	1.03	0.21
11	TALLAROOK	136.70	137.14	137.82	1.12	0.69
9	TALLAROOK	136.72	137.14	137.82	1.10	0.68
3-7	WALLACE	136.67	137.13	137.81	1.14	0.68
3-7	TALLAROOK	136.68	137.13	137.81	1.13	0.68
6	ALEXANDER	136.84	137.87	137.89	1.05	0.02
14	ALEXANDER	137.13	137.45	137.89	0.76	0.44
16	ALEXANDER	136.88	137.38	137.88	1.00	0.50
18	ALEXANDER	136.89	137.59	137.88	0.99	0.29
24	ALEXANDER	136.77	137.54	137.88	1.10	0.34
26	ALEXANDER	136.70	137.69	137.87	1.17	0.18

32	ALEXANDER	136.49	137.40	137.86	1.38	0.47
34	ALEXANDER	136.54	137.40	137.86	1.32	0.46
36	TALLAROOK	136.85	136.89	137.79	0.94	0.90
32	TALLAROOK	136.81	137.13	137.78	0.97	0.65
23	TALLAROOK	136.92	137.41	137.82	0.90	0.41
23	TALLAROOK	136.92	137.42	137.83	0.91	0.41
23	TALLAROOK	136.92	137.40	137.84	0.92	0.44
23	TALLAROOK	136.92	137.51	137.82	0.90	0.31
23	TALLAROOK	136.92	137.49	137.83	0.91	0.34
23	TALLAROOK	136.92	137.49	137.84	0.91	0.35
23	TALLAROOK	136.92	137.40	137.85	0.92	0.45
31	HIGH	136.06	136.37	137.35	1.29	0.98
4	HIGH	136.40	137.09	137.50	1.10	0.41
12	HIGH	136.28	136.73	137.49	1.21	0.76
45	WALLIS	135.76	136.27	137.35	1.59	1.08
45	WALLIS	135.81	136.27	137.33	1.52	1.06
45	WALLIS	135.73	136.23	137.32	1.58	1.09
45	WALLIS	135.77	136.23	137.26	1.49	1.03
6	INDUSTRIAL	136.24	136.70	137.32	1.08	0.62
7	INDUSTRIAL	136.11	136.67	137.32	1.21	0.65
1-3	EMILY	137.21	137.14	138.14	0.93	1.00
25	EMILY	137.12	137.99	138.07	0.95	0.08
2	TIERNEY	136.19	137.43	138.10	1.91	0.67
4	TIERNEY	136.77	137.39	138.11	1.35	0.72
NA	EDWARD	137.18	137.91	138.06	0.88	0.16
NA	EDWARD	137.12	137.92	138.03	0.90	0.10
SWIMMING P	LESLEY	136.53	136.97	137.89	1.36	0.91
KINGS	PARK	136.51	137.44	137.89	1.38	0.45
Kings	Park	136.58	137.41	137.68	1.10	0.27
NA	TIERNEY	137.07	137.56	138.15	1.08	0.59
80	Station	137.31	137.72	137.91	0.60	0.19
15-17	CALLEN	136.76	137.07	137.08	0.32	0.01
15	CALLEN	136.90	137.06	137.11	0.21	0.05
21	ALEXANDER	137.17	138.18	137.91	0.75	
MARGO	ELIZA	136.60	138.32	137.98	1.38	
11	EMILY	136.60	138.41	137.94	1.34	
13	EMILY	136.99	138.03	137.93	0.94	
20	EMILY	137.21	137.84	137.75	0.54	within 100mm
22	EMILY	137.24	137.84	137.73	0.49	
5	ELIZABETH	136.86	137.76	137.71	0.85	within 100mm
28	EMILY	137.13	137.79	137.66	0.53	
57	EMILY	136.07	137.37	137.19	1.12	
51	EMILY	136.43	137.46	137.31	0.89	
28	HIGH	136.04	137.77	137.43	1.39	
22	EMILY	137.15	137.84	137.72	0.57	
NA		136.02	137.86	137.56	1.55	
35	TRISTAN	136.43	137.86	137.50	1.07	
37	TRISTAN	136.33	137.69	137.51	1.18	
88	STATION	137.29	137.85	137.75	0.46	
88	STATION	137.29	137.82	137.75	0.46	within 100mm
84	Station	137.67	137.80	137.75	0.08	within 100mm
34	TRISTAN	136.31	137.87	137.49	1.18	
9	PRESIDENT	136.97	137.59	137.23	0.25	
9	PRESIDENT	136.97	137.76	137.21	0.23	
7	PRESIDENT	136.98	137.49	137.29	0.30	
52	WALLIS	136.05	137.35	137.27	1.23	within 100mm
75	HIGH	136.96	137.71	137.36	0.40	
73	HIGH	136.28	137.76	137.36	1.08	
34	BUTLER	136.96	137.49	137.40	0.44	within 100mm

NA	GV Highway	136.39	136.92	136.86	**0.46**	within 100mm
19	CALLEN	136.84	137.53	137.04	**0.21**	
1-5	GV Highway	136.13	136.87	136.60	**0.47**	
21	TALLAROOK	136.89	138.07	137.82	**0.93**	
12	ALEXANDER	137.13	138.24	137.89	**0.76**	
36	ALEXANDER	136.60	138.18	137.86	**1.26**	
28	TRISTAN	137.45	138.18	137.48	**0.03**	
28	TRISTAN	137.45	138.18	137.48	**0.02**	
28	TRISTAN	137.45	138.18	137.47	**0.01**	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	1.5
Bolton St	1.7
Edward St	2.5
Elizabeth St	1.5
Emily St East	1.1
Emily St West	1.0
Goulburn Valley Highway	0.6
High St	1.7
Lesley St	1.3
Moody St	1.2
Robert St	1.5
Station St	0.7
Tallarook St	1.2
Tierney St	1.5
Wallis St	1.6
William St	1.4

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 8.2m

Refer Flood Map 540207-8

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	137.52	1.44	1.21
41	TALLAROOK	136.62	136.94	137.80	1.17	0.85
NA	BISHOP	136.27	137.56	137.80	1.53	0.23
24	EMILY	137.10	136.94	137.87	0.77	0.93
17	HIGH	136.33	137.37	137.61	1.28	0.24
11-13	HIGH	136.36	137.00	137.63	1.27	0.63
11-13	HIGH	136.36	137.13	137.62	1.27	0.50
11	HIGH	136.87	136.70	137.56	0.69	0.86
38B	TALLAROOK	136.76	137.15	137.95	1.19	0.80
34	TALLAROOK	136.80	137.07	137.96	1.16	0.89
8	HIGH	136.40	137.26	137.65	1.25	0.39
8	HIGH	136.40	137.34	137.64	1.25	0.30
21	HIGH	136.34	136.84	137.60	1.25	0.76
50	TALLAROOK	136.80	137.48	137.90	1.10	0.42
19	HIGH	136.34	137.26	137.60	1.26	0.34
52	TALLAROOK	136.82	137.32	137.90	1.08	0.58
54	TALLAROOK	136.77	137.35	137.86	1.09	0.51
Opposite 1	EMILY	136.86	137.54	138.16	1.29	0.62
WINERY	EMILY	136.75	137.15	138.35	1.60	1.20
2	EMILY	136.58	137.62	138.06	1.48	0.44
2	HANNA	136.64	137.44	137.78	1.15	0.35
10	EMILY	136.51	137.24	138.06	1.55	0.82
10	EMILY	136.53	137.24	138.06	1.52	0.82
12	EMILY	136.76	137.48	138.03	1.27	0.55
8B	EMILY	136.67	137.56	138.08	1.41	0.52
7	EMILY	136.67	137.05	138.12	1.45	1.07
13	EMILY	136.99	138.03	138.11	1.11	0.07
13	EMILY	136.99	137.27	138.10	1.11	0.83
17	EMILY	137.21	137.75	138.12	0.90	0.36
21	EMILY	136.91	137.57	138.10	1.19	0.53
14-16	EMILY	137.16	137.48	138.02	0.86	0.54
16	EMILY	137.59	137.59	137.98	0.38	0.38
20	EMILY	137.21	137.84	137.94	0.72	0.10
22	EMILY	137.24	137.84	137.92	0.68	0.08
25	EMILY	137.00	137.13	138.05	1.05	0.93
14	EMILY	137.20	137.23	138.01	0.80	0.77
20	ALEXANDER	136.88	137.48	138.06	1.17	0.58
22	ALEXANDER	136.86	137.35	138.05	1.19	0.70
29	EMILY	137.45	137.63	137.96	0.52	0.33
5	ELIZABETH	136.86	137.76	137.88	1.02	0.13
44	TALLAROOK	136.78	136.84	137.94	1.16	1.10
42	TALLAROOK	136.79	137.04	137.94	1.15	0.90
32	TALLAROOK	136.81	137.43	137.95	1.14	0.52
28	TALLAROOK	136.81	136.83	137.93	1.13	1.10
30	TALLAROOK	136.83	136.85	137.97	1.14	1.12
41	EMILY	136.68	137.60	137.79	1.12	0.19
35	EMILY	136.45	136.75	137.93	1.47	1.18
44	EMILY	136.71	136.98	137.71	0.99	0.73
38	EMILY	136.85	136.80	137.75	0.89	0.95
32	EMILY	137.05	137.52	137.83	0.78	0.31

28	EMILY	137.13	137.79	137.83	0.70	0.04
26	EMILY	137.41	137.52	137.88	0.47	0.36
57	EMILY	136.07	137.37	137.37	1.29	0.00
55	EMILY	136.32	137.18	137.47	1.15	0.29
55	EMILY	136.32	136.73	137.39	1.07	0.66
53	EMILY	136.43	136.95	137.47	1.04	0.53
51	EMILY	136.43	137.46	137.49	1.06	0.02
47	EMILY	136.49	136.89	137.66	1.17	0.77
50	EMILY	136.83	137.45	137.64	0.81	0.19
48	EMILY	136.90	137.26	137.68	0.78	0.43
23	HIGH	136.39	137.16	137.59	1.20	0.43
60 POLICE	TALLAROOK	136.56	137.35	137.71	1.15	0.36
58	TALLAROOK	136.67	137.04	137.81	1.14	0.78
56	TALLAROOK	136.83	137.07	137.87	1.05	0.81
10	HIGH	136.28	136.73	137.62	1.35	0.90
30	HIGH	136.24	136.82	137.59	1.35	0.77
22	EMILY	137.15	137.84	137.90	0.75	0.07
37-39	EMILY	137.04	137.33	137.84	0.80	0.51
54-56	EMILY	136.79	137.02	137.54	0.75	0.52
54-56	EMILY	136.79	137.08	137.53	0.74	0.45
60	EMILY	136.74	136.84	137.50	0.76	0.66
64-68	EMILY	136.73	137.06	137.42	0.69	0.37
7	HANNA	135.80	136.62	137.37	1.57	0.75
70	EMILY	136.05	136.22	137.40	1.35	1.18
70	EMILY	135.92	136.61	137.39	1.47	0.78
72	EMILY	136.33	136.61	137.37	1.04	0.76
82	EMILY	136.03	136.16	137.30	1.27	1.14
80	EMILY	135.96	136.77	137.33	1.37	0.56
5	HANNA	136.02	136.55	137.50	1.49	0.95
86-90	EMILY	135.85	136.22	137.28	1.43	1.05
34	HIGH	135.90	136.57	137.59	1.69	1.02
NA	ELIZABETH	136.00	136.70	137.63	1.63	0.93
36A	HIGH	135.82	136.45	137.58	1.76	1.13
14	TALLAROOK	136.72	137.20	137.97	1.25	0.77
14	TALLAROOK	136.70	137.20	137.97	1.27	0.77
14	TALLAROOK	136.69	137.20	137.97	1.28	0.77
12	TALLAROOK	136.71	137.07	137.97	1.25	0.90
5	WALLIS	136.71	137.13	137.96	1.26	0.84
8	TALLAROOK	136.68	137.09	137.96	1.28	0.87
8	TALLAROOK	136.68	136.77	137.96	1.28	1.19
39	HIGH	135.82	136.45	137.56	1.74	1.11
37	HIGH	136.26	137.11	137.56	1.31	0.46
63	EMILY	135.95	136.51	137.31	1.36	0.80
84	Station	136.70	137.38	137.90	1.20	0.51
90	STATION	137.29	137.48	137.93	0.64	0.45
96	STATION	137.21	137.32	137.94	0.72	0.62
92	STATION	137.20	137.64	137.93	0.73	0.29
12	WALLIS	136.55	137.28	137.94	1.39	0.66
12	WALLIS	136.55	137.11	137.92	1.37	0.81
114	STATION	136.98	137.17	137.94	0.96	0.77
114	STATION	136.95	137.19	137.95	1.00	0.76
100	STATION	137.10	137.24	137.94	0.84	0.70
Safeway Ca	WALLACE	136.72	137.58	137.89	1.16	0.31
32	WALLACE	135.95	136.54	137.72	1.77	1.18
30	WALLIS	136.03	137.04	137.78	1.75	0.74
38	HIGH	135.82	136.62	137.57	1.75	0.95
116	STATION	136.90	137.13	137.95	1.05	0.82
118	STATION	136.78	137.04	137.95	1.17	0.91
43	HIGH	136.19	136.65	137.56	1.37	0.90

45	HIGH	136.17	136.76	137.56	1.39	0.80
45	HIGH	136.08	136.86	137.55	1.47	0.69
5	WALLIS	136.63	136.81	137.96	1.33	1.15
5	WALLIS	136.49	137.18	137.93	1.44	0.75
5	WALLIS	136.49	137.68	137.92	1.43	0.24
29	WALLACE	136.13	136.67	137.80	1.67	1.13
37	WALLIS	135.99	136.32	137.63	1.65	1.32
39	WALLIS	136.03	137.26	137.62	1.58	0.35
41	WALLIS	136.03	137.27	137.60	1.56	0.32
43	WALLIS	135.95	136.53	137.59	1.64	1.06
32	WALLIS	135.95	136.54	137.71	1.76	1.17
36	WALLIS	135.92	137.27	137.66	1.74	0.40
34	WALLIS	136.31	137.24	137.68	1.37	0.44
34	WALLIS	136.31	137.06	137.67	1.36	0.61
38	WALLACE	136.01	136.74	137.64	1.63	0.91
44	HIGH	135.80	136.46	137.58	1.77	1.11
31	TRISTAN	136.97	137.48	137.68	0.71	0.20
33	TRISTAN	136.52	137.33	137.68	1.16	0.34
Safeway	WILLIAM	136.95	137.47	137.80	0.85	0.34
88	STATION	137.29	137.85	137.93	0.64	0.08
88	STATION	137.29	137.75	137.93	0.64	0.18
88	STATION	137.29	137.82	137.93	0.64	0.11
86	Station	137.53	137.70	137.93	0.40	0.23
84	Station	137.67	137.80	137.93	0.25	0.13
80 (Rear)	Station	136.78	137.31	137.88	1.10	0.57
30	TRISTAN	136.44	137.07	137.66	1.22	0.59
32	TRISTAN	136.42	136.90	137.66	1.24	0.76
32	TRISTAN	136.23	136.92	137.67	1.44	0.74
4	JUBILEE	136.38	136.64	137.32	0.94	0.68
50	WALLIS	136.02	137.19	137.49	1.47	0.29
52	WALLIS	136.05	137.35	137.44	1.39	0.09
5	PRESIDENT	137.06	136.89	137.47	0.41	0.58
3	PRESIDENT	137.12	137.03	137.50	0.38	0.47
36	BUTLER	136.59	136.92	137.57	0.99	0.66
34	BUTLER	136.96	137.49	137.58	0.62	0.09
54	HIGH	136.81	137.35	137.54	0.73	0.20
54	HIGH	136.81	136.98	137.55	0.73	0.56
52	HIGH	136.31	136.73	137.55	1.24	0.83
42	HIGH	135.93	137.21	137.56	1.64	0.36
25	BUTLER	136.92	136.88	137.60	0.67	0.71
27	BUTLER	136.57	137.36	137.60	1.02	0.24
29	BUTLER	136.30	137.12	137.60	1.30	0.48
31	BUTLER	136.19	137.21	137.60	1.40	0.38
33	BUTLER	136.11	136.87	137.59	1.48	0.72
NA	GV Highway	136.39	136.92	137.03	0.63	0.11
15-17	CALLEN	137.08	136.76	137.23	0.15	0.47
15	CALLEN	137.11	136.90	137.23	0.12	0.32
21	CALLEN	136.59	137.02	137.19	0.59	0.17
8	ALEXANDRA	137.10	137.86	138.07	0.97	0.21
43	EMILY	136.59	137.01	137.74	1.15	0.72
43	EMILY	136.60	137.01	137.75	1.15	0.74
38	EMILY	136.91	137.24	137.74	0.83	0.50
36	EMILY	136.98	137.28	137.79	0.81	0.51
34	EMILY	137.02	137.43	137.80	0.78	0.37
29	HIGH	136.22	136.84	137.58	1.35	0.73
35	BUTLER	135.96	136.08	137.59	1.63	1.51
18	TALLAROOK	136.74	137.09	137.97	1.24	0.89
39	TALLAROOK	136.84	137.48	137.97	1.14	0.50
35	TALLAROOK	136.92	137.35	137.99	1.07	0.64

33	TALLAROOK	136.97	137.28	137.99	1.02	0.71
29	TALLAROOK	136.95	137.65	137.99	1.04	0.34
27	TALLAROOK	136.97	137.58	137.99	1.02	0.41
19	TALLAROOK	136.91	137.65	137.99	1.08	0.35
17	TALLAROOK	136.85	137.37	138.00	1.15	0.63
15	TALLAROOK	136.79	137.61	138.00	1.21	0.38
11	TALLAROOK	136.70	137.14	138.00	1.30	0.86
9	TALLAROOK	136.72	137.14	137.99	1.27	0.85
3-7	WALLACE	136.67	137.13	137.99	1.32	0.86
3-7	TALLAROOK	136.68	137.13	137.99	1.31	0.86
6	ALEXANDER	136.84	137.87	138.07	1.23	0.20
14	ALEXANDER	137.13	137.45	138.06	0.93	0.62
16	ALEXANDER	136.88	137.38	138.06	1.18	0.68
18	ALEXANDER	136.89	137.59	138.06	1.17	0.47
24	ALEXANDER	136.77	137.54	138.05	1.28	0.51
26	ALEXANDER	136.70	137.69	138.05	1.34	0.36
32	ALEXANDER	136.49	137.40	138.04	1.55	0.64
34	ALEXANDER	136.54	137.40	138.03	1.50	0.64
36	TALLAROOK	136.85	136.89	137.96	1.11	1.07
32	TALLAROOK	136.81	137.13	137.95	1.14	0.82
23	TALLAROOK	136.92	137.41	137.99	1.07	0.58
23	TALLAROOK	136.92	137.42	138.00	1.08	0.58
23	TALLAROOK	136.92	137.40	138.01	1.09	0.61
23	TALLAROOK	136.92	137.51	137.99	1.07	0.48
23	TALLAROOK	136.92	137.49	138.00	1.08	0.51
23	TALLAROOK	136.92	137.49	138.01	1.09	0.52
23	TALLAROOK	136.92	137.40	138.02	1.10	0.62
31	HIGH	136.06	136.37	137.52	1.46	1.15
4	HIGH	136.40	137.09	137.67	1.27	0.58
12	HIGH	136.28	136.73	137.66	1.39	0.93
45	WALLIS	135.76	136.27	137.52	1.75	1.24
45	WALLIS	135.81	136.27	137.50	1.68	1.22
45	WALLIS	135.73	136.23	137.48	1.75	1.26
45	WALLIS	135.77	136.23	137.43	1.65	1.19
6	INDUSTRIAL	136.24	136.70	137.48	1.25	0.78
7	INDUSTRIAL	136.11	136.67	137.48	1.38	0.82
1-3	EMILY	137.21	137.14	138.28	1.07	1.14
25	EMILY	137.12	137.99	138.23	1.11	0.24
2	TIERNEY	136.19	137.43	138.27	2.08	0.84
4	TIERNEY	136.77	137.39	138.28	1.51	0.89
NA	EDWARD	137.18	137.91	138.23	1.05	0.32
NA	EDWARD	137.12	137.92	138.19	1.07	0.27
SWIMMING P	LESLEY	136.53	136.97	138.06	1.53	1.09
KINGS	PARK	136.51	137.44	138.07	1.56	0.63
Kings	Park	136.58	137.41	137.84	1.26	0.43
NA	TIERNEY	137.07	137.56	138.31	1.24	0.75
80	Station	137.31	137.89	137.91	0.60	0.02
21	ALEXANDER	137.17	138.18	138.09	0.92	within 100mm
MARGO	ELIZA	136.60	138.32	138.16	1.56	
11	EMILY	136.60	138.41	138.11	1.51	
28	HIGH	136.04	137.77	137.60	1.56	
NA		136.02	137.86	137.72	1.70	
35	TRISTAN	136.43	137.86	137.68	1.25	
37	TRISTAN	136.33	137.69	137.69	1.36	within 100mm
34	TRISTAN	136.31	137.87	137.66	1.35	
10	JUBILEE	137.24	137.40	137.25	0.01	
4	JUBILEE	137.27	137.76	137.30	0.03	
4	JUBILEE	137.27	137.72	137.28	0.01	
8	JUBILEE	137.25	137.83	137.28	0.03	

9	PRESIDENT	136.97	137.59	137.39	**0.42**	
9	PRESIDENT	136.97	137.76	137.38	**0.40**	
7	PRESIDENT	136.98	137.49	137.45	**0.46**	within 100mm
75	HIGH	136.96	137.71	137.53	**0.57**	
73	HIGH	136.28	137.76	137.53	**1.25**	
32	BUTLER	137.48	138.13	137.58	**0.10**	
23	BUTLER	137.42	137.88	137.60	**0.18**	
19	CALLEN	136.84	137.53	137.20	**0.36**	
1-5	GV Highway	136.13	136.87	136.77	**0.63**	
21	TALLAROOK	136.89	138.07	137.99	**1.10**	within 100mm
12	ALEXANDER	137.13	138.24	138.07	**0.94**	
36	ALEXANDER	136.60	138.18	138.03	**1.44**	
28	TRISTAN	137.45	138.18	137.66	**0.21**	
28	TRISTAN	137.45	138.18	137.65	**0.20**	
28	TRISTAN	137.45	138.18	137.65	**0.19**	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding

Street	Depth Of Inundation (m)
Alexander St	1.7
Bolton St	1.9
Edward St	2.6
Elizabeth St	1.7
Emily St East	1.3
Emily St West	1.2
Goulburn Valley Highway	0.8
High St	1.8
Lesley St	1.4
Moody St	1.4
Robert St	1.7
Station St	0.8
Tallarook St	1.3
Tierney St	1.6
Wallis St	1.8
William St	1.6

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 8.6m

Refer Flood Map 540207-9

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	137.88	1.79	1.56
41	TALLAROOK	136.62	136.94	138.13	1.51	1.19
NA	BISHOP	136.27	137.56	138.13	1.86	0.57
21	ALEXANDER	137.17	138.18	138.45	1.28	0.26
MARGO	ELIZA	136.60	138.32	138.52	1.92	0.20
24	EMILY	137.10	136.94	138.23	1.13	1.29
17	HIGH	136.33	137.37	137.96	1.62	0.58
11-13	HIGH	136.36	137.00	137.97	1.62	0.98
11-13	HIGH	136.36	137.13	137.96	1.61	0.84
11	HIGH	136.87	136.70	137.91	1.04	1.20
38B	TALLAROOK	136.76	137.15	138.29	1.53	1.14
34	TALLAROOK	136.80	137.07	138.30	1.50	1.23
8	HIGH	136.40	137.26	137.99	1.59	0.73
8	HIGH	136.40	137.34	137.99	1.59	0.65
21	HIGH	136.34	136.84	137.94	1.60	1.10
50	TALLAROOK	136.80	137.48	138.23	1.43	0.75
19	HIGH	136.34	137.26	137.95	1.60	0.68
52	TALLAROOK	136.82	137.32	138.23	1.41	0.91
54	TALLAROOK	136.77	137.35	138.19	1.43	0.84
Opposite 1	EMILY	136.86	137.54	138.55	1.68	1.01
WINERY	EMILY	136.75	137.15	138.73	1.98	1.58
2	EMILY	136.58	137.62	138.45	1.87	0.83
2	HANNA	136.64	137.44	138.16	1.53	0.72
10	EMILY	136.51	137.24	138.43	1.92	1.19
10	EMILY	136.53	137.24	138.43	1.89	1.19
12	EMILY	136.76	137.48	138.40	1.64	0.92
8B	EMILY	136.67	137.56	138.45	1.78	0.89
7	EMILY	136.67	137.05	138.49	1.82	1.44
11	EMILY	136.60	138.41	138.48	1.88	0.07
13	EMILY	136.99	138.03	138.47	1.48	0.44
13	EMILY	136.99	137.27	138.47	1.48	1.20
17	EMILY	137.21	137.75	138.47	1.26	0.72
21	EMILY	136.91	137.57	138.46	1.55	0.89
14-16	EMILY	137.16	137.48	138.38	1.22	0.90
16	EMILY	137.59	137.59	138.34	0.75	0.75
20	EMILY	137.21	137.84	138.30	1.09	0.47
22	EMILY	137.24	137.84	138.28	1.04	0.45
25	EMILY	137.00	137.13	138.41	1.41	1.28
14	EMILY	137.20	137.23	138.37	1.17	1.14
20	ALEXANDER	136.88	137.48	138.41	1.53	0.93
22	ALEXANDER	136.86	137.35	138.40	1.54	1.05
29	EMILY	137.45	137.63	138.32	0.87	0.69
5	ELIZABETH	136.86	137.76	138.22	1.36	0.46
44	TALLAROOK	136.78	136.84	138.28	1.50	1.44
42	TALLAROOK	136.79	137.04	138.28	1.49	1.24
32	TALLAROOK	136.81	137.43	138.29	1.49	0.87
28	TALLAROOK	136.81	136.83	138.28	1.47	1.45
30	TALLAROOK	136.83	136.85	138.31	1.48	1.46
41	EMILY	136.68	137.60	138.13	1.45	0.53
35	EMILY	136.45	136.75	138.27	1.82	1.52

44	EMILY	136.71	136.98	138.05	1.34	1.08
38	EMILY	136.85	136.80	138.09	1.24	1.29
32	EMILY	137.05	137.52	138.17	1.12	0.65
28	EMILY	137.13	137.79	138.18	1.05	0.39
26	EMILY	137.41	137.52	138.23	0.82	0.71
57	EMILY	136.07	137.37	137.71	1.63	0.34
55	EMILY	136.32	137.18	137.81	1.49	0.63
55	EMILY	136.32	136.73	137.73	1.41	1.00
53	EMILY	136.43	136.95	137.82	1.39	0.87
51	EMILY	136.43	137.46	137.84	1.41	0.37
47	EMILY	136.49	136.89	138.00	1.51	1.12
50	EMILY	136.83	137.45	137.99	1.16	0.54
48	EMILY	136.90	137.26	138.03	1.12	0.77
23	HIGH	136.39	137.16	137.93	1.54	0.77
60 POLICE	TALLAROOK	136.56	137.35	138.05	1.49	0.70
58	TALLAROOK	136.67	137.04	138.14	1.47	1.11
56	TALLAROOK	136.83	137.07	138.20	1.38	1.14
10	HIGH	136.28	136.73	137.97	1.69	1.24
28	HIGH	136.04	137.77	137.95	1.91	0.19
30	HIGH	136.24	136.82	137.94	1.70	1.12
22	EMILY	137.15	137.84	138.27	1.11	0.43
37-39	EMILY	137.04	137.33	138.18	1.14	0.85
54-56	EMILY	136.79	137.02	137.89	1.10	0.87
54-56	EMILY	136.79	137.08	137.88	1.09	0.80
60	EMILY	136.74	136.84	137.86	1.11	1.01
64-68	EMILY	136.73	137.06	137.77	1.04	0.72
7	HANNA	135.80	136.62	137.71	1.91	1.10
70	EMILY	136.05	136.22	137.74	1.70	1.53
70	EMILY	135.92	136.61	137.73	1.82	1.13
72	EMILY	136.33	136.61	137.71	1.39	1.10
82	EMILY	136.03	136.16	137.64	1.61	1.48
80	EMILY	135.96	136.77	137.67	1.71	0.90
5	HANNA	136.02	136.55	137.85	1.84	1.30
86-90	EMILY	135.85	136.22	137.61	1.76	1.38
34	HIGH	135.90	136.57	137.93	2.03	1.37
NA	ELIZABETH	136.00	136.70	137.98	1.98	1.28
36A	HIGH	135.82	136.45	137.92	2.10	1.47
NA		136.02	137.86	138.05	2.04	0.19
14	TALLAROOK	136.72	137.20	138.32	1.60	1.12
14	TALLAROOK	136.70	137.20	138.32	1.62	1.12
14	TALLAROOK	136.69	137.20	138.32	1.63	1.12
12	TALLAROOK	136.71	137.07	138.32	1.60	1.25
5	WALLIS	136.71	137.13	138.31	1.60	1.19
8	TALLAROOK	136.68	137.09	138.31	1.63	1.22
8	TALLAROOK	136.68	136.77	138.31	1.63	1.54
39	HIGH	135.82	136.45	137.91	2.09	1.46
37	HIGH	136.26	137.11	137.91	1.65	0.80
63	EMILY	135.95	136.51	137.64	1.69	1.13
84	Station	136.70	137.38	138.24	1.54	0.86
90	STATION	137.29	137.48	138.28	0.99	0.80
96	STATION	137.21	137.32	138.28	1.07	0.96
92	STATION	137.20	137.64	138.28	1.08	0.64
12	WALLIS	136.55	137.28	138.29	1.73	1.01
12	WALLIS	136.55	137.11	138.27	1.72	1.16
114	STATION	136.98	137.17	138.29	1.32	1.13
114	STATION	136.95	137.19	138.30	1.35	1.11
100	STATION	137.10	137.24	138.29	1.19	1.05
Safeway Ca	WALLACE	136.72	137.58	138.23	1.51	0.65
32	WALLACE	135.95	136.54	138.07	2.12	1.53

