MINUTES

—

COMMUNITY FOCUS COUNCIL MEETING

TUESDAY, 14 JULY 2020

7.00PM

COUNCIL:
Cr S Asher (Bellarine Ward)
Mayor
Cr K Grzybek (Windermere Ward)
Deputy Mayor

Cr J Mason (Bellarine Ward)
Cr T Sullivan (Bellarine Ward)
Cr E Kontelj (Brownbill Ward)
Cr S Mansfield (Brownbill Ward)
Cr P Murrihy (Brownbill Ward)
Cr B Harwood (Kardinia Ward)
Cr P Murnane (Kardinia Ward)
Cr R Nelson (Kardinia Ward)
Cr A Aitken (Windermere Ward)

CITY OF GREATER GEELONG

SECTION A - PROCEDURAL MATTERS

SECTION B – REPORTS

MINUTES OF THE COMMUNITY FOCUS COUNCIL MEETING HELD AT THE COUNCIL CONFERENCE AND RECEPTION CENTRE CITY HALL, LITTLE MALOP STREET, GEELONG TUESDAY, 14 JULY 2020 COMMENCING AT 7.00 PM

PRESENT: Cr K Grzybek (Acting Mayor), Crs A Aitken, B Harwood, E Kontelj, S Mansfield, J Mason, P Murnane, P Murrihy, R Nelson, T Sullivan

Also present: M Cutter (Chief Executive Officer), R Leonard (Director Governance, Strategy and Performance)

OPENING: The Mayor declared the meeting open at 7.00pm

ACKNOWLEDGEMENTS:

Council acknowledged Wadawurrung Traditional Owners of this land and I pay my respects to all Elders past and present and to all Aboriginal and Torres Strait Islander People who are part of the Greater Geelong community today.

APOLOGIES: Nil

LEAVE OF ABSENCE: Cr Asher (Mayor) – 6 to 18 July 2020

CONFIRMATION OF MINUTES:

Cr Mansfield moved, Cr Murrihy seconded -

That the Minutes of the Community Focus Council Meeting held on 9 June 2020 be confirmed.

Carried.

DECLARATIONS OF CONFLICTS OF INTEREST:

Cr Nelson declared a Conflict of Interest by Close Association in Agenda Item 2 – Rippleside Inclusive Play Space Update, as his employer is a disability provider and there may be a perceived interest.

Cr Kontelj declared a Conflict of Interest by Close Association in Agenda Item 6 – Tender T2000036 Plant Hire Services, in that the company of which he is a Director provides services and goods to some of those who have been identified as preferred suppliers to the City of Greater Geelong for plant hire.

PUBLIC QUESTION AND SUBMISSION TIME: Nil

PETITIONS: Nil

1. LARA FLOOD STUDY

Source: **City Services – Engineering Services**
Director: **Guy Wilson-Browne**
Portfolio: **Parks, Gardens and City Services**

Purpose

1. To seek endorsement of the Lara Flood Study (the Study) including designation of land liable to flooding; and

2. To seek support to prepare and exhibit a planning scheme amendment to implement the Lara Flood Study into the planning scheme.

Background

3. The Lara Flood Study project was identified as a regional priority in the Corangamite Regional Floodplain Management Strategy 2018-2028.

4. This project was supported and partly funded by the Victorian State Government's Natural Disaster Resilience Grant Scheme (Department of Environment, Land, Water and Planning).

5. The Study was commissioned in mid-2018 to fill the knowledge gaps and better understand the extent and likely impact of flooding within the Study area that covers Hovells Creek and Avalon Road catchments, refer to **Attachment 2.**

Key Matters

6. A Summary Report for the Study has been prepared, refer to **Attachment 5**. Technical reports that support the Study include:

   6.1 Historical event and data review;

   6.2 Flood modelling analysis;

   6.3 Flood impact assessment and mitigation options;

   6.4 Emergency management impacts review; and

   6.5 Flood advice for building and land controls.

7. Damage assessments have calculated an average annual damage cost of over $1.2 million for the 1% Annual Exceedance Probability (AEP) flooding events:

   7.1 Investigation into structural mitigation options was undertaken to ensure all feasible works to reduce flood hazard were considered; and

   7.2 A structural flood mitigation project has been recommended for further development and facilitation under a Special Charge Scheme using pumps to remove water ponding within Kyema Drive, Brownlow Court and Clover Street with a total construction cost estimated at $2.03 million (**Attachment 6**).

8. To assist the community in understanding the outcomes of the Lara Flood Study and the further investigation works, a fact sheet titled Managing Flood Risks in Lara (**Attachment 4**) has been developed to communicate what we are already doing and what we plan to do to manage flood risks in Lara.

Cr Aitken moved, Cr Grzybek seconded -

9. That Council:

9.1 Endorse the Lara Flood Study, as attached; and

9.2 Subject to endorsement of 9.1:

9.2.1 Endorse the designation of land liable to flooding being implemented under officer delegation in accordance with the provisions of the Building Act 1993;

9.2.2 Refer the Study to the Victoria State Emergency Service and Corangamite Catchment Management Authority for use in preparation of flood emergencies and updating of community flood advice;

9.2.3 Support the preparation and exhibition of a planning scheme amendment to implement the findings of the Lara Flood Study, in a manner generally consistent with the recommendations contained in the Lara Flood Investigation Planning Report, including the revision of the existing Floodway Overlay (FO), Land Subject to Inundation Overlay (LSIO) and Special Building Overlay (SBO) along with the Urban Floodway Zone (UFZ), Public Conservation and Resource Zone (PCRZ) and Public Park and Recreational Zone (PPRZ) in the Study area;

9.2.4 Support the publication of the Fact Sheet titled Managing Flood Risks in Lara as attached; and

9.2.5 Note the financial implications will be considered as part of Council's annual budget planning process.

Carried.

Attachment 1

Financial Implications

1. Several flood mitigation options were considered, which have an estimated capital cost ranging from $1.01 million to $2.38 million. Note that combinations of these options were considered in preparing flood mitigation recommendations.

    1.1 The City's typical annual capital expenditure (as per the long-term financial plan) for drainage construction inclusive of flood mitigation works is $2.65 million, with several additional specialist / large scale projects funded separately (i.e. Gheringhap Street drain) through the annual budget planning process; and

    1.2 Any flood mitigation works will need to be funded by Council, through general revenue or considered under a Special Charge Scheme, where specific properties benefit from works consistent with the Stormwater Services Strategy and previous flood mitigation works (i.e. Elcho Channel upgrade).

2. Designation of areas liable to flooding (Building Act 1993) and revision of flood zones and overlays (Victorian Planning Scheme) are implemented from existing budgets.

Community Engagement

3. Thorough community consultation was undertaken during the Lara Flood Study. The City welcomed feedback on all aspects of the project throughout the study via the City's webpage and the online project website. Refer **Attachment 3.**

4. The Study information is used by the State Emergency Service (SES) Victoria for use in preparation of flood emergencies and updating of community flood advice and the Corangamite Catchment Management Authority for floodplain management.

5. To assist the community in understanding the outcomes of the Lara Flood Study and the further investigation works, a fact sheet titled "Managing Flood Risks in Lara" (**Attachment 4**) was developed to communicate "what we are already doing" and "what we plan to do" to manage flood risks in Lara.

6. Information from the Lara Flood Study will be used to inform the Hovells Creek Catchment Management Strategy containing long-term planning and management for floods, waterways and integrated water actions to be adopted in consultation with the community and as guided by the Stormwater Services Strategy in the 2020/21 financial year.

Social Equity Considerations

7. The best available information is accessible by the community to use in emergency management planning and preparedness. This planning includes identification of vulnerable persons.

8. The frequency and duration of flooding in the Hovells Creek and Avalon Road catchments have an adverse social impact on residents, business owners, employees, customers and visitors.

9. Flood risk management actions have been developed that include structural and non-structural mitigation options to be applied throughout the catchment.

Policy/Legal/Statutory Implications

10. The City has various statutory responsibilities associated with drainage and flood management and are set out in:

    10.1 Building Act 1993 and Building Regulations 2018;

    10.2 Local Government Act 1989 and Local Government Regulations 1990;

    10.3 Planning and Environment Act 1987;

    10.4 Water Act 1989;

    10.5 Subdivision Act 1988; and

    10.6 Emergency Management Act 2013.

11. The Study can be used to update land use and planning controls in the Victorian Planning Scheme, which fulfil the objectives of the Planning and Environment Act 1987 for Floodplain Management to protect:

    11.1 Life, property and community infrastructure from flood hazard;

    11.2 The natural flood-carrying capacity of rivers, streams and floodways;

    11.3 The flood storage function of floodplains and waterways; and

    11.4 Floodplain areas of environmental significance or of importance to river health.

12. The Regulation 5 (2) of Victorian Building Regulations 2018 provides Council with the powers to 'designate' land liable to flooding. Regulation 153 (2) would then require consent from Council (or delegate) for an application to build on land liable to flooding.

13. Section 229 of the Local Government Act and Regulation 51 of the Building Regulations 2018 have provision for information certificates containing prescribed information, including the building or land liable to flooding.

14. The Study is a regional priority project in the Corangamite Regional Floodplain Management Strategy 2018-2028 and is aligned to the Victorian Floodplain Management Strategy.

15. The Stormwater Service Strategy 2020-30 has recognised that the Hovells Creek catchment is a high priority to understand and manage flood risk, stormwater quality and identify opportunities for integrated water management initiatives.

16. The Sustainability Framework includes priority actions, recognising climate change as a global emergency and sets out objectives which align with the Study including:

    16.1 to build community resilience to the impacts of climate change; and

    16.2 increase the quantity and quality of our protected natural environment.

Alignment to Council Plan

17. The Study supports the implementation of the Council Plan through:

    17.1 Improved health and safety of our community with a key priority to improve safety in our community which can be achieved through reduction of dangerous stormwater flooding;

17.2 Planned sustainable development with key priorities to manage the impact of development on the character of our townships and improve the environmental performance of new developments using planning controls through implementation of catchment practices that respond to growth in existing and new urban environments;

17.3 Effective environmental management with a key priority to educate and assist our community to act on climate change, by reducing waste, emissions and water usage which can be achieved through implementation of stormwater systems that can adapt to future needs;

17.4 Integrate transport connections with a key priority to deliver better-connected walking, cycling and trail paths across our region by limiting disruption caused by stormwater; and

17.5 Organisational leadership, strategy and governance with a key priority to communicate and engage more effectively with the community, in areas of need by enabling communities to better prepare for, and recover from, stormwater events that lead to flooding.

Conflict of Interest

18. There is no conflict of interest by Council officers in the preparation of this report.

Risk Assessment

19. The financial implications of a flood event are assessed from the damage and disruption experienced across communities, including direct and indirect costs:

19.1 Riverine flooding and urban stormwater flooding have separate damage assessments and have been calculated as having an average annual damage cost of $1.20 million and $1.28 million respectively for the 1% AEP flooding events within the Study area;

19.2 Cost benefit analysis suggests that all the flood mitigation options have a low return on investment (a limited reduction to average annual damages); and

19.3 Investigation to identify non-flood mitigation projects, such as transport corridor improvements responding to flood impacts (i.e. as identified in the Lara Traffic Study), critical asset monitoring, education and preparedness have been summarised in the Fact Sheet titled “Managing flood risks in Lara”.

20. The Victorian State Government’s Natural Disaster Resilience Grant Scheme has historically provided funding to regional and local priority projects including flood studies, detailed design of levees and floodways, and the construction of flood mitigation works. No works identified in the Study would likely meet the cost-benefit criteria for this funding and will require alternative funding to be considered:

20.1 Much of the flood affected land within the Hovells Creek and Avalon Road catchments is already developed or subdivided. There are limited opportunities to collect development contributions that could fund the provision of flood mitigation works.

21. The Study shows that in a 1% AEP flood event, there are 23 buildings identified to have above floor flooding from the riverine flooding, and 48 buildings identified to have above floor flooding from stormwater flooding:

21.1 Four of these buildings are at risk of being flooded above floor from both riverine and stormwater flooding.

21.2 Most of these buildings are located behind the Hovells Creek levee and reliant on the pump systems being operational. Other areas with buildings at risk of being flooded include Kyema Drive, Brunel Close and Archimedes Avenue;

21.3 Flood mitigation options assessed have limited benefit to these properties, marginally reducing flood depths;

21.4 A structural flood mitigation project has been recommended for further development and facilitation under a Special Charge Scheme using pumps to remove water ponding within Kyema Drive, Brownlow Court and Clover Street (**Attachment 11)** with a total estimated at $2.03 million which includes:

21.4.1 Lipson Drive Pipe and Open Drain, $1.02 million (**Attachment 5**); plus

21.4.2 Kyema Drive Two Pumps and Rising Mains, $1.01 million (**Attachment 6**).

21.5 Several buildings have been identified as having less than the desired 300mm freeboard protection from flood levels.

22. McClelland Avenue is acting as a hydraulic control (weir), combined with the flat terrain of the area and limited drainage network causes flood levels to extend back up from McClelland Avenue into Brownlow Court.

23. In less severe events, riverine flooding into local stormwater drains at Melrose Street, Wingara Drive and Walkers Road can occur when flood valves and pumps are not activated behind the levee.

24. Previous flood studies have recommended flood mitigation options which were never delivered. These options were assessed in the current study and due to the flat terrain and relatively low depth of flooding did not create significant flood level reductions.

25. The damage assessment of the Study has identified 3,970 properties with buildings flooded in the 1% AEP stormwater flood event and 885 properties (which have buildings) flooded in the 1% AEP riverine flood.

26. The total number of properties impacted by flooding is 6,152, compared to previous number of 3,373.

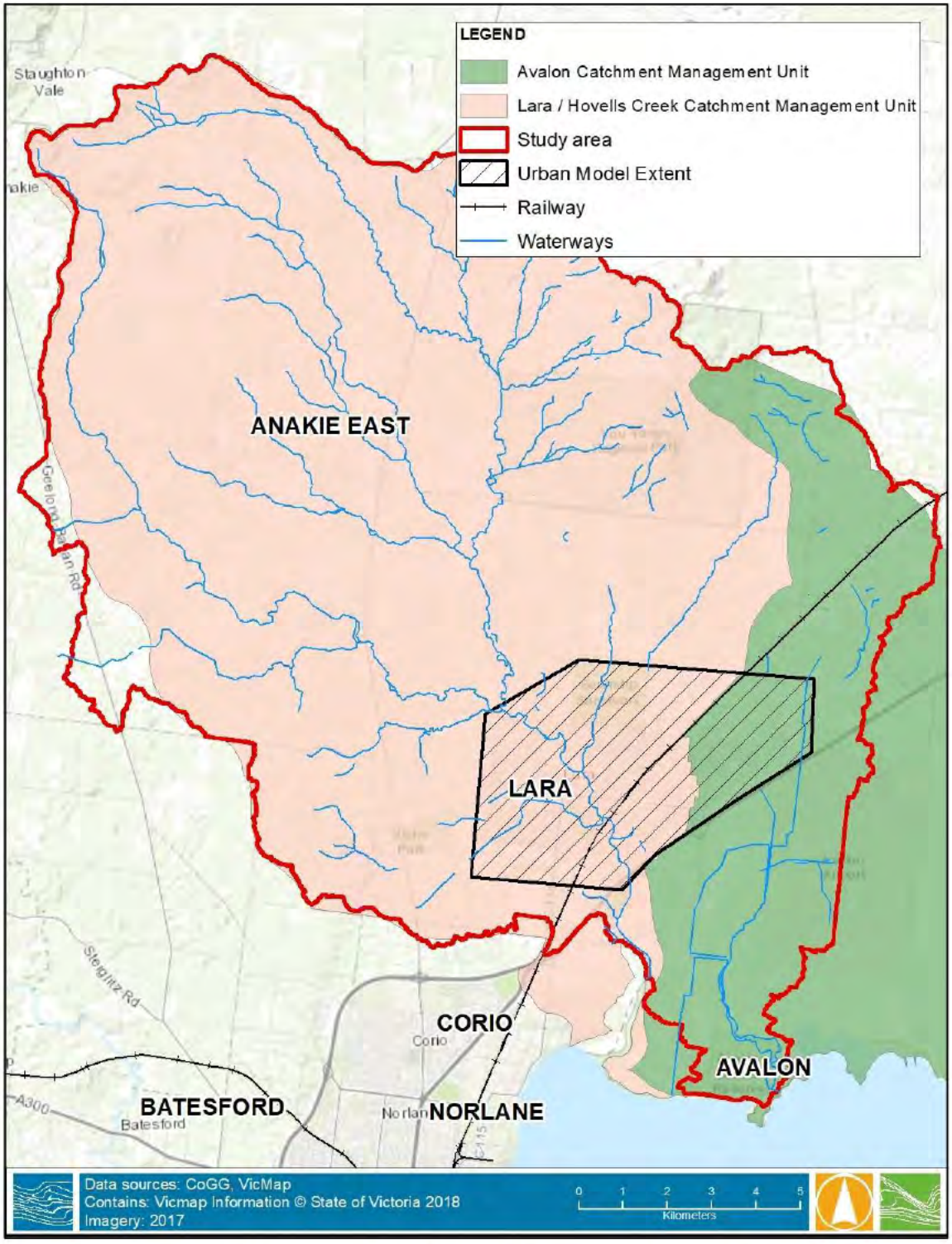
Environmental Implications

27. The Study has considered environmental implications and has assessed mitigation options against a range of criteria, including the potential environmental impact to assess flood mitigation options.

28. The Study proposes land use and planning controls are updated in the Victorian Planning Scheme including the Floodway Overlay (FO), Land Subject to Inundation Overlay (LSIO) and Special Building Overlay (SBO) along with the Urban Floodway Zone (UFZ), Public Conservation and Resource Zone (PCRZ) and Public Park and Recreational Zone (PPRZ) in the Study area.

29. Climate change was incorporated into the Lara Flood Study as a sensitivity analysis to understand how sensitive the study area is to proposed changes in climatic conditions.

Attachment 2



Study Area and the relevant Catchment Management Units as per the City's Stormwater Services Strategy

Attachment 3

Community Engagement

Below is a summary of engagement activities.

Engagement Level	Approach	Activities
Inform	General communications Creating awareness of the project Identifying potential flood extents (including impacted properties)	Have Your Say website Project website (with maps) Advertising in local newspapers Letters in mail to residents requiring flood level survey
Inform / Consult	3 x Community Engagement sessions held at the Lara RSL	<u>1st Engagement Session (11 September 2018)</u> • Main Objective: gather knowledge of historical flooding in the region and create public awareness on the project. • Have Your Say page views: 1922 • Online participation / comments: 3 • City News advertisement: 24/08/2018, 25/08/2018, 07/09/2018, 08/09/2018 • Lara Happening advertisement: 01/09/2018 • Visitors with formal registration: 23 <u>2nd Engagement Session (28 March 2019)</u> • Main Objective: seek feedback on the modelling of the calibration events. • Have Your Say page views: 1927 • Online participation / comments: 2 • City News advertisement: 22/03/2019, 23/03/2019 • Lara Happening advertisement: 16/03/2019 • Visitors with formal registration: 31 <u>3rd Engagement Session (22 October 2019)</u> • Main Objective: comment on the draft flood extents. • Have Your Say page views: 1086 • Online participation / comments: 1 • City News advertisement: 11/10/2019, 12/10/2019, 18/10/2019, 19/10/2019 • Lara Happening advertisement: 12/10/2019 • Visitors with formal registration: 28

THE CITY OF
GREATER GEELONG

MANAGING FLOOD RISKS IN LARA

CITY OF GREATER GEELONG

The purpose of this fact sheet is to explain how we are changing what we do to better manage flood risks in Lara.

The Lara township experiences frequent and significant flood events. The relatively flat terrain makes the area susceptible to widespread, shallow stormwater flooding. Being positioned on the banks of Hovells Creek, the township is also at risk of riverine flooding.

Significant flood events impacting parts of the Lara community were recorded in 1933, 1973, 1983, 1988, 1995, 2005 and 2010. Localised flooding has also impacted individual properties during this time.

The most recently completed Lara Flood Study has improved our understanding of flood risk in the area. "Our increasing population, a rapidly growing economy and climate change are putting increasing pressure on our stormwater systems. It is important that we account for these pressures to ensure we continue to deliver the services the community expects."[1], it is timely to explain what we're planning to do to help the Lara community prepare.

Did you know?

All new developments in Victoria require sustainable floodplain management and drainage planning works to prevent proposed developments from increasing flood risks for existing communities.

WHAT WE'RE ALREADY DOING

Overseeing planning and building controls

As an identified growth area for residential, commercial and industrial development, Lara's steady population growth over the past 30 years has altered the way land is used in a way that has the potential to increase stormwater runoff.

Our obligation to plan communities in a way that minimises flood risk is enshrined in both the *Planning and Environment Act 1987* and the *Greater Geelong Planning Scheme*.

We also have a responsibility to enforce building controls in areas liable to flooding.

Preparing for flood response and recovery

We work in partnership with emergency services and other agencies to plan for, and respond, to flooding emergencies. In Lara, we manage our flood response according to a series of plans, which include the *Hovells Creek – Lara Precinct Flood Emergency Plan*.

Investigating and managing existing flood risks

We assess and, if possible, treat existing flood risks in conjunction with the Corangamite Catchment Management Authority.

To assist with this work, we have carried out a series of investigations to help us better understand how flooding impacts parts of the Lara community. The most recent of these was completed in 2020.

What we have learnt through our investigations is that structural solutions are not always available – or feasible – for the challenges facing Lara.

Our goal therefore must be to look for alternative solutions to help the Lara community address flood risks in a proactive way.

WHAT WE PLAN TO DO

Share updated information

We will make the latest flood data available to the community to assist residents to prepare for flood events.

By providing the latest flood maps to the Corangamite Catchment Management Authority for use on their website, residents will have the information they need to assess flood levels and velocities within a property.

We will also share this information with the Victoria State Emergency Service so they can update community resources, share more accurate predictions about flood risks and assist the community to better prepare.

Designate land liable to flooding

The Annual Exceedance Probability – more commonly referred to as the 'AEP' – refers to the likelihood of a flood of given size

(or larger) occurring in any one year. It is usually expressed as a percentage.

We will update the current extent of land liable to flooding with the latest 1% AEP flood extent. The minimum floor levels of building proposals within the flood prone land will be advised in the Council Report and Consent in accordance to Regulation 153 and 154 of the Building Regulations 2018.

Revise the planning scheme

We will undertake a planning scheme amendment to update the current flood related planning overlays with the Lara Flood Study outcome on Floodway Overlay (FO), Land Subject to Inundation Overlay (LSIO) and Special Building Overlay (SBO) along with the Urban Floodway Zone (UFZ), Public Conservation and Resource Zone (PCRZ) and Public Park and Recreational Zone (PPRZ) in the Study area.

This will help ensure that all buildings and developments constructed in these areas are built to a standard that will protect them against future flooding.

As part of this process, we will also consider how climate change analysis can be incorporated into the planning scheme.

Revise water management processes in growth areas

To establish clear guidelines for new developments in the catchment, we will prepare a Catchment Management Strategy for the Hovells Creek catchment, which includes stormwater management objectives and include the Northern Geelong Growth Area and other notable land development.

Our future plans and strategies will include policy and design notes that guide how we apply climate change scenarios to urban development.

Update Municipal Flood Emergency Plan

We will provide information for VICSES to update the Municipal Flood Emergency Plan to make sure that the most efficient preparation, response and recovery arrangements are in place at a municipal level.

Improve how we manage roads and transport

We will install flood warning signs at new locations identified as being 'at risk' as part of our most recent flood study.

We will also develop community information designed to help people stay safe – for example, information about safety around flood water, alternative routes and wayfinding signage.

Improve how we manage drainage infrastructure and assets

We will identify critical drainage assets in Lara and assign an appropriate regime of inspection and maintenance to them.

We will also develop a detailed infrastructure management manual. As well as outlining inspection and maintenance regimes, it will also identify priority capital works for drainage infrastructure in the region.

Improve the flood warning system

We will liaise with DELWP, BoM, VICSES and CCMA to determine the current capabilities and future requirements of the flood warning system for the Hovells Creek catchment and Avalon Road catchments with a view to increase the accuracy and timeliness of warnings provided by the system and communicate these warnings to the community effectively.

Structural mitigation works

The outcomes of Lara Flood Study and further investigations have helped us identified structural mitigation works that could be used to reduce flooding problems in several low-lying residential areas of Lara. Our investigations identified two projects below – each valued at over $1 million – that could have some positive impact. Project B would rely on Project A to work effectively and reduce the flooding problems of the areas.

- Project A - Lipson Drive Pipe and Open Drain
- Project B - Kyema Drive Two Pumps and Rising Mains

Where projects create new assets or upgrade existing assets which provide special benefit to a property, we may investigate the possibility of implementing a Special Rates and Charges Scheme with those property owners likely to benefit.

For more information about how we're managing flood risks in Lara, please go to https://www.geelongaustralia.com.au/stormwater

[1] City of Greater Geelong (2020) *City of Greater Geelong Stormwater Services Strategy 2020–30*, p 5.

Attachment 5

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Summary Report

Lara Flood Study

City of Greater Geelong

11 February 2020

Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
01	Draft	[redacted]	[redacted]	04/02/2020
02	Draft	[redacted]	[redacted]	05/02/2020
03	Draft	[redacted]	[redacted]	11/02/2020
04	Draft	[redacted]	[redacted]	21/02/2020
05	FINAL	[redacted]	[redacted]	31/03/2020

Project Details

Project Name	Lara Flood Study
Client	City of Greater Geelong
Client Project Manager	[redacted]
Water Technology Project Manager	[redacted]
Water Technology Project Director	[redacted]
Authors	[redacted]
Document Number	R06_V05_Project_Summary_Report.docx

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1 INTRODUCTION

This report is one of a series documenting the outcomes of the Lara Flood Study. The Study provides a detailed analysis of the catchments surrounding the township of Lara and the broader Hovells Creek/ Lara catchment and part of the Avalon catchment management units[1]. The reporting was broken up into a series of deliverables which are summarised in this report and includes a brief overview of each of the previous reports submitted and the recommendations developed throughout the study.

- R01 - Preliminary Report (Water Technology 2018)
- R02 – Hydrology/Hydraulic Calibration Report (Water Technology 2019)
- R03 – Design Hydrology and Detailed Hydraulic Modelling Report (2020a)
- R04 – Assess and Treat Risk Report (Water Technology 2020b)
- R05 – Flood Warning and Intelligence Report (2020c)
- **R06 - Summary Report (Water Technology 2020d)** ***This Report***

1.1 Overview

1.1.1 Project Objectives

The study brief prepared by City of Greater Geelong (the City) demonstrated a strong understanding of the area and its floodplain and drainage infrastructure. The objectives of this study are described below.

1 - To produce detailed flood mapping for a range of flood modelling scenarios within the study area.

2 - To undertake definitive flood investigations for the floodplain reaches within the study area; to pool all the available data and, through rigorous analysis determine robust flood levels, velocities, depths and extents.

3 - To build on the previous flood studies undertaken in 2001/02 by the partnership of Corangamite CMA, City of Greater Geelong and a consultant (Floodplain Management Strategy, April 2002) using baseline data and current technology to update flood data, value add for extra flood events, update of land use changes, update flood intelligence for the City of Greater Geelong Flood Emergency Plan, update flood data in the City of Greater Geelong Planning Scheme with a focus on the technical flood information to inform planning and building controls.

1.2 Study Area

The study area consists of two major drainage catchments, Hovells Ck / Lara and part of the Avalon catchment management unit[1], as shown in Figure 1-1. The township of Lara was also a key focus area of the study as it is impacted from riverine flooding from Hovells Creek and stormwater flooding from within the urban area. The Hovells Creek / Lara catchment begins near Mount Anakie and flows in a south easterly direction through farmland and into the urban area of Lara before flowing into Limeburners Bay, an inlet to Corio Bay. There are several large storages including farm dams located throughout the catchment. The Avalon catchment begins just to the south of the Little River township and flows south. There are no named waterways within the catchment, however, is often referred to as Austins Swamp catchment. Farm drains have been constructed to drain wetlands and local storage depressions throughout the catchment. Flow behaviour in the lower end of the catchment is impacted by a former saltworks located between the Princes Freeway and the Avalon Coastal Reserve (Corio Bay).

[1] Stormwater Services Strategy 2020-30, Draft Report. City of Greater Geelong, 2019

The Melbourne-Geelong Railway and Princes Freeway intersect both catchments, crossing Hovells Creek at the lower end of the catchment. The Avalon Road catchment is crossed by the railway line in the mid-upper catchment and the Princes Freeway in the middle of the catchment.

Lara is a residential and commercial town located at the lower end of the Hovells Ck catchment and has a population of just over 16,000[2]. The town has been identified as a growth area for residential, commercial and industrial development. Lara has been subject to flooding from Hovells Creek and stormwater catchments in the past with significant flood events in 1933, 1973, 1983, 1988, 1995, 2005 and 2010. Several flood investigations have been carried out of this area in the past, and flood mitigation work proposed along the Elcho Drain. Further work into the Northern Growth area to the west of the main township has been undertaken recently.

Drainage assets in the town range from roadside open swale drains within wide road reserves, to pit and pipe networks within the urban areas. Hovells Creek and the Elcho Drain make their way through the town. Elcho Drain runs through several man-made lake/retarding basin systems and in parts is channelised and has underground low-flow pipes before outfalling to Hovells Creek.

[2] Australian Bureau of Statistics, 2016 Census – Lara Population data

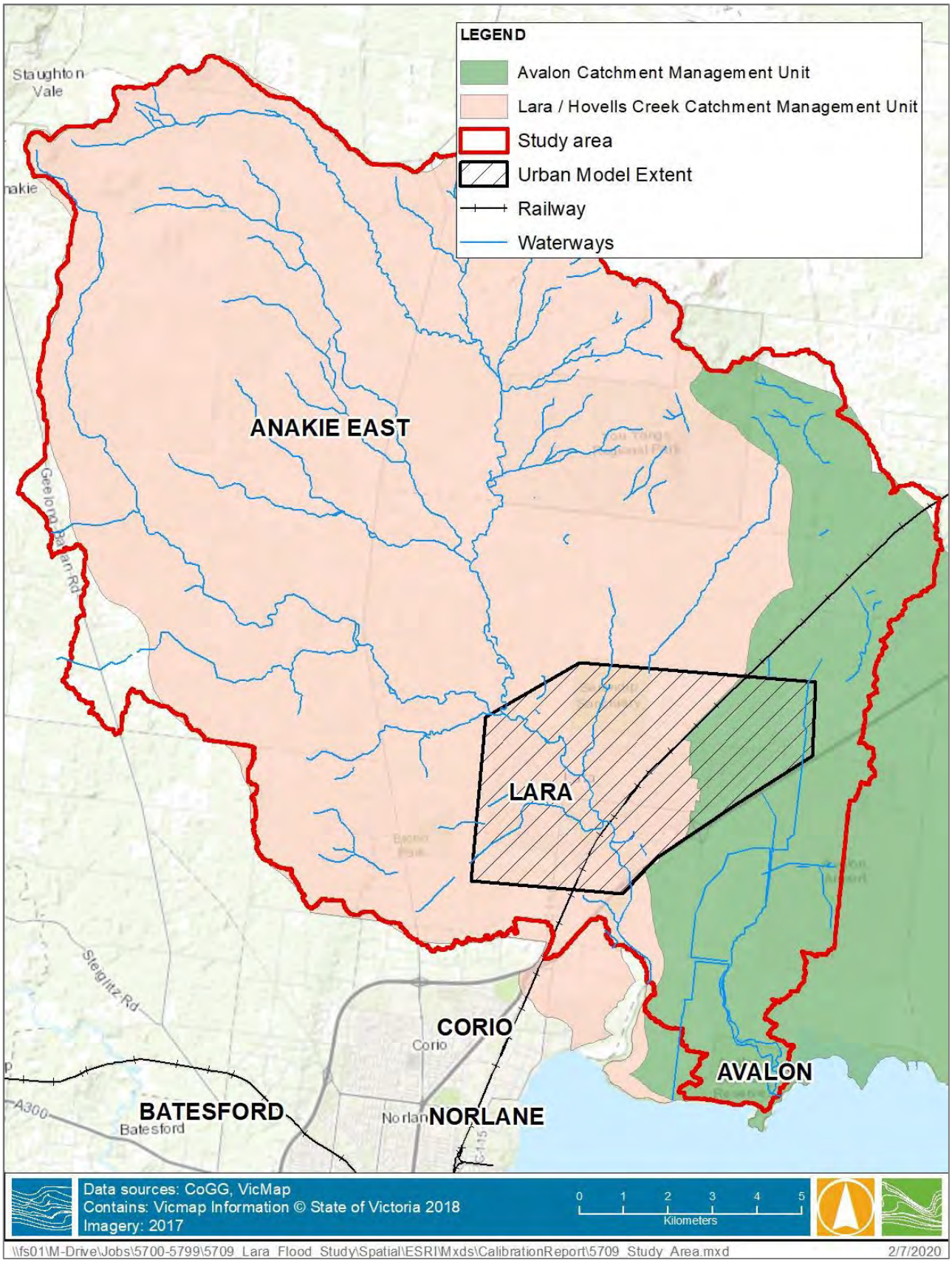

FIGURE 1-1 LARA CATCHMENT AND STUDY AREA

2 PRELIMINARY/ DATA REVIEW REPORT

The Preliminary/Data Review Report *(R01 - Preliminary Report (Water Technology 2018))* was completed in August 2018 and provides an overview of the available existing data and methodology which was used to complete the study. The data review detailed previous studies and identified historically inundated areas based on requests for service and with historical flood information. Rainfall and streamflow data were collected and evaluated. A review of the available drainage infrastructure and topography was completed. As a result of the review of available data, floor level survey and trunk drainage CCTV inspections were undertaken.

