

Draft Creswick Flood Mitigation & Urban Drainage Plan Summary

Flood level events modelled in preparing the draft plan

Table 1: Modelled Flood Levels	
10 year event:	A moderate flood with floodwaters overtopping the banks of Creswick Creek and starting to encroach on properties. Floodwaters from Creswick Creek are starting to inundate properties along North Pde and on the east side of Albert St.
20 year event:	A major flood with water levels overtopping the banks of Creswick Creek and causing widespread floodplain inundation. Floodwaters overtop Albert St inundating properties on the west side of Albert St, Cambridge St and Cushing Ave. Flows from Nuggetty Gully start to overtop the bluestone wall along the primary school and run down Victoria St.
25 year event:	The September 2010 flood
30 year event:	The January 2011 flood
50 year event:	Flood extent and flood depths are slightly larger than the September 2010 and January 2011 event.
100 year event:	Flood extent does not increase significantly but flood depths increase by an average of 170mm.

Other options considered:

In developing the plan a wide range of options was considered during the pre-feasibility stage before five options were analysed in detail. The list of options included:

- Constructing levees throughout the town
- Increasing creek capacity
- Increasing the capacity for water to pass under the Castlemaine and Clunes Rd bridges
- Constructing retarding basins upstream
- Installing baffles upstream to slow flow in the creek
- Building a small retarding basin upstream of Nuggetty Gully or increasing the height of the existing wall at the primary school
- Increasing the capacity of the Victoria St drain
- Using Cosgrave Reservoir and St Georges Lake to mitigate floods

Benefit-Cost Ratio

Indicative benefit-cost ratios were assessed using the construction cost estimates and average annual damage. A net present value model was used applying a 6% discount rate over a 30-year project life (see Table 2).

Note: In determining the benefit-cost ratio it is not possible to quantify the community's emotional stress caused by flooding. Nor is it possible to include the ongoing anxiety associated with rain events and the long drawn out process associated with insurance issues and repeated clean up and refurbishment. The Steering Committee recognises that many Creswick residents sustained personal and family loss during the flood events which compounded their pain and stress. If we could quantify this loss and the associated emotional stress then the benefit-cost ratios would be higher.

Table 2: Summary of Benefits, Costs and Benefit-Cost ratios					
Mitigation	Option 1	Option 2	Option 3	Option 4	Option 5
Benefit	\$930,500	\$904,700	\$1,002,600	\$912,500	\$1,143,400
Capital Cost	\$1,482,000	\$6,190,000	\$4,639,000	\$1,607,000	\$1,372,000
Benefit-Cost Ratio	0.6	0.1	0.2	0.6	0.8

Note: A benefit-cost ratio greater than 1.0 indicates that the benefits are higher than the costs.

