



Natimuk Flood Investigation Study Report



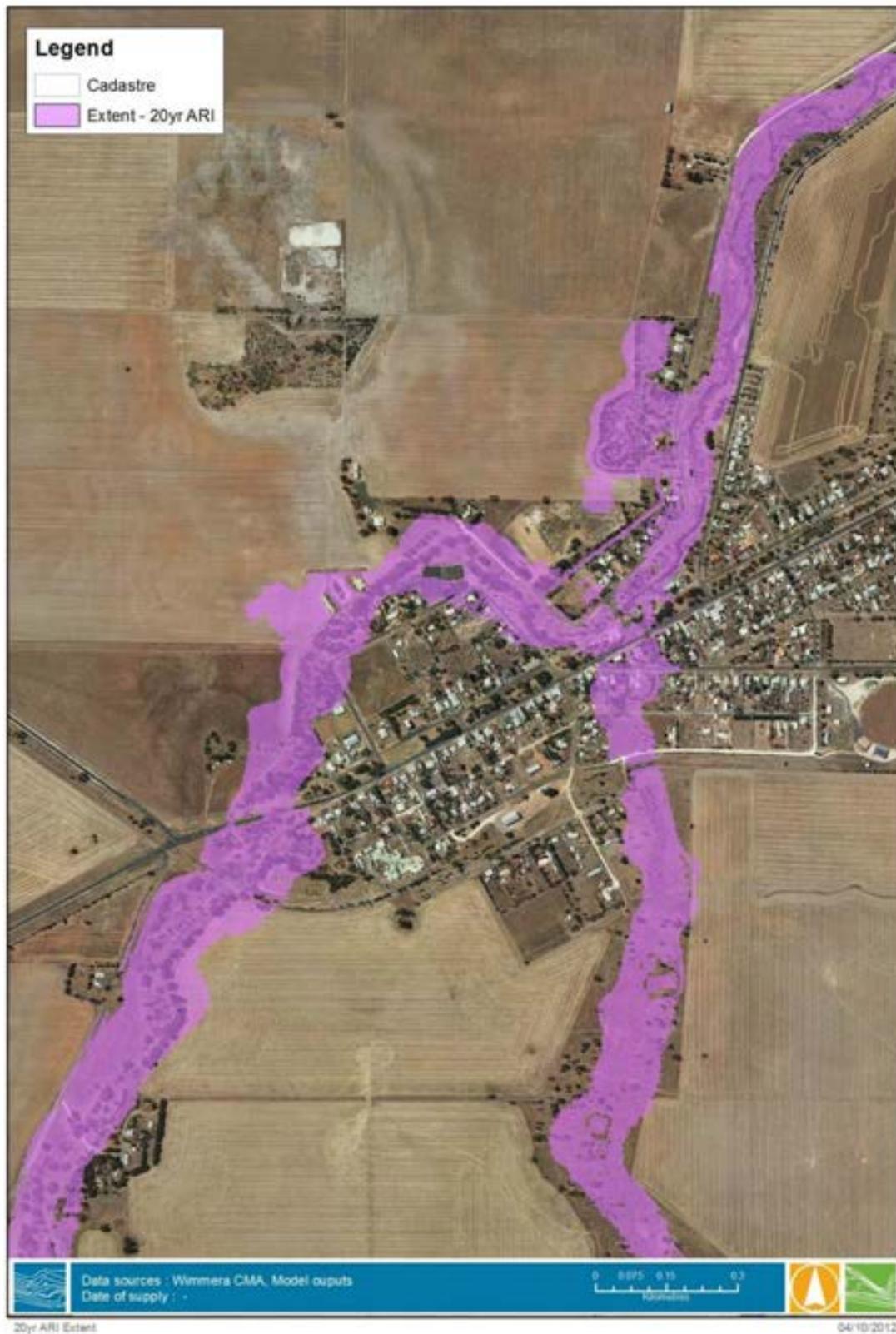
January 2013



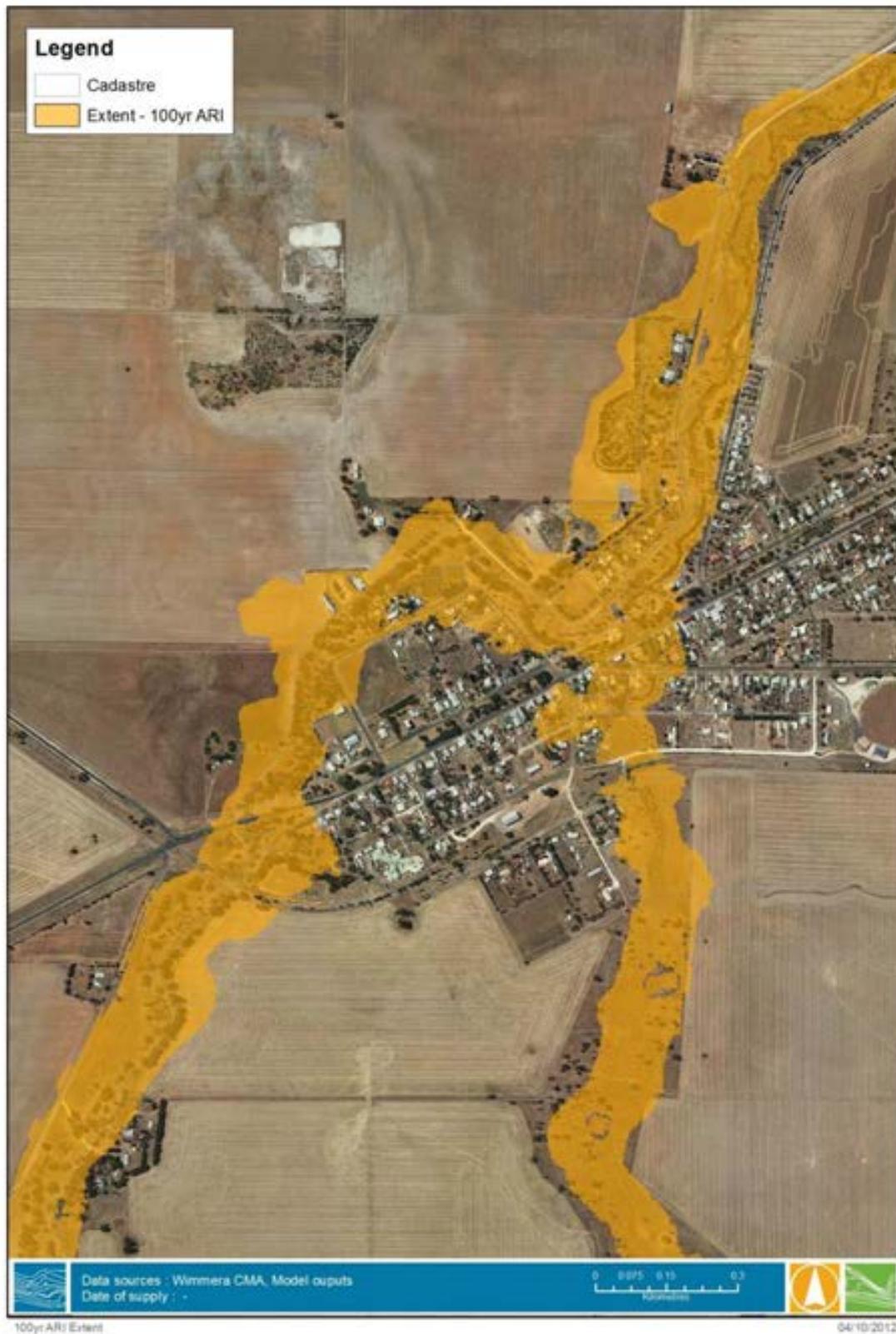
APPENDIX A EXISTING CONDITIONS EVENT MAPPING

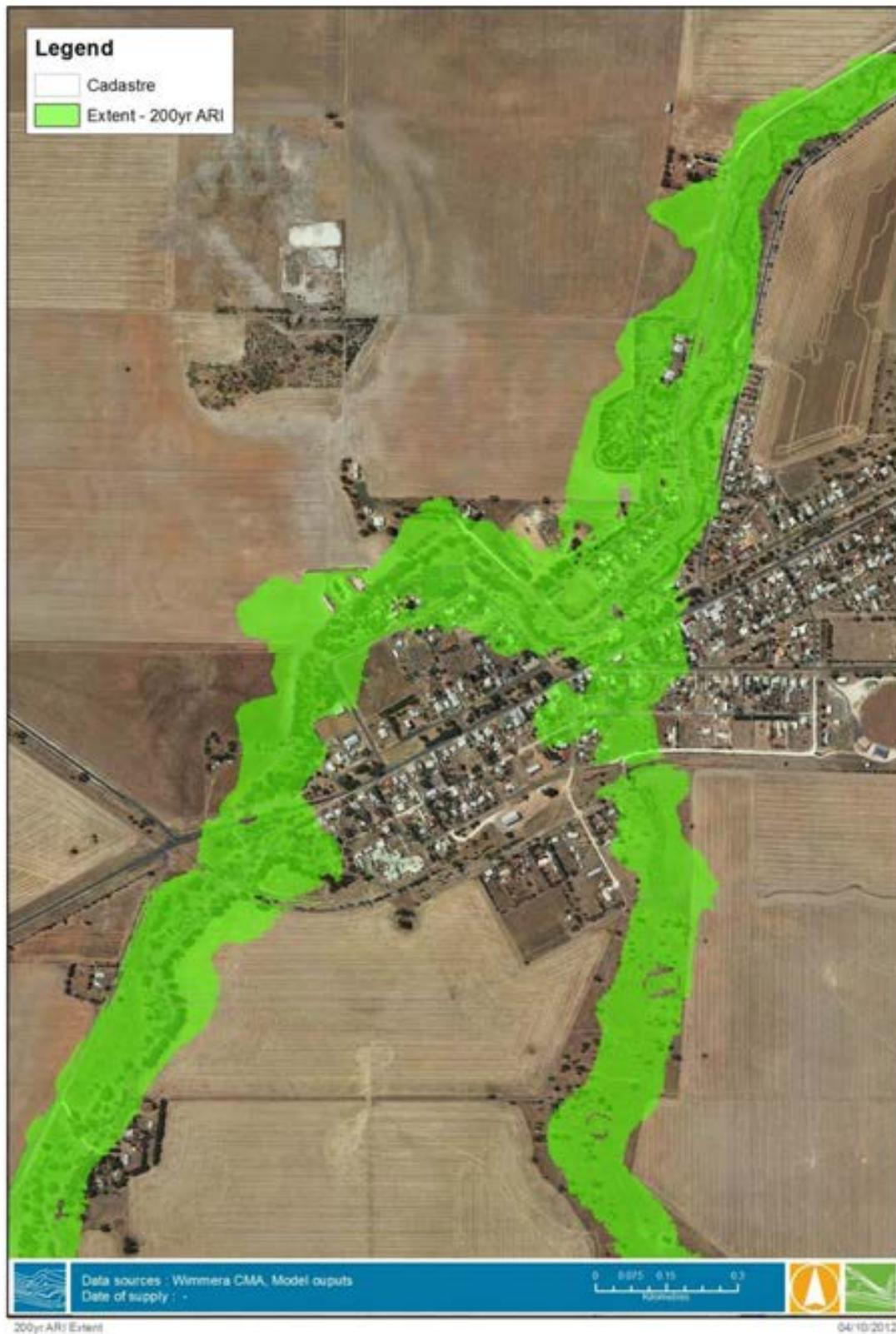


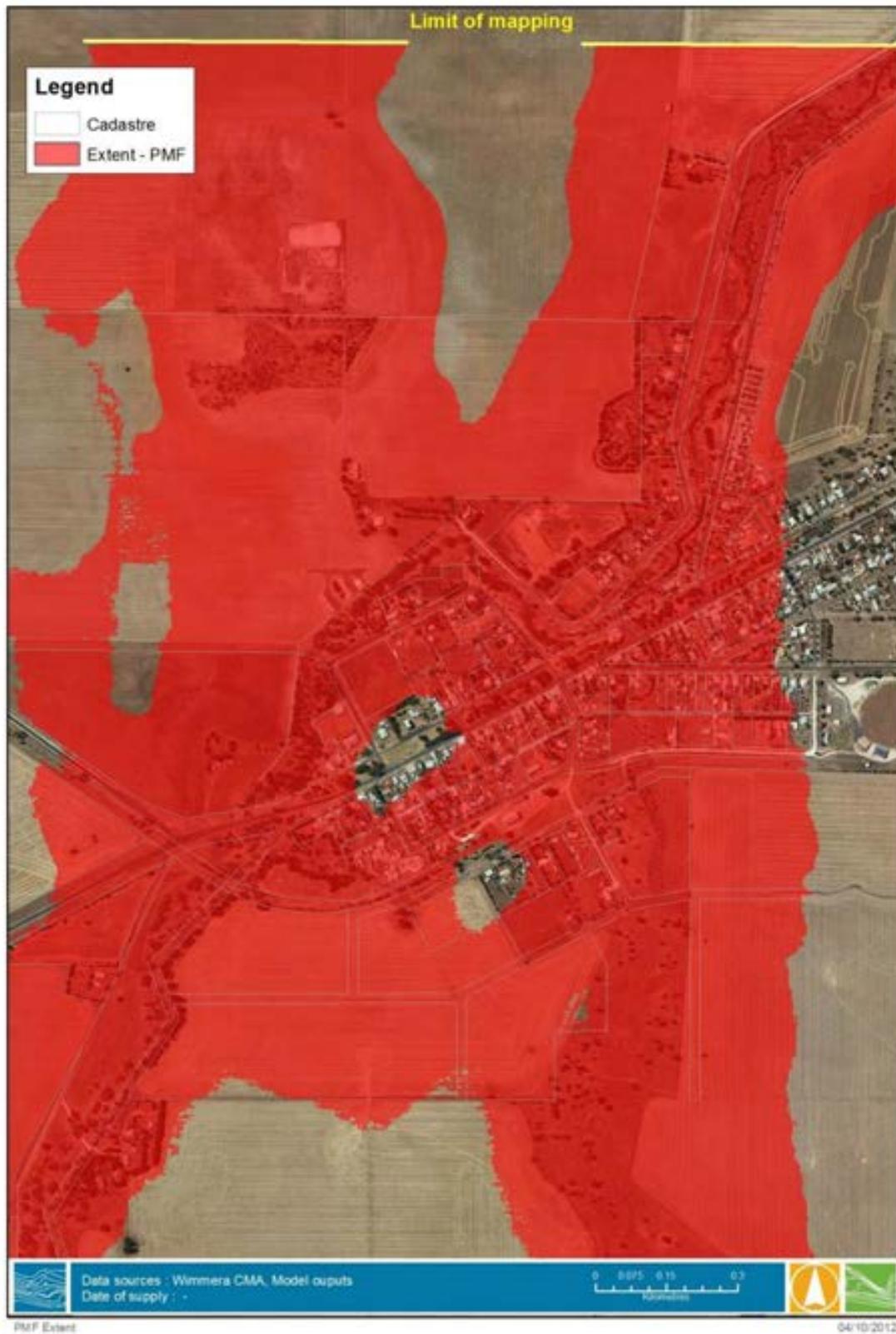




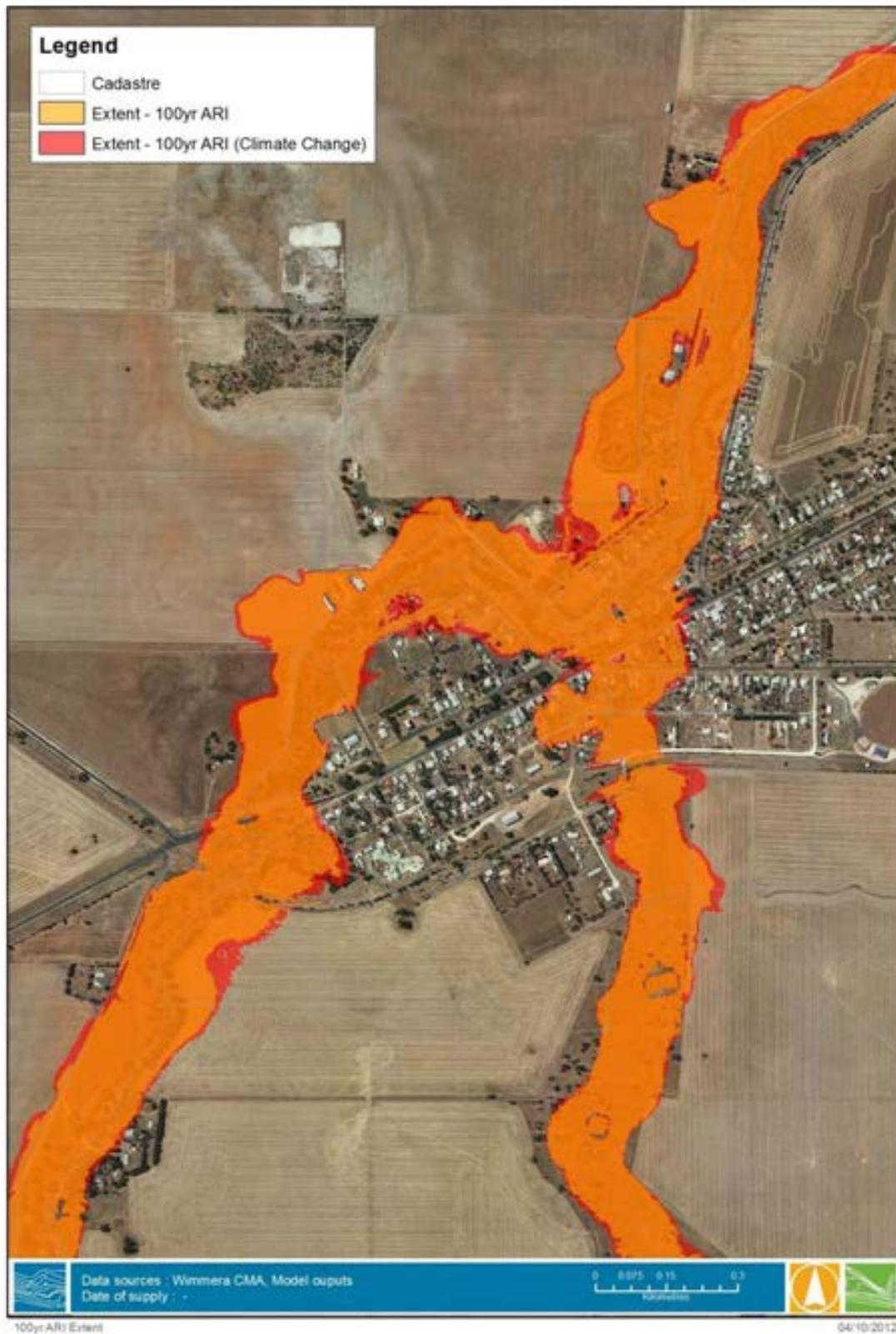


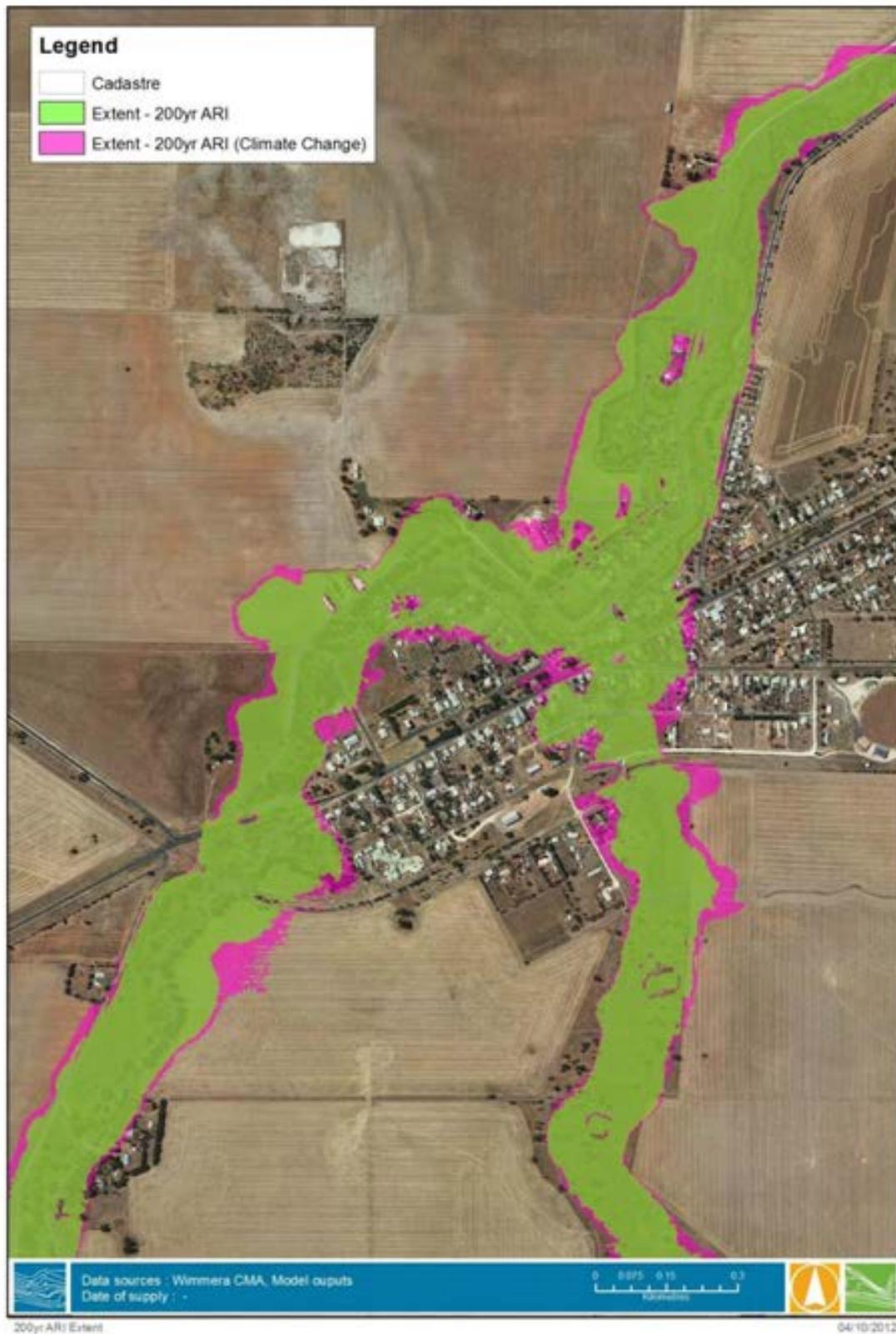












APPENDIX B RORB PEAK FLOWS AND DURATIONS

Run	Dur	ARI	Rain(mm)	Natimuk Creek	Little Natimuk Creek
1	4.5h	5y	35.99	5.6203	2.4652
2	6h	5y	39.17	7.2832	3.1006
3	9h	5y	44.18	7.9392	3.31