30	WALLIS	136.03	137.04	138.12	2.10	1.08
38	HIGH	135.82	136.62	137.92	2.09	1.30
116	STATION	136.90	137.13	138.30	1.40	1.17
118	STATION	136.78	137.04	138.30	1.52	1.26
43	HIGH	136.19	136.65	137.90	1.71	1.25
45	HIGH	136.17	136.76	137.90	1.73	1.14
45	HIGH	136.08	136.86	137.89	1.81	1.03
5	WALLIS	136.63	136.81	138.31	1.68	1.50
5	WALLIS	136.49	137.18	138.28	1.79	1.10
5	WALLIS	136.49	137.68	138.27	1.78	0.59
29	WALLACE	136.13	136.67	138.15	2.02	1.48
37	WALLIS	135.99	136.32	137.99	2.00	1.67
39	WALLIS	136.03	137.26	137.97	1.93	0.71
41	WALLIS	136.03	137.27	137.95	1.92	0.68
43	WALLIS	135.95	136.53	137.94	1.99	1.41
32	WALLIS	135.95	136.54	138.06	2.11	1.52
36	WALLIS	135.92	137.27	138.01	2.09	0.75
34	WALLIS	136.31	137.24	138.03	1.72	0.79
34	WALLIS	136.31	137.06	138.02	1.71	0.96
38	WALLACE	136.01	136.74	137.99	1.99	1.26
44	HIGH	135.80	136.46	137.92	2.12	1.46
31	TRISTAN	136.97	137.48	138.04	1.06	0.55
33	TRISTAN	136.52	137.33	138.03	1.51	0.70
35	TRISTAN	136.43	137.86	138.03	1.60	0.17
37	TRISTAN	136.33	137.69	138.04	1.71	0.35
Safeway	WILLIAM	136.95	137.47	138.15	1.20	0.68
88	STATION	137.29	137.85	138.28	0.99	0.42
88	STATION	137.29	137.75	138.28	0.99	0.53
88	STATION	137.29	137.82	138.28	0.98	0.46
86	Station	137.53	137.70	138.28	0.74	0.58
84	Station	137.67	137.80	138.27	0.60	0.47
80	Station	137.91	137.31	138.24	0.33	0.93
80 (Rear)	Station	136.78	137.31	138.23	1.44	0.91
30	TRISTAN	136.44	137.07	138.02	1.57	0.94
32	TRISTAN	136.42	136.90	138.02	1.60	1.11
32	TRISTAN	136.23	136.92	138.02	1.79	1.10
34	TRISTAN	136.31	137.87	138.02	1.71	0.15
10	JUBILEE	137.24	137.40	137.57	0.33	0.17
4	JUBILEE	136.38	136.64	137.65	1.26	1.00
9	PRESIDENT	136.97	137.59	137.72	0.75	0.13
7	PRESIDENT	136.98	137.49	137.78	0.80	0.29
50	WALLIS	136.02	137.19	137.82	1.81	0.63
52	WALLIS	136.05	137.35	137.77	1.73	0.43
5	PRESIDENT	137.06	136.89	137.80	0.74	0.91
3	PRESIDENT	137.12	137.03	137.83	0.71	0.80
75	HIGH	136.96	137.71	137.87	0.91	0.16
73	HIGH	136.28	137.76	137.87	1.59	0.11
36	BUTLER	136.59	136.92	137.92	1.33	1.00
34	BUTLER	136.96	137.49	137.93	0.97	0.44
54	HIGH	136.81	137.35	137.89	1.07	0.54
54	HIGH	136.81	136.98	137.89	1.08	0.91
52	HIGH	136.31	136.73	137.90	1.58	1.17
42	HIGH	135.93	137.21	137.91	1.98	0.70
23	BUTLER	137.42	137.88	137.95	0.52	0.07
25	BUTLER	136.92	136.88	137.95	1.02	1.06
27	BUTLER	136.57	137.36	137.95	1.37	0.59
29	BUTLER	136.30	137.12	137.95	1.65	0.83
31	BUTLER	136.19	137.21	137.95	1.75	0.73
33	BUTLER	136.11	136.87	137.94	1.83	1.07

NA	GV Highway	136.39	136.92	137.35	0.95	0.43
15-17	CALLEN	137.08	136.76	137.55	0.47	0.79
15	CALLEN	137.11	136.90	137.54	0.44	0.64
21	CALLEN	136.59	137.02	137.49	0.90	0.47
1-5	GV Highway	136.13	136.87	137.09	0.96	0.22
8	ALEXANDRA	137.10	137.86	138.42	1.32	0.56
43	EMILY	136.59	137.01	138.08	1.49	1.06
43	EMILY	136.60	137.01	138.09	1.49	1.08
38	EMILY	136.91	137.24	138.09	1.18	0.85
36	EMILY	136.98	137.28	138.14	1.16	0.86
34	EMILY	137.02	137.43	138.15	1.13	0.72
29	HIGH	136.22	136.84	137.92	1.70	1.08
35	BUTLER	135.96	136.08	137.94	1.98	1.86
18	TALLAROOK	136.74	137.09	138.32	1.58	1.23
39	TALLAROOK	136.84	137.48	138.32	1.48	0.84
35	TALLAROOK	136.92	137.35	138.33	1.41	0.98
33	TALLAROOK	136.97	137.28	138.33	1.37	1.05
29	TALLAROOK	136.95	137.65	138.34	1.39	0.68
27	TALLAROOK	136.97	137.58	138.34	1.37	0.75
21	TALLAROOK	136.89	138.07	138.34	1.45	0.27
19	TALLAROOK	136.91	137.65	138.34	1.43	0.70
17	TALLAROOK	136.85	137.37	138.35	1.50	0.98
15	TALLAROOK	136.79	137.61	138.35	1.56	0.73
11	TALLAROOK	136.70	137.14	138.35	1.65	1.21
9	TALLAROOK	136.72	137.14	138.34	1.62	1.21
3-7	WALLACE	136.67	137.13	138.34	1.67	1.21
3-7	TALLAROOK	136.68	137.13	138.34	1.66	1.21
6	ALEXANDER	136.84	137.87	138.43	1.58	0.55
12	ALEXANDER	137.13	138.24	138.42	1.29	0.18
14	ALEXANDER	137.13	137.45	138.42	1.29	0.97
16	ALEXANDER	136.88	137.38	138.41	1.53	1.03
18	ALEXANDER	136.89	137.59	138.41	1.52	0.82
24	ALEXANDER	136.77	137.54	138.40	1.63	0.86
26	ALEXANDER	136.70	137.69	138.40	1.69	0.71
32	ALEXANDER	136.49	137.40	138.39	1.90	0.99
34	ALEXANDER	136.54	137.40	138.38	1.84	0.98
36	ALEXANDER	136.60	138.18	138.38	1.78	0.21
36	TALLAROOK	136.85	136.89	138.30	1.46	1.41
32	TALLAROOK	136.81	137.13	138.29	1.49	1.17
23	TALLAROOK	136.92	137.41	138.34	1.42	0.93
23	TALLAROOK	136.92	137.42	138.35	1.43	0.93
23	TALLAROOK	136.92	137.40	138.36	1.44	0.96
23	TALLAROOK	136.92	137.51	138.34	1.42	0.83
23	TALLAROOK	136.92	137.49	138.35	1.43	0.86
23	TALLAROOK	136.92	137.49	138.36	1.44	0.87
23	TALLAROOK	136.92	137.40	138.37	1.45	0.97
31	HIGH	136.06	136.37	137.87	1.80	1.49
4	HIGH	136.40	137.09	138.01	1.61	0.92
12	HIGH	136.28	136.73	138.01	1.74	1.28
45	WALLIS	135.76	136.27	137.85	2.09	1.58
45	WALLIS	135.81	136.27	137.83	2.02	1.56
45	WALLIS	135.73	136.23	137.82	2.09	1.59
45	WALLIS	135.77	136.23	137.76	1.98	1.52
6	INDUSTRIAL	136.24	136.70	137.82	1.58	1.12
7	INDUSTRIAL	136.11	136.67	137.82	1.72	1.16
1-3	EMILY	137.21	137.14	138.63	1.42	1.49
25	EMILY	137.12	137.99	138.59	1.47	0.60
2	TIERNEY	136.19	137.43	138.62	2.43	1.19
4	TIERNEY	136.77	137.39	138.63	1.86	1.24

NA	EDWARD	137.18	137.91	138.58	1.40	0.68
NA	EDWARD	137.12	137.92	138.55	1.42	0.62
SWIMMING P	LESLEY	136.53	136.97	138.41	1.89	1.44
KINGS	PARK	136.51	137.44	138.41	1.90	0.97
Kings	Park	136.58	137.41	138.17	1.59	0.76
NA	TIERNEY	137.07	137.56	138.66	1.59	1.10
4	JUBILEE	137.27	137.76	137.63	0.36	
4	JUBILEE	137.27	137.72	137.61	0.34	
8	JUBILEE	137.25	137.83	137.61	0.36	
9	PRESIDENT	136.97	137.76	137.70	0.73	within 100mm
32	BUTLER	137.48	138.13	137.93	0.45	
58	HIGH	137.24	138.13	137.89	0.64	
19	CALLEN	136.84	137.53	137.51	0.67	within 100mm
28	TRISTAN	137.45	138.18	138.01	0.56	
28	TRISTAN	137.45	138.18	138.01	0.55	
28	TRISTAN	137.45	138.18	138.00	0.54	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding	
Street	**Depth Of Inundation (m)**
Alexander St	2.0
Bolton St	2.2
Edward St	3.0
Elizabeth St	2.0
Emily St East	1.7
Emily St West	1.5
Goulburn Valley Highway	1.2
High St	2.2
Lesley St	1.8
Moody St	1.7
Robert St	2.0
Station St	1.2
Tallarook St	1.7
Tierney St	2.0
Wallis St	2.2
William St	2.0

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

Gauge Height = 8.9m

Refer Flood Map 540207-10

Properties Affected By Flooding

House Number	Street Name	Ground Level	Floor Level	Flood Level	Depth of inundation	
					On property	Over-floor
54-56	EMILY	136.09	136.31	138.14	2.06	1.83
41	TALLAROOK	136.62	136.94	138.39	1.77	1.45
NA	BISHOP	136.27	137.56	138.40	2.13	0.83
21	ALEXANDER	137.17	138.18	138.72	1.56	0.54
MARGO	ELIZA	136.60	138.32	138.80	2.20	0.48
24	EMILY	137.10	136.94	138.50	1.40	1.56
17	HIGH	136.33	137.37	138.22	1.89	0.85
11-13	HIGH	136.36	137.00	138.24	1.88	1.24
11-13	HIGH	136.36	137.13	138.23	1.87	1.10
11	HIGH	136.87	136.70	138.17	1.30	1.47
38B	TALLAROOK	136.76	137.15	138.56	1.80	1.41
34	TALLAROOK	136.80	137.07	138.57	1.77	1.50
8	HIGH	136.40	137.26	138.26	1.86	1.00
8	HIGH	136.40	137.34	138.25	1.86	0.92
21	HIGH	136.34	136.84	138.21	1.86	1.37
50	TALLAROOK	136.80	137.48	138.49	1.69	1.01
19	HIGH	136.34	137.26	138.21	1.87	0.95
52	TALLAROOK	136.82	137.32	138.49	1.67	1.17
54	TALLAROOK	136.77	137.35	138.45	1.69	1.10
Opposite 1	EMILY	136.86	137.54	138.84	1.98	1.31
WINERY	EMILY	136.75	137.15	139.02	2.26	1.86
2	EMILY	136.58	137.62	138.74	2.16	1.12
2	HANNA	136.64	137.44	138.44	1.81	1.01
10	EMILY	136.51	137.24	138.71	2.20	1.47
10	EMILY	136.53	137.24	138.71	2.17	1.47
12	EMILY	136.76	137.48	138.68	1.92	1.20
8B	EMILY	136.67	137.56	138.73	2.06	1.17
7	EMILY	136.67	137.05	138.77	2.10	1.72
11	EMILY	136.60	138.41	138.76	2.16	0.35
13	EMILY	136.99	138.03	138.75	1.76	0.72
13	EMILY	136.99	137.27	138.75	1.76	1.48
17	EMILY	137.21	137.75	138.75	1.54	1.00
21	EMILY	136.91	137.57	138.73	1.82	1.16
14-16	EMILY	137.16	137.48	138.66	1.50	1.18
16	EMILY	137.59	137.59	138.62	1.02	1.02
20	EMILY	137.21	137.84	138.58	1.37	0.75
22	EMILY	137.24	137.84	138.56	1.32	0.73
25	EMILY	137.00	137.13	138.68	1.68	1.55
14	EMILY	137.20	137.23	138.65	1.44	1.41
20	ALEXANDER	136.88	137.48	138.69	1.80	1.20
22	ALEXANDER	136.86	137.35	138.68	1.82	1.33
29	EMILY	137.45	137.63	138.59	1.15	0.96
5	ELIZABETH	136.86	137.76	138.49	1.62	0.73
44	TALLAROOK	136.78	136.84	138.55	1.76	1.71
42	TALLAROOK	136.79	137.04	138.55	1.76	1.51
32	TALLAROOK	136.81	137.43	138.56	1.76	1.14
28	TALLAROOK	136.81	136.83	138.55	1.75	1.72
30	TALLAROOK	136.83	136.85	138.59	1.76	1.74
41	EMILY	136.68	137.60	138.39	1.72	0.80
35	EMILY	136.45	136.75	138.54	2.09	1.79

44	EMILY	136.71	136.98	138.32	1.61	1.34
38	EMILY	136.85	136.80	138.36	1.50	1.56
32	EMILY	137.05	137.52	138.44	1.39	0.92
28	EMILY	137.13	137.79	138.45	1.32	0.66
26	EMILY	137.41	137.52	138.50	1.09	0.98
57	EMILY	136.07	137.37	137.97	1.90	0.60
55	EMILY	136.32	137.18	138.07	1.75	0.89
55	EMILY	136.32	136.73	138.00	1.68	1.27
53	EMILY	136.43	136.95	138.08	1.66	1.14
51	EMILY	136.43	137.46	138.10	1.68	0.64
47	EMILY	136.49	136.89	138.27	1.78	1.38
50	EMILY	136.83	137.45	138.25	1.42	0.80
48	EMILY	136.90	137.26	138.29	1.39	1.04
23	HIGH	136.39	137.16	138.20	1.81	1.04
60 POLICE	TALLAROOK	136.56	137.35	138.32	1.75	0.97
58	TALLAROOK	136.67	137.04	138.41	1.73	1.37
56	TALLAROOK	136.83	137.07	138.46	1.64	1.40
10	HIGH	136.28	136.73	138.24	1.96	1.51
28	HIGH	136.04	137.77	138.22	2.18	0.46
30	HIGH	136.24	136.82	138.21	1.97	1.39
22	EMILY	137.15	137.84	138.54	1.39	0.71
37-39	EMILY	137.04	137.33	138.45	1.40	1.11
54-56	EMILY	136.79	137.02	138.16	1.37	1.14
54-56	EMILY	136.79	137.08	138.15	1.36	1.07
60	EMILY	136.74	136.84	138.12	1.38	1.28
64-68	EMILY	136.73	137.06	138.04	1.31	0.98
7	HANNA	135.80	136.62	137.97	2.17	1.36
70	EMILY	136.05	136.22	138.01	1.96	1.79
70	EMILY	135.92	136.61	138.00	2.08	1.39
72	EMILY	136.33	136.61	137.98	1.65	1.37
82	EMILY	136.03	136.16	137.89	1.87	1.74
80	EMILY	135.96	136.77	137.93	1.97	1.16
5	HANNA	136.02	136.55	138.12	2.11	1.57
86-90	EMILY	135.85	136.22	137.86	2.02	1.64
34	HIGH	135.90	136.57	138.20	2.30	1.64
NA	ELIZABETH	136.00	136.70	138.26	2.25	1.56
36A	HIGH	135.82	136.45	138.19	2.37	1.74
NA		136.02	137.86	138.32	2.30	0.46
14	TALLAROOK	136.72	137.20	138.59	1.87	1.39
14	TALLAROOK	136.70	137.20	138.59	1.89	1.39
14	TALLAROOK	136.69	137.20	138.59	1.90	1.39
12	TALLAROOK	136.71	137.07	138.59	1.88	1.52
5	WALLIS	136.71	137.13	138.59	1.88	1.46
8	TALLAROOK	136.68	137.09	138.59	1.91	1.50
8	TALLAROOK	136.68	136.77	138.59	1.91	1.82
39	HIGH	135.82	136.45	138.17	2.35	1.72
37	HIGH	136.26	137.11	138.17	1.92	1.07
63	EMILY	135.95	136.51	137.90	1.95	1.39
84	Station	136.70	137.38	138.51	1.81	1.13
90	STATION	137.29	137.48	138.55	1.26	1.07
96	STATION	137.21	137.32	138.56	1.35	1.24
92	STATION	137.20	137.64	138.55	1.35	0.91
12	WALLIS	136.55	137.28	138.56	2.01	1.28
12	WALLIS	136.55	137.11	138.55	1.99	1.43
114	STATION	136.98	137.17	138.57	1.59	1.40
114	STATION	136.95	137.19	138.57	1.62	1.38
100	STATION	137.10	137.24	138.56	1.46	1.32
Safeway Ca	WALLACE	136.72	137.58	138.50	1.78	0.92
32	WALLACE	135.95	136.54	138.34	2.39	1.80

30	WALLIS	136.03	137.04	138.39	2.37	1.35
38	HIGH	135.82	136.62	138.19	2.36	1.57
116	STATION	136.90	137.13	138.57	1.68	1.44
118	STATION	136.78	137.04	138.58	1.80	1.54
43	HIGH	136.19	136.65	138.17	1.98	1.51
45	HIGH	136.17	136.76	138.17	2.00	1.41
45	HIGH	136.08	136.86	138.16	2.07	1.29
5	WALLIS	136.63	136.81	138.58	1.96	1.78
5	WALLIS	136.49	137.18	138.56	2.06	1.37
5	WALLIS	136.49	137.68	138.55	2.05	0.87
29	WALLACE	136.13	136.67	138.42	2.29	1.75
37	WALLIS	135.99	136.32	138.26	2.27	1.94
39	WALLIS	136.03	137.26	138.24	2.21	0.98
41	WALLIS	136.03	137.27	138.22	2.19	0.95
43	WALLIS	135.95	136.53	138.21	2.25	1.67
32	WALLIS	135.95	136.54	138.33	2.38	1.80
36	WALLIS	135.92	137.27	138.28	2.36	1.02
34	WALLIS	136.31	137.24	138.31	1.99	1.07
34	WALLIS	136.31	137.06	138.29	1.98	1.23
38	WALLACE	136.01	136.74	138.26	2.26	1.53
44	HIGH	135.80	136.46	138.19	2.39	1.73
31	TRISTAN	136.97	137.48	138.31	1.34	0.83
33	TRISTAN	136.52	137.33	138.30	1.78	0.97
35	TRISTAN	136.43	137.86	138.31	1.88	0.45
37	TRISTAN	136.33	137.69	138.32	1.98	0.63
Safeway	WILLIAM	136.95	137.47	138.42	1.47	0.95
88	STATION	137.29	137.85	138.55	1.26	0.70
88	STATION	137.29	137.75	138.55	1.26	0.80
88	STATION	137.29	137.82	138.55	1.26	0.73
86	Station	137.53	137.70	138.55	1.02	0.85
84	Station	137.67	137.80	138.55	0.88	0.75
80	Station	137.91	137.31	138.51	0.60	1.20
80 (Rear)	Station	136.78	137.31	138.49	1.71	1.18
30	TRISTAN	136.44	137.07	138.29	1.85	1.22
32	TRISTAN	136.42	136.90	138.29	1.87	1.39
32	TRISTAN	136.23	136.92	138.29	2.06	1.37
34	TRISTAN	136.31	137.87	138.29	1.98	0.42
10	JUBILEE	137.24	137.40	137.82	0.58	0.43
4	JUBILEE	137.27	137.76	137.88	0.61	0.12
4	JUBILEE	137.27	137.72	137.86	0.59	0.14
8	JUBILEE	137.25	137.83	137.86	0.61	0.03
4	JUBILEE	136.38	136.64	137.90	1.52	1.26
9	PRESIDENT	136.97	137.59	137.98	1.01	0.39
9	PRESIDENT	136.97	137.76	137.96	0.99	0.20
7	PRESIDENT	136.98	137.49	138.04	1.05	0.55
50	WALLIS	136.02	137.19	138.08	2.07	0.89
52	WALLIS	136.05	137.35	138.03	1.98	0.68
5	PRESIDENT	137.06	136.89	138.06	1.00	1.17
3	PRESIDENT	137.12	137.03	138.09	0.97	1.06
75	HIGH	136.96	137.71	138.13	1.17	0.43
73	HIGH	136.28	137.76	138.13	1.85	0.37
36	BUTLER	136.59	136.92	138.19	1.60	1.27
34	BUTLER	136.96	137.49	138.20	1.24	0.71
32	BUTLER	137.48	138.13	138.20	0.72	0.07
58	HIGH	137.24	138.13	138.15	0.91	0.02
54	HIGH	136.81	137.35	138.15	1.34	0.81
54	HIGH	136.81	136.98	138.16	1.34	1.17
52	HIGH	136.31	136.73	138.16	1.85	1.44
42	HIGH	135.93	137.21	138.18	2.25	0.97

23	BUTLER	137.42	137.88	138.21	0.79	0.34
25	BUTLER	136.92	136.88	138.22	1.29	1.33
27	BUTLER	136.57	137.36	138.22	1.64	0.86
29	BUTLER	136.30	137.12	138.22	1.92	1.10
31	BUTLER	136.19	137.21	138.21	2.02	1.00
33	BUTLER	136.11	136.87	138.21	2.10	1.34
NA	GV Highway	136.39	136.92	137.60	1.21	0.68
15-17	CALLEN	137.08	136.76	137.80	0.72	1.04
15	CALLEN	137.11	136.90	137.79	0.68	0.89
19	CALLEN	136.84	137.53	137.75	0.92	0.23
21	CALLEN	136.59	137.02	137.74	1.14	0.71
1-5	GV Highway	136.13	136.87	137.36	1.22	0.48
8	ALEXANDRA	137.10	137.86	138.70	1.60	0.84
43	EMILY	136.59	137.01	138.34	1.75	1.33
43	EMILY	136.60	137.01	138.35	1.75	1.34
38	EMILY	136.91	137.24	138.36	1.45	1.12
36	EMILY	136.98	137.28	138.41	1.43	1.13
34	EMILY	137.02	137.43	138.41	1.40	0.98
29	HIGH	136.22	136.84	138.19	1.97	1.35
35	BUTLER	135.96	136.08	138.21	2.25	2.13
18	TALLAROOK	136.74	137.09	138.60	1.86	1.51
39	TALLAROOK	136.84	137.48	138.59	1.75	1.11
35	TALLAROOK	136.92	137.35	138.60	1.69	1.26
33	TALLAROOK	136.97	137.28	138.60	1.64	1.33
29	TALLAROOK	136.95	137.65	138.61	1.66	0.95
27	TALLAROOK	136.97	137.58	138.61	1.64	1.03
21	TALLAROOK	136.89	138.07	138.62	1.73	0.55
19	TALLAROOK	136.91	137.65	138.62	1.71	0.97
17	TALLAROOK	136.85	137.37	138.62	1.77	1.25
15	TALLAROOK	136.79	137.61	138.62	1.83	1.01
11	TALLAROOK	136.70	137.14	138.62	1.92	1.49
9	TALLAROOK	136.72	137.14	138.62	1.90	1.48
3-7	WALLACE	136.67	137.13	138.61	1.94	1.49
3-7	TALLAROOK	136.68	137.13	138.61	1.93	1.48
6	ALEXANDER	136.84	137.87	138.70	1.86	0.83
12	ALEXANDER	137.13	138.24	138.70	1.57	0.45
14	ALEXANDER	137.13	137.45	138.69	1.56	1.25
16	ALEXANDER	136.88	137.38	138.68	1.80	1.31
18	ALEXANDER	136.89	137.59	138.69	1.80	1.10
24	ALEXANDER	136.77	137.54	138.68	1.91	1.14
26	ALEXANDER	136.70	137.69	138.67	1.97	0.98
32	ALEXANDER	136.49	137.40	138.66	2.17	1.26
34	ALEXANDER	136.54	137.40	138.65	2.12	1.26
36	ALEXANDER	136.60	138.18	138.65	2.06	0.48
36	TALLAROOK	136.85	136.89	138.57	1.73	1.69
32	TALLAROOK	136.81	137.13	138.56	1.76	1.44
23	TALLAROOK	136.92	137.41	138.62	1.69	1.21
23	TALLAROOK	136.92	137.42	138.63	1.71	1.21
23	TALLAROOK	136.92	137.40	138.64	1.71	1.24
23	TALLAROOK	136.92	137.51	138.61	1.69	1.10
23	TALLAROOK	136.92	137.49	138.63	1.70	1.13
23	TALLAROOK	136.92	137.49	138.63	1.71	1.15
23	TALLAROOK	136.92	137.40	138.64	1.72	1.24
31	HIGH	136.06	136.37	138.13	2.07	1.76
4	HIGH	136.40	137.09	138.28	1.88	1.19
12	HIGH	136.28	136.73	138.28	2.01	1.55
28	TRISTAN	137.45	138.18	138.29	0.83	0.10
28	TRISTAN	137.45	138.18	138.28	0.83	0.10
28	TRISTAN	137.45	138.18	138.27	0.81	0.09

45	WALLIS	135.76	136.27	138.12	2.35	1.84
45	WALLIS	135.81	136.27	138.09	2.28	1.82
45	WALLIS	135.73	136.23	138.08	2.35	1.85
45	WALLIS	135.77	136.23	138.02	2.24	1.78
6	INDUSTRIAL	136.24	136.70	138.08	1.84	1.38
7	INDUSTRIAL	136.11	136.67	138.08	1.98	1.42
1-3	EMILY	137.21	137.14	138.91	1.70	1.77
25	EMILY	137.12	137.99	138.86	1.75	0.88
2	TIERNEY	136.19	137.43	138.90	2.71	1.47
4	TIERNEY	136.77	137.39	138.91	2.14	1.52
NA	EDWARD	137.18	137.91	138.85	1.67	0.95
NA	EDWARD	137.12	137.92	138.82	1.70	0.90
SWIMMING P	LESLEY	136.53	136.97	138.69	2.16	1.72
KINGS	PARK	136.51	137.44	138.68	2.17	1.24
Kings	Park	136.58	137.41	138.43	1.85	1.02
NA	TIERNEY	137.07	137.56	138.94	1.87	1.38
30	BUTLER	138.04	138.89	138.18	0.14	
21	BUTLER	138.12	138.97	138.22	0.10	

NOTES: NA indicates that the property in question does not have a street number.

Key Access Roads Effected By Flooding

Street	Depth Of Inundation (m)
Alexander St	2.3
Bolton St	2.5
Edward St	3.2
Elizabeth St	2.3
Emily St East	2.0
Emily St West	1.8
Goulburn Valley Highway	1.5
High St	2.5
Lesley St	2.1
Moody St	2.0
Robert St	2.3
Station St	1.5
Tallarook St	2.0
Tierney St	2.3
Wallis St	2.4
William St	2.2

NOTES:
- Emily St East is from intersection with Tallarook St to Whiteheads Creek.
- Emily St West is from intersection with Tallarook St to Manse Hill Bridge Rd.
- Goulburn Valley Highway is Emily St east of Whiteheads Creek.
- Depth of inundation is taken as the MAXIMUM level of water over the road at any point along the centerline of that section of road.
- Roads with no Depth of Inundation will have negligible to no flooding.

APPENDIX C2 – KILMORE
COMMUNITY FLOOD EMERGENCY MANAGEMENT PLAN

1. Overview

Kilmore is situated on the northern slopes and near the top of the Great Dividing Range approximately 75km north of Melbourne and around 45km south of Seymour. The town is centred around Sydney Street (the Northern Highway) which runs parallel to Kilmore Creek, the main drainage flow path for the town (see Figures C2-1 & C2-2). An extensive underground pipe and surface drainage network drains into Kilmore Creek.

Kilmore township sits across the upper reaches of Kilmore Creek, Ryans Creek and Hamilton Creek (see Figure C2-1). The catchments are quite small at 34.2km^2, 12.4km^2 and 9.2km^2 respectively. There are a number of small private dams and retarding basins within the catchments. The three creeks flow in a generally northerly direction and come together as Kilmore Creek downstream from Kilmore. They then join with Sugarloaf Creek. Sugarloaf Creek joins with Sunday Creek a little upstream of its confluence with the Goulburn River a short distance downstream from Seymour. Flows continue in a northerly direction past Shepparton and into the Murray River.

Kilmore has a population of around 7,000. The town is subject to substantial development pressures and is expanding into the adjacent rural areas that currently comprise low density residential / rural living areas and farm land used mainly for grazing.

