



City of Melton Municipal Storm and Flood Emergency Plan

A Sub-Plan of the Municipal Emergency
Management Plan

for the City of Melton
and
VICSES Melton Unit
Version 3.0, June 2018



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Distribution List *review list*

Copy No.	Issue To:		Date
	Position	Organisation	
Original	MEMP Committee Executive Officer	Melton Council	
1	MEMP Committee Chairperson	Melton Council	
2	MERO	Melton Council	
3	Deputy MERO	Melton Council	
4	MRM	Melton Council	
5	Deputy MRM	Melton Council	
6	MERC	Vic Police	
7	Deputy MERC	Vic Police	
8	RERC	Vic Police	
9	North West REMI	Vic Police	
10	Operations Officer Emergency Management	VICSES Central Region	
11	Controller	VICSES Melton Unit	
12	Group Manager	Ambulance Victoria	
13	Operations Manager	CFA District Office	
14	Emergency Management Coordinator	Department of Health and Human Services	
15	Regional Emergency Management Officer	VicRoads Burwood office	
16	Western Zone	MFESB	
17	Emergency Management Officer	St John Ambulance	
18	Emergency Management Coordinator	City Water	
19	Coordinator Management Systems	Western Water	
20	Team Leader Hydrology & Flood Warnings	Melbourne Water	
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Document Transmittal Form / Amendment Certificate

This Municipal Storm & Flood Emergency Plan (MSFEP) will be amended, maintained and distributed as required by VICSES in consultation with the City of Melton

Suggestions for amendments to this Plan should be forwarded to:

VICSES Regional Office Central Region
239 Proximity Drive

SUNSHINE WEST 3020

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
Issue date of Flood Emergency Plan – 15 May 2013			
2	29/03/2016	R Butler	Update of Appendix A, B, C, F and addition of Appendix G
3	June 2018	R Butler and J Griffin	Update legislative references, acronyms, inclusion of operational information, Update of Appendix A, B, C, F & G
4	May 2019	M Patton	Endorsed by MEMPC

This Plan will be maintained on the Melton Crisisworks website.

List of Abbreviations & Acronyms

The following abbreviations and acronyms are used in the Plan:

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

Part 1. INTRODUCTION

1.1 Municipal Endorsement

This Municipal Storm and Flood Emergency Plan (MSFEP) has been prepared by City of Melton Municipal Emergency Management Planning Committee (MEMPC) pursuant to Section 20 of the Emergency Management Act 1986 (as amended).

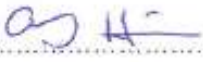
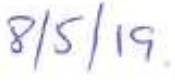


This MSFEP is a sub plan to the City of Melton Municipal Emergency Management Plan (MEMP), is consistent with the Emergency Management Manual Victoria (EMMV), the Victoria Flood Management Strategy, VICSES Central Region Flood and Storm Emergency Plan, the State Flood Emergency Plan and the State Storm Emergency Management Plan and takes into account the outcomes of the Community Emergency Risk Assessment (CERA) process undertaken by the Municipal Emergency Management Planning Committee (MEMPC).

This Municipal Storm and Flood Emergency Plan is a result of the cooperative efforts of the City of Melton Emergency Management Planning Committee (MEMPC) and its member agencies.

Minor and administrative amendments will be made to this MSFEP from time to time without re-presenting the plan to the MEMPC. Any major structural or policy changes will be considered before adoption.

This Plan is endorsed by the City of Melton MEMPC as a sub-plan to the MEMP.

Endorsement

	
Chair MEMPC	Date
	
John Chaplain (Manager Regional Emergency Management - VICSES Central Region)	Date

1.2 The Municipality

An outline of the City of Melton in terms of its location, demography and other general matters is 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 Storm and Flood Emergency Plan

The purpose of this MSFEP is to detail arrangements agreed for the planning, preparedness/prevention, response and recovery from flood incidents within the City of Melton

As such, the scope of the Plan is to:

- Identify the storm and flood risk to City of Melton;
- Support the implementation of measures to minimise the causes and impacts of storm and flood incidents within the City of Melton;
- 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 storm and/or flood.

1.4 Municipal Emergency Management Planning Committee (MEMPC)

Membership of the City of Melton Municipal Emergency Management Planning Committee (MEMPC) is comprised of representatives from various agencies and organisations. Contact lists for the MEMPC membership is available in the Melton MEMP.

1.5 Responsibility for Planning, Review and Maintenance of this Plan

This MSFEP must be maintained in order to remain effective.

VICSES through the Municipal Emergency Management Planning Committee (MEMPC) has responsibility for preparing, reviewing, maintaining and distributing this plan.

The MEMPC may delegate to a subcommittee and will meet at least once per year or as required.

The plan should be reviewed and where necessary, arrangements and information contained in it should be amended:

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

1.6 Endorsement of the Plan

The MSFEP is endorsed by the MEMPC as a sub-plan of the MEMP. The MSFEP will be circulated to MEMPC members seeking acceptance of the plan following any large changes to the plan.

Part 2. PREVENTION / PREPAREDNESS ARRANGEMENTS

2.1 Community Awareness for all Types of Storm and Flooding

Details of this MSFEP will be released to the community through local media, VICSES community education programs and websites (VICSES and the Municipality) upon formal endorsement by City of Melton MEMPC.

VICSES with the support of City of Melton and Melbourne Water will coordinate community education programs for storm and flooding within the council area (i.e. Local Flood Guides and public events).

2.2 Structural Flood Mitigation Measures

Structural flood mitigation measures existing within the City of Melton area are contained in **Appendix A** and **C**.

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 regularly exercised, preferably on an annual basis and reviewed following a significant event.

2.3.2 Storm and Flood Warning

Arrangements for storm and flood warning are contained within the State Flood Emergency Plan and State Storm Emergency Plan (<https://www.ses.vic.gov.au/em-sector/vicses-emergency-plans>), the EMMV (Part 3) and on the BoM website (www.bom.gov.au).

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

2.3.3 Flood Wardens

Flood Wardens provide a means of gathering information in real time on flood behaviour along a stream system, and a network for the distribution of community information and warnings to the community along the stream system.

There are no flood wardens within the Melton municipality however local knowledge is incorporated into this plan through consultation with local response agencies. Previous event history and likely operational considerations are noted in the Flood Intelligence Cards in **Appendix C**.

In line with the VICSES Local Knowledge Policy, reviews of this plan will be undertaken with input from multiple local sources to ensure appropriate local knowledge can be captured before, during and after incidents.

Part 3. RESPONSE ARRANGEMENTS

3.1 Introduction

3.1.1 Activation of Response

Storm and Flood response arrangements may be activated by the VICSES Regional Duty Officer (RDO) or Incident Controller (IC).

The VICSES RDO or IC will activate agencies as required and documented in the VICSES Central Region Storm and Flood Emergency Plans, the State Storm Emergency Plan and the State Flood Emergency Plan (<https://www.ses.vic.gov.au/em-sector/vicses-emergency-plans>).

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 storm or flood within the City of Melton. These agencies will be engaged through the IEMT.

The general roles and responsibilities of supporting agencies are as agreed within the City of Melton MEMP, Part 7 of the EMMV, State Flood and Storm Emergency Plans and Regional Storm and Flood Emergency Plans.

3.1.3 Municipal Emergency Coordination Centre (MECC)

Where activated, the function, location, establishment and operation of the MECC will be as detailed in the City of Melton MEMP.

Liaison with the MECC will be through the VICSES RDO / IC or established ICC.

In the event that a MECC is not operating, the Melton Council MERO will be contacted.

3.1.4 Escalation

Most storm and 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 Part 3 of the EMMV.

3.2 State Emergency Management Priorities

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

1. Protection and preservation of life is paramount - this includes:
 - Safety of emergency response personnel, and;
 - Safety of community members including vulnerable community members and visitors/tourists.
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 assets that considers the cultural, biodiversity, and social values of the environment;

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

3.3 Command, Control and Coordination

The Command, Control and Coordination arrangements in this plan must be consistent with those detailed in State and Regional Storm and Flood Emergency Plans. For further information, refer to Part 3 of the EMMV.

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

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 of the EMMV, identifies VICSES as the Control Agency for storm and flood. It identifies DELWP as the Control Agency responsible for dam safety, water and waste water service disruption related incidents and other emergencies

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

3.3.2 Incident Controller (IC)

An IC will be appointed by VICSES (as the Control Agency), to command and control available resources in response to a storm / flood event on the advice of the Bureau of Meteorology, or other reliable source, that a flood event will occur or is occurring. The IC responsibilities are as defined in Part 3 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 if and when the ICC should be activated, rests with the Control Agency (VICSES).

A pre-determined Incident Control Centre is located at;

- Sunshine ICC
- Burnley ICC
- Ferntree Gully ICC
- Dandenong ICC

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.

Divisions and Sectors may be established to assist with the management of flooding within the Municipality:

Pre-determined Divisional Command locations may include:

- Wyndham West Unit LHQ, 418 Ballan Road, Wyndham Vale
- Brimbank Unit LHQ, Stadium Drive, Keilor Park
- Essendon Unit LHQ, Bruce Street Essendon
- Broadmeadows Unit LHQ, 434 Mahoneys Rd, Campbellfield

Sector Command locations are to be allocated on an as needs basis

3.3.5 Incident Management Team (IMT)

The IC will form an IMT in line with AIIMS principles.

Refer to Part 3 of the EMMV for guidance on IMTs.

3.3.6 Incident Emergency Management Team (IEMT)

The IC will establish a multi-agency IEMT to assist with the storm or flood response. The IEMT 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 IC for consideration in developing incident management strategies.

Organisations required within the IEMT (including Melton City Council) 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 Part 3 of the EMMV for guidance on IEMTs.

3.3.7 On Receipt of a Flood Watch / Severe Weather Warning

The VICSES RDO, (until an Incident Controller is appointed) will undertake actions as defined within the Flood Intelligence Cards (**Appendix C**). General considerations by the VICSES RDO/IC will be as follows:

- Review storm and flood intelligence to assess likely flood consequences, including:
 - Melton Reservoir storage percentage is noted (Southern Rural Water Duty Officer)
http://www.srw.com.au/SRW_Storage/DamChart.aspx?dam=Melton+Reservoir)
 - Melbourne Water rainfall and river monitoring
(http://www.melbournewater.com.au/content/rivers_and_creeks/rainfall_and_river_level_data/subcatchment.asp?SubCatchmentID=22)
- 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, storm/flood rescue and air support
- Notify and brief appropriate officers. This includes RCC, (if established), SCC, (if established), Council (as outlined in the City of Melton MEMP) and other emergency services through the IEMT.
- Assess ICC readiness (including staffing of IMT and IEMT) and open if required
- Ensure flood bulletins and community information is prepared and issued to the community
- Monitor watercourses and undertake reconnaissance of low-lying areas
- Develop media and community information management strategy
- Ensure storm and flood mitigation works are being checked by owners
- Develop and issue incident action plan, if required
- Develop and issue situation report, if required

3.3.8 On Receipt of the First and Subsequent Storm and Flood Warnings

The VICSES RDO (until an Incident Controller is appointed) will undertake actions as defined within the Flood Intelligence Cards (**Appendix C**). General considerations by the VICSES RDO/IC will be as follows:

- Develop an appreciation of current flood levels and predicted levels - are floodwaters, rising, peaking or falling?
- Review flood and storm 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?
 - What populations may be at risk?
 - Determine what the at-risk community need to know and do as the storm and/or flood develops.
 - Warn the at-risk community, ensuring that an appropriate warning and community information strategy is implemented.

This Includes:

- The current storm and/or flood situation
- Storm and/or Flood predictions
- What the consequences of predicted activity or 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 storm and/or 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 VICSES Central Region Storm and Flood Emergency Plans, and the State Storm and Flood Emergency Plans.

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;
- Sirens;
- Verbal Messages (i.e. Doorknocking);
- Agency Websites, including VicEmergency website;
- VicEmergency Hotline;
- Variable Message Signs (i.e. road signs);
- Community meetings;
- Newspapers;
- Email;
- Fax Stream;

-
- Newsletters;
 - Letter drops;
 - Social media and/or social networking sites (i.e. Twitter and/or Facebook).

Refer to **Appendix C and E** for any 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.

Melton City Council will assist VICSES to warn individuals within the community where practicable, 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, DELWP and VicPol may be requested to assist VICSES with the communication of community storm or flood warnings.

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

DHHS will coordinate information regarding public health and safety precautions.

3.5 Media Communication

The IC through the Public Information Unit established at the ICC will manage Media communication. If the ICC is not established, the VICSES RDO will manage all media communication. Melton City Council will work with the IC/VICSES RDO to assist with the dissemination of public messaging and/or warnings.

3.6 Impact assessments (IA)

Impact assessments can be conducted in accordance with Part 3 of the EMMV to assess and record the extent and nature of damage caused by storms and/or flooding. This information may then be used to provide the basis for further needs assessment and recovery planning by Melton Council, DHHS and other applicable recovery agencies.

The control agency is responsible for coordinating the collection, collation and dissemination of IA information on a whole of government basis.

The purpose, function and conduct of IAs are outlined in the State Flood Emergency Plan and the State Storm Emergency Plan. . All IAs should be conducted in accordance with Part 3 of the EMMV

3.7 Preliminary Deployments

When storm impacts and/or flooding is expected to be severe enough to cut access to towns, suburbs and/or communities the IC 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. in line with the Melton MEMP.

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 VICSES Central Region Storm and Flood Emergency Plans, and the State Storm and Flood Emergency Plans.

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, and resources available;
2. Should evacuation be the adopted strategy, it must be supported by public information capability and a rescue contingency plan;
3. Where it is likely people will become trapped by floodwaters, 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.
4. For buildings known to be structurally unsuitable 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.
6. Contact the MERC and Melton MERO at the earliest opportunity to allow relief preparation to commence.

Due to the rapid development of flash flooding it will often be difficult to establish emergency relief centres ahead of actually triggering the evacuation. This is normal practice but this is insufficient justification for not adopting evacuation.

Response arrangements for flash flood events may be contained in **Appendix C**. 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 IC and where possible the IEMT.

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

Once the decision is made VicPol are responsible for the coordination 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 (through the 'Register.Find.Reunite' program) including those who have been evacuated.

Refer to Evacuation Guidelines in Part 8 of the EMMV, Part 3 of the EMMV and the Melton Council Relief and Recovery section of the MEMP for guidance of evacuations for flood emergencies. If evacuation is determined as appropriate, Melton Council MERO and MRM should be notified as soon as possible.

There are currently no detailed evacuation arrangements for the Melton municipality. Detail will be populated into **Appendix D** of this Plan if determined to be required.

3.10 Flood Rescue

VicPol is the designated Control Agency for water rescue and coordinates rescues undertaken during flood events.

In order to activate water rescue services, VICSES as a 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 those areas.

In conducting rescues VicPol may require the 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.

3.11 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 IC in line with State Aircraft Unit Policy 01- Air Operations.

3.12 Resupply

Communities, neighbourhoods or households can become isolated during storms and/or 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, and if time permits, VICSES will advise businesses and/or households that they should stock up on essential items.

After the impact, VICSES may assist with the transport of essential items to isolated communities and assist with logistics functions.

Resupply operations are to be included as part of the emergency relief arrangements as outlined in the Melton MEMP.

3.13 Essential Infrastructure and Property Protection

Essential Infrastructure and Property, (e.g. roads, utilities and telecommunications etc.) may be affected in the event of a storm and/or flood.

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

Melton Council does not maintain a stock of sandbags. Supplies are available through the VICSES Regional Headquarters. The Incident Controller will determine the priorities related to the use of sandbags, which will be consistent with the State Emergency Management Priorities.

If VICSES sandbags are becoming limited in supply, then priority will be given to protection of Essential Infrastructure. If time permits, requests for supplementary supply should be carried out in line with the Melton MEMP.

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 Melbourne Water, Southern Rural Water, Melton Council and VicPol and within appropriate approval frameworks.

Refer to **Appendix C** for further specific details of essential infrastructure requiring protection. Sandbag collection points will be established as needed.

3.14 Disruption to Services

Disruption to services other than essential infrastructure and property can occur in storm and flood events. Refer to **Appendix C** for specific details of likely disruption to services and proposed arrangements to respond to service disruptions in the City of Melton area.

3.15 Levees

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

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

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

Several levees identified within the City of Melton have been identified in **Appendix A**.

3.16 Waste Water related Public Health Issues and Critical Sewerage Assets

The majority of properties are connected to a water sewerage system however the City of Melton has approximately 250 properties registered as using septic tanks. The location of these properties can be obtained from Council's Environmental Health Coordinator.

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

- Advise VICSES and the Melton MERO of the security of critical sewerage assets to assist preparedness and response activities in the event of a flood:
- Maintain or improve the security of critical sewerage assets:

-
- Check and correct where possible the operation of critical sewerage assets in time of flood;
 - Advise the ICC in the event of inundation of critical sewerage assets.

It is the responsibility of the City of Melton Municipal Environment Health Coordinator to inspect and report to the MERO and the ICC on any water quality issues relating to flooding.

General Public Health information and messages are provided by the Melton Council and DHHS and may contain information that is relevant prior to, during and following an incident. Information may be provided in sub plans to the MEMP, specific health notifications and, after discussion within the IEMT, may be included in Flood Bulletins.

3.17 Road Closures

Melton Council, VicPol and VicRoads will carry out their formal functions of road closures. This includes the observation and placement of warning signs and road blocks to its designated local and regional roads, bridges, walking and bike trails. VicPol may liaise with Melton City Council and VicRoads of the need to erect warning signs and / or close roads and bridges under its jurisdiction. VicRoads are responsible for designated main roads and highways and the City of Melton is responsible for the designated local and regional road network.

VicRoads, VicPol and the Melton Council will communicate community information regarding road closures as outlined in the Melton MEMP.

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 contained in **Appendix A**.

3.19 After Action Review

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

All agencies involved in the storm/flood incident should be represented at the After Action Review.

Part 4. EMERGENCY RELIEF AND RECOVERY ARRANGEMENTS

4.1 General

Arrangements for emergency relief and recovery from a storm or flood incident within the City of Melton are detailed in the Melton Council Relief and Recovery Plan (Part 6 of the Melton MEMP).

4.2 Emergency Relief

The IC determines the need for emergency relief services in accordance with Part 4 of the EMMV. ICs are responsible for ensuring that relief arrangements have been considered and implemented where required under the State Emergency Relief and Recovery Plan. This should be carried out in line with the Melton MEMP.

The range and type of emergency relief services to be provided in response to a storm and/or flood event will be dependent upon the size, impact, and scale of the storm/flood. Refer to Part 4 of the EMMV for further information.

Suitable emergency relief/recovery facilities identified for use during floods are detailed in Melton Council MEMP and the Melton Relief and Recovery Sub-Plan. The MRM will facilitate access to emergency relief/recovery facilities as required. The MERO will facilitate access to staging areas as required.

4.3 Animal Welfare

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

Matters relating to companion animals will be shared between Council and RSPCA. Council assists where possible in the rehousing of displaced companion animals

Matters relating to the welfare of wildlife are to be referred to DELWP and Melton Council.

4.4 Transition from Response to Recovery

VICSES as the Control Agency is responsible for ensuring effective transition from response to recovery.

Transition should be done in consultation with emergency management teams (including IEMT and MRM). Further information about transition is provided in Part 4 of the EMMV and the Melton Council MEMP

APPENDIX A - FLOOD THREATS FOR CITY OF MELTON

GENERAL

The City of Melton covers a total area of 528 square kilometres and has two main urban townships that are rapidly growing. These are Melton and Caroline Springs, which are located 35 and 19 kilometres west of Melbourne's CBD, respectively. A third 2,500 ha township is planned, Toolern, to be located south-east of the Melton township with an intended population size of around 60,000 people.

Melton sits predominantly within the Werribee River catchment with tributaries including Toolern Creek, Djerriwarrh Creek, Yangardook River, Arnold Creek and Little Blind Creek. These are all north-south draining rivers that connect into the Werribee River south of Melton and Caroline Springs.

Many of the flooding related issues that have occurred within the City are due to the large number of undrained or insufficiently drained roads with steep valleys in the road. Sheet flow through undeveloped farming land adjacent to urban developments has also presented problems throughout the City in recent flooding events.

RIVERINE FLOODING

Large severe floods within the Municipality generally occur as a result of a moist warm airflow from northern Australia bringing moderate to heavy rainfall over a period of 12 hours or more following a prolonged period of general rainfall. The period of general rainfall "wets up" the catchments and (partially) fills both the on-stream dams and the natural floodplain storage. These combine to increase the runoff generated during the subsequent period of heavy rainfall.

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

FLASH FLOODING & OVERLAND FLOWS

Short Duration, high intensity rainfall (usually associated with thunderstorms) can also cause localised flooding within the municipality along overland flow paths when the local urban drainage system surcharges. Such events, which 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 and localised damage can be severe.

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

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

DESCRIPTION OF MAJOR WATERWAYS & DRAINS

City of Melton manages over 25km of combined waterway adjacent stretches of land and is located predominantly within the Werribee River catchment with tributaries including Toolern Creek, Djerriwarrh Creek, Yangardook River, Arnold Creek and Little Blind Creek. These tributaries drain from north to south through the two townships and connect to the Werribee River at the south of the Melton development. See Catchment Schematics in **Appendix G** for more information.

Boggy Creek

Boggy Creek has three tributaries that begin north and north west of the Melton township, traversing closely along the west side of Melton and merging into the Werribee River to the south west of Melton.

Arnolds Creek

Arnolds Creek begins north-west of the Melton Township, traversing through the centre of Melton and merging into the Werribee River, just south of the Western Freeway.

Toolern Creek

The recent Toolern development encompasses Toolern Creek which traverses along the east side of the Melton Township, flowing south. It then merges into the main reach of the Werribee River at the south side of the City.

Kororoit Creek

Kororoit Creek starts just north of the municipality, traversing through rural land between the two townships. It then bends to the east and passes through the southern portions of Caroline Springs, just below Lake Caroline.

Djerriwarrh Creek

This tributary begins north-west of the municipality and traverses along the southern boundary, merging into Werribee River south west of the Melton Township.

Werribee River

The Werribee River flows north-west to south-east, entering the Shire's boundary south of the Melton Township. Creeks starting to the north-west of the City connect into the Werribee River, as depicted by Figure A1. See **Appendix G** for Werribee River Catchment Schematics.

Melbourne Water Drains & Waterways	Suburb/s	Melbourne Water Drains & Waterways	Suburb/s
Arnolds Creek	Brookfield	Kororoit Creek East Branch	Diggers Rest
Arnolds Creek East Branch	Brookfield, Kurunjang, Melton, Melton West & Toolern Vale	Kororoit Creek West Branch	Diggers Rest & Toolern Vale
Arnolds Creek West Branch	Brookfield & Melton West	Kurung Park Drain	Burnside Heights
Billingham Road Drain	Burnside, Caroline Springs & Rockbank	Lake Caroline Drain	Caroline Springs & Taylors Hill
Botanica Springs Creek	Brookfield	Laverton Main Drain	Ravenhall
Cambrian Way Drain	Melton West	Little Blind Creek	Kurunjang, Melton & Toolern Vale
Centenary Ave Drain	Melton West	Mallee Creek	Eynesbury
Cherrys Diversion Drain	Ravenhall	Mowbray Cres Drain	Kurunjang
Clarkes Drain	Ravenhall	Rees Road Drain	Melton South
Coalville Rd Drain	Burnside Heights	Robinsons Drain	Truganina
Coolibah Creek	Eynesbury	Ryans Creek	Melton
Davis Creek	Mount Cottrell & Tarneit	Skeleton Creek	Truganina
Diggers Creek	Eynesbury	Stony Hill Creek	Caroline Springs & Plumpton
Djerriwarrh Creek	Brookfield, Melton West & Toolern Vale	Tame Street Drain	Diggers Rest
Dohertys Drain	Truganina	Taylors Creek	Plumpton
Dry Creek	Mount Cottrell	Toolern Creek	Eynesbury, Kurunjang, Melton, Melton South, Mount Cottrell & Toolern Vale
Dunes Drain	Truganina	Victoria Avenue Drain	Kurunjang
East Moreton Drain	Burnside Heights & Taylors Hill	Werribee River	Eynesbury, Exford, Melton South & Mount Cottrell
Eynesbury Creek	Eynesbury	Whiteside Drain	Ravenhall
Ironbark Creek	Eynesbury	Yangardook Creek	Toolern Vale
Kororoit Creek	Burnside, Burnside Heights, Caroline Springs, Diggers Rest, Melton, Plumpton, Rockbank & Toolern Vale		

Table A1 – Melbourne Water Drains and Waterways within or bordering the City of Melton

FLOOD MITIGATION SYSTEMS

Flood mitigation has predominantly been developed in the form of 9 Retarding Basins and 2 Levees. These flood mitigation systems are as follows in the tables below. To view their locations and connecting waterway/drainage systems, see map B in **Appendix F**. There are currently no formal pumping stations built within the City of Melton.

RETARDING BASINS

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Caroline Springs R/B # 1	Stony Hill Creek	2.71 ha	39 ML	96.5m AHD	96.5m AHD	2.0m height (98.5m AHD)	Very Low	0	356 F5
Chisholm Park	Billingham Rd Drain (Kororoit Creek)	1.42 ha	23 ML	71.45m AHD	71.6m AHD	1.1m height (71.7m AHD)	Very Low	0	358 J4
Navan Park	Arnolds Creek East Branch	2.4 ha	256 ML	148.15m AHD	Unavailable	8m height (149.0m AHD)	High A	111	336 H5
Peppermint Grove	Centenary Ave Drain (Arnolds Creek West Branch)	1.77 ha	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	336 F4
Rees Road	Rees Road Drain (Werribee River)	1.88 ha	18 ML	N/A	Unavailable	113.5m AHD	Very Low	0	342 G5
Serpentine No. 1&2	Billingham Rd Drain (Kororoit Creek)	4.26 ha	17 ML	78.5m AHD	79.78m AHD	In-cut	Very Low	0	358 F2
Serpentine No.3	Billingham Rd Drain (Kororoit Creek)	5.35 ha	128 ML	N/A	79.98m AHD	in-cut	Very Low	0	358 E1
Sydenham West	Sydenham West Drain (Kororoit Creek)	1.46 ha	17 ML	115.9m AHD	Unavailable	2.4m height (118.3m AHD)	Very Low	0	3 A11
Waigani Avenue	Cherry's Diversion Drain (Kororoit Creek)	0.65 ha	5 ML	61.5m AHD	62.5m AHD	0.8m height (62.8m AHD)	High C	42	25 A7

Table A2 – Melbourne Water Retarding Basins within the City of Melton

LEVEES

City of Melton Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Consequences of Failure	Melway Reference
Gretel Grove, Toolern Creek	Western Highway & Barries Road	West	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	337 A11 - B10
Pinnacle Crescent, Arnolds Creek West	Blackdog Drive & Western Highway	South	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	336 F10 – G11

Table A3 – Levees within the City of Melton

SEWERAGE INFRASTRUCTURE

Sewerage Infrastructure of note during a severe flood event located within the City of Melton is contained within the following table.

SEWER PUMPING STATIONS

Sewerage Pumping Station	On Drain / Waterway	Location	Asset Owner	Level of Protection	Melway Reference
Rockbank Sewer Pumping Station	Kororoit Creek Tributary	Next to the railway line at Troups Road North, Rockbank	Western Water	Requires protection in a 1% AEP event. Compromised and damaged in the February 2005 event	355 B11

Table A4 – Sewer Pumping Stations within the City of Melton

FLOOD WARNING SYSTEM

Within the City of Melton, Melbourne Water has 6 hydrographic monitoring sites along the 3 major waterways in the Municipality. These are outlined in the table below. There are also monitors upstream from Melton Reservoir, including Bacchus Marsh & Lerderderg. These gauges can be monitored online through Melbourne Water at: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx> or through the Bureau of Meteorology at: http://www.bom.gov.au/cgi-bin/wrap_fwo.pl?IDV60201.html. To view their locations, see mapping in **Appendix F**.

Hydrographic Monitoring Station	Station No.	Location	Level Gauge	Rain Gauge	Melway Reference
Kororoit Creek at Diggers Rest (MW)	231106A	West bank of the creek, north side of Holden Road	✓	✓	332 H8
Kororoit Creek at Rockbank (MW)	231105B	North bank of the creek, east side of Leakes Road	✓	✓	344 J1
Toolern Creek at Melton South (MW)	231231A	East bank along dirt track between Bridge Road and Strathtulloh Circuit West	✓	✓	343 A9
Toolern Vale (MW)	587019	Benson Road, 200m from Gisborne – Melton Road		✓	X909 G12
Werribee River at Melton Reservoir Head Gauge (SRW)	231221A	Melton Reservoir Picnic Area	✓		220 J1
Werribee River d/s of Melton Reservoir (Tail Gauge) (DELWP)	231205D	East bank, 300m from Exford Road	✓		220 J2

Table A5 – Hydrographic Monitoring Stations within the City of Melton

Other gauges located in adjoining Municipalities that may assist in flood warning for waterways within City of Melton are outlined below. To view their locations, see mapping in **Appendix F**.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Level Gauge	Rain Gauge	Melway Reference
Kororoit Creek at Deer Park	231104A	North side of the creek along Millbank Drive near Wandsworth Ave	✓	✓	25C7
Lerderderg River u/s Goodman Creek (SWRMP)	231211A	East bank or creek, 100m north of 'Morven' homestead along Lerderderg Gorge Road	✓	✓	327 F6
Merrimu Reservoir Head Gauge (SRW)	231233A	North side of Diggers Rest – Coimadai Road	✓		329 A7
Skeleton Creek at Hoppers Crossing	231110A	East bank of the creek, south side of Sayers Road	✓	✓	203 A6
Werribee River at Bacchus Marsh (SWRMP)	231200B	South bank of the river along Werribee Vale Road	✓		333 G8

Table A6 – Hydrographic Monitoring Stations within adjacent Municipalities to the City of Melton

There are currently 2 Melbourne Water flood warning gauges on the Werribee River that could be used to assist with public safety through the issue of flood warnings. These are at Bacchus Marsh & downstream of the Melton Reservoir. Those gauges with flood class levels established are outlined in the table below.

Hydrographic Monitoring Station	River / Creek Flood Class Level or Flow		
	Minor	Moderate	Major
Werribee River at Bacchus Marsh	4.4m	5.2m	5.6m
Werribee River at Melton Reservoir Tail Gauge	4,000 ML/d (~1.5m)	35,000 ML/d (~5.1m)	50,000 ML/d (~6.4m)

Table A7 – Hydrographic Monitoring Stations with established Flood Class Levels for the City of Melton

At these sites on the Werribee River, the Bureau of Meteorology (the Bureau) in consultation with Melbourne Water will issue flood warnings if levels reach those classified above. This warning will be placed on the Bureau's website (<http://www.bom.gov.au/vic/warnings/index.shtml>). While the City of Melton monitors these warnings in times of high rainfall, there are no specific guidelines to advise how these situations should be responded to.

HISTORIC FLOODS

Significant floods (with high flood gauge levels and likely flooding consequences to property and infrastructure) to have occurred within the City of Melton are as follows in the table below.

Event	Werribee River d/s Melton Reservoir (231205D)		Kororoit Creek at Diggers Rest (231106A)		Kororoit Creek at Rockbank (231105B)		Toolern Creek at Melton South (231231A)	
	River Flow	River Level	Rainfall	Creek Level	Rainfall	Creek Level	Rainfall	Creek Level
Normal Water Level / Flow	3 ML/d – 200 ML/d	0.00m – 0.05m	-	0.0m	-	0.3m	-	0.1m
Minor Flood Class	4,000 ML/Day	~1.5m	-	-	-	-	-	-
Moderate Flood Class	35,000 ML/Day	~5.1m	-	-	-	-	-	-
Major Flood Class	50,000 ML/Day	~6.4m	-	-	-	-	-	-
September 1916	-	-	-	-	-	-	-	-
1941	-	-	-	-	-	-	-	-
1952	-	-	-	-	-	-	-	-
1954	-	-	-	-	-	-	-	-
30 th June 1977	8,887 ML/d	2.35m	-	-	-	-	-	-
3 rd July 1978	20,061 ML/d	4.25m	-	-	-	-	-	-
7 th August 1978	23,205 ML/d	4.69m	-	-	-	-	-	-
19 th November 1978	38,849 ML/d	6.35m	-	-	-	-	-	-
15 th October 1983	70,293 ML/d	8.40m	119mm / 34 hrs	3.87m	-	-	-	3.55m
24 th October 1985	30,513 ML/d	5.56m	69mm / 24 hrs	1.35m	-	-	-	1.56m
10 th December 1985	13,393 ML/d	3.09m	80mm / 50 hrs	2.84m	-	-	-	2.87m
29 th July 1987	13,338 ML/d	3.08m	64mm / 19 hrs	2.18m	-	-	-	1.90m
2 nd December 1987	36,936 ML/d	6.19m	85mm / 36 hrs	0.70m	-	-	-	1.67m
10 th June 1989	1,458 ML/d	1.02m	35mm / 22 hrs	1.17m	-	-	-	2.18m
11 th February 1990	12,038 ML/d	2.86m	30mm / 25 hrs	-	-	-	-	1.70m
12 th October 1990	17,832 ML/d	3.87m	40mm / 33 hrs	1.33m	-	-	-	1.20m
15 th September 1993	46,772 ML/d	6.98m	91mm / 31 hrs	3.42m	-	-	-	2.41m
23 rd October 1995	26,637 ML/d	5.14m	80mm / 33 hrs	1.49m	-	-	-	2.04m

Event	Werribee River d/s Melton Reservoir (231205D)		Kororoit Creek at Diggers Rest (231106A)		Kororoit Creek at Rockbank (231105B)		Toolern Creek at Melton South (231231A)	
	River Flow	River Level	Rainfall	Creek Level	Rainfall	Creek Level	Rainfall	Creek Level
Normal Water Level / Flow	3 ML/d – 200 ML/d	0.00m – 0.05m	-	0.0m	-	0.3m	-	0.1m
Minor Flood Class	4,000 ML/Day	~1.5m	-	-	-	-	-	-
Moderate Flood Class	35,000 ML/Day	~5.1m	-	-	-	-	-	-
Major Flood Class	50,000 ML/Day	~6.4m	-	-	-	-	-	-
6 th November 1995	61,340 ML/d	7.90m	55mm / 61 hrs	1.89m	-	-	-	1.99m
24 th October 2000	24,052 ML/d	4.82m	80mm / 53 hrs	1.46m	-	-	-	1.28m
3 rd February 2005	13,477 ML/d	3.10m	159mm / 31 hrs	2.71m	-	-	-	2.98m
28 th November 2010	19,676 ML/d	3.54m	66mm / 40 hrs	1.88m	68mm / 39 hrs	2.21m	52mm / 37 hrs	1.94m
14 th January 2011	36,659 ML/d	5.24m	69mm / 55 hrs	2.14m	77mm / 55 hrs	2.40m	70mm / 55 hrs	2.15m
5 th February 2011	10,734 ML/d	2.43m	63mm / 13 hrs	1.22m	61mm / 20 hrs	1.62m	60mm / 12 hrs	1.32m
14 th September 2016	5,614 ML/d	1.69m	29mm / 19 hrs	1.19m	22mm / 18 hrs	1.61m	20mm / 19 hrs	1.26m
3 rd October 2016	9,596 ML/d	2.27m	13mm / 7 hrs	0.74m	11mm / 7 hrs	1.20m	7mm / 7 hrs	0.83m

Table A8 – Selection of Historical Flood Events along the Werribee River, Kororoit Creek & Toolern Creek

DAM FAILURE

Flooding resulting from failure of the following dams is likely to cause significant structural and community damage within the City of Melton. See Dam Failure in Section 3 of this plan for more information. Note that if the storage capacity is reached and water flows over the spillway, this is not to be referred to as a flow release or a storage breach or failure. Note that only Dams above 100 ML in capacity are included in this list.