4	12h	5y	48.13	6.4408	2.7942
5	18h	5y	54.46	9.5186	4.0255
6	24h	5y	59.29	11.4704	4.7276
7	30h	5y	63.15	13.1135	5.3952
8	36h	5y	66.3	11.5665	4.8303
9	48h	5y	71.06	12.5555	5.2306
10	72h	5y	76.67	16.2054	6.4773
11	4.5h	10y	42.4	13.7549	6.0259
12	6h	10y	46.11	16.5308	7.1648
13	9h	10y	51.94	16.841	6.9965
14	12h	10y	56.55	15.1052	6.2596
15	18h	10y	63.77	22.1887	8.583
16	24h	10y	69.26	20.3046	8.0722
17	30h	10y	73.62	27.0634	10.6935
18	36h	10y	77.17	24.5283	9.9363
19	48h	10y	82.5	25.1749	10.2658
20	72h	10y	88.65	28.4388	11.0825
21	4.5h	20y	50.92	27.5793	11.956
22	6h	20y	55.34	33.2174	14.2483
23	9h	20y	62.29	34.1152	13.6147
24	12h	20y	67.77	32.8357	12.6591
25	18h	20y	76.19	42.0231	15.136
26	24h	20y	82.58	40.3529	15.0987
27	30h	20y	87.64	47.6114	18.3043
28	36h	20y	91.73	44.9015	17.6258
29	48h	20y	97.84	43.205	17.525
30	72h	20y	104.77	46.489	17.6335
31	4.5h	50y	63.11	52.6978	22.5145
32	6h	50y	68.54	56.2654	23.5072
33	9h	50y	77.06	58.5607	22.11
34	12h	50y	83.77	60.4485	21.345
35	18h	50y	93.86	71.3714	24.0565
36	24h	50y	101.48	67.0019	23.3609
37	30h	50y	107.48	71.5795	26.4755
38	36h	50y	112.31	68.0615	25.3206