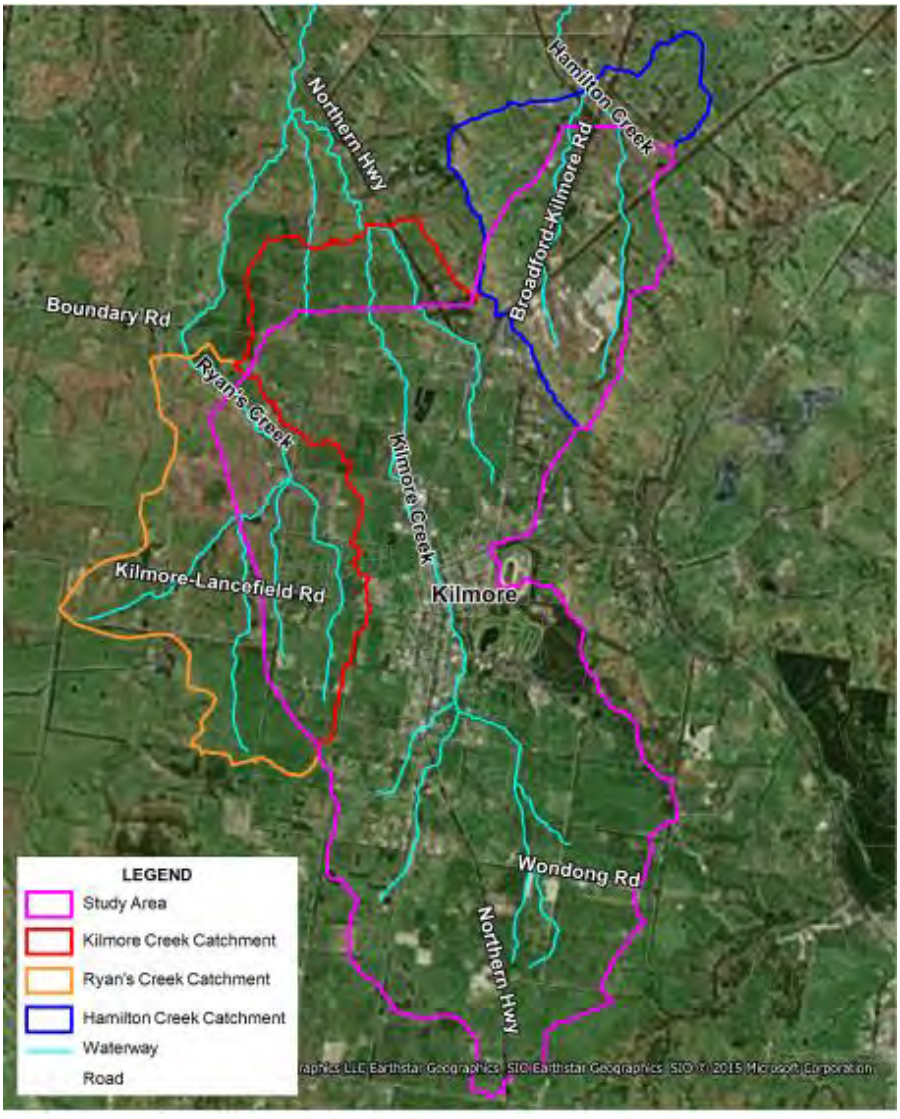


Figure C2-1: Kilmore and the three catchments

Extracted from the Kilmore Flood Mapping and Intelligence Study reports (WBM, 2017)

Figure C2-2: Various parts of Kilmore Creek (courtesy of WBM, 2014 & 2016)

2. Overview of Flooding and Consequences

2.1 Flood Characteristics and Impacts

There are a number of farm dams in the upper reaches of the Kilmore Creek catchment that provide sufficient storage to significantly influence flood extents and levels along the creek. If dam levels are low at the start of a rainfall event, runoff volumes and thus the likelihood of flooding are reduced. Conversely, if dams are full at the start of a heavy rain event, the likelihood or severity of flooding is increased.

There are also a good number of structures along Kilmore Creek upstream of and within the town that influence flood behaviour (e.g. culverts at road crossings, etc). These generally cause some ponding on the upstream side. During larger events, a number of roads are overtopped at culvert locations. If any of the structures / culverts become (partially) blocked during an event, flood extents and impacts increase on the upstream side while reducing on the downstream side. This can result in a road being overtopped unexpectedly during smaller events.

During a 20% AEP (5-year ARI) event, flows are generally contained within the banks of Kilmore Creek and the immediate floodplain upstream of Wandong Road. While minor breakaways begin to occur between Wandong Road and Harrington Drive at the southern end of town, they are generally confined to drainage channels and are typically shallow. The grounds of the Childcare and Kindergarten near the corner of Crimmins Way and Sutherland Street begin to get wetted. Shallow inundation, again from breakaway flows, is also likely in the industrial areas immediately downstream from Harrington Drive either side of the Northern Highway / Powlett Street. The lake in the Kilmore Golf Course expands and extends towards the Cricket and Recreation Reserve and to the other side of Hunts Road on the southern boundary of the Kilmore Racecourse. Flows are well contained through town. The Caravan Park remains dry. Further to the north after the Creek flows under the Northern Highway, shallow inundation up to 250mm deep occur in the industrial estate south of Willowmavin Road.

Up to the 10% AEP (10-year ARI) event, flood waters remain largely contained within the creek channel and designated floodway but with increasing depths. Similarly, flows in drainage lines are wider and deeper with the ones between Fitzroy Street and Kilmore Creek and in the block bounded by Bourke Street, Melbourne Street, Union Street and the creek near the centre of town likely to be noticeably wider and a little deeper. Inundation in the industrial estate at the southern end of town (i.e. downstream from Harrington Drive either side of the Northern Highway / Powlett Street) and also at the northern end of town (i.e. north after the Creek flows under the Northern Highway near the Caravan Park), also becomes a little deeper and more extensive. The Kilmore Golf Course lake continues to expand with water beginning to encroach onto the Cricket and Recreation Reserve and extending further into the Kilmore Racecourse.

The 5% AEP (20-year ARI) event is likely to begin wetting the grounds of the Kilmore Childcare Centre near the corner of White Street and Rutledge Street. Larger floods cause more extensive but not much deeper flooding. In addition, the new development in South Kilmore to the southeast of the Tootle Street and Graves Street intersection is likely to experience increasing patches of shallow flooding. These areas of flooding expand as flood severity increases but maximum depths remain around 250mm or so.

From about the 2% AEP (50-year ARI) event, Victoria Parade and Andrew Street are likely to be wetted with more severe events resulting in deeper faster flowing water and more hazardous conditions. The start of flooding of land around the Kilmore Community Centre on Victoria Parade is likely. In addition, the car park for the Kilmore Maternal and Child Health Centre on the corner of Skehan Place and White Street will begin to get wet. Larger floods will progressively inundate the car park to greater depth. Recreational facilities along Kilmore Creek will also be threatened by this and larger floods.

Above the 1% AEP (100-year ARI) event, flows begin to travel northwards (towards town) alongside the Northern Highway from around Mcivors Road at the southern end of town. Flows also pond on the upstream (southern) side of Lumsden Street. The block bounded by Bourke Street, Melbourne Street, Union Street and the creek will be flooded in parts to a depth of up to around 250mm or so. The rear of properties on the eastern side of Sydney Street between Foote Street and Clarke Street will be inundated to varying depths. The Kilmore Council and Library Centre car park near the corner of Patrick Street and Bourke Street will start to get wet. The Northern Highway from Mitchell Street northwards to beyond Willowmavin Road will also be inundated. Part of the Caravan Park closest to the Northern Highway will be inundated to around 250mm or so and the industrial estate on the other side of the Highway will be flooded to up to 1 metre in places.

In general, as floods become larger through Kilmore, flood extents expand bit by bit but maximum flood depth outside the creek and drainage channel alignments remain around 250mm or a little deeper. Hazard remains low. The exception to this is in the main flow channels where depths are more than a metre and both velocity and hazard are high.

The Police Station, CFA Fire Station, SES Unit shed, Ambulance Station, Telephone Exchange, Kilmore & District Hospital and adjacent Aged Care facilities (i.e. Dianelle Hostel & Caladenia Nursing Home) and Kilmore Council & Library Centre all remain dry with pedestrian and vehicular access. The hospital helipad also remains flood-free.

2.2 Warning Times

Kilmore Creek is subject to flash flooding. Flows begin to rise quickly soon after the start of heavy rain, particularly if the catchment is wet and the many local farm dams are full. Big floods come and go within about 12 hours, smaller floods pass a little quicker (i.e. as quickly as 6 hours).

In summary:

- Flows begin to increase in town around 45 minutes to an hour after the start of heavy rain.
- Peak flow occurs around 3 to 6 hours after the start of rise, with the bigger floods taking longer to reach peak flow.
- Flows drop off almost as quickly as they rise: large floods will rise, peak and return to normal flow within about 12 hours.

While both **Hamilton Creek** and **Ryans Creek** begin to rise around the same time as Kilmore Creek, the peak in Hamilton Creek occurs within about 60 to 90 minutes of the start of rise. The time to rise to peak on Ryans Creek is similar to Kilmore Creek. Peak flow in both Hamilton Creek and Ryans Creek is about 35% of the peak flow in Kilmore Creek.

2.3 1% AEP Design Event Hydrographs

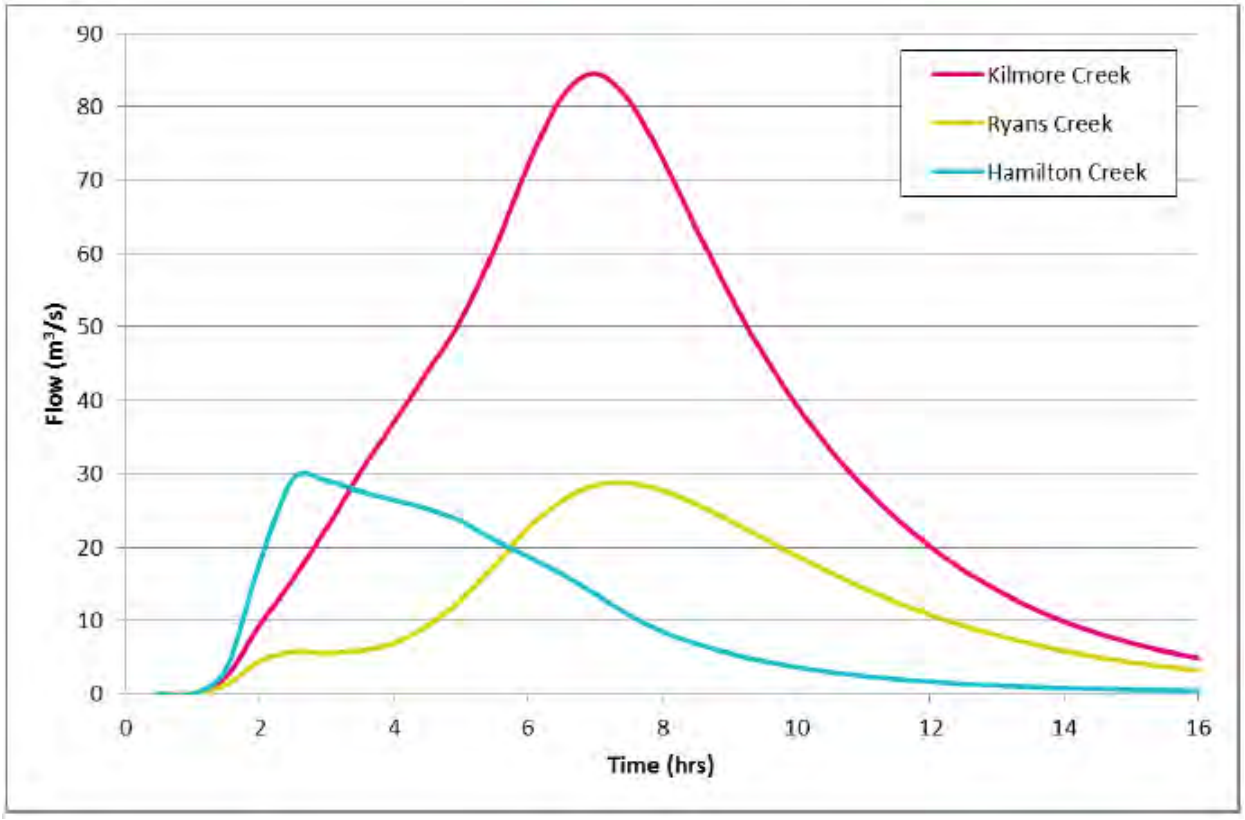


Figure C2-3: 1% AEP design event hydrographs (WBM, 2017)

2.4 Areas Affected

Guidance on where flooding is likely to occur is available from the suite of flood extent and other maps delivered by the WBM (2017) study. These maps are available as layers through FloodZoom. They are also included in the study reports, available as documents (same as this MFEP) through FloodZoom.

Maps have been produced for all design events analysed:

- 20% AEP or 1 in 5 year ARI event
- 10% AEP or 1 in 10 year ARI event
- 5% AEP or 1 in 20 year ARI event
- 20% AEP or 1 in 50 year ARI event
- 1% AEP or 1 in 100 year ARI event
- 0.5% AEP or 1 in 200 year ARI event
- 0.2% AEP or 1 in 500 year ARI event
- 0.1% AEP or 1 in 1000 year ARI event
- The probable maximum precipitation (PMP) event

Maps have **not** been included at Appendix F of this document due to image resolution and document size issues.

2.5 Properties Affected

2.5.1 Summary

In very broad terms, properties backing onto the creek corridor and onto drainage lines and channels as well as those near creek and drainage line crossings, particularly on the upstream side, are the most at risk from flooding. While the expected depth of flooding on each property has not been determined and acknowledging that some properties slope quite steeply to the creek bed, the following criteria were applied as part of the WBM (2017) study in order to identify those properties listed in Section 7.5 as likely to be flooded:

- Residential – the maximum depth on the property is greater than 150mm plus more than 50% of the block is inundated; and.
- Commercial / Industrial – the maximum depth on the property is greater than 100mm plus more than 33% of the block is inundated.

Floor levels have not been surveyed in Kilmore with the result that buildings likely to be flooded over-floor have not been identified. The risk of over-floor flooding is however thought to be small.

Around 200 properties are at risk of inundation during a severe flood.

2.5.2 Detailed List

In addition to a summary of the number of properties likely to be flooded at Kilmore, a detailed list of properties expected to experience over-ground flooding is provided in Section 7.5 of this Appendix. This list is not fully complete as a number of properties subject to some flooding were not sufficiently identified. While they have been included in the count in the summary table, they have not been included in the detailed table as an unidentified property cannot be acted on: there is no value in including them in the table.

It is strongly recommended that the list is used in conjunction with the flood inundation and related maps delivered by WBM (2017). Refer to FloodZoom.

2.5.3 Update of List of Properties Likely to be Flooded

The list of properties likely to be flooded should be reviewed and updated within twelve (12) weeks of a flood. Update should occur with information collected as part of post-flood information recording activities and as may be collected as a consequence of the event debrief. Information on the collective experience of the IMT should also be gathered and utilised.

2.6 Hazard

In addition to flood extent and depth mapping, WBM (2017) delivered hazard mapping (see FloodZoom).

The methodology presented in the Runoff from Urban Areas book of Australian Rainfall and Runoff: A Guide to Flood Estimation (Ball, J (Ed) 2015) based on hazard for children criteria. Mapped hazard is defined in terms of the depth and velocity-depth product:

- Safe – velocity x depth equal to 0.0m2/s (no flooding;
- Low hazard – velocity x depth less than 0.4m2/s if depth is less than 0.5m and velocity is less than 3m/s;
- Significant Hazard - velocity x depth less than 0.6m2/s if depth is less than 0.5m and velocity is less than 3m/s;
- Extreme hazard - velocity x depth greater than 0.6m2/s, depth greater than 0.5m and / or velocity greater than 3m/s.

2.7 Isolation

The main access roads for Kilmore are the:

- Northern Highway to the south and north (and northeast via Broadford and the Hume Freeway);
- Kilmore – Lancefield Road to the west;
- Kilmore East Road (Union Street) to the east and southeast.

The WBM (2017) study indicates that these and other roads are not flooded and rendered impassable by events up to the 2% AEP (50-year ARI) event. However, water does pond along the upstream edge of roads and a blockage at any of the many structures that carry flows under roads in the catchment may cause a road to be overtopped with attendant loss of access.

Floods around and larger than the 1% AEP event are likely to inundate and maybe cause closure of the Northern Highway at two locations:

- From Mitchell Street northwards to beyond Willowmavin Road; and
- At the southern end of town a little to the north of Toddle Street.

2.8 Essential Infrastructure

Essential infrastructure in Kilmore including the Police Station, CFA Fire Station, SES Unit shed, Ambulance Station, Telephone Exchange, and Kilmore & District Hospital, adjacent Aged Care facilities (i.e. Dianelle Hostel & Caladenia Nursing Home) and helipad all remain dry with pedestrian and vehicular access.

Very big floods are likely to cause inundation and perhaps closure of the Northern Highway from Mitchell Street northwards to beyond Willowmavin Road.

2.9 Town Drainage and Risks

Local stormwater runoff poses a risk to property within the Kilmore township. In the older parts of town in particular, the drainage system is not as complete or consistent as might be expected. Capacity also appears to be a periodic issue. The result is that local nuisance flooding along the side of roads and within some properties occurs quite frequently from low intensity rain events.

2.10 Impact of Kilmore Bypass

While final alignment of the proposed Kilmore Bypass has not been determined as at the date of this MFEP, three options have been investigated. All options result in some afflux on the upstream side of creek crossings. Impact on flood timings, extents, levels and characteristics will be minor at best and thus undetectable at downstream locations.

It was noted during conduct of the Kilmore Flood Mapping and Intelligence Study (WBM, 2017) that opportunity existed to implement flow retarding measures at creek crossings in order to reduce flood risk through Kilmore. No decisions had been made on such measures as at the date of this MFEP.

3. Flood History

Kilmore has not flooded in recent years: there is no information on past floods and no stream gauge records.

4. Flood Mitigation

Flood intelligence MUST have regard for changes within the catchment that modify likely flood behaviour (e.g. mitigation works that reduce the severity of flood risk).

The Kilmore Flood Mapping and Intelligence Study (2017) considered a number of options for reducing the extent and depth of flooding at Kilmore and also for reducing flood risk. As at the date of this document, none of the works investigated had been implemented.

5. Flood Impacts and Required Actions

Refer to the following Flood Intelligence Card.

6. Command, Control and Coordination

The Command, Control and Coordination arrangements in this MFEP will be as detailed in the EMMV.

All flood response activities within Mitchell Shire will be under the Control of the VICSES Regional Officer / Incident Controller.

An **EMT** may be established by the Incident Controller in accordance with the EMMV.

An **ICC** may be established by the Control Agency (i.e. VICSES) for its command and control functions in response to flood events within the Municipality. It will be operated in accordance with VICSES arrangements.

When established, the ICC for Mitchell Shire along with any Divisional or Sector Commands will be located as detailed in the VICSES North East Region Flood Emergency Plan and be advised by VICSES to relevant stakeholders dependant on the extent and severity of the flood event.

The establishment and operation of the **MECC** will be in accordance with and as detailed within the MEMP.

7. Flood Intelligence, Action Table and Indicative Flood / No Flood Guidance Tool for Kilmore

7.1 Introduction

The BoM does not currently provide flood forecasts for Kilmore Creek or for Kilmore. All actions must therefore be driven by rainfall and / or water level observations.

There are no water level / flood gauges within the Kilmore Creek catchment.

The BoM collects and records rainfall at a number of locations within or close to the Kilmore Creek catchment. Data from a number of these sites are available from the BoM website at intervals ranging from around 30 minutes to daily. Rainfall data is available at around 30 minute intervals from the AWS at Kilmore Gap (around 9.3km to the south of Kilmore and close to the headwaters of Kilmore Creek) and, during heavy rain events, at hourly (or more frequent intervals) from rain gauges at Pine Creek at Broadford (405290 – around 8.5km to the east of Kilmore) and at Willowmavin (405836 – around 9.5km to the northwest of Kilmore).

Users of the flood intelligence card should consider rainfall depth and rates at locations in the vicinity of Kilmore and across the upper catchment and use the Indicative Flood / No Flood guidance tool at Section 7.3 in order to better appreciate the likely severity of flooding and its impacts within the town. Instructions for use of the tool are also provided in Section 7.3.

Flood impacts described in the following tables relate to creek flooding and may be exacerbated by local stormwater. It should be noted that local impacts, or impacts in excess of those indicated, may occur. Similarly, local increases in flood levels and impacts may result from local factors such as blockages at bridges and culverts, and from obstructions to overland flows such as works, channels, fences, buildings and the like.

Notes:

1. While flood intelligence cards provide guidance on the relationship between flood magnitude and flood consequences, 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. Further, the hydrologic and hydraulic modelling that underpins much of the intelligence detailed below is informed by a number of assumptions and approximations that are unlikely to be replicated exactly during a flood event. Actual impacts under similar rainfall conditions are therefore expected to be similar but may not be exactly the same: there are likely to be some differences. More details about flood intelligence and its use can be found in the Australian Emergency Management Manuals flood series at http://www.ema.gov.au and in particular in Manual 20 “Flood Preparedness”.
2. All rainfalls, impacts and actions listed in the following flood intelligence card and graph may need to be adjusted to better reflect experience.

7.2 Flood Intelligence Card

Observed Rainfall (see graph)	Approx AEP of flood	Consequence / Impact	Action (to be completed – DRAFT ONLY) Actions may include (but not limited to) issue of warnings, closure of roads, sandbagging, etc
USING THIS INTELLIGENCE CARD. Obtain rainfall data and use the indicative flood guidance tool to determine the approximate flood severity. Consider the appropriate flood inundation map. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that for operational and other reasons, some actions may need to be initiated in an order that is different from their relative placement in this table.			
Catchment wetness is a key consideration for flooding along Kilmore Creek. The many farm dams around Kilmore provide sufficient storage to significantly influence flood extents and levels.			
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERC and MERO at Mitchell Shire. Note time available – see below.			
While not likely to be required in Kilmore, it is important that any decision to Evacuate is made early based on available intelligence and local knowledge.			
Due to existing flow paths, it is likely that water will flow across and encroach on a number of properties (see blue shading in the property table below). Over-floor flooding is not expected.			
Partial or full blockage of structures (culverts, bridges) along Kilmore Creek will increase upstream ponding and may cause unexpected overtopping of roads and wetting of normally dry areas.			
Heavy rain on wet catchment		The capacity of the town stormwater drainage system will be exceeded. Local nuisance flooding will occur along the side of roads and within some properties. No over-floor flooding expected.	o Consider deploying "water over road signs" at hot spots. o Monitor rainfall and water levels. o Use the indicative flood / no flood tool to develop an appreciation of the likely scale of the flood event.
~30mm in 2 hours to ~45mm in 6 hours	20% AEP (5-yr ARI)	o Flows generally contained within the banks of Kilmore Creek and the immediate floodplain upstream of Wandong Road. o Minor breakaways begin to occur between Wandong Road and Harrington Drive at the southern end of town. o The grounds of the Childcare and Kindergarten near the corner of Crimmins Way and Sutherland Street begin to get wetted. o Shallow inundation likely in the industrial areas immediately downstream from Harrington Drive either side of the Northern Highway / Powlett Street. o The Kilmore Golf Course lake expands and extends towards the Cricket and Recreation Reserve and to the other side of Hunts Road on the southern boundary of the Kilmore Racecourse.	o Monitor rainfall and water levels. o Use the indicative flood / no flood tool to develop an appreciation of the likely scale of the flood event. o Refer to indicated maps and impacts. o Implement appropriate response actions that may include deploying "water over road" signs.

Observed Rainfall (see graph)	Approx AEP of flood	Consequence / Impact	Action (to be completed – DRAFT ONLY) Actions may include (but not limited to) issue of warnings, closure of roads, sandbagging, etc
USING THIS INTELLIGENCE CARD. Obtain rainfall data and use the indicative flood guidance tool to determine the approximate flood severity. Consider the appropriate flood inundation map. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that for operational and other reasons, some actions may need to be initiated in an order that is different from their relative placement in this table.			
Catchment wetness is a key consideration for flooding along Kilmore Creek. The many farm dams around Kilmore provide sufficient storage to significantly influence flood extents and levels.			
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERC and MERO at Mitchell Shire. Note time available – see below.			
While not likely to be required in Kilmore, it is important that any decision to Evacuate is made early based on available intelligence and local knowledge.			
Due to existing flow paths, it is likely that water will flow across and encroach on a number of properties (see blue shading in the property table below). Over-floor flooding is not expected.			
Partial or full blockage of structures (culverts, bridges) along Kilmore Creek will increase upstream ponding and may cause unexpected overtopping of roads and wetting of normally dry areas.			
		o Caravan Park remains dry. o Shallow inundation up to 250mm deep occur in the industrial estate south of Willowmavin Road. o Around 46 properties with water on them. Over-floor flooding unlikely.	
~35mm in 2 hours to ~55mm in 6 hours	20% AEP (5-yr ARI)	o Flood waters remain largely contained within the creek channel and designated floodway but with increasing depths. o Flows in drainage lines are wider and deeper with the ones between Fitzroy Street and Kilmore Creek and in the block bounded by Bourke Street, Melbourne Street, Union Street and the creek near the centre of town likely to be noticeably so. o Inundation in the industrial estates at the southern and northern ends of town a little deeper and more extensive. o The Kilmore Golf Course lake continues to expand with water beginning to encroach onto the Cricket and Recreation Reserve and extending further into the Kilmore Racecourse. o Around 59 properties with water on them. Over-floor flooding unlikely.	o Continue to monitor rainfall and water levels. o Continue to use / maintain plot on the indicative flood / no flood tool in order to further develop appreciation of likely scale of flood event. o Refer to indicated maps and impacts. o Implement appropriate response actions that may include deploying “water over road” signs.

Observed Rainfall (see graph)	Approx AEP of flood	Consequence / Impact	Action (to be completed – DRAFT ONLY) Actions may include (but not limited to) issue of warnings, closure of roads, sandbagging, etc
USING THIS INTELLIGENCE CARD. Obtain rainfall data and use the indicative flood guidance tool to determine the approximate flood severity. Consider the appropriate flood inundation map. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that for operational and other reasons, some actions may need to be initiated in an order that is different from their relative placement in this table.			
Catchment wetness is a key consideration for flooding along Kilmore Creek. The many farm dams around Kilmore provide sufficient storage to significantly influence flood extents and levels.			
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERC and MERO at Mitchell Shire. Note time available – see below.			
While not likely to be required in Kilmore, it is important that any decision to Evacuate is made early based on available intelligence and local knowledge.			
Due to existing flow paths, it is likely that water will flow across and encroach on a number of properties (see blue shading in the property table below). Over-floor flooding is not expected.			
Partial or full blockage of structures (culverts, bridges) along Kilmore Creek will increase upstream ponding and may cause unexpected overtopping of roads and wetting of normally dry areas.			
~40mm in 2 hours to ~60mm in 6 hours	5% AEP (20-yr ARI)	o Grounds of the Kilmore Childcare Centre near the corner of White Street and Rutledge Street likely to begin to get wet. o New development in South Kilmore to the southeast of the Tootle Street and Graves Street intersection likely to experience increasing patches of shallow flooding. These areas of flooding expand as flood severity increases but maximum depths remain around 250mm or so. o Around 85 properties with water on them. Over-floor flooding unlikely. o Larger floods cause more extensive but not much deeper flooding.	o Continue to monitor rainfall and water levels. o Continue to use / maintain plot on the indicative flood / no flood tool in order to further develop appreciation of likely scale of flood event. o Refer to indicated maps and impacts. o Implement appropriate response actions that may include deploying “water over road” signs.
~50mm in 2 hours to ~75mm in 6 hours	2% AEP (50-yr ARI)	o Victoria Parade and Andrew Street are likely to be wetted with more severe events resulting in deeper faster flowing water and more hazardous conditions. o Likely to see start of flooding of land around the Kilmore Community Centre on Victoria Parade. o Kilmore Maternal and Child Health Centre car park on the corner of Skehan Place and White Street will begin to get wet. Larger floods will progressively inundate the car park to greater depth.	o Continue to monitor rainfall and water levels. o Continue to use / maintain plot on the indicative flood / no flood tool in order to further develop appreciation of likely scale of flood event. o Refer to indicated maps and impacts – check / confirm road conditions and property flooding. o Check access to / from Caravan Park and Industrial Estates.