Dam	Location	Owner	Dam Capacity	Full Supply Level	Melway Reference
Melton Reservoir	Werribee River Melton South	SRW	14,360 ML	82.56m AHD	Melway 341G2-220J1
Merrimu Reservoir	Pyrites Creek, Coimadaí	SRW	32,215 ML	174.1m AHD	VicMap Central: 6526J2
Pykes Creek Reservoir	Werribee River Tributary, Myrniong	SRW	22,119 ML	396.57m AHD	VicMap Central: 6525B1
Lake Caroline Ornamental Lake. (Refer to dam management plan held in MECC)	Stoney Hill Creek at Caroline Springs Town Centre	MCC	120 ML	78.50m AHD	Melway 356 H10

Table A9 – Melbourne Water Reservoirs that pose a risk to the City of Melton from Dam Failure

Service Reservoirs located within the Municipality are listed below.

Service Reservoir	Location	Owner	Material	Reservoir Capacity	Melway Reference
Elevated Water Tank	Hillview Court, Hillside	City West Water	Potable	Unavailable	354 G8
Sydenham Steel Tank	Southbank Walk, Taylors Hill	Melbourne Water	Steel	46.5 ML	356 K3
Western Water Water Storages	Cnr Bulmans Road & Minns Road, Melton West	Western Water	Unavailable	Unavailable	330 F11

Table A10 –Service Reservoirs in the City of Melton

APPENDIX B - TYPICAL FLOOD PEAK TRAVEL TIMES

In using the information contained in this Appendix, consideration needs to be given to the time of travel of the flood peak. A flood on a 'dry' waterway will generally travel more slowly than a flood on a 'wet' waterway (eg. The first flood after a dry period will travel more slowly than the second flood in a series of floods). Hence, recent flood history, soil moisture and forecast weather conditions all need to be considered when using the following information to direct flood response activities.

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

Where negative values are shown in the table below this indicates that a flood peak may be expected at the gauge downstream before a separate flood peak is experienced at the upstream gauge. This phenomenon may be due to the location of the thunderstorm passing through the catchment between the two gauges, or because of the urban environment found downstream causing floodwaters to enter the waterway quicker than those in a more rural setting upstream. Lastly this may be because of the existence of a retarding basin between the two gauges.

1. Typical Travel Times

Location From (gauge)	Location To (gauge)	Typical Travel Time	Comments
KOROROIT CREEK			
Diggers Rest	Deer Park	Between 1 to 7 hours	Inflows from tributaries likely to impact on travel times.
WERRIBEE RIVER			
Ballan	d/s Melton Reservoir	Between (-3) to 14 hours	Minor at d/s Melton Reservoir. Ballan & Bacchus Marsh just as likely to peak after Melton Reservoir even though it is located upstream. Therefore flood peak travel times between these gauges should be used with caution.
Bacchus Marsh		Between (-7) to 8 hours	
Darley		Between 1 to 10 hours	
Ballan	d/s Melton Reservoir	Between 1 to 7 hours	Moderate at d/s Melton Reservoir.
Bacchus Marsh		Between 2 to 8 hours	
Darley		Between 4 to 6 hours	
Ballan	d/s Melton Reservoir	Between 4 to 5 hours	Major at d/s Melton Reservoir.
Bacchus Marsh		Between 2 to 3 hours	
Darley		Around 5 hours	

Table B1 – Typical Flood Travel Times between gauges on Kororoit Creek and the Werribee River

2. Historical Travel Times

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
KOROROIT CREEK				Deer Park
15 th October 1983	Diggers Rest	Deer Park	5.7 hours	Major
10 th December 1985	Diggers Rest	Deer Park	2.5 hours	Minor
29 th July 1987	Diggers Rest	Deer Park	1.5 hours	Below Minor
15 th September 1993	Diggers Rest	Deer Park	2.2 hours	Moderate
6 th November 1995	Diggers Rest	Deer Park	6 hours	Below Minor
3 rd February 2005	Diggers Rest	Deer Park	1.8 hours	Major
14 November 2010	Diggers Rest	Deer Park	6 hours	Below Minor
28 November 2010	Diggers Rest	Deer Park	2 hours	Below Minor
14 th January 2011	Diggers Rest	Deer Park	6 hours	Below Minor
WERRIBEE RIVER				d/s Melton Reservoir
30 th June 1977	Ballan	d/s Melton Reservoir	10 hours	Minor
3 rd July 1978	Ballan	d/s Melton Reservoir	2 hours	Minor
	Bacchus Marsh		2 hours	
7 th August 1978	Ballan	d/s Melton Reservoir	Ballan peaked 1 hour before d/s Melton Res.	Minor
	Bacchus Marsh		3 hours	
19 th November 1978	Ballan	d/s Melton Reservoir	4 hours	Moderate
	Bacchus Marsh		2 hours	
	Darley		4 hours	
6 th October 1979	Ballan	d/s Melton Reservoir	13 hours	Minor
	Bacchus Marsh		8 hours	
	Darley		6 hours	
15 th October 1983	Ballan	d/s Melton Reservoir	4 hours	Major
	Bacchus Marsh		2 hours	
	Darley		5 hours	
24 th October 1985	Ballan	d/s Melton Reservoir	Ballan peaked 3 hours before d/s Melton Res.	Minor
	Bacchus Marsh		0 hours	
	Darley		3 hours	
2 nd December 1987	Ballan	d/s Melton Reservoir	7 hours	Moderate
	Bacchus Marsh		3 hours	
	Darley		6 hours	
11 th February 1990	Ballan	d/s Melton Reservoir	11 hours	Minor
	Bacchus Marsh		6 hours	
	Darley		10 hours	
12 th October 1990	Ballan	d/s Melton Reservoir	3 hours	Minor
	Bacchus Marsh		3 hours	
	Darley		2 hours	
15 th September 1993	Ballan	d/s Melton Reservoir	1 hour	Moderate
	Bacchus Marsh		8 hours	
	Darley		4 hours	
19 th September 1993	Ballan	d/s Melton Reservoir	9 hours	Minor
	Bacchus Marsh		5 hours	
	Darley		3 hours	
23 rd October 1995	Ballan	d/s Melton Reservoir	4 hours	Minor

Flood Event	Location From (gauge)	Location To (gauge)	Flood Peak Travel Time	Flood Class at
	Bacchus Marsh		2 hours	
	Darley		1 hour	
	Ballan		5 hours	
6 th November 1995	Bacchus Marsh	d/s Melton Reservoir	3 hours	Major
	Darley		5 hours	
	Ballan		0 hours	
24 th October 2000	Bacchus Marsh	d/s Melton Reservoir	Bacchus Marsh peaked 4 hours before d/s Melton Res.	Minor
	Darley		10 hours	
	Ballan		0 hours	
3 rd February 2005	Bacchus Marsh	d/s Melton Reservoir	Bacchus Marsh peaked 7 hours after d/s Melton Res.	Minor
	Darley		10 hours	
	Ballan		Ballan peaked 1 hour before d/s Melton Res.	
28 th November 2010	Bacchus Marsh	d/s Melton Reservoir	Bacchus Marsh peaked 1 hour before d/s Melton Res.	Minor
	Darley		5 hours	
	Ballan		3 hours	
14 th January 2011	Bacchus Marsh	d/s Melton Reservoir	3 hours	Moderate
	Darley		5 hours	
	Ballan		Unavailable	
5 th February 2011	Bacchus Marsh	d/s Melton Reservoir	4 hours	Minor
	Darley		2 hours	
	Ballan		3 hours	
14 th September 2016	Bacchus Marsh	d/s Melton Reservoir	Unavailable	Minor
	Darley		17 hours	
	Ballan		Unavailable	
3 rd October 2016	Bacchus Marsh	d/s Melton Reservoir	Unavailable	Minor
	Darley		6 hours	
	Ballan		Unavailable	

Table B2 – Historical Flood Travel Times between gauges on Kororoit Creek and the Werribee River

APPENDIX C1 – WERRIBEE RIVER & EYNESBURY FLOOD EMERGENCY PLAN

OVERVIEW OF FLOODING CONSEQUENCES

The Werribee River and the adjoining towns of Brookfield, Parwan, Exford, Melton South, Eynesbury & Mount Cottrell are located between 30-40km West of Melbourne in a rural setting. The Werribee River is the prominent watercourse in the area, flowing from the West through the Moorabool Shire and the towns of Ballan and Bacchus Marsh. Prolonged rainfall events are the primary concern for the area, which may see the Werribee River or two of its tributaries in Coolibah Creek or Eynesbury Creek flood. If either of these two Creeks flood, the Eynesbury Township may have access cut via Eynesbury Road. See mapping in **Appendix F** for more insight into flooding in the area.

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Summary of Consequences in a 1% AEP (100yr ARI) flood along Werribee River & Eynesbury

Property					
Properties	0				
Residential	0				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	0		Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	0		Sewerage Facilities	0	
Power Facility	0		Levees	0	
Comms Services	0		Drainage Facilities	2	Melton Reservoir & Rees Road R/B
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	1	Eynesbury Golf Course	Caravan Parks	0	
Recreation Facilities	0		Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Melton	CMA	1	Port Phillip & Westernport
Adjacent LGAs	2	Moorabool; & Wyndham	CFA District	1	District 14
SES Resp' Boundary	1	Melton	MFB District	0	

Table C1.1 – Consequence Summary of 1% AEP flood along the Werribee River and Eynesbury in City of Melton

WARNING TIMES

Warnings are available for flooding expected along Werribee River at the Melton Reservoir Tail Gauge. For other hydrographic/telemetry (river gauges) within the Municipality, Melbourne Water does not provide any flood warning service at this point.

Hydrographic Monitoring Station	Station No.	Location	Owner	Gauge Type	Melway Ref
Lerderderg River upstream of Goodman Creek	231211A	East bank or creek, 100m north of 'Morven' homestead along Lerderderg Gorge Road	SWRMP	Stream Level & Rain	327 F6
Merrimu Reservoir Head Gauge	231233A	North side of Diggers Rest – Coimadai Road	SRW	Reservoir Level	329 A7
Parwan Creek at Parwan	231234A	East bank of the creek. Access from Smiths Road	Melbourne Water	Stream Level & Rain	339 D8
Pykes Creek Reservoir Head Gauge	231203A	North side of Western Freeway bridge, east bank of the channel	SRW	Reservoir Level	-
Werribee River at Ballan	231225B	East bank of the River, south side of Old Melbourne Road	SRW	Stream Level	-
Werribee River at Bacchus Marsh	231200B	South bank of the river along Werribee Vale Road	SWRMP	Stream Level	333 G8
Toolern Creek at Melton South	231231A	East bank along dirt track between Bridge Road and Strathtulloh Circuit West	Melbourne Water	Stream Level & Rain	343 A9
Werribee River at Melton Reservoir Head Gauge	231221A	Melton Reservoir Picnic Area	SRW	Reservoir Level	220 J1
Werribee River d/s of Melton Reservoir (Tail Gauge)	231205D	East bank, 300m from Exford Road	SWRMP	Stream Level	220 J2

Table C1.1 – Hydrographic Monitoring Stations within the Werribee River catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website www.emergency.vic.gov.au for any thunderstorm, flood or severe weather warnings present for their area.

AREAS OF FLOOD RISK

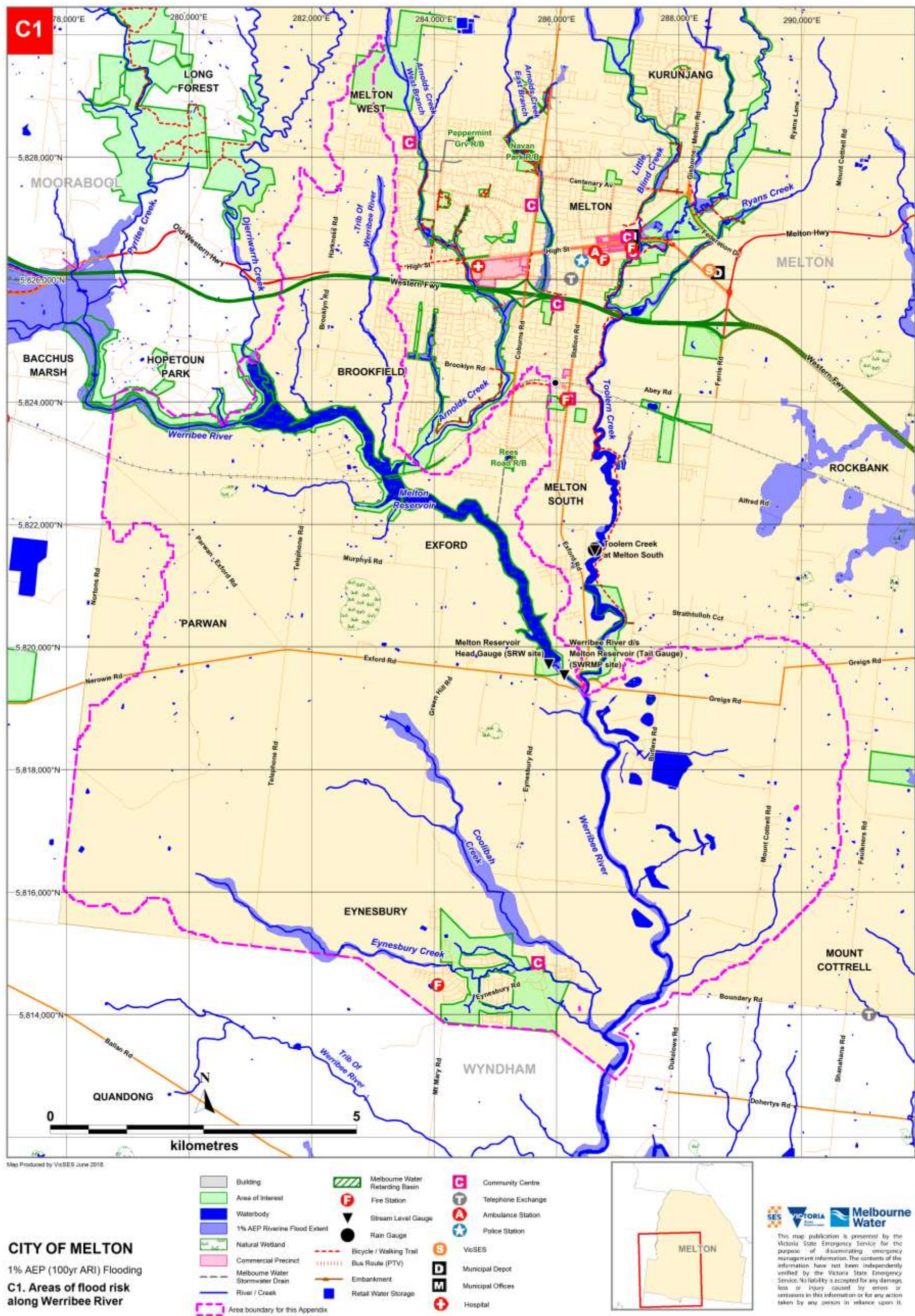


Figure C1 – Areas of flood risk around the Werribee River in the City of Melton

PROPERTIES AT FLOOD RISK

Properties listed in the table below are at risk from flooding along the Werribee River or the Coolibah and Eynesbury Creeks in the City of Melton. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Werribee River d/s Melton Reservoir (Melbourne Water, October 2017) and the Coolibah & Eynesbury Creeks (Melbourne Water, August 2008) flood mapping and risk assessment programs.

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

Properties at risk from Flooding the Werribee River or in Eynesbury during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
Nil				
Total				
0				

Table C1.2 – Properties at risk of flooding along the Werribee River catchment in the City of Melton

No properties have been identified as being at risk from a 1% AEP flood along either the Werribee River or the Coolibah and Eynesbury Creeks in the City of Melton based on current flood modelling.

ISOLATION

- Eynesbury Township may become isolated for a period above the Minor Flood Class Flow if the Coolibah and Eynesbury Creeks are in flood resulting in the inundation of the only access road out of the township, Eynesbury Road which runs northward toward Exford.
- Alternate access via “Haul Road” (as of 2018, unsealed road) can be arranged on a temporary basis by the Incident Controller

No other major isolation risks exist for Brookfield, Parwan, Exford, Melton South and Mount Cottrell. Some localised short-duration isolation may occur due to flash flooding.

ESSENTIAL INFRASTRUCTURE

During an event, see the Public Transport Victoria’s Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within the City of Melton is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/31_Melton_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around the Melton Reservoir and Eynesbury Township are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

ROAD CLOSURES

The following roads are subject to closure during flooding around Exford, Melton South & Eynesbury. Check the VicRoads website for more details: <http://alerts.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event

-
- Nil

Table C1.3 – VicRoads Possible Road Closures during a flooding event

Melton City Council Roads affected in a 1% AEP event	
EYNESBURY	<ul style="list-style-type: none"> • Kevington Drive
<ul style="list-style-type: none"> • Bendigo Drive 	<ul style="list-style-type: none"> • Rushworth Avenue
<ul style="list-style-type: none"> • Eynesbury Road 	<ul style="list-style-type: none"> • Walhalla Drive
<ul style="list-style-type: none"> • Haul Road 	

Table C1.4 – Melton City Council Possible Road Closures during a flooding event

FLOOD MITIGATION

RETARDING BASINS

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Rees Road	Rees Road Drain (Werribee River)	1.88 ha	18 ML	N/A	Unavailable	113.5m AHD	Very Low	0	342 G5

Table C1.5 – Melbourne Water Retarding Basins within the Werribee River catchment in the City of Melton

SEWERAGE INFRASTRUCTURE

There is no sewerage Infrastructure expected to be within the vicinity of floodwaters during severe flood events around the Werribee River.

COMMAND, CONTROL & COORDINATION

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

FLOOD IMPACTS & OPERATIONAL CONSIDERATIONS (INTELLIGENCE CARDS)

The tables on the following pages provide a breakdown of the possible consequences of flooding along the Werribee River and in Eynesbury at various river heights or rain totals within the City of Melton. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Downstream of Melton Reservoir, Melton South
- Eynesbury

FLOOD INTELLIGENCE CARD – MELTON RESERVOIR TAIL GAUGE, WERRIBEE RIVER

Version 3 – June 2018



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

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LOCATION	East bank of River, 300m from Exford Road, Melton South
MELWAY REFERENCE:	220 J2
STREAM:	Werribee River
GAUGE NUMBER:	231205D
GAUGE ZERO:	58.014m AHD
GAUGE TYPE	Stream Level

MINOR:	4,000 ML / Day
MODERATE:	35,000 ML / Day
MAJOR	50,000 ML / Day
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	70,293 ML/d (15 th October 1983)

River Flow	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
4,000 ML/Day	MINOR FLOOD FLOW		
35,000 ML/Day	MODERATE FLOOD FLOW		
50,000 ML/Day	MAJOR FLOOD FLOW		
70,293 ML/d	15 th October 1983 Flood Flow Peak		
99,000 ML/d	1% AEP (100yr ARI) Flood Flow (Major)	Properties at Flood Risk <ul style="list-style-type: none"> Nil Community Infrastructure Likely Flooded <ul style="list-style-type: none"> Nil 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash

River Flow	Flood Class or Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Water Over Road Werribee River <ul style="list-style-type: none"> Werribee River and Toolern Creek water at top of bridges on Exford Road and Greigs Road West, Melton South 	<p>Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Table C1.6 – Breakdown of likely consequences at various River gauge level heights along the Werribee River in Melton with operational considerations

FLOOD INTELLIGENCE CARD – EYNESBURY (UNGAUGED)

Version 1 – June 2018



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

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CLOSEST RAIN GAUGE	Toolern Creek at Melton South
LOCATION	East bank along dirt track between Bridge Road and Strathulloh Circuit West
MELWAY REF:	343 A9

GAUGE NUMBER	231231A
GAUGE TYPE	Stream Level & Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
70mm in 55 hours	14 th January 2011 Flood Flow Peak	Event Summary <ul style="list-style-type: none"> Eynesbury Road, Eynesbury flooded at Coolibah Creek 	
20mm in 10 mins; 33mm in 30 mins; 40mm in 1 hour; 49mm in 2 hours; 56mm in 3 hours; or 71mm in 6 hours Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a	1% AEP (100 year ARI)	<ul style="list-style-type: none"> Note: It is not known at what level infrastructure contained below starts being flooded Properties at Flood Risk 0 Properties in Total <ul style="list-style-type: none"> Nil Community Infrastructure Likely Flooded <ul style="list-style-type: none"> Eynesbury Historic Homestead Car-park Essential Infrastructure Likely Impacted <ul style="list-style-type: none"> Nil Tourism / Recreation Likely Impacted <ul style="list-style-type: none"> Sections of the Eynesbury Golf Course Water Over Road Coolibah & Eynesbury Creeks <ul style="list-style-type: none"> Eynesbury Road, Eynesbury at Coolibah Creek and Eynesbury Creek bridges Walhalla Drive, Eynesbury 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident VICSES to respond on a request by request

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i> guide only.	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> • Kevington Drive, Eynesbury • Bendigo Drive, Eynesbury between Heathcote Drive and Rushworth Avenue • Rushworth Avenue, Eynesbury • Haul Road, Eynesbury at Eynesbury Creek bridge 	<p>basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangements</p>

Table C1.7 – Breakdown of possible consequences at various rainfall intensities around Eynesbury with operational considerations

APPENDIX C2 – ARNOLDS CREEK FLOOD EMERGENCY PLAN

OVERVIEW OF FLOODING CONSEQUENCES

Arnolds Creek and the adjoining towns of Melton West and Brookfield are located approximately 40km west of Melbourne in a predominantly residential area. Arnolds Creek is the prominent watercourse in the area, flowing from the north where it begins as two branches; east and west. High Intensity, short duration rainfall events are the primary concern for the area and are likely to cause flash flooding in and around the residential drainage network as well as the Creeks. See mapping in **Appendix F** for more insight into flooding in the area.

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Summary of Consequences in a 1% AEP (100yr ARI) flood along Arnolds Creek

Property					
Properties	121				
Residential	121				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	0				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	1	Brookfield Village	Places of Worship	0	
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	0		Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	2	455 & 458	Sewerage Facilities	0	
Power Facility	0		Levees	1	Black Dog Drive to Western Hwy
Comms Services	0		Drainage Facilities	2	Retarding Basins
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	0		Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Melton	CMA	1	Port Phillip & Westernport
Adjacent LGAs	0		CFA District	1	District 14
SES Resp' Boundary	1	Melton	MFB District	0	

Table C2.1 – Consequence Summary of 1% AEP flood along Arnolds Creek

WARNING TIMES

Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for Arnolds Creek. All flood response actions must therefore be driven by rainfall and / or river level observations. Telemetered rain gauges are located at Toolern Vale & Melton South within the Toolern Creek Catchment.

Hydrographic Monitoring Station	Station No.	Location	Level Gauge	Rain Gauge	Melway Reference
Toolern Creek at Melton South (MW)	231231A	East bank along dirt track between Bridge Road and Strathtulloh Circuit West	✓	✓	343 A9
Toolern Vale (MW)	587019	Benson Road, 200m from Gisborne – Melton Road		✓	X909 G12

Table C2.2– Hydrographic Monitoring Stations within the Toolern Creek Catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website www.emergency.vic.gov.au for any thunderstorm, flood or severe weather warnings present for their area.

AREAS OF FLOOD RISK

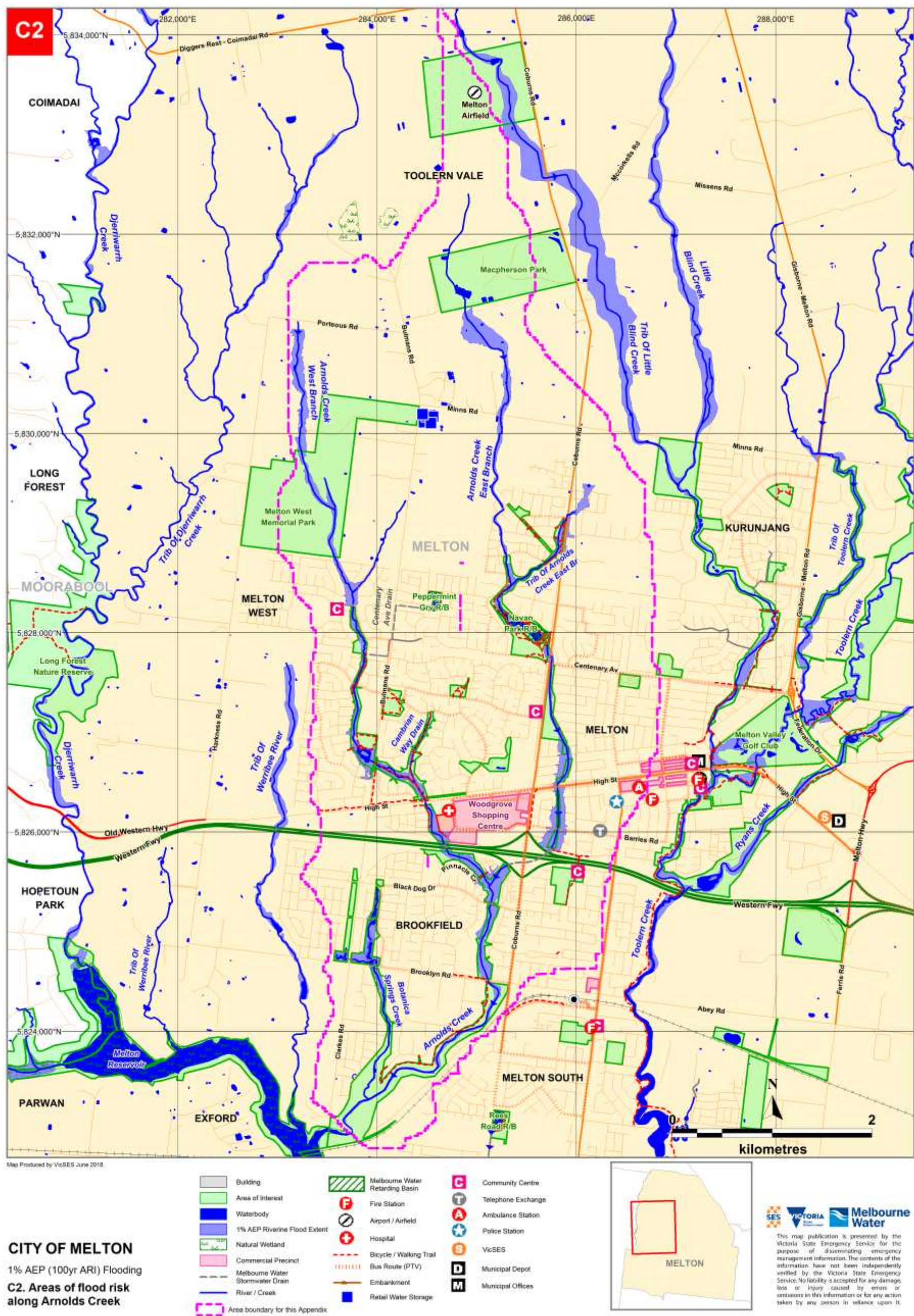


Figure C2 – Areas of flood risk around Arnolds Creek in the City of Melton

PROPERTIES AT FLOOD RISK

Properties listed in the table below are at risk from flooding around Arnolds Creek. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Arnolds Creek East Branch (Melbourne Water, June 2015), the Arnolds Creek East Tributary (BMT WBM, June 2012) and the Arnolds Creek West Branch (Melbourne Water, June 2015) flood mapping and risk assessment programs.

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Properties at risk from Flooding along Arnolds Creek during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
1	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
2	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
3	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
5	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
7	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
9	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
11	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
13	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
15	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
17	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
19	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
21	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
23	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
2/25	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
27	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
29	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
31	Alkemade Drive	Melton	Arnolds Creek East Branch	Riverine
98	Barries Road	Melton	Arnolds Creek East Branch	Riverine
100	Barries Road	Melton	Arnolds Creek East Branch	Riverine
102	Barries Road	Melton	Arnolds Creek East Branch	Riverine
111	Barries Road	Melton	Arnolds Creek East Branch	Riverine
113	Barries Road	Melton	Arnolds Creek East Branch	Riverine
115	Barries Road	Melton	Arnolds Creek East Branch	Riverine
7	Bell Court	Melton	Arnolds Creek East Branch	Riverine
9	Bell Court	Melton	Arnolds Creek East Branch	Riverine
2	Bryan Court	Melton	Arnolds Creek East Branch	Riverine
4	Bryan Court	Melton	Arnolds Creek East Branch	Riverine
6	Bryan Court	Melton	Arnolds Creek East Branch	Riverine
8	Bryan Court	Melton	Arnolds Creek East Branch	Riverine
10	Bryan Court	Melton	Arnolds Creek East Branch	Riverine
12	Bryan Court	Melton	Arnolds Creek East Branch	Riverine
25	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
27	Carina Drive	Melton	Arnolds Creek East Branch	Riverine

Properties at risk from Flooding along Arnolds Creek during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
29	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
31	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
33	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
35	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
37	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
39	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
41	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
43	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
45	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
47	Carina Drive	Melton	Arnolds Creek East Branch	Riverine
8	Claret Ash Boulevard	Harkness	Arnolds Creek West Branch	Riverine
10	Claret Ash Boulevard	Harkness	Arnolds Creek West Branch	Riverine
111-139	Coburns Road	Brookfield	Arnolds Creek	Riverine
27	Greenhills Drive	Kurunjang	Local Drainage	Flash
487	High Street	Melton	Arnolds Creek East Branch	Riverine
488	High Street	Melton	Arnolds Creek East Branch	Riverine
489	High Street	Melton	Arnolds Creek East Branch	Riverine
491	High Street	Melton	Arnolds Creek East Branch	Riverine
497	High Street	Melton	Arnolds Creek East Branch	Riverine
14	Irving Road	Melton	Arnolds Creek East Branch	Riverine
1	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
3	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
5	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
7	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
9	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
10	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
11	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
12	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
13	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
15	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
17	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
19	Kinkora Road	Melton	Arnolds Creek East Branch	Riverine
1	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
2	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
3	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
1/3A	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
2/3A	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
4	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
5	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
6	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
7	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
8	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
9	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
10	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine

Properties at risk from Flooding along Arnolds Creek during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
12	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
14	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
16	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
18	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
20	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
22	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
24	Kinloch Road	Melton	Arnolds Creek East Branch	Riverine
1	Lakeview Terrace	Melton West	Arnolds Creek West Branch	Riverine
3	Leafy View Esplanade	Harkness	Arnolds Creek West Branch	Riverine
5	Leafy View Esplanade	Harkness	Arnolds Creek West Branch	Riverine
2	Norma Street	Melton	Arnolds Creek East Branch	Riverine
4	Norma Street	Melton	Arnolds Creek East Branch	Riverine
42	Oldershaw Road	Melton	Arnolds Creek East Branch	Riverine
49	Oldershaw Road	Melton	Arnolds Creek East Branch	Riverine
15	Perry Close	Melton	Arnolds Creek East Branch	Riverine
17	Perry Close	Melton	Arnolds Creek East Branch	Riverine
24	Perry Close	Melton	Arnolds Creek East Branch	Riverine
26	Perry Close	Melton	Arnolds Creek East Branch	Riverine
28	Perry Close	Melton	Arnolds Creek East Branch	Riverine
30	Perry Close	Melton	Arnolds Creek East Branch	Riverine
1	Piccolotto Drive	Melton West	Arnolds Creek West Branch	Riverine
1A	Piccolotto Drive	Melton West	Arnolds Creek West Branch	Riverine
8	Pinnacle Crescent	Brookfield	Arnolds Creek West Branch	Riverine
10	Pinnacle Crescent	Brookfield	Arnolds Creek West Branch	Riverine
12	Pinnacle Crescent	Brookfield	Arnolds Creek West Branch	Riverine
14	Pinnacle Crescent	Brookfield	Arnolds Creek West Branch	Riverine
16	Pinnacle Crescent	Brookfield	Arnolds Creek West Branch	Riverine
33	Quail Crescent	Melton	Arnolds Creek East Branch	Riverine
51	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
59	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
61	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
63	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
65	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
67	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
69	Rosina Drive	Melton	Arnolds Creek East Branch	Riverine
2	Ross Court	Brookfield	Arnolds Creek West Branch	Riverine
5	Ruairi Court	Kurunjang	Local Drainage	Flash
15	Stirling Terrace	Melton West	Arnolds Creek West Branch	Riverine
4	Waterdale Close	Melton West	Arnolds Creek West Branch	Riverine
5	Waterdale Close	Melton West	Arnolds Creek West Branch	Riverine
6	Waterdale Close	Melton West	Arnolds Creek West Branch	Riverine
7	Waterdale Close	Melton West	Arnolds Creek West Branch	Riverine
8	Waterdale Close	Melton West	Arnolds Creek West Branch	Riverine
23	Winfield Drive	Kurunjang	Local Drainage	Flash

Properties at risk from Flooding along Arnolds Creek during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
Total				
121				

Table C2.3 – Properties at risk of flooding along the Arnolds Creek catchment in the City of Melton

ISOLATION

- A section of the Brookfield Village Retirement Village, Brookfield is at risk of Isolating residents west of the Village Drive bridge during a 100yr ARI Event as Arnolds Creek East and West branch flood. Village Drive is the only vehicle access to that section of the Retirement Village which crosses Arnolds Creek East Branch. A walking path crosses Arnolds Creek West branch which will also likely become impassable.