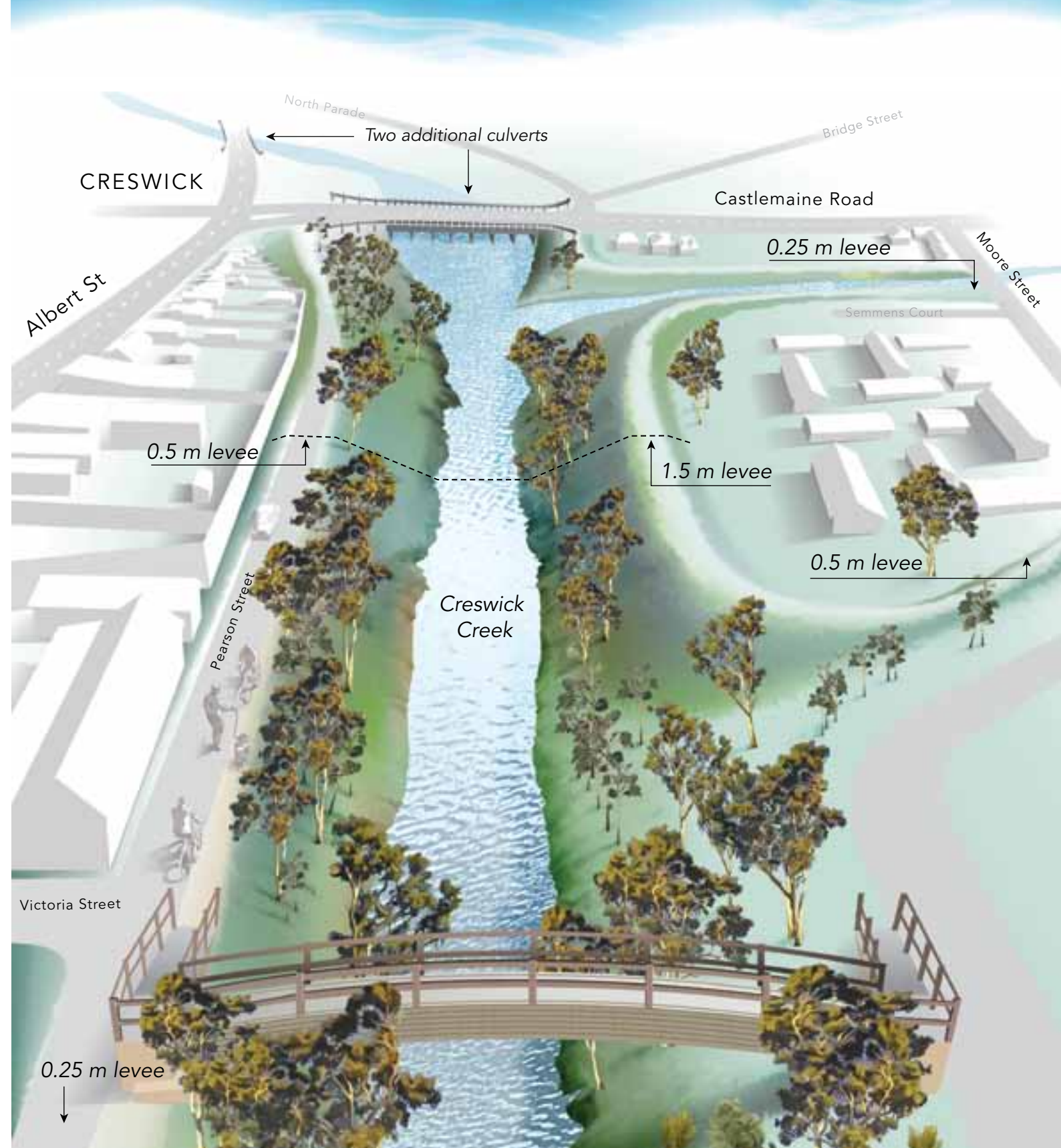
A copy of the full detailed draft plan is available from the North Central CMA website www.nccma.vic.gov.au. For information contact the North Central CMA by phoning 5448 7124.

Display copies of the full draft plan are available from the Creswick library, Hepburn Shire Creswick Customer Service office, and the Creswick Flood Recovery office.

Public meeting 1 December 2011

All Creswick residents are invited to a public meeting in the RSL Hall, 81 Albert St, at 7.30 pm on Thursday 1 December, where the draft plan will be explained in more detail.

For catering purposes please RSVP to the North Central CMA by 30 November. Phone 5448 7124 or email info@nccma.vic.gov.au.



Artist's impression of the preferred flood mitigation option

November 2011

Introduction

Flooding in Creswick last spring and summer damaged residences, businesses and sporting facilities. It also caused significant distress and hardship to the Creswick community. Recognising the need to reduce the risk of future flooding in the town a draft mitigation plan has now been prepared.

A Steering Committee, with support from a Technical Working Group, has prepared the Draft Creswick Flood Mitigation and Urban Drainage Plan. The Creswick community is represented on the Steering Committee.

In August 2011 two initial flood mitigation options were presented to the Creswick community. Following the meeting further options were modelled. In all, five mitigation options have been modelled and they are summarised in this brochure.

Options 1-4 are rejected as either unacceptable to the Creswick community, too costly or not providing sufficient protection from future flooding. Mitigation Option 5 is preferred.

Before the plan is submitted to government for consideration, the Steering Committee is seeking community feedback on the preferred option.

Preparation of the draft plan is funded by the Victorian Government and has followed industry best practice guidelines. This gives the plan the best chance of success when it is submitted to government for funding to design and construct.