Observed Rainfall (see graph)	Approx AEP of flood	Consequence / Impact	Action (to be completed – DRAFT ONLY) Actions may include (but not limited to) issue of warnings, closure of roads, sandbagging, etc
USING THIS INTELLIGENCE CARD. Obtain rainfall data and use the indicative flood guidance tool to determine the approximate flood severity. Consider the appropriate flood inundation map. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that for operational and other reasons, some actions may need to be initiated in an order that is different from their relative placement in this table.			
Catchment wetness is a key consideration for flooding along Kilmore Creek. The many farm dams around Kilmore provide sufficient storage to significantly influence flood extents and levels.			
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERC and MERO at Mitchell Shire. Note time available – see below.			
While not likely to be required in Kilmore, it is important that any decision to Evacuate is made early based on available intelligence and local knowledge.			
Due to existing flow paths, it is likely that water will flow across and encroach on a number of properties (see blue shading in the property table below). Over-floor flooding is not expected.			
Partial or full blockage of structures (culverts, bridges) along Kilmore Creek will increase upstream ponding and may cause unexpected overtopping of roads and wetting of normally dry areas.			
		o Recreational facilities along Kilmore Creek will be threatened by this and larger floods. o Around 138 properties with water on them. Over-floor flooding unlikely.	o Implement appropriate response actions that may include deploying “water over road” signs.
~60mm in 2 hours to ~80mm in 6 hours	1% AEP (100-yr ARI)	o Flows beginning to travel northwards alongside the Northern Highway from around Mcivors Road at the southern end of town. o Flows ponding on the upstream (southern) side of Lumsden Street. o The block bounded by Bourke Street, Melbourne Street, Union Street and the creek will be flooded in parts to a depth of up to around 250mm or so. o The rear of properties on the eastern side of Sydney Street between Foote Street and Clarke Street will be inundated to varying depths. o The Kilmore Council and Library Centre car park near the corner of Patrick Street and Bourke Street will start to get wet. o The Northern Highway from Mitchell Street northwards to beyond Willowmavin Road will be inundated.	o Continue to monitor rainfall and water levels. o Continue to use / maintain plot on the indicative flood / no flood tool in order to further develop appreciation of likely scale of flood event. o Refer to indicated maps and impacts – check / confirm road conditions and property flooding. o Check access to / from Caravan Park and Industrial Estates. o Implement appropriate response actions that may include deploying “water over road” signs.

Observed Rainfall (see graph)	Approx AEP of flood	Consequence / Impact	Action (to be completed – DRAFT ONLY) Actions may include (but not limited to) issue of warnings, closure of roads, sandbagging, etc
USING THIS INTELLIGENCE CARD. Obtain rainfall data and use the indicative flood guidance tool to determine the approximate flood severity. Consider the appropriate flood inundation map. Review all consequences and actions in this table, from the first row down to the approximate expected severity of flooding. Initiate all actions in a logical sequence. Note that for operational and other reasons, some actions may need to be initiated in an order that is different from their relative placement in this table.			
Catchment wetness is a key consideration for flooding along Kilmore Creek. The many farm dams around Kilmore provide sufficient storage to significantly influence flood extents and levels.			
If response has been initiated locally, the first action should be a call to VICSES, followed by a call to the MERC and MERO at Mitchell Shire. Note time available – see below.			
While not likely to be required in Kilmore, it is important that any decision to Evacuate is made early based on available intelligence and local knowledge.			
Due to existing flow paths, it is likely that water will flow across and encroach on a number of properties (see blue shading in the property table below). Over-floor flooding is not expected.			
Partial or full blockage of structures (culverts, bridges) along Kilmore Creek will increase upstream ponding and may cause unexpected overtopping of roads and wetting of normally dry areas.			
		o Part of the Caravan Park closest to the Northern Highway will be inundated to around 250mm or so. Access may be compromised. o The industrial estate on the other side of the Northern Highway will be flooded to up to 1 metre in places. o Around 215 properties with water on them. Over-floor flooding unlikely.	
A little above the 100-year ARI line on the indicative flood / no flood tool	0.5% AEP (200yr ARI)	o As floods become larger through Kilmore, flood extents expand bit by bit but maximum flood depth outside the creek and drainage channel alignments remain around 250mm or a little deeper. Hazard remains low. The exception to this is in the main flow channels where depths are more than a metre and both velocity and hazard are high. o Around 275 properties with water on them.	o Continue to monitor rainfall and water levels. o Maintain plot on indicative flood / no flood tool in order to further develop appreciation of likely scale of flood event. o Refer to indicated maps and impacts – check / confirm road conditions and property flooding. o Check access to / from Caravan Park and Industrial Estates. o Continue to implement appropriate response actions.

7.3 Indicative Flood / No flood Guidance Tool for Kilmore

7.3.1 Introduction

The BoM does not currently provide flood forecasts for Kilmore Creek or for Kilmore. All flood response actions must therefore be driven by rainfall and / or water level observations. There are no gauges within the Kilmore Creek catchment to provide an indication of the onset of flooding or to provide historic data that will enable a comparison of past flood events.

7.3.2 Indicative Flood Behaviours

In very general terms, the approximate time between start of heavy rain and the start of rise in Kilmore Creek is around 45 to 60 minutes on a wet catchment and longer on a dry catchment. Levels fall at around the same rate as they rise.

7.3.3 Using the Indicative Flood / No flood Guidance Tool

In the lead up to a flood event

Rainfall as reported by the BoM AWS at Kilmore Gap or an average of the rainfall recorded at the rain gauges at Broadford and Willowmavin should be used to determine an appropriate rainfall depth for use in the Indicative Flood / No Flood guidance tool provided below, unless data from alternative locations closer to Kilmore is available at 30 minute or more frequent intervals.

The guidance tool has been constructed to guide response to creek flooding rather than stormwater flooding with a wet catchment and the many farm dams full. If the catchment is very dry, **the curve one level down** should be used as guidance on the likely severity of flooding. The curve identifies the appropriate flood extent and depth mapping together with parts of the flood information card at Section 7.2 above that should be used to inform flood response.

If the catchment is dry and / or rain extends over more than about 12 hours, the guidance tool will tend to over-estimate the likelihood of flooding.

Using the Tool

Unless there are unusual circumstances, actions as per the Flood Intelligence Card should be initiated as soon as the guidance tool suggests flooding is likely. Response can be escalated if the tool indicates an increase in the expected severity of flooding.

Discounting the early lighter rain from consideration (i.e. begin calculating rainfall depth from start of heavy rain), plot rainfall depth against time on a copy of the tool. A new plot should be started on receipt of data for each new time step and existing plots should be extended using the new data. Assess the likelihood and expected severity of flooding from the curves with due regard for included notes. A crossing of the curves by any of the plots indicates that flooding is likely.

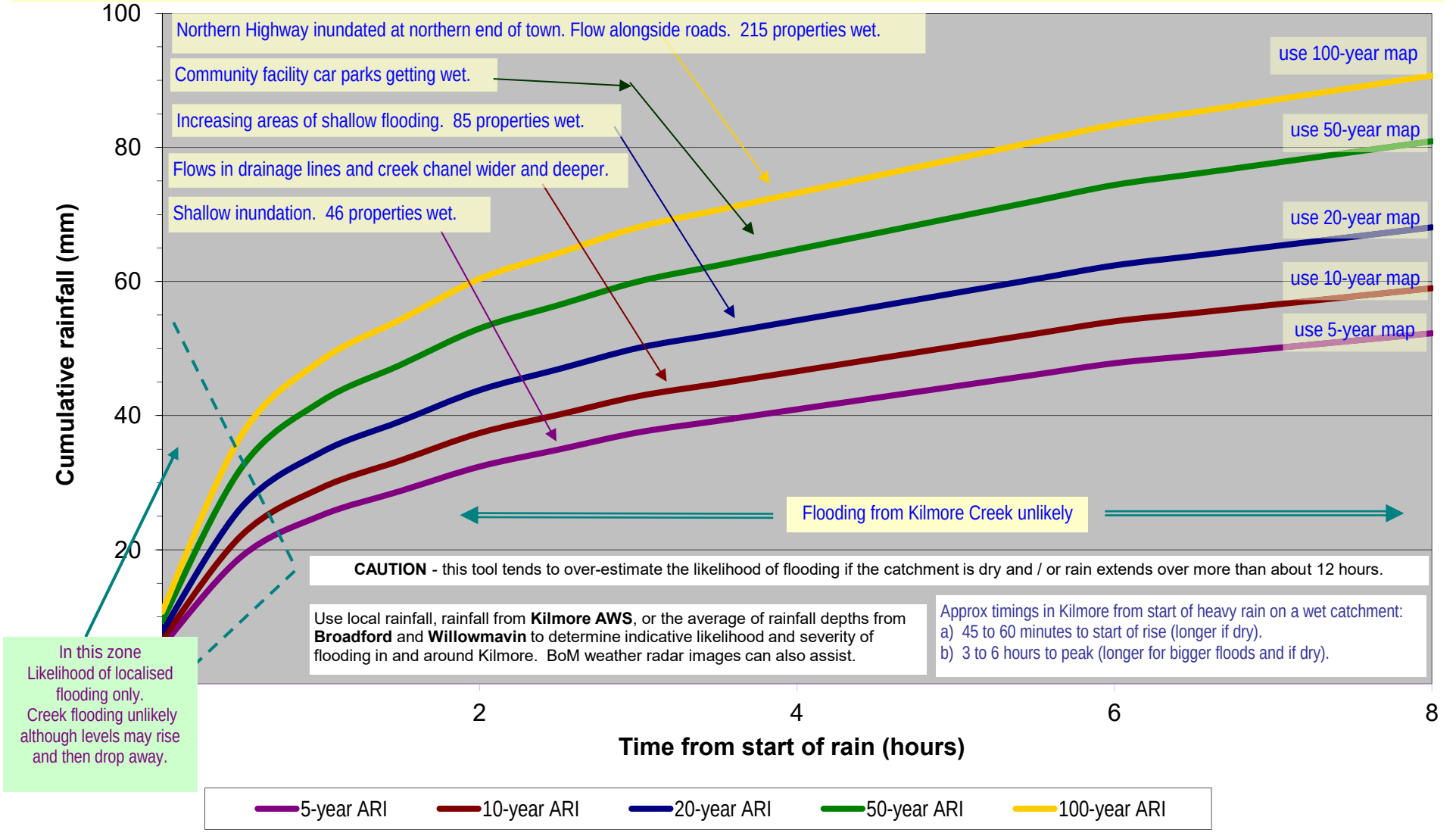
CAUTION. While a strength of the tool is that it does provide a quick ball-park answer to questions such as “will we flood” and “how bad will it be”, it is based on a number of gross assumptions and generalisations. It is therefore indicative only. It is not property specific and does not provide a prediction of expected flood height or the time of flood peak. As the tool uses data from rain gauges that are all outside the Kilmore Creek catchment (albeit not by much), it may not perform to expectations in severe thunderstorm situations and / or when there are locally heavy falls embedded in more general rain. The key message is that the tool will not always indicate the expected severity of flooding correctly although it will usually give a heads-up to severe flooding and thus of likely consequences. The indicative guidance provided can be related to the flood inundation maps (and GIS datasets) produced by WBM (2017) and available through FloodZoom or from the study reports.

After a flood event

After a flood event, plot the event rainfall depth (with date) on the tool and include an overview of the event, including antecedent conditions, in Appendix A of this MFEP. Relevant information should also be added to Appendix C2.

Indicative guidance for likelihood of flooding at Kilmore based on rainfall

This guide assumes that rainfall affects the whole catchment and is not localised heavy falls. If localised, the guide will over-estimate the likelihood of flooding.
If the catchment is very dry, move down one level. For example, if rainfall is on the 10-year curve and the catchment is very dry, refer to the 5-year map and consequences.



7.4 Summary of Properties Flooded

Summary of number of flood affected properties in Kilmore EXISTING CONDITIONS – NO CROSSING UPGRADES OR KILMORE BYPASS										
Level at local gauge										
Equivalent level in mAHD										
Flood severity	As % AEP	20%	10%	5%	2%	1%	0.5%	0.2%	0.1%	PMP
	As years ARI	5yr	10yr	20yr	50yr	100yr	200yr	500yr	1000yr	
Number of properties flooded (see Section 2.5.1)		46	59	85	138	215	275	380	448	1,188

7.5 Detailed List of Properties Flooded

	LEGEND		Over-ground flooding				
Location	Building Type	5yr	10yr	20yr	50yr	100yr
34 ALBERT STREET	Residential					
5/36 ALBERT STREET	Residential					
6/36 ALBERT STREET	Residential					
1/39 ALBERT STREET	Residential					
69 ALBERT STREET	Residential					
71 ALBERT STREET	Residential					
73 ALBERT STREET	Residential					
3 ALLEN STREET	Residential					
4 ALLEN STREET	Residential					
15 ALLEN STREET	Residential					
2 ANDREW STREET	Residential					
4 ANDREW STREET	Residential					
6 ANDREW STREET	Residential					
8 ANDREW STREET	Residential					
21-23 ANDREW STREET	Commercial					
4 BALLANTINE COURT	Residential					
1 BINDLEY COURT	Residential					
3 BONNEY PLACE	Residential					
4 BONNEY PLACE	Residential					
10 BONNEY PLACE	Residential					
12 BONNEY PLACE	Residential					
9 BUCKLEY COURT	Residential					
12 CENTENARY DRIVE	Residential					
61 CENTENARY DRIVE	Residential					
3 CLOVER PLACE	Residential					
5 CLOVER PLACE	Residential					
6 COTTAGE CRESCENT	Residential					
3/2 CRIMMINS WAY	Residential					
25 CURRY ROAD	Residential					
37 FITZROY STREET	Residential					
96 GEHREYS LANE	Residential					
40 GEORGE STREET	Residential					

LEGEND		Over-ground flooding				
Location	Building Type	5yr	10yr	20yr	50yr	100yr
48 GEORGE STREET	Residential					
5 GINA COURT	Residential					
7 GINA COURT	Residential					
9 GINA COURT	Residential					
11 GINA COURT	Residential					
13 GINA COURT	Residential					
19 GLANVILLE DRIVE	Industrial					
21 GLANVILLE DRIVE	Industrial					
32 HAMILTON STREET	Residential					
34 HAMILTON STREET	Residential					
36 HAMILTON STREET	Residential					
57 HAMILTON STREET	Residential					
85 HAMILTON STREET	Residential					
117 HAMILTON STREET	Residential					
119 HAMILTON STREET	Residential					
20 HARRINGTON DRIVE	Residential					
22 HARRINGTON DRIVE	Residential					
21 HIBISCUS COURT	Residential					
20 HIBISCUS COURT	Residential					
19 HIBISCUS COURT	Residential					
10 JOHN HAMMOND PLACE	Commercial					
9 KULIN DRIVE	Residential					
47 KULIN DRIVE	Residential					
49 KULIN DRIVE	Residential					
51 KULIN DRIVE	Residential					
65 KULIN DRIVE	Residential					
67 KULIN DRIVE	Residential					
1 LUMSDEN STREET	Residential					
3 LUMSDEN STREET	Residential					
3/6 LUMSDEN STREET	Residential					
5 LUMSDEN STREET	Residential					
12 LUMSDEN STREET	Residential					
6 MAHER STREET	Industrial					
3 MANNAGUM COURT	Residential					
MELBOURNE STREET	Commercial					
MELBOURNE STREET	Commercial					
MELBOURNE STREET	Commercial					
40 MELBOURNE STREET	Commercial					
42 MELBOURNE STREET	Commercial					
46 MELBOURNE STREET	Commercial					
55 MELBOURNE STREET	Residential					
60 MIKADA BOULEVARD	Residential					
62 MIKADA BOULEVARD	Residential					
65 MIKADA BOULEVARD	Residential					
67 MIKADA BOULEVARD	Residential					
71 MIKADA BOULEVARD	Residential					
1 MILL ROAD	Residential					
1A MILL ROAD	Residential					

LEGEND		Over-ground flooding				
Location	Building Type	5yr	10yr	20yr	50yr	100yr
3 MILL ROAD	Residential					
4 MILL STREET	Commercial					
5 MILL ROAD	Residential					
7 MILL ROAD	Residential					
9 MILL ROAD	Residential					
19 MILL ROAD	Residential					
25E MILL ROAD	Residential					
41 MILL ROAD	Residential					
43 MILL ROAD	Residential					
5 MOLLISON COURT	Residential					
6 MOLLISON COURT	Residential					
26 MORRIS COURT	Residential					
109 NORTHERN HIGHWAY	Industrial					
111 NORTHERN HIGHWAY	Industrial					
125 NORTHERN HIGHWAY	Industrial					
123 NORTHERN HIGHWAY	Industrial					
121 NORTHERN HIGHWAY	Industrial					
19 PARK VIEW DRIVE	Residential					
21 PARK VIEW DRIVE	Residential					
23 PARK VIEW DRIVE	Residential					
2 PEPPERCORN COURT	Residential					
3 PEPPERCORN COURT	Residential					
13 PINEWOOD PLACE	Residential					
14 PINEWOOD PLACE	Residential					
10 PONTISFORD COURT	Residential					
11 PONTISFORD COURT	Residential					
12 PONTISFORD COURT	Residential					
13 PONTISFORD COURT	Residential					
35 POWLETT STREET	Residential					
37 POWLETT STREET	Residential					
61 POWLETT STREET	Residential					
116 POWLETT STREET	Commercial					
119-125 POWLETT STREET	Commercial					
122-124 POWLETT STREET	Commercial					
128 POWLETT STREET	Commercial					
130A POWLETT STREET	Commercial					
130B POWLETT STREET	Commercial					
127-145 POWLETT STREET	Commercial					
147-149 POWLETT STREET	Commercial					
2 ROSE COURT	Residential					
76 ROYAL PARADE	Residential					
78 ROYAL PARADE	Residential					
82 ROYAL PARADE	Residential					
30 RUTLEDGE STREET	Residential					
1/32 RUTLEDGE STREET	Residential					
11/32 RUTLEDGE STREET	Residential					
34A RUTLEDGE STREET	Residential					
34B RUTLEDGE STREET	Residential					

Location	Building Type	LEGEND	Over-ground flooding			
		5yr	10yr	20yr	50yr	100yr
58 SUTHERLAND STREET	Residential					
65 SUTHERLAND STREET	Residential					
67 SUTHERLAND STREET	Residential					
69 SUTHERLAND STREET	Residential					
71 SUTHERLAND STREET	Residential					
76 SUTHERLAND STREET	Residential					
114 SUTHERLAND STREET	Residential					
116 SUTHERLAND STREET	Residential					
SYDNEY STREET	Commercial					
10/11-13 SYDNEY STREET	Commercial					
28 SYDNEY STREET	Commercial					
32 SYDNEY STREET	Commercial					
34 SYDNEY STREET	Commercial					
41 SYDNEY STREET	Commercial					
46 SYDNEY STREET	Commercial					
8/47-51 SYDNEY STREET	Commercial					
9-10/47-51 SYDNEY STREET	Commercial					
48-50 SYDNEY STREET	Commercial					
52 SYDNEY STREET	Commercial					
54-56 SYDNEY STREET	Commercial					
61-63 SYDNEY STREET	Commercial					
68A SYDNEY STREET	Commercial					
70 SYDNEY STREET	Commercial					
78 SYDNEY STREET	Commercial					
80 SYDNEY STREET	Commercial					
82 SYDNEY STREET	Commercial					
88 SYDNEY STREET	Commercial					
89 SYDNEY STREET	Commercial					
90 SYDNEY STREET	Commercial					
91-93 SYDNEY STREET	Commercial					
93 SYDNEY STREET	Commercial					
94-98 SYDNEY STREET	Commercial					
97A SYDNEY STREET	Commercial					
102-104 SYDNEY STREET	Commercial					
104 SYDNEY STREET	Commercial					
16 THE ELMS BOULEVARD	Residential					
18 THE ELMS BOULEVARD	Residential					
20 THE ELMS BOULEVARD	Residential					
24 THE ELMS BOULEVARD	Residential					
40 THE ELMS BOULEVARD	Residential					
42 THE ELMS BOULEVARD	Residential					
44 THE ELMS BOULEVARD	Residential					
46 THE ELMS BOULEVARD	Residential					
48 THE ELMS BOULEVARD	Residential					
50 THE ELMS BOULEVARD	Residential					
44 TOOTLE STREET	Residential					
27 UNION STREET	Commercial					
29 UNION STREET	Commercial					

		LEGEND	Over-ground flooding			
Location	Building Type	5yr	10yr	20yr	50yr	100yr
69 UNION STREET	Residential					
32A VICTORIA PARADE	Residential					
40 VICTORIA PARADE	Residential					
3 WALNUT GROVE COURT	Residential					
5 WARATAH COURT	Residential					
22 WATTLEBIRD WAY	Residential					
WHITE STREET	Residential					
41 WHITE STREET	Residential					
43 WHITE STREET	Residential					
109 WHITE STREET	Commercial					
111 WHITE STREET	Commercial					
113 WHITE STREET	Commercial					
115 WHITE STREET	Commercial					
117 WHITE STREET	Commercial					
119 WHITE STREET	Commercial					
WILLOWMAVIN ROAD	Industrial					
WILLOWMAVIN ROAD	Industrial					
24 GREEN STREET	Commercial					
30 WILLOWMAVIN ROAD	Industrial					
35 WILLOWMAVIN ROAD	Industrial					

APPENDIX C3 – BROADFORD
COMMUNITY FLOOD EMERGENCY MANAGEMENT PLAN

1. Overview

Sunday Creek is a major tributary of the Goulburn River and joins it to the immediate west (downstream) of Seymour. The creek rises near Mt Disappointment in the Kinglake National Park and flows down steep forested areas onto flatter agricultural plains through Clonbinane, Waterford Park and **Broadford**. Its tributary Dry Creek also flows through **Broadford** with the confluence on the north side of town. Sunday Creek is regulated at Sunday Creek Reservoir, situated just upstream of **Broadford**. The reservoir provides potable water to Broadford, Kilmore, Wallan, Wandong and Heathcote Junction. The catchment area to Tallarook is 337km^2.

Mollison Creek flows to the northeast through Pyalong to join Sugarloaf Creek which flows into Sunday Creek immediately upstream of its confluence with the Goulburn River downstream of Seymour. There are no significant urban centres along Sugarloaf Creek. The catchment area to Ash Bridge is 609km^2.

2. Flooding Hot Spots

Low-lying properties may be affected at Broadford but the number and extent of damage is unknown.

Old Hume Highway, Broadford.
Date and source unknown

APPENDIX C4 – DABYMINGA CREEK AND TALLAROOK COMMUNITY FLOOD EMERGENCY MANAGEMENT PLAN

1. Overview

The Dabyminga Creek catchment is steep. It is approximately 180km^2 in area and flows into the Goulburn River a short distance upstream of Seymour after flowing through Tallarook.

Tallarook is situated on the Hume Highway approximately 10km south of Seymour.

The creek flows along the eastern margins of the town. The western edge of the floodplain at Tallarook is well defined by a steep escarpment but is less well defined on the eastern side as ground levels rise gradually. See map in Appendix F.

2. Flood Impacts

Intense thunderstorms can cause very rapid rises and fast flowing water.

A house on the west bank of the creek is known to have flooded up to 2m above floor-level.

Floodwaters have never been known to penetrate to the west of the Hume Freeway (KinHill, 1991).

The BoM does not currently provide flood forecasts for Dabyminga Creek or its tributaries.

APPENDIX C5 – HUGHES CREEK AND AVENEL COMMUNITY FLOOD EMERGENCY MANAGEMENT PLAN

1. Overview

Hughes Creek forms part of the Shire boundary with the catchment extending into Strathbogie Shire. The only significant urban centre within the catchment is Avenel and it is located in the Shire of Strathbogie.

Hughes Creek flows through the town

Avenel is situated on the Hume Highway approximately 20km north of Seymour.

The catchment area to the Hume Highway Bridge is 528km^2.

The eastern edge of the floodplain through the town is characterised by a steep escarpment. The extent of flooding is therefore readily definable along the right hand side. The likely extent of flooding on the left hand side is more difficult to define. See map in Appendix F.

2. Flood Impacts

The area of prime concern is the west (left hand) bank of the creek immediately downstream from the Hume Highway. Aerial photography suggests that several houses in this vicinity are flood prone, a conclusion supported by anecdotal evidence (Kinhill, 1991).

During severe floods, the floodplain will be filled to a significant depth. Property damage is expected to be low as there is little encroachment of inappropriate development into the floodplain.

The BoM does not currently provide flood forecasts for Hughes Creek at Avenel.

APPENDIX D – FLOOD EVACUATION ARRANGEMENTS

There are five stages in the evacuation process: decision, warning, withdrawal, shelter and return.

Phase 1 - Decision to Evacuate

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

- When life and safety are at risk;
- 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 as a consequence of flooding and evacuation is considered the most effective risk treatment. This is the role of the Health Commander of the incident to assess and manage. Refer to the State Health Emergency Response Plan (SHERP) for details);
- Buildings have been made uninhabitable;
- Essential services have been damaged and are not available to a community and evacuation is considered 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 to conduct the evacuation;
- Time 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;
- Resources required to conduct the evacuation;
- Resources available to conduct the evacuation;
- Shelter including Emergency Relief Centres, Assembly Areas etc.;
- Vulnerable people and facilities;
- Transportation;
- Registration;
- People of CALD background and transient populations;
- Safety of emergency service personnel;
- Different stages of an evacuation process.

The decision to evacuate should be made in consultation with the MERO, MERC, DHHS, Health Commander and other key agencies and expert advice (Glenelg Hopkins CMA and Flood Intelligence specialists) unless time constraints prevent this consultation.

The following **Evacuation Checklist** can be used as a guide when evaluating the need for evacuation in a particular area as a result of flooding.

Evacuation Checklist

Key Questions	Answers
Are there any existing Flood Evacuation Plans for the Municipality?	
Name of area(s) at risk.	
How many people are at risk (including special needs groups)?	
When and where are access routes likely to be disrupted?	
Is the area a flood island, accessible by road, accessible overland or land locked?	
How much time is available to warn the area? Where Flash Flooding risks exist adopt the strategy detailed in Section 3.8 of this MFEP.	
Under what circumstances and in what areas is shelter in place and not evacuation the best option?	
Where are Flood Relief Centres located?	
What are the triggers for evacuation? (i.e. a particular area at a specified gauge height?) – refer to Appendix C of this MFEP.	
How will evacuation warning messages be communicated to people? (i.e. OSOM, Emergency Alert, etc.)	
Have standard evacuation messages been developed for predicted or likely flood scenarios?	
What forms of transport are needed to assist with evacuation?	
Where are airbase facilities located?	
Where are animal shelter compounds located? Any other arrangements for management and accommodation of pets / animals?	
What are the local command and control arrangements for evacuation?	
Other Confirmations and Clarifications:	
Clarify and confirm local arrangements and responsibilities for evacuation at the local level. This includes: ➢ Confirming and facilitating local awareness of responsibilities for the decision to evacuate (i.e. Incident Controller), the management of evacuation (i.e. VICPOL) and the tasks to be undertaken for evacuation (i.e. development and communication of evacuation warnings). ➢ The role of agencies at the local level involved in evacuation (i.e. VICPOL, VICSES, Australian Red Cross, etc.) Local arrangements must be consistent with arrangements as set out in Section 3.8 of the EMMV and the Evacuation Guidelines.	

Phase 2 – Warning or Recommendation

Warnings may include a warning to prepare to evacuate and a warning to evacuate immediately. Once the decision to evacuate has been made, the at-risk community will be warned to evacuate. Evacuation warnings can be disseminated via methods listed in Part 3 of this Plan.

Evacuation warning messages will be developed and issued by VICSES in consultation with the MERO, MERC, DHHS and other key agencies and expert advice (e.g. Glenelg Hopkins CMA and Flood Intelligence specialists).

Phase 3 – Withdrawal

Withdrawal will be controlled by the VICPOL Evacuation Manager. The Evacuation Manager is responsible for managing the withdrawal which will include developing an evacuation plan which clearly identifies activities and timelines as well as the roles and responsibilities of any agencies involved.

VICSES will provide advice regarding the most appropriate evacuation routes and locations for at-risk communities to evacuate to, etc.

VICSES, CFA, AV and Local Government will provide resources where available to support VICPOL / 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 – refer to the MEMP.

Landing zones for helicopters are located at:

- Seymour Hospital and Kilmore Hospital

Special needs groups and vulnerable residents likely to need help may be identified via the Nexus community Health database or through community network organisations. Refer to the MEMP or seek information from the MERO or MRM.

Phase 4 – Shelter

Relief Centres and / or assembly areas which cater for people's basic needs may be established to meet the immediate needs of people affected by flooding. Relief / Recovery Centres are listed in the MEMP.

VICPOL will liaise with Local Government and DHHS (where regional coordination is required) via the relevant control centre to plan for the opening and operation of relief centres. This can best be achieved through the Emergency Management Team (EMT).

Animal Shelter

Animal management guidelines are provided in the Mitchell Shire Municipal Emergency Animal Welfare Plan (in development) along with the location and contact details for appropriate animal welfare entities.

Matters relating to the welfare of livestock and companion animals (including feeding and rescue) are to be referred to DEDJTR. This includes requests for emergency supply and / or delivery of fodder to stranded livestock or for livestock rescue.

Matters relating to the welfare of wildlife are to be referred to DEDJTR and / or ParksVic.

Caravans

The following caravan parks are located in the Shire of Mitchell. It should be noted that some of these may be located in flood prone areas and early contact should be made with these parks when flooding is

expected. Discussions with the Shire should occur to look at possible short term storage / relocation strategies.

Name	Street Location	Town
Goulburn River Caravan Park	30 Trevan St,	Seymour
Highlands Caravan Park	33 Emily St,	Seymour
Kilmore Caravan Park	110 Northern Hwy,	Kilmore
Ace Caravan Park	5 Emily Street	Seymour
Wandong Australiana Motel Caravan Park	5 Broadhurst Lane	Wandong

Levee Environments

Not applicable in Mitchell Shire.

Isolated Properties

At the time of writing, no long term isolated properties have been identified.

Phase 5 – Return

Return will be consistent with the Strategic Plan for the Return of Community.

The Incident Controller in consultation with VICPOL and other relevant agencies will determine when it is safe for evacuees to return to the affected area / their properties and will arrange for the notification of the community.

VICPOL will manage the return of evacuated people with the assistance of other agencies as required.

Considerations for deciding whether those evacuated may return to the affected area include:

- Current flood situation;
- Status of flood mitigation systems;
- Size and location of the community;
- Access and egress routes available and their status;
- Resources required to coordinate the return;
- Special needs groups;
- Forecast weather;
- Transportation particularly for people without access to transport.