No major isolation risks exist for areas around Melton West & Brookfield during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

ESSENTIAL INFRASTRUCTURE

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within the City of Melton is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/31_Melton_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Melton West & Brookfield are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

ROAD CLOSURES

The following roads are subject to closure during flooding around Melton West & Brookfield. Check the VicRoads website for more details: <http://alerts.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
	<ul style="list-style-type: none"> nil

Table C2.4 – VicRoads Possible Road Closures during a flooding event

Melton City Council Roads flooded in a 1% AEP (100yr ARI) event		
BROOKFIELD	MELTON	
<ul style="list-style-type: none"> Black Dog Drive 	<ul style="list-style-type: none"> Barries Road 	<ul style="list-style-type: none"> Lakeview Terrace
<ul style="list-style-type: none"> Keating Street 	<ul style="list-style-type: none"> Kinkora Road 	<ul style="list-style-type: none"> Leafy View Esplanade
<ul style="list-style-type: none"> Menzies Grove 	<ul style="list-style-type: none"> Kinloch Road 	<ul style="list-style-type: none"> Meadow Glen Drive
<ul style="list-style-type: none"> Scullin Street 	MELTON WEST	<ul style="list-style-type: none"> Minns Road
<ul style="list-style-type: none"> Village Drive 	<ul style="list-style-type: none"> Bulmans Road 	<ul style="list-style-type: none"> River Views Road
	<ul style="list-style-type: none"> Claret Ash Boulevard 	<ul style="list-style-type: none"> Riverbank Boulevard
	<ul style="list-style-type: none"> Coburns Road 	<ul style="list-style-type: none"> Stanford Terrace

Table C2.5 – Melton City Council Possible Road Closures during a flooding event

FLOOD MITIGATION

RETARDING BASINS

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Navan Park	Arnolds Creek East Branch	2.4 ha	256 ML	148.15m AHD	Unavailable	8m height (149.0m AHD)	High A	111	336 H5
Peppermint Grove	Centenary Ave Drain (Arnolds Creek West Branch)	1.77 ha	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	336 F4

Table C2.6 – Melbourne Water Retarding Basins within the Arnolds Creek catchment in the City of Melton

LEVEES

City of Melton Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Consequences of Failure	Melway Reference
Pinnacle Crescent, Arnolds Creek West	Black Dog Drive & Western Highway	South	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	336 F10 – G11

Table C2.7 – Melbourne Water Levees in the Arnolds Creek Catchment in the City of Melton

SEWERAGE INFRASTRUCTURE

There is no sewerage Infrastructure expected to be within the vicinity of floodwaters during severe flood events around Arnolds Creek.

COMMAND, CONTROL & COORDINATION

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

FLOOD IMPACTS & OPERATIONAL CONSIDERATIONS (INTELLIGENCE CARDS)

The tables on the following pages provide a breakdown of the possible consequences of flooding along Arnolds Creek at various rain totals. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Arnolds Creek, Melton West

FLOOD INTELLIGENCE CARD – ARNOLDS CREEK, MELTON WEST (UNGAUGED)

Version 3 – June 2018



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

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CLOSEST RAIN GAUGE	Toolern Vale
LOCATION	Benson Road, 200m from Gisborne – Melton Road
MELWAY REF:	X909 G12

GAUGE NUMBER	587019
GAUGE TYPE	Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
23mm in 10 mins; 39mm in 30 mins; 51mm in 1 hour; 63mm in 2 hours; 87mm in 6 hours; or 107mm in 12 hours Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.	1% AEP (100 year ARI)	Properties at Flood Risk 121 Properties in Total Arnolds Creek <ul style="list-style-type: none"> 111-139 Coburns Road, Brookfield Arnolds Creek East Branch <ul style="list-style-type: none"> 1, 2, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 2/25, 27, 29 & 31 Alkemade Drive, Melton 98, 100, 102, 111, 113 & 115 Barries Road, Melton 7 & 9 Bell Court, Melton 2, 4, 6, 8, 10 & 12 Bryan Court, Melton 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45 & 47 Carina Drive, Melton 487, 488, 489, 491 & 497 High Street, Melton 14 Irving Road, Melton 1, 3, 5, 7, 9, 10, 11, 12, 13, 15, 17 & 19 Kinkora Road, Melton 1, 2, 3, 1/3A, 2/3A, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22 & 24 Kinloch Road, Melton 2 & 4 Norma Street, Melton 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident VICSES to respond on a request by request basis.

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 42 & 49 Oldershaw Road, Melton 15, 17, 24, 26, 28 & 30 Perry Close, Melton 33 Quail Crescent, Melton 51, 59, 61, 63, 65, 67 & 69 Rosina Drive, Melton <p>Arnolds Creek West Branch</p> <ul style="list-style-type: none"> 8 & 10 Claret Ash Boulevard, Harkness 1 Lakeview Terrace, Melton West 3 & 5 Leafy View Esplanade, Harkness 1 & 1A Piccolotto Drive, Melton West 8, 10, 12, 14 & 16 Pinnacle Crescent, Brookfield 2 Ross Court, Brookfield 15 Stirling Terrace, Melton West 4, 5, 6, 7 & 8 Waterdale Close, Melton West <p>Local Drainage</p> <ul style="list-style-type: none"> 27 Greenhills Drive, Kurunjang 5 Ruairi Court, Kurunjang 23 Winfield Drive, Kurunjang <p>Community Infrastructure Likely Flooded</p> <ul style="list-style-type: none"> Brookfield Village Retirement Village affected by property flooding to northern section of Village across Village Drive Bridge. Bridge may become flooded, cutting access to residents on Keating Street, Menzies, Grove, Reid Street, Lyons Street, Scullin Street, Page Street, Bruce Court and Whitlam Court Melton Christian College, Brookfield affected by flooding to sports grounds <p>Essential Infrastructure Likely Impacted</p> <p>Arnolds Creek East Branch</p> <ul style="list-style-type: none"> Bus Route 455 if Coburns Road, Kurunjang flooded Bus Route 458 if Barries Road, Melton flooded <p>Water Over Road</p> <p>Arnolds Creek East Branch</p> <ul style="list-style-type: none"> Barries Road, Melton Coburns Road, Melton West at Highfield Way and north of Centenary Ave Intersection Kinkora Road, Melton Kinloch Road, Melton Minns Road, Melton West ford crossing 	<p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement</p>

Design Rainfall Depths (mm) – <i>Indication of Possible Flooding</i>	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> • Scullin Street, Brookfield • Village Drive, Brookfield Arnolds Creek West Branch <ul style="list-style-type: none"> • Bulmans Road, Melton West between Trethowan Avenue & Piccolotto Drive • Leafy View Esplanade, Melton West • Riverbank Boulevard, Melton West • Claret Ash Boulevard, Melton West at Arnolds Creek Bvd roundabout • River Views Road, Melton West • Stanford Terrace, Melton West • Lakeview Terrace, Melton West • Keating Street, Brookfield 	

Table C2.8 – Breakdown of possible consequences at various rainfall intensities around Arnolds Creek with operational considerations

APPENDIX C3 – TOOLERN CREEK FLOOD EMERGENCY PLAN

OVERVIEW OF FLOODING CONSEQUENCES

Toolern Creek, Little Blind Creek & Ryans Creek and the surrounding towns of Toolern Vale, Kurunjang, Melton & Melton South are located between 33-40km north west of Melbourne in a mixed rural and residential setting. Toolern Creek, Little Blind Creek & Ryans Creek are all prominent watercourses in the area, flowing from the north where the three creeks join in Melton. High Intensity, short duration rainfall events can cause flash flooding in and around the urban residential area, while prolonged rainfall may see the creeks flood, causing damage to unsealed roads in the north of the catchment and affecting properties adjoining the creeks. See mapping in **Appendix F** for more insight into flooding in the area.

This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.

Summary of Consequences in a 1% AEP (100yr ARI) flood along Toolern Creek

Property					
Properties	15				
Residential	3				
Commercial	0				
Industrial	0				
Public Land	1				
Rural	11				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	3	Diggers Rest-Coimadai Road; Gisborne-Melton Road; & High Street	Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	2	456 & 943	Sewerage Facilities	0	
Power Facility	0		Levees	1	Barries Road & Western Hwy
Comms Services	0		Drainage Facilities	0	
Emergency Services	0		Airports / Airfields	1	Melton Airfield
Tourism / Recreation					
Sports Facilities	1	Melton Valley Golf Club	Caravan Parks	0	
Recreation Facilities	1	Melton Recreation Reserve	Camping Grounds	0	
Government Boundaries					

Local Gov't Areas	1	Melton	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Macedon Ranges	CFA District	1	District 14
SES Resp' Boundary	1	Melton	MFB District	0	

Table C3.1 – Consequence Summary of 1% AEP flood along Toolern Creek

WARNING TIMES

Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for Toolern Creek. All flood response actions must therefore be driven by rainfall and / or river level observations. Telemetered water level / flood gauges are located at Melton South within the Toolern Creek catchment.

Hydrographic Monitoring Station	Station No.	Location	Level Gauge	Rain Gauge	Melway Reference
Toolern Creek at Melton South (MW)	231231A	East bank along dirt track between Bridge Road and Strathulloh Circuit West	✓	✓	343 A9
Toolern Vale (MW)	587019	Benson Road, 200m from Gisborne – Melton Road		✓	X909 G12

Table C3.2 – Hydrographic Monitoring Stations within the Toolern Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website www.emergency.vic.gov.au for any thunderstorm, flood or severe weather warnings present for their area.

AREAS OF FLOOD RISK

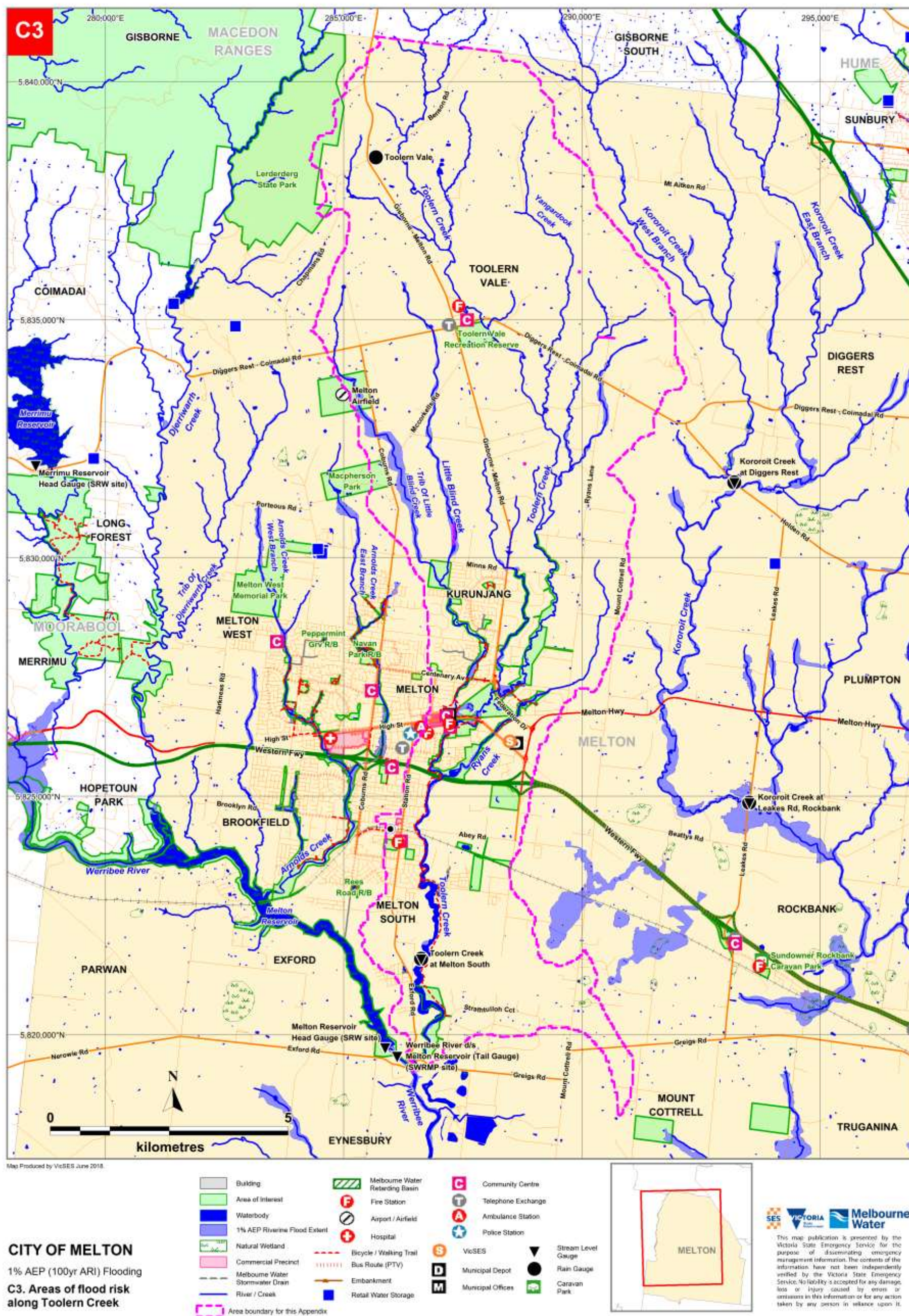


Figure C3 – Areas of flood risk around Toolern Creek in the City of Melton

PROPERTIES AT FLOOD RISK

Properties listed in the table below are at risk from flooding along Toolern Creek and Little Blind Creek. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Little Blind Creek (Melbourne Water, July 2008) and the Toolern Creek (PB Australia, December 2007) flood mapping and risk assessment programs.

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

Properties at risk from Flooding along Little Blind Creek & Toolern Creek during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
1	Buckle Road	Kurunjang	Toolern Creek	Riverine
47	Centenary Avenue	Melton	Little Blind Creek	Riverine
742	Coburns Road	Toolern Vale	Little Blind Creek	Riverine
744-818	Coburns Road	Toolern Vale	Little Blind Creek	Riverine
820-916	Coburns Road	Toolern Vale	Little Blind Creek	Riverine
995-1097	Coburns Road	Toolern Vale	Little Blind Creek	Riverine
14	Darlingsford Boulevard	Melton	Toolern Creek	Riverine
1909	Gisborne-Melton Road	Kurunjang	Toolern Creek	Riverine
1911	Gisborne-Melton Road	Kurunjang	Toolern Creek	Riverine
1913	Gisborne-Melton Road	Kurunjang	Toolern Creek	Riverine
1915	Gisborne-Melton Road	Kurunjang	Toolern Creek	Riverine
2-30	Melton Valley Drive	Melton	Toolern Creek	Riverine
308-374	Minns Road	Kurunjang	Little Blind Creek	Riverine
8	Phar Lap Place	Kurunjang	Toolern Creek	Riverine
410-416	Ryans Lane	Toolern Vale	Toolern Creek	Riverine
Total				
15				

Table C3.3 – Properties at risk of flooding along the Toolern Creek catchment in the City of Melton

ISOLATION

No major isolation risks exist for areas around Toolern Vale, Kurunjang, Melton & Melton South during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

ESSENTIAL INFRASTRUCTURE

- **Melton Airfield** may become flooded to the eastern edges of the two air strips during a 1% AEP event. The buildings on the premises are expected to remain relatively dry.

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within the City of Melton is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/31_Melton_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Toolern Vale, Kurunjang, Melton & Melton South are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

ROAD CLOSURES

The following roads are subject to closure during flooding around Toolern Vale, Kurunjang, Melton & Melton South. Check the VicRoads website for more details: <http://alerts.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
•	Diggers Rest – Coimada Road, Toolern Vale east of township
•	Gisborne – Melton Road, Kurunjang at Minns Road
•	High Street, Melton at Little Blind Creek and Ryans Creek crossings

Table C3.4 – VicRoads Possible Road Closures during a flooding event

Melton City Council Roads flooded in a 1% AEP (100yr ARI) event		
MELTON	KURUNJANG	TOOLERN VALE
• Centenary Avenue	• Buckle Road	• Bensons Road
• Killarney Drive	• Croxton Drive	• McCorkells Road
• Minns Road	• Minns Road	• McPhersons Road
• Nixon Street		• Missens Road
• Vivians Way		• Ryans Lane
• Yuille Street		

Table C3.5 – Melton City Council Possible Road Closures during a flooding event

FLOOD MITIGATION

LEVEES

Levee	Reach	Side	Levee Height	Levee Length	Expected Level of Protection	ANCOLD Hazard Rating	Consequences of Failure	Melway Reference
Gretel Grove, Toolern Creek	Western Highway & Barries Road	West	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	337 A11 - B10

Table C3.6 –Levees in the Toolern Creek Catchment in the City of Melton

SEWERAGE INFRASTRUCTURE

There is no sewerage Infrastructure expected to be within the vicinity of floodwaters during severe flood events around Toolern Vale, Kurunjang, Melton & Melton South.

COMMAND, CONTROL & COORDINATION

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

FLOOD IMPACTS & OPERATIONAL CONSIDERATIONS (INTELLIGENCE CARDS)

The table on the following pages provide a breakdown of the possible consequences of flooding along Toolern Creek and Little Blind Creek at various creek heights. This table is to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Toolern Creek at Melton South

FLOOD INTELLIGENCE CARD – MELTON SOUTH GAUGE, TOOLERN CREEK

Version 3 – June 2018



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

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LOCATION	East bank along dirt track between Bridge Road and Strathtulloh Circuit West
MELWAY REFERENCE:	343 A9
STREAM:	Toolern Creek
GAUGE NUMBER:	231231A
GAUGE ZERO:	87.031m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	Unknown
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	3.55m (15 th October 1983)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
1.94m	November 2010 Flood Level Peak	Event Summary <ul style="list-style-type: none"> Melton Recreation Reserve flooded at Toolern Creek 	
2.15m	January 2011 Flood Level Peak	Event Summary <ul style="list-style-type: none"> Minns Road, Melton flooded at Toolern Creek crossing Benson Road, Toolern Vale overtopped at Toolern Creek crossing Melton Recreation Reserved flooded at Little Blind Creek just south of High Street Nixon Street flooded at Toolern Creek ford crossing 	Traffic Management – road closures: Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage.
2.97m	1% AEP (100yr ARI) Flood Level	Properties at Flood Risk 15 Properties in Total Toolern Creek <ul style="list-style-type: none"> 410-416 Ryans Lane, Toolern Vale 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 8 Phar Lap Place, Kurunjang 1 Buckle Road, Kurunjang 14 Darlingsford Boulevard, Melton 1909, 1911, 1913 & 1915 Gisborne-Melton Road, Kurunjang 2-30 Melton Valley Drive, Kurunjang <p>Little Blind Creek</p> <ul style="list-style-type: none"> 47 Centenary Avenue, Melton 742, 744-818, 820-916 & 995-1097 Coburns Road, Toolern Vale 308-374 Minns Road, Kurunjang <p>Community Infrastructure Flooded</p> <ul style="list-style-type: none"> Melton Valley Golf Club flooded in parts Melton Recreation Reserve flooded in parts <p>Essential Infrastructure Impacted</p> <ul style="list-style-type: none"> Melton Airfield affected by flooding which may impact on eastern edges of runways. Buildings at premises likely to remain mainly dry <p>Water Over Road</p> <p>Toolern Creek</p> <ul style="list-style-type: none"> McPhersons Road, Toolern Vale Benson Road, Toolern Vale at Toolern Creek crossing Diggers Rest – Coimadaí Road, Toolern Vale 200m east of township near bend Ryans Lane, Toolern Vale breakout occurs south of Diggers Rest – Coimadaí Road intersection then again 700m further south Minns Road, Melton at Gisborne – Melton Road and between Gisborne – Melton Road and Ryans Lane Gisborne – Melton Road, Kurunjang at Minns Road Croxton Drive, Kurunjang Buckle Road, Kurunjang Nixon Street, Melton Viviannes Way, Melton <p>Little Blind Creek</p> <ul style="list-style-type: none"> Missens Road, Toolern Vale McCorkells Road, Toolern Vale near Coburns Road Minns Road, Kurunjang between Coburns Road and Gisborne – Melton Road Centenary Avenue, Melton at Little Blind Creek crossing Yuille Street, Melton near Unitt Street Intersection High Street, Melton near Yuille Street 	<p>BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement with prompted by notification</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Ryans Creek <ul style="list-style-type: none"> Killarney Drive, Melton at both Ryans Creek crossings High Street, Melton between Reserve Road and Holland Drive 	
2.98m	3 rd February 2005 Flood Level Peak	Event Summary <ul style="list-style-type: none"> High Street, Melton flooded at Little Blind Creek 	

Table C3.7 – Breakdown of likely consequences at various Melton South gauge level heights along Toolern Creek with operational considerations

APPENDIX C4 – KOROROIT CREEK FLOOD EMERGENCY PLAN

OVERVIEW OF FLOODING CONSEQUENCES

Kororoit Creek and the surrounding towns of Diggers Rest, Plumpton, Rockbank & Caroline Springs are located between 20 and 38km west of Melbourne in a predominantly rural setting except for Caroline Springs which contains newly established residential estates. Kororoit Creek is the prominent watercourse in the area, flowing from the north out of Gisborne South in Macedon Ranges Shire. The creek begins as two branches; east and west, where they combine in Diggers Rest. A number of tributaries join the main stream through Plumpton and Rockbank, each containing their own flooding issues mainly relating to overtopped roads. High Intensity, short duration rainfall events can cause flash flooding in and around the Rockbank area where water cannot drain away quick enough due to the flat terrain, while prolonged rainfall may see Kororoit Creek and its tributaries flood. See mapping in **Appendix F** for more insight into flooding in the area.

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Summary of Consequences in a 1% AEP (100yr ARI) flood along Kororoit Creek in City of Melton

Property					
Properties	57				
Residential	22				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	35				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	3	Diggers Rest-Coimadai Rd; Melton Hwy & Western Fwy	Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	2	456 & 943	Sewerage Facilities	1	Rockbank Pumping Station
Power Facility	0		Levees	0	
Comms Services	0		Drainage Facilities	6	Retarding Basins
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	1	Witchmount Estate &	Camping Grounds	0	

		Winery			
Government Boundaries					
Local Gov't Areas	1	Melton	CMA	1	Port Phillip & Westernport
Adjacent LGAs	3	Macedon Ranges; Hume; & Brimbank	CFA District	1	District 14
SES Resp' Boundary	1	Melton	MFB District	0	

Table C4.1 – Consequence Summary of 1% AEP flood along Kororoit Creek

WARNING TIMES

Warnings are available for flooding expected along Kororoit Creek at Deer Park. For other hydrographic/telemetry (river gauges) within the Municipality, Melbourne Water does not provide any flood warning service at this point.

Hydrographic Monitoring Station	Station No.	Location	Level Gauge	Rain Gauge	Melway Reference
Kororoit Creek at Diggers Rest (MW)	231106A	West bank of the creek, north side of Holden Road	✓	✓	332 H8
Kororoit Creek at Rockbank (MW)	231105B	North bank of the creek, east side of Leakes Road	✓	✓	344 J1
Kororoit Creek at Deer Park	231104A	North side of the creek along Millbank Drive near Wandsworth Ave	✓	✓	25C7

Table C4.1 – Hydrographic Monitoring Stations within the Kororoit Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website www.emergency.vic.gov.au for any thunderstorm, flood or severe weather warnings present for their area.

AREAS OF FLOOD RISK



Figure C4 – Areas of flood risk around Diggers Rest, Plumpton, Rockbank, Caroline Springs & Burnside in the City of Melton

PROPERTIES AT FLOOD RISK

Properties listed in the table below are at risk from flooding along Kororoit Creek and its tributaries. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Kororoit Creek (Melbourne Water, May 2016) flood mapping and risk assessment program.

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

Properties at risk from Flooding Kororoit Creek						
Residential		Commercial	Industrial	Rural		Public Use
Street No. at Risk in AEP Event						
20% AEP	5% AEP	1% AEP	Address	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
-	31-41	31-41	Alfred Road	Melton South	Rockbank Flats	Riverine
-	52-78	52-78	Alfred Road	Melton South	Rockbank Flats	Riverine
-	59-85	59-85	Alfred Road	Melton South	Rockbank Flats	Riverine
-	16	16	Bay Street	Caroline Springs	Kororoit Creek	Riverine
-	4	4	Brook Street	Caroline Springs	Kororoit Creek	Riverine
-	6	6	Brook Street	Caroline Springs	Kororoit Creek	Riverine
-	-	402	Clarke Road	Rockbank	Billingham Road Drain	Flash
-	-	1-11	Cropley Lane	Truganina	Billingham Road Drain	Flash
-	-	547-555	Leakes Road	Plumpton	Leakes Road Tributary	Riverine
-	-	557-581	Leakes Road	Plumpton	Leakes Road Tributary	Riverine
-	686-718	686-718	Leakes Road	Plumpton	Kororoit Creek	Riverine
720	720	720	Leakes Road	Plumpton	Kororoit Creek	Riverine
722-766	722-766	722-766	Leakes Road	Plumpton	Kororoit Creek	Riverine
-	768-778	768-778	Leakes Road	Plumpton	Kororoit Creek	Riverine
-	780-792	780-792	Leakes Road	Plumpton	Kororoit Creek	Riverine
-	783-815	783-815	Leakes Road	Plumpton	Kororoit Creek	Riverine
794-834	794-834	794-834	Leakes Road	Plumpton	Kororoit Creek	Riverine
-	1871-1963	1871-1963	Melton Highway	Plumpton	Kororoit Creek	Riverine
-	877-907	877-907	Mount Cottrell Road	Melton South	Rockbank Flats	Riverine
-	972-1000	972-1000	Mount Cottrell Road	Melton South	Rockbank Flats	Riverine
-	1008-1046	1008-1046	Mount Cottrell Road	Melton South	Rockbank Flats	Riverine
-	-	123-139	Murray Road	Rockbank	Rockbank Flats	Riverine
-	-	624-648	Neale Road	Rockbank	Billingham Road Drain	Flash
-	-	15	Nullabor Place	Caroline Springs	Billingham Road Drain	Flash
-	-	16	Nullabor Place	Caroline Springs	Billingham Road Drain	Flash
-	-	17	Nullabor Place	Caroline Springs	Billingham Road Drain	Flash
-	-	66-144	Paynes Road	Rockbank	Rockbank Flats	Riverine
-	-	30-46	Sheahan Road	Truganina	Billingham Road Drain	Flash

Properties at risk from Flooding Kororoit Creek						
Residential		Commercial	Industrial	Rural		Public Use
Street No. at Risk in AEP Event						
20% AEP	5% AEP	1% AEP	Address	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
-	-	37-49	Sheahan Road	Truganina	Billingham Road Drain	Flash
137-235	137-235	137-235	Sinclairs Road	Plumpton	Kororoit Creek	Riverine
-	-	248-256	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	258-274	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	276-288	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	290-302	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	303-329	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	304-316	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	318-324	Sinclairs Road	Rockbank	Billingham Road Drain	Flash
-	-	1	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	1/2	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	2/2	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	3	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	4	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	5	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	6	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	7	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	8	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	9	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	10	Stewart Crescent	Rockbank	Deanside Drive Tributary	Riverine
-	-	11	Troups Road North	Truganina	Deanside Drive Tributary	Riverine
-	-	14	Troups Road North	Rockbank	Deanside Drive Tributary	Riverine
-	-	18	Troups Road North	Rockbank	Deanside Drive Tributary	Riverine
-	-	20	Troups Road North	Rockbank	Deanside Drive Tributary	Riverine
-	-	104-112	Troups Road North	Rockbank	Deanside Drive Tributary	Riverine
-	-	1	Westcott Parade	Rockbank	Deanside Drive Tributary	Riverine
-	-	3	Westcott Parade	Rockbank	Deanside Drive Tributary	Riverine
-	-	1915-1937	Western Highway	Truganina	Deanside Drive Tributary	Riverine
-	-	2243-2277	Western Highway	Rockbank	Rockbank Flats	Riverine
Totals						
4	17	57				

Table C4.2 – Properties at risk of flooding along the Kororoit Creek catchment in the City of Melton

ISOLATION

No major isolation risks exist for areas around Diggers Rest, Plumpton, Rockbank, Caroline Springs & Burnside during a 1% AEP (100yr ARI) event. Some localised short-duration isolation may occur due to flash flooding.

ESSENTIAL INFRASTRUCTURE

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within the City of Melton is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/31_Melton_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Diggers Rest, Plumpton, Rockbank, Caroline Springs & Burnside are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

ROAD CLOSURES

The following roads are subject to closure during flooding around Diggers Rest, Plumpton, Rockbank, Caroline Springs & Burnside. Check the VicRoads website for more details: <http://alerts.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event	
•	Diggers Rest – Coimadai Road, Diggers Rest at Kororoit Creek East Branch crossing
•	Melton Highway, near Leakes Road Plumpton and east of Plumpton Road at a dip
•	Western Freeway, Rockbank between BP Service Station and Troups Road North; also west of Paynes Road; and a low point west of Leakes Road exit/entry point

Table C4.3 – VicRoads Possible Road Closures during a flooding event

Melton City Council Roads flooded in a 1% AEP (100yr ARI) event			
CAROLINE SPRINGS	DIGGERS REST	PLUMPTON	ROCKBANK
• Brook Street	• Holden Road	• Leakes Road	• Beattys Road
• Caroline Springs Bvd	• Mount Aitken Road	• Plumpton Road	• Imaroo Circuit
• Clarke Road	• Mullock Drive	• Tarleton Road	• Mount Cottrell Road
• Jamieson Link	• Raglan Street	• Taylors Road	• Paynes Road
• Kosciuszko Place	• Townsings Road	MELTON SOUTH	• Sinclairs Road
• Monaghans Lane		• Alfred Road	• Stewart Crescent
			• Troups Road North
			• Westcott Parade

Table C4.4 – Melton City Council Possible Road Closures during a flooding event

FLOOD MITIGATION

RETARDING BASINS

Melbourne Water Retarding Basin	On Drain/ Waterway	Area	Storage Capacity	Spillway Crest Level	Full Supply Level	Embankment Crest Level	ANCOLD Hazard Rating	Houses In Flow Path (dam breach)	Melway Reference
Caroline Springs	Stony Hill Creek	2.71 ha	39 ML	96.5m AHD	96.5m AHD	2.0m height (98.5m AHD)	Very Low	0	356 F5
Chisholm Park	Billingham Rd Drain (Kororoit Creek)	1.42 ha	23 ML	71.45m AHD	71.6m AHD	1.1m height (71.7m AHD)	Very Low	0	358 J4
Serpentine No. 1&2	Billingham Rd Drain (Kororoit Creek)	4.26 ha	17 ML	78.5m AHD	79.78m AHD	In-cut	Very Low	0	358 F2
Serpentine No.3	Billingham Rd Drain (Kororoit Creek)	5.35 ha	128 ML	N/A	79.98m AHD	in-cut	Very Low	0	358 E1
Sydenham West	Sydenham West Drain (Kororoit Creek)	1.46 ha	17 ML	115.9m AHD	Unavailable	2.4m height (118.3m AHD)	Very Low	0	3 A11
Waigani Avenue	Cherry's Diversion Drain (Kororoit Creek)	0.65 ha	5 ML	61.5m AHD	62.5m AHD	0.8m height (62.8m AHD)	High C	42	25 A7

Table C4.5 – Melbourne Water Retarding Basins within the Kororoit Creek catchment in the City of Melton

SEWERAGE INFRASTRUCTURE

Sewerage Infrastructure of note during a severe flood event located around Kororoit Creek and its Tributaries are contained within the following table.