2.1 Methodology

The study methodology was considered and separated into several separate stages these were as follows:

- Model development - hydrologic and hydraulic models.
- Calibration.
- Design modelling.
- Stormwater Assessment.
- Stakeholder Engagement.
- Online Mapping.

2.2 Summary

The report detailed the thorough data review process undertaken and identified several gaps in the available data with appropriate methods to overcome these issues. The major data gaps included the main stormwater pipe network inverts and major rail and road structure details.

Feature survey was collected across the study area to fill some of these data gaps, as well as to validate the LiDAR used in the study. The existing LiDAR dataset was combined with recently captured photogrammetry of the township.

Cross section survey of Hovells Creek between Station Lake Road and Flinders Avenue was used to provide a suitable cross-sectional representation in the model terrain. It also highlighted erosion and scouring of the channel bed at Station Lake Road.

3 CALIBRATION

The Calibration Report *(R02 – Hydrology/Hydraulic Calibration Report)* discussed the method used to calibrate both the hydrological and hydraulic models.

3.1 Methodology

A joint hydrology/hydraulic calibration approach was adopted for the following reasons:

- There is little available streamflow information for the Hovells Creek catchment, with only a short-term record at Flinders Avenue and Rennie Street streamflow gauges located on Hovells Creek.
- Previous flow estimates of historical flood events were found to have little justification or detail regarding how the estimates were determined.
- The joint calibration approach allowed for the uncertainties in both flow estimation and hydraulic model behaviour to be combined, with both models evaluated against the known flood observations (i.e. flood heights, extents, photos, etc).

Through the calibration phase, storages in the upper catchment and drainage infrastructure throughout the township was incorporated into the model to better estimate runoff (hydrology modelling) and flood behaviour (hydraulic modelling) for the range of modelled flood events. The extensive calibration provided confidence that the models were producing realistic results and ensured the design modelling results were fit for purpose.

The calibration process was able to replicate the recorded streamflow levels for the April 2017 event at Flinders Avenue and Rennie Street, providing limited validation to the appropriateness of the calibration. Despite being a relatively minor event, this is the highest recorded streamflow within the Hovells Creek catchment, with there being no gauged flows available for the older events. The 1988, 1973 and 2005 flood events were also calibrated against the available flood observations and anecdotal evidence.

3.2 Summary

The joint calibration process showed the combination of hydraulic and hydrologic modelling was suitable to replicate a range of flow events from relatively minor in-channel events (April 2017) through to larger, rarer floods such as the December 1988 event. The extensive calibration provides confidence that the models are producing realistic results and ensures that the design modelling results will be fit for purpose.

The calibration and validation process has relied heavily on aerial photography and anecdotal evidence with limited recorded flood information available. The use of aerial imagery, recorded flood marks and previous reporting was used to build a database of flood marks that are recommended to be adopted in the Victorian Flood Data (VFD) Mapping Guidelines. The limited streamflow gauge information was used to ensure the model results for in-channel events and flood behaviour matching with recorded data. The hydrology model parameters adopted (initial loss, continuing loss and kc) are within reasonable ranges based on the regional parameters documented in Australian Rainfall and Runoff (ARR2019) and the RORB regional approximation equations. The results of the joint calibration validate the parameters adopted in both the RORB and TUFLOW models.

An additional rain-on-grid hydraulic model was developed for the design modelling of urban areas. This ensured that small overland flow paths and local depressions within urban areas are represented. This was not specifically used in the calibration process, however was used to identify inflow locations for the hydraulic model.

4 CONSULTATION

A key element in the Lara Flood Study was the active engagement of community members. Formal and informal engagement was undertaken at the following stages of the study:

- Data Collation Phase – To collect information, photos and anecdotal evidence from previous flood events.
- Calibration Phase – To seek feedback from the community on the modelling of the calibration events.
- Draft Design Modelling – To provide the community an opportunity to view draft study result

Community consultation sessions were held at the Lara RSL with an open drop-in format where hard copy maps and an online mapping portal were on display. A range of flooding and drainage issues were identified during the consultation sessions, with Council staff from planning and engineering, the CCMA, VicSES and the Water Technology project team in attendance. Community attendance was consistent throughout each of the sessions and was supplemented with public notices in the Geelong Independent, Geelong Advertiser and information available on the City's 'Have Your Say' webpage. The web content also hosted a link to the online mapping portal where the community could view the calibration and draft 1% AEP modelling results. A summary of the key issues identified at each stage of the community consultation are shown in Table 4-1.

TABLE 4-1 SUMMARY OF COMMUNITY CONSULTATION AND KEY ISSUES

Engagement	Purpose	Outcome and key issues identified
Data collection phase	To collect information, photos and anecdotal evidence from previous flood events.	Regular Nuisance Flooding occurs in several locations in Lara. Kyema Drive is flooding hot-spot, McClelland Av service Roads Bike path access is cut along Hovells Creek Trail Drainage asset maintenance was highlighted as a key concern form the community
Calibration phase	To seek feedback from the community on the modelling of the calibration events.	Information and photos of the 1988 and 2005 flood events were collected and used in the calibration/ validation. Localised issues were noted, additional site visit was organised to identify culverts not in council database Concerns around the impact of 'farm dams' on Creek flows and flood events
Draft design modelling	To provide the community an opportunity to view draft study result	Calibration modelling generally confirmed community anecdotes and recollections Community members concerned with future development

5 DESIGN MODELLING

The Design Modelling Report *(R03 - Design Hydrology and Detailed Hydraulic)* detailed the model build for both RORB and TUFLOW, the design parameters selected, the scenarios modelled, and sensitivity assessments undertaken.

5.1 Methodology

The parameters used in the hydrology model (RORB) and hydraulic model (TUFLOW) for the calibration were used to inform the final parameters adopted in the design modelling. The Lara township and broader urban area is impacted by both stormwater flooding caused by shorter intense storm events within the urban area as well as widespread riverine flooding from the Hovells Creek catchment.

The design mapping produced demonstrates flood behaviour from the two inundation types to inform flood intelligence documentation and planning overlays. The following sections provide an overview of how the modelling outputs were combined to produce final mapping and intelligence outputs.

5.1.1 Riverine Flooding

Riverine flooding across the study area is a result of longer duration storms (6+ hours), with the critical duration being a 12-hour or 18-hour storm event. A hydrology (RORB) model was developed to obtain excess runoff hydrographs that were placed in the hydraulic (TUFLOW) model. This allowed for an assessment of a range of variables within the catchment including antecedent conditions (storage levels within major dams, initial and continuing losses) and the selection of appropriate design storm events (duration and temporal pattern selection).

The hydraulic model (TUFLOW) was built at a 4m grid resolution and utilised the latest available LiDAR and photogrammetry. Over 160 inflow locations were placed across the model to allow the rainfall excess hydrographs developed in RORB to be represented in the model. Available culvert, bridge, pit and pipe information was incorporated into the model and gaps in the drainage network were filled using engineering judgement (ensuring similar cover to nearby pipes and maintaining a consistent downstream gradient etc.).

5.1.2 Urban Stormwater Flooding

Using the calibrated model parameters from the riverine modelling, an urban stormwater model was developed to provide detailed mapping of the township area. While the township area is prone to flooding from short intense storms, both short intense storm events and longer duration events also create inundation issues in the broader urban area due to relatively flat terrain resulting in shallow widespread ponding.

Significant areas of flooding around north east and west Lara were shown to be a result of overland flow from semi-urban areas. A TUFLOW rain-on-grid model at 3 metre grid resolution was used to represent these areas. Available pit and pipe information was incorporated into the model and data gaps in the underground drainage network were filled using engineering judgement (ensuring similar cover to other pipes/downstream gradient etc.).

5.2 Design Parameters Adopted

The recommended design hydrology parameters were highlighted, along with justification for their adoption. A summary of the adopted design parameters for the riverine model are outlined below:

- Significant storages within the model were set at 50% full as initial conditions at the start of the modelling.
- Initial and continuing loss values for rural areas were 15 mm and 1.5 mm/hour respectively.

- The riverine model was simulated for 2-hour, 6-hour, 9-hour, 18-hour and 48-hour event durations to capture the range of critical durations across the study area.
- Temporal Patterns were selected for each event duration based on median peak flow for Hovells Creek at Lara.
- Static tailwater boundaries based on the Highest Astronomical Tide (HAT) were used as the downstream tailwater level. Hydraulic model sensitivity testing demonstrated tailwater levels (from Limeburners Bay) do not extend upstream further than Rennie Street.

Model parameters for the urban modelling included:

- The rain on grid model was simulated for 15-minute, 30-minute, 1-hour, 2-hour, 3-hour and 6-hour duration events to provide a range of critical durations across the study area.
- Initial and continuing losses were applied via the material (land-use) layer of the hydraulic model. Values varied based on the current land use.
- Temporal pattern selection was based on the temporal pattern which gave the 'median' water level the greatest number of times across the urban model area for each 1% AEP duration event.
- Temporal patterns were selected for the remaining AEPs based on the 1% AEP methodology listed above.

5.3 Results

Hydraulic model results were processed to produce a set of GIS layers for the riverine and urban modelling individually as well as a combined set. An example of flood extents for each AEP from the combined results are shown in Figure 5-3. These are examples of different areas within the study area, results of the full study are available and are easily viewed in GIS software. Figure 5-1 and Figure 5-2 show the above floor levels for the urban flood model results and the riverine above floor results. The high-risk areas with above floor flooding are shown by the red dots.

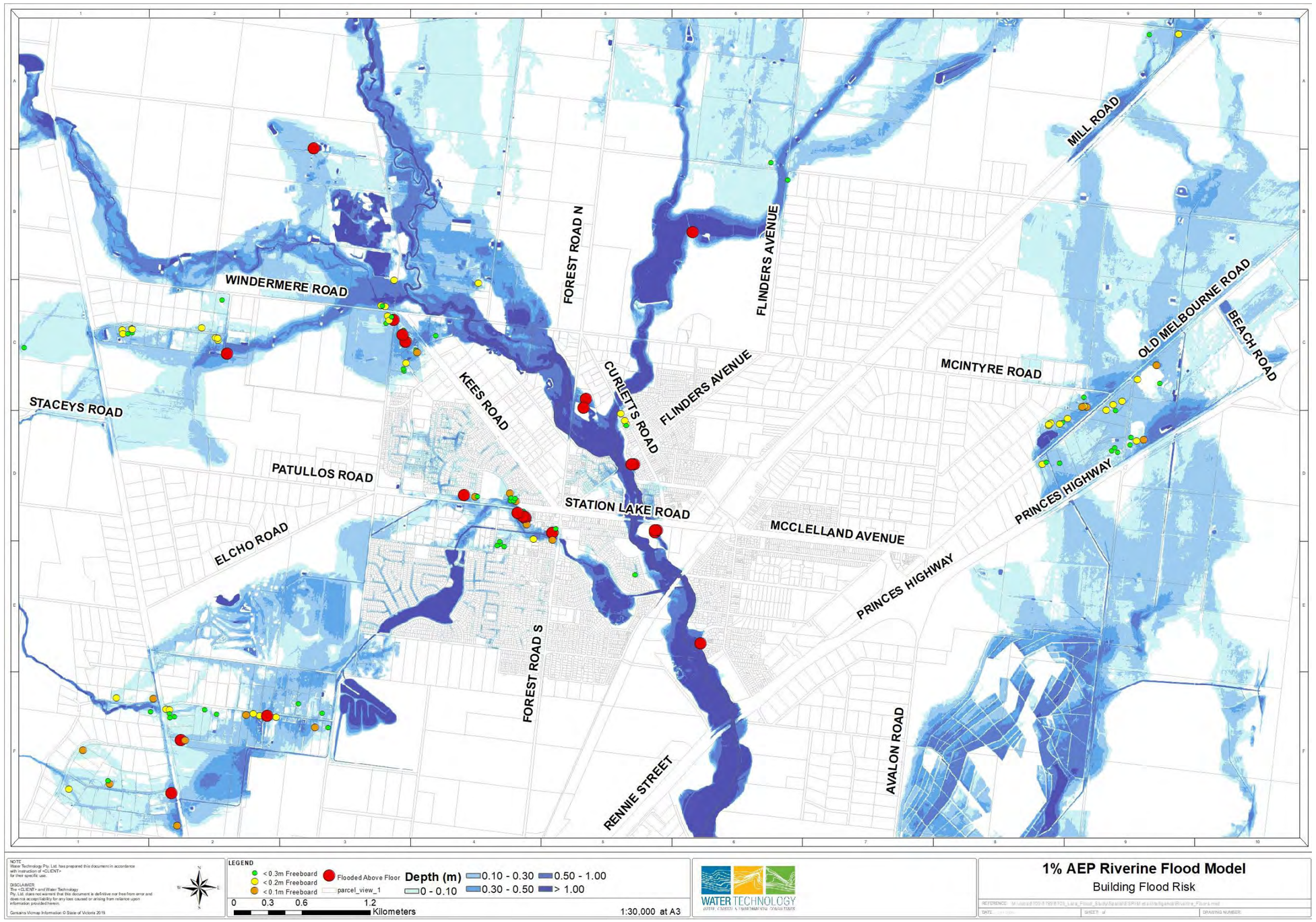

FIGURE 5-1 PROPERTIES WITH ABOVE FLOOR FLOODING – 1% AEP RIVERINE FLOODING

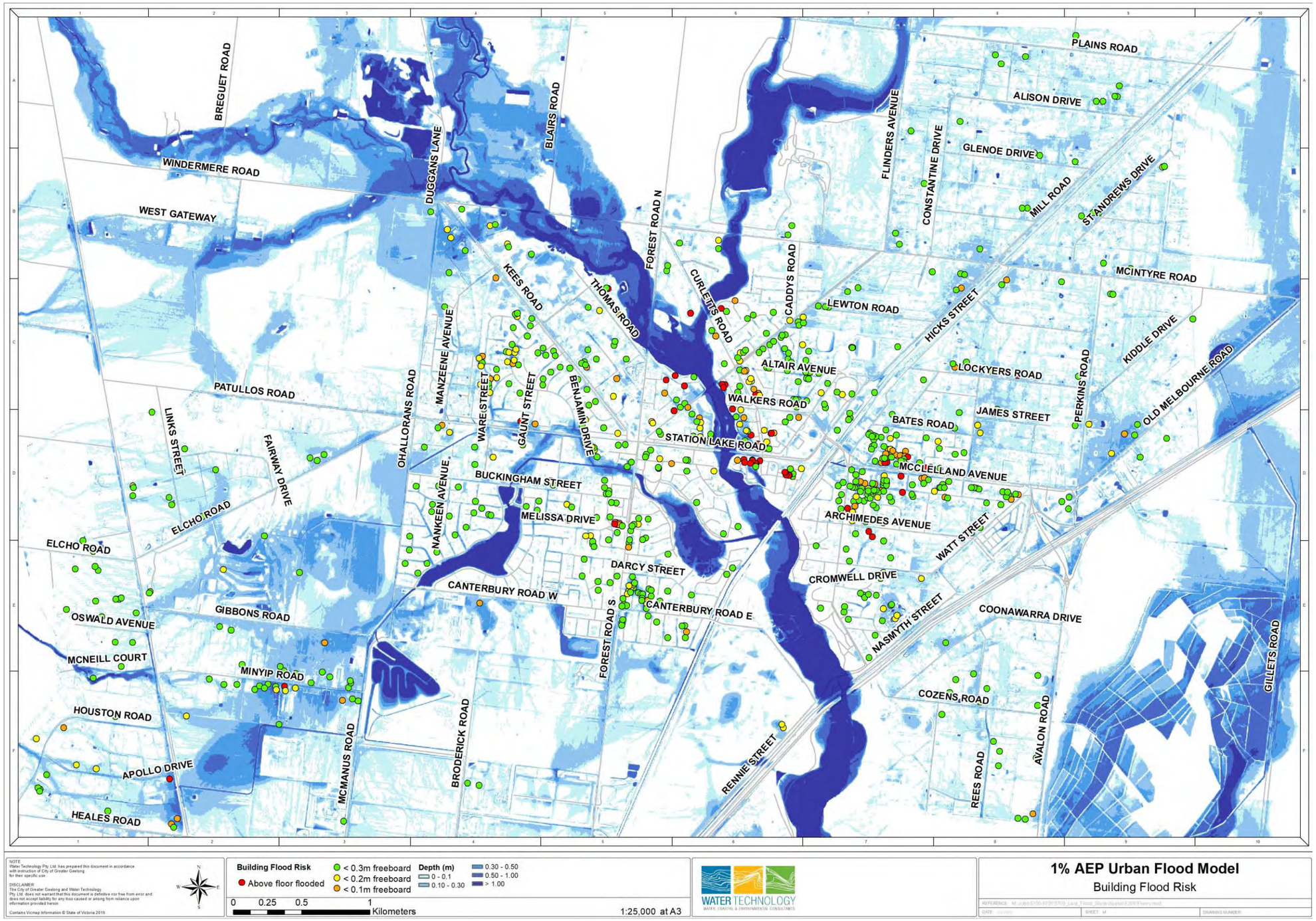

FIGURE 5-2 PROPERTIES WITH ABOVE FLOOR FLOODING – 1% AEP STORMWATER FLOODING

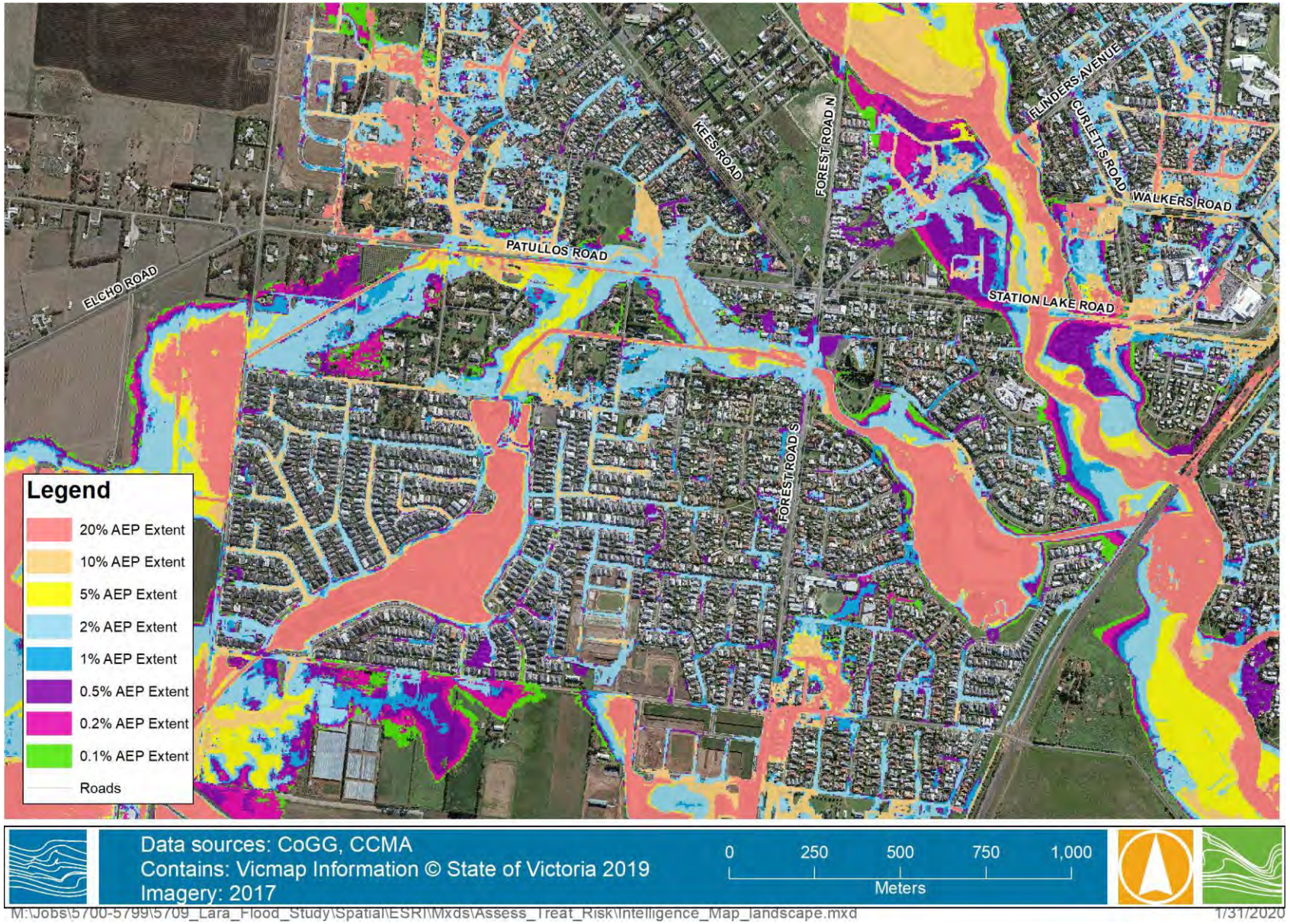

FIGURE 5-3 DESIGN FLOOD EXTENTS FOR LARA (COMBINED RIVERINE AND URBAN MODELLING)

Maps of each design event was produced mapping depth, water surface elevation, velocity and flood hazard. These were produced at a catchment wide scale as well as zoomed in to Lara for easier viewing. Given the size of the study area, the results are more easily viewed using GIS software or via a flood portal. An example of the depth output map (1% AEP) is shown below Figure 5-4.

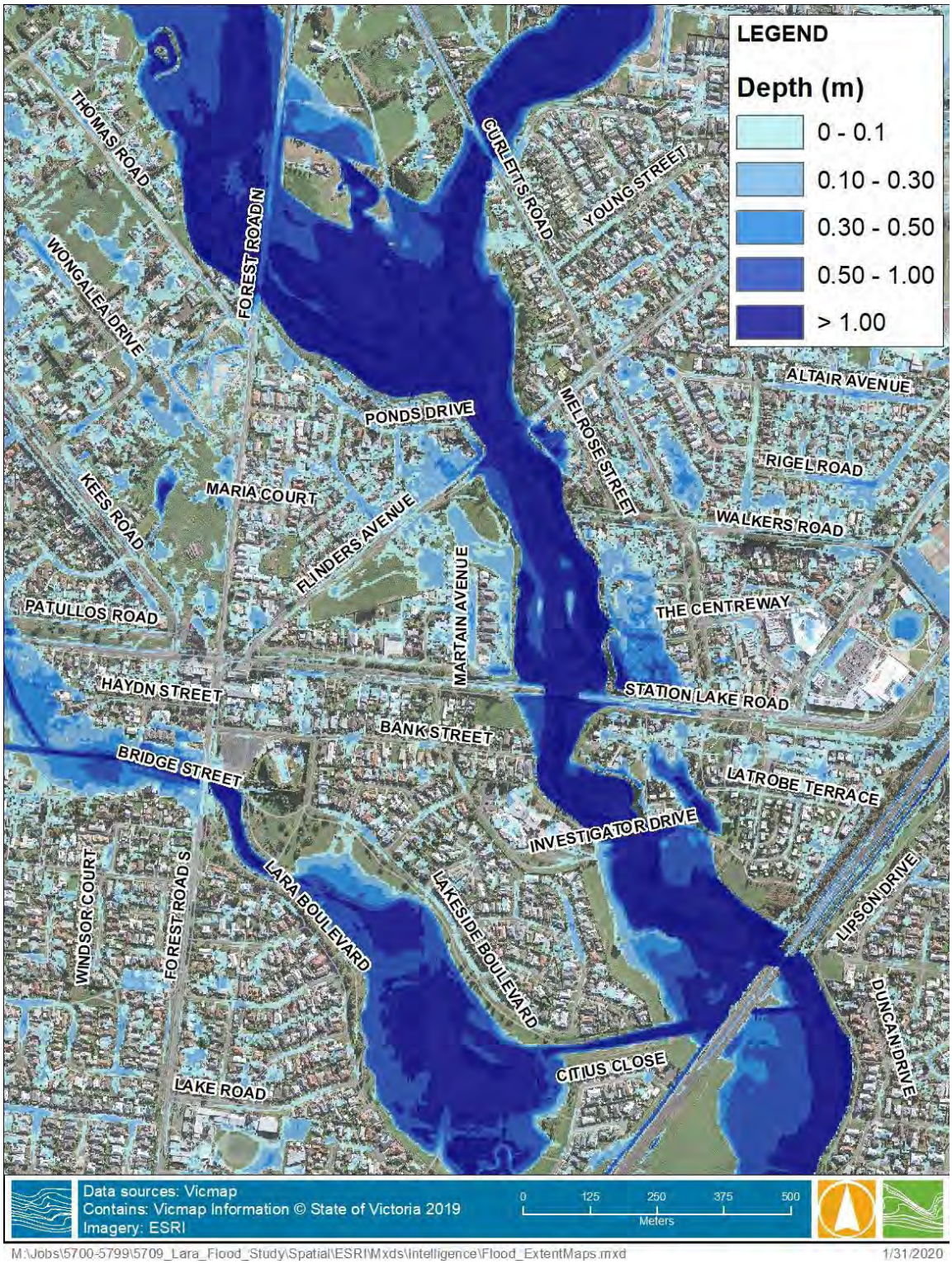

FIGURE 5-4 1% AEP DEPTH PLOT (COMBINED RESULTS)

5.4 Climate Change

At the time of the scope of the project was defined, climate change was incorporated into the project brief as a sensitivity analysis to understand how sensitive the study area is to proposed changes in climatic conditions. By gaining an understanding of the sensitivity of the catchment to these changes provides an information gathering exercise for decisions and policy regarding future impacts to be considered. Since project inception, more information and guidance on managing climate change risk has been developed by DELWP[3]. The City currently have a Climate Change Adaption Strategy[4] which aims to prepare the City and the broader Greater Geelong community for climate change impacts by integrating climate change adaption through its decision-making process.

The climate change sensitivity analysis relating to climate change are summarised in Section 5.5

5.5 Sensitivity Analysis

A range of parameters were selected for sensitivity analysis within the hydraulic model. These are listed below along with a brief summary of the sensitivity analysis undertaken:

- Climate Change
  - **Increased rainfall intensity based on Representative Concentration Pathways (RCP) 4.5 & 8.5 for years 2050 and 2090, undertaken for the 1% AEP 12-hour duration**. The increased rainfall intensity as a result of climate change for the four scenarios modelled was using the IFD data downloaded from Bureau of Meteorology (BoM). The results showed maximum increases in flood levels along Hovells Creek through Lara ranging from 150 mm (RCP 4.5 for year 2050) through to an increase of 500 mm for RCP 8.5 for the year 2090. It should be noted that although the increase in rainfall intensity was modelled, the initial and continuing loss values were maintained as is. While predictions suggest rainfall intensity is likely to increase as a result of climate change, it is also expected that average annual rainfall will decrease[5] (CSIRO, 2015). Based on this prediction, it is likely that the on average, the broader catchment conditions will be drier and an increase in initial loss and potentially continuing loss would be likely. This would reduce the increase in flood levels in a riverine flooding context, however new major infrastructure along the waterway and within the floodplain should assess the impact of climate change predictions during design. Stormwater flooding in urban areas are more likely to be impacted from predicted increase in extreme events, specifically increased rainfall intensity. Given the antecedent conditions of the impervious areas in Lara are relatively static, increased rainfall intensity is likely to result in an increase in design levels throughout the town.
  - **10% and 1% AEP 12-hour duration with sea level rise for year 2090 (+0.80m tailwater level).** Flood modelling results showed the increases in flood levels were significant within the lower end of the Avalon Road catchment (and likely to cause significant flooding along the Avalon Foreshore Road). It is likely that minimal sea level rise will result in increased frequency and severity of flooding along the foreshore. An increase of 0.80 m along the lower end of Hovells Creek is likely to result in the capacity of the Rennie Street Ford crossing being reduced due to the higher tailwater level. This may reduce the flow rate at which the road is overtopped, increasing the frequency at which the road is closed causing implications on access and egress to the broader road network. Planning to mitigate the implications on access throughout the transport network and its impact is an important consideration and may need to be assessed as part of a broader transport project.

[3] DELWP – Managing Climate Change Risk – Guidance for Board Members and Executives of Water Corporations and Catchment Management Authorities
[4] City of Greater Geelong – Climate Change Adaptation Strategy
[5] CSIRO – Climate Change in Australia.

- No significant increase in design flood levels is expected upstream of Rennie Street. The Princes Freeway bridge may experience a higher frequency at which the underside of the bridge is inundated, however it is not likely that the frequency of overtopping would increase as a result of the modelled sea level rise.

- **The temporal pattern (9) which produces the highest peak flow (18-hour in the riverine model).** This resulted in a higher flow along Hovells Creek at Lara of around 40 m^3/s and increased flood levels through Lara of between 200-300 mm. Temporal patterns are based on the Average Variability Method for estimating the temporal pattern of rainfall in the most intense burst of rainfall within a storm event. This approach is known to result in storm bursts that have higher temporal correlations than exist in real storm events. By selecting the temporal pattern producing the highest peak flow, allows for the most conservative approach to be taken towards producing flood modelling results.
- **Major Storages within the Catchment filled to provide no available storage at the start of the storm event (1% AEP – 6- & 48-Hour Event).** This does not result in an increase in peak flood level (or flow) through Lara in the 48-Hour event, but a faster rise in the rising limb. The 6-Hour event showed with the storage removed, the peak flow increased by 25 m^3/s resulting in an increase in flood levels of around 200 mm along Hovells Creek through Lara.
- **Removal of dense vegetation from within the waterway.** To assess the impact of the vegetation within the waterway, the channel roughness (Mannings n value) along Hovells Creek was increased and reduced by 20%. This was found to increase levels varied between 20-50mm (increased for coarser roughness and lowered for smoother roughness). Given there is minimal reduction of flood levels within the waterway and the vegetation plays a significant role in ecology, erosion control and aesthetic value, it is unlikely the removal of vegetation would be viable.
- **100% blockage of key structures along major waterways (1% & 10% AEP 18-hour event)** This showed a significant increase in flood levels along Hovells Creek with isolated increases upto 300 mm. These increases were predominately confined to the floodplain, however and a complete blockage of a major structure is unlikely due to the number of structures and the availability of large debris within the catchment to cause a major blockage.
- **50% blockage of all pit inlets in the urban area (1% & 10% AEP 2-hour event).** Increased flood levels were generally isolated, cul-de-sacs where water ponded up were areas that showed increases.
- '**Ultimate development' scenario assuming no retention of flows to pre-developed conditions (1% & 10% AEP 2-Hour event).** The proposed Elcho Drain upgrade was incorporated into the model and showed a widespread decrease in flood levels downstream of Bacchus Marsh Road (150-300mm) and extended further downstream to the Grand Lakes estate where a decrease of 10-20 mm was observed. Increases appeared in the Elcho Road and Patullos Road area, as expected due to increased run-off from development and no inclusion of flow retardation incorporated. Elsewhere, increases were generally less than 20mm. This suggests that even with higher flow rates (as a result of future development), the Elcho Drain widening provides a positive impact on flood risk.

6 FLOOD MITIGATION

6.1 Overview

The Flood Mitigation Report (*R04 – Assess and Treat Risk)* documented options for treating identified flood risks from coastal, riverine and stormwater flooding. The flood results show that in a 1% AEP event, there are 23 buildings identified to have above floor flooding from the riverine flooding, and 48 buildings identified to have above floor flooding from stormwater flooding. Four of these buildings are at risk of being flooded above floor from both stormwater and riverine flooding. There is also an isolated area of buildings on the Avalon Foreshore Road which have been identified at risk from coastal inundation.

Properties impacted by riverine flooding were generally located either north of Lara or along the Elcho Drain flood extent. The levees provide protection for nearly all properties upto a 1% AEP event, however these properties rely on pumps and flood gates/valves on the stormwater pipes to stop inundation from water backing up into the pipe network.

Properties with above floor flooding from stormwater are scattered across the township with no major clusters of properties flooded above floor identified for the 1% AEP event. There is a significant number of properties throughout the study area which do not have a reasonable level of protection from stormwater flooding (with floor levels less than 300mm above the 1% AEP flood level). These properties are at risk of frequent and nuisance flooding which can result in external property damage. A large portion of these properties are in the eastern side of Lara spreading from Kyema Drive south across McClelland Avenue, to Brunel Close and through to Archimedes Avenue. Flood hazard through these areas is typically low, with slow moving water due to the relatively flat terrain.