1. Disruption to Services

Disruption to a range of services can occur in the event of a flood. This may include road closures affecting school bus routes, damage to water treatment plant affecting potable water supplies, etc.

Service	Impact	Trigger point for action	Strategy / Temporary Measures
Nil identified			

2. Essential Community Infrastructure and Property Protection

Essential Community Infrastructure and properties (e.g. residences, businesses, roads, power supply, etc) that require protection are as follows:

Facility	Impact	Trigger Point for action	Strategy / Temporary Measures
Highlands Caravan Park		6.4 – 136.64	Liaise with Caravan Park regarding Park Emergency Plan
Seymour Police Station	Access to the Police Station is severely compromised.	6.6 – 136.84	Liaise with Victoria Police regarding Emergency Management Plan
Seymour Flexible Learning Centre			
Goodstart Early Learning Seymour			
Seymour Ambulance Station			
Wellington Street 3 Year Old Preschool Program Wallan			

Mitchell Shire will establish a sandbag collection point if and as required in consultation with the MERO if required.

3. Rescue

The following resources are available within Mitchell Shire to assist with rescue operations:

- Aircraft available through the State Aircraft Unit.
- Boats available through VICSES RDO.
- VICPOL resources available via RERC.

Mitchell Shire is part of the MAV MoU for resource sharing / mutual assistance with other Municipalities and / or other agencies. Details are provided in the MEMP. Further, resource sharing is facilitated by Victorian incident management arrangements established for flood.

Known high-risk areas / communities (i.e. low-lying areas) where rescues might be required include:

- Nil identified

APPENDIX E – FLOOD WARNING SYSTEMS

1 Flood Warning Products

Flood Warning products and Flood Class Levels can be found on the BoM website. Flood Warning products include Severe Thunderstorm Warnings, Severe Weather Warnings, Flood Watches and Flood Warnings.

2 Severe Thunderstorm and Severe Weather Warnings

The BoM can forecast the environment in which severe thunderstorms or small scale weather systems that are locally intense and slow moving may occur and provides a generalised service to that effect. However, it is not yet scientifically possible to predict individual flash flooding events except on time scales of tens of minutes at the very best.

The BoM issues warnings of flash flooding when it becomes apparent that an event has commenced which may lead to flash flooding or when flash flooding has commenced.

3 Flood Watches

Flood watches are issued by the BoM to notify communities and other stakeholders within broad areas (rather than specific catchments) of the potential flood threat from a developing weather situation. They provide a 'heads up' of likely flooding.

Flood watches are based on an assessment of the developing weather situation and indicators of current catchment wetness. They provide generalised statements about expected forecast rainfall totals, the current state of the catchments within the target area and the streams at risk from flooding. Instructions for obtaining rain and stream level observations and access to updated Watches and Warnings are also included.

Normally, the BoM would issue a Flood Watch 24 to 36 hours in advance of any likely flooding and issue updates as required. If at any time during that period there was an imminent threat of floods occurring, the Flood Watch would be upgraded to a Flood Warning.

4 Flood Warnings

4.1 Overview

Flood Warnings are firm predictions of flooding based on actual rainfall and river height information as well as the results of stream flow based models of catchment behaviour that take account of antecedent conditions (i.e. the 'wetness' of the catchment, storage levels within dams, etc) and likely future rainfall. Releases from dams are an essential input to such models.

Flood warnings are categorised as 'minor', 'moderate' or 'major' (see BoM website for an explanation of these terms and current flood class levels) and indicate the expected severity of the flood for agreed key locations along the river. More specifically, flood warnings usually include:

- Rainfall amounts for selected locations within and adjacent to the catchment;
- River heights and trends (rising, steady, falling) at key locations within the catchment;
- Outflows (in ML/d) from any major dams within the catchment;
- Forecasts of the height and time of flood peaks at key locations;
- Weather forecast and the likely impact of expected rainfall on flooding; and
- A warning re-issue date and time.

Note 1: The term "local flooding" may be used for localised flooding resulting from intense rainfall over a small area.

Note 2: The term "significant rises" may be used in the early stages of an event when it is clear that river levels will rise but it is too early to say whether they will reach flood level.

Additional information (e.g. weather radar and satellite images as well as updated rain and river level information) can also be obtained from the Bureau's website (www.bom.gov.au/hydro/flood/vic) or for the cost of a local call on ☎ 1300 659 217.

4.2 Whiteheads Creek

There are currently no specific flood warning systems or arrangements in place for the Whiteheads Creek catchment.

4.3 Sunday Creek

The Bureau of Meteorology provides current creek levels for Sunday Creek at Tallarook and Sugarloaf Creek at Ash Bridge.

4.4 Other Watercourses within the Shire

There are currently no specific flood warning systems or arrangements in place for other watercourses within Mitchell Shire although the Bureau of Meteorology does provides current water levels at existing river gauging stations.

5 Flood Bulletins

VICSES distributes flood emergency information to the media through "Flood Bulletins". Flood Bulletins provide BoM Flood Warning information as well as information regarding possible flood consequences and safety advice, not contained in BoM Flood Warning products. VICSES uses the title Flood Bulletin to ensure emphasis is placed upon BoM Flood Warning product titles.

The relevant VICSES Region Headquarters or the established ICC will normally be responsible for drafting, authorising and issuing Flood Bulletins, using the One Source, One Message (OSOM) system.

Flood Bulletins should refer to the warning title within the Bulletin header.

Flood Bulletins should follow the following structure:

- What is the current flood situation;
- What is the predicted flood situation;
- What are the likely flood consequences;
- What should the community do in response to flood warnings;
- Where to seek further information;
- Who to call if emergency assistance is required.

It is important that the description of the predicted flood situation is consistent with and reflects the relevant BoM Flood Warning.

Flood Bulletins should be focused on specific gauge (or in the absence of gauges, catchment) reference areas, that is the area in which flood consequences specifically relate to the relevant flood gauge.

Flood Bulletins 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 Flood Bulletins are released in a timely manner, standardised Flood Bulletins may be drafted based on different scenarios, prior to events occurring. The standardised Flood Bulletins can then be adapted to the specifics of the event occurring or predicted to occur.

6 Local Flood Warning System Arrangements

Local flood warning arrangements have been established for Seymour – see above. Further details are provided in the "Flood Alert Operations Procedures" guide.

7 Flood Class Levels

The occurrence of a certain class of flooding at one point in a catchment will not necessarily lead to the same class of flooding at other points – for example along the main river and its tributary creeks or along a drainage network's overland flow paths. This is because the floodplain physiography and use (and thus flood impact) varies along the river or flow path and also because antecedent conditions combined with where and how rainfall occurs (both in time and space) will drive how a flood develops and progresses.

It is emphasised that the flood class levels quoted in the table below refer to that part of the watercourse where the flood effects can be related to the gauge reading.

It is important to remember that flood impact is dependent on more than the peak height or flow. The rate of rise, duration, extent and season of flooding are also important. For this reason, flood class levels can only be considered as a guide to flood severity.

8 Details of relevant gauges

Station No	River / Creek	Station	Flood Class Levels (m)			Gauge Zero AHD (m)	Comments
			Minor	Moderate	Major		
405203	Goulburn River	Lake Eildon D/S	3.0 15,000ML/d	4.0 26,000ML/d	5.0 40,000MLd	205.729	800 m downstream Pondage Weir
405241	Rubicon River	Rubicon	N/A	N/A	N/A		
405209	Acheron River	Taggerty	2.0	2.6	3.0	198.177	400m d/s of Taggerty-Alexandra Road Bridge
405274	Home Creek	Yarck	N/A	N/	N/A	186.896	
405217	Yea River	Devlins Bridge	1.8	2.3	2.8	206.752	70m upstream of the bridge on the Melba Highway
	Yea River	Yea	3.0	3.9	4.9		
405231	King Parrot Creek	Flowerdale	2.0	N/A	N/A		
	Goulburn River	Ghin Ghin	N/A	N/A	N/A		
405201	Goulburn River	Trawool	4.0	5.6	7.5	38.93	20m upstream of the main Road Bridge
405202	Goulburn River	Seymour	4.0	5.2	7.0	130.244	280m upstream of Old Hume Highway bridge
405253	Goulburn River	Goulburn Weir	36,700ML/d	52,000ML/d	90,200ML/d		
405228	Hughes Creek	Tarcombe Road	2.0	2.8	3.6	157.854	8 km South East of the Avenal Railway Station
405212	Sunday Creek	Tallarook	3.0	3.5	4.0	153.199	280m upstream of Road Bridge
405240	Sugarloaf Creek	Ash Bridge	N/A	N/A	N/A	142.398	
	Mollison Creek	Pyalong	N/A	N/A	N/A	247.867	
405248	Major Creek	Graytown	N/A	N/A	N/A	140.26	

APPENDIX E1 - DELATITE ROAD FLOOD WARNING SYSTEM

Operation of Delatite Road Flood Warning Signs

1 Introduction

The Following document is a summary of the Automated Flood Warning Station installed over Whiteheads Creek on Delatite Road in Seymour. It comprises of one level monitoring base station and two flood warning signs to notify approaching traffic of a road closure (water over road).

2 Main components of the system

Warning Signs

Highlands Rd End

Tarcombe Rd End

Control Box/Base Station

Float Switch

3 Operation of Base Station

The Base Station consists of an OTT PLS level monitoring sensor and two Optical Float Switches. The Base Station sends data via a 3G modem to the ALS server (Supplier) and Vista Data Vision (VDV) displays this data, to make it available for Mitchell Shire Council to manage contact access and to trigger or meet the conditions of the custom alarm setup, within VDV.

4 Flood Warning Signs

Once the flood warning level is reached (water over road) the flood warning signs will be activated via short-hop radio. The sign will run for at least 1 week without solar exposure, due to a large battery in the underground lockable pit.

5 Alarms

The alarms have been setup to send via SMS and Email to designated contacts i.e. VicSES Seymour Unit, Victoria Police and Mitchell Shire Council. The Site will send an early warning alarm when the water level reaches the top of the culverts, to inform when a road closure is imminent. Then once the water reaches and begins to spill over the road, the second alarm will be sent via SMS and email. Additionally, when the water level recedes below the alarm triggers, a message will be sent to inform the contacts, and the road closure signs will be de-activated.

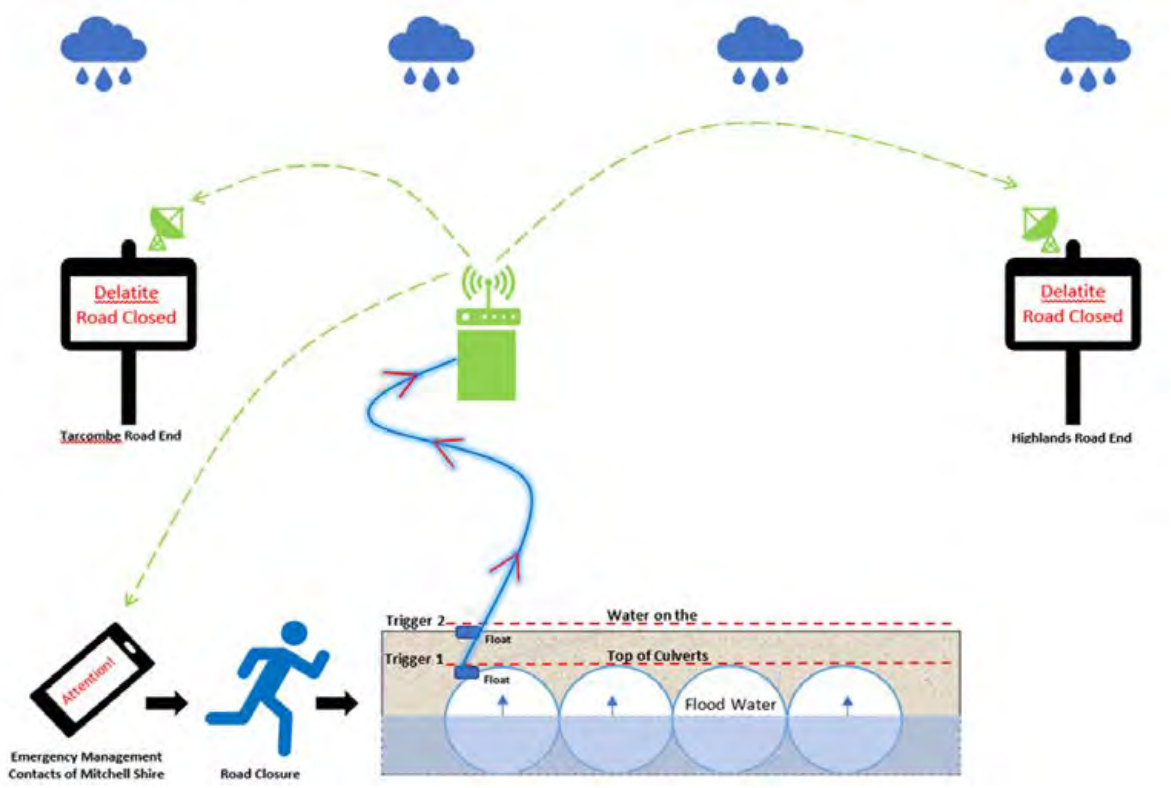
Following are some of the key flood warning SMS types.

Early Warning Alarm (Top of Culverts)

Flood Warning Sign ON (Water Over Road-North/South)

Flood Warning Sign OFF (Water Over Road-North/South)

6 Schematic layout



7 Maintenance

The stations are relatively maintenance free but will require servicing to ensure the sensors are clean, and a system test completed to ensure the sensors, radios, lights and batteries are all in good condition. The area surrounding the sensors (in the creek), will need to be kept clear by Mitchell Shire Council's maintenance staff, i.e. staff will need to cut grass/reeds around the sensors (galvanised pipe housing) to ensure it is not overgrown. Additionally, if there is a silt, mud or soil build-up around the end of the galvanised pipe this will need to be cleared (by hand shovel) to ensure water can flow up the galvanised pipe, so an accurate water level can be obtained by the sensors.

8 System Testing

The alerting and warning system will be tested annually to confirm personnel listed in the system contact list receive the notifications.

9 Operational Procedure

The following outlines the operational process to monitor and respond to rain fall in the Whiteheads Creek catchment which results in flooding of Delatite Road.

- Bureau of Meteorology (BoM) issues weather alerts/warnings relevant to the area. These alerts/warnings are monitored by VicSES, VicPol and council.
- The Delatite Road Flood Warning System monitors the water level as it rises and automatically ends SMS and email alerts/warnings at pre-determined levels.

- VicSES Seymour Unit and VicPol liaise to confirm receiving alerts/warnings.
- VicSES Seymour Unit determines road closure requirement in anticipation of water rising to level over the road. The Delatite Road Flood Warning System will activate and switch on flashing lights and Road Closed signage when the pre-determined level is reached.
- Road closed – Incident Controller requests council to erect road closed barriers on Delatite Road near the warning signs to close the road.
- On confirmation that water is crossing the Delatite road, VicSES Seymour Unit will notify the SES NEDO (North East Duty Officer). The SES NEDO in consultation with the SES RAC (Regional Agency Commander) may issue a flash flood warning for the Whiteheads Creek area.
- When the water level drops below the road level, the Delatite Road Flood Warning System will automatically switch of the warning signs and send an SMS and email message. VicSES Seymour Unit to verify water level has dropped and notify council to inspect road way and crossing before re-opening Delatite Road. VicSES Seymour Unit will notify the NEDO that the flash flood risk has passed and that the flash flood warning can be removed.
- Council checks the roadway and crossing, if the roadway is safe enough for road users, notify VicSES Seymour Unit accordingly. VicSES Seymour Unit liaise to confirm road re-opening.

APPENDIX F – MAPS for MITCHELL SHIRE

1 Overview

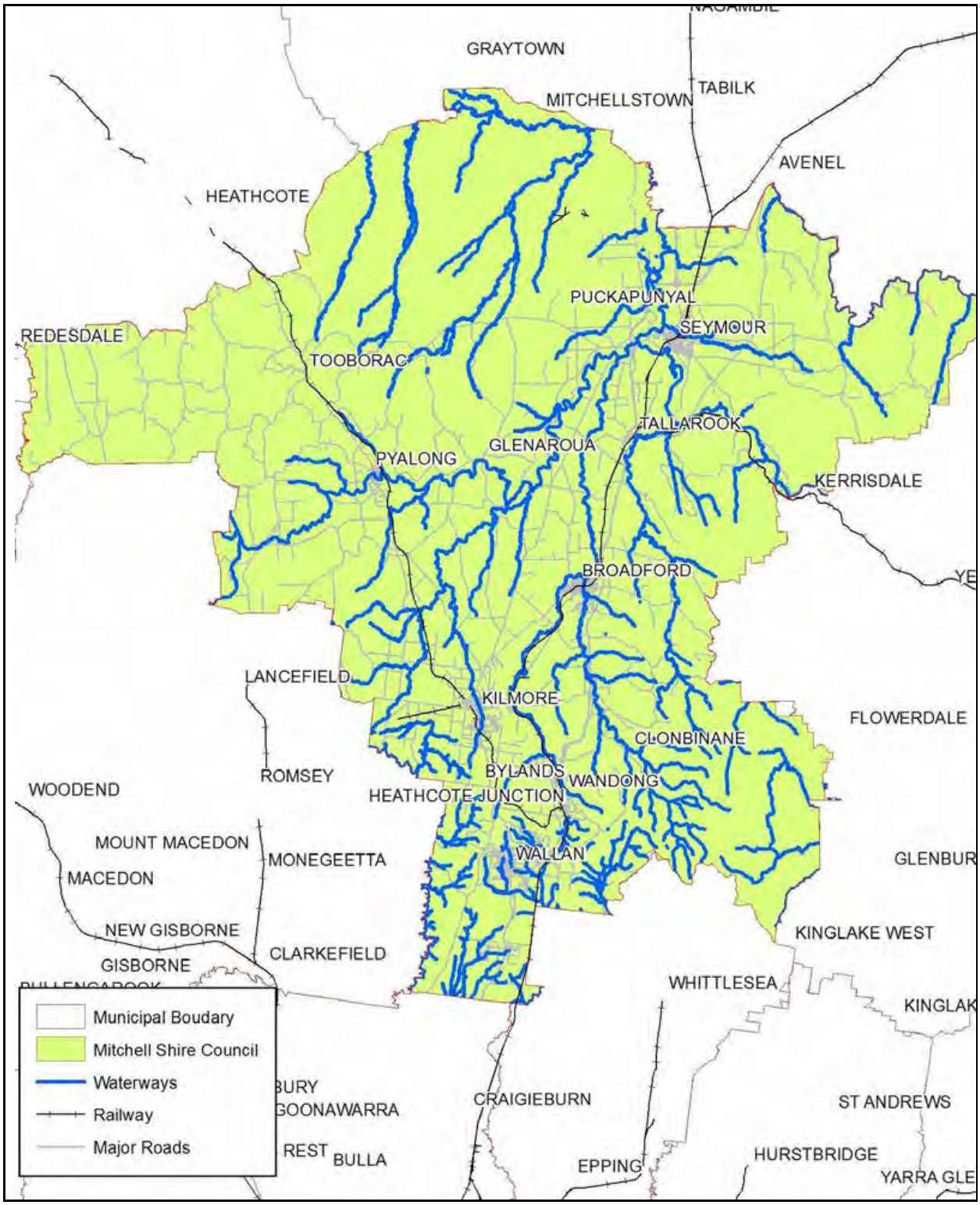
Maps considered useful to flood response within Mitchell Shire are included in this Appendix. They comprise:

- A set of maps showing flood extents and depths for a range of gauge heights at Seymour and for the 100-year ARI event (WBM, 2001 and VICSES). The maps also show flow velocities houses flooded above and below floor level, water depth at six (6) pints of interest within Seymour, key buildings, street names and town cadastral information.
- Maps showing flood extents and depths for Goulburn River flooding at Seymour (sourced from Seymour Floodplain Mapping Study, March 2001)
- Map showing flood extent and depths for Whiteheads Creek at Seymour (sourced from Seymour Floodplain Mapping Study, March 2001)
- Map showing 1% AEP flood extent: Sunday & Dry Creeks at Broadford
- Two maps showing the 1% AEP extent at Tallarook (GBMCA, 2008 and VICSES).
- A map showing the 1% AEP flood extent at Avenel (VICSES).
- A map showing the 1% AEP flood extent at Broadford (VICSES).
- A map showing the 1% AEP flood extent at Beveridge (Melbourne Water).
- Two maps showing the 1% AEP flood extent at Wallan (Melbourne Water).

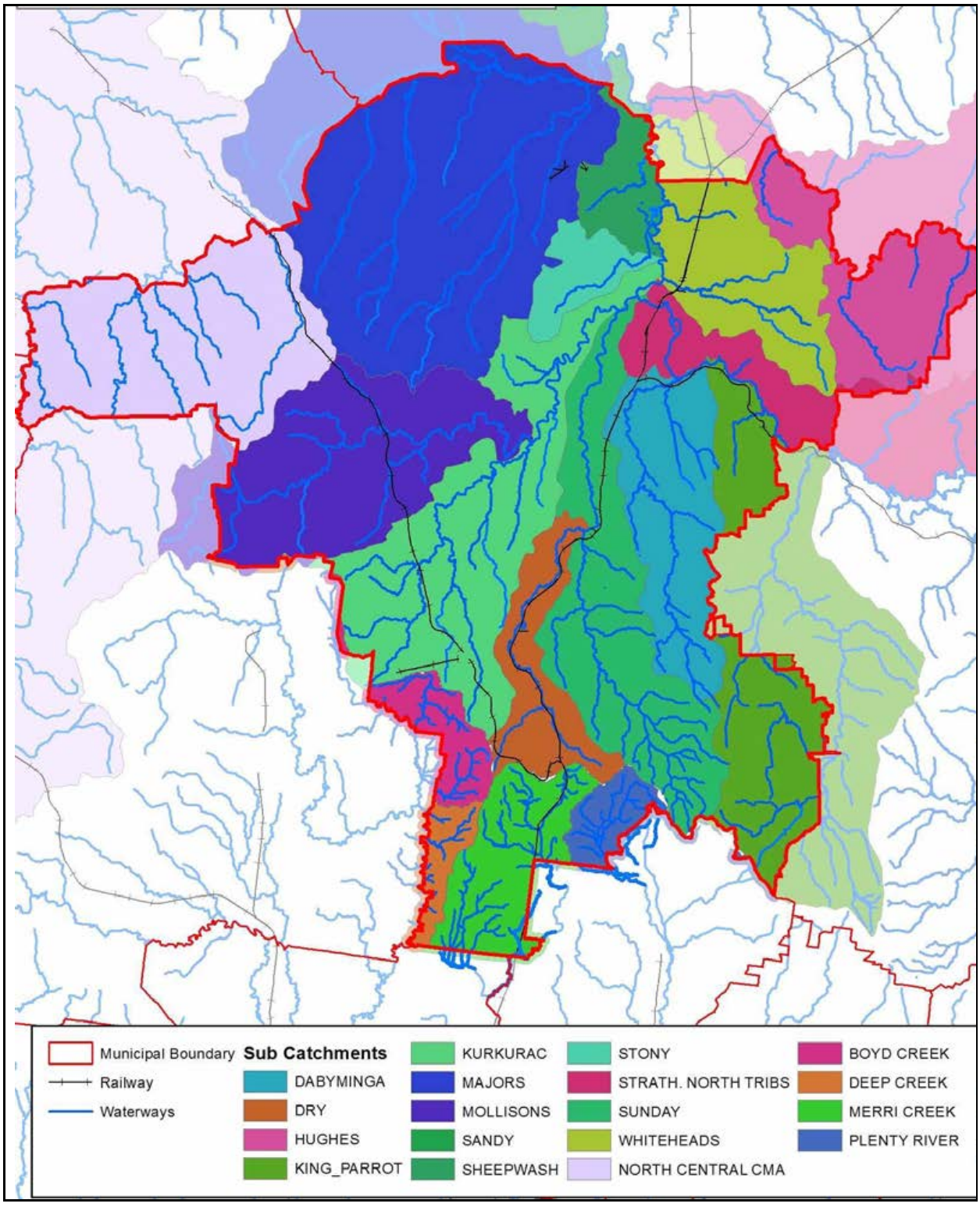
Note that:

- Maps showing flood extent, depth and hazard for the PMF event were also delivered for Seymour (WBM, 2001) and are available from the GBCMA or Council.
- Maps showing the Land Subject to Inundation Overlay are included in the Mitchell Planning Scheme and can be used as a guide to areas that may flood during an event. These maps can be found in hard copy form at the Council's main office or online at the Department of Planning and Community Development website (see the list of references in Appendix G).
- Maps showing 100-year ARI (1% AEP) flood extent and floodways (together with volume, height and water quality data) are shown at the Victorian Water Resources website (see the list of references in Appendix G).
- At Seymour, flows in Whiteheads Creek have not been included in the above 10-map set but is included in the 1% AEP map.
- Maps developed as part of the Kilmore Flood Mapping and Intelligence Study (WBM, 2017) have not been included in this document. They are available through FloodZoom and / or the study reports.
-

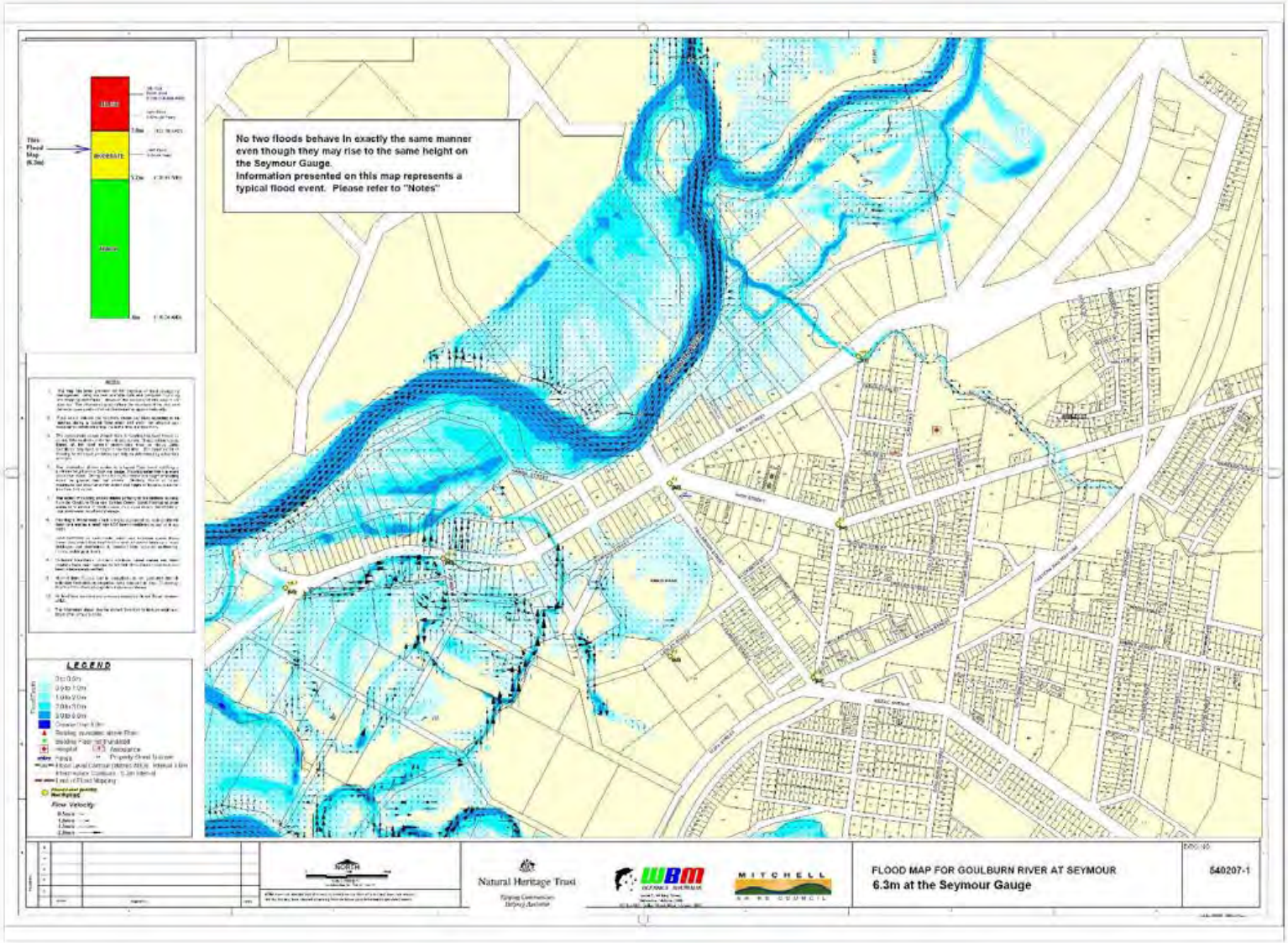
2 Mitchell Shire (extracted from Mitchell Shire Flood Management Plan, Water Technology, 2013)