SEWER PUMPING STATIONS

Melbourne Water Sewerage Pumping Station	On Drain / Waterway	Location	Level of Protection	Melway Reference
Rockbank Sewer Pumping Station	Kororoit Creek Tributary	Next to the railway line at Troups Road North, Rockbank	Requires protection in a 1% AEP event. Compromised and damaged in the February 2005 event	355 B11

Table C4.6 – Sewer Pumping Stations within the Kororoit Creek Catchment in the City of Melton

COMMAND, CONTROL & COORDINATION

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

FLOOD IMPACTS & OPERATIONAL CONSIDERATIONS (INTELLIGENCE CARDS)

The tables on the following pages provide a breakdown of the possible consequences of flooding along Kororoit Creek and its tributaries at various creek heights or rain totals within the City of Melton. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Kororoit Creek at Diggers Rest
- Kororoit Creek at Rockbank
- Rockbank Flats

FLOOD INTELLIGENCE CARD – DIGGERS REST GAUGE, KOROROIT CREEK

Version 3 – June 2018



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

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LOCATION	West bank of the creek, north side of Holden Road
MELWAY REFERENCE:	332 H8
STREAM:	Kororoit Creek
GAUGE NUMBER:	231106A
GAUGE ZERO:	152.662m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	3.87m (15 th October 1983)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.2m	20% AEP (5yr ARI) Flood Level		
2.55m	10% AEP (10yr ARI) Flood Level		
2.71m	3 rd February 2005 Flood Level Peak	Event Summary <ul style="list-style-type: none"> Mount Aitken Road, Diggers Rest overtopped at Kororoit Creek West Branch 	
2.85m	5% AEP (20yr ARI) Flood Level		
3.12m	2% AEP (50yr ARI) Flood Level		
3.71m	1% AEP (100yr ARI) Flood Level	Water Over Road Kororoit Creek West Branch <ul style="list-style-type: none"> Mount Aitken Road, Diggers Rest 	VICSES may provide warnings using EM-COP to Melton Council and appropriate agencies as

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		Kororoit Creek East Branch <ul style="list-style-type: none"> Raglan Street, Diggers Rest Mount Aitken Road, Diggers Rest Townships Road, Diggers Rest 	<p>required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond to RFA's on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement</p>
3.87m	15 th October 1983 Flood Level Peak		

Table C4.7 – Breakdown of likely consequences at various Diggers Rest gauge level heights along Kororoit Creek with operational considerations

FLOOD INTELLIGENCE CARD – ROCKBANK GAUGE, KOROROIT CREEK

Version 3 – March 2016



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

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LOCATION	North bank of the creek, east side of Leakes Road
MELWAY REFERENCE:	344 J1
STREAM:	Kororoit Creek
GAUGE NUMBER:	231105B
GAUGE ZERO:	96.812m AHD
GAUGE TYPE	Stream Level & Rain

MINOR:	Not Established
MODERATE:	Not Established
MAJOR	Not Established
LEVEE HEIGHT:	N/A
TELEMETRIC/MANUAL	Telemetric
HIGHEST RECORDED FLOOD:	2.40m (14 th January 2011)

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
2.55m	20% AEP (5yr ARI) Flood Level		
2.60m	10% AEP (10yr ARI) Flood Level		
2.75m	5% AEP (20yr ARI) Flood Level	Properties at Flood Risk 4 Properties in Total Kororoit Creek Main Stream <ul style="list-style-type: none"> 720, 722-766 & 794-834 Leakes Road, Plumpton 137-235 Sinclairs Road, Plumpton Water Over Road Kororoit Creek Main Stream <ul style="list-style-type: none"> Leakes Road, Plumpton at Tarletons Road Tarletons Road, Plumpton at Leakes Road 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Beattys Road, Rockbank at Kororoit Creek crossing Sinclairs Road, Rockbank north of Neale Road Monaghans Lane / Clarke Road, Caroline Springs at Kororoit Creek crossing. Road contains gates at either side of floodway 	<p>incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement Alternate routes via clearly signed detours.</p> <p>Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage. VicPol assistance required to ensure vehicles do not attempt crossing</p>
3.10m	2% AEP (50yr ARI) Flood Level	<p>Properties at Flood Risk 6 New at Level; 10 Properties in Total Kororoit Creek Main Stream</p> <ul style="list-style-type: none"> 1871-1963 Melton Highway, Plumpton 686-718 & 783-815 Leakes Road, Plumpton 16 Bay Street, Caroline Springs 4 & 6 Brook Street, Caroline Springs 	VICSES to respond on a request by request basis.
3.30m	1% AEP (100yr ARI) Flood Level	<p>Properties at Flood Risk 37 New at Level; 47 Properties in Total Leakes Road Tributary</p> <ul style="list-style-type: none"> 533-537, 547-555 & 557-581 Leakes Road, Plumpton <p>Deanside Drive Tributary</p> <ul style="list-style-type: none"> 11, 14, 18, 20 & 22-102 Troups Road North, Rockbank 1,1/2, 2/2, 3, 4, 5, 6, 7, 8, 9 & 10 Stewart Crescent, Rockbank 	

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> 1 & 3 Westcott Parade, Rockbank 1915-1937 Western Highway, Rockbank <p>Billingham Road Drain</p> <ul style="list-style-type: none"> 248-256, 258-274, 276-288, 290-302, 303-329, 304-316 & 318-324 Sinclairs Road, Rockbank 624-648 Neale Road, Rockbank 1-11 Cropley Lane, Rockbank 30-46 & 37-49 Sheahan Road, Rockbank 402 Clarke Road, Rockbank 15, 16 & 17 Nullarbor Place, Caroline Springs <p>Tourism / Recreation Likely Impacted</p> <ul style="list-style-type: none"> Witchmount Estate & Winery, Leakes Road Plumpton possibly isolated by flooding across driveway to premises and car-park <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Bus Routes 456 & 943 if Western Freeway is flooded Western Water Rockbank sewer pumping station at Troups Road South compromised and alternate sewerage outfall measures put in place via education <p>Water Over Road</p> <p>Kororoit Creek Main Stream</p> <ul style="list-style-type: none"> Jamieson Link, Caroline Springs Brook Street, Caroline Springs Kosciuszko Place, Caroline Springs Caroline Springs Boulevard, Caroline Springs at Caroline Springs Front Lake <p>Leakes Road Tributary</p> <ul style="list-style-type: none"> Plumpton Road, Diggers Rest near 'Plumpton Park' Access Road to Excel Quarries, Plumpton off Leakes Road Melton Hwy, near Leakes Road, Plumpton Tarletons Road, Plumpton near Leakes Road <p>Beattys Road Tributary</p> <ul style="list-style-type: none"> Holden Road, Plumpton east of Plumpton Road Plumpton Road, Plumpton north of Melton Hwy and also north of Tarletons Road at a dip Tarletons Road, Plumpton west of Plumpton Road at a dip <p>Deanside Drive Tributary</p> <ul style="list-style-type: none"> Western Freeway, Rockbank between BP Service Station and Troups Road North Troups Road North, Rockbank. Majority of road likely affected Stewart Crescent, Rockbank near Troups Road North 	<p>VICSES to respond on a request by request basis.</p> <p><u>Western Water</u> Protect the pump house via temporary flood protection measures. Western Water to be advised and preparation for emergency sewerage education.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement</p>

Creek Height	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
		<ul style="list-style-type: none"> Westcott Parade, Rockbank near Troups Road North Vere Court Tributary <ul style="list-style-type: none"> Melton Hwy, Plumpton east of Plumpton Road at a dip Beattys Road, Plumpton east of Plumpton Road Taylors Road, Plumpton east of Plumpton Road Billingham Road Drain <ul style="list-style-type: none"> Sinclairs Road, Rockbank Neale Road, Rockbank Western Freeway, Rockbank at Keating Road Sheahan Road, Rockbank 	

Table C4.8 – Breakdown of likely consequences at various Rockbank gauge level heights along Kororoit Creek with operational considerations

FLOOD INTELLIGENCE CARD – ROCKBANK FLATS (UNGAUGED)

Version 3 – June 2018



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

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CLOSEST RAIN GAUGE	Kororoit Creek at Rockbank
LOCATION	North bank of the creek, east side of Leakes Road
MELWAY REF:	344 J1

GAUGE NUMBER	231105B
GAUGE TYPE	Stream Level & Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
20mm in 10 mins; 34mm in 30 mins; 44mm in 1 hour; 55mm in 2 hours; 76mm in 6 hours; or 94mm in 12 hours Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.	2% AEP (50 year ARI)	Properties at Flood Risk 6 Properties in Total <ul style="list-style-type: none"> 31-41, 52-78 & 59-85 Alfred Road, Melton South 877-907, 972-1000 & 1008-1046 Mount Cottrell Road, Melton South Water Over Road <ul style="list-style-type: none"> Alfred Road, Melton South Mount Cottrell Road, Rockbank either side of the Railway Line. 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident VICSES to respond on a request by request basis.

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
<p>23mm in 10 mins; 39mm in 30 mins; 51mm in 1 hour; 63mm in 2 hours; 87mm in 6 hours; or 107mm in 12 hours</p> <p>Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.</p>	1% AEP (100 year ARI)	<p>Properties at Flood Risk 3 New at Level; 9 Properties in Total</p> <ul style="list-style-type: none"> 123-139 Murray Road, Rockbank 66-114 Paynes Road, Rockbank 2243-2277 Western Highway, Rockbank <p>Essential Infrastructure Likely Impacted</p> <ul style="list-style-type: none"> Bus Routes 456 & 943 if Western Freeway is flooded <p>Water Over Road</p> <ul style="list-style-type: none"> Western Freeway, Rockbank west of Paynes Road. Also a low point west of Leakes Road exit/entry Paynes Road, Rockbank south of the Railway Line and also a small overtopped point possible north of the Western Freeway Iramoo Circuit, Rockbank. Overtopped point midway between Mount Cottrell Road and Paynes Road 	<p>VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident</p> <p>VICSES to respond on a request by request basis.</p> <p>Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement</p>

Table C4.9 – Breakdown of possible consequences at various rainfall intensities around Rockbank with operational considerations

APPENDIX C5 – DRY CREEK & SKELETON CREEK FLOOD EMERGENCY PLAN

OVERVIEW OF FLOODING CONSEQUENCES

Dry Creek and Skeleton Creek, along with the surrounding areas of Mount Cottrell and Truganina are located between 23 and 27km west of Melbourne in a rural setting. Dry Creek and Skeleton Creek both flow from north to south, beginning in the area and leaving the City of Melton at Boundary Road before entering the City of Wyndham where the two creeks join. High Intensity, short duration rainfall events can cause flash flooding in and around the rural area where flat terrain causes ponding, while prolonged rainfall may see Dry Creek and Skeleton Creek flood. See mapping in **Appendix F** for more insight into flooding in the area.

This Summary table is generated from Victorian Government data. The State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for error, loss or damage which may arise from reliance upon it. All persons access this information should make appropriate enquiries to assess the currency of the data.

Summary of Consequences in a 1% AEP (100yr ARI) flood along Dry and Skeleton Creeks

Property					
Properties	10				
Residential	0				
Commercial	0				
Industrial	0				
Public Land	0				
Rural	10				
Community Infrastructure					
Health Facilities	0		Child Care / Kindergartens	0	
Care Facilities	0		Community Venues	0	
Retirement Villages	0		Places of Worship	0	
Schools / Colleges	0		Prisons	0	
Essential Infrastructure					
Major Roads	1	Hopkins Road	Police Stations	0	
Major Rail	0		Government Buildings	0	
Bus Routes	0		Sewerage Facilities	0	
Power Facility	0		Levees	0	
Comms Services	0		Drainage Facilities	0	
Emergency Services	0		Airports / Airfields	0	
Tourism / Recreation					
Sports Facilities	0		Caravan Parks	0	
Recreation Facilities	0		Camping Grounds	0	
Government Boundaries					
Local Gov't Areas	1	Melton	CMA	1	Port Phillip & Westernport
Adjacent LGAs	1	Wyndham	CFA District	1	District 14
SES Resp' Boundary	1	Melton	MFB District	0	

Table C5.1 – Consequence Summary of 1% AEP flood along Dry and Skeleton Creeks in City of Melton

WARNING TIMES

Neither the Bureau of Meteorology nor Melbourne Water currently provides flood forecasts for Dry Creek or Skeleton Creek. All flood response actions must therefore be driven by rainfall and / or river level observations. Telemetered water level / flood gauges are located at Hoppers Crossing within the Skeleton Creek catchment.

Melbourne Water Hydrographic Monitoring Station	Station No.	Location	Level Gauge	Rain Gauge	Melway Reference
Skeleton Creek at Hoppers Crossing	231110A	East bank of the creek, south side of Sayers Road	✓	✓	203 A6

Table C5.2 – Hydrographic Monitoring Stations within the Skeleton Creek catchment

These Gauges may provide some warning of expected flooding. See the Melbourne Water website for more information on these gauges: <http://www.melbournewater.com.au/waterdata/rainfallandriverleveldata/Pages/Rainfall-and-river-level-new.aspx>. It is advised that residents monitor the Bureau of Meteorology's website <http://www.bom.gov.au/> and the VicEmergency website www.emergency.vic.gov.au for any thunderstorm, flood or severe weather warnings present for their area.

AREAS OF FLOOD RISK

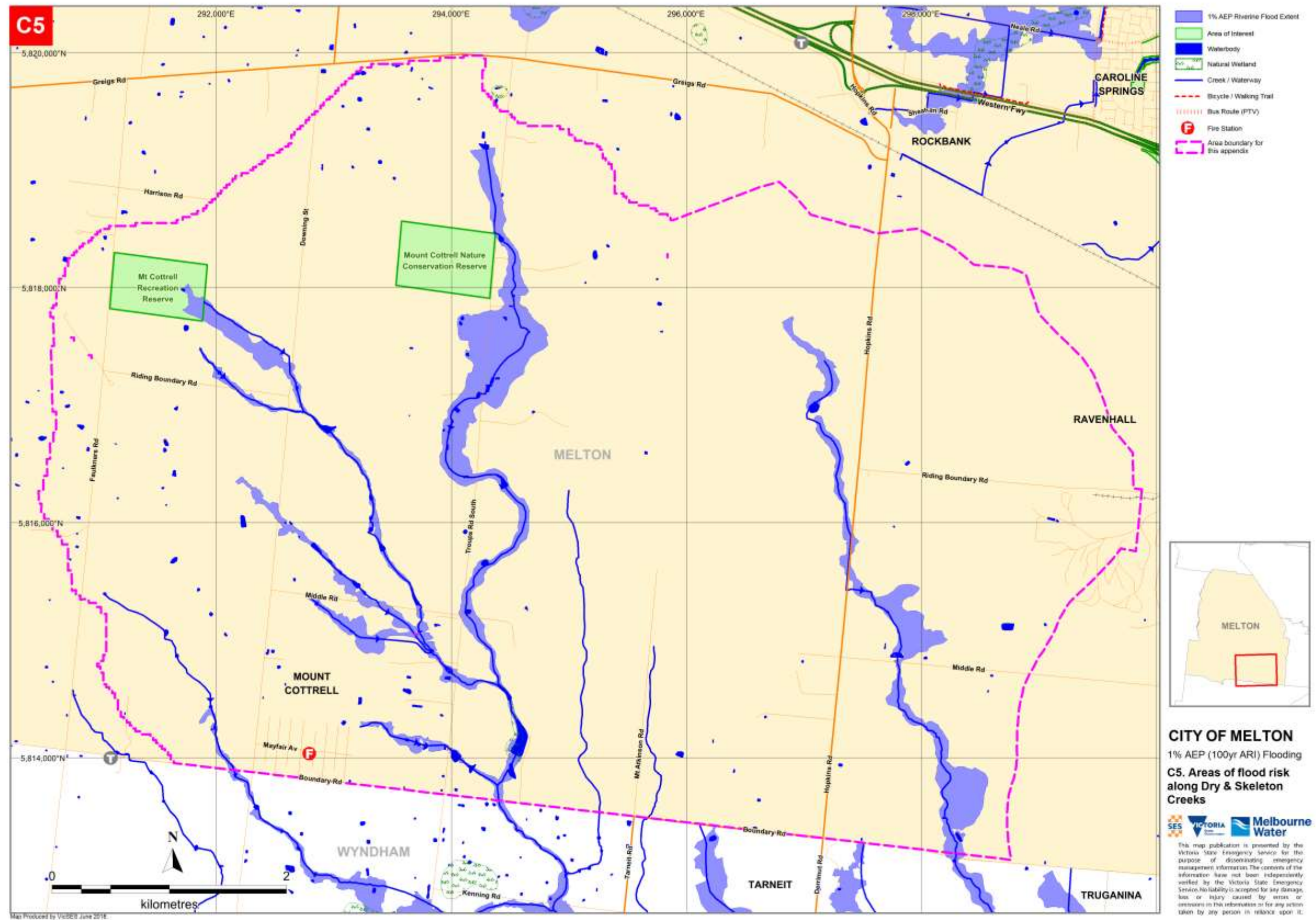


Figure C5 – Areas of flood risk around Mount Cottrell & Truganina in the City of Melton

PROPERTIES AT FLOOD RISK

Properties listed in the table below are at risk from flooding along Dry and Skeleton Creeks in the City of Melton. As more intelligence becomes available, this list may change. This table has been populated based on modelling work as part of the Dry Creek (Melbourne Water, July 2008) and the Skeleton Creek (Melbourne Water, July 2008) flood mapping and risk assessment programs.

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

Properties at risk from Flooding along Dry and Skeleton Creeks during a 1% AEP event				
Residential	Commercial	Industrial	Rural	Public Use
Street No. at Risk	Street	Suburb	Along Melbourne Water Watercourse	Flood Risk Type
522-588	Middle Road	Truganina	Skeleton Creek	Riverine
361-395	Troups Road South	Mount Cottrell	Dry Creek	Riverine
397-429	Troups Road South	Mount Cottrell	Dry Creek	Riverine
418-472	Troups Road South	Mount Cottrell	Dry Creek	Riverine
431-533	Troups Road South	Mount Cottrell	Dry Creek	Riverine
474-528	Troups Road South	Mount Cottrell	Dry Creek	Riverine
530-544	Troups Road South	Mount Cottrell	Dry Creek	Riverine
546-562	Troups Road South	Mount Cottrell	Dry Creek	Riverine
564-578	Troups Road South	Mount Cottrell	Dry Creek	Riverine
788-802	Troups Road South	Mount Cottrell	Dry Creek	Riverine
Total				
10				

Table C5.3 – Properties at risk of flooding along the Dry & Skeleton Creek catchments in the City of Melton

ISOLATION

Properties along Middle Road and Troups Road South in Mount Cottrell may become isolated for an extended period following a 2% AEP (50yr ARI) event or larger.

ESSENTIAL INFRASTRUCTURE

During an event, see the Public Transport Victoria's Website for details on delays or alterations to services. <http://ptv.vic.gov.au/live-travel-updates/>. A map of Public Transport routes within the City of Melton is available via the website at: https://static.ptv.vic.gov.au/siteassets/Maps/Localities/PDFs/31_Melton_LAM.pdf

Apart from the roads outlined below, all other essential infrastructure and services areas around Mount Cottrell & Truganina are expected to remain unaffected by flooding during a 1% AEP (100yr ARI) event.

ROAD CLOSURES

The following roads are subject to closure during flooding around Mount Cottrell & Truganina. Check the VicRoads website for more details: <http://alerts.vicroads.vic.gov.au/>

VicRoads Roads flooded in a 1% AEP (100yr ARI) event

- Hopkins Road, Truganina north of Middle Road

Table C5.4 – VicRoads Possible Road Closures during a flooding event

Melton City Council Roads flooded in a 1% AEP (100yr ARI) event

MOUNT COTTRELL	TRUGANINA
• Boundary Road	• Boundary Road
• Downing Street	• Middle Road
• Middle Road	
• Riding Boundary Road	
• Troups Road South	

Table C5.5 – Melton City Council Possible Road Closures during a flooding event

FLOOD MITIGATION

No formal Retarding Basins, Pumping Stations or Levees exist around Mount Cottrell & Truganina.

SEWERAGE INFRASTRUCTURE

There is no sewerage Infrastructure expected to be within the vicinity of floodwaters during severe flood events around Mount Cottrell & Truganina.

COMMAND, CONTROL & COORDINATION

VICSES will assume overall control of the response to flood incidents. Control and coordination of a flood incident shall be carried out at the lowest effective level and in accordance with the State Emergency Response Plan (EMMV Part 3). During significant events, VICSES will conduct incident management using multi-agency resources.

FLOOD IMPACTS & OPERATIONAL CONSIDERATIONS (INTELLIGENCE CARDS)

The tables on the following pages provide a breakdown of the possible consequences of flooding along Dry Creek and Skeleton Creek at various creek heights or rain totals within the City of Melton. These tables are to be used only as a guide as no two floods at a location will have identical impacts.

Intelligence Cards have been included for the following locations:

- Dry Creek at Mount Cottrell
- Skeleton Creek at Truganina

FLOOD INTELLIGENCE CARD – DRY CREEK, MOUNT COTTRELL (UNGAUGED)

Version 3 – June 2018



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

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CLOSEST RAIN GAUGE	Skeleton Creek at Hoppers Crossing
LOCATION	East bank of the creek, south side of Sayers Road, Truganina
MELWAY REF:	203 A6

GAUGE NUMBER	231110A
GAUGE TYPE	Stream Level & Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
19mm in 10 mins; 32mm in 30 mins; 41mm in 1 hour; 52mm in 2 hours; 73mm in 6 hours; or 92mm in 12 hours Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.	2% AEP (50 year ARI)	Properties at Flood Risk 10 Properties in Total <ul style="list-style-type: none"> 361-395, 397-429, 418-472, 431-533, 474-528, 530-544, 546-562, 564-578 & 788-802 Troupes Road South, Mount Cottrell. More likely isolated by multiple points of flooding along road. Water Over Road <ul style="list-style-type: none"> Middle Road, Mount Cottrell Troups Road South, Mount Cottrell at multiple locations between Greigs Road and Boundary Road 	VICSES may provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident VICSES to respond on a request by request basis.

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
			Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement
22mm in 10 mins; 37mm in 30 mins; 47mm in 1 hour; 60mm in 2 hours; 85mm in 6 hours; or 106mm in 12 hours Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.	1% AEP (100 year ARI)	Properties at Flood Risk 10 Properties in Total <ul style="list-style-type: none"> 361-395, 397-429, 418-472, 431-533, 474-528, 530-544, 546-562, 564-578 & 788-802 Troupes Road South, Mount Cottrell. More likely isolated by multiple points of flooding along road. Water Over Road <ul style="list-style-type: none"> Boundary Road, Mount Cottrell east of Troups Road South Downing Street, Mount Cottrell near Riding Boundary Road and north of Middle Road Middle Road, Mount Cottrell Riding Boundary Road, Mount Cottrell near Downing Street Troups Road South, Mount Cottrell at multiple locations between Greigs Road and Boundary Road 	VICSES will provide warnings using EM-COP to Melton Council and appropriate agencies as required based on the predictions provided by BoM regarding flood levels and the risk of Flash Flooding. The VICSES RDO in conjunction with the Regional Agency Commander will maintain operational awareness and form an appropriate response arrangement to suit the level of incident VICSES to respond on a request by request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement

Table C5.6 – Breakdown of possible consequences at various rainfall intensities along Dry Creek in the City of Melton with operational considerations

FLOOD INTELLIGENCE CARD – SKELETON CREEK, TRUGANINA (UNGAUGED)

Version 3 – June 2018



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

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CLOSEST RAIN GAUGE	Skeleton Creek at Hoppers Crossing
LOCATION	East bank of the creek, south side of Sayers Road, Truganina
MELWAY REF:	203 A6

GAUGE NUMBER	231110A
GAUGE TYPE	Stream Level & Rain
TELEMETRIC/MANUAL	Telemetric

Design Rainfall Depths (mm) – Indication of Possible Flooding	Annual Exceedance Probability (% AEP)	Consequence / Impact	Operational Considerations
22mm in 10 mins; 37mm in 30 mins; 47mm in 1 hour; 60mm in 2 hours; 85mm in 6 hours; or 106mm in 12 hours Note: rainfall depths are a very rough method of estimating flood events and have been used due to the ungagged nature of the catchment. This should be used as a guide only.	1% AEP (100 year ARI)	Properties at Flood Risk 1 Properties in Total <ul style="list-style-type: none"> 522-588 Middle Road, Truganina Water Over Road <ul style="list-style-type: none"> Hopkins Road, Truganina north of Middle Road Middle Road, Truganina near Hopkins Road Boundary Road, Truganina east of Hopkins Road 	VICSES to respond on a request by request basis. Council and VicRoads (as appropriate) to provide road closure signage under predetermined arrangement

Table C5.7 – Breakdown of possible consequences at various rainfall intensities along Skeleton Creek in the City of Melton with operational considerations

APPENDIX D - FLOOD EVACUATION ARRANGEMENTS

Phase 1 - Decision to Evacuate

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

- Properties are likely to become inundated;
- Properties are likely to become isolated and occupants are not suitable for isolated conditions;
- Public health is at threat 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);
- 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 is to be made by the IC in consultation with the MERC, MERO, MRM, DHHS, Health Commander and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

There are currently no pre-established triggers for evacuation within the Melton Council area.

Phase 2 – Warning

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, MRM, DHHS and other key agencies and expert advice (CMA's and Flood Intelligence specialists).

Phase 3 – Withdrawal

Withdrawal will be controlled by VicPol. VICSES may provide advice regarding most appropriate evacuation routes and locations for at-risk communities to evacuate to.

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 at the request of the IC or via the appointed VicPol Evacuation Manager.

Vulnerable People in Emergencies

Vulnerable people living in the community will be identified through funded agencies, community service organisations or other community networks. Such people will be assessed against the definition of a vulnerable person and may qualify for registration on the Vulnerable Persons Register (VPR). A list of facilities where vulnerable people may be located is also kept by Council. These may be funded facilities including education, health and childcare, Commonwealth regulated aged care facilities and other locally identified facilities.

Further information on Vulnerable People in Emergencies can be obtained from Melton Council's MRM.

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Phase 4 – Shelter

Relief / Recovery Centres and/or assembly areas which cater for people's basic needs for floods may be established to meet the immediate needs of people affected by flooding. The need for Relief Centres will be determined dependant on the location and scale of the event.

Relief / Recovery Centres that may be used are listed in the City of Melton Relief and Recovery Plan (Part 6 of the Melton MEMP).

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

Animal Shelter

The need for animal shelter compounds will be determined dependant on the location and size of the event. Details of emergency relief and recovery arrangements can be found in the City of Melton Recovery Plan (Part 6 of the Melton MEMP).

Caravans

Whilst there is one caravan park within the City of Melton municipality, it is not located within a flood prone area; hence there is no requirement for caravan evacuation.

Phase 5 – Return

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

The IC in consultation with VicPol will determine when it is safe for evacuees to return to 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 to evacuate include:

- Current storm/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

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, water treatment plant affecting potable water supplies etc.

Service	Impact	Trigger Point for action	Strategy/Temporary Measures
Sinclair's Road at Kororoit Creek	Closure of major road due to flooding of Sinclair's Road Ford at Kororoit Creek	1 in 5	Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road

			conditions, closure signage and detour signage. VicPol assistance required to ensure vehicles do not attempt crossing.
Nixon Ford at Toolern Creek	Closure of minor local road due to flooding of Nixon Ford at Toolern Creek	1 in 5	Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage.
Minns Road at Toolern Creek	Closure of minor local road due to flooding of Nixon Ford at Toolern Creek	1 in 5	Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage.
General Transport	General road closures across network	Inundation of road network and associated damage to an extent that it is unsafe for vehicles to use road	Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage.
School Bus Services	General road closures across network leading to student pickups being suspended	Inundation of road network and associated damage to an extent that it is unsafe for vehicles to use road	Alternate routes via clearly signed detours. Alternate routes to be determined by Council Traffic Engineers. Council works crews to install and monitor detour signage. Council Network Inspectors to monitor road conditions, closure signage and detour signage. Alternate student collection points to be established.

Essential Infrastructure and Property Protection

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

Facility	Impact	Trigger Point for action	Strategy/Temporary Measures
Rockbank sewer pumping station – Troups Road North, Rockbank	Loss of pumping station will impact provision of sewerage outfall to the Rockbank township	1 in 100 event	Protect the pump house via temporary flood protection measures. Western Water to be advised and preparation for emergency sewerage education.

Residences in the Gretel Grove area	The Toolern Creek in flood will cause a surcharge of the stormwater drainage system servicing the Gretel Grove area.	Unknown. To be determined	Activate the Gretel Grove flood gate.

City of Melton will establish a sandbag distribution point for sandbags provided by VICSES at the Council Depot, 90 – 92 High Street, Melton

For small scale events, sandbags can be purchase from hardware stores such as Bunnings. For large scale events, sandbag collection points and filling points will be determined, with the community being informed of these points depending on the nature and proximity of the event

Rescue

Requests for Melton Council resources to support rescue activities should be forwarded to the MECC or EMLO if an ICC has been established.

Resources are available from the Melton SES Unit to assist with rescue operations – specific details of equipment and resources available can be obtained from the VICSES RDO.

No High risk areas/communities (i.e. low-lying islands where rescues might be required) have been identified, other than the occurrence of flash flooding over roadways.

APPENDIX E - FLOOD WARNING SYSTEMS

Flood Warning

Storm and Flood Warning products and Flood Class Levels can be found on the BoM website and the VicEmergency website. Storm and Flood Warning Products include Severe Thunderstorm Warnings, Severe Weather Warnings, Flood Watches and Flood Warnings – see example on following page.

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 RDO or the established ICC will normally be responsible for drafting, authorising and issuing of Flood Bulletins, using the VicEmergency system.

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

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.

Local Flood Warning System Arrangements

There are no local arrangements for Flood Warnings Systems in Melton Council.

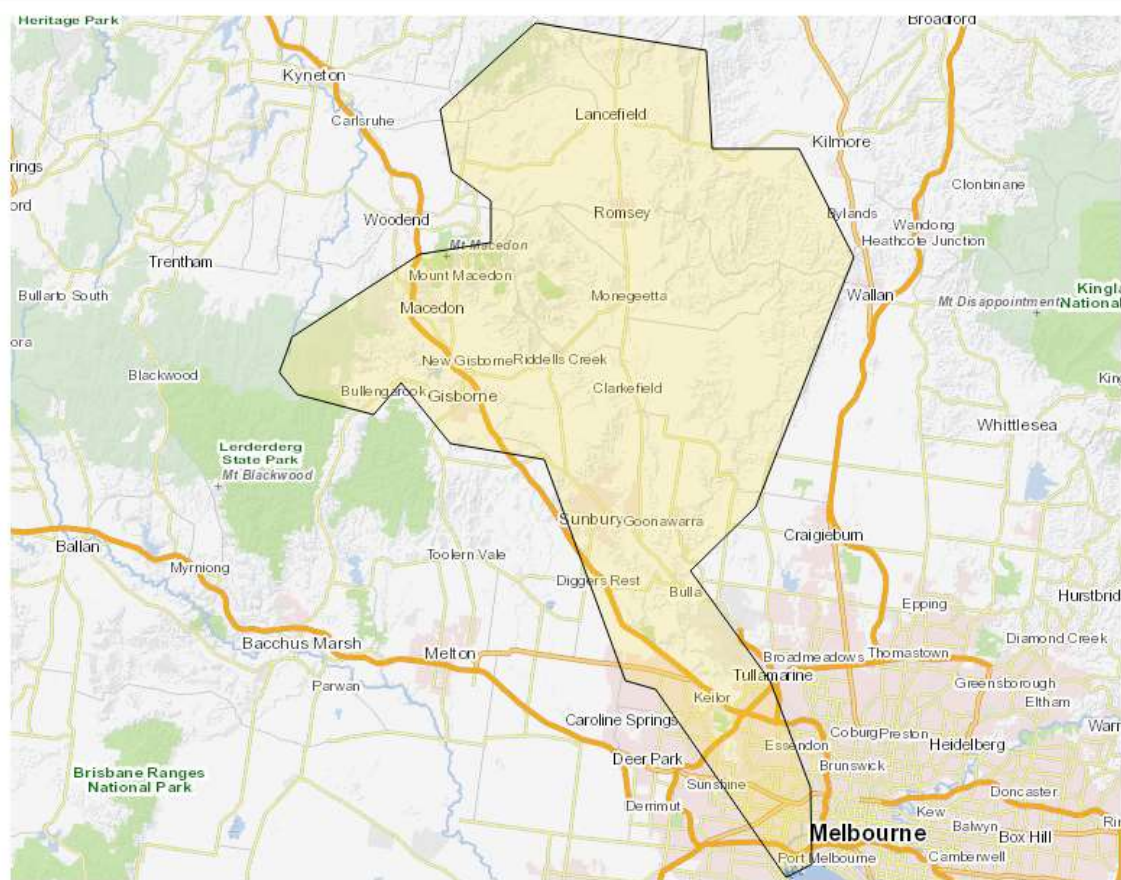
BOM Flood Warning Example



ADVICE - FLOOD

Incident Location: Maribyrnong
Incident Name: Maribyrnong Flood Sept 2016
Issued: Set at publish time
Next Update Expected:

Map



Message

This **Minor Flood Warning** is being issued for Maribyrnong River.

- The Maribyrnong River catchment has received rainfall averaging about 31mm since 0900am yesterday. Rainfall totals of 5mm have been forecast for the catchment in the next 2 hours.
- Water levels of the Maribyrnong River and its tributaries at various locations are rising in response to the rain.
- The level of the Deep Creek at Darraweit Guim is currently 5.41m and rising. It is expected to peak above the Minor Flood Level (5.50m) this morning.
- Minor flooding in the Deep Creek and Maribyrnong River catchment is expected to affect low lying areas adjacent to the waterway. Minor roads may be closed.

The river heights at 08.14am 14/09/2016 were:

- Deep Creek at Doggetts Bridge, Lancefield: 2.22 metres, rising
- Deep Creek at Darraweit Guim: 5.47 metres, falling
- Deep Creek at Konagaderra: 3.62 metres, falling
- Bolinda Creek at Clarkefield: 1.19 metres, rising
- Deep Creek at Bulla: 2.39 metres, falling
- Rosslynne Reservoir, Head Gauge: 38.52 metres, rising
- Jacksons Creek at Sunbury: 2.13 metres, rising
- Steele Creek at Keilor East: 1.19 metres, rising
- Maribyrnong River at Keilor North: 3.58 metres, rising
- Maribyrnong River at Keilor: 1.84 metres, rising
- Maribyrnong River at Maribyrnong: 0.04 metres, rising

Stay informed - monitor your local conditions and remain alert.

What you should do:

- Be prepared to act if your situation changes.
- You should stay informed by listening to emergency broadcasters and monitoring warnings.
- Monitor weather forecasts and river levels. Go to www.bom.gov.au/vic/warnings.
- Floodwater is dangerous - never drive, walk or ride through floodwater.

Impacts in your area:

- Flooding above floor level of a single story home is likely to occur in some locations.
- Local roads may be closed and low bridges may be underwater.
- Areas around rivers and streams may be flooded.

This message was issued by State Emergency Service.

The next update is expected by 4PM this afternoon or as the situation changes.

Flood information:

- For river heights check www.bom.gov.au or phone 1300 659 217.
- For urgent animal welfare issues call [Agriculture Victoria](http://www.agriculture.vic.gov.au) on 136 186 or your local vet.