39	48h	50y	119.48	62.0492	24.4383
40	72h	50y	127.43	57.5316	21.5857
41	4.5h	100y	73.19	76.2514	32.079
42	6h	100y	79.44	81.5111	33.4019

43	9h	100y	89.25	84.3617	30.075
44	12h	100y	96.97	87.5583	29.5404
45	18h	100y	108.4	99.8547	31.6649
46	24h	100y	116.99	94.7098	32.2348
47	30h	100y	123.75	95.0254	33.484
48	36h	100y	129.17	92.1614	32.7272
49	48h	100y	137.16	85.2403	31.8358
50	72h	100y	145.88	72.7456	26.9684

APPENDIX C DAMAGE ASSESSMENT METHODOLOGY

Two primary sources for flood damage calculations were used, the original ANUFLOOD cost curves (CRES 1992) and the RAM methodology (Reed Sturgess and Associates (RSA) 2000). Further details on the ANUFLOOD methodology are provided in a guidance report produced by DNR (2002). ANUFLOOD cost curves cover residential and commercial direct costs applicable for townships. The RAM methodology incorporates the ANUFLOOD approach and extends it to include indirect and intangible costs resulting from flooding and provides guidance on costs for agricultural enterprises. A major study of the Economics of Natural Disasters in Australia by the Bureau of Transport Economics (BTE 2001) provides some further information on indirect costs and a recent study by Geoscience Australia (Middelmann-Fernandes 2010) provides information for accounting for the impact of velocity in flood damage assessments. These key references are described below.

Bureau of Transport Economics (2001). Economic Costs of Natural Disasters in Australia. Report 103. Bureau of Transport Economics, Canberra.

CRES (1992). ANUFLOOD: A field guide, prepared by D.I. Smith and M.A. Greenaway, Centre for Resource and Environmental Studies, ANU, Canberra.