A range of mitigation options were identified during the study, with ten options considered at the prefeasibility assessment stage. Each of these options was considered for their benefits and drawbacks at a conceptual level and a decision was made as to whether to take them forward to the detailed modelling stage of the flood study. The initial suggestions were developed from a range of sources, these included Council staff, residents who attended community consultation sessions and Water Technology. Three mitigation options were selected based on the results from the prefeasibility assessment for a detailed assessment which included flood modelling for all AEP's, a flood damages assessment and high-level costing of the mitigation option. The flood modelling results for the three mitigation options selected as part of the detailed assessment do not show a significant reduction in the number of properties flooded above floor.

There are limitations and constraints within the catchment which impact on the current level of protection at a significant number of properties. Both the buildings identified as flooding above floor and those with a low level of protection, that are close to being flooded above floor, have minimal clearance above the surrounding natural surface which increases their sensitivity to localised flood impacts. This reduces the effectiveness of flood level reductions in significant flood events. However, there may be viable mitigation options including improvements to the local drainage network that address nuisance flooding and improves protection during more frequent storm events.

6.2 Existing areas of high flood risk

6.2.1 Riverine Risk

Property damage resulting from riverine flooding within the Hovells Creek catchment is generally confined to the external of buildings for flood events upto a 2% AEP. There are isolated pockets of flooding along Hovells Creek (north of the township), Windemere Road and the Elcho Drain where more significant damage is shown in events larger than a 20% AEP event. Riverine flooding via backwater into local stormwater drains also occurs in events less than a 1% AEP at Melrose Street, Wingara Drive and Walkers Road when flood valves and pumps are not activated behind the levee. However, this is less likely to occur if valves are shut off and

pumps operated. As a result, properties in this area are also at risk of local catchment flooding (stormwater flooding).

In a 1% AEP flood event, there are 27 buildings flooded above floor, including two buildings behind the levee downstream of Flinders Avenue. Eight buildings along the fringe of the floodplain north of Lara are flooded above floor, while eight buildings along the Elcho Drain are also flooded above floor.

6.2.2 Stormwater Risk

The locations of the 44 buildings impacted by above floor flooding from stormwater flooding during a 1% AEP event, are relatively spread out, with the majority of these impacted properties and buildings located behind the Hovells Creek levee and reliant upon the water level in Hovells Creek being low and or the pumps being operational. Other areas impacted by above floor flooding include Kyema Drive, Brunel Close and Archimedes Avenue.

A number of properties have been identified as having frequent and or nuisance flooding and do not have the expected level of protection for buildings located on land subject to flooding (300 mm freeboard above 1% AEP level). These are more easily grouped when compared with the identified building at risk from above floor flooding. A large portion of these buildings in the Hovells Creek floodplain are located behind the existing levees, within Lara East and along Elcho Drain. Figure 6-2 highlights properties that are flooded above floor or close to being flooded above floor in a 1% AEP flood event in the Lara East area.

Model results for the 1% AEP flood event in this area (Figure 6-1) show McClelland Avenue acting as a hydraulic control, resulting in a 200 mm water level drop across the road. This combined with the flat terrain of the area and limited drainage network causes flood water to extend back up from McClelland Avenue into Brownlow Court. The depth of flooding within Kyema Drive is generally less than 300 mm in a 1% AEP flood event, as event magnitude increases, the depth of flooding in Kyema Drive is not likely to get significantly higher due to the weiring of floodwaters over McClelland Avenue. As a result of the flat terrain and relatively low depth of flooding, the mitigation options were unable to yield significant reductions.

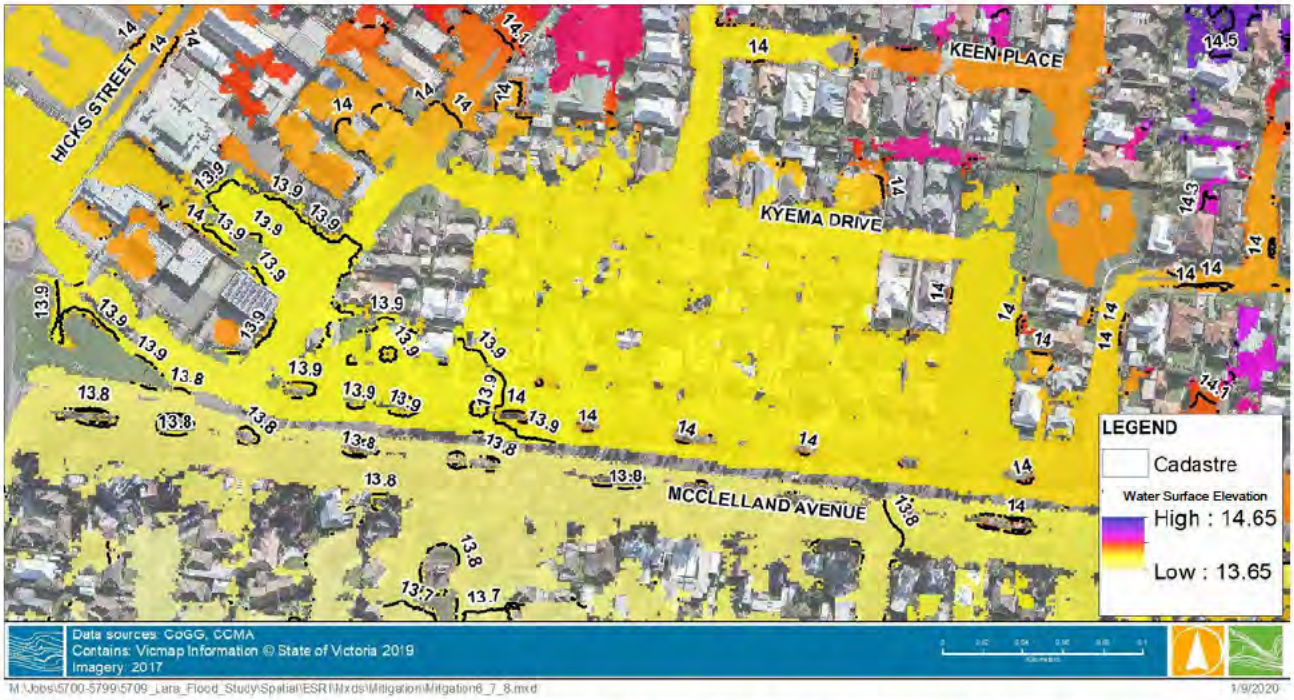

FIGURE 6-1 1% AEP WATER SURFACE LEVELS AT MCCLELLAND AVENUE

6.2.3 Coastal Inundation Risk

Approximately 30 dwellings located on the Avalon Foreshore Road have been identified to be at risk of becoming isolated during minor storm tide events. The highest astronomical tide level of 1.13 m AHD for Corio Bay indicates a potential flooding risk to these properties. The impact of coastal storm surge combined with a relatively minor catchment storm event is likely to result in a more significant flood impact to these properties. No detailed survey of these building structures was undertaken as part of this assessment. The impact of predicted sea level rise is likely to have a significant impact on these properties. The status of these properties is unknown and were not included in the calculation of flood damages or properties flooded above floor from riverine flooding.

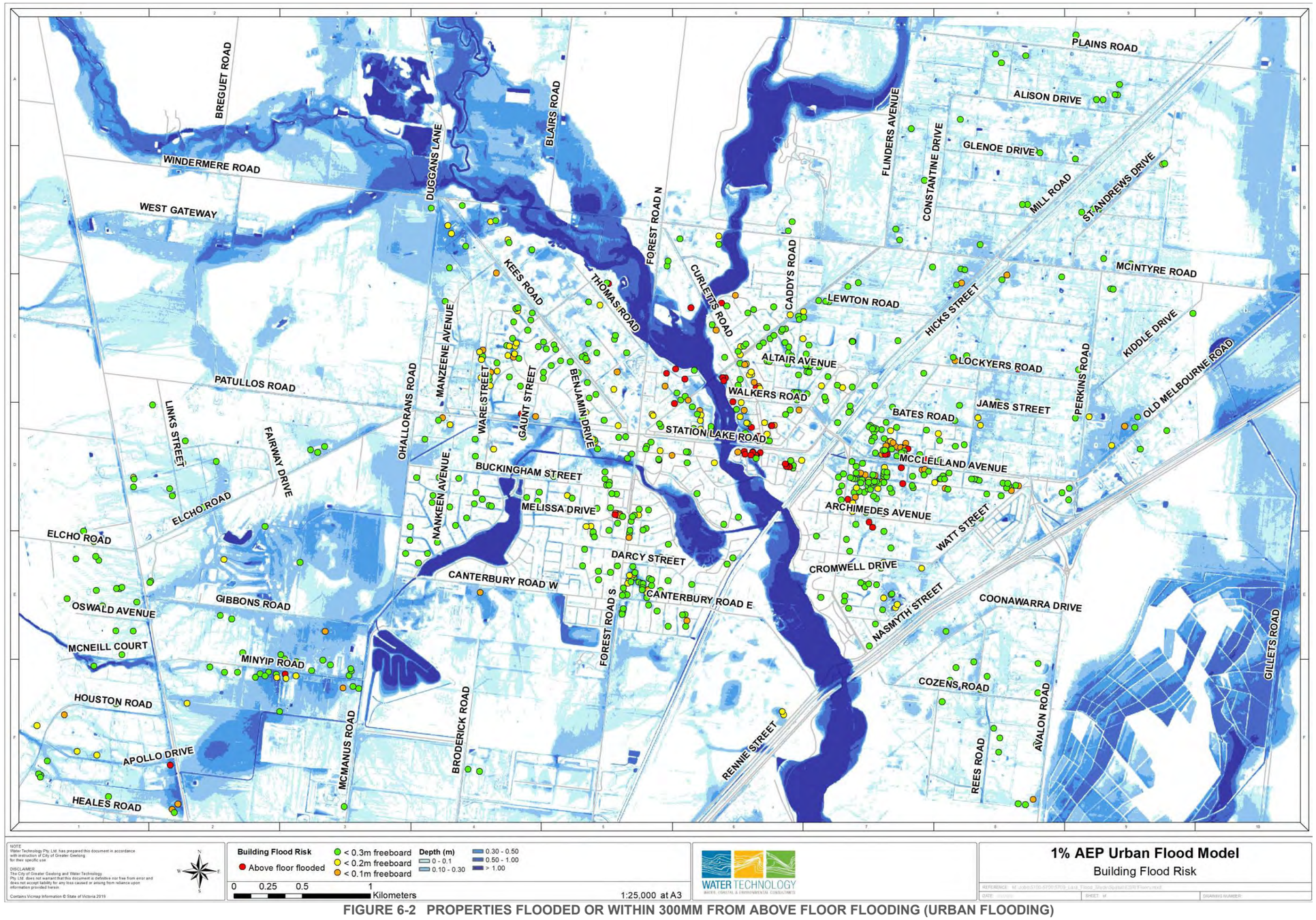

FIGURE 6-2 PROPERTIES FLOODED OR WITHIN 300MM FROM ABOVE FLOOR FLOODING (URBAN FLOODING)

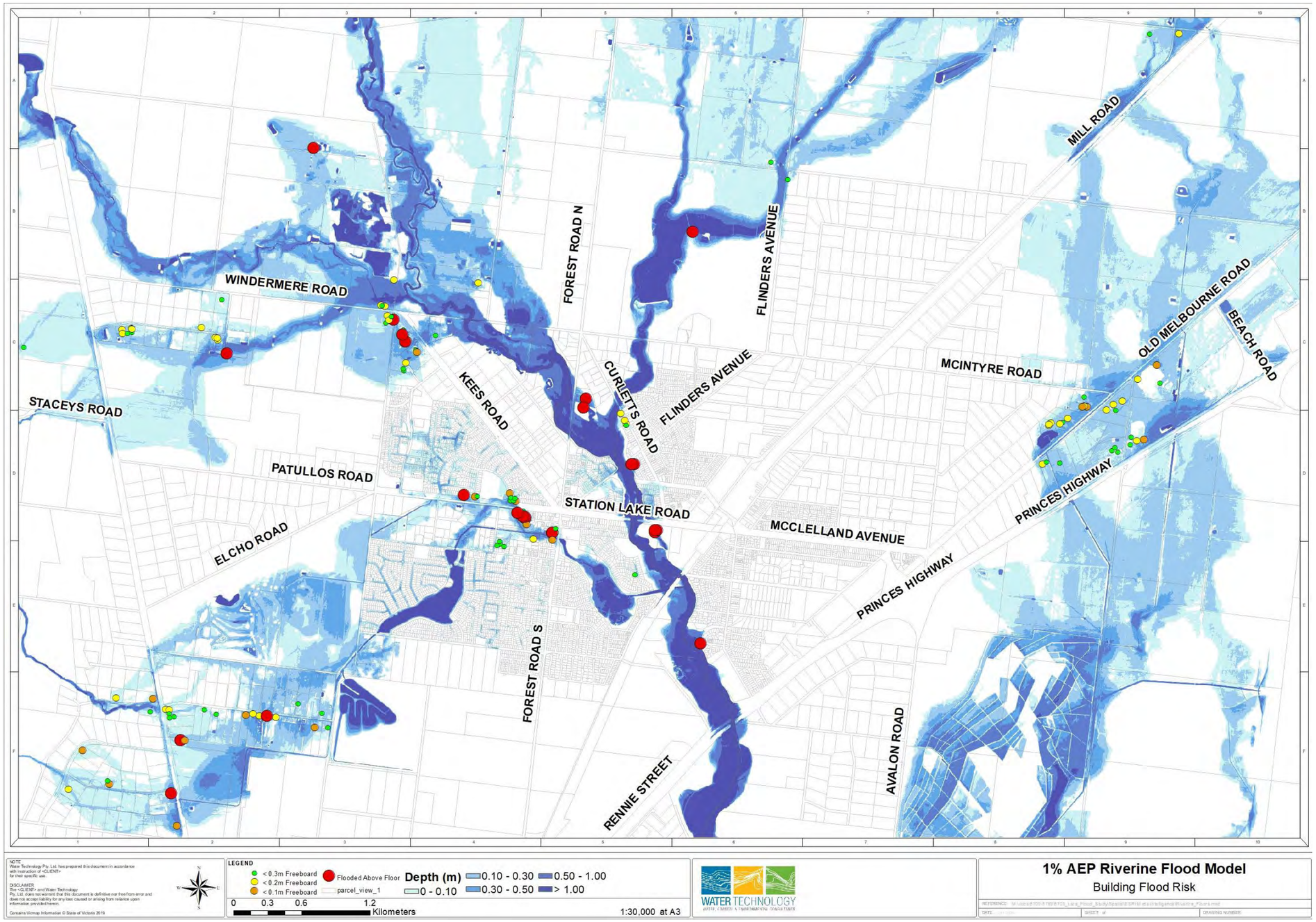

FIGURE 6-3 PROPERTIES FLOODED OR WITHIN 300MM FROM ABOVE FLOOR FLOODING (RIVERINE FLOODING)

6.3 Prefeasibility Assessment

Prefeasibility mitigation assessment and preliminary testing identified 10 potential mitigation options across the study area. Each of the 10 options were assessed against a range of criteria, including their potential to reduce flood damage, cost and feasibility of construction and potential environmental impact. This weighted assessment is an approach developed by Water Technology and has been used across numerous flood studies to compare mitigation options prior to detailed modelling in order to determine which options may be most suitable.

Table 6-1 detailed the results of the prefeasibility assessment, reviews and the scores of each mitigation option against the four criteria. The table also presents the calculated total score for each option by summing the weighted criterion. Reduction in flood damage is the most heavily weighted criteria as this is considered to be the most important objective for all flood mitigation. Details of each option are outline in *R04 Assess and Treat Risk Report*.

FIGURE 6-4 LOCATION OF MITIGATION OPTIONS ASSESSED

TABLE 6-1 MITIGATION OPTION PREFEASIBILITY RESULTS

Mitigation option	Damage Reduction	Cost	Feasibility/ Constructability	Environmental Impact	Score
Lipson Drive pipe and open drain	**6**	**1**	**2**	**2**	**11**
Lipson Drive + regrading Kyema Drive to RB (gravity fed outlet)	8	1	1.5	2	12.5
Lipson Drive + regrading Kyema Drive to RB (pumped outlet)	10	1	1.5	2	14.5
Rennie Street Ford Crossing Upgrade	2	2	2.5	1.5	8
Increase pipe size along Rennie Street	6	1	2	1.5	10.5

Mitigation option	Damage Reduction	Cost	Feasibility/ Constructability	Environmental Impact	Score
Levee Failure at St Laurence at single failure location at peak water level	-	-	-	-	-
Divert Kyema Drive Upstream Catchment East to Avalon Catchment	8	2	1.5	1.5	13
Station Lake Road Upgrade	4	1	4	1.5	10.5
Removal of vegetation within Creek	4	5	2	0.5	10.5
Raised houses in Kyema Drive	6	1	1.5	2	10.5

6.4 Mitigation Modelling

6.4.1 Overview

The three options selected for detailed modelling and costing are listed below:

- Option 1 – Installation of new Lipson Drive pipe and open drain.
- Option 2 - Installation of new Lipson Drive pipe and open drain + regrading Kyema Drive to the City owned land + retarding basin + pumped outlet to open drain west of Rennie Street.
- Option 3 - Divert overland flow upstream of Kyema Drive toward Avalon Road Catchment via a new detention basin.

6.4.2 Option 1 - Lipson Drive Pipe and Open Drain

A new pipe alignment beneath a proposed open drain between Lipson Drive and the railway reserve was assessed to improve the drainage of flood water from McClelland Avenue, (east of Rennie St) into Hovells Creek. An upgrade of the culvert at Rennie Street to convey flows from McClelland Avenue to the open drain behind the Lara RSL was also included in this option. The option was initially developed following the Lara North-East Flood Study in 2002.

The existing pipe network along with the additional open drain, pipes and pits that were added to this scenario are displayed in Figure 6-5. The materials, construction, design and associated traffic management and administration costs for this mitigation option are summarised in Section 6.5.

Flood modelling results showed only minor reductions in flood levels and were concentrated to the residential areas south of McClelland Avenue. Only a single building was reduced from above floor to below floor flooding in the 1% AEP event.

6.4.3 Option 2 - Lipson Drive Drain and Kyema Drive Regrading

In addition to the Lipson Drive Pipe and Open Drain (Option 1), a regrade of Kyema Drive (road reserve) east of Brownlow Court towards existing vacant land owned by the City was modelled. It is proposed that this would house a small retarding basin with a pumped outlet, with connection pipes draining to the open drain situated to the west of Rennie Street. The option is displayed in Figure 6-5.

The pump was modelled using a pump control, with a capacity of 0.3 m^3/s. The pump was controlled using a water level trigger, turning on when the level reached 13.05 m AHD and turning off when the level drops below 12.50 m AHD. The pump was essential to the design of this mitigation option as a result of the flat terrain limiting the capacity of existing pipes and the potential to construct new gravity fed pipes, which is not practical

in this area. The option aimed to alleviate the pressure on the existing and new drainage infrastructure south of Kyema Drive which is exceeded from local runoff falling directly within the immediate vicinity of Kyema Drive, McClelland Avenue and further south at Smeaton Close, Rennie Street, Lipson Drive and Archimedes Avenue.

Flood modelling results showed a similar reduction in flood levels when compared with the previous mitigation option, with again, only one building changing from above to below floor flooring. There is a slightly wider spread of flood level reductions along Brunel Close and through McAdam Court; however, the reductions are still limited to less than 50 mm through the residential areas.

Further investigation into an alternative pumped option (involving additional pumps at the western end of Kyema Drive) and potentially larger pumps to remove floodwater from within Kyema Drive may provide additional benefits to those identified from the current modelling. There are several risks associated with the reliance on a pump-based mitigation system that need to be considered. These include the need for a reliable power source (and back up source), ongoing operation and maintenance costs and perceived sense of protection within the community.

6.4.4 Option 3 - Divert Lara North East Flows towards the Avalon Catchment

Mitigation Option 3 included an open channel diversion drain. The option diverted overland flow and runoff from north-east Lara towards the Avalon Catchment. Under existing conditions, this water flows south towards Kyema Drive and McClelland Avenue, and adds to existing water ponding behind McClelland Avenue. This option involved using roadside drainage and a proposed drainage easement through private property to capture and convey flows east to reduce the flood risk around Kyema Drive and McClelland Avenue.

It should be noted that purchase and or compensation for land is not a preferred action and consultation with the private property owner of the land identified for this mitigation option would be required for this to be considered. The location of the 8-m wide open drains added to the model is shown in Figure 6-6. The open drain would outfall to a proposed retarding basin at Old Melbourne Road before discharging via an existing culvert set at Princes Freeway into the Avalon Road catchment. The option offers a potential drainage alternative for any further growth in north-east Lara. Currently, most of the area upstream (north) of Bates Road is low-density residential properties. There currently appears to be a lack of formal drainage infrastructure within this area, with anecdotal evidence suggesting water often pools on the flat terrain following relatively minor storm events. Any future growth of this area would likely require a formalised drainage scheme to accommodate increased runoff frequency associated with any development.

This option had the largest and most widespread reduction in flood levels, with reductions around Kyema Drive and minor reductions south of McClelland Avenue, while also provided a reduction in levels and extents between Lockyers Road and McClelland Avenue. Further refinement of this option to remove the isolated areas of increased flood levels north of Bates Road would be required. There would also need to be provision for work to incorporate the open drains and the allocation of a suitable area for a retarding basin. An additional culvert crossing at the Princes Freeway was not investigated as part of this project but may be required into the future.

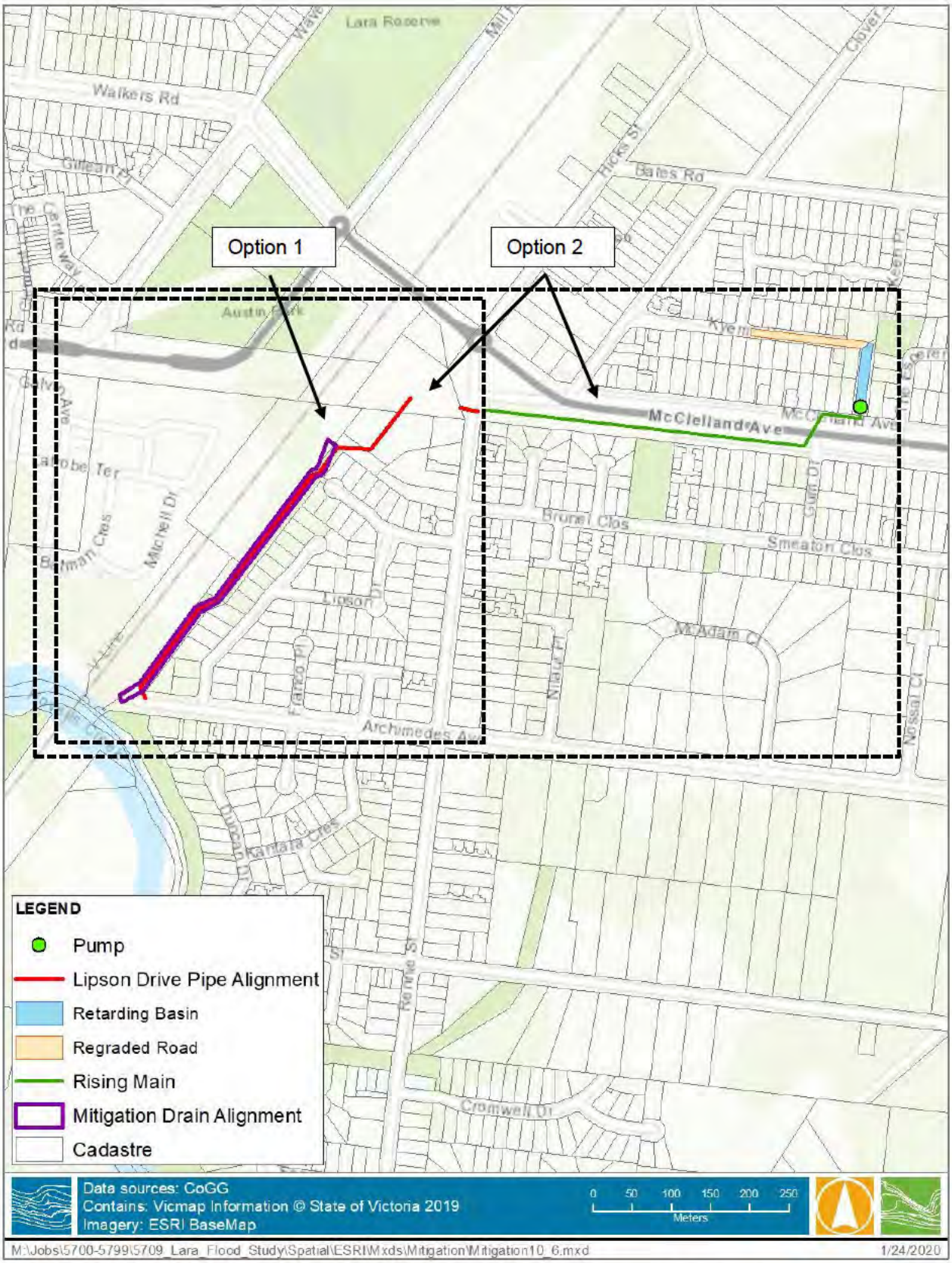

FIGURE 6-5 MITIGATION OPTIONS 1 & 2 LAYOUT

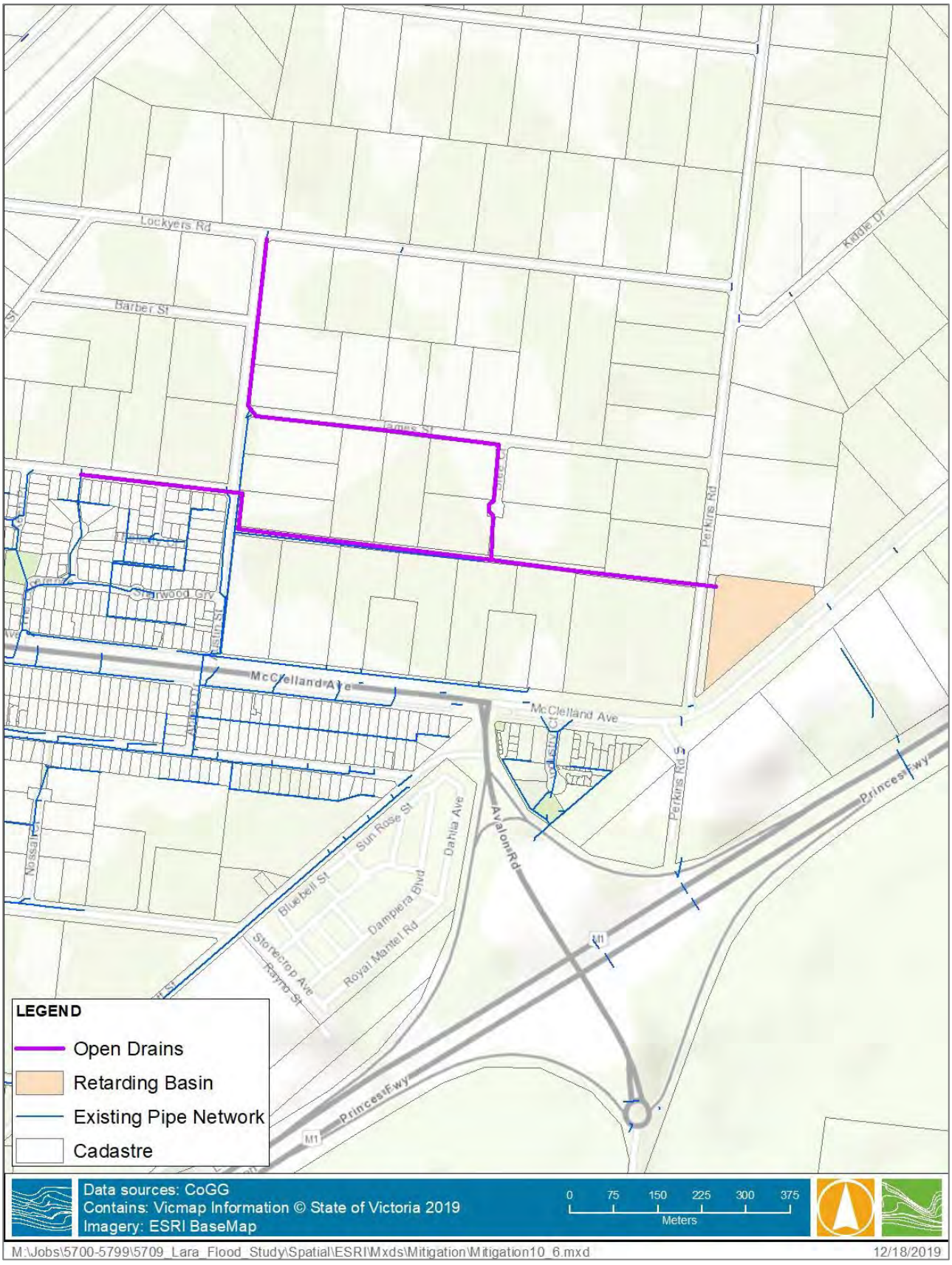

FIGURE 6-6 MITIGATION OPTION 3 - AVALON DIVERSION LAYOUT

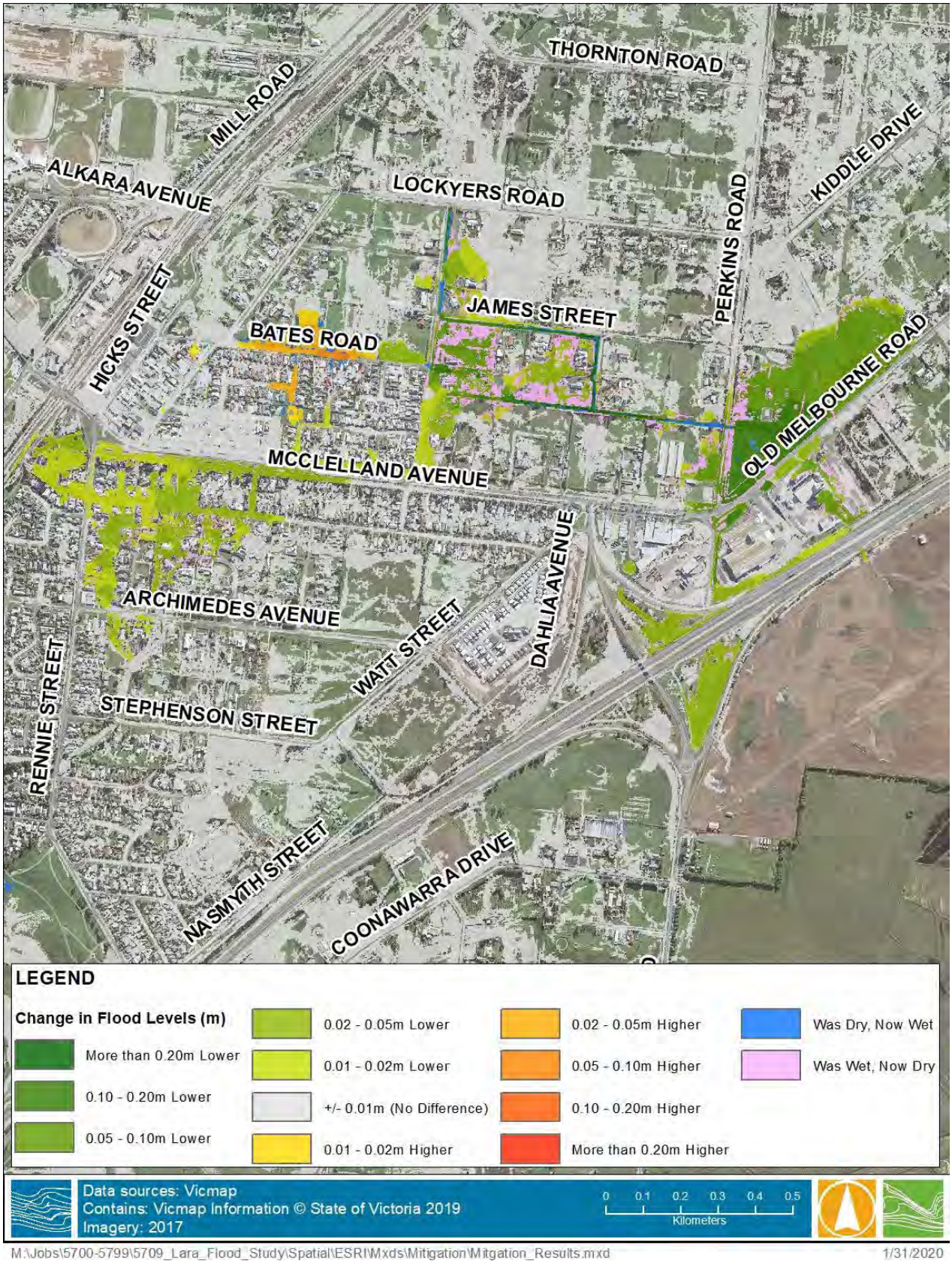

FIGURE 6-7 MITIGATION OPTION 3 - AVALON DIVERSION FLOOD LEVEL DIFFERENCE (1% AEP)

6.5 Mitigation Discussion

When assessing the current model results and topography of Kyema Drive, it appears McClelland Avenue is acting as the main hydraulic control, with flood water backing up behind the road crest. A long section showing the existing topography and the 1% AEP water level from Brownlow Court, Kyema Drive, McClelland Avenue through to Brunel Close is provided (Figure 6-8) as described Section 6.2. This highlights the flat terrain and hydraulic control that McClelland Avenue has on flood behaviour. Whilst lowering the crest level of McClelland Avenue might seem to be an obvious solution, it is likely to result in increased flooding risk to the downstream catchment and would likely increase the flood risk on McClelland Avenue itself, such that it would be unlikely to meet road safety limits.