APPENDIX F – MAPS

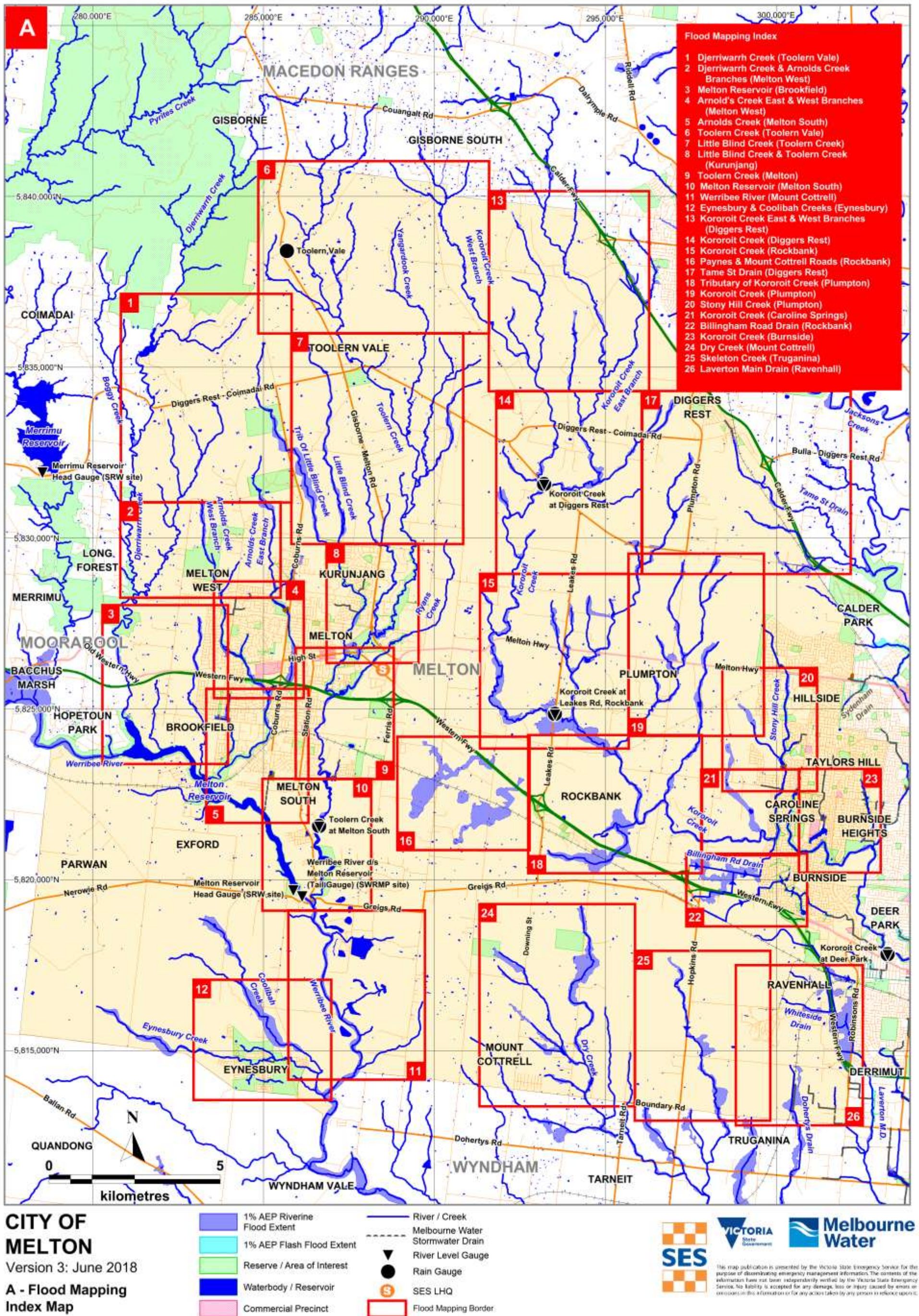
Overview

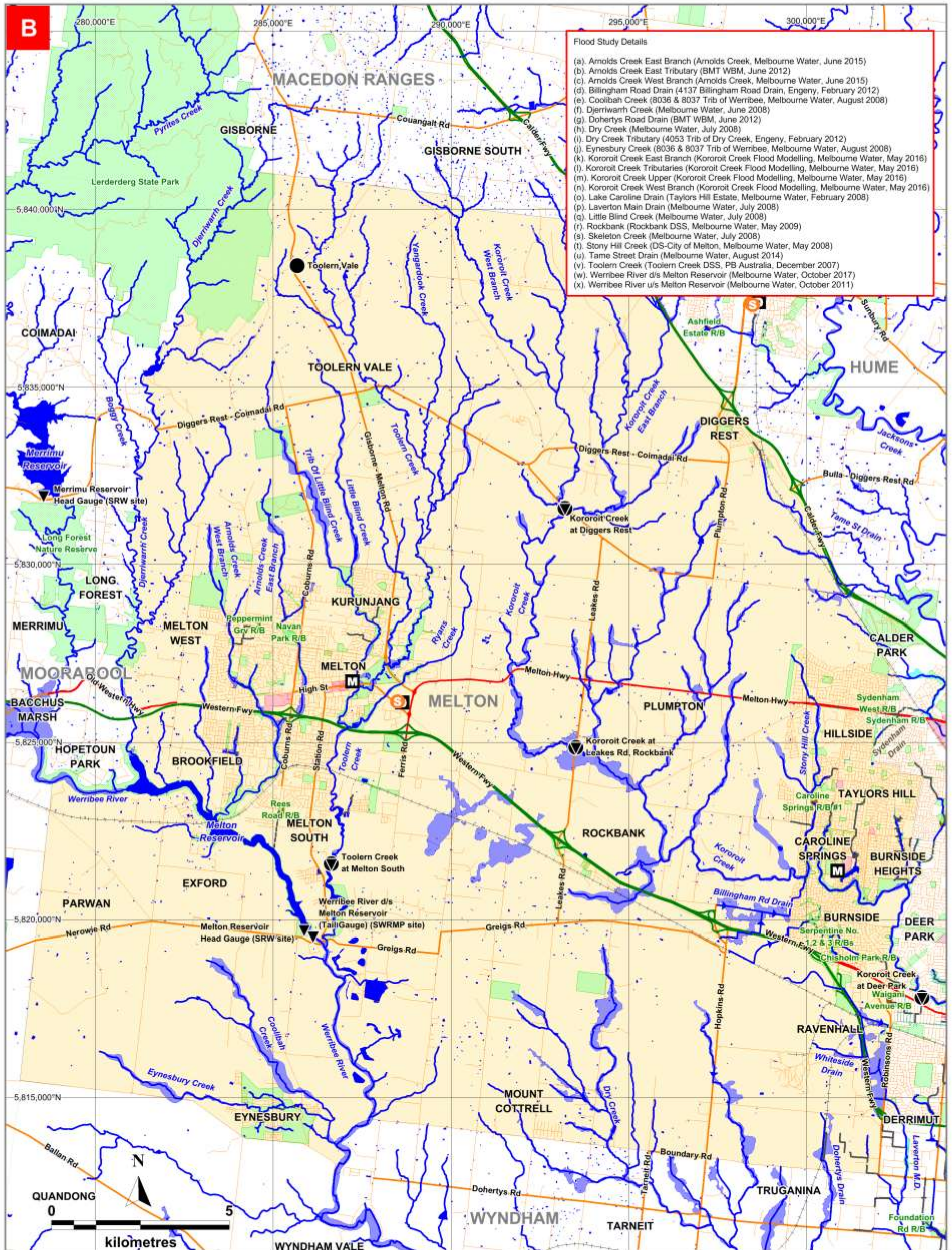
Maps considered useful to flood response are included in this Appendix. They include:

- A map outlining a series of flooding hot spot maps within the City of Melton.
- A map showing the Municipal boundary together with the open waterways and underground stormwater drainage pipe network within the City of Melton and the 1% AEP (100-year ARI) flood extents (sourced from Melbourne Water GIS).
- A set of 26 maps showing flooding hot spots within the City of Melton together with the 1% AEP (100-year ARI) flood extents (sourced from the Melbourne Water GIS).

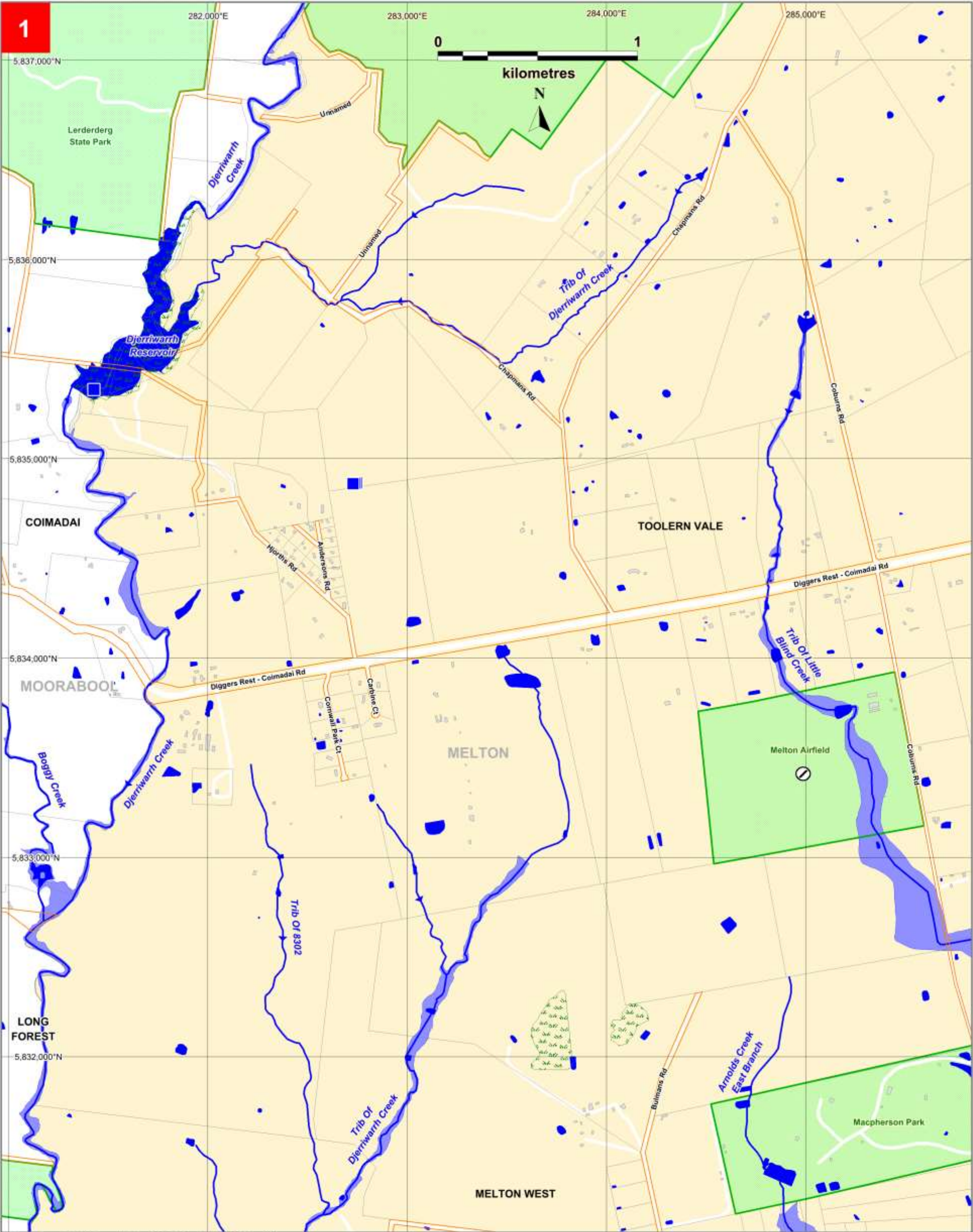
Note that:

- The mapping/data provided in this Appendix has been developed from Melbourne Water and other sources and taken from historical records and flood modelling. It may not include more recent data or local anecdotal information. It is planned that the mapping/data be updated as further studies or modelling is completed and other Information obtained.
- Maps showing the Special Building Overlay and Land Subject to Inundation Overlay are included in the Melton Planning Scheme can be used as a guide to areas that may flood during an event. The maps can be found in hard copy form at the Council's main office or online at the DELWP website <http://planningschemes.dpcd.vic.gov.au/>.





Flood Extent Maps (sourced Melbourne Water GIS)



Flood modelling completed by Melbourne Water, June 2008. Map Produced by VICSES June 2018.

- | | |
|--|----------------------|
| Building | Airport / Airfield |
| Waterbody | Retail Water Storage |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | |
| Reserve / Park | |
| Natural Wetland | |
| River / Creek | |

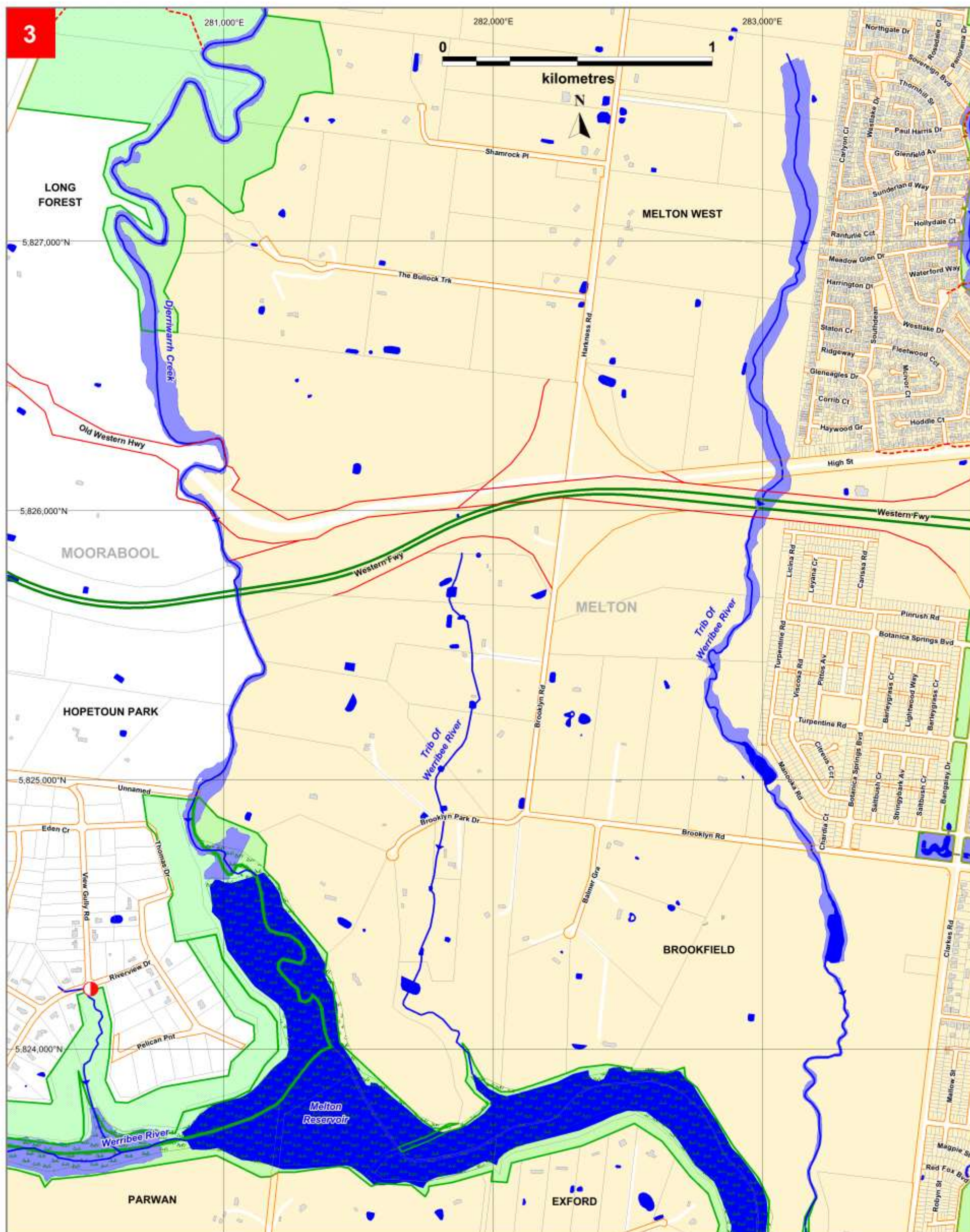
CITY OF MELTON

1% AEP (100yr ARI) Flooding

1. Djerriwarrh Creek
(Toolern Vale)



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Flood modelling completed by Melbourne Water, June 2008. Map Produced by VICSES June 2018.

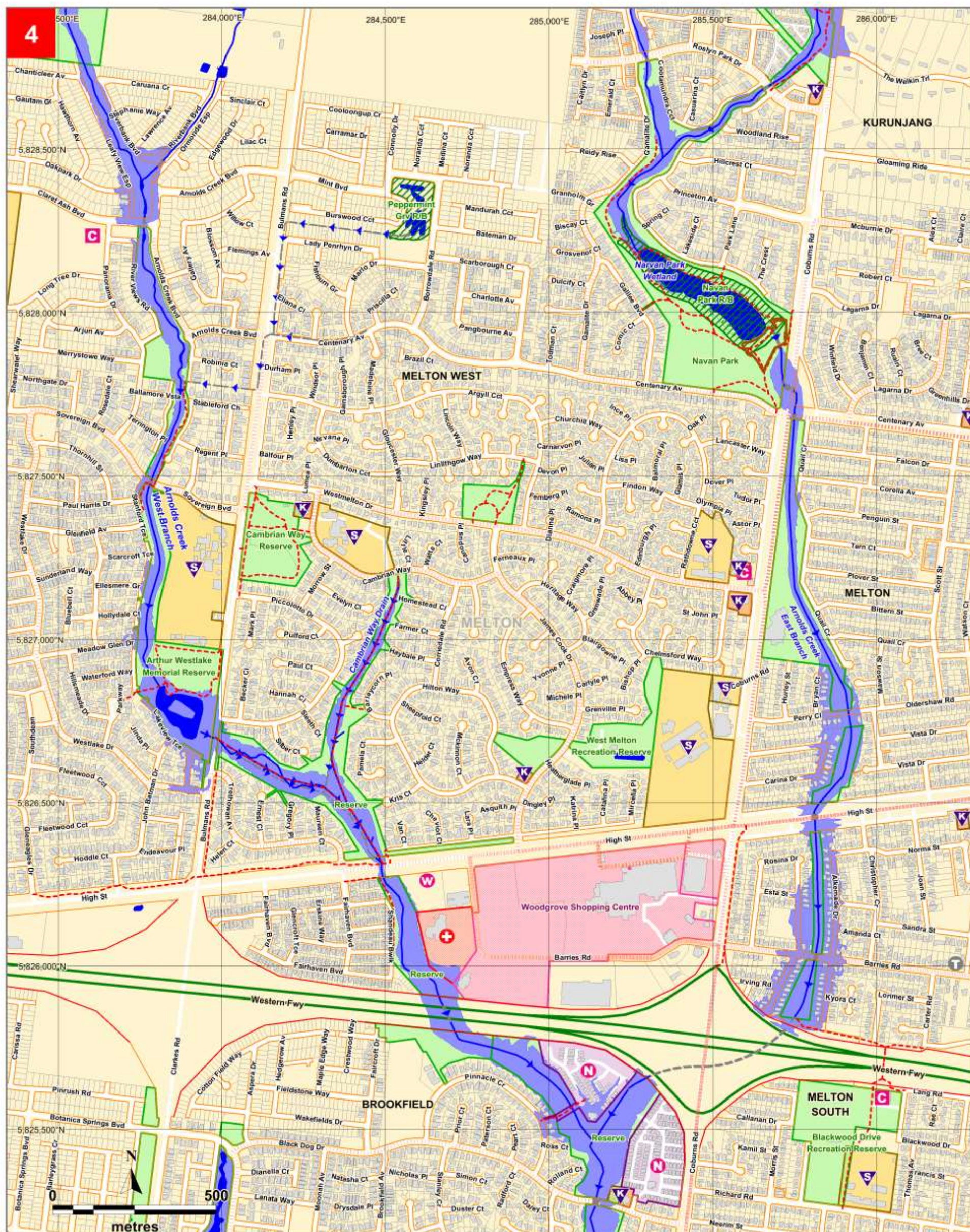
CITY OF MELTON

1% AEP (100yr ARI) Flooding
3. Melton Reservoir (Brookfield)

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- Natural Wetland
- River / Creek
- Bicycle / Walking Trail
- Sewer Emergency Relief Point



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Flood modelling completed by Melbourne Water, June 2015. Map Produced by VICSES June 2018

CITY OF MELTON

1% AEP (100yr ARI) Flooding

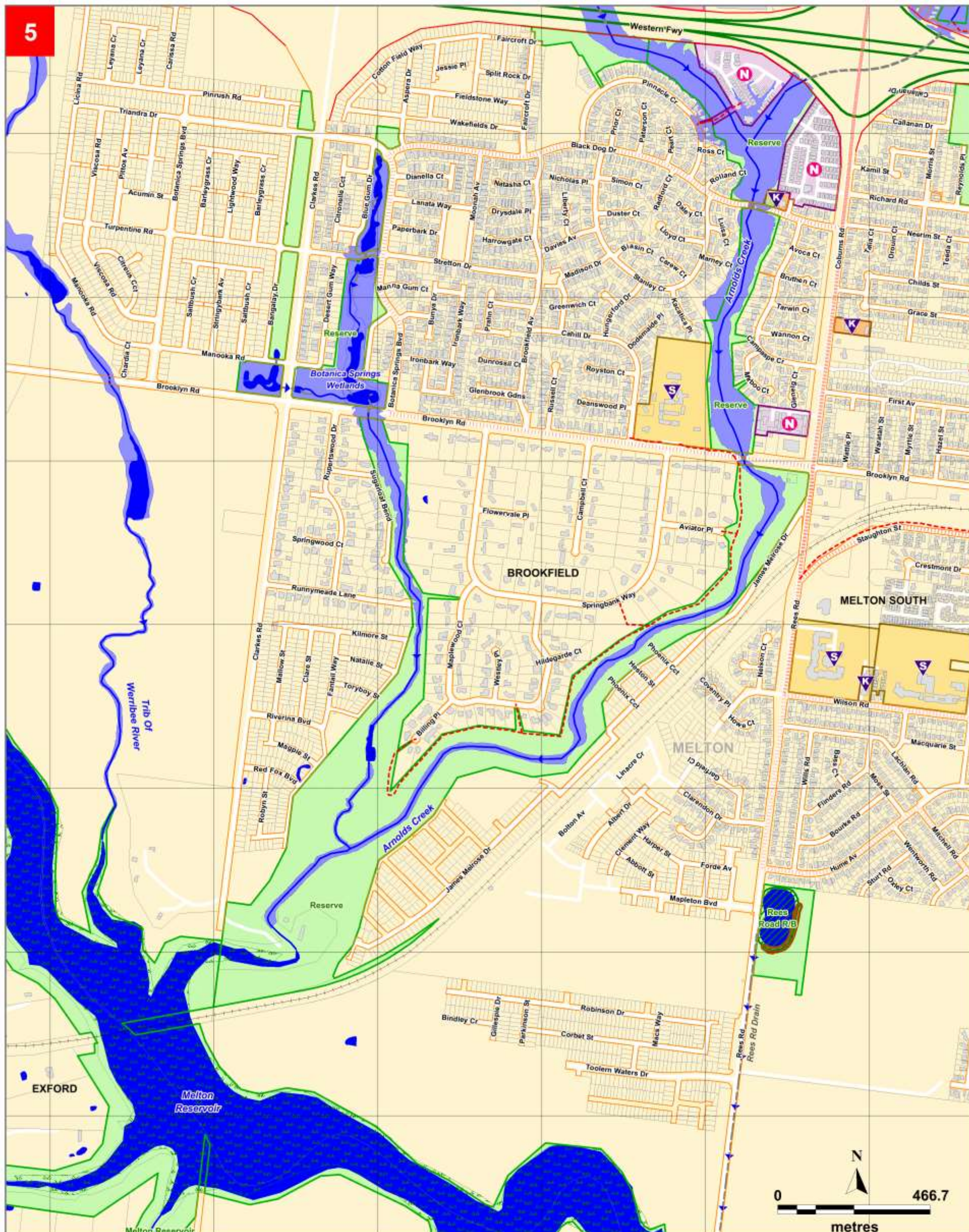
4. Arnold's Creek East & West Branches (Melton West)

- | | |
|--|----------------------------------|
| Building | Shopping Centre |
| Waterbody | Melbourne Water Stormwater Drain |
| 1% AEP Riveline Flood Extent (Depth Unavailable) | Embankment |
| Reserve / Park | School / College |
| Natural Wetland | Nursing Home / Aged Care |
| Melbourne Water Retarding Basin | Kindergarten / Child Care |
| River / Creek | Community Centre |
| Bicycle / Walking Trail | Hospital |
| Bus Route (PTV) | |



VICTORIA **Melbourne Water**

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Flood modelling completed by PB Australia, December 2007. Map Produced by VICSES June 2018.

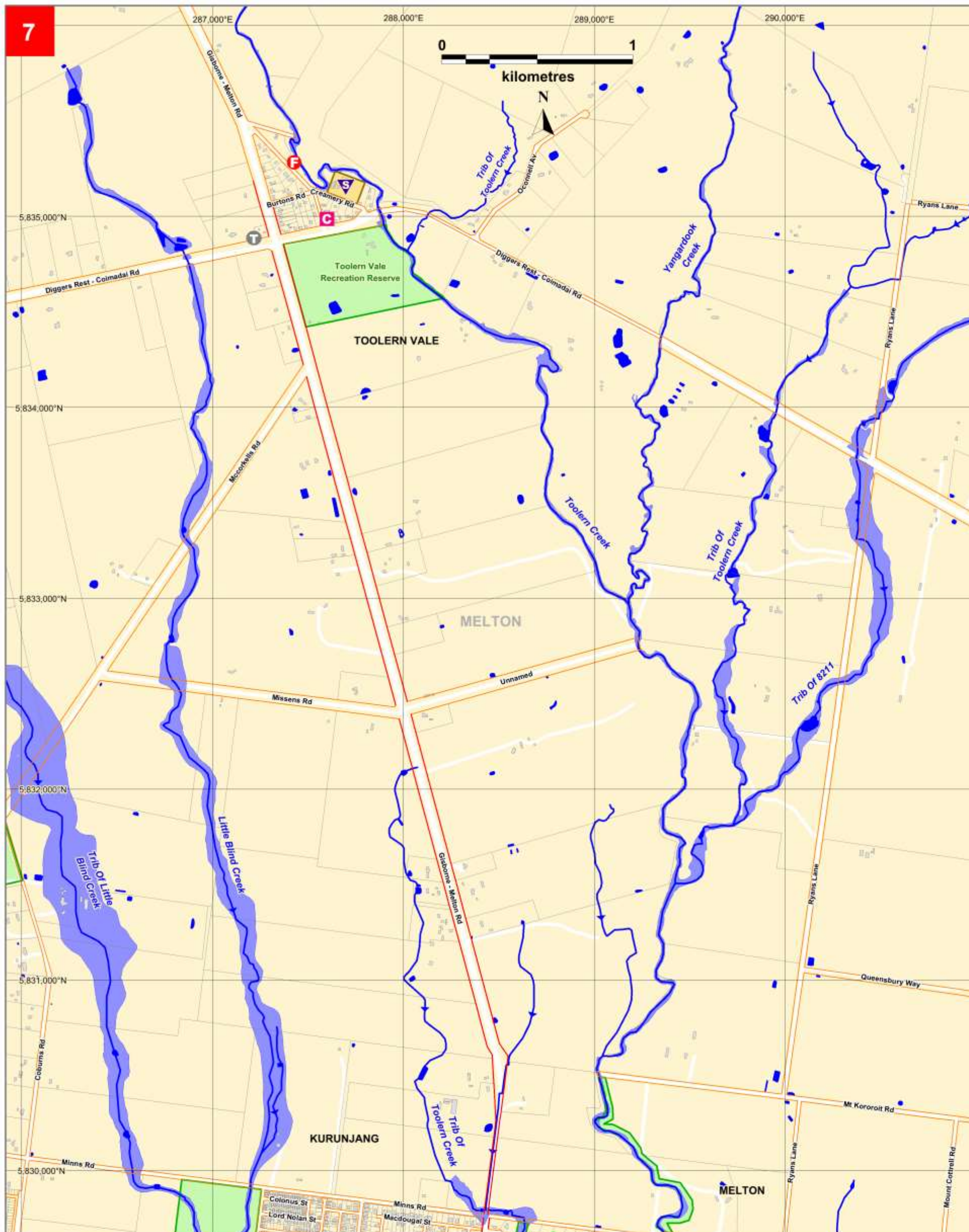
CITY OF MELTON 1% AEP (100yr ARI) Flooding **5. Arnolds Creek** **(Melton South)**

- | | |
|--|----------------------------------|
| Building | Melbourne Water Stormwater Drain |
| Waterbody | Embankment |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | School / College |
| Reserve / Park | Nursing Home / Aged Care |
| Natural Wetland | Kindergarten / Child Care |
| Melbourne Water Retarding Basin | |
| River / Creek | |
| Bicycle / Walking Trail | |
| Bus Route (PTV) | |



SES VICTORIA **Melbourne Water**

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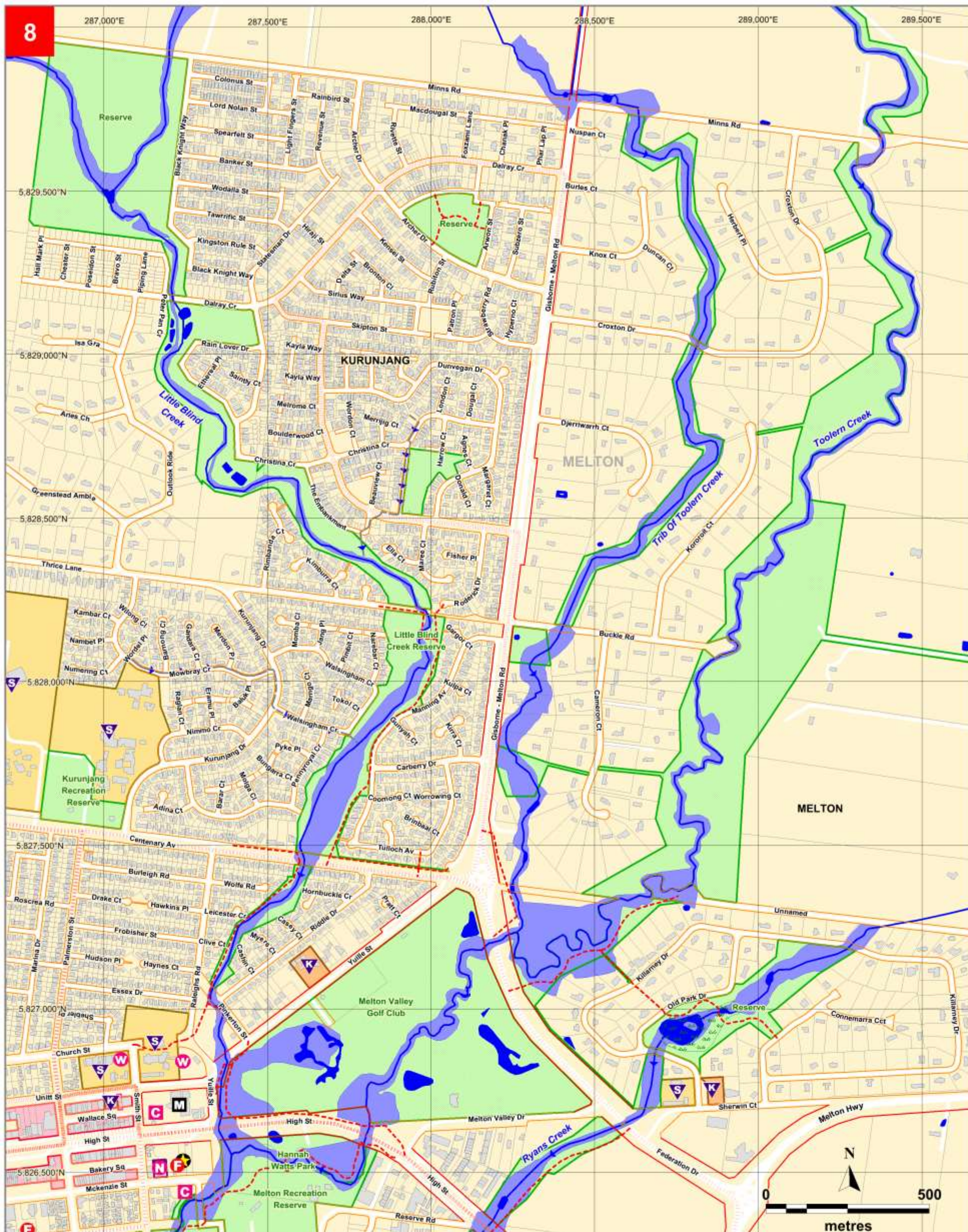
Flood modelling completed by Melbourne Water, June 2008. Map Produced by VICSES June 2018.

- | | | | |
|--|--|--|------------------|
| | Building | | Community Centre |
| | Waterbody | | Fire Station |
| | 1% AEP Riverine Flood Extent (Depth Unavailable) | | School / College |
| | Reserve / Park | | |
| | River / Creek | | |

CITY OF MELTON
1% AEP (100yr ARI) Flooding
7. Little Blind Creek
(Toolern Vale)



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Toolern Creek Flood modelling completed by PB Australia, December 2007. Little Blind Creek flood modelling completed by Melbourne Water, July 2008. Map Produced by VICSES June 2018.