Mitigation Option 1

This option involves constructing levees to protect against Creswick Creek and Saw Pit Gully overflows and a retarding basin upstream of Nuggetty Gully. The option is designed to protect against a 100 year flood event.

Works include a left bank levee along Creswick Creek (from Water St down to Cushing Ave), a retarding basin embankment wall in the upper reaches of Nuggetty Gully and ring levees around Semmens Court Village and the properties along Castlemaine Rd. The main levee along Creswick Creek would have an average depth of 1.8m and maximum depth of 3.1m. Freeboard is included in the design of the levees and the Nuggetty Gully embankment wall.

BENEFIT: \$0.93 million

COST – Construction \$1.48 million
Annual Maintenance \$13,600

BENEFIT-COST RATIO: 0.6

This mitigation option is rejected by the community. Feedback from the August public meeting considered 3.1 m high levees unacceptable.

Mitigation Option 2

This option involves widening and deepening Creswick Creek and converting the Clunes Rd and Castlemaine Rd culvert bridges into clear span structures. The option was modelled to identify the scale of channel and bridge works required to prevent Creswick Creek from overtopping its banks during a 100 year event. As such, no works were considered for the tributary creeks.

BENEFIT: \$0.90 million

COST – Construction \$6.19 million
Annual Maintenance \$20,600

BENEFIT-COST RATIO: 0.1

This mitigation option is rejected because of its low benefit-cost.

Mitigation Option 3

This option involves a combination of widening and deepening the Creswick Creek between Water St and the railway bridge (excluding the channel section between the bridges which will remain at the same width but be excavated down to 0.5m) and with some minor levee alignments. Widening at the bridge is minimised by having steeper bank slopes. Both bridges have been modelled as clear span bridges. Secondary works include low levees along Saw Pit Gully, a levee at the back of the motel and an embankment wall along the primary school. The option is designed to protect against a 50 year flood event.

BENEFIT: \$1.00 million

COST – Construction \$4.64 million
Annual Maintenance \$23,700

BENEFIT-COST RATIO: 0.2

This mitigation option is rejected because of its low benefit-cost.

Mitigation Option 4

Creswick Creek is made into a uniform channel and concrete lined, while avoiding any major works to the bridges. The primary works involve creating a uniform channel and concrete lining Creswick Creek between Water St and Clunes Rd. The creek cross-section is not changed dramatically.

BENEFIT: \$0.91 million

COST – Construction \$1.61 million
Annual Maintenance \$5,580

BENEFIT-COST RATIO: 0.6

The secondary works (low levees along Saw Pit Gully, a levee at the back of the motel and an embankment wall along the primary school) were kept exactly the same as option 3, in order to directly compare the effects of widening the creek against concrete lining. The option is designed to protect against a 50 year flood event.

This option is rejected because of its low benefit-cost, its lack of community support and the fact that it is not best practice. Whilst reducing water levels, this option does not have as much impact as widening and deepening the creek. This is because the existing bridges in Option 4 still act as a constriction to the flow capacity.

Mitigation Option 5 – the preferred option

This option would protect against a 50 year flood event – providing greater protection than a flood the size of the September 2010 and January 2011 events.

This option involves works that include:

- Installing two additional culverts under both the Clunes Rd and Castlemaine Rd bridges
- Minor channel deepening (0.25 m at Water St grading down to zero at the invert of the Castlemaine Rd bridge, and 0.25 m between Clunes Rd bridge and Nuggetty Gully). This includes minor widening of the channel bed
- Constructing levees along the left bank between Water St and Nuggetty Gully

- Constructing low levees along Saw Pit Gully
- Raising the embankment wall along Nuggetty Gully at the primary school

Note: Further investigation is required to determine feasible and cost effective options to protect the few remaining properties still at risk of flooding.