Department of Natural Resources and Mines (DNR) (2002). Guidance on assessment of Tangible Flood Damages. Queensland Department of Natural Resources and Mines, September 2002.

Middelmann-Fernandes, M.H. (2010). Flood damage estimation beyond stage-damage functions: an Australian example. *Journal of Flood Risk Management* 3 (2010): 88-96.

Reed Sturgess and Associates (2000). Rapid Appraisal Method (RAM) for floodplain management. May 2000. Report prepared for the Department of Natural Resources and Environment.

Before any stage damage curves from the literature were applied in the Natimuk flood damage assessment they were adjusted to today's value by scaling using a ratio of CPI (June 2012 data) and the CPI at the time of development of the stage-damage curve. A number of stage damage curves are included below, representing the value at the time of development (i.e. no CPI adjustment).

This appendix does not include a detailed methodology of how the damage assessment was carried out but does include the majority of the source data sets that were used in the development of the methodology.

Table F - 1 Above Floor Level Stage Damage Relationships for Residential Properties (From ANUFLOOD 1992; Reproduced from DNR 2002)

		Small house (< 80 m²)	Medium house (80 – 140m²)	Large house (> 140m²)
Depth over flood level	0 m	\$905	\$2 557	\$5 873
	0.1 m	\$1 881	\$5 115	\$11 743
	0.6 m	\$7 370	\$13 979	\$25 351
	1.5 m	\$17 379	\$18 585	\$32 276
	1.8 m	\$17 643	\$18 868	\$32 768

Table F - 2 Size Categories for Commercial Properties (from ANUFLOOD 1992; Reproduced from DNR 2002)

Size category	Guideline
Small	< 186 m ²
Medium	186 – 650 m ²
Large	650 m ²

Table F - 3 ANUFLOOD Commercial Properties Cost Curve (Reproduced from DNR 2002)

Value class	Small commercial properties (<186m ²)					Medium commercial properties (186-650m ²)					Large commercial properties (>650m ²)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
0.25	\$2 202	\$4 405	\$8 809	\$17 618	\$35 237	\$6 975	\$13 948	\$27 896	\$55 791	\$111 583	\$7	\$15	\$32	\$61	\$122
0.75	\$5 506	\$11 011	\$22 023	\$44 046	\$88 092	\$16 884	\$33 768	\$67 537	\$135 074	\$270 147	\$39	\$78	\$154	\$308	\$619
1.25	\$8 258	\$16 518	\$33 034	\$66 069	\$132 137	\$25 693	\$51 387	\$102 773	\$205 574	\$411 094	\$81	\$162	\$326	\$649	\$1297
1.75	\$9 176	\$18 352	\$36 705	\$73 410	\$146 819	\$28 445	\$56 893	\$113 785	\$227 570	\$455 140	\$132	\$267	\$533	\$1065	\$2129
2	\$9 726	\$19 454	\$38 907	\$77 814	\$155 628	\$30 281	\$60 564	\$121 126	\$242 252	\$484 504	\$159	\$318	\$636	\$1 272	\$2 545

* units of \$/m²

Table F - 4 External/Below Floor Damage per Building (From DPIE Floodplain Management in Australia (1992))

Depth above ground (m)	External Damage (\$)
0	0
0.065	0
0.26	\$1 833
0.5	\$4 000
0.75	\$6 166
1	\$8 333
2	\$8 333

Table F - 5 Unit Damages for Roads and Bridges (per Kilometre of Road Inundated) (From DNR 2002)

	Initial road repair (\$)	Subsequent accelerated deterioration of roads (\$)	Initial report and subsequent increased maintenance (\$)	Total cost to be applied per km of road inundated (\$)
Major sealed road	34,860	17,430	11,985	64,275
Minor sealed road	10,895	5,450	3,815	20,160
Unsealed road	4,900	2,450	1,740	9,090

Table F - 6 Actual to Potential Damages Ratio from RAM (RSA 2002)

Warning time (hrs)	Actual to Potential Damages Ratio	
	Past Flood Experience	No Flood Experience
0	0.8	0.9
2	0.8	0.8
7	0.6	0.8
12	0.4	0.8
12	0.4	0.7
96	0.4	0.7

Table F - 7 Indirect Costs Following BTE (1999)

Indirect damages	Cost (\$)	Note
Clean-up costs per Residential property		
-cost of materials	\$330	
-cost of labour (40 hours)	\$1,102	This is the 2007 av. weekly wage from ABS
Clean-up costs per Commercial property		
-total cost to clean up	\$2,400	
Alternative Housing per Residential property		
-relocation of household items	\$53	
-alternative accommodation	\$473	Based on 2.6 ppl. per household & 7 nights
Emergency Response Costs		
-cost of labour	\$4,000 - \$20,000	Different magnitude events require different responses