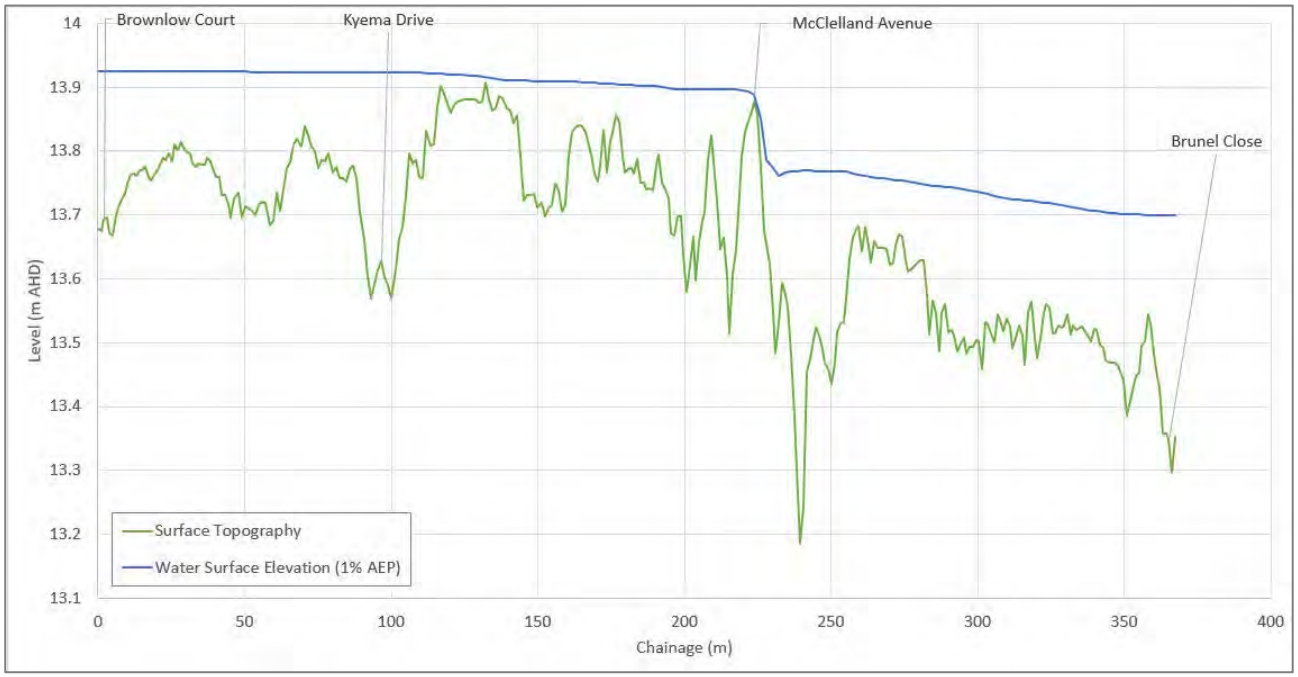

FIGURE 6-8 1% AEP WATER LEVEL AND NATURAL SURFACE

6.6 Summary

Each of the mitigation options tested showed a reduction in 1% AEP flood levels south of McClelland Avenue. The focus of the mitigation scenarios tested was to reduce flooding in the broader McClelland Avenue area including Kyema Drive. Outlined below are some key points of the findings.

- Option 3 (Avalon Diversion) was the only option that showed a reduction north of McClelland Avenue. There are widespread reductions through the North-East Lara area and across to Melbourne Road through a number of properties. Despite these reductions, there was still only a minor reduction in flood levels (less than 1cm) in a 1% AEP Flood event around Kyema Drive.
- There is no significant or noticeable reduction in the 1% AEP flood levels upstream of McClelland Avenue, likely due to the flat design pipe grade.
- Further investigation into an alternative pumped option (involving additional pumps at the western end of Kyema Drive) and potentially larger pumps to remove floodwater from within Kyema Drive may provide additional benefits to those identified from the current modelling.
- Sensitivity of pipe blockage within the main pipe alignment along Clover Street which drains the western end of Kyema Drive was found to result in a larger reduction in flood levels compared to both mitigation

options focused on Kyema Drive. The design slope of the existing pipe is less than 0.2%, which makes the pipe susceptible to blockage from sediment deposition. Pipe blockage of up to 50% due to sedimentation was found during CCTV of the alignment during the flood study. As a result, a 50% blockage was applied to the 900 mm drainage pipe along Clover Street for all design modelling.

Maintenance within the area has typically been reactive, responding to drainage blockages only once a storm event has occurred. Flood modelling has highlighted the sensitivity to reduced effectiveness of the drainage network for several areas in Lara. A more pro-active maintenance schedule for critical drainage assets (large or flat pipes) may be a viable option to reduce the frequency of nuisance flooding and risk of failure. This is one of the recommendations of the study. This would likely involve the identification of pipes with a low grade, existing blockages within pipes (as part of an on-going CCTV program), reporting of blockages and cleaning of debris/blockages from pipes.

A summary of the cost associated with the design and construction of each mitigation option is summarised in Table 6-2. The mitigation works were costed based on several key references:

- Costing spreadsheet originally developed by Melbourne Water that has been adapted by Water Technology of the course of several flood mitigation projects to provide a more accurate cost for works and materials in regional areas.
- Rawlinsons Australian Construction Handbook Rates (Rawlinson, 2011)
- The United Kingdom Environmental Agency Temporary and Demountable Flood Protection Guide (EA UK, 2011)
- Comparison to cost estimates for similar mitigation works for other flood studies undertaken by Water Technology

TABLE 6-2 MITIGATION OPTION COST ESTIMATE

	Option 1- Lipson Drive Pipe and Drain	Option 2- Lipson Drive Pipe and Drain + Pumped Outlet from RB	Option 3 – Avalon Road Diversion Drain
Construction	$ 661,875	$ 960,000	$ 1,030,000
Engineering (15%)	$ 100,000	$ 144,000	$ 154,000
Admin (9%)	$ 60,000	$ 88,000	$ 90,000
Contingency (30%)	$ 200,000	$ 288,000	$ 300,000
Total	**$1,021,875**	**$1,480,000**	**$1,574,000**
Annual Maintenance /Operating	$ 500	$ 2,000	$ 1,000

7 FLOOD DAMAGES

7.1 Overview

An existing conditions flood damage assessment will be undertaken for the study area in two facets. The flood assessment determined the monetary flood damages for design floods (50%, 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2% and 0.1% AEP events) for the riverine and urban stormwater flooding separately. The flood damage assessment will also be undertaken for the three mitigation options assessed in detailed modelling and be used in the cost-benefit-analysis.

7.1.1 Urban Damages

A summary of the existing conditions flood damage assessment of the urban flooding is shown in Table 7-1.

Table 7-1 Existing Conditions Flood Damages – Urban Modelling

EXISTING CONDITIONS									
ARI (years) AEP	1000yr 0.001	500yr 0.002	200yr 0.005	100yr 0.01	50yr 0.02	20yr 0.05	10yr 0.1	5yr 0.2	2yr 0.5
Residential Buildings Flooded Above Floor	81	65	51	44	35	27	20	13	5
Commercial Buildings Flooded Above Floor	3	3	2	2	0	0	0	0	0
Properties Flooded Below Floor	4494	4341	4101	3924	3691	3339	3122	2857	2498
Total Properties Flooded	**4578**	**4409**	**4154**	**3970**	**3726**	**3366**	**3142**	**2870**	**2503**
Direct Potential External Damage Cost	$6,239,039	$5,468,696	$4,477,807	$3,842,924	$3,150,914	$2,609,064	$2,143,878	$1,534,711	$971,156
Direct Potential Residential Damage Cost	$3,937,103	$3,176,321	$2,478,477	$2,117,676	$1,686,730	$1,252,450	$956,293	$657,100	$272,026
Direct Potential Commercial Damage Cost	$6,665	$4,816	$2,244	$1,018	$0	$0	$0	$0	$0
Total Direct Potential Damage Cost	**$10,182,807**	**$8,649,833**	**$6,958,528**	**$5,961,618**	**$4,837,644**	**$3,861,514**	**$3,100,171**	**$2,191,811**	**$1,243,182**
Total Actual Damage Cost *(0.8*Potential)*	**$8,146,246**	**$6,919,866**	**$5,566,822**	**$4,769,294**	**$3,870,115**	**$3,089,211**	**$2,480,137**	**$1,753,449**	**$994,546**
Infrastructure Damage Cost	**$2,124,348**	**$1,936,828**	**$1,687,417**	**$1,497,980**	**$1,273,082**	**$1,037,100**	**$831,149**	**$572,422**	**$359,025**
Indirect Clean Up Cost									
Indirect Residential Relocation Cost									
Indirect Emergency Response Cost									
Total Indirect Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Cost	**$10,270,593**	**$8,856,695**	**$7,254,240**	**$6,267,274**	**$5,143,198**	**$4,126,311**	**$3,311,286**	**$2,325,871**	**$1,353,571**

Average Annual Damage (AAD)	$1,283,343

A summary of the flood damage assessment of the urban flooding for Mitigation Option 1 is shown in Table 7-2

Table 7-2 Mitigation Option 1 Flood Damages – Urban Modelling

MITIGATION SCENARIO 1									
ARI (years)	1000yr	500yr	200yr	100yr	50yr	20yr	10yr	5yr	2yr
AEP	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5
Residential Buildings Flooded Above Floor	79	65	51	43	35	27	20	13	5
Commercial Buildings Flooded Above Floor	3	3	2	2	0	0	0	0	0
Properties Flooded Below Floor	4494	4338	4097	3921	3688	3338	3120	2856	2499
Total Properties Flooded	**4576**	**4406**	**4150**	**3966**	**3723**	**3365**	**3140**	**2869**	**2504**
Direct Potential External Damage Cost	$6,215,578	$5,436,308	$4,443,481	$3,812,630	$3,136,211	$2,610,230	$2,145,177	$1,534,405	$971,077
Direct Potential Residential Damage Cost	$3,870,544	$3,166,868	$2,456,656	$2,077,255	$1,681,319	$1,252,440	$956,333	$657,104	$272,027
Direct Potential Commercial Damage Cost	$6,664	$4,815	$2,244	$1,017	$0	$0	$0	$0	$0
Total Direct Potential Damage Cost	**$10,092,786**	**$8,607,991**	**$6,902,381**	**$5,890,902**	**$4,817,530**	**$3,862,670**	**$3,101,510**	**$2,191,509**	**$1,243,104**
Total Actual Damage Cost *(0.8*Potential)*	**$8,074,229**	**$6,886,393**	**$5,521,905**	**$4,712,722**	**$3,854,024**	**$3,090,136**	**$2,481,208**	**$1,753,207**	**$994,483**
Infrastructure Damage Cost	**$2,122,787**	**$1,934,500**	**$1,685,722**	**$1,496,442**	**$1,271,978**	**$1,036,977**	**$832,480**	**$572,643**	**$359,168**
Indirect Clean Up Cost									
Indirect Residential Relocation Cost									
Indirect Emergency Response Cost									
Total Indirect Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Cost	**$10,197,016**	**$8,820,893**	**$7,207,627**	**$6,209,164**	**$5,126,002**	**$4,127,113**	**$3,313,688**	**$2,325,850**	**$1,353,651**

Average Annual Damage (AAD)	$1,282,488

A summary of the flood damage assessment of the urban flooding for Mitigation Option 2 is shown in Table 7-3

Table 7-3 Mitigation Option 2 Flood Damages – Urban Modelling

MITIGATION SCENARIO 2									
ARI (years)	1000yr	500yr	200yr	100yr	50yr	20yr	10yr	5yr	2yr
AEP	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5
Residential Buildings Flooded Above Floor	77	64	49	43	34	27	20	13	5
Commercial Buildings Flooded Above Floor	3	3	2	2	0	0	0	0	0
Properties Flooded Below Floor	4492	4336	4098	3921	3669	3333	3120	2855	2498
Total Properties Flooded	**4572**	**4403**	**4149**	**3966**	**3703**	**3360**	**3140**	**2868**	**2503**
Direct Potential External Damage Cost	$6,175,996	$5,393,504	$4,416,676	$3,805,787	$3,092,620	$2,603,001	$2,140,274	$1,531,935	$969,204
Direct Potential Residential Damage Cost	$3,788,460	$3,114,850	$2,372,979	$2,075,239	$1,627,100	$1,252,544	$956,259	$657,021	$271,941
Direct Potential Commercial Damage Cost	$6,665	$4,814	$2,242	$1,017	$0	$0	$0	$0	$0
Total Direct Potential Damage Cost	**$9,971,121**	**$8,513,168**	**$6,791,897**	**$5,882,043**	**$4,719,720**	**$3,855,545**	**$3,096,533**	**$2,188,956**	**$1,241,145**
Total Actual Damage Cost *(0.8*Potential)*	**$7,976,897**	**$6,810,534**	**$5,433,518**	**$4,705,634**	**$3,775,776**	**$3,084,436**	**$2,477,226**	**$1,751,165**	**$992,916**
Infrastructure Damage Cost	**$2,120,473**	**$1,931,216**	**$1,681,132**	**$1,495,253**	**$1,266,392**	**$1,034,091**	**$827,181**	**$573,219**	**$360,522**
Indirect Clean Up Cost									
Indirect Residential Relocation Cost									
Indirect Emergency Response Cost									
Total Indirect Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Cost	**$10,097,369**	**$8,741,751**	**$7,114,649**	**$6,200,888**	**$5,042,168**	**$4,118,527**	**$3,304,407**	**$2,324,384**	**$1,353,438**

Average Annual Damage (AAD)	$1,278,805

A summary of the flood damage assessment of the urban flooding for Mitigation Option 3 is shown in Table 7-4

Table 7-4 Mitigation Option 3 Flood Damages – Urban Modelling

MITIGATION SCENARIO 3									
ARI (years) AEP	1000yr 0.001	500yr 0.002	200yr 0.005	100yr 0.01	50yr 0.02	20yr 0.05	10yr 0.1	5yr 0.2	2yr 0.5
Residential Buildings Flooded Above Floor	81	64	49	42	33	26	20	13	5
Commercial Buildings Flooded Above Floor	3	3	2	2	0	0	0	0	0
Properties Flooded Below Floor	4481	4327	4085	3907	3648	3321	3106	2843	2483
Total Properties Flooded	**4565**	**4394**	**4136**	**3951**	**3681**	**3347**	**3126**	**2856**	**2488**
Direct Potential External Damage Cost	$6,155,385	$5,354,101	$4,366,614	$3,746,100	$3,032,462	$2,566,678	$2,111,874	$1,515,508	$965,119
									$0
Direct Potential Residential Damage Cost	$3,934,535	$3,114,208	$2,364,469	$2,028,353	$1,580,335	$1,219,638	$956,093	$657,108	$272,024
Direct Potential Commercial Damage Cost	$6,665	$4,815	$2,244	$1,017	$0	$0	$0	$0	$0
Total Direct Potential Damage Cost	**$10,096,585**	**$8,473,124**	**$6,733,327**	**$5,775,470**	**$4,612,797**	**$3,786,316**	**$3,067,967**	**$2,172,616**	**$1,237,143**
Total Actual Damage Cost *(0.8*Potential)*	**$8,077,268**	**$6,778,499**	**$5,386,662**	**$4,620,376**	**$3,690,238**	**$3,029,053**	**$2,454,374**	**$1,738,093**	**$989,714**
Infrastructure Damage Cost	**$2,112,818**	**$1,925,952**	**$1,678,478**	**$1,493,579**	**$1,259,059**	**$1,025,618**	**$814,446**	**$561,885**	**$359,688**
Indirect Clean Up Cost									
Indirect Residential Relocation Cost									
Indirect Emergency Response Cost									
Total Indirect Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Cost	**$10,190,086**	**$8,704,451**	**$7,065,139**	**$6,113,955**	**$4,949,297**	**$4,054,671**	**$3,268,819**	**$2,299,978**	**$1,349,403**

Average Annual Damage (AAD)	$1,265,359

7.1.2 Riverine Damages

A summary of the existing conditions flood damage assessment of the riverine flooding is shown in Table 7-5.

TABLE 7-5 RIVERINE EXISTING CONDITIONS FLOOD DAMAGES

EXISTING CONDITIONS									
ARI (years) AEP	1000yr 0.001	500yr 0.002	200yr 0.005	100yr 0.01	50yr 0.02	20yr 0.05	10yr 0.1	5yr 0.2	2yr 0.5
Residential Buildings Flooded Above Floor	215	185	104	27	16	6	4	4	1
Commercial Buildings Flooded Above Floor	0	0	0	0	0	0	0	0	0
Properties Flooded Below Floor	993	930	893	858	791	702	596	443	350
Total Properties Flooded	**1208**	**1115**	**997**	**885**	**807**	**708**	**600**	**447**	**351**
Direct Potential External Damage Cost	$3,417,995	$3,244,718	$3,028,565	$2,676,502	$2,313,125	$1,834,593	$1,556,679	$1,185,963	$737,238
Direct Potential Residential Damage Cost	$16,266,296	$12,954,033	$6,492,763	$1,856,217	$895,348	$664,538	$505,263	$422,258	$194,989
Direct Potential Commercial Damage Cost	$0	$0	$0	$0	$0		$0	$0	$0
Total Direct Potential Damage Cost	**$19,684,291**	**$16,198,751**	**$9,521,328**	**$4,532,719**	**$3,208,473**	**$2,499,131**	**$2,061,942**	**$1,608,221**	**$932,227**
Total Actual Damage Cost *(0.8*Potential)*	**$15,747,433**	**$12,959,001**	**$7,617,062**	**$3,626,175**	**$2,566,778**	**$1,999,305**	**$1,649,554**	**$1,286,577**	**$745,782**
Infrastructure Damage Cost	**$2,588,684**	**$2,454,467**	**$2,263,551**	**$2,001,316**	**$1,669,464**	**$1,422,940**	**$1,199,276**	**$902,751**	**$624,715**
Indirect Clean Up Cost									
Indirect Residential Relocation Cost									
Indirect Emergency Response Cost									
Total Indirect Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Cost	**$18,336,117**	**$15,413,467**	**$9,880,614**	**$5,627,491**	**$4,236,242**	**$3,422,245**	**$2,848,830**	**$2,189,328**	**$1,370,497**

Average Annual Damage (AAD)	$1,200,441

7.2 Non – Economic Flood Damages

Assessment of non-monetary flood related damage in Lara and the broader study area is high as observed from the study. This covers damage such as emotional distress and health issues. The benefit-cost analysis (see Section 8) has not considered this cost, which is standard practice for this level of assessment. There has been extensive research undertaken and documented in the scientific literature relating to the individual and community response to natural disasters. The reason for this being is that there are no agreed methods for valuing these costs, despite intangible losses often being found to be more important than tangible losses.

The additional benefits gained for houses throughout Lara that would be protected in events up to 1% AEP design flood level have also not been calculated in this assessment. Anecdotal stories reveal that several

residents in the Kyema Drive area perceive their property value reduced as a result of frequent flooding occurring in the previous decades. Any decisions made that are based on the benefit-cost ratios need to understand that the true cost of floods in Lara is far higher than the economic damages alone, and that there is uncertainty over calculating their worth. This would have the effect of increasing the benefit cost ratio, improving the argument for approving a mitigation option within Lara.

8 MITIGATION BENEFIT-COST ANALYSIS

A benefit cost analysis was undertaken to assess the economic viability of the three mitigation options that were modelled and costed. Indicative benefit-cost ratios were based on the construction cost estimates and average annual damages. For the analysis, a net present value model was used, applying a 6% discount rate over a 30-year project life. A 30% contingency cost has been added along with engineering and administration costs. An annual maintenance cost including mowing, weed control and electricity costs (Mitigation Option 2) was also included.

The mitigation works were costed (Table 6-2) based on key references including but not limited to:

- Melbourne Water's standard rates for earthworks and pipe/headwall construction costs.
- Rawlinsons Australian Construction Handbook Rates
- Comparison to cost estimates for similar mitigation works for other flood studies

Based on the minimal reduction in flood levels for each of the mitigation options showing only minor reductions in the number of properties flooded above floor, it was not anticipated that benefit-cost analysis would provide a high benefit-cost ratio. The comparison of the benefit-cost ratio does allow for each of the three mitigation options to be assessed alongside each other. A summary of the Benefit-Cost Ratio for the three mitigation options is shown in Table 8-1.

TABLE 8-1 BENEFIT COST ANALYSIS

	Option 1- Lipson Drive Pipe and Drain	Option 2- Lipson Drive Pipe and Drain + Pumped Outlet from RB	Option 3 – Avalon Road Diversion Drain
Average Annual Damage	$ 1,282,488	$ 1,278,804	$ 1,265,359
Annual Maintenance Cost	$ 500	$ 2,000	$ 1,000
Annual Cost Saving	$ 354	$ 2,538	$ 16,983
Net Present Value (6%)	$ 4,987	$ 35,693	$ 238,829
Capital Cost of Mitigation	$ 1,021,875	$ 1,478,400	$1,540,000
Benefit-Cost Ratio	0.005	0.02	0.16

9 FLOOD WARNING

The Flood Warning Assessment Report *(R05 – The Flood Warning and Intelligence Report)* documented the existing flood warning system for the study and potential improvements.

9.1 Overview

Flood warning systems are necessary to ensure the safety of the public and enhance readiness in the event of a flood. An effective flood warning system will provide communities with time to protect themselves and if time permits, their property. A review of the available data (rainfall, streamflow and intelligence data) for the study areas was undertaken before several recommendations for potential flood warning information was also provided.

9.2 Riverine Flood Warning

Historically the onset of riverine flooding in Lara can potentially happen quite soon after heavy rainfall. The onset of riverine flooding (rise in stream levels) can occur some 6-8 hours after heavy rainfall. When considering the processes of detection, forecasting, interpretation and messaging, the flood warning time is likely to be shorter than 6 hours under typical storm events. The impacts of local stormwater are likely to occur in a much shorter time frame than riverine flooding.

There is currently no flood warning service provided by the BoM for the Hovells Creek catchment, and given the short available warning time the BoM would most likely classify the area as subject to “flash flooding”, and would not be covered under the traditional riverine flood warning service. The BoM has a responsibility to provide predictions of weather conditions likely to lead to flash flooding (e.g. thunderstorms), while Local Government has primary responsibility for flash flood warning extending from system establishment and operation through to the provision of predictions of stream levels if required.

In the event of severe weather conditions for Lara and the broader catchment that may lead to flooding, the BoM may issue a Severe Weather Warning, Severe Thunderstorm Warning or a Flood Watch for the broader Barwon Moorabool and Leigh area. This is intended to inform the community when heavy or severe rainfall that may lead to flooding or flash flooding in town could occur. This typically relates to stormwater flooding, however warnings for storm durations greater than 6 hours may lead to riverine flooding.

BoM does not issue river height predictions for the Hovells Creek in Lara streamflow gauge. Warnings issued by BoM may provide information about when flooding is possible in the town, but the warning is not specific, and does not include the expected height of the river peak for riverine flooding.

The installation of a new flood warning system on Rennie Street at Hovells Creek was completed in 2018 as part of a broader Hovells Creek Flood Warning system. This system entails flashing lights which are activated when water reaches the road level. The system was installed to improve driver safety at Hovells Creek, where drivers are known to drive through flood water. The system still relies upon flood gates being manually closed by Council staff to close the road. In the event of flood waters reaching the underside the Princes Freeway support beam, VicRoads officers are notified via an automatic SMS alert as part of the flood warning system.

9.3 Stormwater Flood Warning

As identified above, the BoM may issue a Severe Weather Warning or Severe Thunderstorm Warning for Lara. This is intended to inform the community when heavy or severe rainfall that may lead to flooding or flash flooding in town could occur. This is likely to impact on the township and broader urban areas.

9.4 Summary

It is recommended that the City investigate and document the feasibility of a flash flood warning service for Lara. While it was not the scope of this project to develop a comprehensive flash flood warning system for the township, it has been considered at a high level. To better manage and understand flood warning in Lara it is recommended the three rainfall gauges with telemetry within Hovells Creek catchment along with the Avalon automatic weather station (BoM managed gauge) be investigated for their use in a flash flood warning system. Alternatively, calibrated radar rainfall and weather model forecasts could be used to develop a flash flood warning system. This along with hydrological models and rating curves developed during the Lara Flood Study (2020), could provide the information required for a flash flood warning system.

The system could be kept simple, similar to that shown in Figure 9-1 to help emergency management authorities and the general public better predict the magnitude of an event based on rainfall alone. With the estimated rainfall storm AEP used to select flood maps to predict likely flood impacts. The system could also be slightly more complex and could use a combination of rainfall gauges and radar rainfall, along with the hydrological models run in forecast mode, generating automated alerts. This is all possible using available technology.

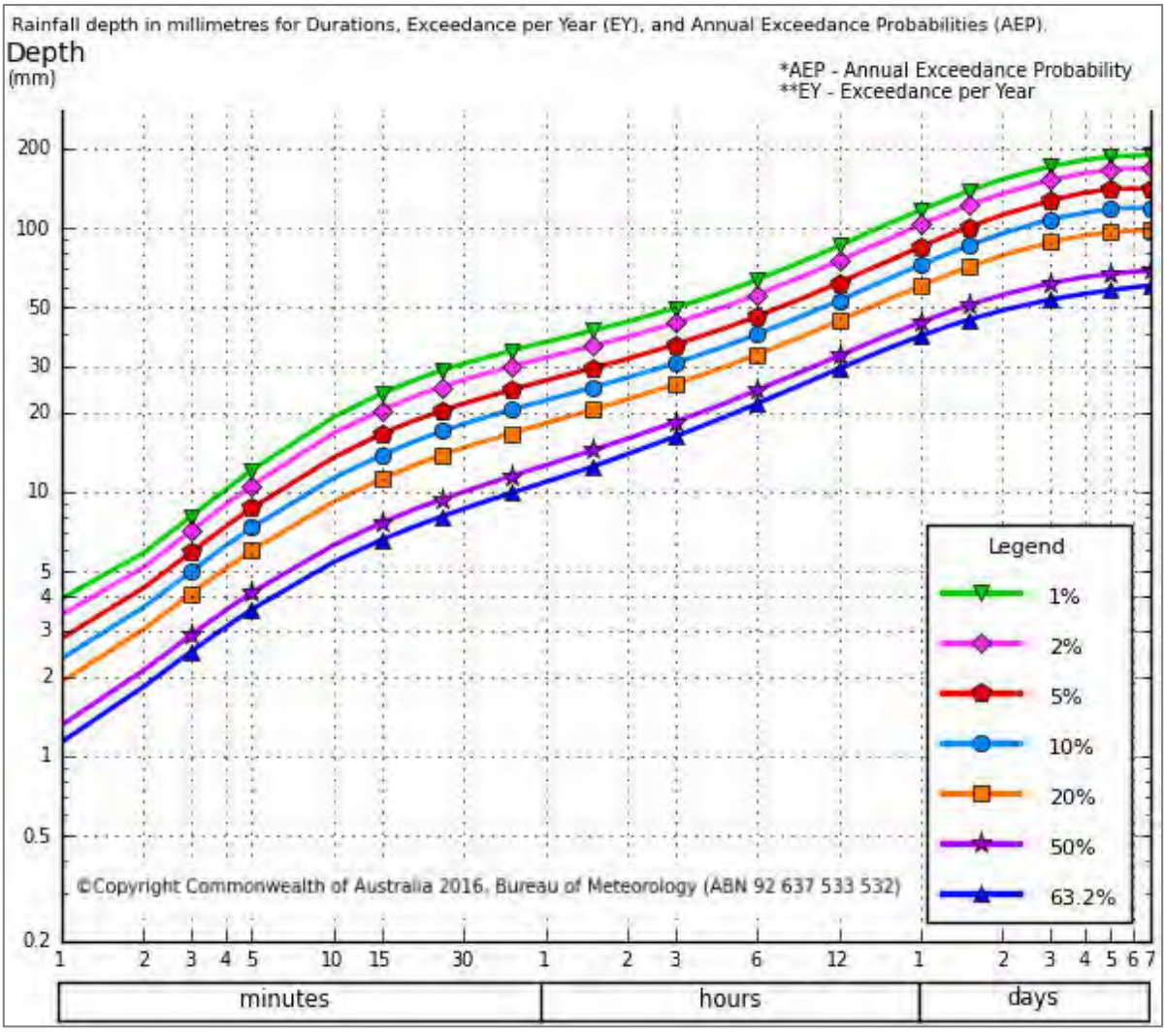

FIGURE 9-1 BOM RAINFALL IFD CHART (LARA- HOVELLS CK CATCHMENT)

10 FLOOD INTELLIGENCE

The Flood Intelligence Report (*R05– Flood Warning Intelligence Report*) provides a detailed description of the flood behaviour in the study area and the impact flooding has on people and assets throughout the catchment.

10.1 Overview

During significant rainfall events, the catchment to the northwest and north of Lara begins to contribute runoff which accumulates and flows towards Lara, the Princes Freeway and eventually Corio Bay. While there is significant flow along Hovells Creek, there is also accumulation of shallow flows across agricultural properties. In order to appropriately plan for flood response activities. Intelligence information collected from the study will be used to update the Municipal Emergency Management Plan, the VicSES Lara Local Flood-Guide, and general information which can be utilised by agencies for flood warning and response purposes. It can also be used to be distributed to the public for education purposes including building community resilience.

10.2 Methodology

Above floor flooding was provided as a separate spreadsheet and where possible has been based on floor level survey. It should be noted the above floor flooding impacts described do not consider individual flood protection measures such as local flood walls or levees which protect individual homes (sandbagging, flood gates, sealed fencing). For this reason, such measures cannot be assumed to be in place and operating effectively under design conditions.

Flooding from urban stormwater runoff impacts different parts of the town compared to riverine flooding. Impacts from both forms of flooding is summarised in Table 10-1. Above floor flooding increases significantly above the 1% AEP flood event from riverine flooding as levees become overtopped.

A set of summary tables and maps were developed to be read from top to bottom, with each subsequent larger magnitude event reporting on the incremental changes in consequences across different regions of the study area. An example of this (Table 10-2), if the reader is wishing to understand the consequences of a 20% AEP event, then the flood characteristics should be read for the 50% and 20% AEP events in succession.

TABLE 10-1 SUMMARY OF ABOVE FLOOR FLOODING

Design Event (AEP)	Properties Flooded Above Floor	
	Riverine	Stormwater
50%	1	5
20%	4	13
10%	4	20
5%	6	27
2%	16	35
1%	27	44
0.5%	104	51
0.2%	185	65
0.1%	215	81

TABLE 10-2 EXAMPLE OF SUMMARY OF FLOOD BEHAVIOUR FOR DESIGN EVENTS (50% & 20% AEP)

Flood Event	Characteristics – Flood Behaviour	Key Roadways Inundated
50% AEP ~1,400 ML/d 7.06 m Gauge Height at Flinders Avenue 2.58 m Gauge Height at Rennie Avenue	Floodwaters begin to accumulate across the upper Hovells Creek floodplain. Flooding of the Elcho Drain beings to inundate private property. Elcho Golf Course flooded. Stream level rises along Hovells Creek Widespread ponding across flat areas.	■ Windermere Road Overtopped. ■ Flinders Avenue Overtopped. ■ Rennie Street Floodway Overtopped. ■ Duggans Lane overtopped.
20% AEP ~4,000 ML/d 7.90 m Gauge Height at Flinders Avenue 3.00 m Gauge Height at Rennie Avenue	**Upper Hovells Creek Floodplain** Overland flows impact farmland west of the HM Prison Barwon, north of Windermere Road and west of Blairs Road **Hovells Creek floodplain & Lara West:** Widespread flooding north to the town having impacts on farmlands. Overland flows at West Gateway impact on several properties. Two houses are flooded above floor at Station Lake Road. **Lara West, Elcho Park & Elcho Drain:** Widespread floodwaters along waterways impact farmlands and properties. Elcho Park has widespread flooding across the golf course. **Hovells Creek through Lara:** Flooding is confined to a narrow floodplain along Hovells Creek on most of the study area. **Lara East:** Land between Lockyers Road and McClelland Avenue is partially overtopped. **Avalon Road Catchment (Mill Road to Princes Freeway):** The floodwater flows across farmland from upstream until Old Melbourne Road. Floodwater breaks out of waterways and spread across farmlands south of Princes Freeway	■ Peak School Road overtopped (depth <0.2m). ■ Peak School Road at Duggans Lane bridge (depth >1m). ■ Windermere Road cut at Blairs Road (depth >1.5m). ■ Windermere Road overtopped east of Forest Rd North (depth <0.1m). ■ O'Hallorans Rd overtopped near Windermere Rd (depth <0.3m). ■ Kees Road overtopped near Windermere Rd (depth <0.1m). ■ Forest Rd North overtopped north of Peak School Rd (depth <0.2m). ■ Forest Road South overtopped near Canterbury Rd (depth <0.1m). ■ Flinders Avenue overtopped near Plains Road (depth >0.3m). ■ Flinders Avenue overtopped for 50m east of Hovells Creek (depth < 0.1m). ■ Flinders Avenue cut at Hovells Creek (depth > 0.5m). ■ Mill Road inundated south to Peak School Road (depth < 0.5m). ■ Rennie Street cut at Hovells Creek (depth > 0.5m). ■ Old Melbourne Road overtopped near McIntyre Rd (depth < 0.1m).