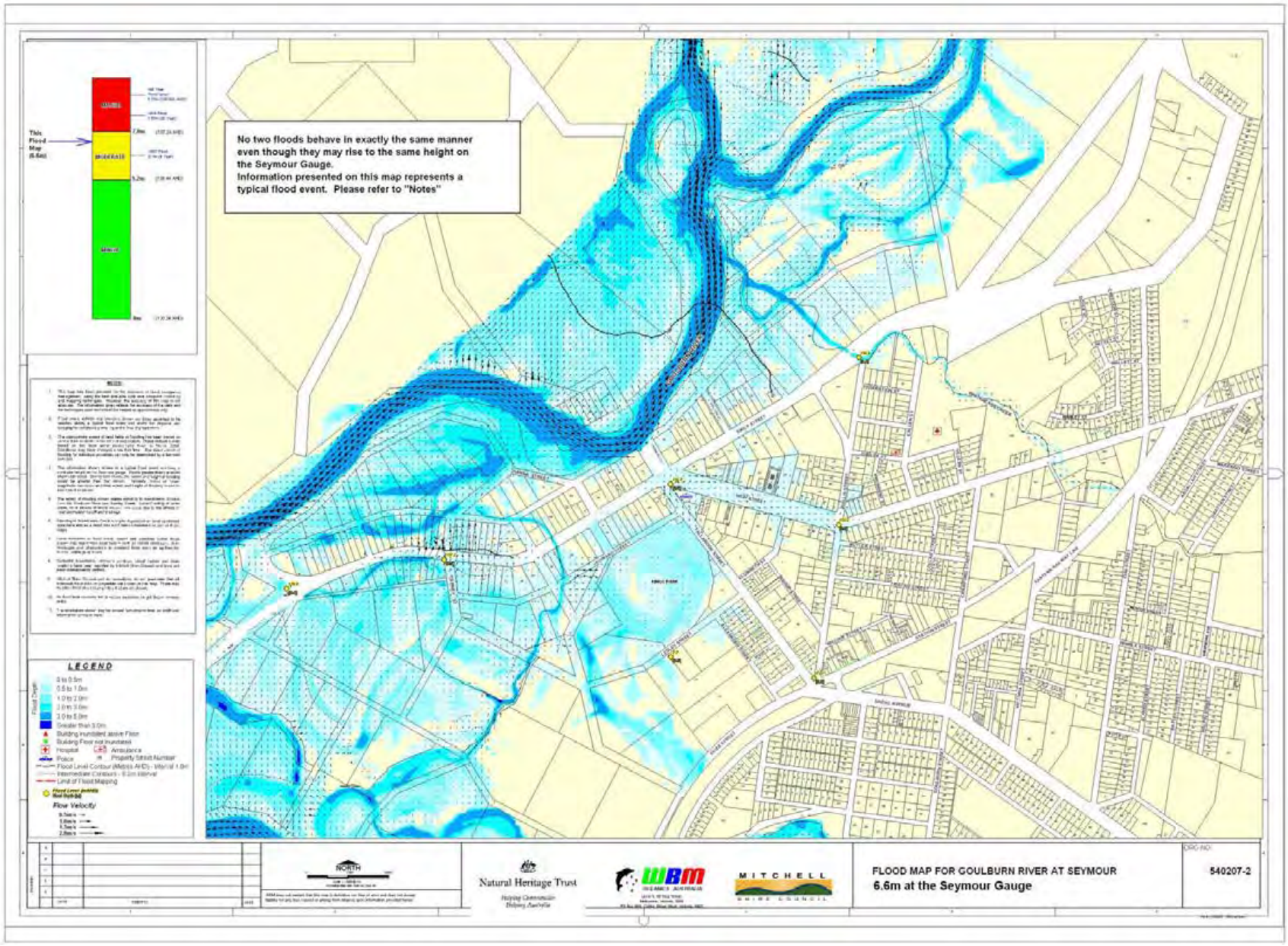
3 Mitchell Shire Catchments and Waterways (extracted from Mitchell Shire Flood Management Plan, Water Technology, 2013)



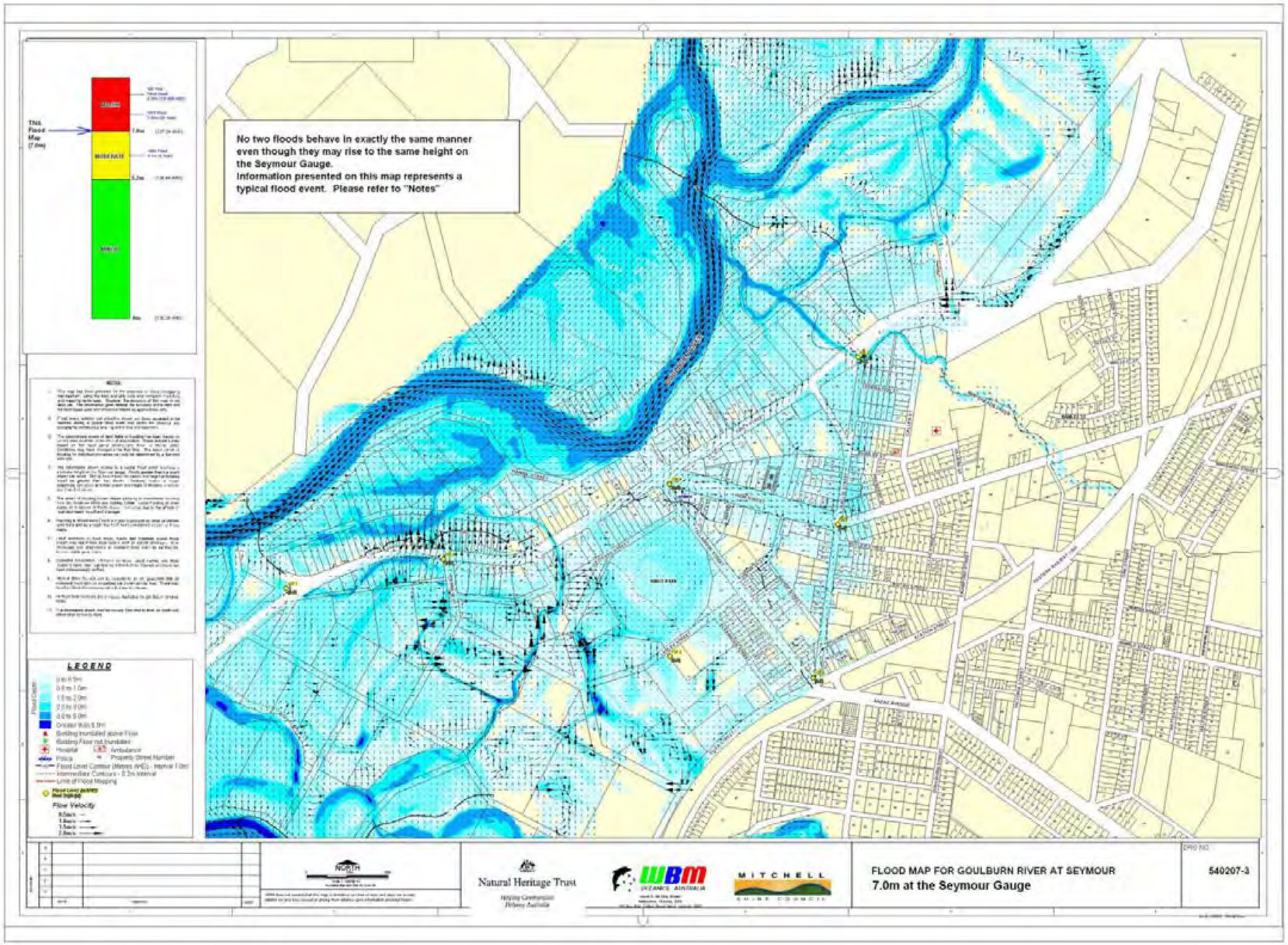
4 Maps showing flood extents and depths for Goulburn River flooding at Seymour (sourced from Seymour Floodplain Mapping Study, March 2001)



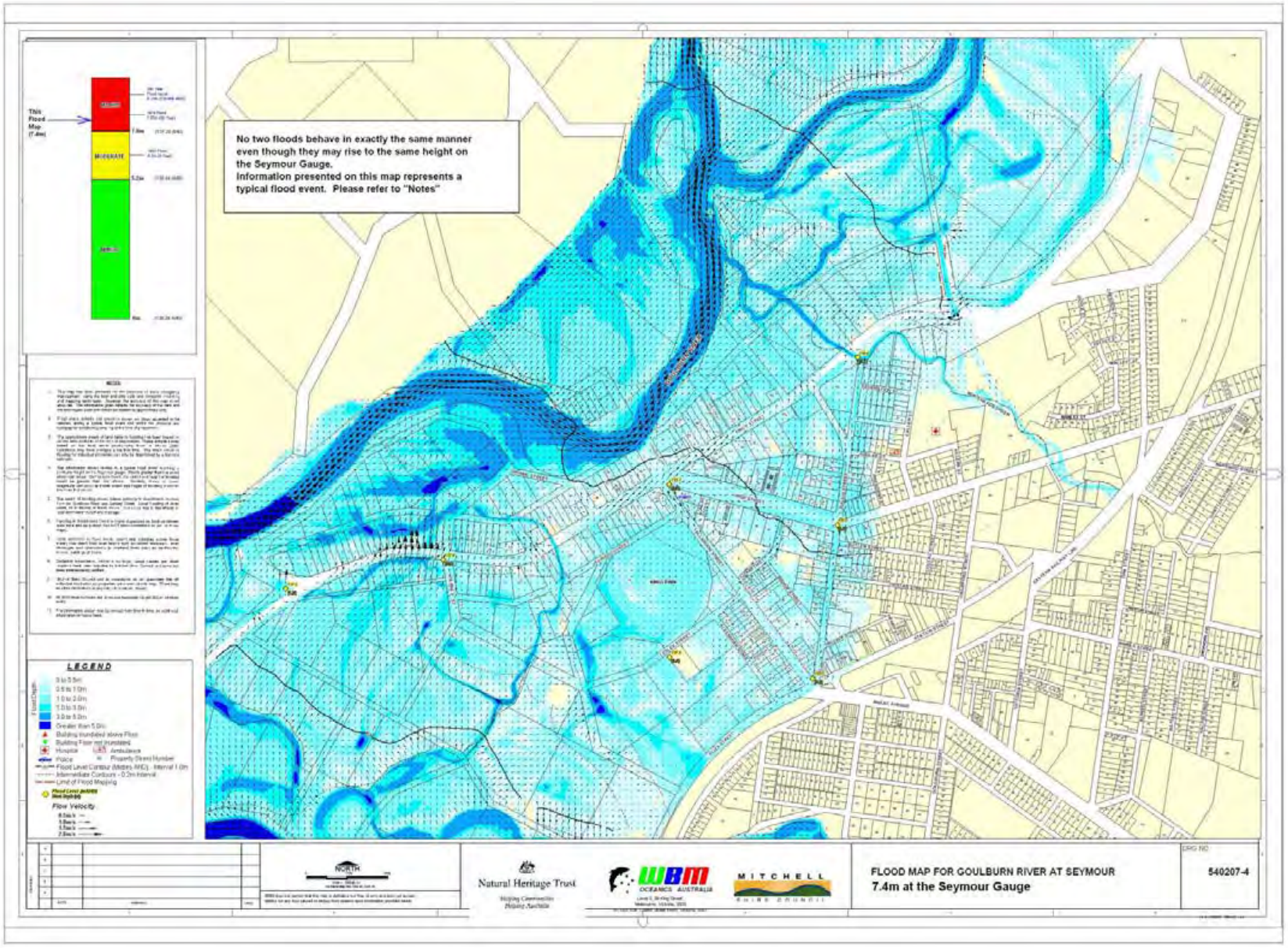
Flood extent, depths and velocities at Seymour - gauge height 6.3m



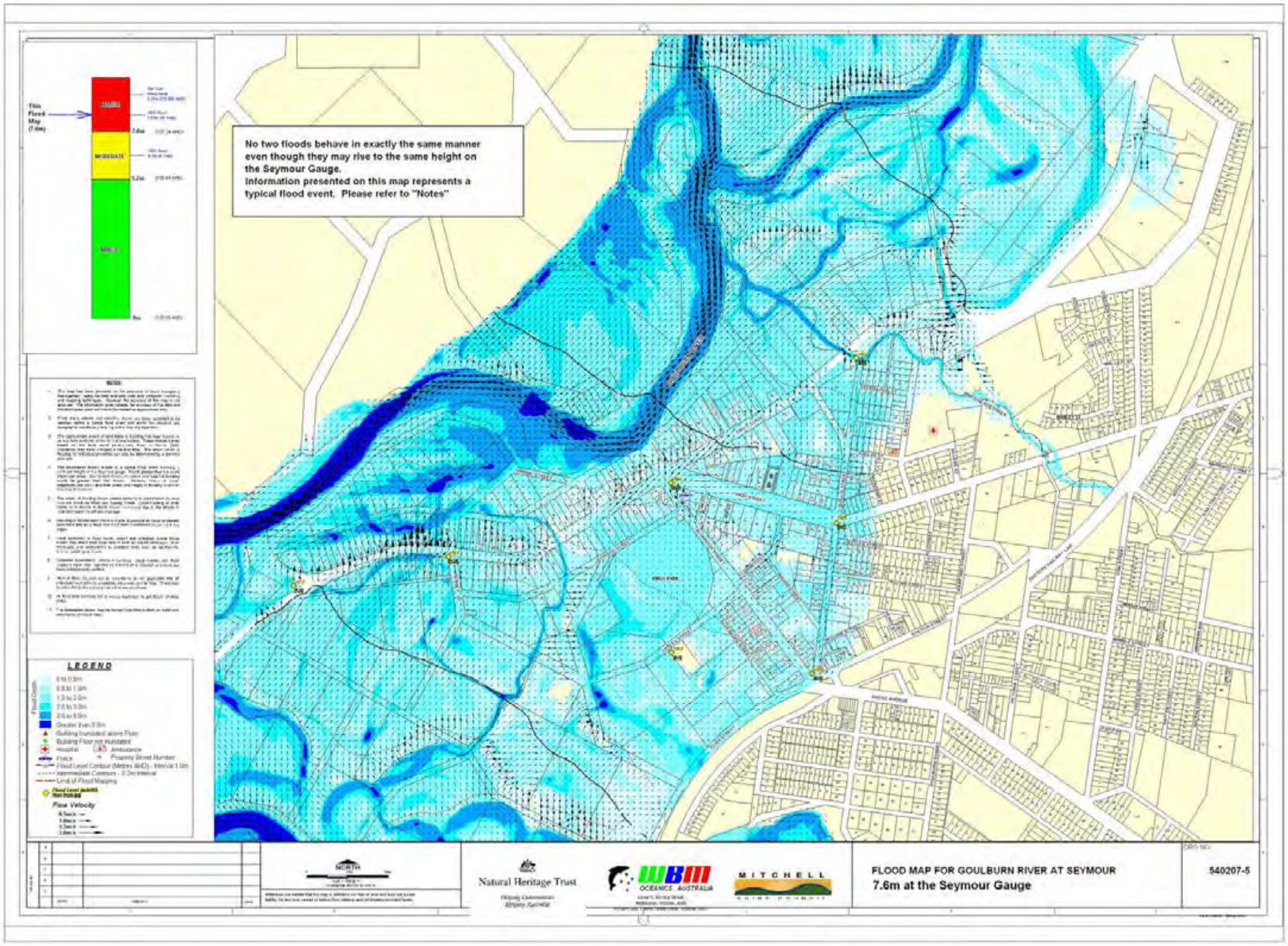
Flood extent, depths and velocities at Seymour - gauge height 6.6m



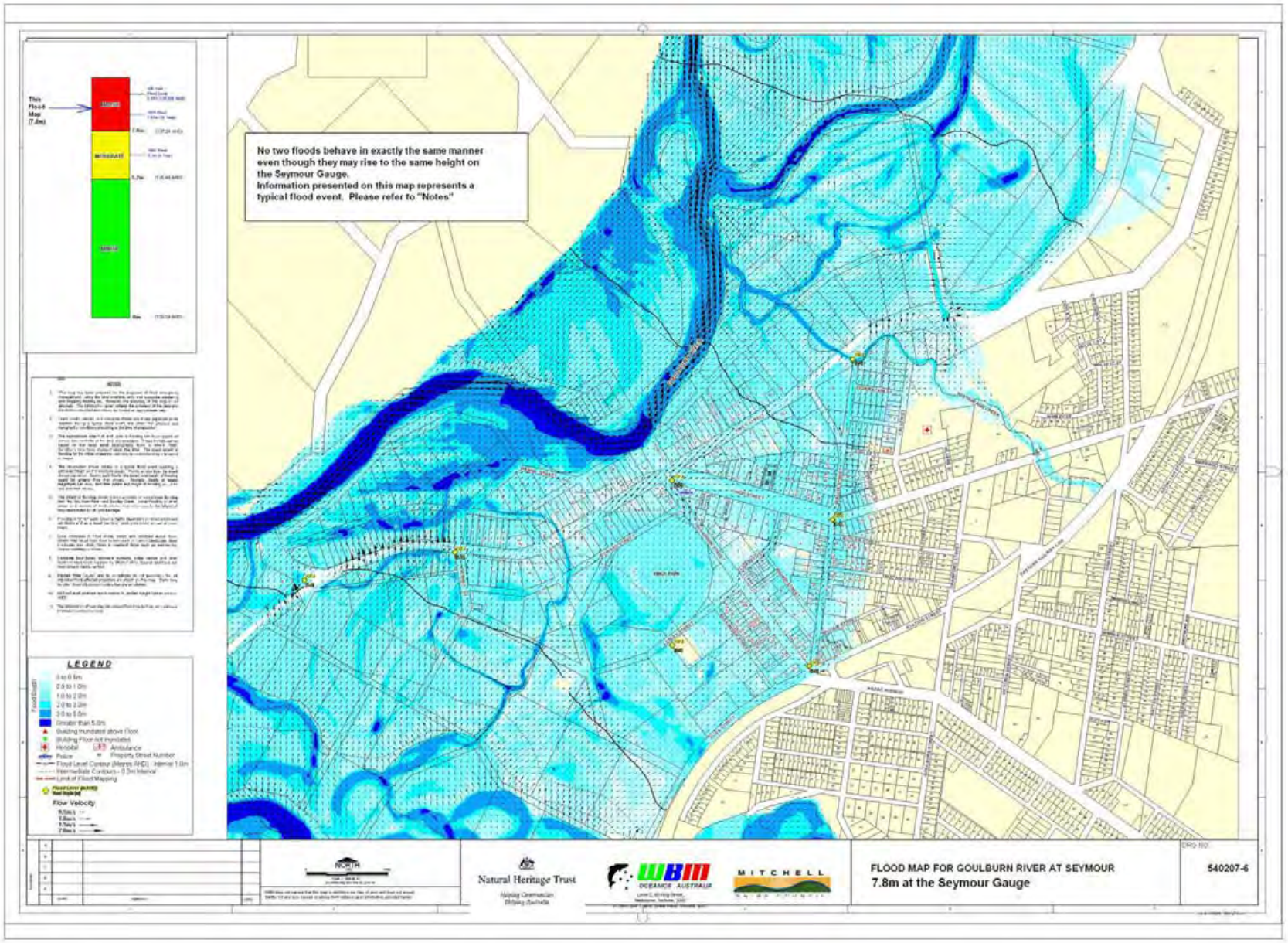
Flood extent, depths and velocities at Seymour - gauge height 7.0m



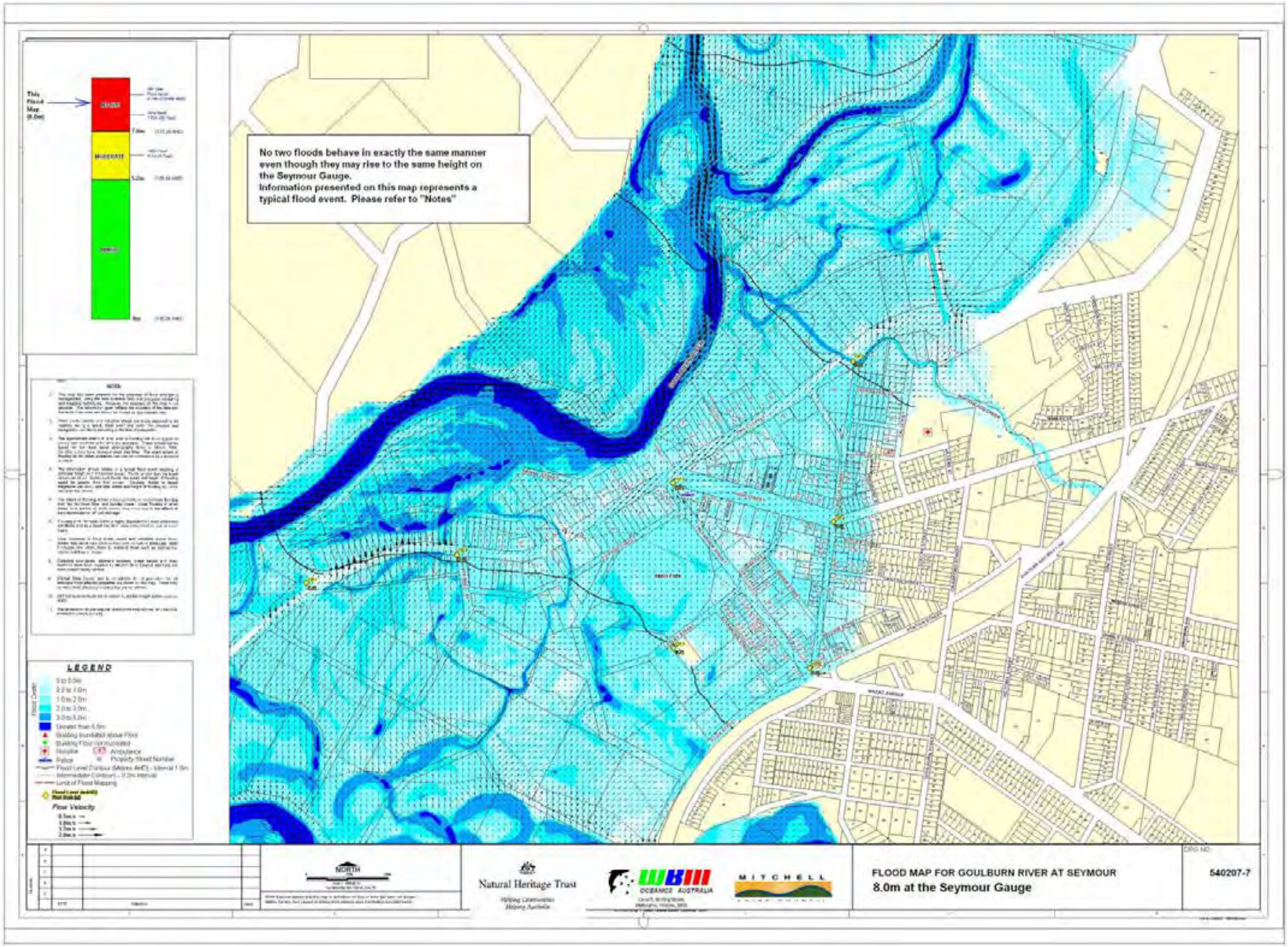
Flood extent, depths and velocities at Seymour - gauge height 7.4m



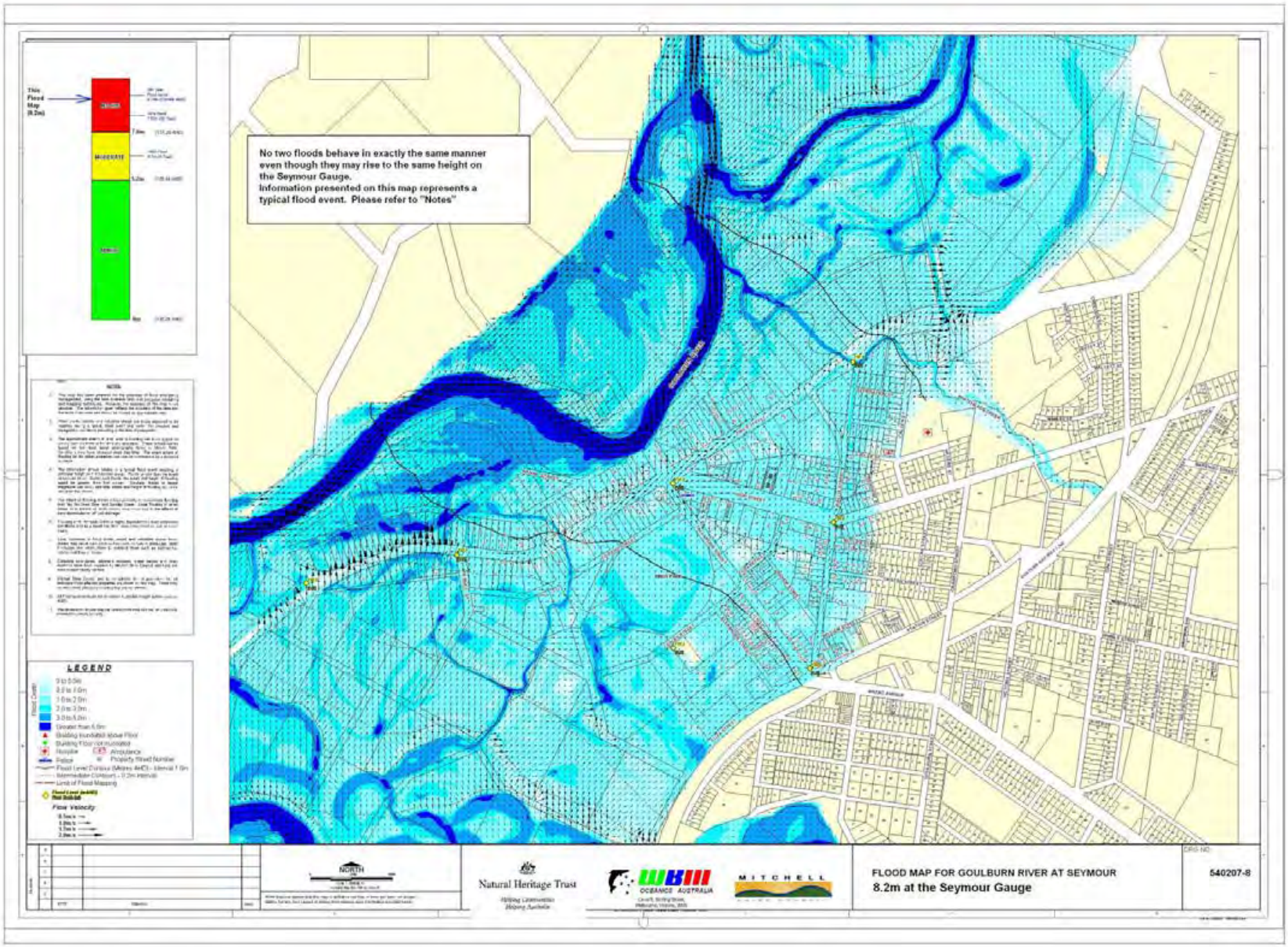
Flood extent, depths and velocities at Seymour - gauge height 7.6m



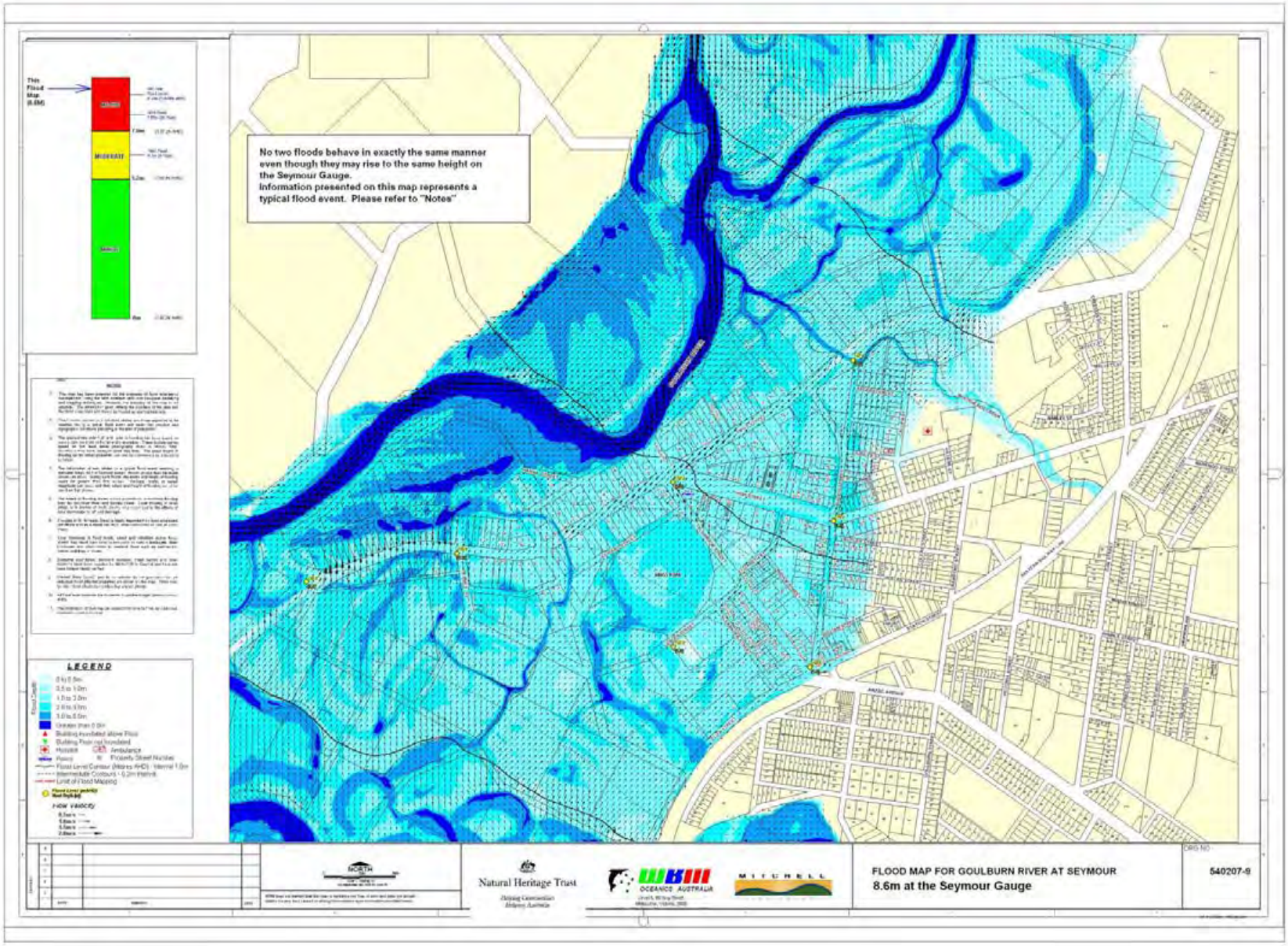
Flood extent, depths and velocities at Seymour - gauge height 7.8m