CITY OF MELTON

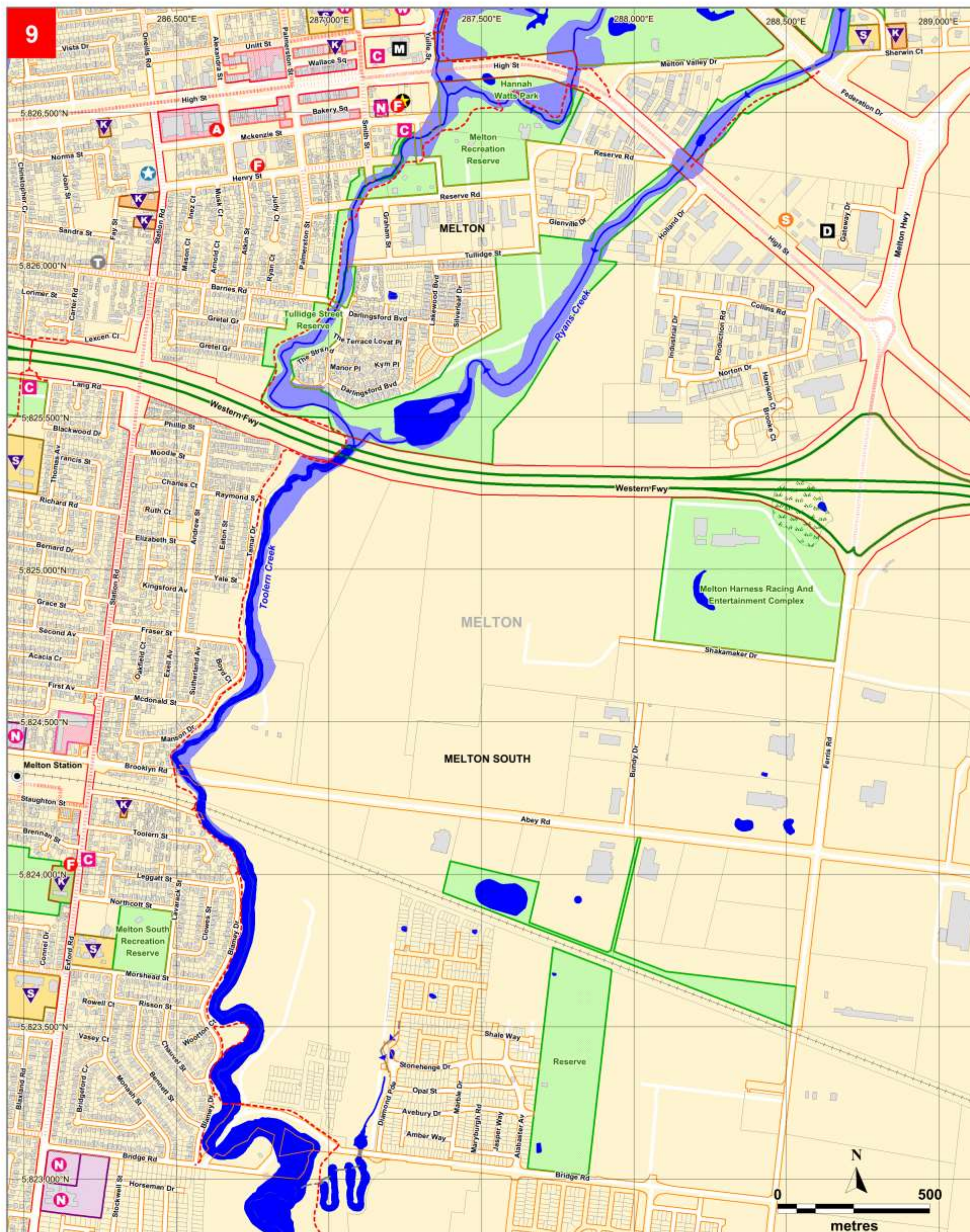
1% AEP (100yr ARI) Flooding

8. Little Blind Creek & Toolern Creek (Kurunjang)

- | | |
|--|-------------------------------|
| Building | School / College |
| Waterbody | Nursing Home / Aged Care |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Community Centre |
| Reserve / Park | Fire Station |
| Natural Wetland | Kindergarten / Child Care |
| Shopping Centre | Emergency Coordination Centre |
| River / Creek | Municipal Offices |
| Bicycle / Walking Trail | |
| Bus Route (PTV) | |



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Flood modelling completed by PB Australia, December 2007. Map Produced by VICSES, June 2018

CITY OF MELTON

1% AEP (100yr ARI) Flooding

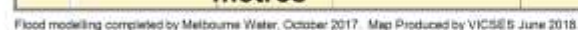
9. Toolern Creek (Melton)

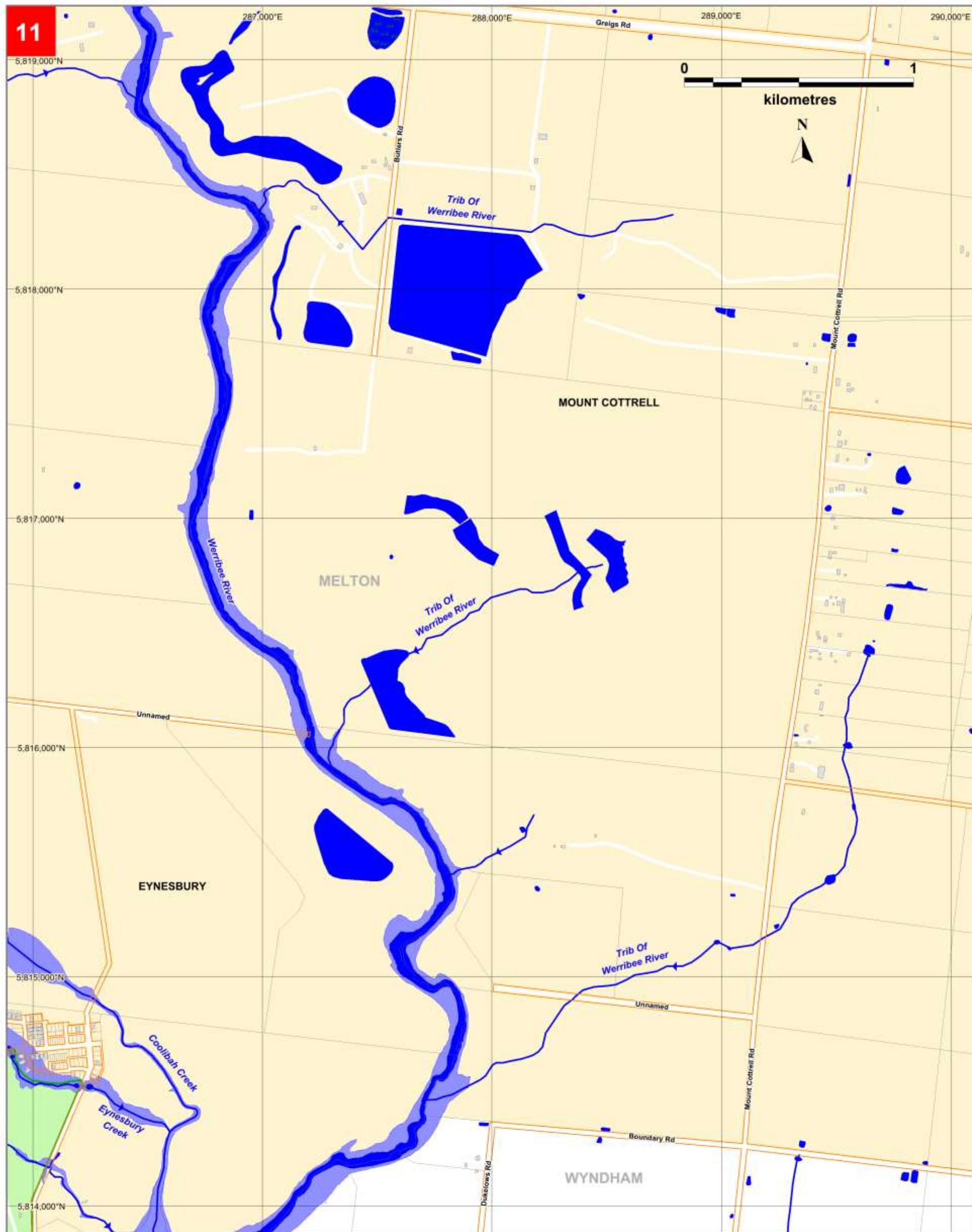
- | | | |
|--|-------------------------------|--------------------|
| Building | School / College | Police Station |
| Waterbody | Nursing Home / Aged Care | Telephone Exchange |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Community Centre | Municipal Offices |
| Reserve / Park | Ambulance Station | |
| Natural Wetland | Fire Station | |
| Shopping Centre | Kindergarten / Child Care | |
| River / Creek | Emergency Coordination Centre | |
| Bicycle / Walking Trail | | |
| Bus Route (PTV) | | |



VICSES **VICTORIA** **Melbourne Water**

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Flood modelling completed by Melbourne Water, October 2017. Map Produced by VICSES June 2018.

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- River / Creek

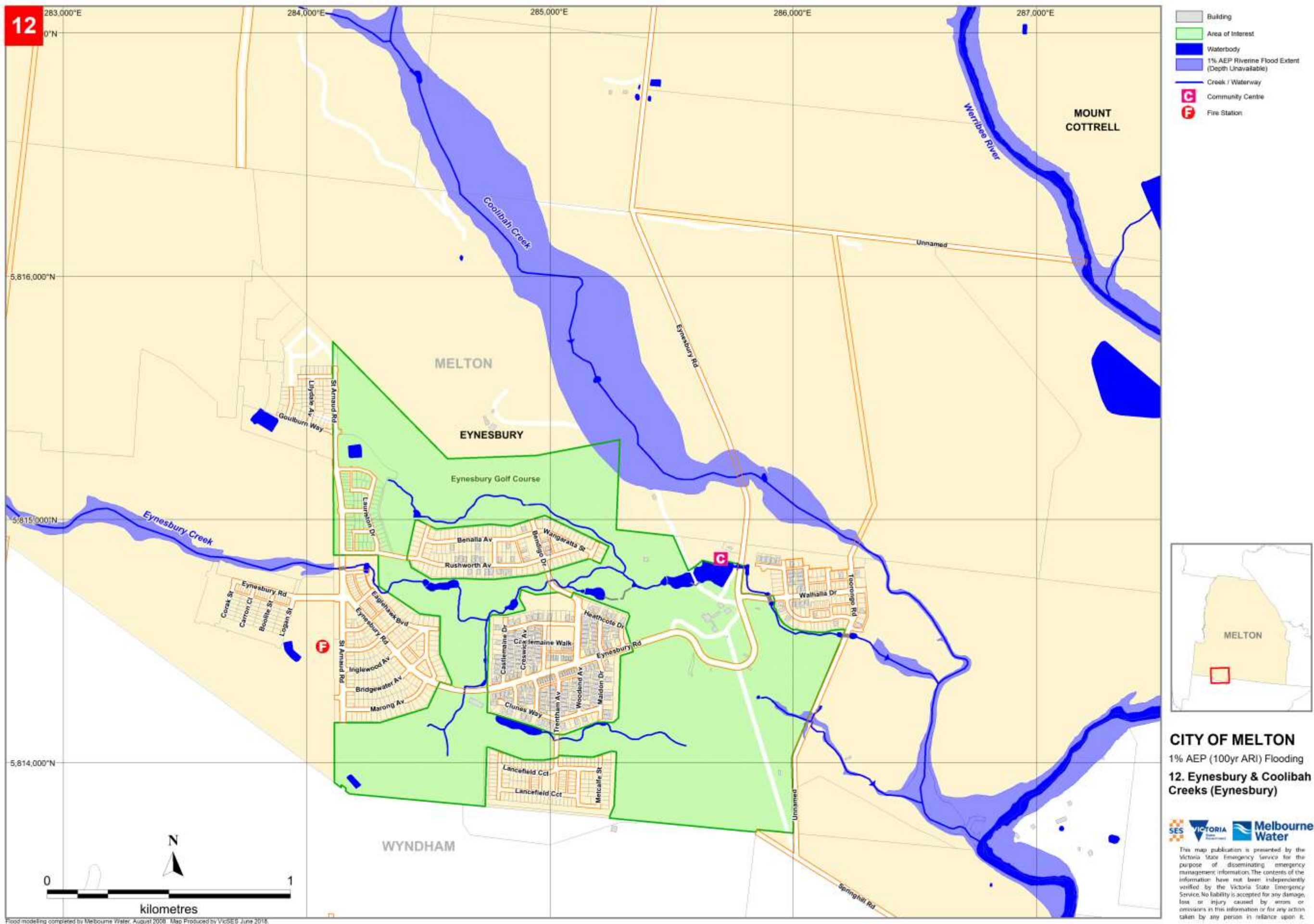
CITY OF MELTON

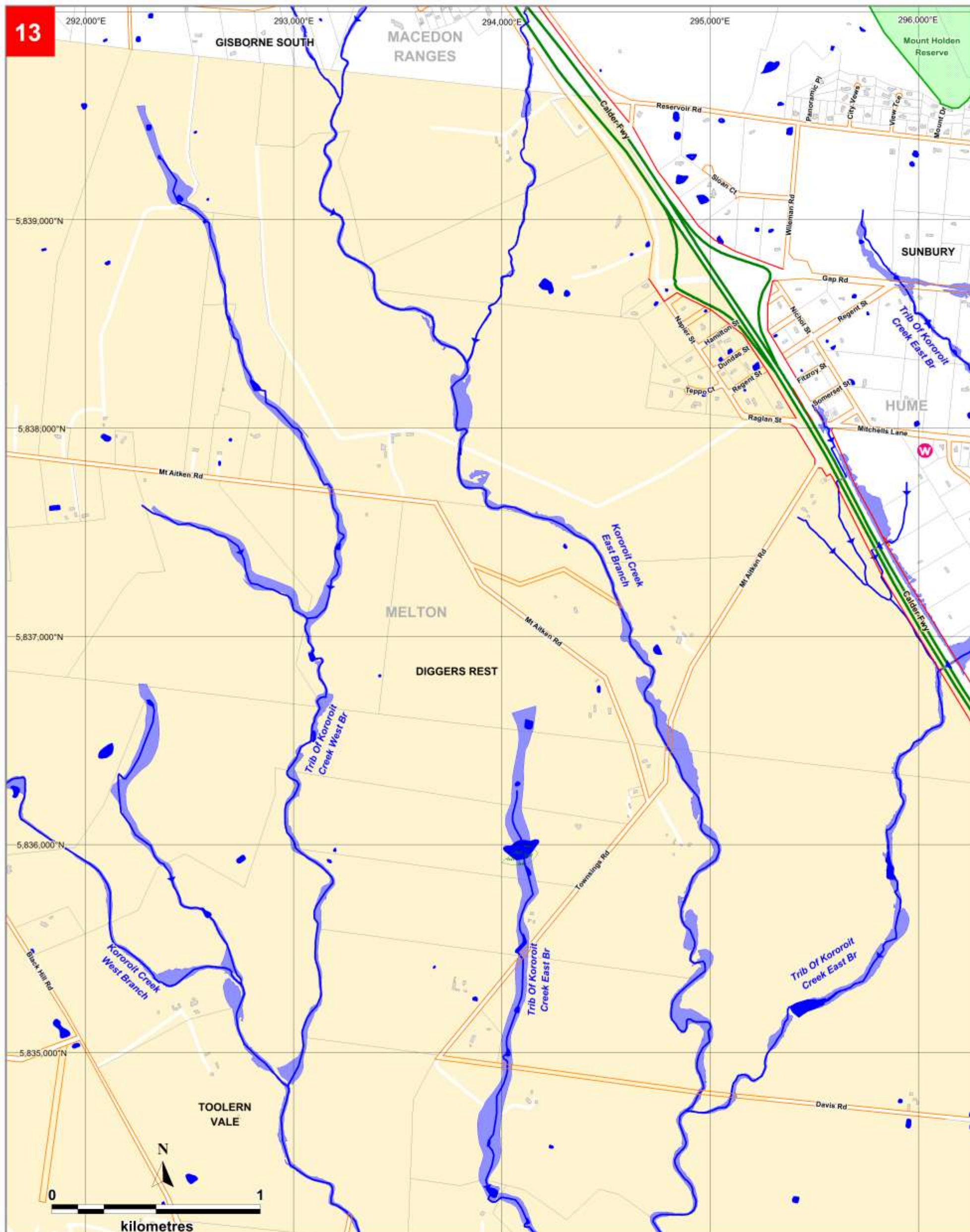
1% AEP (100yr ARI) Flooding

11. Werribee River (Mount Cottrell)



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Flood modelling completed by Melbourne Water, May 2016. Map Produced by VICSES June 2018.

CITY OF MELTON

1% AEP (100yr ARI) Flooding

13. Kororoit Creek East & West Branches (Diggers Rest)

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Area Of Interest
- River / Creek
- Place Of Worship



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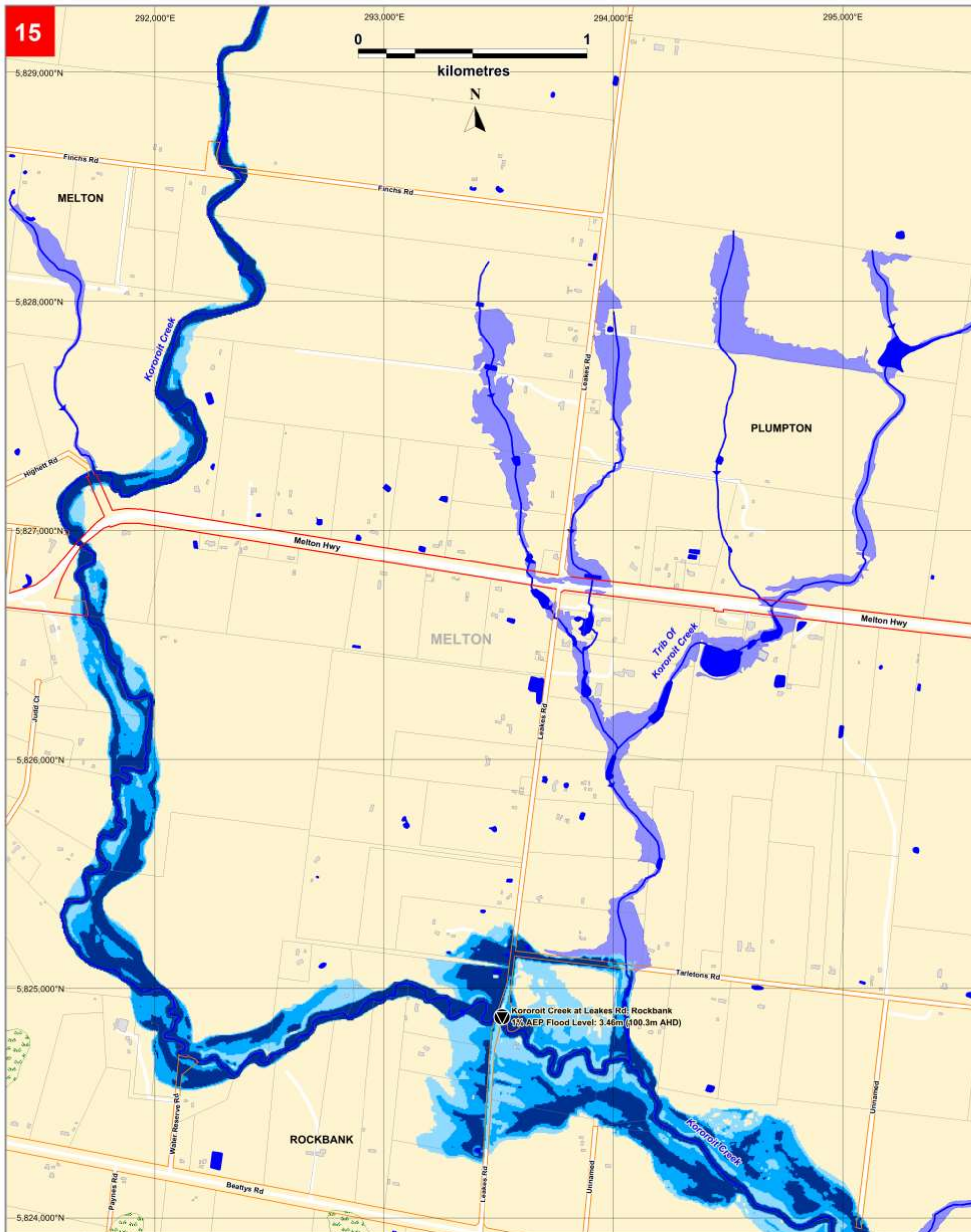
Flood modelling completed by Melbourne Water, May 2016. Map Produced by VICSES June 2016.

CITY OF MELTON 1% AEP (100yr ARI) Flooding **14. Kororoit Creek** **(Diggers Rest)**



SES VICTORIA
Melbourne Water

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Flood modelling completed by Melbourne Water, May 2016. Map Produced by VICSES June 2018.

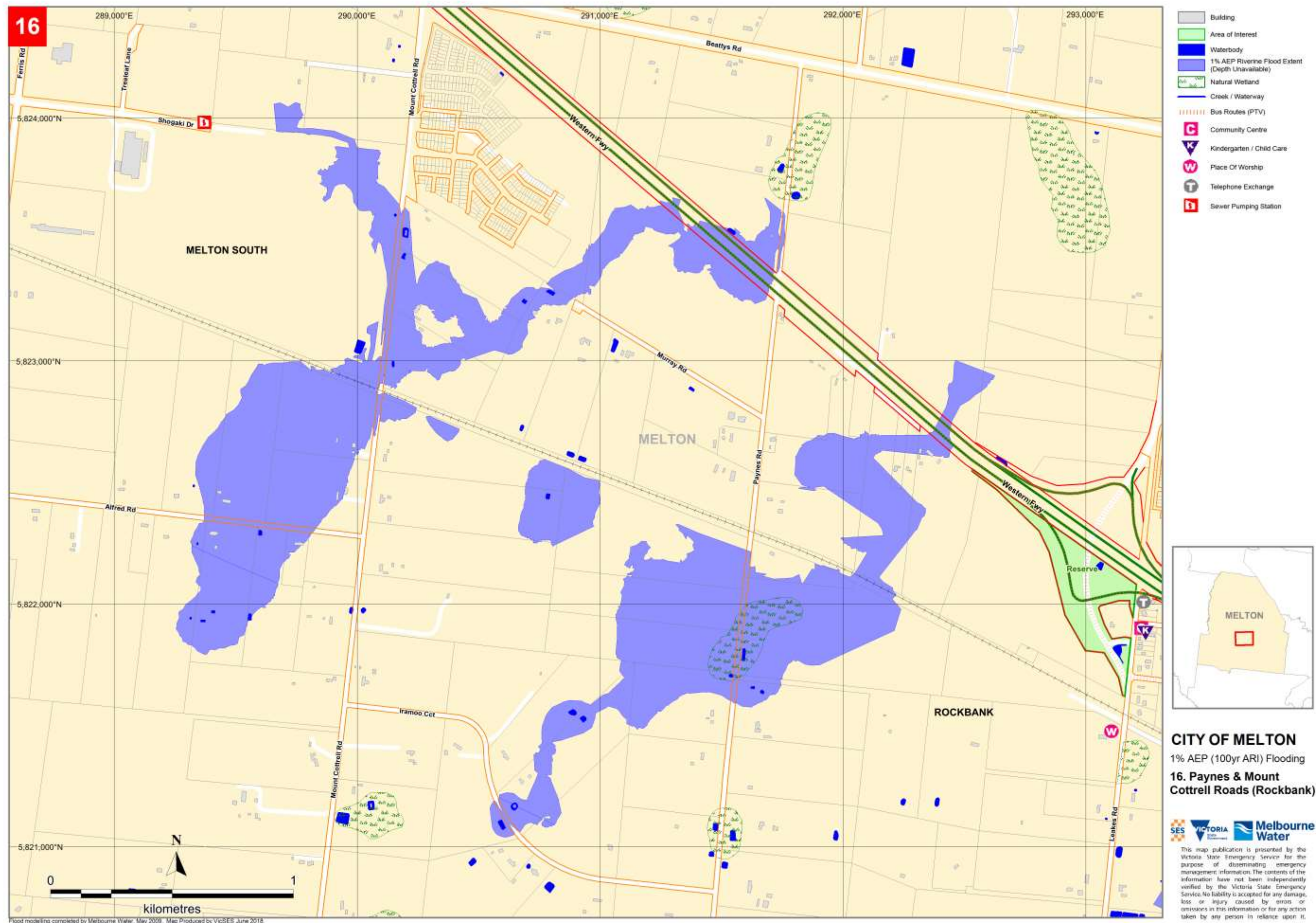
CITY OF MELTON

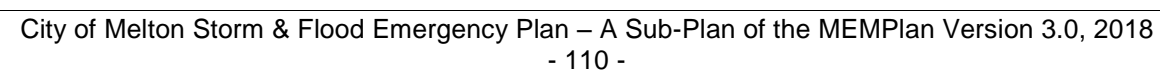
1% AEP (100yr ARI) Flooding

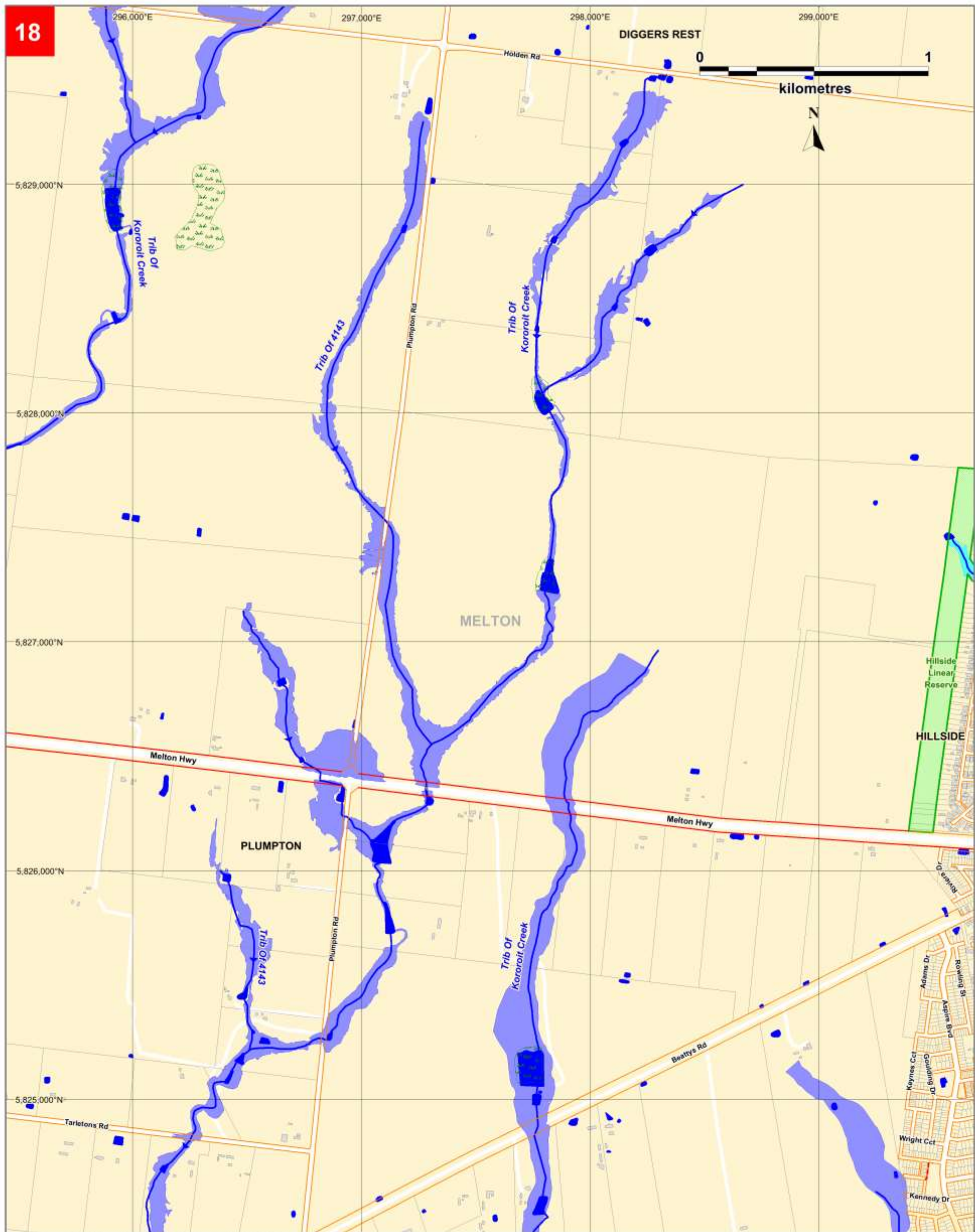
15. Kororoit Creek (Rockbank)



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Flood modelling completed by Melbourne Water, May 2016. Map Produced by VICSES June 2018.

CITY OF MELTON

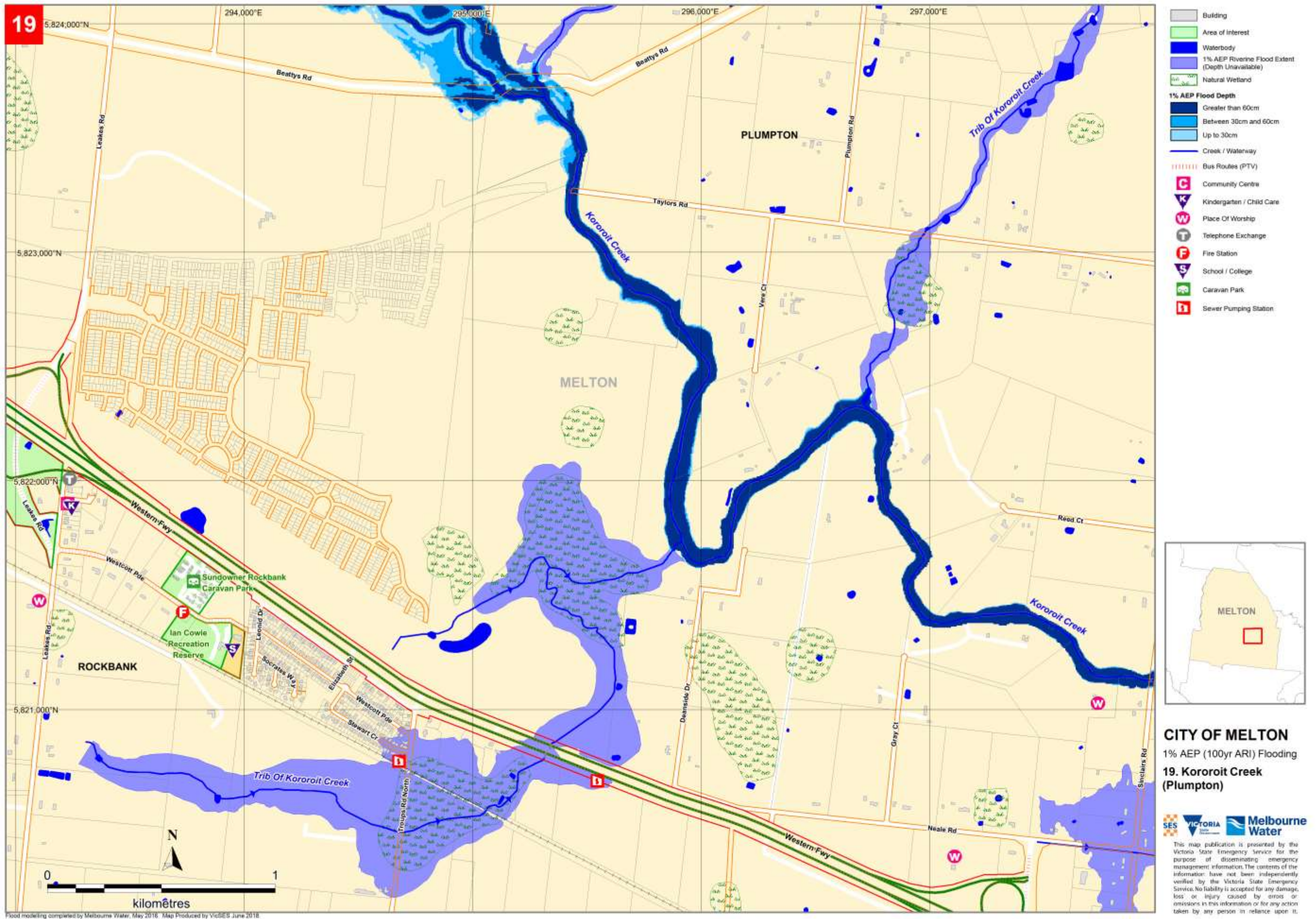
1% AEP (100yr ARI) Flooding

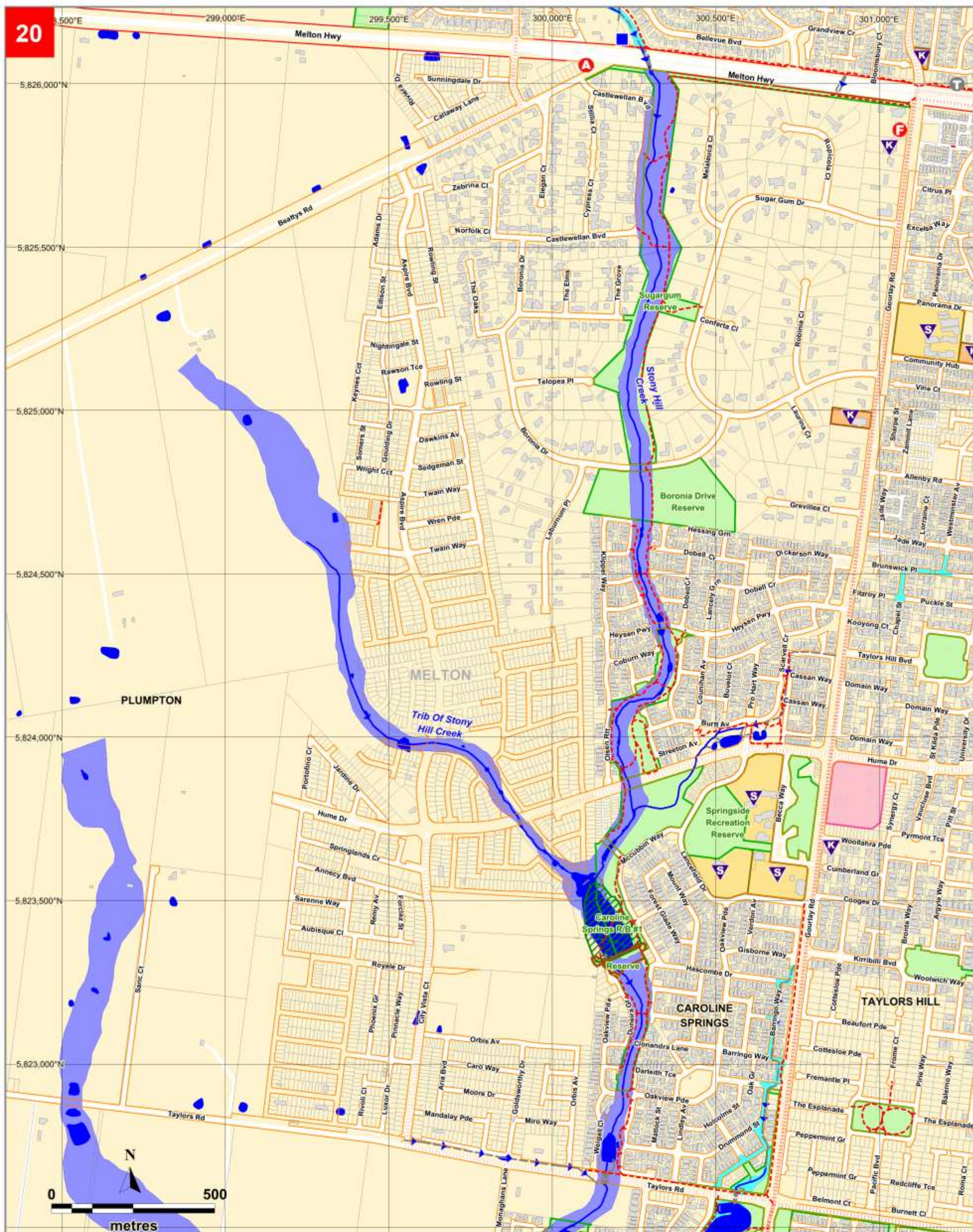
18. Tributary of Kororoit Creek (Plumpton)

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Natural Wetland
- River / Creek
- Area of Interest



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Flood modelling completed by Melbourne Water, June 2008. Map Produced by VICSES June 2018.