10.3 Summary

The flood intelligence report was compiled using existing resources combined with the hydrological and hydraulic flood modelling undertaken as part of this project. The report aimed to provide a standalone document to provide information on flood behaviour, design flood extents and potential consequences related to water levels at the existing streamflow gauges on Hovells Creek. Flood warning is limited due to the relatively short warning time prior to riverine flooding from Hovells Creek occurring in Lara following heavy rainfall in the Hovells Creek catchment. Stormwater flood warning is also limited and is currently issued as a Severe Weather Warning or Severe Thunderstorm Warning by BoM. The report was also developed in a manner that will allow for inputs into an update of the MFEP and the Lara Flood Guide in conjunction with the VicSES.

The Flood Intelligence component of the study should not only inform staff and volunteers involved in emergency management, but to also raise awareness to the broader community of flood risk within the study area. To enable information from this study to be shared, it is recommended that the City undertake the following:

- Review the information within the Flood Warning and Intelligence Report to undertake an update of the MFEP
- Flood mapping outputs and information from the study be considered for a planning scheme amendment to update current planning controls.

Consider the flood information to inform any designation of flood prone land.

- Use the available flood mapping to develop the online Lara Flood Report portal to improve flood preparedness and awareness within the community. (An example of the portal can be found here: www.floodreport.com.au). It is noted that this has been funded as part of this project.

General information and resources providing information on the Hovells Creek and Avalon Road/Austin Swamp Catchments can be found at:

- Lara Local Guide – VicSES
  - https://www.ses.vic.gov.au/documents/112015/135106/Lara+Local+Flood+Guide-pdf/7e6d23d2-3733-4467-9fae-f0063cb131a3
- City of Greater Geelong Municipal Flood Emergency Plan
- Victorian State Emergency Service - Flood Safe (General Information)
  - https://www.ses.vic.gov.au/get-ready/floodsafe
- City of Greater Geelong – Emergency Information
  - https://www.geelongaustralia.com.au/em/floods/article/item/8cb670e83e30ce8.aspx

11 LAND USE AND PLANNING CONTROLS

11.1 Overview

The CCMA and the City have a responsibility to assess and if possible, manage flood risk. In some cases, flood risk is unable to be reduced or eliminated by structural means. In Lara the result of the flood investigation indicates a widely spread flooding risk which is difficult and costly to manage with typical structural mitigation measures. Where residual risk remains, planning and building controls provide an important role in ensuring that development within areas known to be at risk is appropriately managed and measures are taken to ensure potential damage and loss of life mitigated.

The Victoria Planning Provisions (VPPs) provide guidance for the use and development of land that is affected by inundation from floodwaters by way of several planning zones and overlay controls. These available controls include the Floodway Overlay (FO), the Land Subject to Inundation Overlay (LSIO), the Special Building Overlay (SBO), the Urban Floodway Zone (UFZ) and the Environmental Significance Overlay (ESO).

Section 6(e) of the Planning and Environment Act 1987 enables planning schemes to 'regulate or prohibit any use or development in hazardous areas, or likely to be hazardous'. As a result, planning schemes contain State planning policy for floodplain management requiring, among other things, that flood risk to be considered in the preparation of planning schemes and in land use decisions.

Guidance for applying flood controls to Planning Schemes is available from the Department of Environment, Land Water and Planning (DELWP) Practice Note on Applying Flood Controls in Planning Schemes and The Victorian Floodplain Management Strategy, released by the DELWP in 2016. The objective of the state planning policy framework[6] for floodplain management is to assist in the protection of:

- Life, property and community infrastructure from flood hazard.
- The natural flood-carrying capacity of rivers, streams and floodways.
- The flood storage function of floodplains and waterways.
- Floodplain areas of environmental significance or of importance to river health.

11.2 Existing Controls

An assessment of the existing planning controls for Lara, along with the broader Hovells Creek and Avalon catchments was undertaken by Water Technology and Planning and Environmental Design.

The current controls include both planning scheme zones and overlays, along with building controls. Within the study area planning overlays including the Floodway Overlay (FO), Land Subject to Inundation Overlay (LSIO) and Special Building Overlay (SBO) have been applied. There are also several areas within the study area where Urban Floodway Zone (UFZ) applies.

The current zones and overlays within the Lara area do not cover the extent of the known flood risk. As shown in Figure 11-1 and Figure 11-2 the designated flood prone layer (Building Regulations) covers a broader area than that of the existing planning controls.

The current planning and building controls as they apply within the study area are shown in Figure 11-1 and Figure 11-2.

[6] Victorian Floodplain Management Strategy (2016) , accessed from: https://www.water.vic.gov.au/__data/assets/pdf_file/0021/53715/Victorian-Floodplain-Management-Strategy-Part-1-to-5.pdf

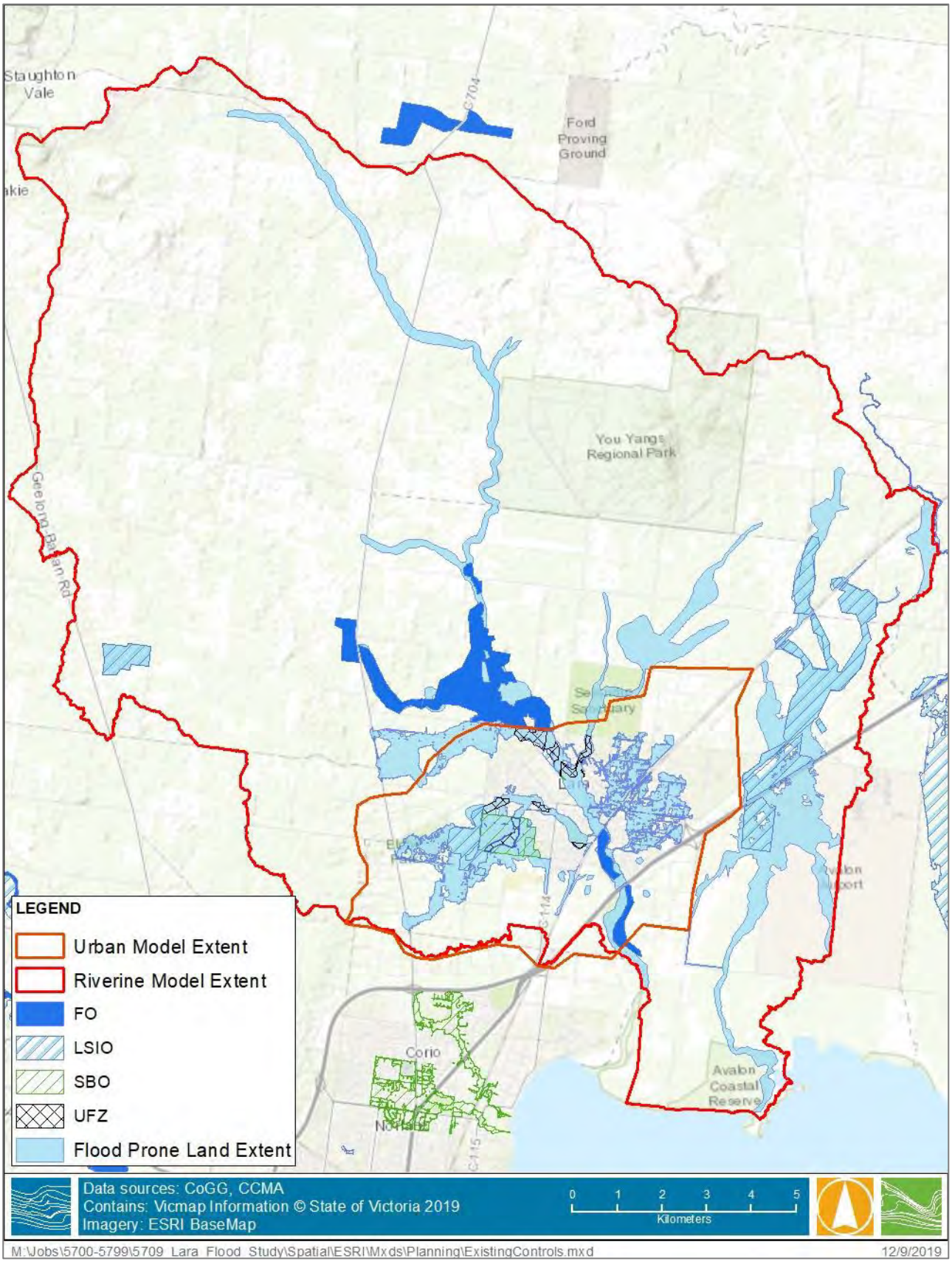

FIGURE 11-1 EXISTING FLOOD RELATED PLANNING CONTROLS – STUDY AREA

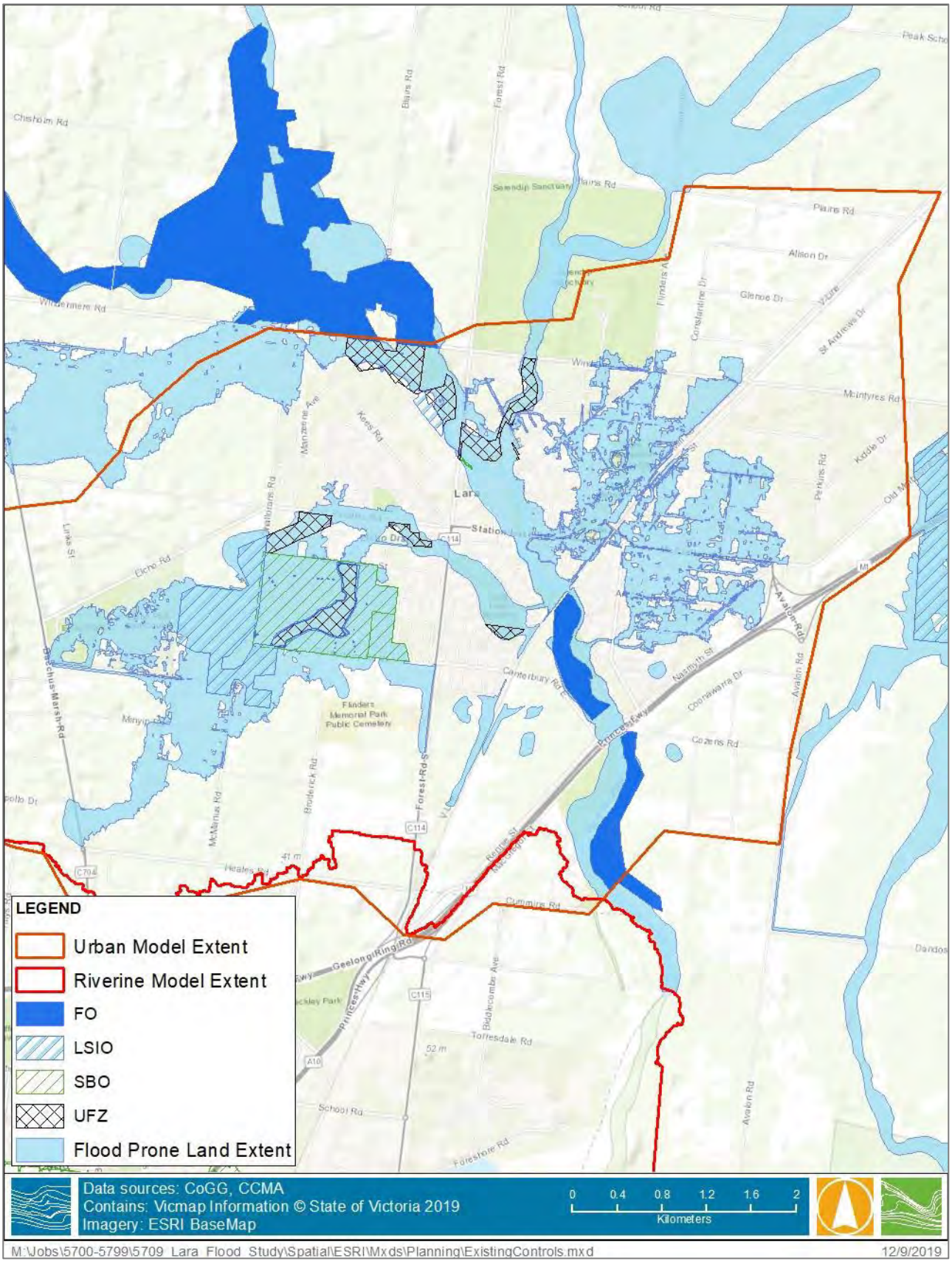

FIGURE 11-2 EXISTING FLOOD RELATED PLANNING CONTROLS – LARA TOWNSHIP

11.3 Identified Risk and Available Controls

The State Planning Policy framework floodplain management policy currently recognise the 1% AEP flood event as the design flood event by which planning and building controls should apply. There are a number of available land use and development controls which enable authorities to regulate development so that the likelihood and consequences of flooding to community safety and property are considered and where possible minimised.

In assessing how controls should be applied within Lara Study Area, consideration must be given to both the extent of the 1% AEP flood event as produced by the study result and the nature of the flood risk. Each of the available flood provisions (VPP) provides differing degrees of flexibility for the development of flood affected land which directly relates to the identified flood risk. Available controls include:

- **Land Subject to Inundation Overlay (LSIO)** – defines the floodplain fringe and lower hazard areas within the 1% AEP flood extent

Purpose: Land Subject to Inundation Overlays are planning scheme controls that apply to land affected by flooding associated with waterways, natural flow paths and drains. Such areas are commonly known as floodplains. The LSIO is used to identify flood fringe areas of the floodplain where flooding depths and velocities are typically lower.

- **Floodway Overlay (FO)–** defines the high hazard portion of the floodplain

Purpose: Floodway Overlays apply to land that's identified as carrying active flood flows associated with waterways, natural flow paths and drains.[7] The overlay is characterised by areas impacted by deep and or fast flowing floodwaters during the 1% AEP flood event.

- **Special Building Overlay (SBO)** – defines flooding within the urban environment from overland flow results from stormwater

*Purpose: The Special Building Overlay (SBO) identifies land in **urban areas** liable to inundation by overland flows that exceed the capacity of the drainage system. The purpose of the SBO is to ensure that future developments allow the free passage of floodwaters, minimise flood damage, are compatible with flood hazard and local drainage conditions, and will not cause a significant rise in flood level or flow velocity*.[8]

- **Urban Floodway Zone (UFZ)** – defines flooding high hazard areas and major flow paths within the urban areas

Purpose: To identify waterways, major flood paths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding.

It is recommended that the planning scheme and building controls for Lara and the broader study area be updated to reflect the flood risk identified by this project. Selection of the most appropriate planning controls must consider both the nature of the flood risk (riverine or urban stormwater) and the flood hazard in accordance with Australian Rainfall and Runoff safety limits[9]. For the purposes of this assessment, hazard category H1 has been considered to be safe with hazard categories H2-H6 being acknowledged as being unsafe. The delineation between the urban and riverine 1% AEP flood extent is shown in Figure 11-3. The extent of the safe and unsafe flood hazard during the 1% AEP flood event is shown Figure 11-4. A comprehensive assessment of land use and planning controls is addressed in the Flood Warning and Mitigation Report *(R04 - Flood Warning and Mitigation Report).*

[7] Corangamite Catchment Management Authority knowledge base website. http://www.ccmaknowledgebase.vic.gov.au/flood/cb_pages/floodplain_management.php

[8] City of Greater Geelong Planning Website: https://www.geelongaustralia.com.au/sbo/article/item/8d4024c6c179322.aspx

[9] Australian Rainfall and Runoff, www.arr.org.au

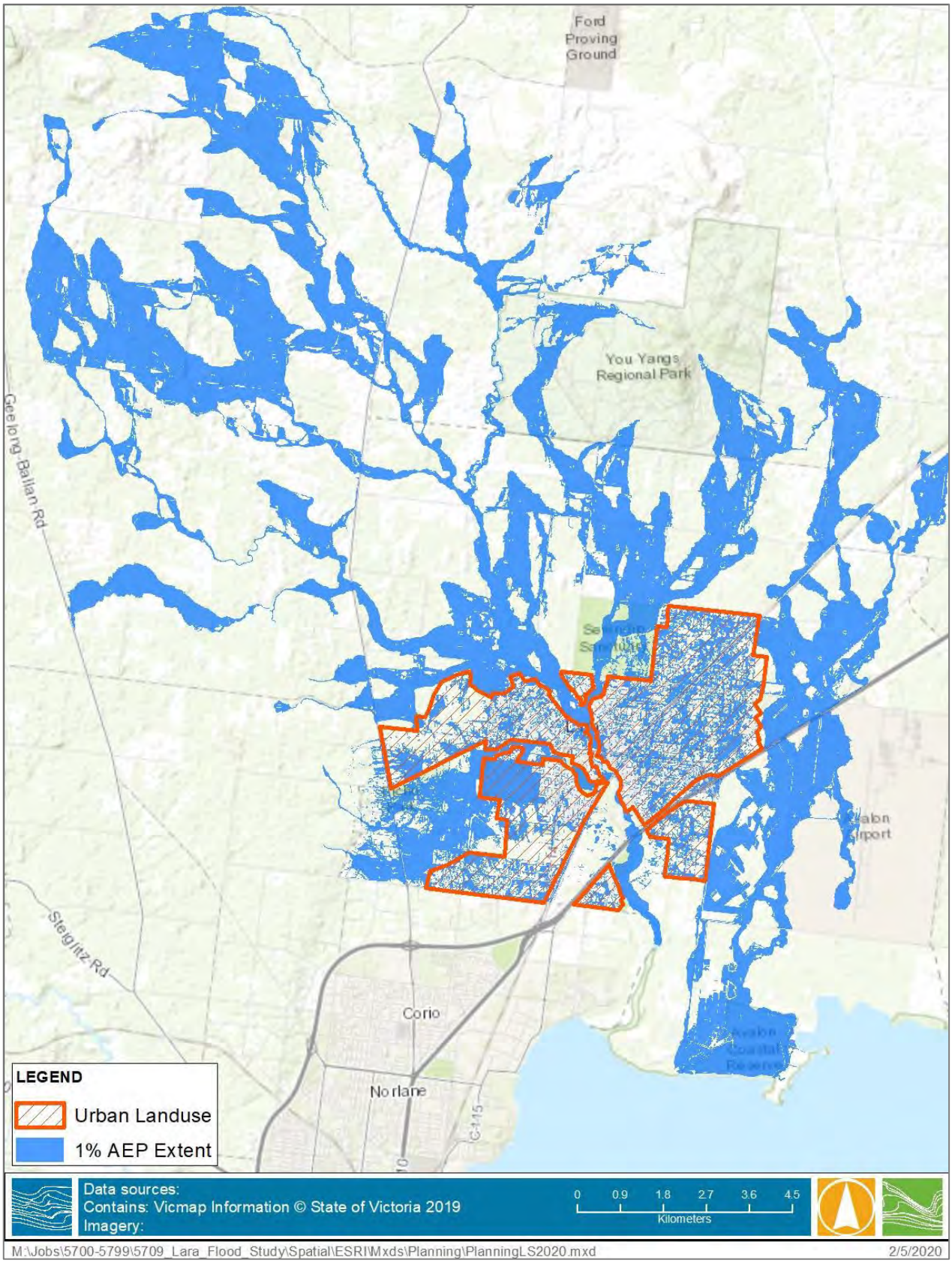

FIGURE 11-3 COMBINED RIVERINE & STORMWATER 1% AEP EXTENT

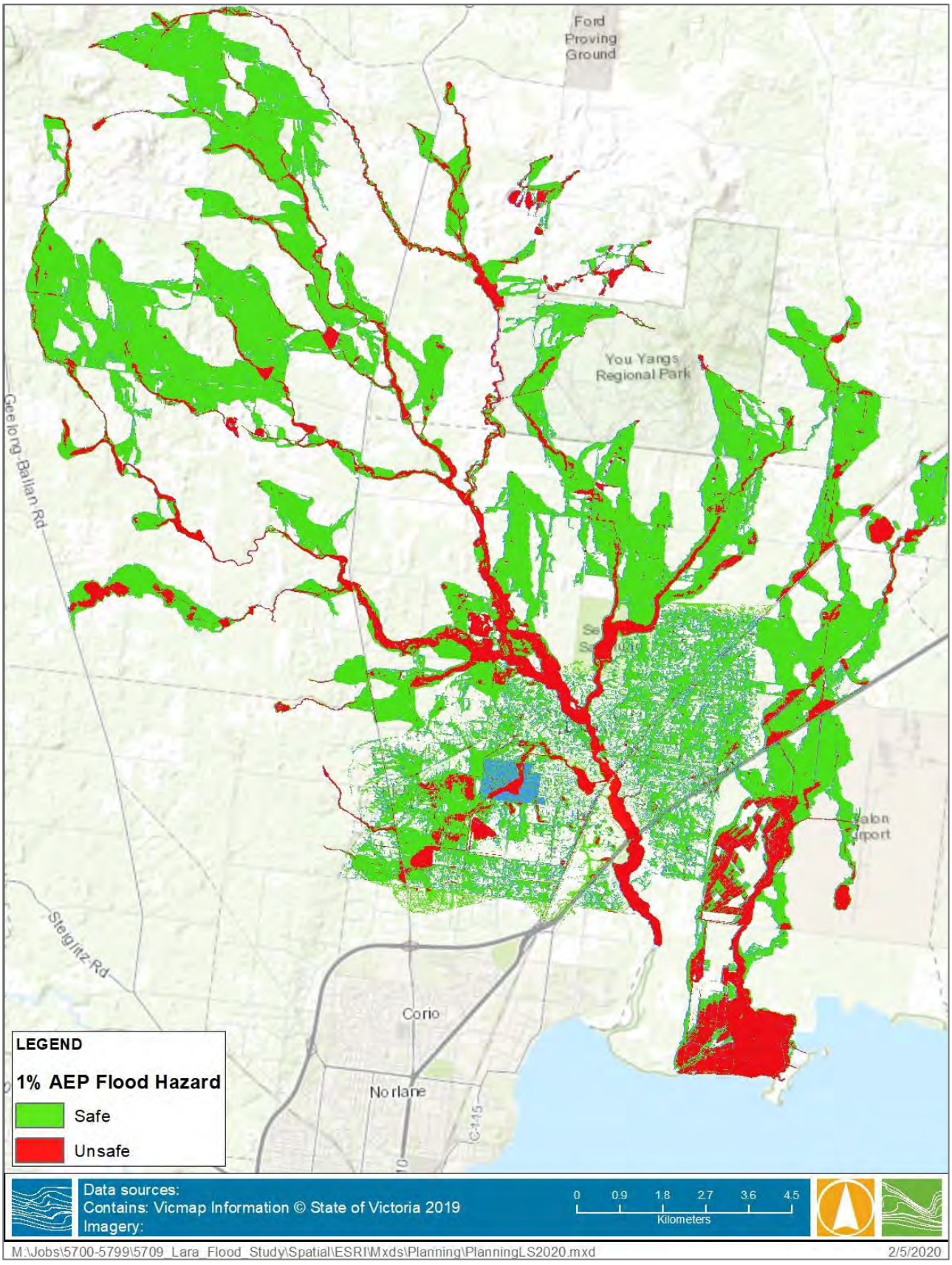

FIGURE 11-4 MODELLED FLOOD HAZARD (ARR2019 CLASSIFICATION)

12 RECOMMENDATIONS

Recommendations from the Lara Flood Study have been separated into the agencies responsible for their fulfilment, these are as follows:

- **City of Greater Geelong**
  - Endorse the flood study with the aim of adopting the flood study recommendations.
  - Undertake a planning scheme amendment to update the flood related planning overlays to introduce new SBO, LSIO and FO mapping along with UFZ into the planning scheme.
  - Consider the designation of flood prone land as provisioned under the Building Act
  - Continue to include Climate Change as a consideration in understanding and assessing flood risk.
  - Liaise with DELWP regarding measures to respond to emerging risks arising from increased extreme weather events. It is noted that the City currently has a Climate Change Adaption Strategy which seeks to respond to current climate science and policy.
  - Discuss with the Bureau of Meteorology and CCMA for the consideration of the:
    - Potential Flash Flood Warning system for Lara.
    - Review of existing water level boards along road networks impacted.
  - Review the information within the Flood Warning and Intelligence Report to undertake an update of the MFEP.
  - Use the available flood mapping to develop the online Lara Flood Report portal. It is noted that this has been funded as part of this project.
  - Undertake a review of the current response, maintenance and operations documentation with Council staff.
  - Ensure adequate maintenance of pumps/training is carried out on regular basis.
  - Develop maintenance schedule for large pipes and pipes with low design grade.
  - Assess funding options to pursue a mitigation option discussed in this report.
- **Corangamite Catchment Management Authority**
  - Endorse the flood study and use the flood mapping data to inform floodplain risk management decisions.
  - Upload the Victoria Flood Database mapping data and the excel spreadsheet of property inundation to FloodZoom.
  - Assess the need to develop Flood Warning System for Hovells Creek at Lara based on the information contained within the Flood Warning and Intelligence Report.
- **Victoria State Emergency Service** with assistance from Corangamite CMA and the City:
  - Continue to engage the community through regular flood awareness programs such as the VICSES FloodSafe program.
  - Update Local Flood Guide once new template is developed.
  - Assist the City in updating the MFEP.
  - Review the updated MFEP (when available) and discuss with the City the changes proposed by Water Technology prior to adopting the revised document.

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MEMORANDUM

To [redacted]

From [redacted] – Water Technology

Date 18 May 2020

Subject Lara Mitigation Modelling – Update Memo

Dear [redacted]

Please find below a short memo detailing the additional mitigation modelling as part of the Lara Flood Study. We have currently modelled only the 1% AEP 2-hour duration event for each of the mitigation options as this duration was previously identified as the critical duration for much of the urban stormwater network. Following the submission of the first version of this memo, a meeting was held on 30th April to discuss the results of the modelling with a number of Council staff.

Following the meeting, an additional assessment of the likely reduction in flooding above floor for the 1% AEP 2-hour duration event was included in the updated memo. It was also discussed that a full cost-benefit assessment be undertaken for the 'Kyema Drive pumps' mitigation option that will assess the impact across a range of AEP's.

The layout for each of the options is shown in a separate figure along with a difference plot for the 1% AEP – 2-hour storm event.

The modelled options shown below included:

- Kyema Drive retarding basin and pumps
- Kyema Drive pumps
- Lower McClelland
- Rennie Street diversion pipe
- Chirnside retarding basin
- Brunel Close pipe and pump

KYEMA DRIVE REGRADING + BASIN + PUMPS

This is the extension of the mitigation option investigated in the Lara Flood Study – Assess and Treat Risk Report. This option involved regrading the eastern end of Kyema Drive road surface to convey flow within the roadway to a new retarding basin located on council owned land. From here, a pumped outlet would convey flows around 550m to the open drain west of Rennie Street. To improve the results, an additional pump has been located at the intersection of Brownlow Court and Kyema Drive to help remove ponded floodwater. The secondary pump will convey flows through a rising main west to Clover Street south across McClelland Avenue and to the open drain west of Rennie Street. This is approximately 410 metres in length (Figure 1).

The cost of this option is likely to be in the order of $1.3-1.5 million based on revised costings undertaken during the Lara Flood Study, this includes the additional pump and pipe required to draw down and convey flows from Brownlow Court/ Kyema Drive.

The flood modelling results (Figure 2) showed reductions above 200-250 mm within Kyema Drive and smaller reductions (20-100 mm) south through a number of properties fronting Kyema Drive and McClelland Avenue as well further south in Brunel Close. This option relies on the pump capacity of 300L/s which is extracted from the proposed retarding basin and within a pump station pit located at Brownlow Close.

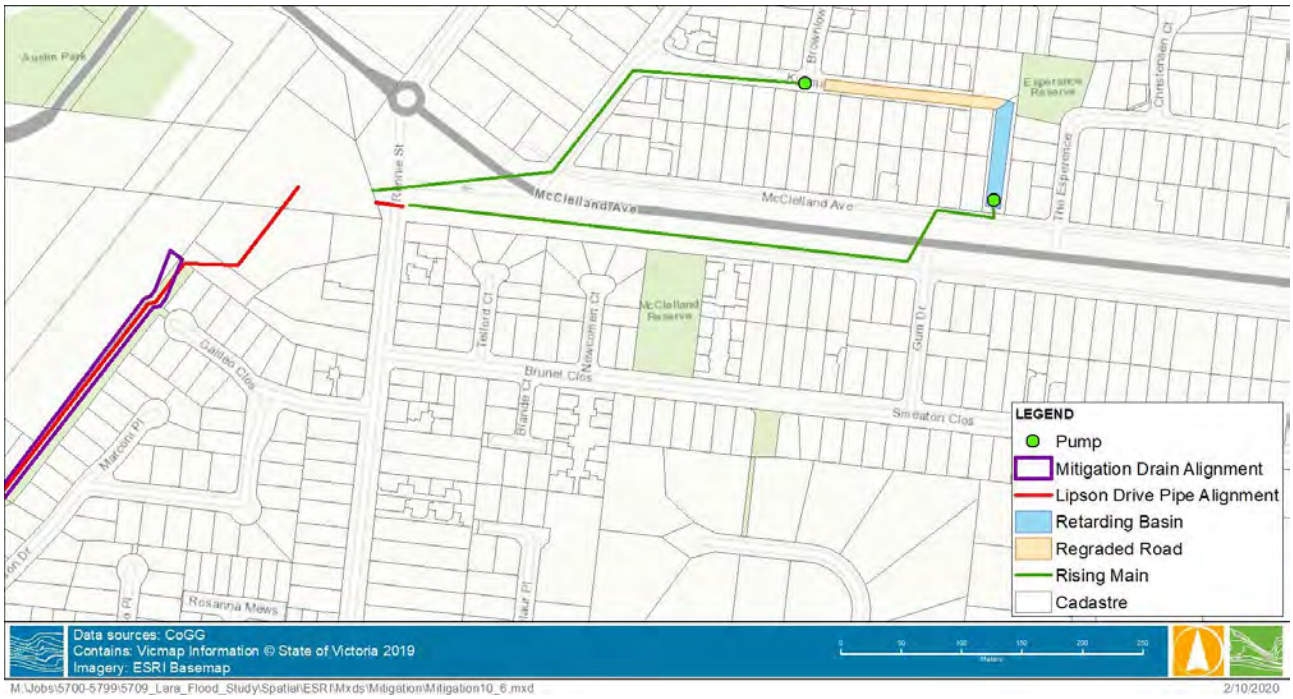


Figure 1 Kyema Drive Regrading + Basin + Pumps Layout

Figure 2 Kyema Drive Regrading + Basin + Pumps Difference Plot (Mitigation Minus Existing)

KYEMA DRIVE PUMPS

This option relies on two pumps to remove water ponding within Kyema Drive, Brownlow Court and Clover Street (Figure 3). The pump located at Brownlow Court has a pumping rate of 300L/s while the pump at Clover Street and Kyema Drive has a pumping rate of 600 L/s. The pumps would feed a rising main along Clover Street then crosses McClelland Avenue and outfalls to the open drain west of Rennie Street. This option also uses the proposed Lipson Drive mitigation design It also has significantly shorter length rising main to be installed and does not require the land set aside for the retarding basin. This reduces the estimated capital costs when compared with the previous option outlined above to around $1-$1.2 million, while providing similar reductions in flood levels (Figure 4) within Kyema Drive and larger reductions around McClelland Avenue and Brunel Close.