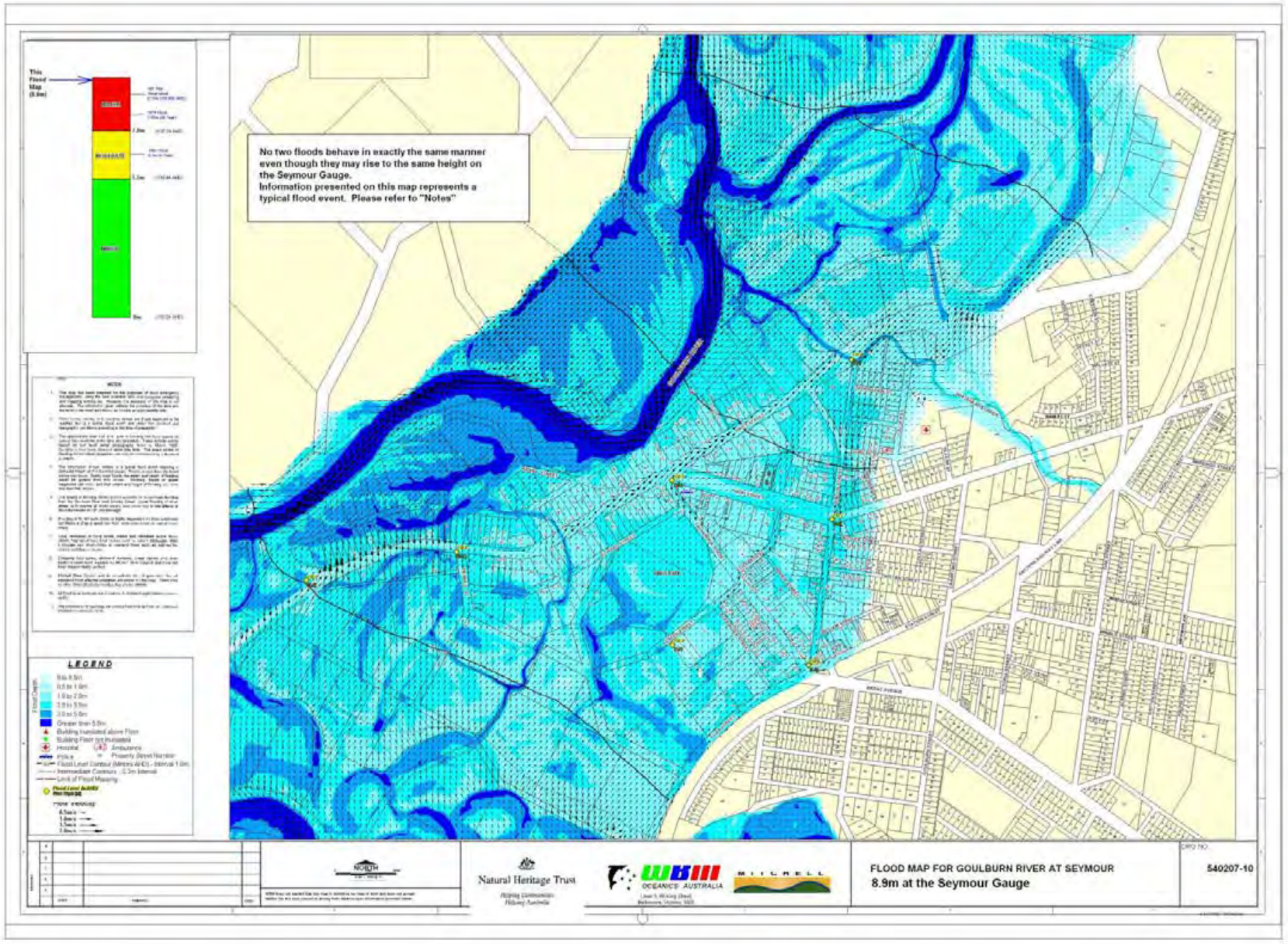
Flood extent, depths and velocities at Seymour - gauge height 8.0m



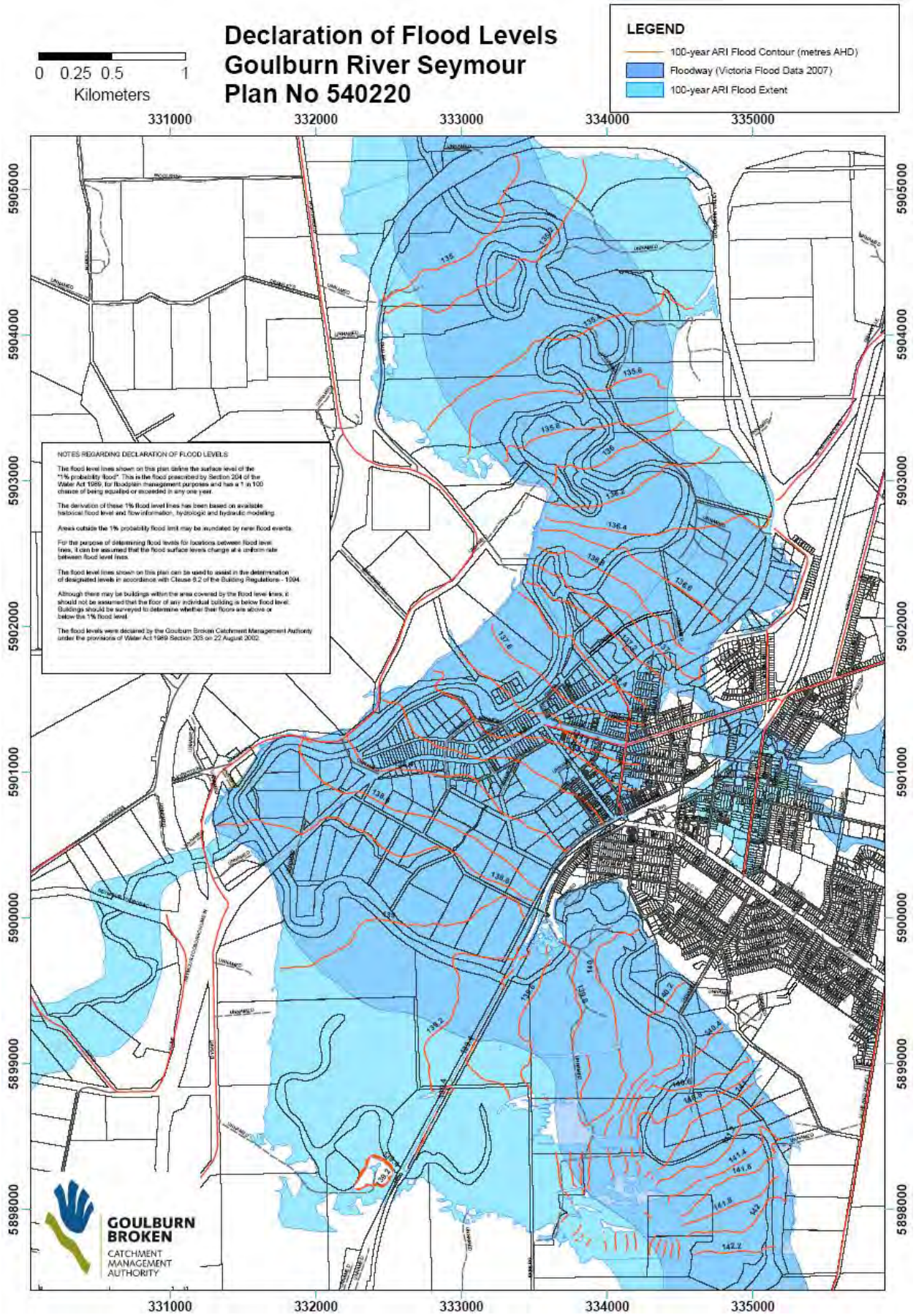
Flood extent, depths and velocities at Seymour - gauge height 8.2m



Flood extent, depths and velocities at Seymour - gauge height 8.6m



Flood extent, depths and velocities at Seymour - gauge height 8.9m



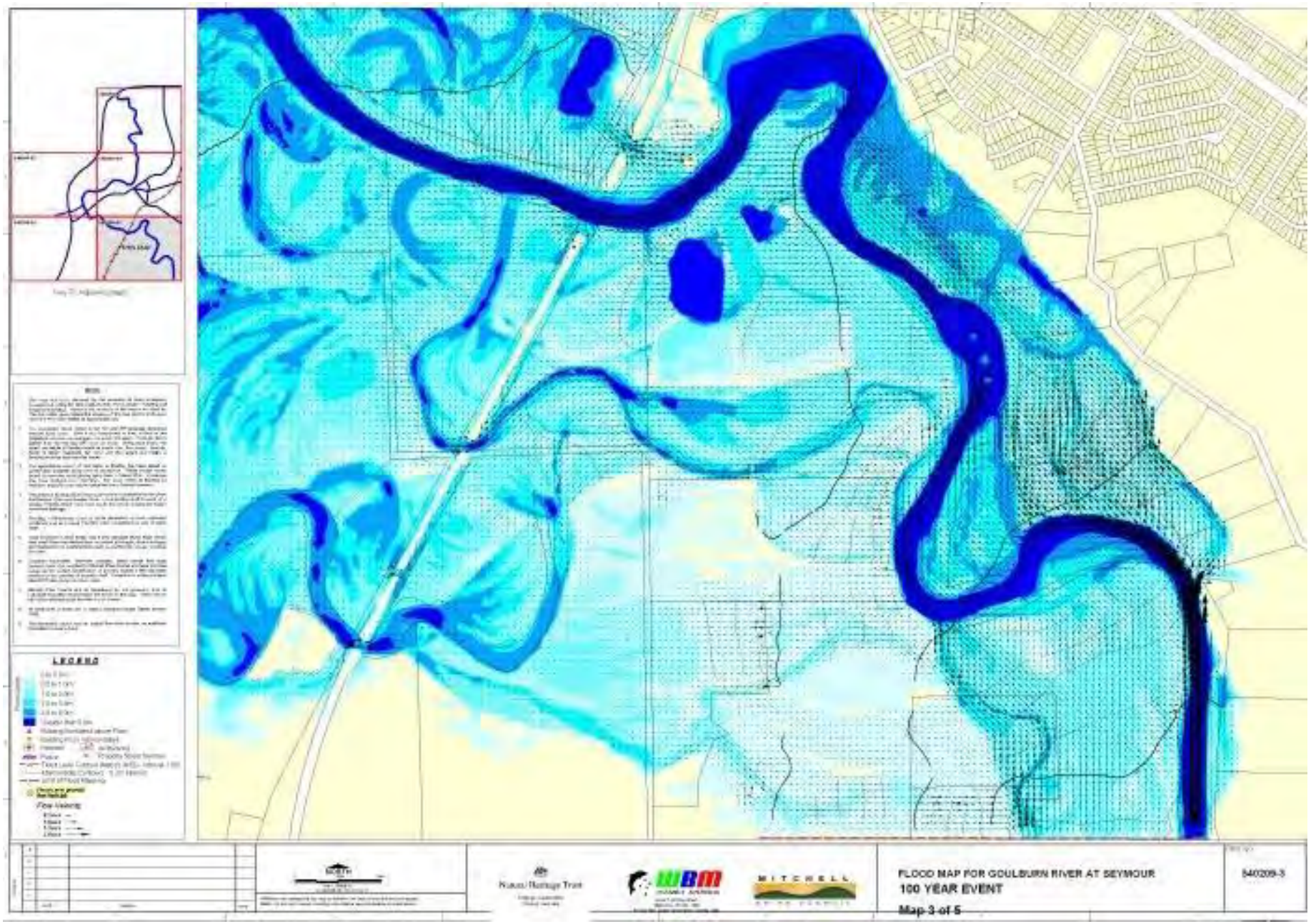
100-year ARI flood extent and depths at Seymour

5 Map showing 1% AEP flood extent at Seymour

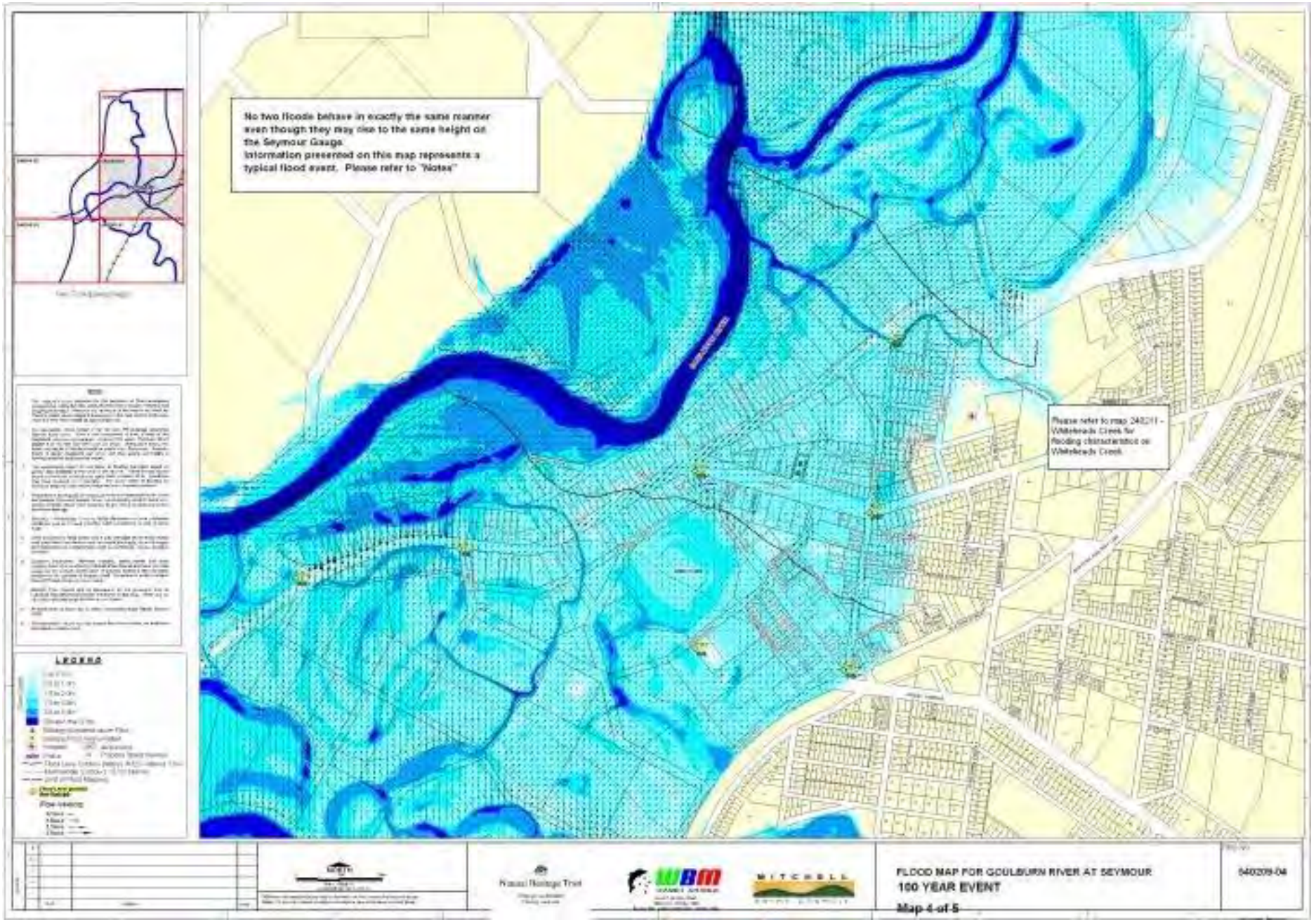
6 Maps showing flood extents and depths for Goulburn River flooding at Seymour (sourced from Seymour Floodplain Mapping Study, March 2001)

1% AEP (100-year ARI) flood extent and depths at Seymour for a Goulburn River flood

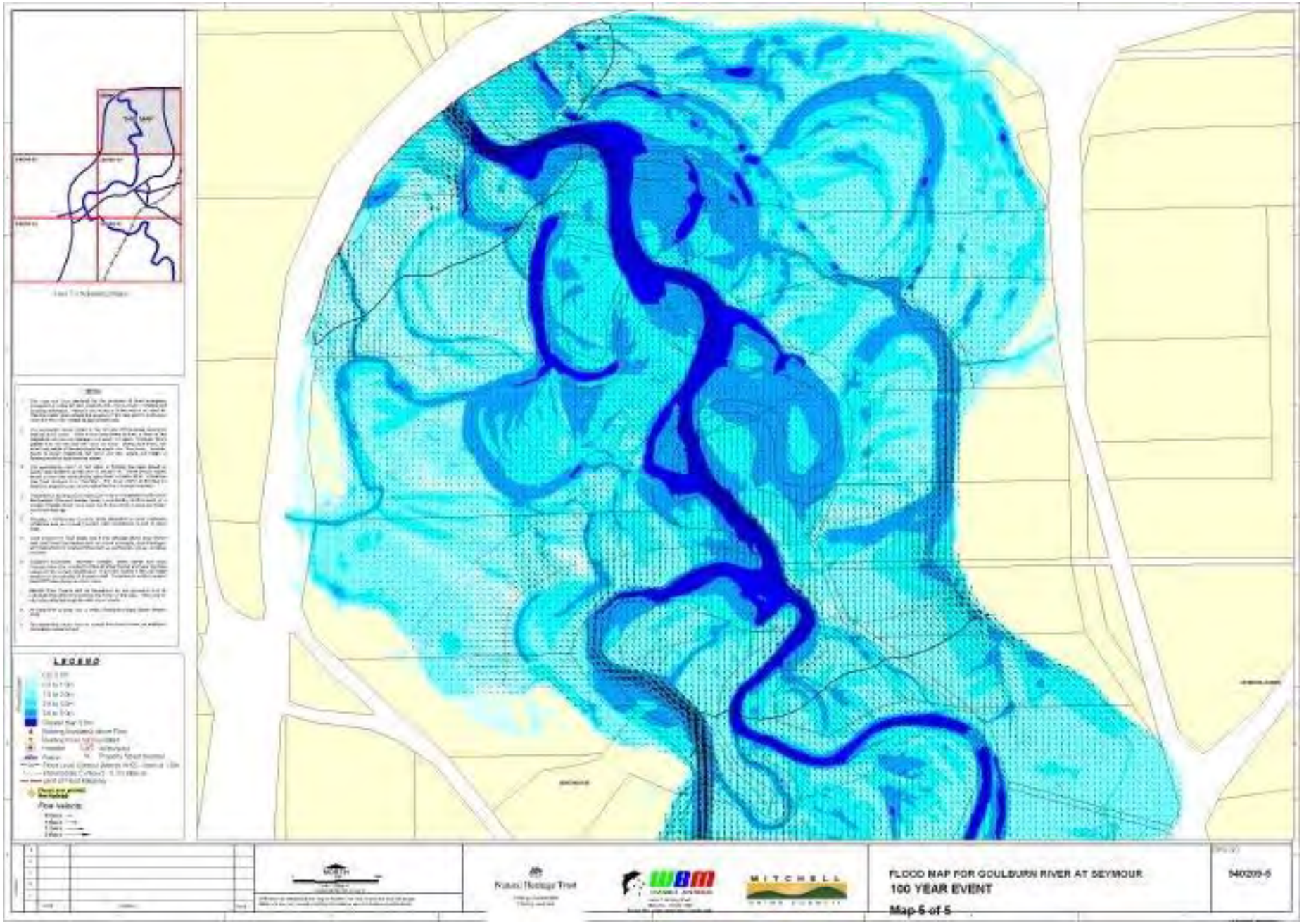
1% AEP (100-year ARI) flood extent and depths at Seymour for a Goulburn River flood



1% AEP (100-year ARI) flood extent and depths at Seymour for a Goulburn River flood

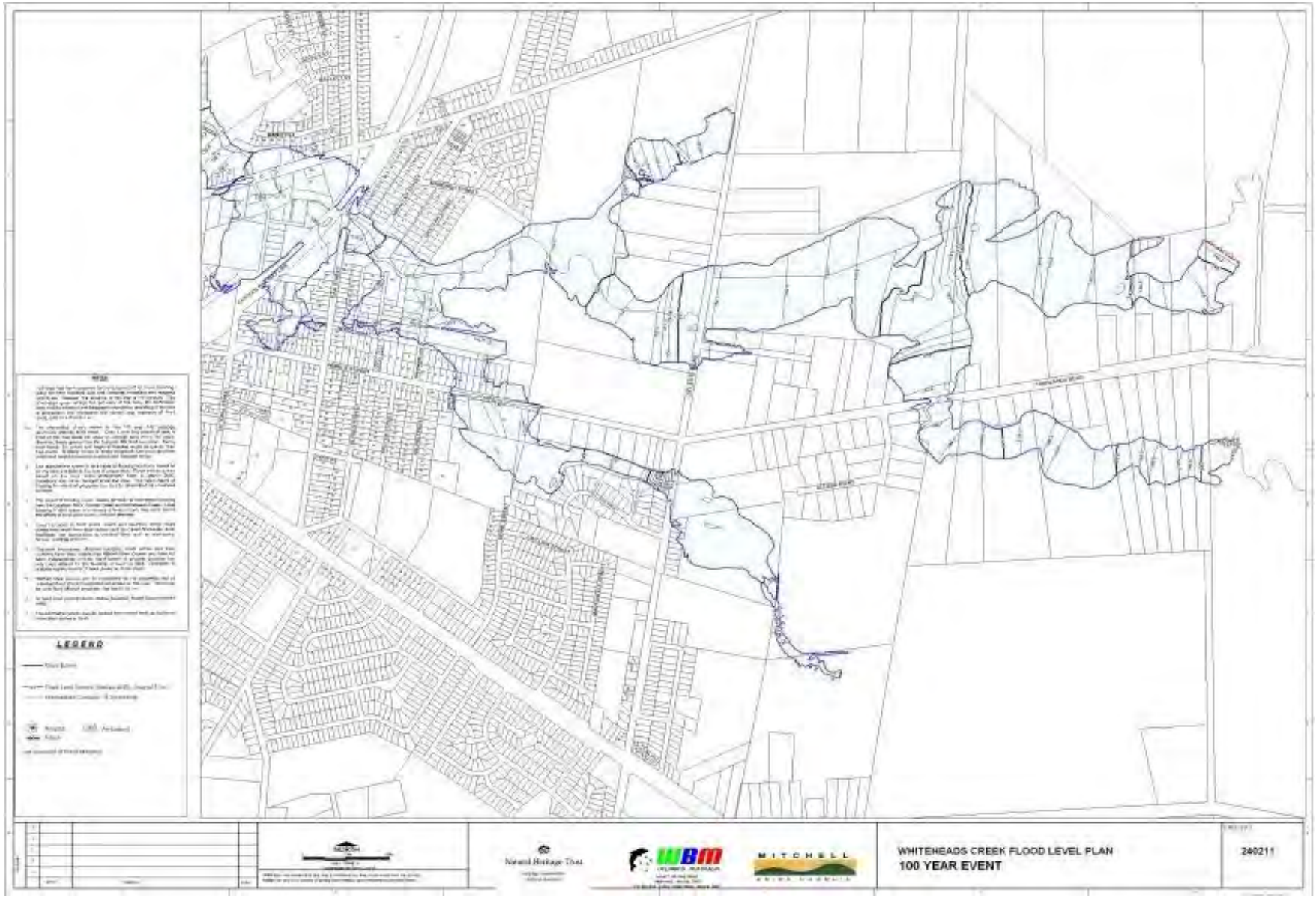

No two floods behave in exactly the same manner even though they may rise to the same height on the Seymour Gauge.
Information presented on this map represents a typical flood event. Please refer to "Notes"
Please refer to map 240211 - Whiteheads Creek for flooding characteristics on Whiteheads Creek
LEGEND
FLOOD MAP FOR GOULBURN RIVER AT SEYMOUR
100 YEAR EVENT
Map 4 of 5
640209-04

1% AEP (100-year ARI) flood extent and depths at Seymour for a Goulburn River flood

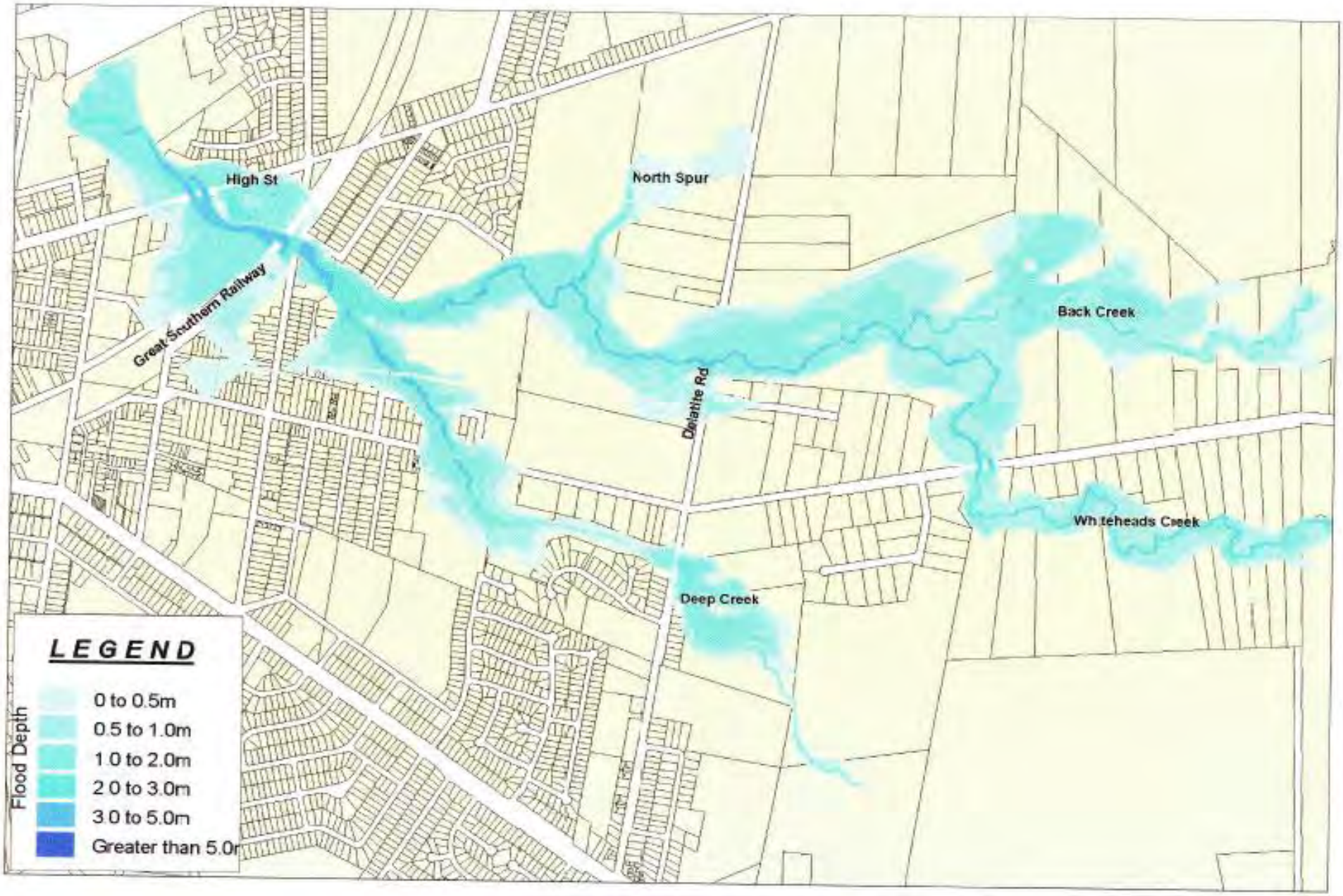


1% AEP (100-year ARI) flood extent and depths at Seymour for a Goulburn River flood

7 Map showing flood extent and depths for Whiteheads Creek at Seymour (sourced from Seymour Floodplain Mapping Study, March 2001)