BENEFIT: \$1.14 million

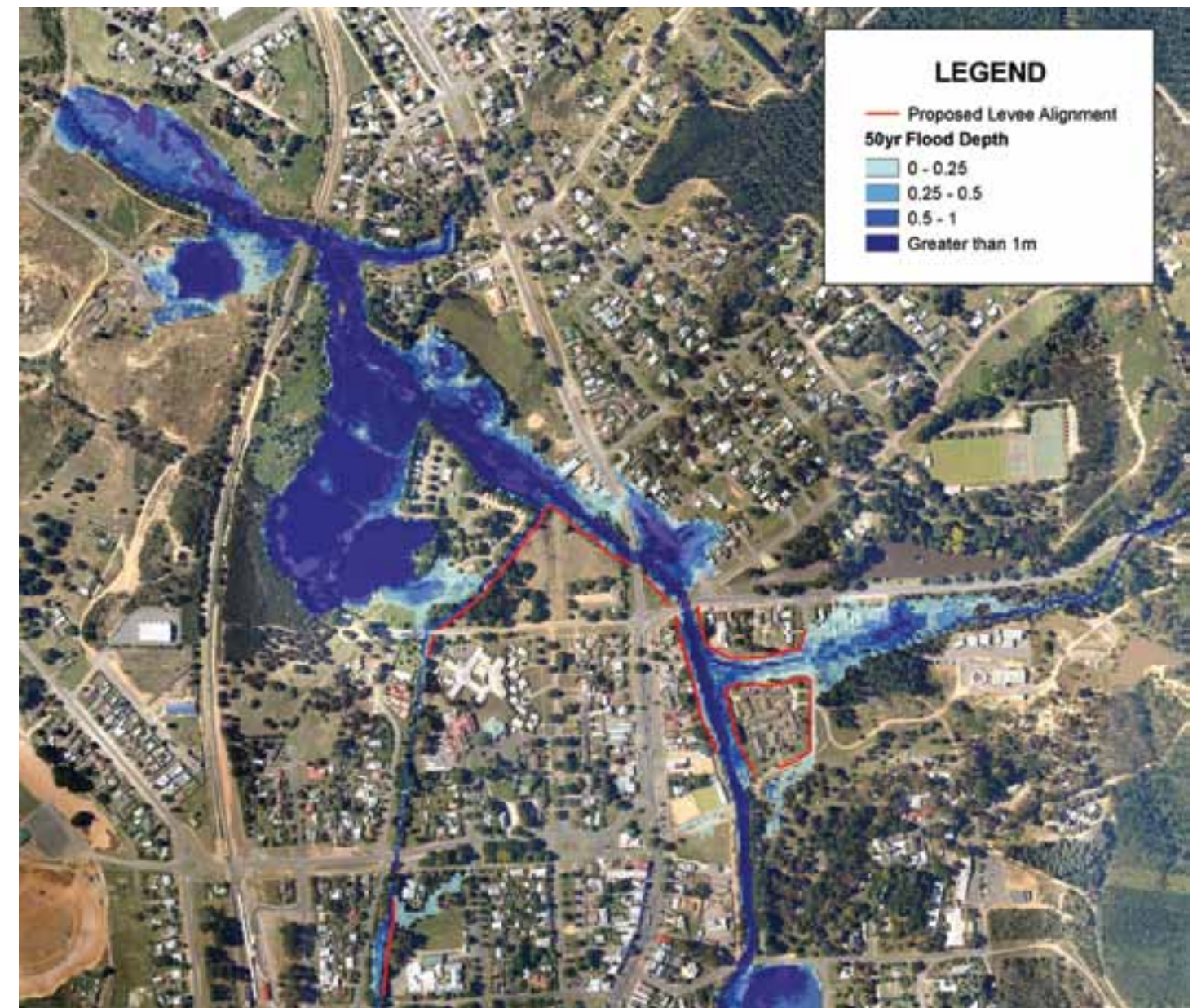
COST – Construction \$1.37 million
Annual Maintenance \$5,840

BENEFIT-COST RATIO: 0.8

If the plan progresses to detailed design and construction then bike and walking trails along the creek levees will be considered further.

Creswick urban drainage plan

Hepburn Shire Council has responded to the localised flooding issues by providing additional funds in its 2011-2012 budget. In Creswick the areas that have been highlighted as part of the Creswick Flood Mitigation and Urban Drainage Plan include Harvey Street, Wright Court and Gardiner Streets.



Proposed Creswick levee locations for Mitigation Option 5.