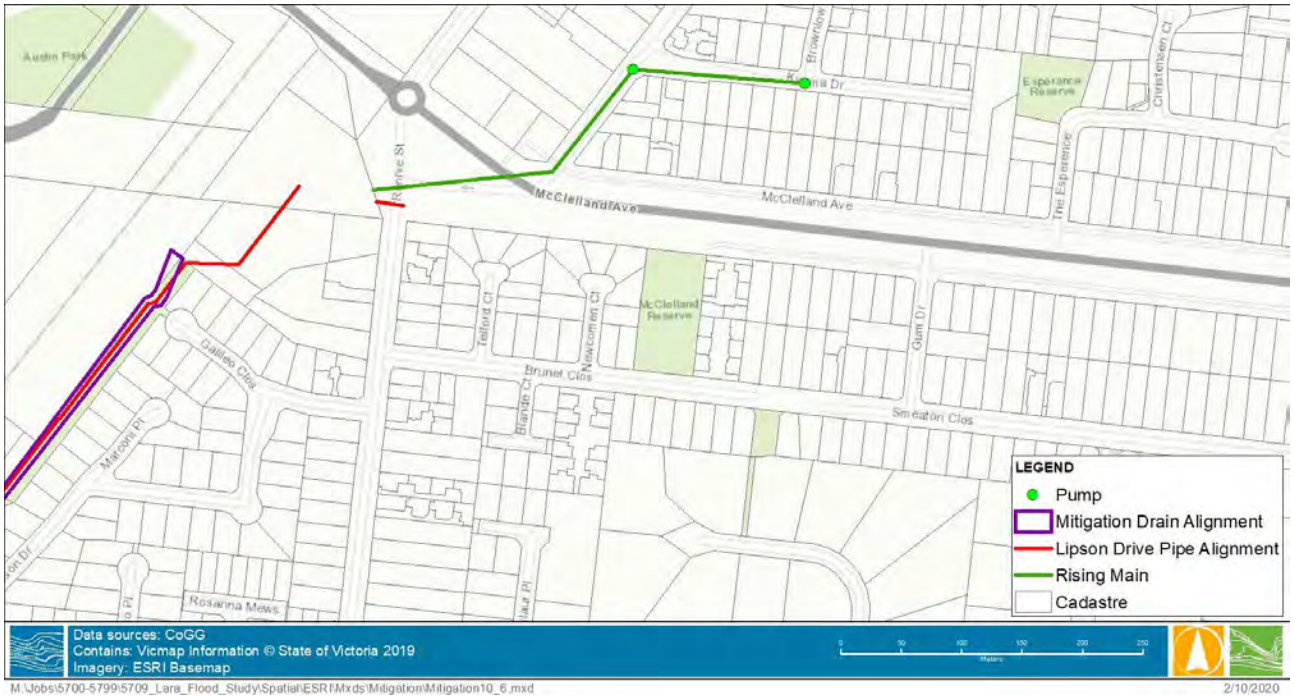


Figure 3 Kyema Drive & Clover Street Pumping Layout

Figure 4 Kyema Drive & Clover Street Pumping Difference Plot (Mitigation Minus Existing)

LOWER MCCLELLAND AVENUE

This option involves lowering the McClelland Avenue road reserve which was identified as forming a hydraulic control during the Lara Flood Study. The impact of lowering the road is likely to result in increases in flood levels to properties to the south of McClelland Avenue. In order to mitigate this the option modelled incorporated a levee along the northern boundary of these properties (Figure 5). In some locations the levee needs to be around 300 mm in height to ensure it is not overtopped by the additional flow from McClelland Avenue. The levee would still need to allow for access to the properties that front McClelland Avenue. There are 9 driveway crossovers between McClelland Reserve and Gum Drive and 20 properties between Gum Drive and Abbey Drive. There would need to be consultation with each of these land holders to develop a suitable sealed gate or temporary levee section to ensure flood waters do not enter the properties. The flood modelling results show reductions of upto 200 mm across McClelland Avenue and around 100 mm on properties fronting McClelland Avenue. Reductions within Kyema Drive are much smaller, around 20-50 mm (Figure 6). The results also indicate increases in flows through Brunel Close as flows are squeezed through the playground (McClelland Reserve). The City has also identified that there are significant trees within the road reserve that would likely make works to this extent difficult without significant controls around tree protection zones. This option also increases flood risk across McClelland Avenue as depths are increased upto 200 mm. This option would also likely involve significant traffic management and potential relocation of services to allow for the road reserve to be lowered. An alternative may be to incorporate a smaller section of the roadway could be lowered to help reduce the water level on the upstream side of the roadway. This still has the potential to increase flood risk along the road, however a third option may be to install a series of low flow culverts to convey flows from north of McClelland Avenue to the southern side of the road in a controlled manner.

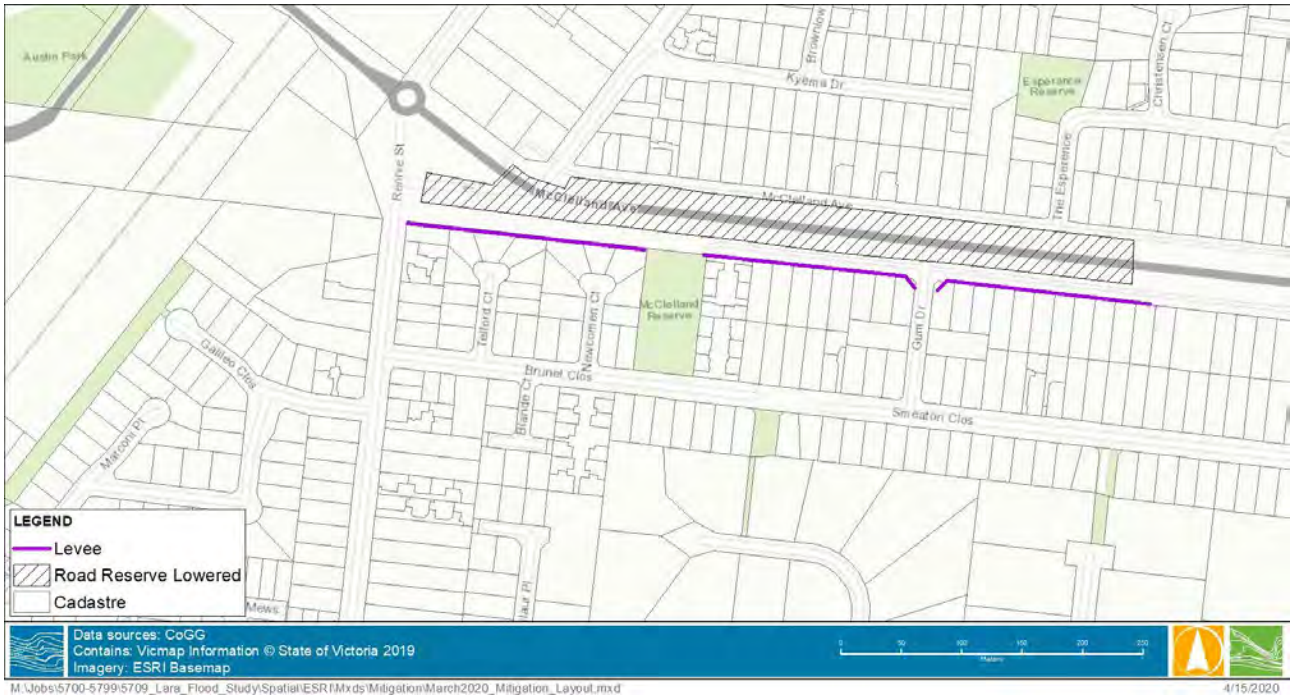


Figure 5 Lower McClelland Avenue Layout

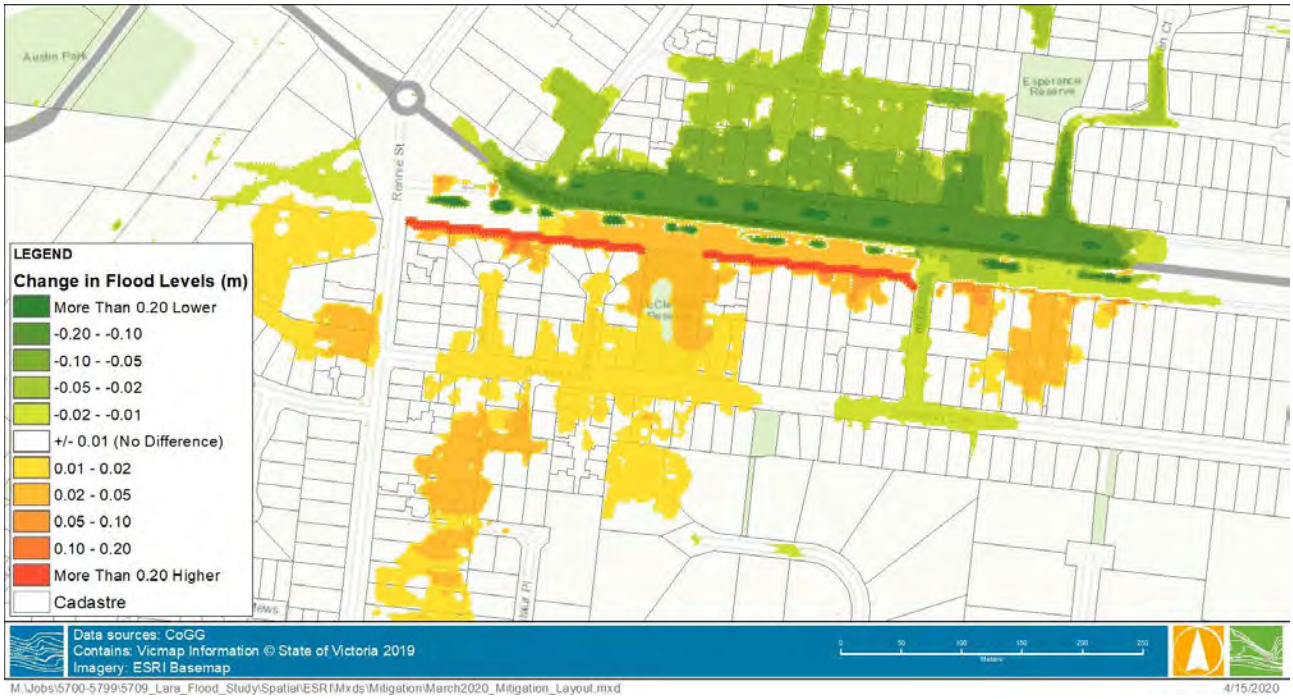


Figure 6 Lower McClelland Avenue Difference Plot (Mitigation Minus Existing)

RENNIE STREET DIVERSION PIPE

This option utilises the existing drainage network and incorporates an additional pipe along Rennie Street (Figure 7). The 840 metre pipe has a 900 mm diameter. The pipe would run at a slightly higher grade than existing pipe which runs along the eastern side of Rennie Street with several connections to the existing pipe. The pipe outfalls to the open drain just north of Cromwell Drive. The existing pipe currently conveys a peak flow around 0.3 m^3/s. The peak flow through the new mitigation pipe is around 0.4 m^3/s which slightly reduces in the peak flow in the existing pipe. Figure 8 shows the reductions in flood levels are relatively restricted to Brunel Close, however these reductions are not as significant as the Brunel Close Pump option and are similar in the reduction to the Kyema Pumps option. Rennie Street is an important transport route in the area and construction of a pipeline along the street would result in significant disruption. It is also likely that construction of a pipeline along this road would require relocation of major services that can significantly increase the project costs.

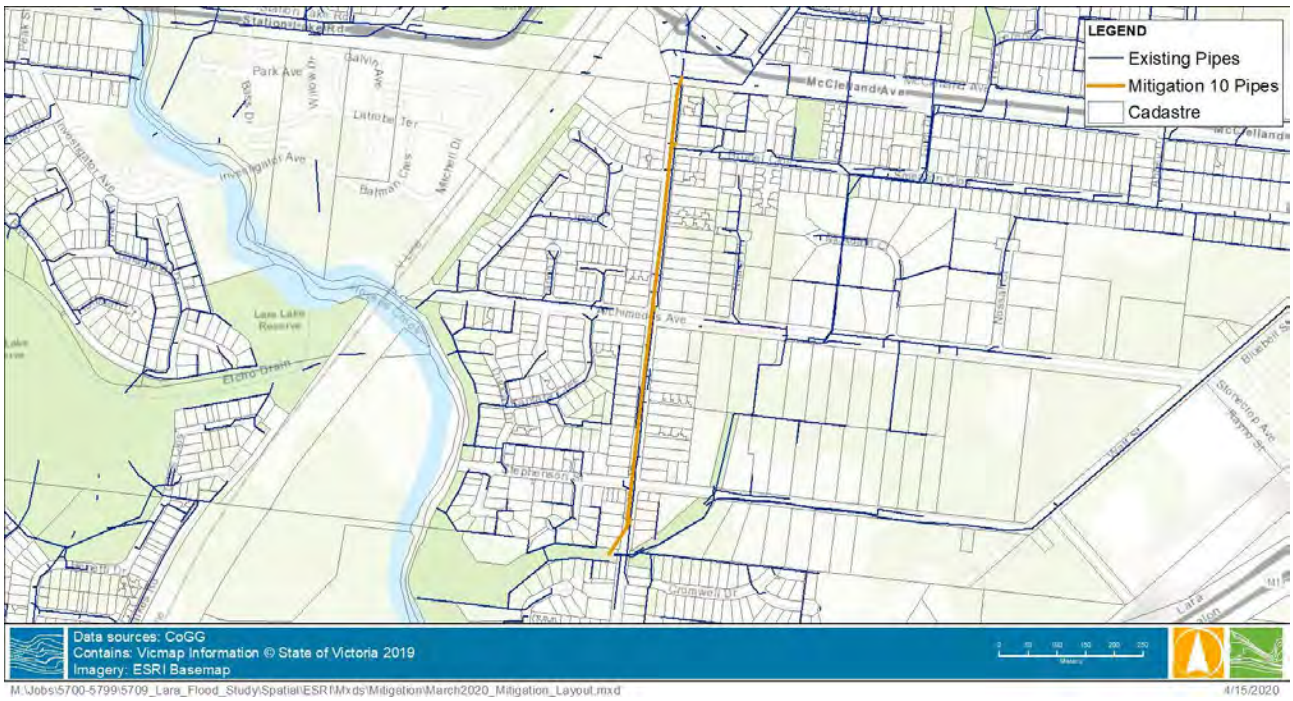


Figure 7 Rennie Street Diversion Pipe Layout

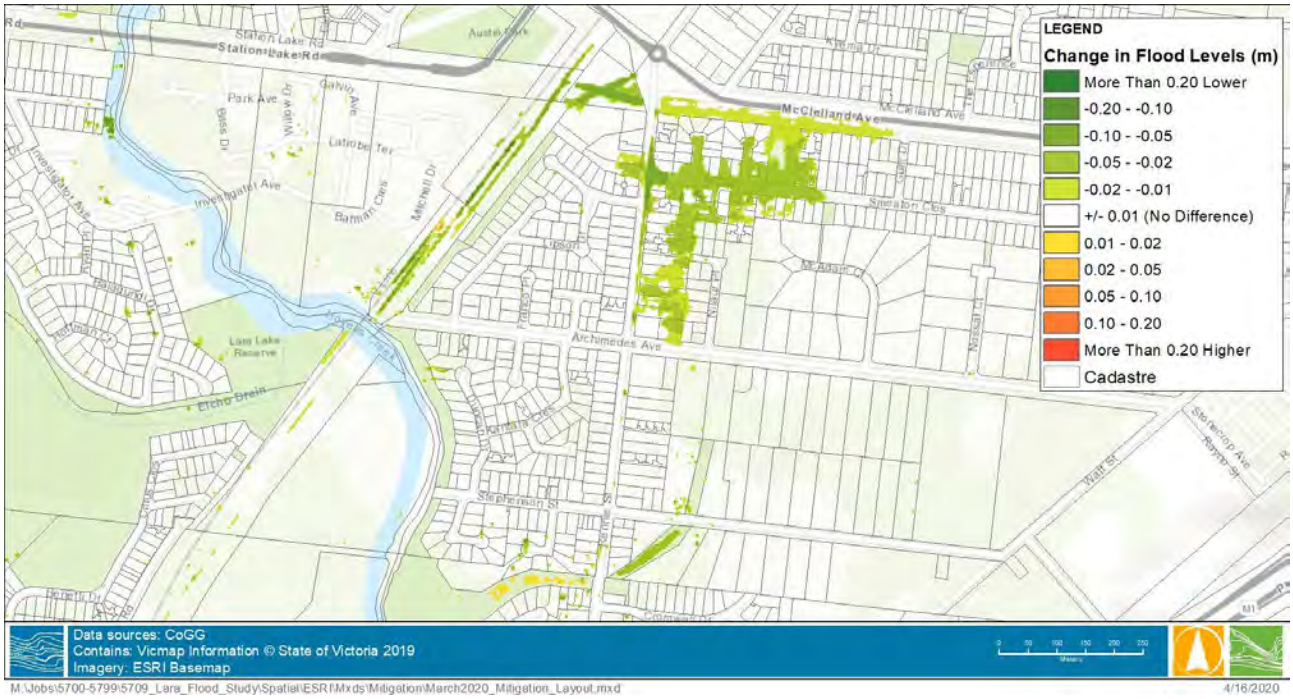


Figure 8 Rennie Street Diversion Pipe Difference Plot (Mitigation Minus Existing)

CHIRNSIDE PARK RETARDING BASIN

Chirnside Park is located north of Patullos Road and has a basketball court, BBQ facilities and a small rotunda. The park also has existing vegetation. Four catchment areas are located upstream of the park and outfall via two pipes to the open drain (Elcho Drain) on the southern side of Patullos Road. There are a number of properties impacted by flooding both to the south of Patullos Road as well as to the west of Chirnside Park. The mitigation option aims to lower the basin level to allow four inlet pipes to retain flows and then discharge via a single outlet (Figure 9). The initial modelling has proposes to remove around 100,000 m^3 of soil from the park. The modelling results (Figure 10) show significant reductions along Patullos Road as well as upstream of the park in Foot Court and Sheeran Crescent. Reductions along Elcho Drain downstream of the basin are present within private properties. The basin levels are limited by the existing invert levels, however the basin sizing and outlets could be optimised with further investigations with the aim to reduce the quantity of earthworks required to achieve similar reductions in flood levels. Currently, only the 2-hour duration event has been assessed, given the critical duration for this section of Elcho Drain is likely to be driven by a longer event, it is important to consider the longer events when assessing the basin. The catchment contributing to the proposed basin is much smaller than the Elcho Drain catchment and therefore understanding the critical duration of each system is required to ensure peak flows do not align, potentially increasing flood levels. Further options to the south of Patullos Road may also provide benefits to the Elcho Drain system. This area offers the opportunity to implement Water Sensitive Urban Design (WSUD) and Integrated Water Management for the existing catchment as well as potential future developments at Manzeene Village and further west.

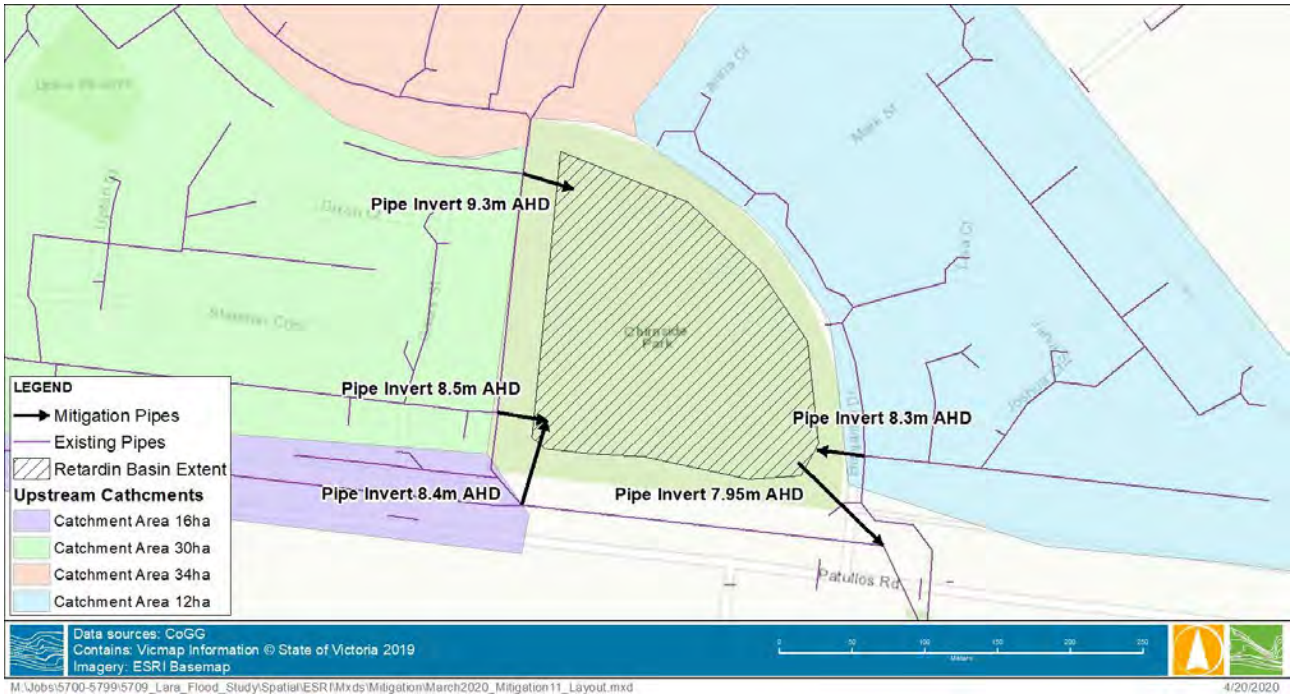


Figure 9 Chirnside Park Retarding Basin Layout

Figure 10 Chirnside Park Retarding Basin Difference Plot (Mitigation Minus Existing)

BRUNEL CLOSE PIPE AND PUMP

The initial concept looked at a new pipe running west along Brunel Close along Rennie Street and then through Galileo Close to the proposed Lipson Drive drain. However, when assessing the model results from this, there appears to be insufficient slope and suitable pipe cover to provide any significant flow. Results showed a peak flow through the new diversion pipe of only 0.1-0.15 m^3/s. A modified option incorporated a pump located within Brunel Close to convey ponded flows west along Brunel Close through private property (would require an easement) and through to the existing open drain (Figure 11). The pump included in the model has a pumping rate of 600 L/s and collects flows from within Brunel Close by providing a new drainage pipe along the southern side of the road that flows to a pit and sump. This also allows for flows from the pipe coming from north of McClelland Avenue to be diverted through this system, freeing up capacity further along the existing network. The flood modelling results showed significant reductions in flood levels through Brunel Close (200mm) and across a number of properties further south (Figure 12). There are increases to the north west of Brunel Close (Mittagong). These increases may be offset by coupling the Lipson Drive mitigation open to increase drainage capacity through this area.

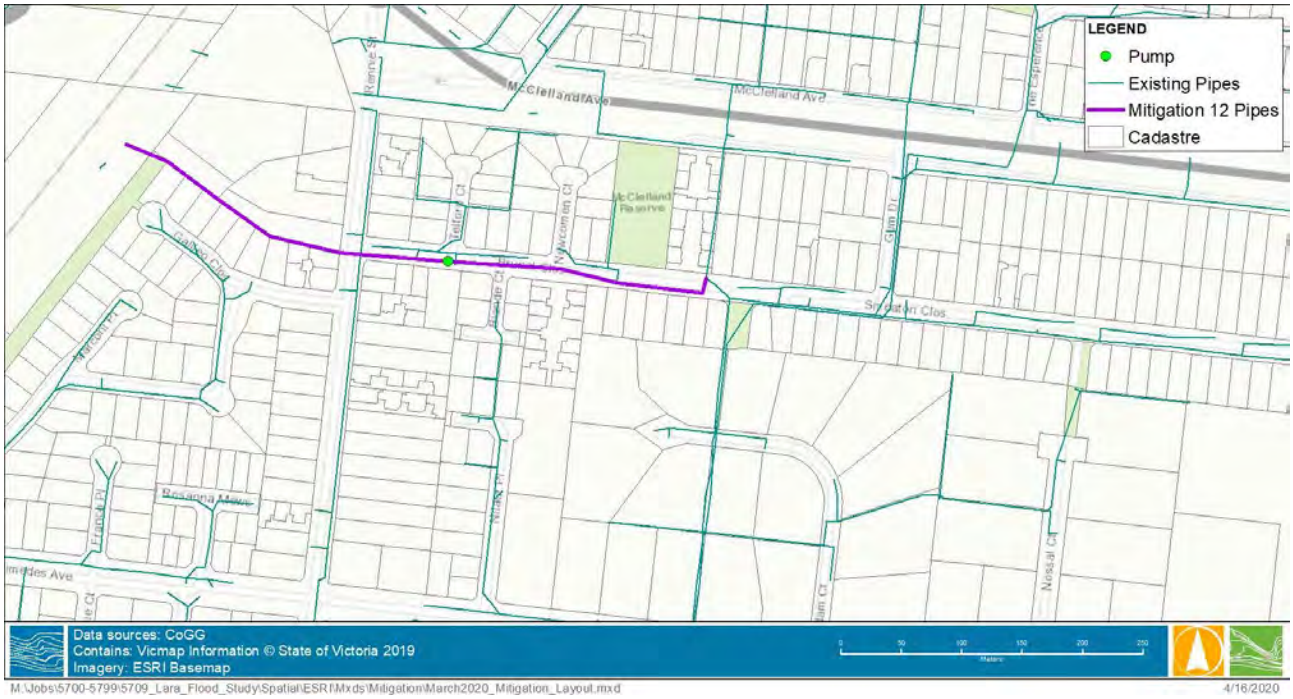


Figure 11 Brunel Close Pumped Outlet Layout

Figure 12 Brunel Close Pumped Outlet Difference Plot

SUMMARY

An initial review investigating six potential mitigation options has identified at least two options which may be worth investigating further. One option is focused at reducing levels within Kyema Drive using pumps and a rising main coupled with the Lipson Drive open drain. It appears the success of any of the upstream works around Kyema Drive are reliant upon the Lipson Drive drainage works to not cause increases in water levels on private property. The second option that may be worth pursuing further is the construction of a retarding basin within Chirnside Park to limit the flow rate entering Elcho Drain. This project has the potential to offer a number of additional benefits focused on water quality and WSUD and may be better suited to an integrated water management project. Both options are focused where small clusters of properties flooded above floor in a 1% AEP events have been identified or where there are a number of properties that are close to being flooded above floor.

When assessing mitigation options simply by the reduction in above floor flooding, the number of properties does not reduce significantly with only the Kyema Drive Pumps option reducing above floor flooding at 3 properties. When assessing the reduction in the number of properties where there is less than 300 mm freeboard between the floor level and flood level, the Kyema Drive Pumps Option reduces the number of properties by 12. The results of this are based solely on the 1% AEP-2 hour Duration event and summarised in Table 1. If all durations were assessed, these values may change slightly.

It is recommended to undertake further investigation of the Kyema Drive Pumps and Chirnside Park Retarding Basin options including assessing all duration events up to 48-hour storm durations in line with the modelling undertaken during the Lara Flood Study. Further investigation of Brunel Close may also be worth pursuing to alleviate flooding in the broader area. This area currently has only minor drainage and may require collection of pipe invert information to better inform mitigation modelling.

The option to lowering McClelland Avenue does not appear to provide a suitable outcome due to the inability to avoid increased flood levels on private property to the South of McClelland Avenue. The Rennie Street diversion pipe option does offer reductions in flood levels, however not as great as the Brunel Close pumping option. The Rennie Street works are also likely to cause significant traffic disruption during construction and would likely require relocation of services.

Table 1 Preliminary Mitigation Summary

Mitigation Option	Reductions	No Increased Levels	Cost Estimate	Further Investigation Recommended	Reduction in above floor flooding	Reduction in Properties Within 300mm of Above Floor Flooding
Kyema Dr Pumps + Basin	200-250 mm reduction in Kyema Drive	✓	$1.31 M	✓	2	10
Kyema Drive Pumps	~200 mm reduction in Kyema Drive	✓	$1.01 M	✓	3	12
Lower McClelland Ave	200mm Road Reserve, 100mm north of McClelland Ave, 50 mm Kyema Drive	✗	$2.09 M	✗	2	5
Rennie St Diversion	50-60 mm reduction in Brunel Close	✓	$1.97 M	✗	1	3
Chirnside Park RB	200 mm Elcho Drain, 50 mm Foot Court, 300 mm Pattulos Road	✓	$2.38 M	✓	1	2
Brunel Close Pipe and Pump	250 mm Brunel Close	✗	$1.24 M	?	1	6

Cr Nelson declared a Conflict of Interest by Close Association in Agenda Item 2 – Rippleside Inclusive Play Space Update, as his employer is a disability provider and there may be a perceived interest, he therefore left the room at 7.13pm prior to discussion.

2. RIPPLESIDE INCLUSIVE PLAY SPACE UPDATE

Source:	**Community Life – Social Planning and Investment**
Director:	**Robyn Stevens**
Portfolio:	**Sport and Recreation**

Purpose

1. To seek Council approval for release of the Rippleside Inclusive Play Space concept plans for the purposes of further community consultation.

Background

2. The municipality currently has limited play opportunities for people with disabilities. In Greater Geelong, over 14,000 people need help in their day-to-day lives, with an increase in help needed amongst younger demographics.

3. At the ordinary meeting on 26 March 2019, Council resolved to: *authorise the CEO to enter into a Memorandum of Understanding with Touched by Olivia and Variety to partner in the delivery of an inclusive play space at Rippleside Park*.

4. The proposal is to redevelop the existing Geelong Community Adventure Playground. The current playground was built in 2000 and is now identified for renewal. The design objectives for the proposed new play space are an inclusive play space, employing universal design principles to create a variety of play settings for people of all abilities and ages with a focus on natural and sensory play **(Attachment 2)**.

Key Matters

5. The City has partnered with Variety - The Children's Charity, worked with a range of community stakeholders and undertaken preliminary community consultation in November 2019. The feedback from this partnership and consultation has been used to inform the concept design for the proposed Rippleside Inclusive Play Space **(Attachment 3)**.

6. Key elements of the draft concept plans include a unique timber structure, nature play areas, water play, sensory and artistic elements and gathering and picnic areas.

7. The estimated total project cost is $2.5 million. This includes the play space, amenity block upgrade to include accessible toilets and changing places and other accessible infrastructure such as connecting paths and car parking.

8. Funding of $800,000 has been sought from the state government through the Sport and Recreation Community Infrastructure Program, along with a community funding campaign proposed to be launched in early 2021.

Cr Aitken moved, Cr Kontelj seconded -

9. That Council approves release of the draft concept designs for the Rippleside Inclusive Play Space for community engagement.

Carried.

Attachment 1

Financial Implications

1. The total project cost is estimated at $2.5 million. This overall figure includes demolition of the existing play space as well as upgrades to supporting infrastructure that will be required to service the new inclusive play space, such as car parking, toilet facilities and improving accessibility of path connections.

2. In the 2020-21 $400,000 has been allocated with a further $1.1 million projected for the 2021-22 year.

3. Funding from the State Government has been sought through the Sport and Recreation Community Infrastructure Program of $800,000. The outcomes of this funding round are due to be announced in July 2020.

4. The balance of funding will be sought via a community funding campaign to seek direct financial contributions and in-kind support from other community partners. Our project partner, Variety, will be leading this fundraising campaign.

5. The play space design allows for a staged approach to construction, in order to progress the project whilst remaining responsive to funding availability.

6. The inclusion of waterplay elements and anticipated higher visitation is likely to increase operational and maintenance costs at this site and will need to be factored into future annual operational budgets.

Community Engagement

7. The first round of consultation in November 2019 was conducted through an on-line survey as well as school and public workshops. Data was gathered about the elements and experiences that were most important to the public and potential users of the play space.

8. The initial consultation for this project had over 2,220 visits to the City's 'Have Your Say' page, with 158 people completing the survey. Around 40% of responders reported to have a child or family member living with a disability.

9. The survey responses identified shade, multi-aged experiences, toilet location, cleanliness and nature play as being of primary importance. Top play experiences included swinging, climbing, sensory play, water play and nature play.

10. Subject to the resolution of Council, the second round of community engagement would be undertaken during July and August 2020

11. Together with Variety, Council officers will take the concept drawings to key agencies, stakeholders and the wider community. The concept drawings will be available on-line and on-site during July and August 2020 via the City's website.

12. Zoom forums run by Variety will be offered to stakeholder groups and schools who participated in the first round of community engagement.

13. Media releases and social media will be organised to raise community awareness of the project and to invite the community to visit the City's Have Your Say webpage for this project.

14. Engagement findings will be collated and fed back to the landscape architect before the design plans are finalised and presented to Council for final endorsement early in 2021.

Social Equity Considerations

15. Play is for everyone, young and old, families and carers, and people of all abilities. The importance of play is recognised by the United Nations Convention on the Rights of the Child. The United Nations recognises play as a right for all children. Play is essential to children's development.

16. The City's *Geelong Play Strategy 2012-2021* also recognises the important role of play in the development of children and their families, and in the development of prosperous and cohesive communities. The strategy recognises that play enables children to learn new skills, make friends and build self-confidence. Play is important to the health and wellbeing of people of all ages and cultural backgrounds.