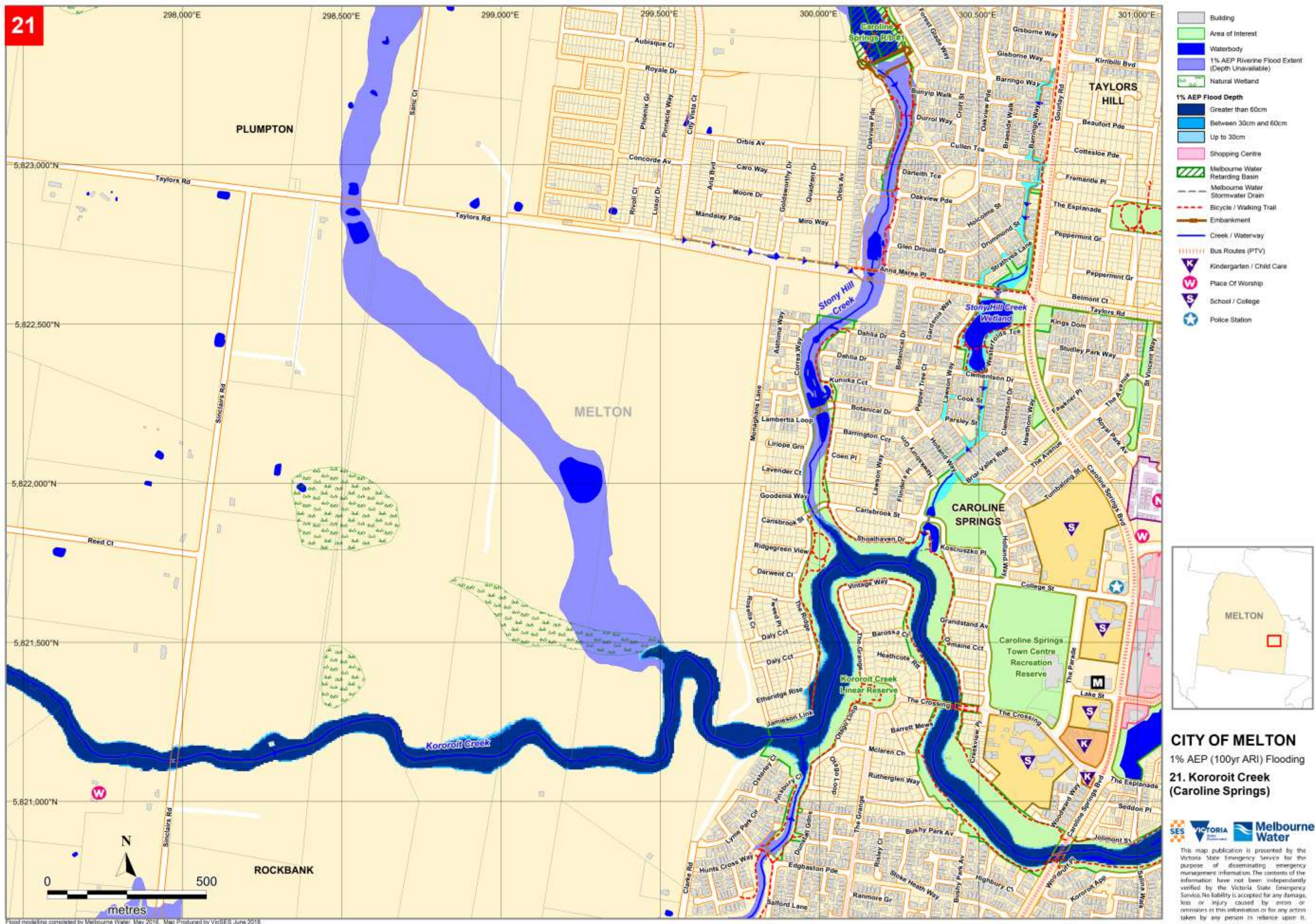
CITY OF MELTON
1% AEP (100yr ARI) Flooding
20. Stony Hill Creek (Plumpton)

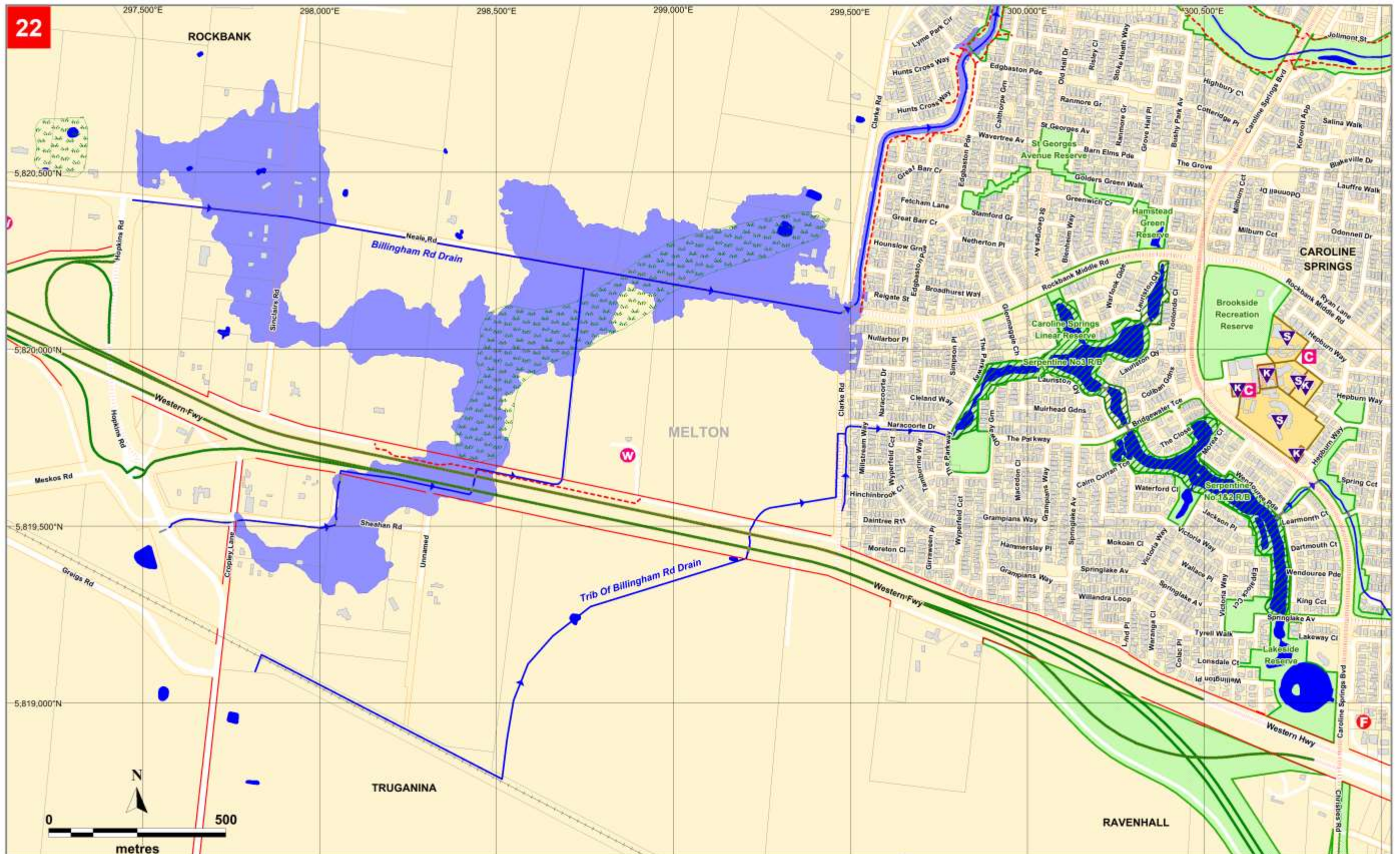
- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- 1% AEP Flash Flood Extent (Depth Unavailable)
- Melbourne Water Retarding Basin
- River / Creek
- Bicycle / Walking Trail
- Bus Route (PTV)
- Shopping Centre
- Melbourne Water Stormwater Drain
- Embankment
- School / College
- Kindergarten / Child Care
- Ambulance Station
- Fire Station
- Telephone Exchange
- Retail Water Storage



SES VICTORIA
Melbourne Water

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Flood Mapping completed by Engeny, February 2012. Map Produced by VicSES June 2018.

CITY OF MELTON

1% AEP (100yr ARI) Flooding

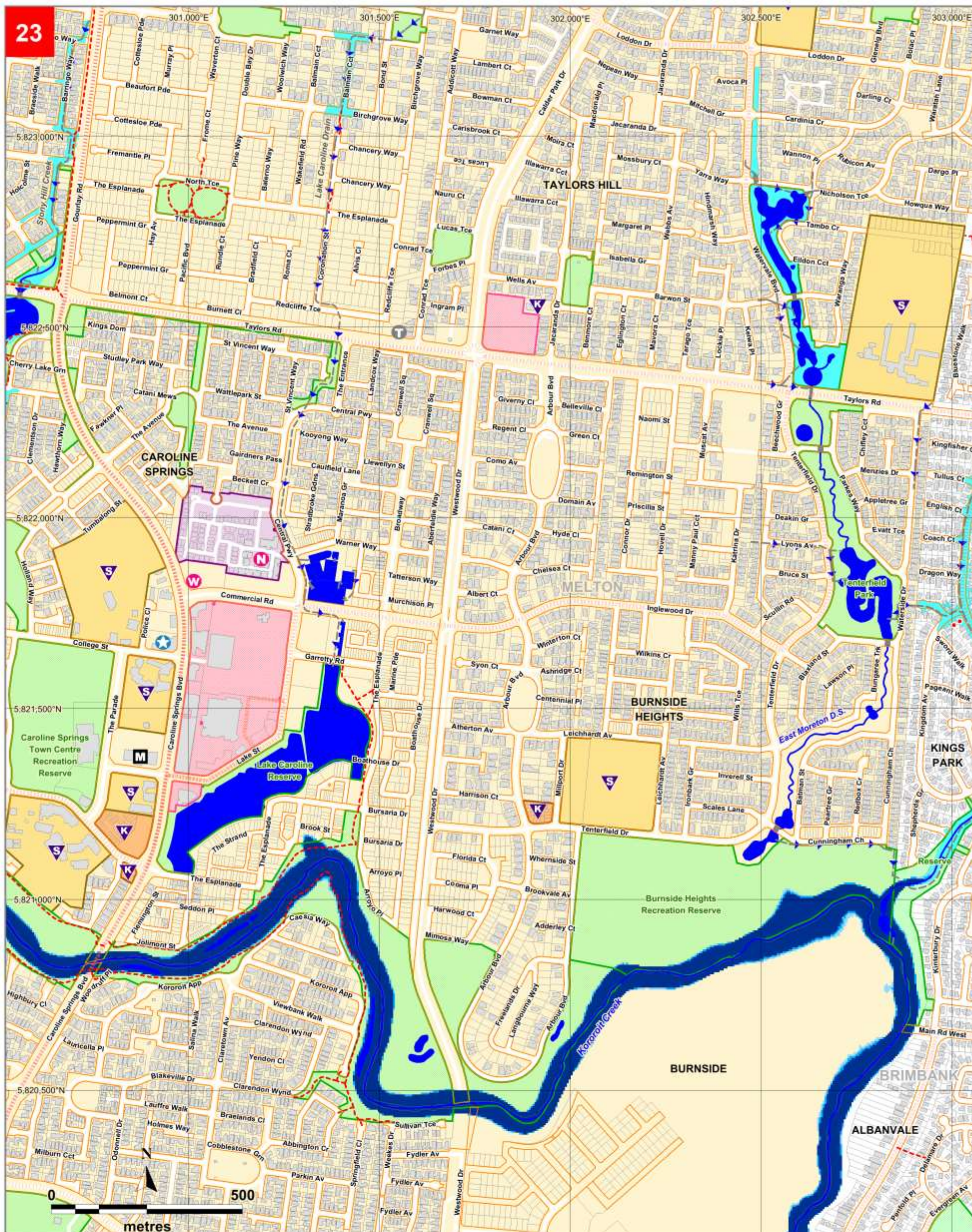
22. Billingham Road Drain
(Rockbank)

- | | | |
|--|----------------------------------|---------------------------|
| Building | Creek / Channel | Community Centre |
| Area of Interest | Melbourne Water Stormwater Drain | School / College |
| Waterbody | Bicycle / Walking Trail | Kindergarten / Child Care |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | Bus Route (PTV) | Place Of Worship |
| Melbourne Water Retarding Basin | | Fire Station |
| Natural Wetland | | |



SES VICTORIA **Melbourne Water**

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Flood modelling completed by Melbourne Water, May 2016. Map Produced by VICSES June 2018.

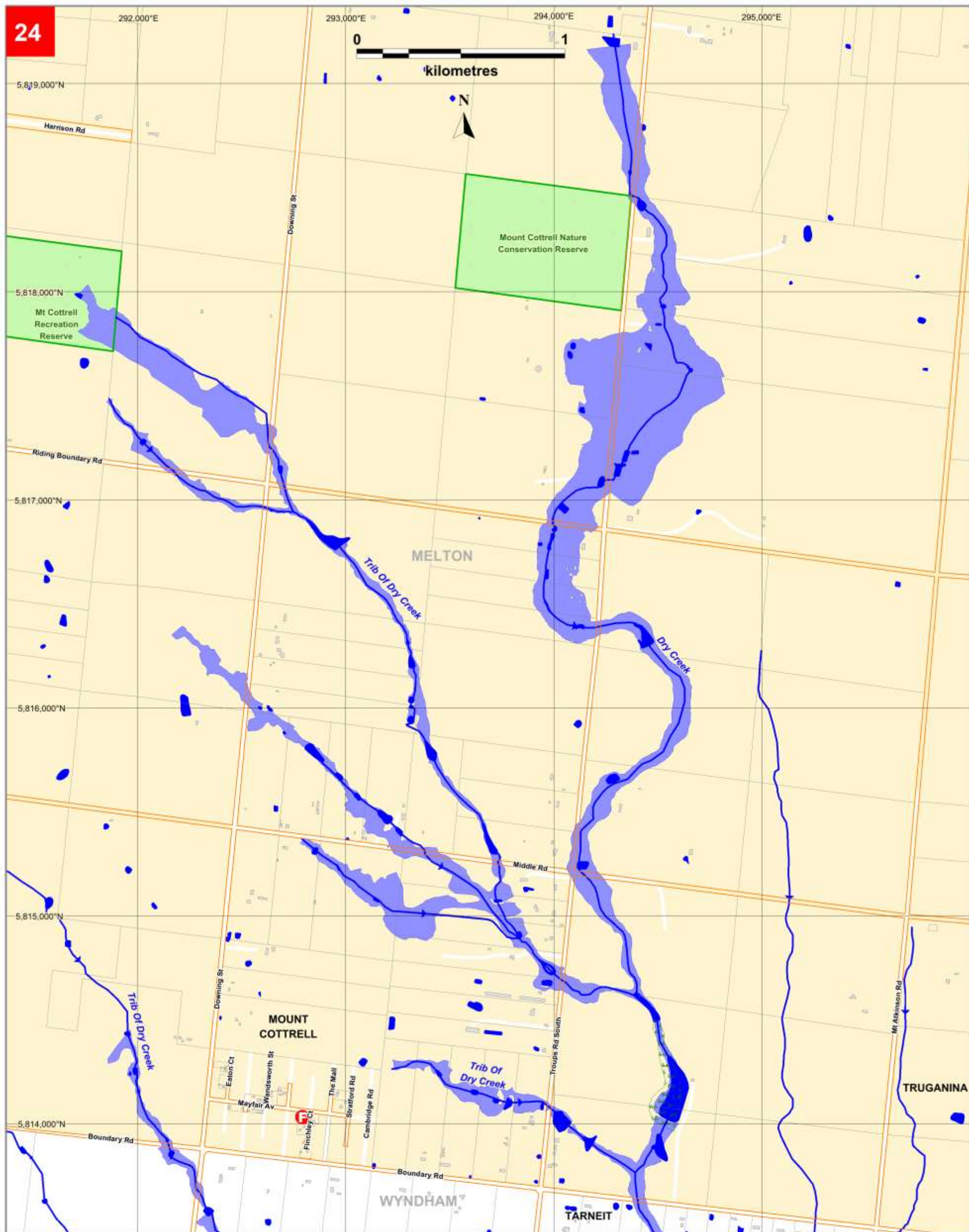
CITY OF MELTON 1% AEP (100yr ARI) Flooding **23. Kororoit Creek** **(Burnside)**

- | | | |
|--|----------------------------------|--------------------------|
| Building | Shopping Centre | Place Of Worship |
| Waterbody | Melbourne Water Stormwater Drain | Nursing Home / Aged Care |
| 1% AEP Riverine Flood Extent (Depth Unavailable) | River / Creek | Police Station |
| Reserve / Park | Bicycle / Walking Trail | |
| 1% AEP Flash Flood Extent (Depth Unavailable) | Bus Route (PTV) | |
| 1% AEP Flood Depth Greater than 60cm | School / College | |
| 1% AEP Flood Depth Between 30cm 60cm | Kindergarten / Child Care | |
| 1% AEP Flood Depth Up to 30cm | | |



SES VICTORIA
Melbourne Water

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Flood modelling completed by Melbourne Water, July 2008. Map Produced by VICSES June 2018.

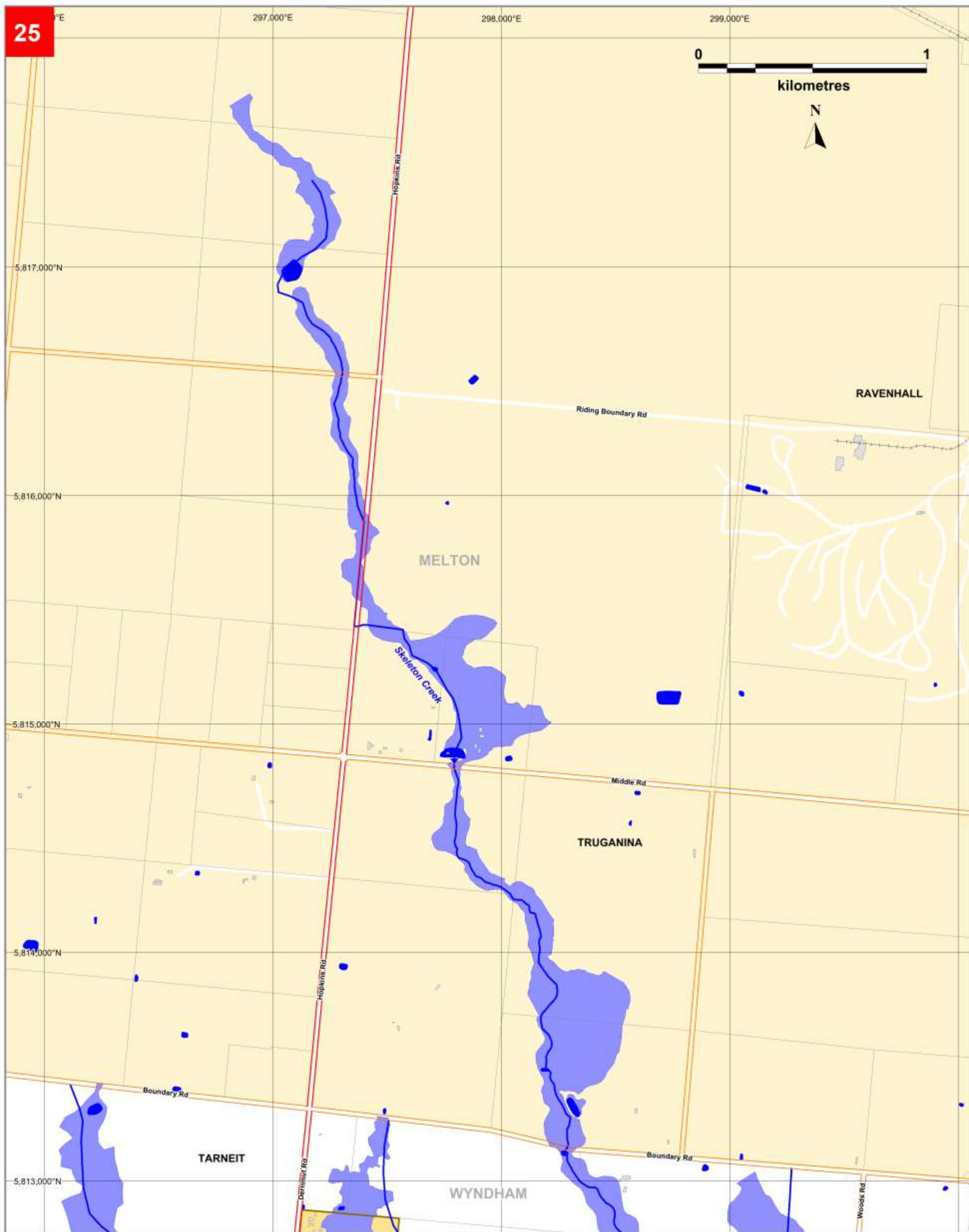
- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- Reserve / Park
- River / Creek
- Fire Station

CITY OF MELTON
1% AEP (100yr ARI) Flooding
24. Dry Creek
(Mount Cottrell)



SES VICTORIA **Melbourne Water**

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Flood modelling completed by Melbourne Water, July 2008. Map Produced by VICSES June 2018.

-  Building
-  Waterbody
-  1% AEP Riverine Flood Extent (Depth Unavailable)
-  River / Creek

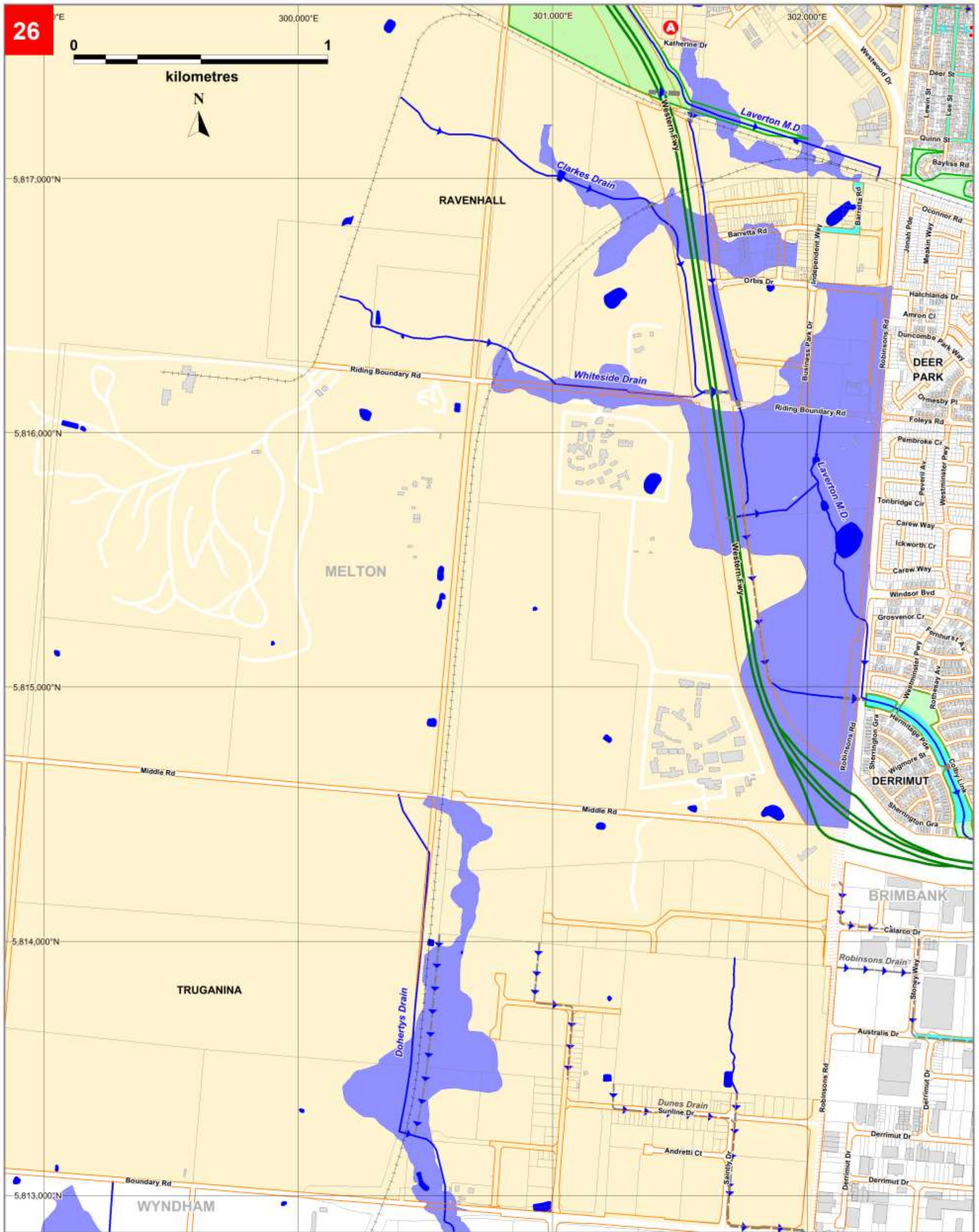
CITY OF MELTON

1% AEP (100yr ARI) Flooding

**25. Skeleton Creek
(Truganina)**



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Flood modelling completed by Melbourne Water, July 2006. Map Produced by VICSES June 2018.

CITY OF MELTON 1% AEP (100yr ARI) Flooding **26. Laverton Main Drain** **(Ravenhall)**

- Building
- Waterbody
- 1% AEP Riverine Flood Extent (Depth Unavailable)
- 1% AEP Flash Flood Extent (Depth Unavailable)
- Reserve / Park
- River / Creek
- Melbourne Water Stormwater Drain
- Bus Routes (PTV)
- Ambulance Station



Melbourne Water

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APPENDIX G – CATCHMENT SCHEMATICS

Schematics detailing the drainage catchments relevant for this municipality have been included in this Appendix. Each Schematic outlines the drainage system comprising of rivers, creeks or storm-water drains contained within one of the major catchments in the Port Phillip & Westernport Region.

Within each Schematic, there are details useful to flood response such as those relating to gauges, towns, rivers, creeks, drains and reservoirs. Historical facts and figures may also be shown.

The schematics also detail the response boundaries for SES Units and local government, and provide a reference link to the corresponding Municipal Storm and Flood Emergency Plan.

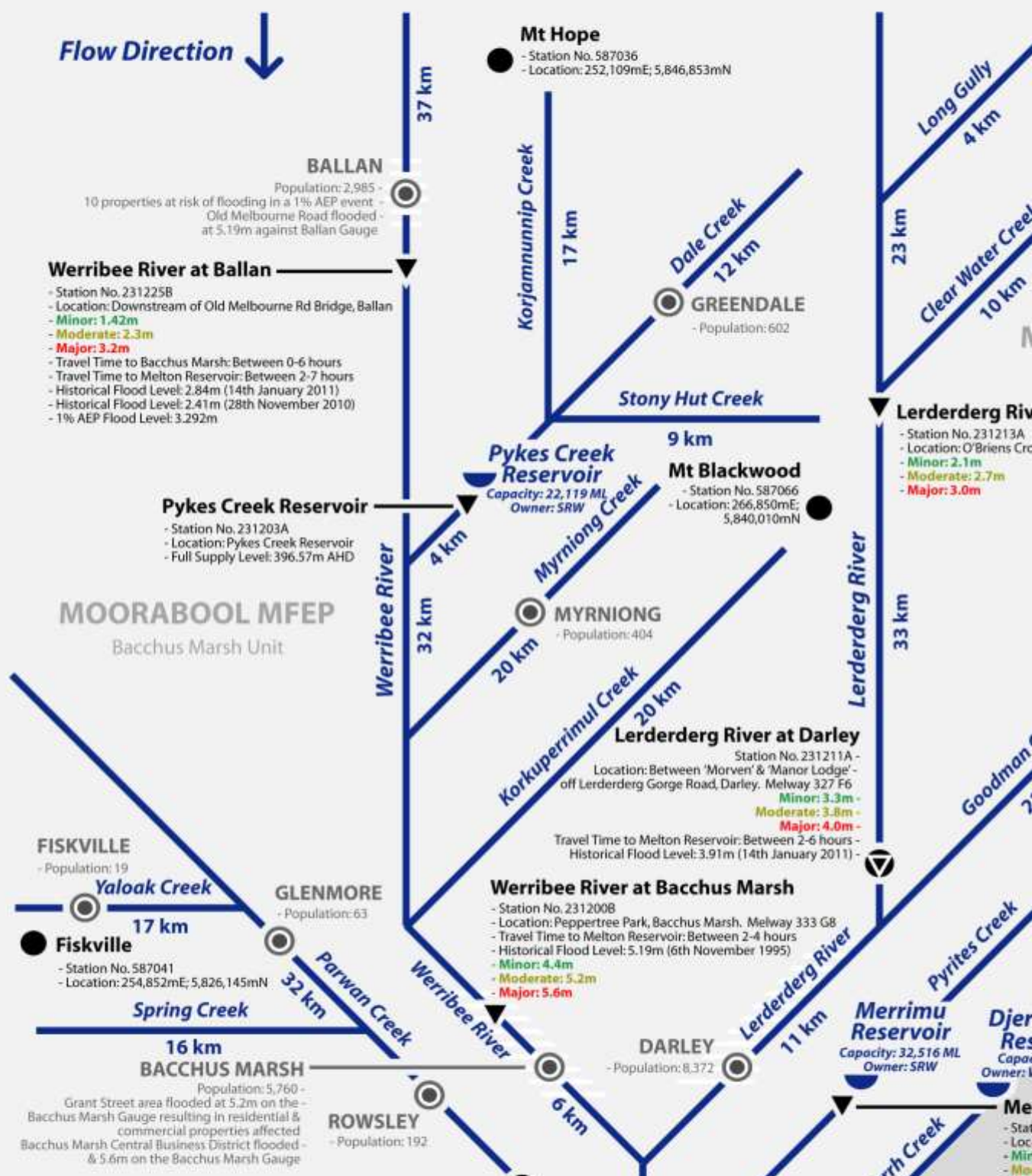
Details within these Catchment Schematics reflect those contained within either other sections of this Municipal Storm and Flood Emergency Plan or refer to other Municipal Storm and Flood/Flood Emergency Plans. These details have been filtered to contain only key facts. For more information on a gauge, drainage system or town consult the corresponding Flood Emergency Plan

Note that not all waterways or drains are included in the schematics, only those that are likely to contribute to flooding further on along the drainage system. Note also the flow direction; the schematics either flow from the top of the page to the bottom, or vice versa.