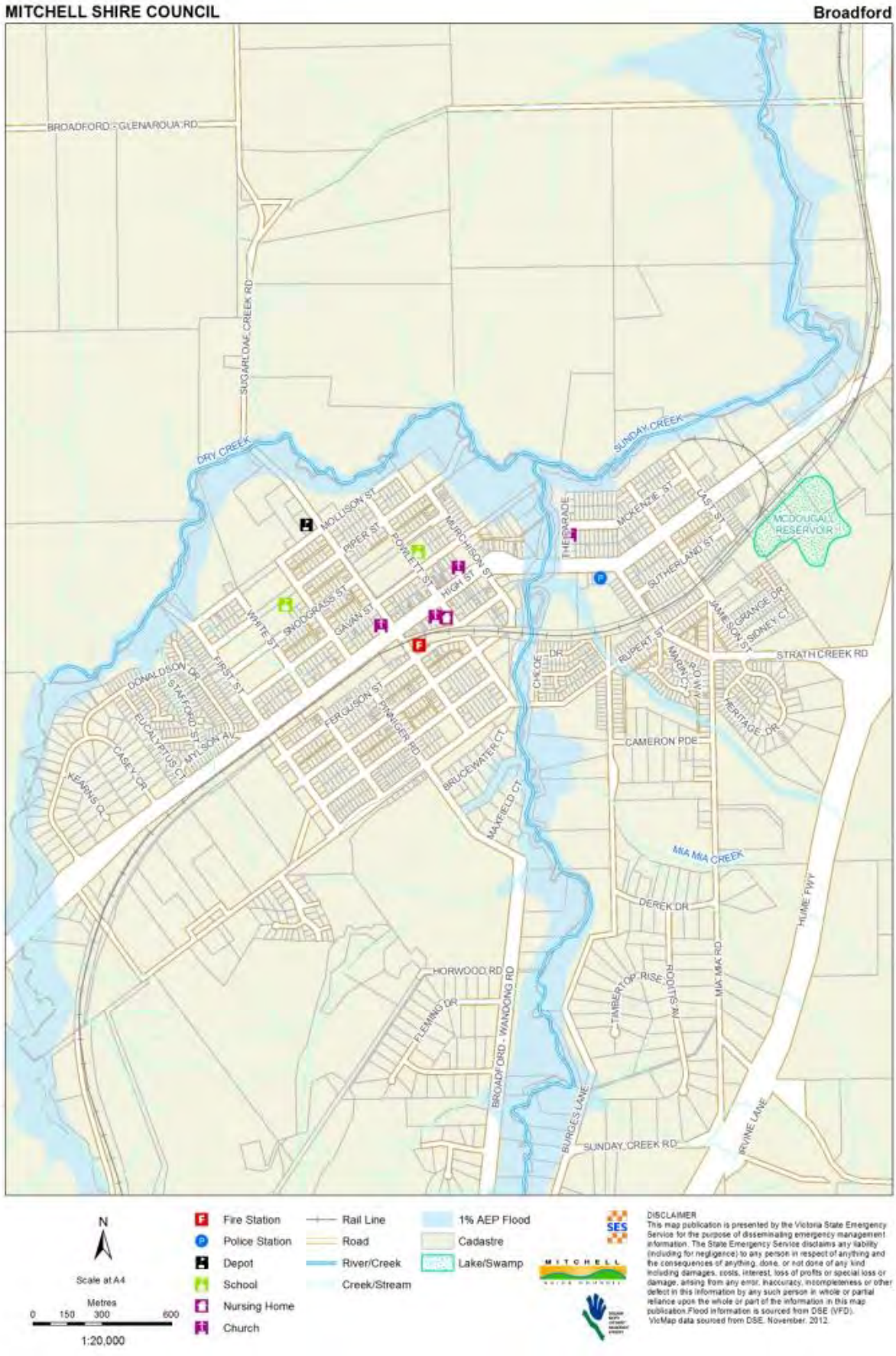


1% AEP (100-year ARI) flood extent and levels at Seymour for a Whiteheads Creek flood



1% AEP (100-year ARI) flood extent and depths at Seymour for a Whiteheads Creek flood

8 Map showing 1% AEP flood extent: Sunday & Dry Creeks at Broadford



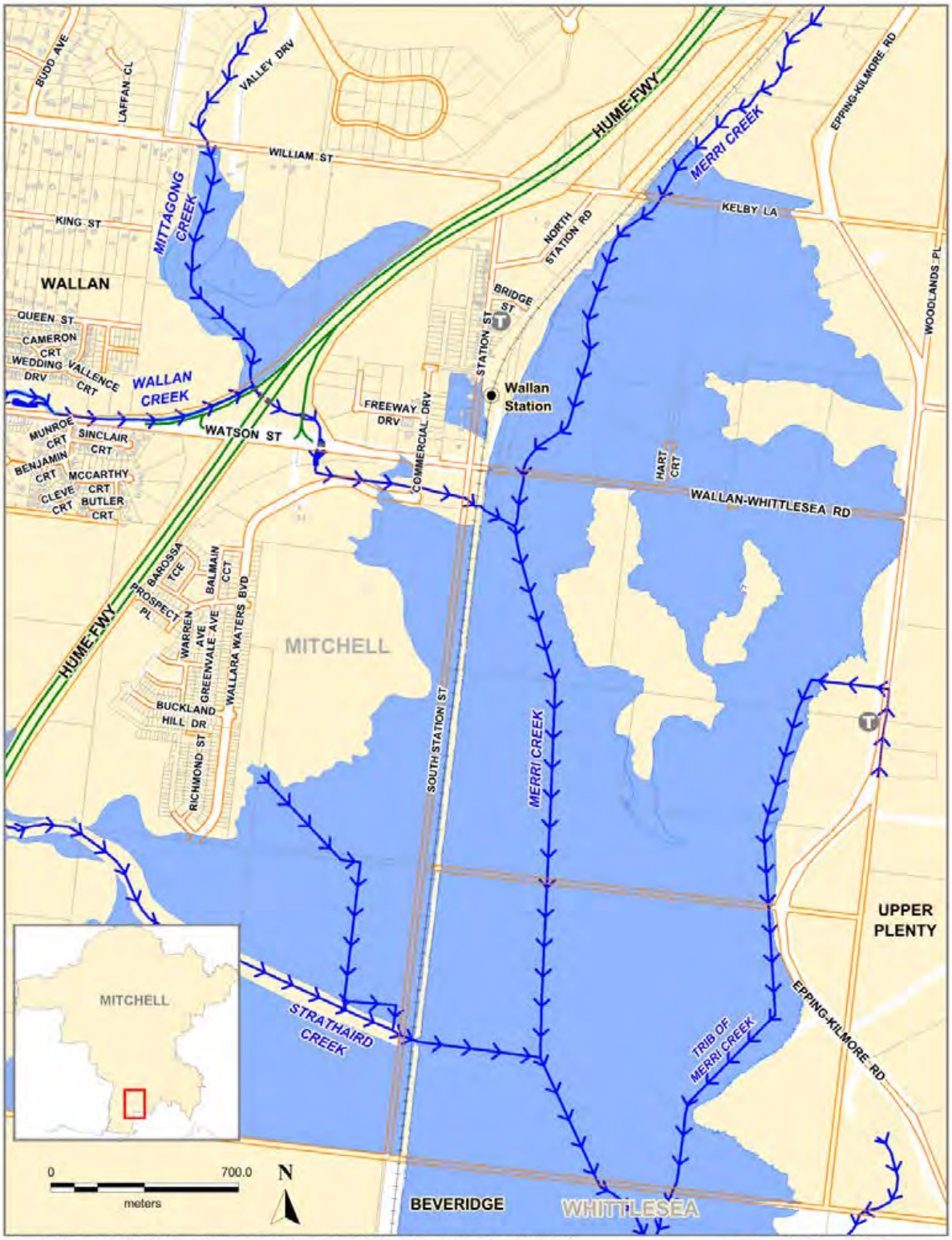
9 Map showing 1% AEP flood extent and depth for Dabyminga Creek at Tallarook (source: Tallarook Flood Investigation, 2008 & VICSES)

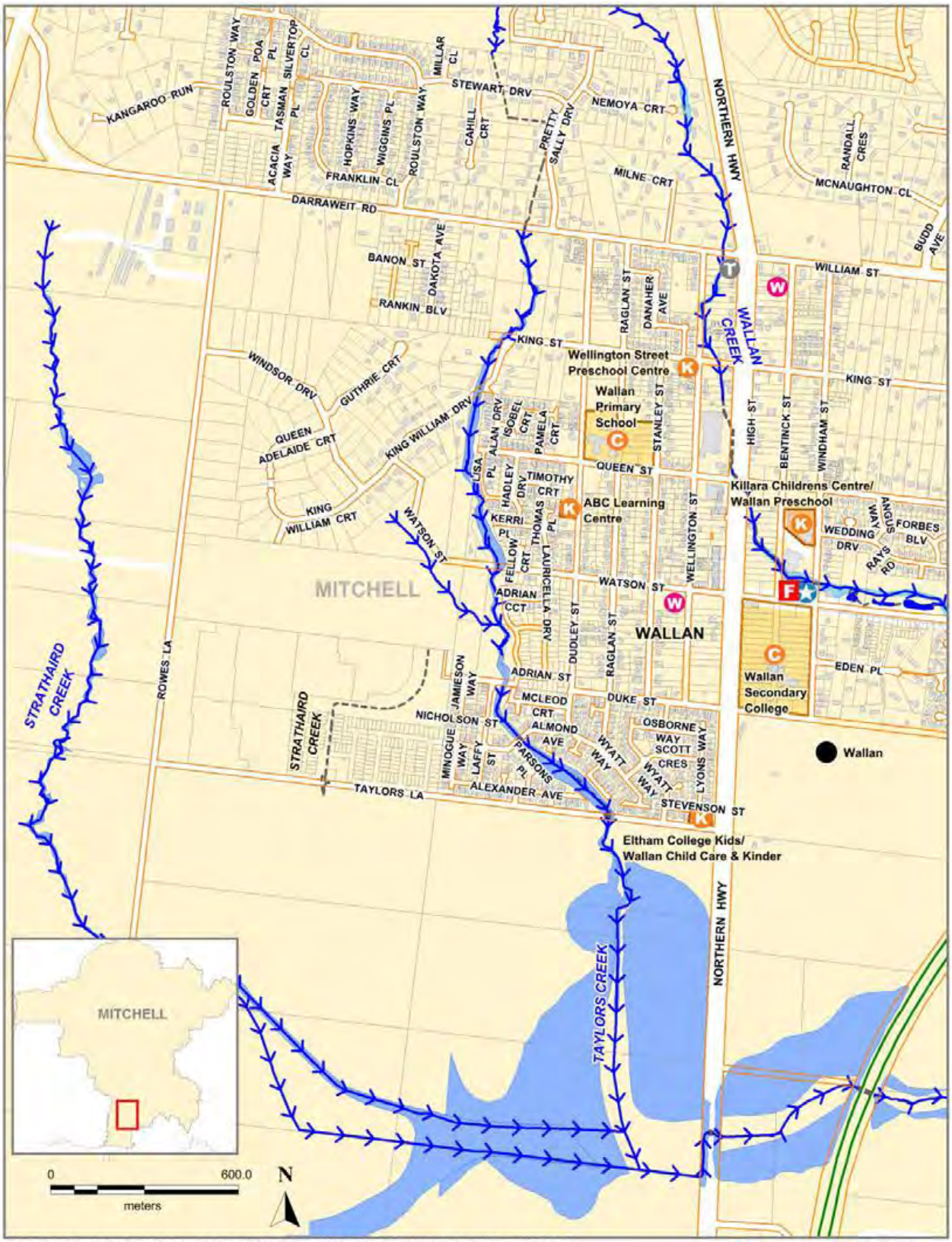

MITCHELL SHIRE COUNCIL
Tallarook
SUNGARRIN RD
SCHOOLHOUSE LANE
KEITH RD
OLD HUME HWY
LEAHYS RD
UPPER GOULBURN RD
LODGE ST
SANCTUARY RD
DAEYUNGA CREEK
TALLAROOK - PYALONG RD
HUME FWY
HEDLEYS LANE
MAIN RD
SHARPS AND TAYLORS RD
N
Scale at A4
Metres
0 150 300 600
1:20,000
Fire Station
School
Church
Rail Line
Road
River/Creek
Creek/Stream
5.91m on the gauge (1% AEP)
Cadastre
SES
MITCHELL SHIRE COUNCIL
DISCLAIMER
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 Goulbourn Broken CMA (Tallarook Flood Investigation 2008). VicMap data sourced from DSE. November 2012.

10 Map showing 1% AEP flood extent for Hughes Creek at Avenel

11 Map showing 1% AEP flood extent for Kalkallo Creek at Beveridge (source: Melbourne Water)

12 Maps showing 1% AEP flood extent for Wallan (source: Melbourne Water)





Please note: Map shows flood extent for Melbourne Water assets only. Flood extent does not reflect council owned drains or assets. March 2013.

MITCHELL SHIRE

1% AEP Flooding

Wallan Creek (Wallan)

- 1% AEP Flood Extent
- Building
- Fire Station
- Place Of Worship
- Police Station
- Open Waterway with Flow Direction
- Telephone Exchange
- Kindergarten / Childcare
- College / School
- Rain Gauge

SES Victoria Melbourne Water

APPENDIX G – Special Flood Considerations for Quarries

The following extracts for have been taken from the quarry risk assessments completed by Jacobs in 2015.

WA1189

WA1189 is located north of the Goulburn River, immediately downstream from two Melbourne to Sydney Railway Line Bridges. The work authority includes two pits. Current operations are restricted to a single pit, with an area of 13.1 hectares and pit depth of 20 m. It is estimated that the basement of the pit lies 12.8 m below the invert of the Goulburn River. This pit is setback 100 m from the Goulburn River. The final approved plan is for a total area of 33 hectares across two pits with a pit depth of 28 m. The basement of the pits would then lie 22 m below the invert of the Goulburn River.

Figure 3.8 shows an aerial image of the Goulburn Floodplain within the vicinity of WA1189. Annotated on this image are arrows showing potential flow paths and avulsion channels that could form if pit capture were to occur. The approximate position of the proposed Seymour town levee is also shown. Figure 3.9 presents a cross-section of the floodplain developed from LiDAR and information known about the depth of the pits. The approximate level for the 100 year flood is also shown to highlight the extent of flooding across the floodplain. A review of modelling by Water Technology indicate that the 20 year flood would inundate the floodplain and result in flow into the pits.

The outcomes of the risk assessment for WA1189 are presented in Table 3.14. Table 3.15 presents a list of infrastructure assets that would be impacted by pit capture, primary failure mechanism, consequence, likelihood and risk ratings.

Pit capture would have major consequences to the physical environment, potentially leading to the formation of a new river alignment with a length of 2 km. The avulsion could potentially create a shorter straighter alignment, with existing meander bends left abandoned. Pit capture could occur at multiple locations, with erosion progressing upstream and downstream degrading the physical form of the floodplain and connecting river. Incision and widening along the avulsion would result in the removal of vegetation and habitat, with trees toppling into the channel. The Goulburn River would be expected to experience high rates of bed and bank erosion for many months and years, impacting on water quality downstream.

Pit capture would have extreme consequences to infrastructure assets and private property. Erosion upstream of the pit could result in severing of the Melbourne to Sydney Railway Lines and damage/failure of the bridges that cross the Goulburn River. Any services that are attached to the railway bridges or traverse the floodplain in the area impacted would also be damaged or destroyed (i.e. electricity, telecommunications, water, gas, sewer). The town levee, although not yet constructed may also be damaged. Emily Street and other roads could potentially be severed. Any buildings that lie within the area may also be impacted.

Lateral migration of the river channel into the current pit is assessed as having a rare likelihood. Sub-surface piping into pit and subsequent failure of pit walls is also assessed as likely. During a flood, palaeochannels that traverse the floodplain will function as preferred flow paths. Sub-surface piping is a likely scenario where these watercourses run close to the pit (within 30 m). Flow of water into and through the pit during a flood and subsequent erosion of the buffer strip between the channel and the pit is assessed as almost certain to occur. Overall, lateral migration of the river channel into the pit is assessed as a low/medium risk. Failure of pit walls as a result of sub-surface piping is assessed as a high/critical risk. Flow of water into and through the pit and subsequent erosion is a critical risk. Potential management options to treat assessed risks are outlined in Table 3.16.

Figure 3.8: Preferred flow and potential avulsion paths and points of flow entry and exit into pit at WA1189. The approximate proposed levee alignment is also shown.

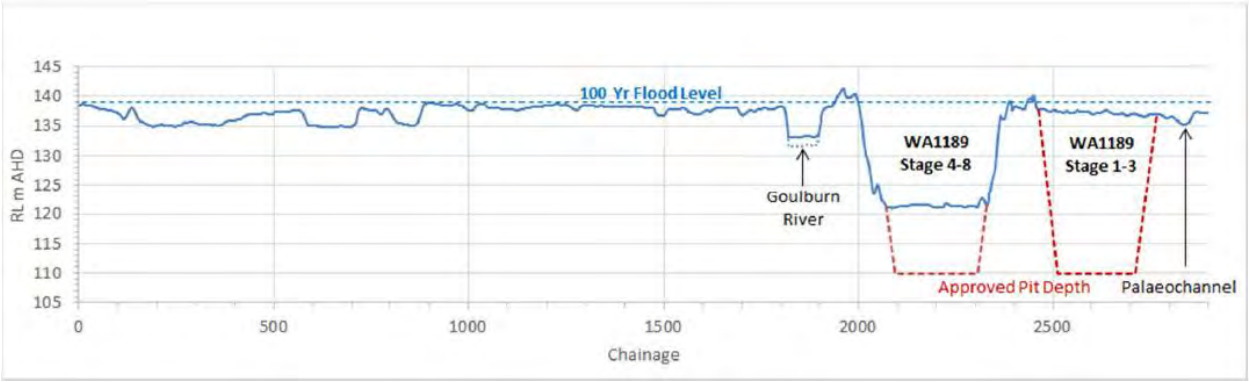


Figure 3.9: Floodplain cross-section from LiDAR showing the relief of the Goulburn River Floodplain, WA1189 Current and Approved Pits.

WA781

WA781 is located east of the Goulburn River, 1 km upstream of the Hume Freeway. The work authority includes two existing pits with a total area of 13.5 hectares, with approval to mine seven pits with a total area of 56 hectares. The smaller of the two existing pits is setback 50 m from the Goulburn River and has a maximum depth of 15 m. This pit is no longer being mined. The second existing pit is setback further from the Goulburn River and has a maximum depth of 15 m. It is estimated that the basement of both existing pits lie 8.4 m below the invert of the Goulburn River. It is noted that the approved work plan does not explicitly limit the depth of the extraction pits to 15 m. It only refers to 15 m as a batter height.

The floodplain is also traversed by a series of palaeochannels, which during floods would act as preferred flow paths. Figure 3-10 shows an aerial image of the Goulburn Floodplain within the vicinity of WA781.

Annotated on this image are arrows showing potential flow paths and avulsion channels that could form if pit capture were to occur. Many of these arrows follow the course of palaeochannels. Figure 3-11 presents a cross-section of the floodplain developed from LiDAR and information known about the depth of the pits. The approximate level for the 100 year flood is also shown to highlight the extent of flooding across the floodplain. A review of modelling by Water Technology indicate that the 20 year flood would inundate the floodplain and result in flow into the pits.

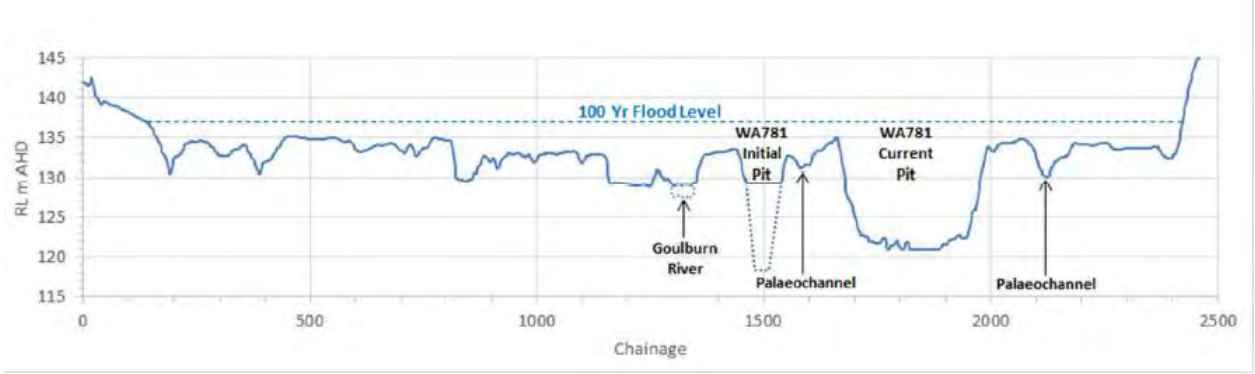
Review of aerial imagery and ground inspection showed that the western and northern battered banks of the smaller pit are covered with vegetation, however the southern and western batter banks, which are closest to the Goulburn River are relatively bare and lacking in vegetation (see Figure 3-10 and Figure 3-11A). A palaeochannel/drainage line also traverses between the two pits (Figure 3-11B). An assessment of this drainage line between the two pits in the field showed this to have experienced some piping and scour of the embankments of the smaller pit (Figure 3-11C, D). While the erosion observed is relatively minor, it does highlight that material is readily eroded and that relatively minor flows along this drainage line will spill into the smaller pit. A review of 2011 aerial imagery and LiDAR indicates that the 2011 floods resulted in flow into both the smaller and larger pit, capturing this drainage line. Figure 3.13 shows a panoramic photograph taken of the larger pit. Vegetation has established in areas at the base of the pit and the lower batters. The upper batters are generally bare and lacking in vegetation cover.

The outcomes of the risk assessment for WA781 are presented in Table 3.17. Table 3.18 presents a list of infrastructure assets that would be impacted by pit capture, primary failure mechanism, consequence, likelihood and risk ratings.

Pit capture would have major consequences to the physical environment, potentially leading to the formation of a new river alignment that could range in length from 700 m to > 3 km. Pit capture could occur at multiple locations, with erosion progressing upstream and downstream degrading the physical form of the floodplain and connecting river. Incision and widening along the avulsion would result in the removal of vegetation and habitat, with trees toppling into the channel. The avulsion may follow the alignment of an existing palaeochannel or potentially create a shorter, straighter path to the Goulburn River, with the abandonment of existing sections of the river. The Goulburn River would be expected to experience high rates of bed and bank erosion for many months and years, impacting on water quality downstream.
Pit capture would have major consequences to infrastructure assets and private property. The Hume Freeway may be impacted by pit capture, as erosion downstream of the pits could result in severing of the freeway and damage/failure of the bridge that crosses the Goulburn River. Local access tracks would be severed, splitting properties, with damages to agricultural assets (i.e. fences) and land capability.

Lateral migration of the river channel into the smaller pit is assessed as having a moderate likelihood. Continued erosion of the Goulburn River bank could result in the river being captured by the pit. Sub-surface piping into either of the two pits and subsequent failure of pit walls is considered likely. During a flood, palaeochannels that traverse the floodplain will function as preferred flow paths. Sub-surface piping is a likely scenario where these watercourses run close to the pits (within 30 m). Flow of water into and through the pits during a flood and subsequent erosion of the buffer strip between the channel and the pits leading to pit capture and consequences outlined is assessed as almost certain to occur.

Preferred flow and potential avulsion paths and points of flow entry and exit into two pits at WA781.



Floodplain cross-sections from LiDAR showing the relief of the Goulburn River Floodplain and WA781 Pits

WA232

WA232 is located east of the Goulburn River, 1 km downstream of the Hume Freeway. The pit is setback from the river 40 m with a total area of 5.5 hectares. There is a narrow low lying embankment that divides the pit into two areas. Both areas have a maximum depth of 15 m, are at their deepest nearest to the river, becoming more shallow towards the eastern boundary of the pit where they only reach 5-6 m in depth, with bedrock at the base. It is estimated that the basement of the pit lies up to 9.3 m below the invert of the Goulburn River. The pit is no longer being mined.

Figure 3.14 shows an aerial image of the Goulburn Floodplain from the Hume Freeway downstream to WA232. Annotated on this image are arrows showing potential flow paths and avulsion channels that could form if pit capture were to occur. A review of modelling by Water Technology indicates that the 20 year flood would inundate the floodplain and result in flow entry into the pit. The flooding pattern is such that as the river rises, water backs up into the downstream pit area first, with water following the path of a palaeochannel that connects with the pit.

The outcomes of the risk assessment for WA232 are presented in Table 3.20. Table 3.21 presents a list of infrastructure assets that would be impacted by pit capture, primary failure mechanism, consequence, likelihood and risk ratings.
Pit capture would have major consequences to the physical environment, potentially leading to the formation of a new river alignment. Pit capture could occur at multiple locations, with erosion progressing upstream and downstream degrading the physical form of the floodplain and connecting river. Incision and widening along the avulsion would result in the removal of vegetation and habitat, with trees toppling into the channel. The avulsion could potentially create a shorter straighter alignment, with existing meander bends left abandoned. The Goulburn River would be expected to experience high rates of bed and bank erosion for many months and years, impacting on water quality downstream.

Pit capture would have major consequences to infrastructure assets and private property. The Hume Freeway may be impacted by pit capture, as erosion upstream of the pits could result in severing of the freeway and damage/failure of the bridge that crosses the Goulburn River. Local access tracks would be severed, splitting properties, with damages to agricultural assets (i.e. fences) and land capability.

Lateral migration of the river channel into the pit is assessed as having a moderate likelihood. Continued erosion of the Goulburn River bank could result in the river being captured by the pit. Sub-surface piping into pit and subsequent failure of pit walls is also assessed as having a moderate likelihood. Flow of water into and through the pit during a flood and subsequent erosion of the buffer strip between the channel and the pit and consequences outlined is assessed as almost certain to occur. Overall, lateral migration of the river channel into the pit and failure of pit walls as a result of sub-surface piping is assessed as a medium/high risk. Flow of water into and through both pits and subsequent erosion is a critical risk. Potential management options to treat assessed risks are outlined in Table 3.22.

Potential avulsion paths and points of flow entry and exit into WA232 pit.

APPENDIX H – REFERENCES AND INTEL SOURCES

The following studies maybe useful in understanding the nature of flooding within Mitchell Shire.

- GBCMA (2008): *Tallarook Flood Investigation,* 2008.
- HydroTechnology (1995): *Documentation and Review of 1993 Victorian Floods - Volume 5 – Goulburn catchment*, March 1995.
- KinHill Engineers (1991): *Shire of Seymour Floodplain Mapping, Avenal and Tallarook Townships – Final Report*, October 1991.
- Melbourne Water (2007): *Kalkallo Creek Flood Mapping*, June 2007.
- Melbourne Water (2007): *Taylors Creek Flood Study*, November 2007.
- Mitchell Shire Council (2010): *Taylors Creek Strategic Plan*, January 2010.
- Mitchell Shire Council (2013): *Historical Flood Incidents*, 2013.
- PB Aust (2007): *Kalkallo Creek Drainage Scheme*, June 2007 ----- for West Beveridge
- Shire of Kilmore (1990): *Merri Creek Catchment Study - Wallan Flood Mitigation Strategy*, November 1990.
- Shire of Kilmore (1990): *Wallan Airfield and Saleyards Development Report – Merri Creek Catchment Study*, 1990.
- Water Technology (2012): *Strategic Flood Intelligence Report – Goulburn Basins*, May 2012.
- Water Technology (2013): *Flood Management Plan for Mitchell Shire and Melbourne Water,* May 2013.
- WBM (2001): *Seymour Floodplain Mapping Study, Final Report*, March 2001.
- WBM (2001): *Seymour Floodplain Mapping Study, Addendum to Final Report – Whiteheads Creek Flood Mapping,* March 2001.
- WBM (2017): *Kilmore Flood Mapping and Intelligence Study*. Series of reports.

Other sources of information of direct relevance to the Municipality include:

- http://www.gbcma.vic.gov.au
  Goulburn Broken Catchment Management Authority for various references and the 1% flood level contour atlas.
- http://www.nccma.vic.gov.au
  North Central Catchment Management Authority for various references
- http://planningschemes.dpcd.vic.gov.au/index.html
  Department of Planning and Community Development for planning scheme flood maps
- http://www.vicwaterdata.net/vicwaterdata/home.aspx
  for historical data on water quality, river heights and flows
- http://www.bom.gov.au
  Bureau of Meteorology for river gauge readings and flood warnings
- http://www.floodvictoria.vic.gov.au
  for information on historic floods in Victoria – VERY USEFUL
- http://www.ses.vic.gov.au
  Victoria State Emergency Service
- http://www.dse.vic.gov.au/fire-and-other-emergencies
  Department of Sustainability and Environment emergency management. (note that this may shortly change to DEDJTR)
- COUNCIL, GBCMA, NCCMA, Melbourne Water and VICSES Geographical Information System (GIS) – these contain layers showing drainage assets, flooding extents, flood related call-out locations, roads, title boundaries and other useful information.

Relevant but more general references include:

- Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000), Standing Committee on Agriculture and Resource Management (SCARM) Report No 73: *Floodplain Management in Australia, Best Practice Principles and Guidelines*.
- Bureau of Meteorology (1996): *Bureau of Meteorology Policy on the Provision of the Flash Flood Warning Service.* May 1996.

- Department of Sustainability and Environment (DSE) (2008): *Victoria Caravan Parks Flood Emergency Management Plan Template and Guidelines*. (Two documents) March 2008.
- Victorian Flood Management Strategy 1997-2007
- Emergency Management Act 1986
- Emergency Management Manual Victoria, 1997 Edition
- http://www.ema.gov.au
  Emergency Management in Australia
  - Managing the Floodplain, Manual 19, EMA 2009
  - Flood Preparedness, Manual 20, EMA 2009
  - Flood Warning, Manual 21, EMA 2009
  - Flood Response, Manual 22, EMA 2009
  - Emergency Management Planning for Flood Affected by Dams, Manual 23, EMA 2009
- Mitchell Shire Municipal Emergency Management Plan
- Water Act 1989
- Flood Warning Station Information Manual - February 1999

Mitchell Shire
Flood Emergency Plan