17. Geelong currently has limited play opportunities for people with disabilities. With over 14,000 people with a disability in the region, an ageing population increasingly involved in the everyday care of their grandchildren, and a multicultural society, play spaces should provide an inclusive experience for all.

18. The development of an inclusive playground addresses the first three goals in the *Access and Inclusion Action Plan 2018-2022*:

    18.1 Ensure facilities, buildings, environments and experiences are accessible to everyone;

    18.2 Provide more accessible public urban space; and

    18.3 Increase the number of community facilities with accessible toilets and adult change facilities.

    Rippleside Park is a central and highly accessible location within the municipality.

Policy/Legal/Statutory Implications

19. A memorandum of understanding (MOU) has been developed between Variety – The Children's Charity and the City. The MOU is not a legal relationship; its intent is to demonstrate a harmonious and cooperative approach by City of Greater Geelong and Variety to develop an inclusive playground at Rippleside Park.

Alignment to Council Plan

20. The development of an inclusive play space is consistent with the following strategic priorities of the *Council Plan*:

    20.1 *Improved health and safety for our community* – by improving the safety and user satisfaction of community infrastructure, creating more health and fitness options and promoting active living;

    20.2 *Informed social infrastructure and planning* – by providing more quality spaces that support active lifestyles, delivering accessible and attractive community infrastructure based on community need and maintaining our public open space;

    20.3 *A more inclusive and diverse community* – by supporting activities that improve social connections in our community, improving access to facilities and programs for people of all abilities; and

    20.4 *A destination that attracts local and international visitors*.

Conflict of Interest

21. No Council officers or contractors who have provided advice in relation to this report have declared a conflict of interest regarding the matter under consideration.

Risk Assessment

22. Initial concept plans for the inclusive play space have been costed at approximately $2.5 million. Delivery of the full scope of works will rely on in-kind and financial support from community and corporate fundraising initiatives being led by Variety - The Children's Charity, as well as significant state government funding contributions.

23. Due to the Covid-19 pandemic, community fundraising initiatives and state government funding applications have been subject to delays. Consequently, the final available project budget has not yet been determined.

24. To mitigate the risk of funding uncertainty, the concepts have been designed with an ability to deliver works in a staged approach. This will allow the scope of constructed works to respond to future funding availability.

25. Whilst there has been strong community support for an inclusive play space at Rippleside, the next round of engagement will provide the first opportunity for many community members to view and provide feedback on the Concept Plans. It is possible that not all community members will be supportive of all aspects of the play space.

26. Following the upcoming community engagement process, Jeavons Landscape Architects will prepare final designs which will consider and respond to the key issues and opportunities identified from community feedback.

Environmental Implications

27. No significant environmental implications are associated with this report.

Attachment 2

Rippleside Inclusive Play Space: Design Objectives and Key Elements

1. The design objectives were to create:

    1.1 a wide variety of play settings for all abilities and ages with a focus on natural and sensory play;

    1.2 an iconic tree top walk with views through the trees, across the play space and towards the bay the structure has multiple entries for all abilities, including wheelchair access up to almost 2.5 metres high;

    1.3 resolved complex site levels to ensure wheelchair accessible routes;

    1.4 an engaging planting palette suited to the local area, robust enough for a playground and an adventure for the senses;

    1.5 sheltered and comfortable seating for supervision and gatherings; and

    1.6 a surrounding fence with two gated entries.

2. Key elements of the draft concept design include:

    2.1 unique timber structure with a variety of climbing challenges, accessible swing bridge and high slides;

    2.2 nature play area with loose surfaces, plants trees, water and sand with living tunnels and cubbies with cosy planted spaces for creative natural play;

    2.3 water play area with mist, spurts and accessible boat;

    2.4 rocking, spinning and jumping zone including inclusive inground trampolines;

    2.5 dedicated toddler play area;

    2.6 sand play area with wheelchair accessible table beneath a pergola;

    2.7 a range of swings and flying foxes with back support;

    2.8 sensory and artistic elements including sound, smell, touch and kinesthetic awareness;

    2.9 agility and fitness area with accessible hand cycle, exercise bike, balance course and monkey bars; and

    2.10 gathering and picnic areas.

Artist Impression of Tree Top Walk

About the Project
The City of Greater Geelong and Variety - The Children's Charity are creating a new inclusive playspace at Ripplesde Park. This will be a unique place where people of all ages and abilities will be able to play alongside each other, creating a key community hub.

Jeavons Landscape Architects have been engaged to design the new playspace to replace the much-loved existing playground. Additional associated infrastructure such as external path connections and accessible toilets are planned future projects with elements on the plan subject to funding.

Community Consultation
The first round of consultation in November last year helped us to understand the needs of future users and surrounding communities. Through school and public workshops and an online survey we gathered data about the elements and experiences that were most important to community members. The project web-page had over 2220 hits with 158 people completing the initial survey. Around 40% of respondents reported to have a child or family member living with a disability.

We discovered that shade, multi-aged experiences, toilet location, cleanliness and nature play are all important. Top play experiences include swinging, climbing, sensory play, water play and nature play.

Wherever possible, we have included these elements and experiences into our Draft Concept Design and are pleased to present it for your review and comment. Note that all elements on the plan are subject to funding. You can view and comment on the design at www.geelongaustralia.com.au/yoursay.

Design Approach

Universal design principles have been used to create considered layouts that offer a broad choice of activities and types of play. The design aims to be safe, foster social interaction, provide amenity for all users and appeal to both the internal and external senses.

Design objectives for Rippleside Inclusive Playspace
To create:

- a wide variety of play settings for all ages and abilities with a focus on natural and sensory play
- an iconic tree top walk with views through trees, across the playspace and towards the bay. The structure has multiple entries for all abilities, including wheelchair access up to almost 2.5m high
- resolved complex site levels to ensure wheelchair accessible routes
- an engaging planting palette suited to the local area, robust enough for a playground and an adventure for the senses
- sheltered and comfortable seating for supervision and gatherings
- a surrounding fence with two gated entries.

We understand that the users are at the heart of creating a successful playspace and look forward to your feedback.

Jeavons LANDSCAPE ARCHITECTS

Draft Concept Design
Rippleside Park Inclusive Playspace

CITY OF GREATER GEELONG

variety the children's charity

01 Main Entrance

through a gate from Rippleside Park Dr. Another gated entry is located next to the toilet block. Additionally, the entire playspace will be encolsed with fencing.

02 Rocking, Spinning & Jumping

This zone includes inclusive inground trampolines, carousel and rocker beneath new shade trees.

03 Toddler Play

A dedicated space for toddlers with a slide, play panels, and swings with inclusive seating options beneath new shade trees.

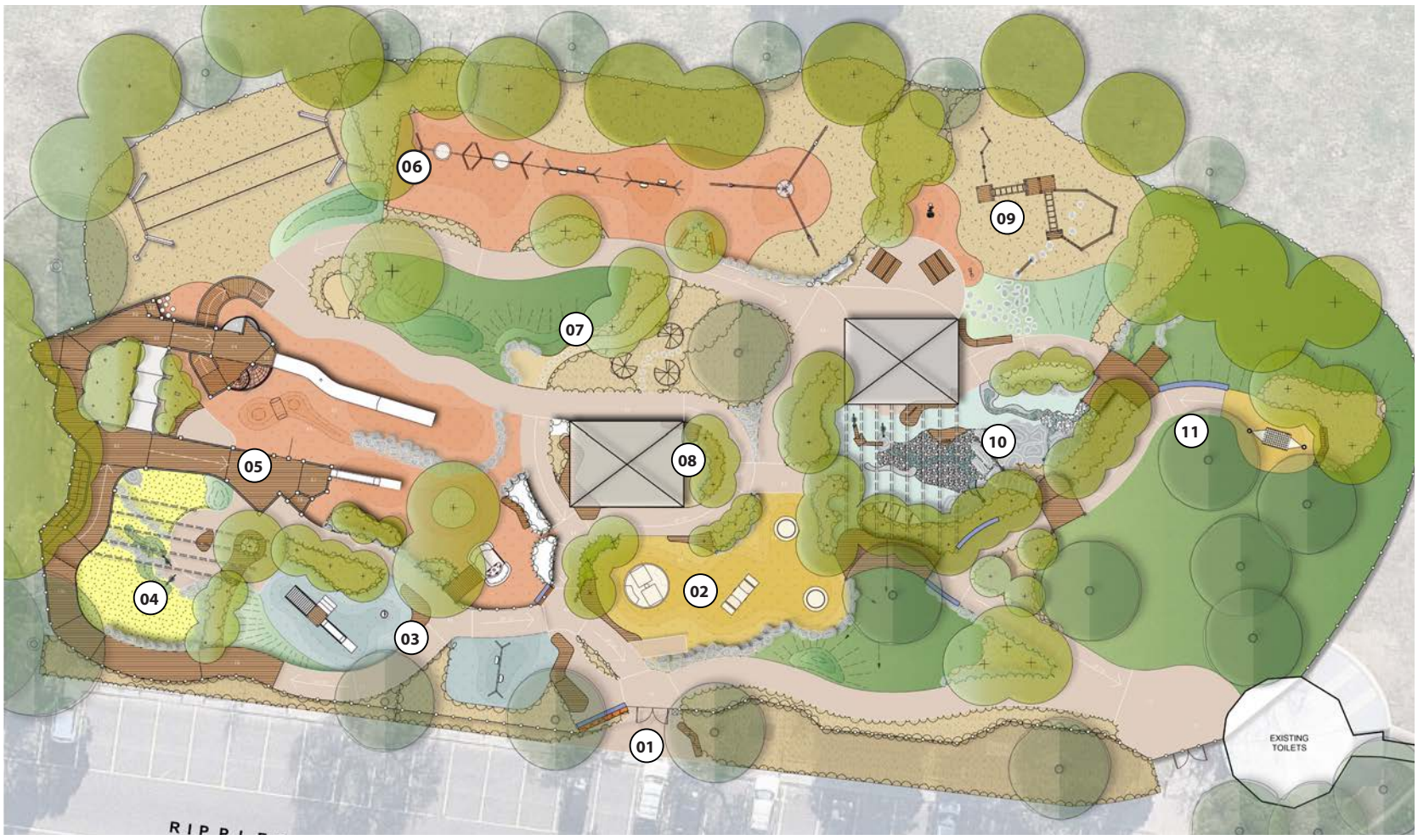
04 Sand Play

A generous sand play area with wheelchair accessible sand play table and water pumps beneath a pergola with climbing plants over.

05 Tree Top Walk

A unique feature timber structure that allows everyone play amongst the tree tops. Separate junior and senior zones ensure everyone can find a challenge to suit their ability. The walk is accessible via wheelchair up to 2.5m above ground and includes:

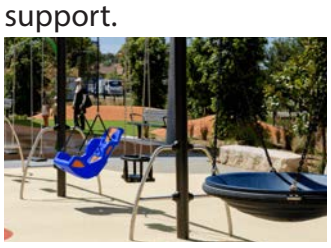
- A choice of high exciting slides
- Adventurous wheelchair accessible swing bridge
- A variety of climbing challenges for differing abilities
- Shaded cubbies, artistic elements, sensory experiences and exploration beneath.



Draft Concept Plan for Community Consultation

06 Swinging

A range of seating options for people all abilities including a flying fox, large swivel birds nest swing, smaller birds nest swing and various swings with back support.



07 Nature Play

Loose surfaces, plants, trees, water, sand and natural elements throughout the playspace provide inclusive opportunities for rich nature play. The area shown includes a gently undulating lawn, wheelchair accessible living tunnels and cubbies with cosy planted spaces for creative play with natural materials.

08 Gathering & Picnics

Centrally located and sheltered gathering spaces make supervising children's play in different areas accessible and comfortable. These spaces include accessible formal picnic settings, barbeques and informal seating. As well as lawns beneath mature trees.

09 Agility & Fitness

Accessible hand cycle, exercise bike, balance courses and monkey bars will challenge users to increase their upper body strength and balance.

10 Water Play

A water play area to engage the senses and cool down in hot months. Including mist, accessible boats, spurts and water play activities under shady trees and a new pergola.

11 Sensory Experiene and Artistic Elements

Accessible sensory experiences including sound, smell, touch and kinesthetic awareness.

Draft Concept Design
Rippleside Park Inclusive Playspace

Jeavons LANDSCAPE ARCHITECTS

CITY OF GREATER GEELONG

variety the children's charity

Artist Impression of Water Play Area

Materials Palette

Draft Concept Design
Rippleside Park Inclusive Playspace

Jeavons LANDSCAPE ARCHITECTS

CITY OF GREATER GEELONG

variety the children's charity

Draft Concept Design
Rippleside Park Inclusive Playspace

Jeavons LANDSCAPE ARCHITECTS

CITY OF GREATER GEELONG

variety the children's charity

Cr Nelson re-entered the meeting room at 7.30pm.

3. AFFORDABLE SOCIAL HOUSING ADVISORY COMMITTEE TERMS OF REFERENCE

Source:	**Community Life – Healthy Communities**
Director:	**Robyn Stevens**
Portfolio:	**Social Inclusion**

Purpose

1. To seek Council endorsement for the Affordable Social Housing Advisory Committee Terms of Reference (**Attachment 2**).

Background

2. Council endorsed the *Social Housing Plan 2020 – 2041* (the Plan) on 25 February 2020.

3. The Plan recommended specific roles for the City in its implementation:

   3.1 Leadership – advocating for an increase in social housing in public policy and in the local community by means of establishing an Affordable Housing Advisory Committee to Council;

   3.2 Capacity building – developing the capacity of the City of Greater Geelong to deliver the implementation of the Plan; and

   3.3 Governance - drafting the Terms of Reference for an Advisory Committee to help guide the type of representation required for this Committee that will in turn, provide Council with strategic advice from a range of stakeholders.

Key Matters

4. The drafted Terms of Reference outlines the functions of this new Committee which includes:

   4.1 Monitoring and promoting, advising and assisting Council the implementation of Council's Social Housing Plan.

   4.2 Advising Council on housing related issues, activities and opportunities within the municipality and broader sector particularly those that are linked to the supply of social and affordable housing.

   4.3 Assisting Council to identify priorities for advocacy to state and commonwealth governments on matters relating to social and affordable housing.

   4.4 Conveying the views and interests of the Geelong community and the various housing related networks to Council.

5. Recruitment for this Advisory Committee will be completed via an expression of interest process. Once the expressions of interest have been received appointment of members will be appointed in accordance with the Committee Representation Council Policy whereby, the Council appoints the Councillor representative and the CEO appoints the community and officer representatives.

Cr Mansfield moved, Cr Murnane seconded -

6. That Council endorse the Affordable Social Housing Plan Advisory Committee Terms of Reference (Attachment 2).

Carried.

Attachment 1

Financial Implications

1. There are no financial implications associated with this report.

Community Engagement

2. The Terms of Reference will be communicated upon advertising for members of the Committee.

Social Equity Considerations

3. All activities of the City will be informed by up to date demographic and geographic information on social equity in the region, which identifies priority areas and groups for attention. The *Social Housing Plan 2020-2041* provides comprehensive data and information that supports such a plan for Council's attention.

4. Planning of all activities will be informed by effective, focused partnerships and engagement with priority groups and areas, aimed at fully understanding the particular needs and obstacles they experience in accessing services and facilities. Implementation of the Social Housing Plan is reinforced by the need to convene a strategic advisory committee that will provide significant input and ideas into a range of actions as outlined in the Plan.

5. Service and infrastructure design, location, communication and support arrangements will address particular needs and obstacles faced by priority areas and groups. The Social Housing Plan identified key population groups who are more vulnerable than others and presents a roadmap that will help alleviate these obstacles, noting that the implementation of this plan has a long-term horizon.

Policy/Legal/Statutory Implications

6. The Victorian Government wants the assistance of local government in identifying local needs, using the planning system to encourage social housing development and by providing land.

7. The right to housing is to have somewhere adequate to live. Relevant policy and statutory implications include:

    7.1 Victorian Housing Act 1983;

    7.2 Planning and Environment Act 1987;

    7.3 National Housing and Homelessness Agreement (NHAA); and

    7.4 Victorian Charter of Human Rights and Responsibilities 2006.

Alignment to Council Plan

8. Under the *Council Plan 2018-2022*, 'Informed Social Infrastructure and Planning' priority states that Council will advocate and plan for a range of social and affordable housing options.

9. Under the *Council Plan 2018-2022*, 'Planned Sustainable Development' states that Council will make sure housing supply, diversity and affordability can meet the needs of our growing community.

Conflict of Interest

10. No City officers or contractors who have provided advice in relation to this report have declared a conflict of interest regarding the matter under consideration.

Risk Assessment

11. The Committee will provide advice to council on specific issues relating to Affordable Social Housing within the Greater Geelong Region.

Environmental Implications

12. There are no environmental implications.

THE CITY OF
GREATER GEELONG

Attachment 2

COMMITTEE TERMS OF REFERENCE

CITY OF GREATER GEELONG

AFFORDABLE SOCIAL HOUSING ADVISORY COMMITTEE

DOCUMENT NO:	**RECORD NUMBER D20-218547**
APPROVAL DATE:	
APPROVED BY:	
REVIEW DATE:	
VERSION NO:	1
RESPONSIBLE OFFICER:	Jane Wager
AUTHORISING OFFICER:	Janice Lane

1. SUMMARY

- A Council Advisory Committee (Committee) is established to provide strategic advice. Committees are guided by Council priorities outlined in the Council Plan.
- The purpose of a Committee is to draw upon local expertise, experience and networks to inform Council decision making by providing formal pathways for community input and providing regular, formal feedback to Council.
- The Affordable Social Housing Advisory Committee has been formed following the adoption of the *Social Housing Plan 2020-2041* (the Plan) which included a commitment to establish an Affordable Housing Advisory Committee to strengthen the leadership role that Council seeks to take in relation to the growth of social housing supply in the City.

2. OBJECTIVES

The Plan is built around five key goals. These are the objectives that will guide the Committee, providing the context for the operation of the Committee:

- Increase the supply of social housing from the current 3 per cent to 7 per cent of total households by 2031, an estimated increase in supply of 6,000 dwellings and to 10 per cent by 2041 (a further 6,000 dwellings);
- Increase the supply of social housing through: the provision of the City's owned land for social housing developments; and a new requirement for all development of the City's owned land to contribute to an increased supply of social housing. There is significant land supply in Geelong and the municipality is not "locked" by adjacent populated municipalities;
- Maximise state and commonwealth investment in new social housing across the City;
- Amend the City of Greater Geelong Planning Scheme to require the inclusion of social and affordable housing in new developments based on identified need; and
- Complete an '*Urban Refreshment'* of areas of high social housing concentration to enhance the utilisation and quality of social housing and increase the liveability and social wellbeing of these areas.

The Plan **also** recommends specific roles for the City in its implementation:

- Leadership – advocating for an increase in social housing in public policy and in the local community;
- Investment – investing in social housing by contributing City land and cash to leverage significant funding from state and commonwealth governments;

- Partnerships – developing partnership agreements with the commonwealth and Victorian state government Department of Health and Human Services to develop and undertake housing projects and access funding to expand the supply of social housing in Greater Geelong;
- Planning – utilising recent amendments to the *Planning & Environment Act* to negotiate the inclusion of new social housing within all new residential developments where development approvals have added value to land;
- Urban revitalisation – contributing to public urban improvements in Corio, Norlane and Whittington; and
- Capacity building – developing the capacity of the City of Greater Geelong to deliver the implementation of the Plan.

3. ROLE OF THE COMMITTEE

The role of the Affordable Housing Advisory Committee is to:

- Monitor and promote the implementation of Council's Social Housing Plan;
- Advise Council on housing related issues, activities and opportunities within the municipality and broader sector particularly those that are linked to the supply of social and affordable housing;
- Monitor research on housing need, housing demand and housing supply and advise Council on the implications for Council policies, trends to be communicated to the Geelong community and local priorities for research;
- Advise Council on the delivery mechanisms necessary for the implementation of the social housing growth targets in the Plan;
- Advise Council on any future opportunities to expand its role in the delivery of social and affordable housing and assist Council to promote the community benefits of social and affordable housing and best practice in social and affordable housing design and management;
- Assist Council to identify priorities for advocacy to state and commonwealth governments on matters relating to the demand and supply of social and affordable housing;
- Convey the views and interests of the Geelong community and the various housing related networks to Council; and
- Assist Council with event planning, consultation processes and other forms of engagement relating to affordable housing issues.

4. DEFINITIONS

Act	The *Local Government Act 2020*
CEO	The Chief Executive Officer of the City appointed by Council.
City	The administration of the City of Greater Geelong, led by the Chief Executive Officer.
Council	The City of Greater Geelong.
Councillor	Elected officials representing the City of Greater Geelong, including the Mayor.
Council officer	All staff of the City, including all contractors and volunteers engaged by the City, and the Executive Leadership Team.
ELT	Executive Leadership Team consisting of the Directors or Executive Managers of the Departments of the City who all report to the Chief Executive Officer.
Mayor	The Councillor elected to be the Mayor of the Council in accordance with the *City of Greater Geelong Act 1993*.
Affordable Housing	Affordable Housing is defined as housing, including social housing that is appropriate for the housing needs of very low, low and moderate income households.
Affordability	That household costs should not exceed 30 per cent of income for those households in the Very Low, Low and Moderate incomes categories.
DHHS	Department of Health and Human Services
Social Housing	An umbrella term that refers to public housing, delivered by the state government, and community housing, delivered by community housing providers.
Attachment 1	Key terms: City of Greater Geelong Social Housing Plan 2020–2041.

5. TERMS OF REFERENCE

5.1 Expected / Definite life of the Committee

5.1.1 The life of the Committee as the Social Housing Plan 2020–2041.

5.1.2 The term of community membership will be three years.

5.1.3 Members may be reappointed for a second term, however no more than 50 per cent of members who have served a full term may be reappointed at the commencement of a new term.

5.2 Appointment of members

5.2.1 The appointment of community members on the Committee shall follow the following process:

- Council will publicly advertise seeking applications from qualified community members requiring them to demonstrate how they meet the key selection criteria in the approved Position Description;
- Council will write to all key stakeholder networks to advise them of the opportunity and to encourage them to promote it amongst their networks and to endorse suitable applications;
- Following receipt of applications and the reaching the closing date for applications the applications will be assessed against the selection criteria and the requirement for a broad cross section of members involved in the "affordable housing system". Appointment of community representative will be made in accordance with the Committee Representation Council Policy;
- Should there be insufficient members appointed by the open process Council may approach individuals considered to meet the selection criteria and request they submit an application for consideration; and
- Following receipt and assessment of the application they may be appointed to the Committee in accordance with the Committee Representation Council Policy.

5.3 Composition of the Committee

5.3.1 The number of community members of the Committee shall be no less than eight and no more than 12 and be drawn from those sectors of the community who have a particular participation in the "affordable housing system" including:

- Consumers of social and / or affordable housing;
- Representatives of community service agencies that understand the impact of homelessness and unaffordable housing on low income households;
- Representatives of community housing organisations that provide social housing within Geelong;
- Representatives of the development industry involved in the delivery of housing;
- Representatives of the planning industry involved in the planning of housing developments;
- Representatives of the construction industry involved in the building of residential property;
- Representatives of the finance industry involved in the financing of the housing sector;
- Representatives of the philanthropic sector involved in the funding of social housing;
- Representatives of the Director of Housing within the Victorian State Government; and
- An academic/researcher with knowledge and experience in the housing system and preferably the social/affordable housing system.

5.3.2 The DHHHs will appoint two (2) members in a non-voting capacity. One (1) representing the Divisional Office One (1) representing the Central Office.

5.3.3 The Committee will be chaired by a Councillor appointed by the Mayor and is expected to be the Councillor holding the relevant portfolio.

5.3.4 A second Council representative will be nominated by Council.

5.3.5 Other City of Greater Geelong Councillors are welcome to participate as non-voting members.

5.3.6 The Committee will also be attended by the following Council Officers:

- Director – Community Life;
- Senior officers from Healthy Communities and Planning and Growth; and
- Additional staff may be invited to attend when their area of work is relevant to the work of the Committee.

5.4 The role of community members is to

5.4.1 Commit themselves to the Terms of Reference of the Committee.

5.4.2 Attend meetings of the Committee personally (no proxy allowed) and attend at least 80 per cent of all meetings.

5.4.3 Abide by best practice in the conduct of Advisory Committees by declaring any real or perceived personal conflicts of interest as soon as such becomes known.

5.4.4 Bring their knowledge, skills and experience of housing matters to the Committee and contribute to the development of collective wisdom.

5.4.5 Represent the views and ideas of their network to the Committee and communicate the collective wisdom of the Committee to their network.

5.4.6 Actively contribute by participating in discussions and offer opinions and knowledge.

5.4.7 Treat others with respect and have due regard to the opinions, rights and responsibilities of others.

5.4.8 Maintain the confidentiality of all information provided unless otherwise advised.

5.4.9 Act in a voluntary capacity.

5.4.10 A “representative” of an organisation is expected to be able to represent the views and ideas of that organisation while participating in the Committee as an individual with their own views, ideas and experience to be contributed for the benefit of the Committee.

5.5 Authority of the Committee

5.5.1 The Committee is an Advisory Committee for the purposes of the Local Government Act, therefore does not have delegated authority, and reports to Council as required.

5.5.2 The Committee has no financial delegation authority.

5.5.3 The Mayor and the Director are the designated media spokespeople for Council in accordance with Council’s Media Policy.

5.5.4 Advisory Committee, Working Group and Business Forum members may speak to the media about their own views but must not purport to represent Council.

5.6 Conflict of Interest and Confidentiality

5.6.1 If a Committee member determines that they have a Conflict of Interest in any matter which is to be considered at a meeting of the Committee then that person must:

- If he or she intends to be present at the meeting, disclose the nature of the interest immediately before the consideration or discussion; or
- If he or she does not intend to be present at the meeting, disclose the nature of the interest to the Chairperson of the Committee at any time before the meeting is held.

5.6.2 While any vote or discussion is taken on the subject matter the member must:

- Leave the room and notify the Chairperson that he or she is doing so; and
- Remain outside the room and any gallery or other area in view or hearing of the room.

5.6.3 The Chairperson of the Committee must record the declaration and the nature of the interest in the minutes of the meeting.

5.7 Timing, Place and Regularity of Meetings

5.7.1 The Committee will meet at least every quarter and for no more than three hours.

5.7.2 The Committee may decide to meet more often to consider specific issues in a workshop format.

5.7.3 The Committee will be hosted by Council in an appropriate venue.

5.7.4 A meeting of the Committee will not be called with less than two weeks’ notice to all members, unless there are exceptional circumstances.

5.7.5 The Committee may form Working Groups on particular issues as it sees fit.

5.8 Meeting Agenda

5.8.1 The Standing Agenda will include:

- Acknowledgement of Country;
- Attendance and apologies;
- Declaration of any conflicts of interest;
- Minutes of the previous meeting;
- Business arising from previous meeting;
- Council Report on Implementation of the Social Housing Plan;

- Questions and discussion arising from the Council Report;
- Matters identified by community members in writing for discussion and action; and
- Summary of maters to be reported on at the next meeting.

5.9 Meeting Procedure

5.9.1 The Chairperson shall chair the meetings, taking account of both the need for efficiency and the importance of accountability.

5.9.2 If the Chairperson is not present the meeting will be chaired by one of the members present.

5.10 Meeting Quorum

5.10.1 A quorum is six (6) members, not including Council officers or Councillors.

5.10.2 If less than six members attend, the meeting may proceed but no decisions can be made.

5.11 Reporting Requirements

5.11.1 The Committee shall report to Council providing an update of committee activities as required but at least annually.

5.11.2 Distribution time for agendas is one week prior to the scheduled meeting date.

5.11.3 Minutes from the Committee meeting will be circulated one week after the meeting has been held.

5.12 Secretariat

5.12.1 A Council officer will support the Committee.

5.12.2 The Council officer will prepare the agenda for every Committee meeting in consultation with the chair and circulate the agenda and any meeting papers to Committee members before the meeting.

5.12.3 Access to information and request for support from Council departments will be led through the department holding the housing portfolio.

5.12.4 Minutes of actions and decisions will be recorded and distributed to Committee members.

5.12.5 Minutes, reports and correspondence of the Committee will be registered in Council's record keeping software.

5.13 Facilities & Resources

5.13.1 The Committee will not have a budget for approved activities but will advise Council annually on budget requirements in relation to research, advocacy, promotions and community engagement for inclusion in respective program budgets.

6. QUALITY RECORDS

QUALITY RECORDS SHALL BE RETAINED FOR AT LEAST THE PERIOD SHOWN BELOW.

Record	Retention/Disposal Responsibility	Retention Period	Location

7. ATTACHMENTS

- Key terms: City of Greater Geelong Social Housing Plan 2020 - 2041

Key terms: City of Greater Geelong Social Housing Plan 2020 - 2041

Affordable housing	A dwelling available through a housing assistance program that provides for a specified level of below market rent price (e.g. public housing, community housing, National Rental Affordability Scheme, shared equity scheme for home ownership).
Community housing	Community housing is secure, affordable, long term rental housing managed by not-for-profit organisations for people on low incomes or with special needs.
Community housing provider	A not-for-profit organisation that delivers and/or manages community housing.
Commonwealth Rent Assistance (CRA)	A non-taxable Commonwealth Government supplementary payment added on to the benefit or family payment of people who rent in the private rental market above applicable rent thresholds.
Crisis accommodation	Crisis and emergency accommodation includes a range of specialist services for people who are homeless, at risk of homelessness, escaping family violence, or in other emergencies. These services are available 24-hours a day, however they are temporary and designed to immediately assist people in crisis to stabilise and move on to something more permanent.
Department of Health and Human Services	The Department of Health and Human Services (DHHS) is an agency of the Victorian State Government. DHHS delivers policies, programs and services for children and families, women, gender and equality, sport and recreation health and wellbeing, ambulance services, public health, ageing, disability, mental health, alcohol and other drugs and housing and homelessness.
Director of Housing (DoH)	The Director of Housing is the body corporate established under section 9(2) of the Housing Act 1983. The Director of Housing sits within DHHS and is the landlord of Victoria's public housing. The Director has powers to purchase, develop, lease and sell property.
Homelessness	The Australian Bureau of Statistics definition states that when a person does not have suitable accommodation alternatives, they are considered homeless if their current living arrangement: is in a dwelling that is inadequate has no tenure, or if their initial tenure is short and not extendable does not allow them to have control of, and access to space for social relations.
Household	One or more persons, at least one of whom is at least 15 years of age, usually resident in the same private dwelling. The people in a household may or may not be related. They must live wholly within one dwelling.
Housing need	A household is in housing need if its housing falls below at least one of the adequacy, affordability or suitability, standards and it would have to spend 30 per cent or more of its total before-tax income to pay the median rent of alternative local housing that is acceptable. Adequate is reported by residents as not requiring any major repairs. Affordable housing costs less than 30 per cent of total before-tax household income. Suitable housing has enough bedrooms for the size and make-up of resident households, according to National Occupancy Standard (NOS) requirements.
Low-income household	A household with income in the bottom 20 per cent of all household income distribution
Moderate income household	A household with income in the second income quintile (21–40%) of all household income distribution
National Affordable Housing Agreement (NAHA)	From 1 January 2009, government response to homelessness is administered under the NAHA and the National Partnership Agreement on Homelessness (NPAH).
National Partnership Agreement on Homelessness (NPAH)	The National Partnership Agreement on Homelessness (NPAH) commenced in January 2009. Under the current agreement the Australian and state and territory governments have committed to provide $1.1 billion in funding. It contributes to the National Affordable Housing Agreement outcome, to help people who are homeless or at risk of homelessness achieve sustainable housing and social inclusion.