Werribee River (Upper Catchment Schematic)

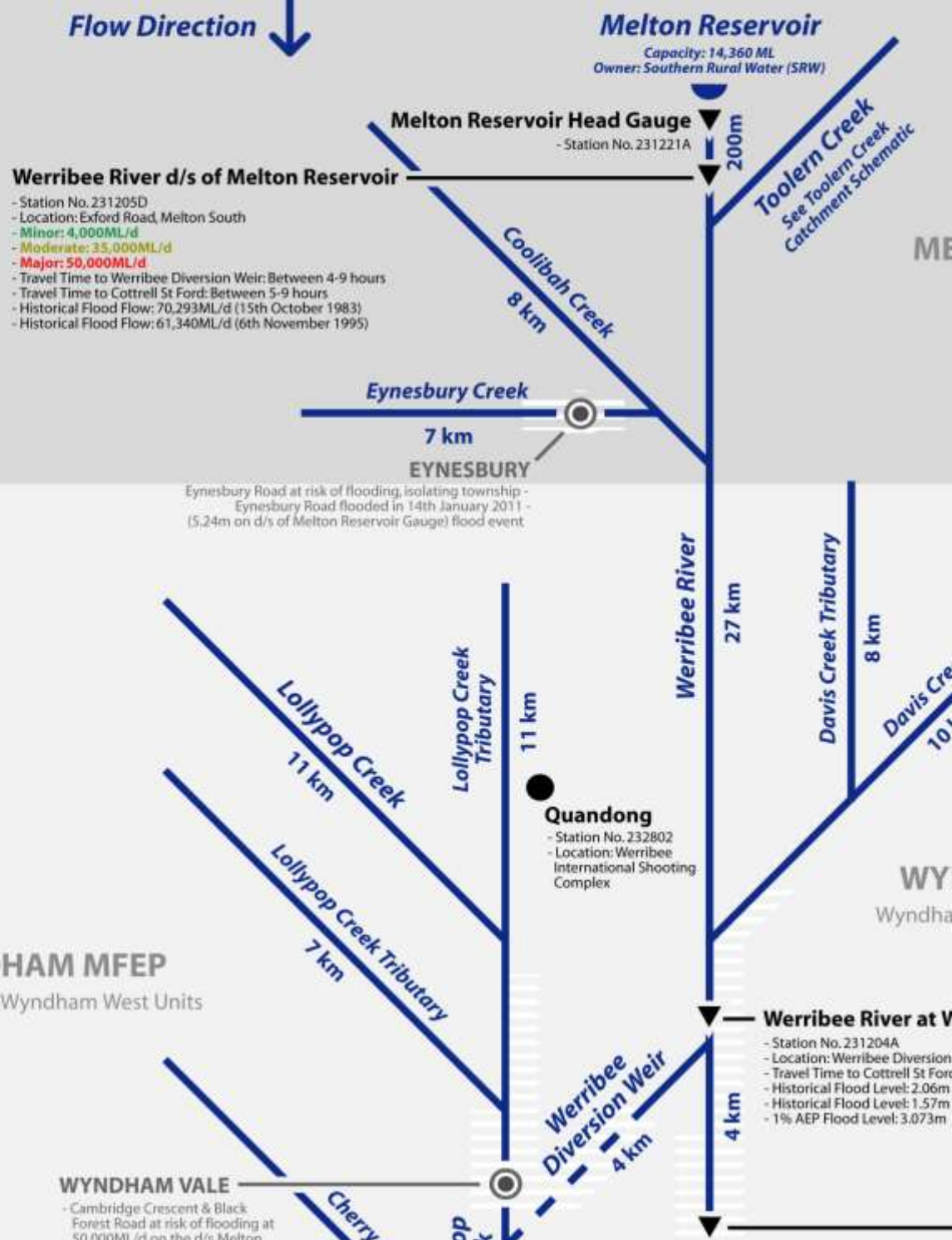
Version 2 - June 2018





Werribee River (Lower) & Lollypop Catchment Schematic

Version 2 - June 2018





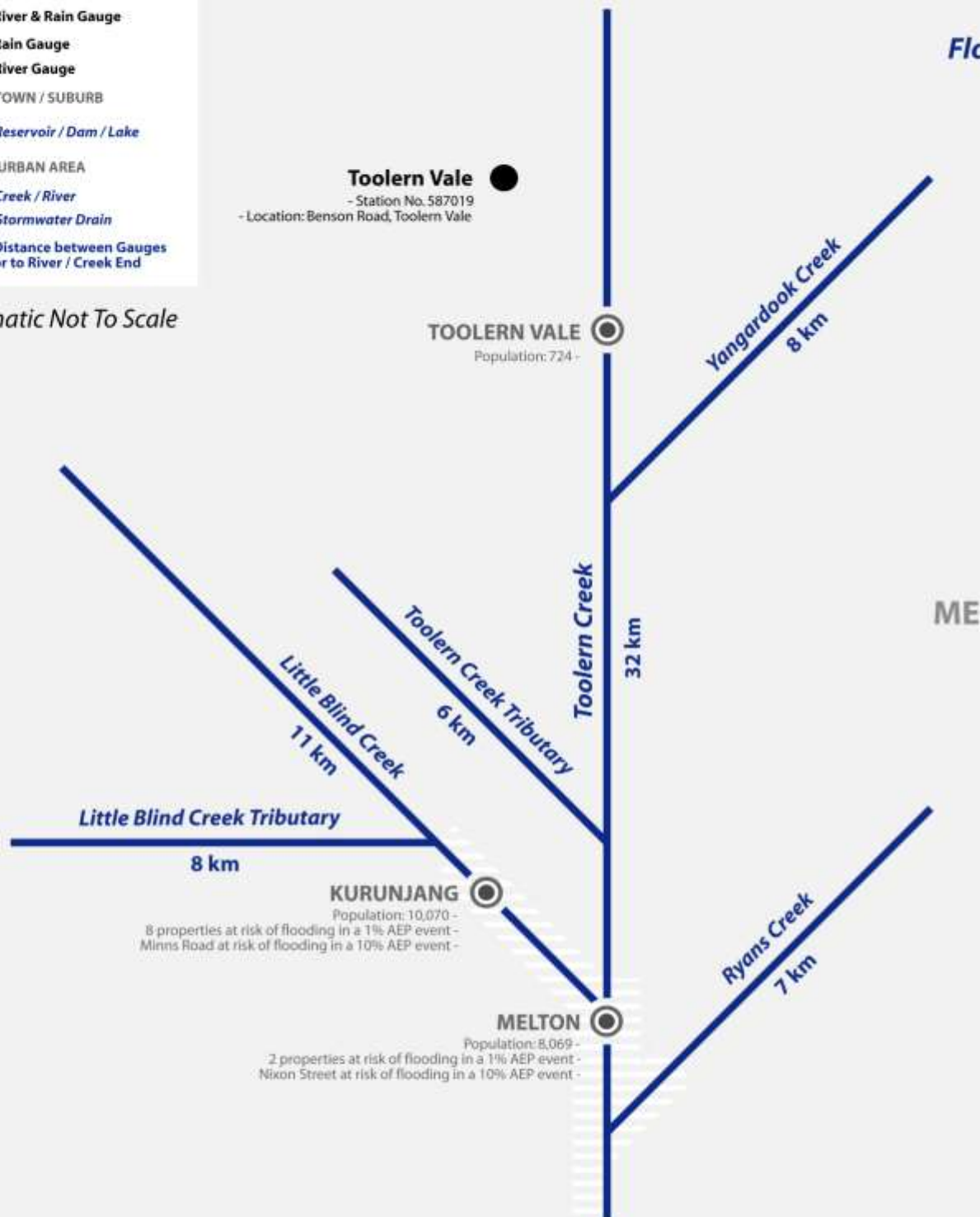
Toolern Creek Catchment Schematic

Version 2 - June 2018

LEGEND

- River & Rain Gauge
- Rain Gauge
- River Gauge
- TOWN / SUBURB
- Reservoir / Dam / Lake
- URBAN AREA
- Creek / River
- Stormwater Drain
- 20km Distance between Gauges or to River / Creek End

Schematic Not To Scale





Kororoit Creek & Stony Creek Catchment Schema

Version 3 - October 2017

LEGEND

- Stream Level & Rain Gauge
- Rain Gauge
- Stream Level Gauge
- TOWN / SUBURB
- URBAN AREA
- Creek / River
- Stormwater Drain
- 20km Distance between Gauges or to River / Creek End

Schematic Not To Scale

Flow Direction ↓

MELTON MFEP
Melton Unit

Toolern Vale
- Station No. 587019
- Location: 285,680mE; 5,838,420mN

Kororoit Creek at Diggers Rest
- Station No. 231106A
- Location: Holden Road, Diggers Rest
- Travel Time to Deer Park: Between 1-7 hours
- Travel Time to Brooklyn: Between 4-9 hours
- Historical Flood Level: 2.71m February 2005
- Historical Flood Level: 3.42m September 1993
- 1% AEP Flood Level: 3.71m

Kororoit Creek at Rockbank
- Station No. 231105B
- Location: Leakes Road, Rockbank
- 1% AEP Flood Level: 3.3m

ROCKBANK
Population: 1,536
34 properties at risk of flooding over-floor in a 1% AEP Event
Western Freeway flooded in a 1% AEP Event

CAROLINE SPRINGS
3 properties at risk of flooding over-floor in a 1% AEP Event

Kororoit Creek at Deer Park

- Station No. 231104A
- Location: Cavendish Drive, Deer Park
- Minor: 3.6m
- Moderate: 4.0m
- Major: 4.5m
- Travel Time to Brooklyn: Between 1-3 hours
- Historical Flood Level: 5.32m February 2005

DEER PARK

Kororoit Creek East Branch
20 km

Kororoit Creek West Branch
14 km

PLUMPTON
- Population: 4,324
- 13 properties at risk of flooding
- Melton Hwy near Leakes Road

10 km

Tributary

7 km

Tributary

5 km

Stony Hill Creek

20 km

Kurung Park Drain

Jones Creek

Upper Stony Creek

St Albans

St Albans

St Albans

St Albans

St Albans

St Albans

St Albans

St Albans

St Albans

St Albans

St Albans

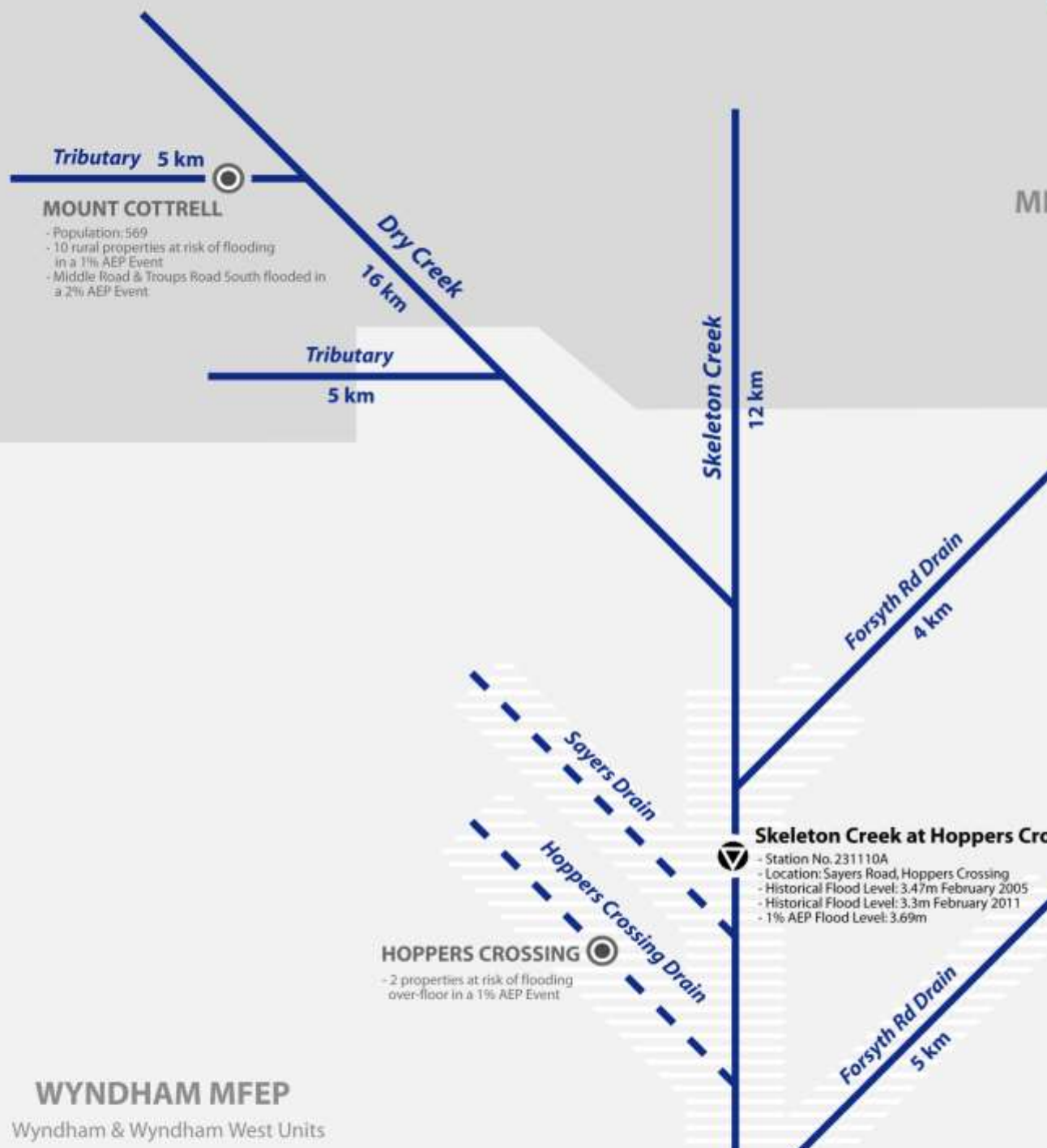
St Albans

St Albans



Skeleton Creek Catchment Schematic

Version 3 - June 2018



WYNDHAM MFEP

Wyndham & Wyndham West Units

APPENDIX H – SEVERE WEATHER (STORM) EVENTS

1. Overview

Melton municipality is susceptible to severe weather events because of a combination of its undulating terrain, isolated mature trees and wind exposed properties. Storm events the City of Melton may be subject to include wind storms, dust storms, hailstorms, heavy rain leading to flash flooding and thunderstorms (including lightning activity). There have also been isolated occurrences of atmospheric downbursts/microburst in adjacent municipalities.

Older homes may be more susceptible to damage, as can properties undergoing development and renovation. Blocked drains and pits, or drainage systems that may be insufficiently sized for the level of development in the City of Melton also contribute to the effects of storm activity. New estates under construction can be particularly vulnerable as construction works can interfere with natural drainage pathways, while excavations may impact on stability of existing trees.

Severe storm activity could result in injuries and increase in road accidents. Damaging wind events will tend to lead to trees down, with damage to the built and natural environment. Obstructions across roads could disrupt services, affect community functioning and have great potential for road traffic delays. Infrastructure near waterways such as pedestrian bridges may become damaged either directly, or from debris that has been washed into the current.

This Appendix uses Request for Assistance data from the Victoria State Emergency Service (VICSES) to display areas at risk from severe weather events.

2. VICSES requests for assistance

The Victoria State Emergency Service records requests for assistance made by the public during severe weather events. Additional calls may have been made directly to Council during these events. Table H1 below is a breakdown of requests by suburb and damage type during the period June 2010 and January 2018 in relation to severe weather and storm events.

Table H1 – Breakdown of Severe Weather Requests for Assistance received by VICSES Melton Unit by suburb

VicSES Request for Assistance (June 2010 – Jan 2018)				
Suburb	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard
Brookfield	34	13	6	9
Burnside	16	5	2	4
Burnside Heights	38	3	7	7
Caroline Springs	152	37	25	20
Cobblebank				1
Deanside			1	
Deer Park	1			2
Diggers Rest	19	8	17	20
Exford	4			3
Eynesbury	14	2	2	3
Fraser Rise	2	1		
Harkness	6	2		
Hillside	40	15	12	7
Kurunjang	81	31	20	20

Melton	112	34	71	28
Melton South	114	24	58	16
Melton West	135	67	60	37
Mount Cottrell	1	3		2
Parwan				3
Plumpton	10	5	2	7
Ravenhall	3	5	1	3
Rockbank	5	1	7	16
Taylors Hill	171	23	8	14
Toolern Vale	4	7	7	25
Truganina	1	2	3	7

*RFAs captured are those that occurred in conjunction with storm/ severe weather activity. Single incident RFAs that have occurred in calm weather have not been included.

**RFAs relating to Rescues, Assist fire service, Assist police, Message, SES incident other etc. have not been included in the dataset

Table H2 is a breakdown of requests for assistance by date (month) and damage type. High figures during December 2011 were the result of an intense storm with large hail on Christmas Day that moved across the north-west metropolitan suburbs causing significant building damage and some flooding issues. Severe weather events with fierce winds in June 2014 and October 2016 led to many RFAs for building damage and tree down related issues, which lead to secondary traffic issues and road closures as a result of trees across roads. Heavy rainfall in December 2016 caused building damage and flash flooding to roads and property. Heavy rain events in December 2017 lead to building damage and issues with flooding of properties and roads.

Table H2 – Breakdown of severe weather requests for assistance received by VICSES Melton Unit within City of Melton by date

VICSES Request for Assistance (June 2010 – Jan 2018)				
Date	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard
Jun 2010	5	2	1	4
Jul 2010		1		
Aug 2010	3		1	1
Sep 2010	8		7	2
Oct 2010	13	10	1	
Nov 2010	24	45	1	4
Dec 2010	15	14	3	1
Jan 2011	18	49	4	3
Feb 2011	6	6	3	4
Mar 2011	1	1	1	
Apr 2011	1	1		2
May 2011	2			
Jun 2011			1	1
Jul 2011	3		2	1
Aug 2011	2			
Sep 2011	10	2	4	4
Oct 2011	21	14		
Nov 2011	9	6	1	
Dec 2011	120	22	5	2
Jan 2012	13	1	4	5
Feb 2012	22	6	4	7
Mar 2012	3	1	2	

VICSES Request for Assistance (June 2010 – Jan 2018)				
Date	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard
Apr 2012	2		1	2
May 2012	3	4		1
Jun 2012	4	2	2	1
Jul 2012	2			
Aug 2012	8	10	1	
Sep 2012	17	1	19	7
Oct 2012	2	2		1
Nov 2012	8	2	1	1
Dec 2012	9	2	11	5
Jan 2013	5	1	2	
Feb 2013	26	2		
Mar 2013	6		6	3
Apr 2013	4			1
May 2013		1		
Jun 2013	6	2		
Jul 2013	7		3	2
Aug 2013	4	1	9	2
Sep 2013	7		5	5
Oct 2013	96		39	24
Nov 2013	5			1
Dec 2013	4	2	1	2
Jan 2014	10		5	9
Feb 2014	5		3	8
Mar 2014	1		2	
Apr 2014	5		1	1
May 2014				1
Jun 2014	24	3	17	9
Jul 2014	12		7	8
Aug 2014	5			
Sep 2014	13		3	1
Oct 2014	4		1	2
Nov 2014	9	1	2	3
Dec 2014	8	1	6	4
Jan 2015	12		2	6
Feb 2015	17		5	15
Mar 2015	9		15	5
Apr 2015	2	1	1	
May 2015	1		2	
Jun 2015	1		2	
Jul 2015	5	1	2	
Aug 2015	3			
Sep 2015	1			
Oct 2015	1		3	2
Nov 2015	14	5	11	10
Dec 2015	25		7	7
Jan 2016	15	4	2	
Feb 2016	1	1	1	2
Mar 2016	7	1	3	1
Apr 2016	3			
May 2016	5	1	6	
Jun 2016	6	1		6
Jul 2016	26	8	9	2
Aug 2016	3	1		1
Sep 2016	4	3	1	1
Oct 2016	59	1	26	26
Nov 2016	8	1	5	2
Dec 2016	7	1	2	1

VICSES Request for Assistance (June 2010 – Jan 2018)				
Date	Building Damage	Flooding	Tree Down	Tree Down Traffic Hazard
Jan 2017	4	4	3	1
Feb 2017	9	6	3	1
Mar 2017	10	1	1	1
Apr 2017	27	9		1
May 2017	3			
Jun 2017	31		9	8
Jul 2017	31		9	8
Aug 2017	4		1	
Sep 2017	3			2
Oct 2017			3	1
Nov 2017	7	4	1	
Dec 2017	26	13	2	3
Jan 2018	20	9	1	1

*RFAs captured are those that occurred in conjunction with storm/ severe weather activity. Single incident RFAs that have occurred in calm weather have not been included.

**RFAs relating to Rescues, Assist fire service, Assist police, Message, SES incident other etc. have not been included in the dataset

3. VICSES requests for assistance mapping

Figure 1 – Breakdown of Severe Weather Requests for Assistance received by VICSES Melton Unit within Melton LGA by request type

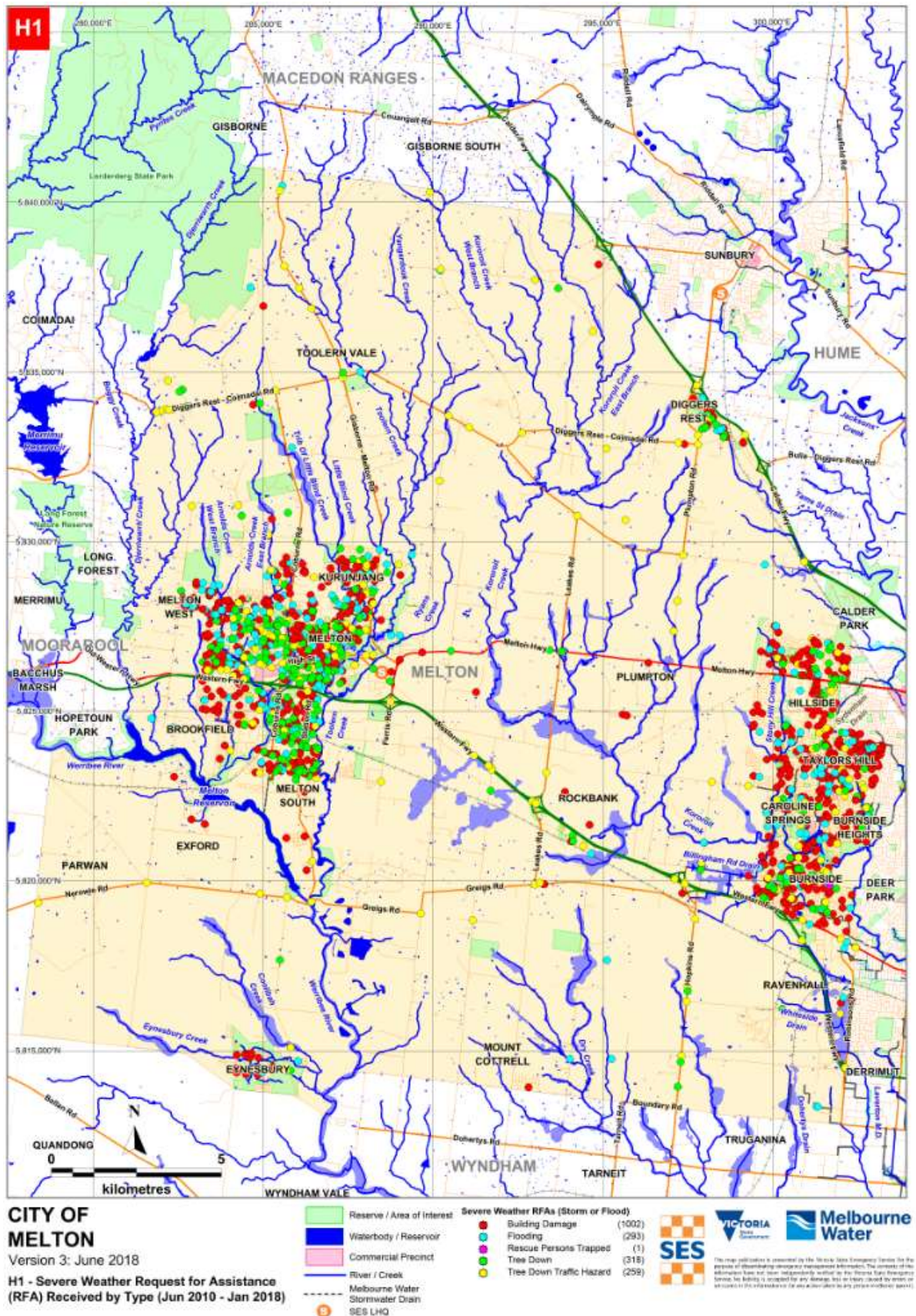
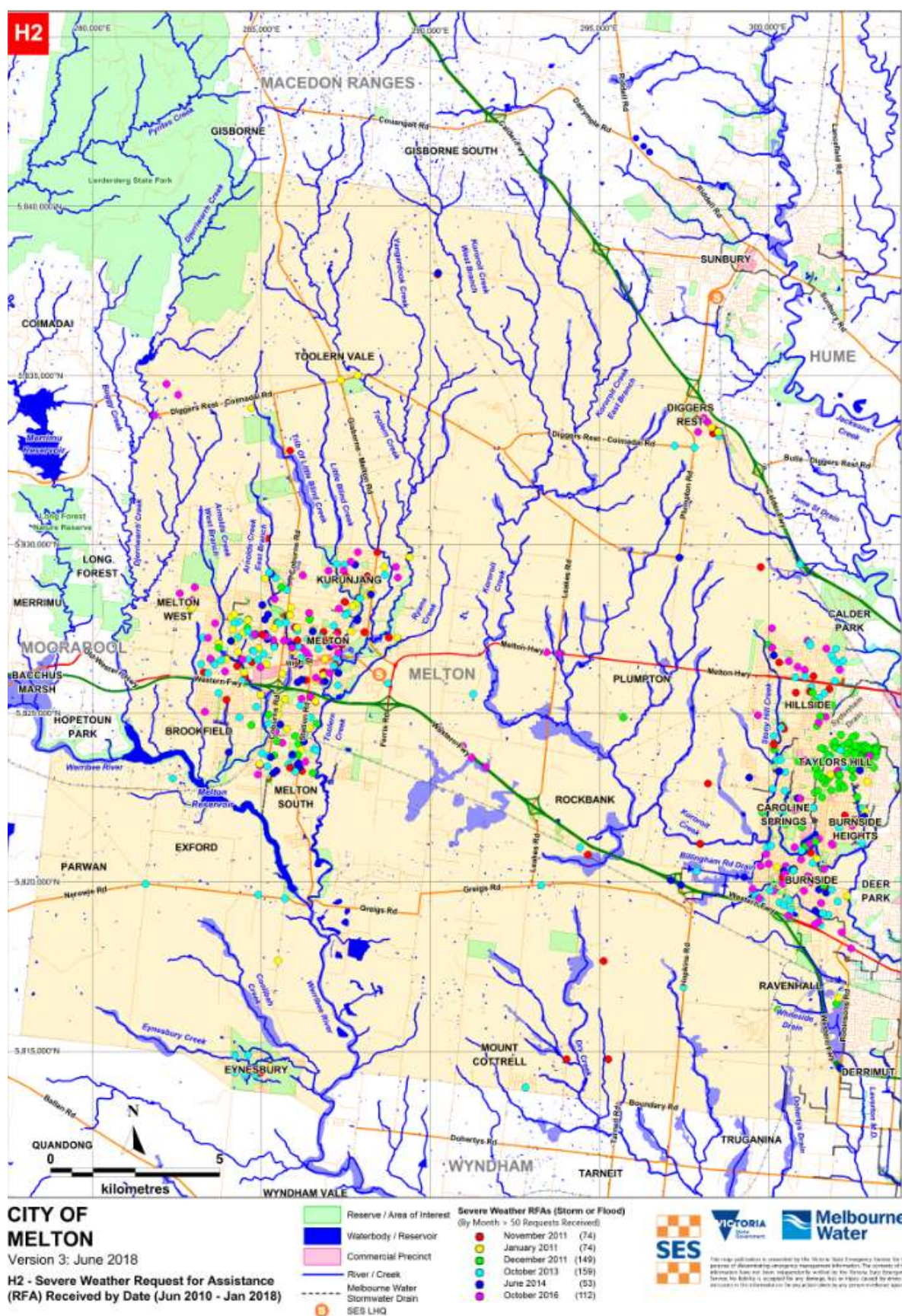


Figure 2 – Breakdown of Severe Weather Requests for Assistance received by VICSES Melton Unit within Melton LGA by date.



4. Activation Triggers

Triggers for activation in flood and storm have been identified as follows:

FLOOD READINESS AND ACTIVATION TRIGGER CONSIDERATIONS - V3.0 - SEPTEMBER 2017						
Readiness Level	RL 1- LOW TO MODERATE	RL 2 - HIGH	RL 3(A) - VERY HIGH	RL 3(B) - VERY HIGH	RL 4 - SEVERE	RL 5 - EXTREME
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Fire Behaviour	Fires can be easily controlled	Fires can be controlled, expect short distance spotting	Fires can be difficult to control, crown fires may develop in forest.	Fires can be difficult to control, crown fires may develop in forest.	Fires may be uncontrollable and move quickly. Spot fires may occur up to 4km ahead of the fire.	Fires will be uncontrollable, unpredictable and fast moving. Spot fires up to 6km ahead of the fire.
	Minor		Moderate		High End Moderate to Major	
Flood Prediction	Flood Watch issued and /or Minor Flood warning issued	Minor Flood Warning issued	Low to Mid range Moderate Flood warning issued with low consequences for built environment based on risk	Moderate to High end MODERATE Flood Warning with moderate consequences for built environment based on risk	MAJOR Flood Warning predicted and/or >2 high end MODERATE Flood warnings with risks and consequences for built environment & economic	Two or more MAJOR Flood warning(s) or One with significant consequences / widespread evacuations for built environment, exceeding 1 in 100 year riverine event. Multiple MODERATE Flood Warnings. Large Dam failure considered very likely.
Flood Behaviour	Anticipated continued light rain. Catchments able to absorb predicted rain for consecutive days but may lead to flooding. Nil impacts or consequences predicted unless identified.	Anticipated continued rain. Catchments able to absorb predicted rain for consecutive days with minor flooding occurring. Low-lying areas next to water courses are inundated. Minor roads may be closed and low-level bridges submerged. In urban areas inundation may affect some backyards and buildings below the floor level as well as bicycle and pedestrian paths. In rural areas removal of stock and equipment may be required	Anticipated continued rain. Catchments likely to be saturated and unable to absorb continued rain. Areas of inundation are more substantial in size but consequence low . Main traffic routes may be affected. Unlikely for buildings to be affected above the floor level. Evacuation of flood affected areas may start to be considered. In rural areas removal of stock is required.	Anticipated continued rain. Catchments are saturated and unable to absorb continued rain. Areas of inundation are more substantial. Main traffic routes may be affected. Some buildings may be affected above the floor level. Evacuation of flood affected areas may be planned for. In rural areas removal of stock is required. Impact assessment may be required.	Anticipated continued high rain. Catchments are saturated and unable to absorb continued rain and runoff. Extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas likely. Utility services likely to be impacted.	Anticipated significant extreme weather event that will lead to rapidly rising river conditions. Catchments are saturated and unable to absorb current or additional runoff. Extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas are likely. Utility services will be impacted.
Readiness Level (State)	Preparedness WHITE SDO and SAC (monitor)	Preparedness WHITE SDO and SAC (monitor)	Preparedness WHITE SDO and SAC (monitor)	SCC level BLUE or when ICC activated SDO and SAC in place METRO: RCC open, Base RCT in place	SCC level ORANGE. Multiple ICCs activated or multi region SDO and SAC in place Consider day & night	SCC Level RED. Multiple ICCs activated or multi region SDO and SAC in place Day & night
Readiness levels (Regional)	Preparedness WHITE	Preparedness WHITE	Regional Command (on call/ STBY)	RURAL: Regional Cmd in place, RC notified. METRO: RCC OPEN, base RCT in place	RCC OPEN: RCT in place, some agencies available on immediate recall	RCC OPEN: Full RCT and most REMT in place
	RAC (Monitoring)	RAC (Monitoring)	RAC (Monitoring)	RAC and RDO at the RCC	RAC and RDO at the RCC	RAC and RDO at the RCC
	RDO (monitor and issuing public information)	RDO (monitor and issuing warnings)	RDO (issuing warnings - oversighting basic response (eg: evac caravan park)	FULL RCT on Standby REMT Briefed by RAC	REMT briefed by RAC and on standby to come in (as required)	RCT, RAC and RDO in place at RCC
Readiness levels (Incident)			Base IMT (Rostered STBY)	Base IMT (In Place - Primary ICC)	RURAL - BASE IMT (In Place), CORE (on call/ Stby) METRO - CORE IMT (In Place) Observed activity - CORE IMT (In Place)	RURAL - CORE IMT (In Place), FULL (on call/Stby) METRO - FULL IMT (In Place) Observed activity - FULL IMT (In Place)

STORM READINESS AND ACTIVATION TRIGGER CONSIDERATIONS - V3.0 - SEPTEMBER 2017						
Readiness Level	RL 1- LOW TO MODERATE	RL 2 - HIGH	RL 3(A) - VERY HIGH	RL 3(B) - VERY HIGH	RL 4 - SEVERE	RL 5 - EXTREME
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Fire Behaviour	Fires can be easily controlled	Fires can be controlled, expect short distance spotting	Fires can be difficult to control, crown fires may develop in forest.	Fires can be difficult to control, crown fires may develop in forest.	Fires may be uncontrollable and move quickly. Spot fires may occur up to 4km ahead of the fire.	Fires will be uncontrollable, unpredictable and fast moving. Spot fires up to 6km ahead of the fire.
	THUNDERSTORM FORECAST CHART [TFC] issued daily Oct - Apr			SEVERE WEATHER INTELLIGENCE BRIEFING [SWIB] issued TUE & FRI		
Storm Prediction or Warning READINESS CONSIDERATION	No Thunderstorms No Severe Weather	TFC show THUNDERSTORMS POSSIBLE No SWW	TFC shows SEVERE THUNDERSTORMS POSSIBLE SWW issued for winds and/or possible heavy rainfall STW issued for wind and/or heavy rainfall and/or hail	Severe Weather Intelligence Briefing (SWIB) colored YELLOW TFC shows SEVERE THUNDERSTORM LIKELY SWW issued for wind and/or heavy rainfall STW issued for wind and/or heavy rainfall and/or hail	SWIB colored ORANGE for winds and rainfall, showing TFC shows SEVERE THUNDERSTORMS LIKELY including potential for LARGE Hail, Damaging Winds, Heavy Rainfall leading to flash flooding SWW issued for Damaging Winds and/or Heavy Rainfall STW issued for wind and/or heavy rainfall and/or hail	SWIB colored RED for Damaging to Destructive Winds and Very Heavy Rainfall TFC shows SEVERE THUNDERSTORMS LIKELY including potential for GAI NT Hail, Damaging Winds, Heavy Rainfall leading to flash flooding SWW for damage or destructive winds or heavy rainfall STW - Super Cells possible, Heavy Rain and/or Very Dangerous Thunderstorm warning issued
Storm Behaviour READINESS CONSIDERATIONS	No Thunderstorms No Severe Weather	Wind gusts < 90km/h, rain rates not conducive to flash flooding, small hail (<2cm)	SWIB - 50km/hr+ average winds, gusts reaching 90-100 km/hr for prolonged periods. TFC - Possibility of Thunderstorms, may or may not include small hail <3cm. SWW or STW - Chance of flash flooding and damaging winds considered Possible.	SWIB - 60km/hr+ average winds, gusts reaching over 100km/hr (101-109 km/hr) for 6 or more hour period. TFC - Severe Thunderstorms Possible, high possibility of 3 or 4cm hail, wind gusts over 100km/hr. SWW - Heavy Rainfall leading to flash flooding across Districts considered 'Possible' STW - Localised flash flooding rates of >20mm per 30mins likely.	SWIB - 70km/hr+ average winds, DAMAGING gusts reaching over 110km/hr (110-120 km/hr) for 3 or more hour period. TFC - Severe Thunderstorms LIKELY SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Likely' STW - Possibility of hail of 4-5cm, wind gusts over 110km/hr. POTENTIAL for Super Cell, Squall or Tornado. Localised flash flooding rates of >30mm per 30mins likely.	SWIB - Very unstable weather conditions including 80km/hr+ average winds, DAMAGING (120km/hr to DESTRUCTIVE > 125km/hr for 3 or more hour period CERTAIN. TFC - Severe Thunderstorms more LIKELY. SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Very Likely' STW - Super Cells including Hail > 5cm, wind gusts > 120km/hr. Localised flash flooding rates of >40mm per 30mins. Squalls or likely Tornado.
NOTE: ADD 10km/hr to average winds and/or gusts when considering Alpine District predictions and/or warnings						
Storm Activity ACTIVATION CONSIDERATIONS	Local level unit response with less than 10 RFAs	Local level unit response with less than 10 RFAs	Local Unit level response with local agency support METRO 30+ RFA active at each 8-10 Units RURAL 15+ RFA active at each 4-6 Units	Multi-Unit responses with increasing multi-agency responses METRO 250+ active RFA in the region, where multi Units have more than 30 RFAs, ESTA has activated Critical Incident Response Plan (CIRP) Level 1 RURAL 100+ active RFA across the region, where Units have 15+ RFA at more than 5 Units	Multi-Unit response activity with multi-agency support and high level of multi-agency response activity (eg: Fire Alarms) METRO 400+ RFA active across the region, where Units have more than 30 RFAs or ESTA CIRP Level 2, event creation has increased to 2-4 per minute, < 15 calls waiting RURAL 250+ RFA, where multi Units have more than 30+ RFA each	Multi-Unit response and high level of multi-agency response activity with significant impacts across multi municipalities METRO 1000+ RFA across ICC footprint, where Units have more than 60 RFAs or ESTA CIRP Level 2 event creation has increased to more than 4 per minute, 15+ calls waiting consistently RURAL 500+ RFA across ICC footprint, where multi Units have more than 45+ RFA each
	VICSES - Business as Usual Operations			JSOP 2.03 LINE OF CONTROL		
Readiness (State)	SCC Level White	SCC Level White	SCC Level White/Blue	SCC Level Blue or when ICC activated	SCC Level Orange. Multiple ICCs activated or multi region	SCC Level Red. Multiple ICCs activated or multi region
	SAC and SDO (monitor)	SAC and SDO (monitor)	SAC and SDO (actively monitoring)	SDO and SAC in place	SDO and SAC in place. Consider day/ night	SDO and SAC in place day and night
Readiness levels (Regional)	RDO (monitor)	RAC (monitor)	Regional Command IN PLACE	RURAL: Regional Cmd In Place, RC notified METRO - RCC OPEN: Base RCT in place	RCC OPEN: RCT in place, some agencies available on immediate recall	RCC OPEN: Full RCT/ most REMT in place
	RAC (aware)	RAC (aware)	RAC/RDO attends Regional Office	Rural - RAC & RDO In Place at Regional Office Metro - RC, RAC, RDO at RCC	RC, RAC and RDO In Place at RCC	RCT, RAC and RDO In Place at RCC
Readiness levels (Incident)	RDO (monitor)	RDO (monitor)	RDO - RAC IN PLACE Resource Officer (STBY-OnCall) Management Support (STBY)	RURAL - BASE IMT (Rostered) METRO - BASE IMT (In Place) Observed activity - BASE IMT (In Place)	RURAL - BASE IMT (In Place), CORE (Stby) METRO - CORE IMT (In Place) Observed activity - CORE IMT (In Place)	RURAL - CORE IMT (In Place), FULL (Stby) METRO - FULL IMT (In Place) Observed activity - FULL IMT (In Place)