National Rental Affordability Scheme (NRAS)	A Commonwealth Government scheme that commenced on 1 July 2008, providing annual incentives (tax credits—if paying tax, grants—if not paying tax) to investors for 10 years to create 50 000 new affordable rental properties rented to low-income and moderate-income households at 20 per cent below local area market rents. The scheme was stopped for new property incentives in 2014, and as a result 37142 dwellings will be built
Not-for-profit sector	Community organisations providing a broad range of social services, including in relation to homelessness, housing, education, health, conservation and recreation.
Public housing	A form of long-term rental housing managed by the State Government and targeted at people on low incomes or with special needs
Quintile	A proportion of a set of data that has been ranked and divided into five groups, each of which contains an equal number of data items. For example, Housing Affordability Stress is assessed for households in the bottom two quintiles (i.e. the bottom 40%) of the income distribution. Q1 households are those earning in the bottom quintile (0–20%) of Australia's income distribution. Q2 households are those earning in the second quintile (21–40%) of Australia's income distribution.
Renewal	The process whereby existing, ageing public housing estates or buildings are redeveloped to improve both housing outcomes for public housing tenants and the neighbourhood's amenity
Social housing	An umbrella term that refers to public housing, delivered by the State Government, and community housing, delivered by community housing providers.
Shared equity	An umbrella term that refers to a range of initiatives which 'enable the division of the value of a dwelling between more than one legal entity' (Whitehead and Yates 2007 p16)
Social inclusion	In the Australian policy context, social inclusion is conceptualised as the opportunity to participate in society through employment and access to services, connect with family, friends and the local community, deal with personal crises and be heard.
Social mix	Defined as a 'combination of diverse shares of social groups in a neighbourhood'. A social group has one or more factors in common, such as having similar economic resources (i.e. having low- or high-income), the same ethnic background or nativity (i.e. born in the same country), the same household structure (e.g. families with children or households of young singles) or the same tenure (i.e. being tenants or home owners/buyers).
Supply side assistance	Forms of housing assistance given to providers, not consumers, of housing to help increase the quantity or quality of housing (e.g. National Rental Affordability Scheme).
Supported Housing	Supported Housing is a type of Community Housing targeted to households in high need, including people who are often homeless or at-risk. It is coupled with other support services and owned and managed by the government and/or a non-government housing provider.
Tenancy support services	Services provided to assist those at risk of homelessness with existing tenancies in the public and private rental sectors. These are early intervention services that aim to stop homelessness from occurring.
Tenure	The nature of a person's or household's legal right to occupy a dwelling. These legal rights range across rights of use, control and disposal. Tenure types include home owners (outright owners, **purchaser owners**, **shared equity**), renters (private, public, community, social), rent free.
Transitional Housing	Transitional Housing is a supported short-term accommodation program. It acts as a stepping stone to more permanent housing in public housing, community housing or the private rental market. People moving into transitional housing have often been victims of a change in circumstance. For example, a lost job has meant the rent can't be paid, a marriage break-up leaves one partner with no money or support, or a person may lose the

	support of – or can no longer live with – other family members. A key element of transitional housing is that it's a temporary option, and tenants must be actively working with their support provider to apply for long-term housing.
Victorian Housing Register	The Victorian Housing Register manages applications for long-term social housing in Victoria. The waitlist now combines public and community housing applications for housing so that people only need to apply once and can be considered for both types of housing. Priority Access is given to those people who are homeless and receiving support, are escaping or have escaped family violence, living with a disability or have significant support needs and with special housing needs.

Source: Adapted from https://www.ahuri.edu.au/policy/glossary

4. TREE MANAGEMENT POLICY

Source:	**City Services – Tree Management Unit**
Director:	**Guy Wilson-Browne**
Portfolio:	**Parks, Gardens and City Services**

Purpose

1. To seek Council endorsement to release the draft Tree Management Policy for community engagement.

Background

2. The Tree Management Policy **(Attachment 2)** has been developed to provide a framework for the management of trees within the City of Greater Geelong and supports the objectives and vision of the Urban Forest Strategy 2015 and the Sustainability Framework 2020.

Key Matters

3. The Tree Management Policy has been developed to respond to the community's commitment to a cool green city that was identified in the development of the Urban Forest Strategy and the Sustainability Framework. To this end the policy is aimed at increasing canopy cover by protecting and preserving the existing tree population and ensuring successful planting opportunities for the future.

4. The Tree Management Policy will provide consistent and clear guidance for Council and the community on the management of trees within the City of Greater Geelong.

5. This policy applies to all trees within the City of Greater Geelong located on Council owned and managed land or subject to protection by the City of Greater Geelong planning scheme.

6. The policy framework applies to all Council departments, government entities, utility companies, land owners, developers and community members.

7. The Policy framework will guide decision making in the consideration of planning permits and project design and implementation across Council.

8. The policy outlines when Council will plant, prune or remove a tree and what measures must be undertaken to protect and enhance the tree population. Key provisions of the policy address:

   8.1 Planning;

   8.2 Tree planting;

   8.3 Tree maintenance;

   8.4 Tree protection;

   8.5 Tree removal; and

   8.6 Tree root interactions with public and private infrastructure.

Cr Aitken moved, Cr Mason seconded -

9. That Council endorse the release of the draft Tree Management Policy (Attachment 2) for community engagement from July to August 2020 (4 weeks).

Carried.

Attachment 1

Financial Implications

1. There are no additional financial implications arising from the adoption of this policy. The City provides tree management and planting through the Tree Management Unit.

Community Engagement

2. Internal engagement has involved two workshops with six teams and consultation on the draft policy with 17 teams across the City and the Parks, Gardens and City Services Portfolio and Environment Portfolio Councillors. Teams included Environment and Sustainability, Local Laws, Urban Design and Heritage, Open Space Planning, Planning Strategy, Parks, Engineering Services, Central Geelong and Capital Works.

3. Engagement with the community on the Urban Forest Strategy and the Sustainability Framework has also informed the development of this policy.

Social Equity Considerations

4. This policy will ensure fair, transparent and consistent management decisions by the Tree Management Unit.

5. The planning and management of trees in accordance with this Policy will give due consideration to protecting Aboriginal culture and heritage. This will include raising awareness and compliance with the Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2018. Council acknowledges that certain native trees can be important to cultural heritage places and are a significant part of the heritage of all Australians.

Policy/Legal/Statutory Implications

6. This policy is consistent with the Policies and Procedures Management Policy. The City has benchmarked the provisions of this policy with policies of other Victorian Councils.

7. The planning scheme includes regulatory protection overlays for trees on private property. These include 42.01 Environmental Significance Overlays, 42.02 Vegetation Protection Overlays, 42.03 Significant Landscape overlays, 43.01 Heritage Overlays and 52.17 Native Vegetation Provision

Alignment to Council Plan

8. A Key Priority of the Council Plan 2018-22 is to plant more trees to green and cool our city and to maintain quality public open space. This priority is reflected in the community's 30-year Clever and Creative vision, the Urban Forest Strategy and the Sustainability Framework.

Conflict of Interest

9. Officers involved in the preparation or providing advice to this report do not have direct or indirect interest.

Risk Assessment

10. Failure to adopt the policy can result in inconsistent management decisions across Council, causing community dissatisfaction and exposing the City to potential reputational risk and undermining the stated objectives of the Council Plan to deliver infrastructure, services and programs to the community in a sustainable way.

Environmental Implications

11. As the organisation and region face considerable environmental challenges, the Tree Management Policy provides framework for best practice in managing our tree population and addressing climate change issues through greening the City.

THE CITY OF
GREATER GEELONG

Attachment 2

TREE MANAGEMENT COUNCIL POLICY

VERSION: 1

Approval Date: DD Month YYYY of official approval

Approved by: Approval authority – e.g CEO or Council

Review Date: DD Month YYYY – generally 4 years from approval date unless shorter review period required

Responsible Officer: Title – as assigned by Authorising Officer

Authorising Officer: Title – CEO or Director/ Exec Manager of subject area

CITY OF GREATER GEELONG

Contents

D19-4828

INTRODUCTION

Council acknowledges Wadawurrung Traditional Owners of this land and all Aboriginal and Torres Strait Islander People who are part of the Greater Geelong community today. We pay our respects to their Elders past, present and emerging.

The planning and management of trees in accordance with this Policy will give due consideration to protecting Aboriginal culture and heritage. This will include raising awareness and compliance with the Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2018. Council acknowledges that certain native trees can be important to cultural heritage places and are a significant part of the heritage of all Australians.

Purpose

This policy provides the framework for the management of trees within City of Greater Geelong. It establishes when Council will plant, prune or remove a tree and what measures must be undertaken to protect and enhance the tree population.

Scope

This policy applies to all trees within the City of Greater Geelong located on Council owned and managed land or subject to protection by the City of Greater Geelong planning scheme.

The policy framework applies to all Council departments, government entities, utility companies, land owners, developers and community members.

DEFINITIONS

This section defines the key terms used in this policy.

Term used in Policy

BIODIVERSITY - The variety of all life forms on earth: the different plants, animals and micro-organisms and the ecosystems in which they are a part

CANOPY TREE – A tree with spreading branches that is greater than 6 metres in height at maturity.

CITY - The City of Greater Geelong organisation, led by the CEO.

CONSTRUCTION WORKS – Any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure, road or preparation of a building site and its surrounds.

COUNCIL - The City of Greater Geelong Council comprised of elected councillors and led by the Mayor.

COUNCIL OWNED AND MANAGED LAND – Land within the City of Greater Geelong Council that is owned or managed by the City, either developed or otherwise.

DEVELOPMENT WORKS – Real estate development, property development, service installation and changes to land use.

HABITAT TREE – Live or dead trees managed to provide ecological niches (microhabitats) such as cavities, bark pockets, large dead branches, cracks, sap runs, or trunk rot.

PLANNING SCHEME – Includes 42.01 Environmental Significance Overlays, 42.02 Vegetation Protection Overlays, 42.03 Significant Landscape overlays, 43.01 Heritage Overlays, 52.17 Native Vegetation Provision and the Distinctive Area Landscape Statement

STRATEGIC WORKS – Works by public authorities that set the direction for the City of Greater Geelong municipality and its community.

SUITABLY QUALIFIED ARBORIST - An arborist who holds recognised qualifications in arboriculture, appropriate to the task they are undertaking as per the appropriate legislation or Australian Standard.

TREE - a long lived woody perennial plant, with one or relatively few main stems or trunks.

POLICY

Policy Statement

The City of Greater Geelong is Victoria's second largest city, 75km south west of Melbourne. The City contains a mix of coastal, country and suburban communities that are home to over 150,000 trees. These trees provide many social, economic and environmental benefits. They beautify and soften streetscapes, provide wildlife habitat and play a significant role in determining the urban character of our city. Trees are critical in the maintenance of a healthy urban environment as they produce oxygen, trap airborne pollutants and absorb carbon dioxide.

The City of Greater Geelong's Urban Forest Strategy presents a vision that 'Geelong will be a cool green city for the future', this supports the objectives of the Sustainability Framework to 'green our urban spaces'. To support this vision and ensure consistency and the best community outcome when managing trees, the Tree Management Policy has been divided into seven key areas:

1. Planning
2. Tree Planting
3. Tree Maintenance
4. Tree Protection
5. Tree Removal
6. Tree root interactions with public and private infrastructure
7. Native Vegetation and Biodiversity

1. Planning

1.1. All strategic, development and construction work within the municipality is required to consider trees as early as possible in the design of the project to ensure the protection of existing trees and alignment with the Urban Forest Strategy and Sustainability Framework.

1.2. The principles that will guide construction and development within the City include:

1.2.1. All design and construction work around trees must consider existing trees to ensure the retention and protection of canopy trees in accordance with Australian Standard 4970 Protection of Trees on Development Sites

1.2.2. All subdivision applications must identify and prioritise sufficient space for canopy tree planting and include tree zones in the functional layout plans in accordance with the Code of Practice for Infrastructure in Road Reserves.

1.2.3. All developments must be designed and built to accommodate a minimum of one mature canopy tree in the nature strip per residential block or every fifteen metres, regardless of the presence of a tree at the time of design and planning.

1.2.4. Engineering solutions that decrease compaction and increase water availability are to be adopted to improve the growing environment for trees, and reduce conflicts with infrastructure

1.2.5. New buildings and associated infrastructure must be designed or located to minimise conflict with existing trees.

1.3. To improve and increase canopy cover in accordance with the Urban Forest Strategy, the largest species suitable for the site shall be selected.

1.4. When designing streetscapes trees that provide an appropriate scale, form and character for the neighbourhood and maximise beneficial environmental outcomes must be selected.

1.5. The importance of indigenous and native tree species is recognised and the City will seek to enhance biodiversity where possible.

1.6. Opportunities to integrate environmental outcomes such as promotion of habitat and biodiversity corridors into tree management programs will be sought.

1.7. The City will build partnerships with local, state and federal organisations to help green and cool the city.

2. Tree Planting

2.1. Opportunities for planting will be proactively identified within streets and parks to increase canopy cover across the municipality.

2.1.1. Resident requests for planting will be assessed and if the site is found suitable a tree will be planted in the next available planting season.

2.2. The City will aim to plant at least one tree in front of every property frontage. Additional trees will be planted where there is appropriate space and site conditions.

2.3. Species selection will consider the current and future environment of the site, the constraints specific to the site, the character of the neighbourhood, and diversity and resilience of the tree population

2.4. All tree stock will be grown in accordance with Australian Standard 2303 Tree Stock for Landscape Use

2.5. Council will advocate for greater tree planting on private land

3. Tree Maintenance

3.1. Best arboricultural practice will be applied at all times to promote a healthy and safe tree population. All pruning will be undertaken by a suitably qualified arborist in accordance with Australian Standard 4373 Pruning of Amenity Trees

3.2. Street and park tree inspections and pruning will be undertaken on a regular basis to improve tree health and safety and to provide clearances for pathways, roads, buildings and other essential infrastructure.

3.3. Trees will be inspected and pruned to ensure compliance with the Electricity Safety (Electric Line Clearance) Regulations 2015 (as amended from time to time) and other relevant statutory requirements.

3.4. Tree/s will not be pruned to facilitate views, to provide solar access to solar panels or gardens or to reduce the impact from wildlife waste or noise.

3.5. New technology in the field of arboriculture will be incorporated into management and maintenance techniques where appropriate.

3.6. Trees in areas of environmental significance will be managed to promote safety, the environmental values of the site and habitat opportunities for wildlife

4. Tree Protection

4.1. All development applications must include all information necessary to allow a full assessment of the potential impacts on trees to be retained, on or adjacent the site.

4.2. All trees will be protected in accordance with Australian Standard 4970 for the Protection of Trees on Development Sites. Developers are required to meet all costs related to tree protection.

4.3. Council owned and managed trees are protected under the Neighbourhood Amenity Local Law. The City's Local Laws team will investigate and pursue enforcement for any vandalism or unauthorised works to trees.

4.3.1. Trees that do not survive works will be retained as habitat trees where appropriate or a new tree will be replanted in the same location.

4.4. Trees recognised in a Significant Tree Register for scientific, social, horticultural or aesthetic reasons shall be recognised, protected and retained in the landscape.

5. Tree Removal

5.1. Tree removal will not be permitted to facilitate views (including advertising signs), off-street parking, installation of solar panels or awnings or to reduce the impact from any bird / bat / other animal waste or noise.

5.2. Risk to public safety and property will take priority in tree removal decisions in emergency situations.

5.3. The removal of individual street and park trees will only be approved when:

5.3.1. removal is the only option to mitigate a high or extreme risk; or

5.3.2. the tree is dead or in decline and unlikely to recover; or

5.3.3. the tree is causing damage to infrastructure or property and there is no reasonable option to otherwise resolve the issue; or

5.3.4. the tree is affected by development and there is no other design option available. Removal will occur if the applicant agrees to pay all costs, including removal, replacement and the value of the tree being removed as calculated by the City's methodology. All money collected will be used to improve tree canopy cover; or

5.3.5. the tree/s unable to be maintained to meet Electricity Safety (Electric Line Clearance) Regulations 2015 (as amended from time to time) and other relevant statutory requirements; or

5.3.6. the removal of trees is required to facilitate renewal of the street or reserve.

6. Tree root interactions with public and private infrastructure

6.1. All development and construction works must make allowances for the protection of Council-owned or managed trees on nature strips and parks during the planning, design and implementation process.

6.2. When tree roots are reported to be interfering with private infrastructure, investigations will be undertaken in accordance with the City's adopted risk reporting method.

6.3. Cracked pipes or drains leak moisture and provide an ideal entry point and growing environment for any plant roots in the area. It is the responsibility of the asset owner to maintain pipes, so they are fully sealed and do not leak.

6.4. Practical solutions will be sought to reduce the risk of damage to infrastructure from public trees. Tree removal will only be considered if no practical arboricultural solution can be found.

7. Native Vegetation and Biodiversity

7.1. Native Vegetation Framework

7.1.1. Council will embrace a native vegetation framework with the following goals;

7.1.1.1. Increase the national extent and connectivity of native vegetation;

7.1.1.2. Maintain and improve the condition and function of native vegetation;

7.1.1.3. Maximise the native vegetation benefits of ecosystem service markets;

7.1.1.4. Build capacity to understand, value and manage native vegetation; and

7.1.1.5. Advance the engagement and inclusion of Indigenous peoples in management of native vegetation.

7.2. What Biodiversity means to the City

7.2.1. Biodiversity means the variety of life, including how that life is organised and associated ecological processes. The variety of life includes plants, animals, fungi, bacteria and micro-organisms. Life is organised at a number of different levels:

7.2.1.1. genes that shape the form and function of each individual organism;

7.2.1.2. species which are groups of interbreeding populations;

7.2.1.3. ecosystems which are a dynamic complex of species and their environment; and

7.2.1.4. landscapes that are a mosaic of connected ecosystems.

7.2.2. Fundamental to the adaptation and maintenance of biodiversity are ecological processes. These include interactions between organisms (such as competition, predation, parasitism and mutualism) and between organisms and their environment (such as photosynthesis, respiration and biogeochemical cycling). Through time, these ecological processes contribute to natural selection, which shapes each species' genetic diversity and drives evolution.

7.3. Why is biodiversity important to the City

7.3.1. Biodiversity and the associated ecological processes underpin the health of our environment and its ability to support human needs. This includes basic requirements such as the production of oxygen, creation of soil, cycling and purification of water, and breakdown of wastes. It regulates our climate, underpins the production of our food and provides the basis for many popular recreational pursuits.

IMPLEMENTATION OF THIS POLICY

Monitoring and reporting

The Responsible Officer monitors compliance with this Policy and is responsible for reporting to Council.

The Responsible Officer will report to Council quarterly via the Council Plan Quarterly Report.

Advice and assistance

The Responsible Officer for this policy manages the provision of advice to the organisation regarding this policy.

A person who is uncertain how to comply with this policy should seek advice from this person or from their Manager.

Records

The City must retain records associated with this policy and its implementation for at least the period shown below.

Record	Retention / Disposal Authority	Retention Period	Location
Significant Tree Register	Coordinator - Tree Management	Seven years	Parks Gardens Reserves and Foreshore - Reports
Parks Planning Referrals	Parks Planning Officer	Seven years	Community Laws Management – Planning and Strategy
Tree Planting Program	Tree Planting Supervisor	Seven years	Parks Gardens Reserves and Foreshore – Projects and Programs
Tree Maintenance Program	Coordinator Tree Management	Seven years	Parks Gardens Reserves and Foreshore – Projects and Programs

Review

The City should review and, if necessary, amend this policy within four years of the approval date.

References

- City of Greater Geelong, *Municipal Road Management Plan*, 2018
- City of Greater Geelong, *Neighbourhood Amenity Local Law 2014*, 2014
- City of Greater Geelong, *Urban Forest Strategy*, 2015
- National Trust Register of Significant Trees, 2014
- Standards Australia, AS4970-2009 *Protection of trees on development sites*, 2009
- Standards Australia, AS4373-2007 *Pruning of amenity trees*, 2007
- Standards Australia, AS2303-2018 *Tree stock for landscape use*, 2018
- Victorian Government Gazette, Code of Practice for Management of Infrastructure in Road Reserves – Victoria, 28 April 2016
- Victorian Government Gazette, *Electricity Safety (Electric Line Clearance) Regulations 2015*, 23 June 2015
- Wadawurrung People, Caring for Country, 2020

5. GEELONG MAJOR EVENTS COMMITTEE - APPOINTMENT OF EXTERNAL REPRESENTATIVES 2020-2024

Source:	**Economy, Investment & Attraction – Economic Development & Events**
Director:	**Brett Luxford**
Portfolio:	**Tourism and Events**

Purpose

1. To appoint three community members as external representatives of the Geelong Major Events Committee (GME) for the period August 2020 – July 2024.

Background

2. Council established GME in August 1998, pursuant to section 86 of the Local Government Act (Vic) 1989:

   2.1. GME consists of a maximum of 12 persons. External members may fill up to six positions, where suitable candidates offering considerable value are identified. External members serve four-year terms and vacate the role at the end of each term, however may reapply via the public recruitment process;

   2.2. The term for GME external committee members, Dean Anglin and Julie Maxwell, will expire following the July 2020 GME meeting. A third position is available following the resignation of external committee member, Mark Stone; and

   2.3. External representation on the GME is considered to be essential as it enables the GME to draw upon expertise and networks beyond Council. Specifically, experience relevant to the business, arts, events or media communities.

Key Matters

3. In response to public advertisements, 12 applications were received. Two applications were received after the closing date and were ineligible. Advertisements were placed in City News on 21 February, 28 February and 6 March 2020. The opportunity to join the GME was also advertised online and promoted on the City's social media platforms.

4. A selection panel of the Director for Economy, Investment & Attraction, an incumbent GME external committee member, the GME Chair and the GME Executive Officer interviewed a shortlist of the new applicants. The panel recommends to Council the appointment of three external committee members for the period 2020 to 2024.

Cr Murrihy moved, Cr Sullivan seconded -

5. That Council:

5.1 Endorse the appointment of Julie Maxwell, Natalie Valentine and Brenden Caligari as external representatives to the Geelong Major Events Committee for the four-year term August 2020 – July 2024;

5.2 Formally thank the other applicants for their interest in joining the Geelong Major Events Committee; and

5.3 Formally thank Dean Anglin for his contribution to Geelong Major Events since August 2013.

Carried.

Attachment 1

Financial Implications

1. There are no financial implications arising from this report, as no remuneration is paid to external representative positions on GME. All GME committee positions are voluntary. Members can claim out of pocket expenses associated with participation on the committee.

Community Engagement

2. The appointment of three new external representatives to GME will be communicated to key stakeholders and the media.
3. The unsuccessful candidates will be notified in writing thanking them for their application and interest in GME.
4. A letter of thanks has already been sent to Mark Stone, following his resignation, thanking him for his contribution to the GME since 2016.

Social Equity Considerations

5. The inclusion of external representatives on the GME supports the transparency of the Committee. The recruitment process is open to anyone, whilst indicating a preference for experience relevant to the business, arts, events or media communities, as it applies to the subject matter of the Committee. The GME continues to have a gender balance of representation.

Policy/Legal/Statutory Implications

6. Within the Council Committee Representation Policy, there are no legal or statutory implications arising from this report. The appointment process is within the framework of the GME Terms of Reference, the Council Instrument of Delegation to GME and the Local Government Act 2020.

Alignment to Council Plan

7. Council has identified Growing Our Tourism and Events, along with A Thriving and Sustainable Economy as two of the strategic priorities of the *Council Plan 2018-2022*. It lists the Geelong Major Events Strategy as a key related plan.
8. The objectives of GME also support the community vision for Geelong to be recognised as a clever and creative city region. The vision identifies Geelong as a destination that will attract local and international visitors. This outcome is supported by the outcomes of the GME Committee.

Conflict of Interest

9. The Local Government Act requires members of any Council committees to disclose conflicts of interest and not participate in a decision when they have a conflict of interest. No officer involved in the preparation of this report has any direct or indirect conflict of interest in the matters raised in this report.

Risk Assessment

10. There are no known risks arising from this report.

Environmental Implications

11. There are no direct environmental implications arising from this report.

Cr Kontelj declared a Conflict of Interest by Close Association in Agenda Item 6 – Tender T2000036 Plant Hire Services, in that the company of which he is a Director provides services and goods to some of those who have been identified as preferred suppliers to the City of Greater Geelong for plant hire, and left the meeting room at 8.06pm for the evening.

6. TENDER NO. T2000036 – SUPPLY OF PLANT HIRE

Source:	**Customer & Corporate Services – Property, Procurement & Assets**
Director:	**Michael Dugina**
Portfolio:	**Finance**

Purpose

1. To establish a contract panel based on an agreed schedule of rates for the supply of plant hire used in civil construction and maintenance activities undertaken by the City.

Background

2. The current panel of contractors for the supply and delivery of plant hire services expired on 1 July 2020.
3. To facilitate the ongoing supply of plant hire, the Procurement Unit undertook a public tender (Tender T2000036) on behalf of the City Works Department.
4. The annual budget allocated for this contract is $3,000,000 (ex-GST).

Key Matters

5. At tender close the City received 47 tender submissions.
6. The submissions were evaluated in accordance with the processes detailed in the City's *'Procurement and Contracts Manual'.*
7. Based on the variety and volume of plant used and the competitive pricing of the submissions, the Tender Evaluation Panel have determined that 32 tenderers should be included on the Contract Panel.
8. Subject to Council awarding the contract, the service will commence 1 August 2020.

Cr Aitken moved, Cr Nelson seconded -

9. That Council:

9.1 Award Panel Contract C2000036 for the Supply of Plant Hire for an initial term of 3 years (with a further 2 x 12-month extension options) based on the tendered schedule of rates to the following preferred tenderers; and

No.	Tenderer	ABN
1	A&K Tucker Excavations Pty Ltd as Trustee for the Tucker Business Trust	**56 712 907 353**
2	Anthony Tromp t/a Tony Tromp Backhoe Hire	69 926 136 191
3	Aquatech Civil and Plumbing Pty Ltd	**39 621 412 431**
4	Bitu-Mill (Road Maintenance) Pty Ltd	**28 097 282 981**
5	Stephen Blake as Trustee for the Blake Property Trust	**13 745 748 162**

6	Brooks Hire Service Pty Ltd	**20 008 975 988**
7	Conplant Pty Ltd	15 000 373 151
8	D.A. Beretta Pty Ltd as Trustee for the Beretta Family Trust	58 174 651 945
9	Delta Rent Pty Ltd	24 116 501 725
10	Draper's Civil Contracting Pty Ltd	64 006 741 288
11	Goldsmith Civil & Environmental Pty Ltd	31 127 510 472
12	Harcom Civil Pty Ltd as Trustee for the Hart Family Trust	55 249 254 962
13	Trent McDonald as Trustee for the T&M McDonald Family Trust	81 193 716 608
14	Kennards Hire Pty Ltd	69 001 740 727
15	Keystone Civil Holdings Pty Ltd	11 167 195 619
16	Luxton Plant Pty Ltd	14 004 772 785
17	Marendaz Excavations Pty Ltd	81 098 667 504
18	Richmor Holdings Pty Ltd t/a Scott Morrow & Co	99 099 689 059
19	N & W Stolk Earthmoving Pty Ltd	15 625 682 751
20	D.P. and J.L. Dunoon Pty Ltd t/a Newcomb Sand & Soil Supplies	12 006 757 660
21	Norris Plant Hire (Geelong) Pty Ltd	17 007 218 108
22	PatAsh and Civil (Group) Pty Ltd	16 151 663 875
23	PJ&T Motors Pty Ltd	43 064 780 972
24	Plumbtrax Pty Ltd	11 142 872 491
25	Porter Constructions (Vic) Pty Ltd as Trustee for Pitman Investment Trust	31 660 634 992
26	Porter Excavations Pty Ltd	92 063 115 346
27	Rollers Australia Pty Ltd	50 087 309 091
28	Russell Brown t/a Russell Brown Bobcat & Tipper Services	59 941 638 261
29	Sherrin Rentals Pty Ltd	52 074 173 756
30	Solution Plant Hire Pty Limited	99 152 528 491
31	Tutt Bryant Hire Pty Ltd	59 087 847 489
32	W&B Dando Pty Ltd as Trustee for the Dando Family Trust	38 737 886 759

9.2 Authorise the Chief Executive Officer to execute Contract No. C2000036 and any other documents required by or to give effect to the terms of the Contract on behalf of Council.

Carried.

Attachment 1

Financial Implications

1. The current budget allocation for the supply of plant hire is $3,000,000 p/a (ex-GST) and is contingent on funding allocations in future recurrent budgets. The estimated total cost for the term of the 5-year agreement (inclusive of option periods) is $15,000,000 (ex-GST) subject to annual CPI adjustments.

Social Equity Considerations

2. The majority of successful tenderers operate businesses within the Geelong Region providing significant local employment and economic benefits to the Geelong community.

Policy/Legal/Statutory Implications

3. This tender was publicly tendered in accordance with the requirements of section 186 of the Local Government Act 1989 and the tender process has been conducted in accordance with Council's Procurement Policy.

Alignment to Council Plan

4. This project will aid in the delivery of integrated transport connections by supporting improvements to existing roads, streets and footpaths.

Conflict of Interest

5. All voting members on the evaluation panel confirmed that they did not have a conflict of interest with any of the tenderers.

Risk Assessment

6. The tender evaluation process involved the assessment of work, health and safety policies, procedures and risk assessment documents. Any other risks associated with the acceptance of this tender will be managed through the contract conditions.

Environmental Implications

7. Any environmental implications associated with this contract provision are the responsibility of the contractor and will be managed through the contract documentation.

Attachment 2

Tender Details

Contract Details

1. Contract C2000036 – Supply of Plant Hire

Invitation to Tender

2. The City released Tender T2000036 seeking to appoint a panel of contractors to provide wet and dry plant hire.

Table 1 Invitations to Tender

Medium	Date Advertised
Geelong Advertiser	18 January 2020
City of Greater Geelong website	18 January 2020

Tender Evaluation Panel

3. The Tender Evaluation Panel (TEP) comprised the following staff.

Table 2 Tender Evaluation Panel

Position Title	**Panel role**
Senior Procurement Services Officer	Chair
Supervisor Plant & Hire	Member
Co-ordinator Construction	Member
Co-ordinator Maintenance	Member

Tender Submissions

4. At tender close the City received 47 conforming tender submissions.

Tender Evaluation Criteria

5. The TEP used the following qualitative criteria (in order of weighting) to assess the submissions:

Table 3 Comparative Criteria Weighting

Comparative Criteria	**Weighting %**
Capability and experience, past performance over last 3 years	40%
Proposed plant and equipment	30%
Staffing & Customer Service	20%
Economic & local content contribution (mandatory)	10%

Tender Evaluation

6. The TEP shortlisted the remaining tenders based on the compliance to the contract, variety and volume of plant used, the quality of the submission and a value for money assessment of the tendered rates.

7. At the conclusion of the evaluation, the tenderers that achieved a weighted score of >50% and addressed the mandatory OH&S requirements were recommended for inclusion on the contract panel.

Table 6 Tender Evaluation Scores

Ref	Tender	Recommended / Not Recommended
Tender A		Not Recommended
Tender B	A&K Tucker Excavations Pty Ltd as Trustee for the Tucker Business Trust	Recommended
Tender C		Not Recommended
Tender D	Anthony Tromp t/a Tony Tromp Backhoe Hire	Recommended
Tender E	Aquatech Civil and Plumbing Pty Ltd	Recommended
Tender F		Not Recommended
Tender G	Bitu-Mill (Road Maintenance) Pty Ltd	Recommended
Tender H	Stephen Blake as Trustee for the Blake Property Trust	Recommended
Tender I	Brooks Hire Service Pty Ltd	Recommended
Tender J	Conplant Pty Ltd	Recommended
Tender K	D.A. Beretta Pty Ltd as Trustee for the Beretta Family Trust	Recommended
Tender L	Delta Rent Pty Ltd	Recommended
Tender M	Draper's Civil Contracting Pty Ltd	Recommended
Tender N		Not Recommended
Tender O		Not Recommended
Tender P		Not Recommended
Tender Q	Goldsmith Civil & Environmental Pty Ltd	Recommended
Tender R	Harcom Civil Pty Ltd as Trustee for the Hart Family Trust	Recommended
Tender S	Trent McDonald as Trustee for the T&M McDonald Family Trust	Recommended
Tender T	Kennards Hire Pty Ltd	Recommended
Tender U	Keystone Civil Holdings Pty Ltd	Recommended
Tender V	Luxton Plant Pty Ltd	Recommended
Tender W	Marendaz Excavations Pty Ltd	Recommended
Tender X		Not Recommended
Tender Y		Not Recommended
Tender Z	Richmor Holdings Pty Ltd t/a Scott Morrow & Co	Recommended
Tender AA	N & W Stolk Earthmoving Pty Ltd	Recommended

Ref	Tender	Recommended / Not Recommended
Tender AB	D.P. and J.L. Dunoon Pty Ltd t/a Newcomb Sand & Soil Supplies	Recommended
Tender AC	Norris Plant Hire (Geelong) Pty Ltd	Recommended
Tender AD	PatAsh and Civil (Group) Pty Ltd	Recommended
Tender AE		Not Recommended
Tender AF		Not Recommended
Tender AG	PJ&T Motors Pty Ltd	Recommended
Tender AH	Plumbtrax Pty Ltd	Recommended
Tender AI	Porter Constructions (Vic) Pty Ltd as Trustee for Pitman Investment Trust	Recommended
Tender AJ	Porter Excavations Pty Ltd	Recommended
Tender AK		Not Recommended
Tender AL	Rollers Australia Pty Ltd	Recommended
Tender AM	Russell Brown t/a Russell Brown Bobcat & Tipper Services	Recommended
Tender AN	Sherrin Rentals Pty Ltd	Recommended
Tender AO	Solution Plant Hire Pty Limited	Recommended
Tender AP		Not Recommended
Tender AQ		Not Recommended
Tender AR		Not Recommended
Tender AS	Tutt Bryant Hire Pty Ltd	Recommended
Tender AT	W&B Dando Pty Ltd as Trustee for the Dando Family Trust	Recommended
Tender AU		Not Recommended

Probity

8. No probity issues identified.

CLOSE OF MEETING

As there was no further business the meeting closed at 8.09pm. Tuesday, 14 July 2020.

Signed: _____
Cr Stephanie Asher (Mayor)

Date of Confirmation: _____.