APPENDIX D COMMUNITY QUESTIONNAIRE



Natimuk Flood Investigation - Flood Questionnaire

Background –

The Natimuk Flood Investigation has been commissioned by the Wimmera Catchment Management Authority and the Horsham Rural City Council. The investigation aims to improve the understanding and knowledge of flooding in Natimuk and Little Natimuk Creek, allowing for improved flood planning and response. The questionnaire responses received from the community will be used throughout the investigation assisting this this understanding. All views presented will be considered.

Return Details –

Please return all questionnaires by 20/01/2012 to the 'Natimuk Flood Investigation Questionnaire Box' located the Natimuk Post Office or to the Horsham Rural City Council Civil Centre, Horsham, Attention: Martin Bride.

Name: _____

(optional)

Contact details:

(optional – if further follow-up is required)

Address: _____

Phone: _____

- | | |
|----|--|
| 1. | How long have you lived in Natimuk and when have you been affected by floods in the past (month and year)? |
| 2. | Where there any significant differences in flooding during the December 2010 and January 2011 floods? |

3.	What damage did you personally sustain from the recent floods in Natimuk?
4.	If your property was flooded in December 2010 or January 2011 can you estimate the height of the water level above or below floor?
5.	What do you think are the major flooding issues in Natimuk?
6.	What do you think would improve the flood situation in Natimuk?
7.	How did you find out that a flood was imminent, did you receive warning, and how long did you have before flood waters arrived?
8.	Do you have any other comments to make regarding flooding in Natimuk?

Additional comments and suggestions are encouraged and can be attached to this questionnaire.

For further information or queries please contact David Eltringham at the Horsham Rural City Council on 5382 9777

APPENDIX E FLOOR LEVEL RAISING

Building Construction	Use	Raise amount (m)	Estimated Cost
RENDERED BRICK ON CONC. SLAB	Commercial	0.01	-
IRON CLADDING, FOUNDATION TBA	Community	0.06	\$34,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.08	\$19,700
Shed	Shed	0.10	-
IRON CLADDING HOUSE ON STUMPS	Dwelling	0.10	\$19,700
Shed	Shed	0.11	-
BRICK BUILDING ON CONC. SLAB	Commercial	0.12	\$48,200
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.13	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.15	\$19,700
IRON CLADDING ON STUMPS	Telstra	0.16	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.16	\$19,700
BRICK BUILDING, FOUNDATION TBA	Commercial	0.20	\$48,200
LARGE CORRUGATED IRON SHED ON CONC. SLAB	Shed	0.23	-
BRICK SHOP (EASTERN), FOUNDATION TBA	Commercial	0.24	\$22,650
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.25	\$19,700
BRICK/LARGE BLOCK HOUSE ON STUMPS	Dwelling	0.27	\$22,650
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.27	\$19,700
BRICK SHOP (WESTERN), FOUNDATION TBA	Commercial	0.30	\$22,650
IRON CLADDING SHOP, BRICK FACADE, ON CONC. SLAB	Commercial	0.31	\$48,200
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.35	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.39	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.40	\$19,700
STEEL CLADDING ON STUMPS	Commercial	0.43	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.46	\$19,700
BRICK HOUSE ON CONC. SLAB	Dwelling	0.48	\$48,200
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.49	\$19,700
RENDERED BRICK BUILDING ON CONC. SLAB	Commercial	0.50	\$48,200

WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.53	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.58	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.60	\$19,700
WEATHERBOARD HOUSE ON STUMPS	Dwelling	0.63	\$19,700
WOODEN PALING SHED, GRAVEL FLOOR	Shed	0.79	-
		Total	698,250

APPENDIX F FLOOD INTELLIGENCE REPORT

APPENDIX G PHOTOS FROM SITE VISIT



Structure 01 – Natimuk Creek at Wimmera Highway



Structure 02 – Natimuk Creek at Lake Avenue



Structure 03 – Little Natimuk Creek at disused railway line



Structure 03 – Little Natimuk Creek at Jory Street



Structure 04 – Little Natimuk Creek at the Wimmera Highway – Road bridge



Structure 05 – Little Natimuk Creek at the Wimmera Highway – Pedestrian Bridge in foreground



Structure 06 – Little Natimuk Creek pedestrian bridge



Structure 04 – Natimuk Creek offtake at Lake Avenue

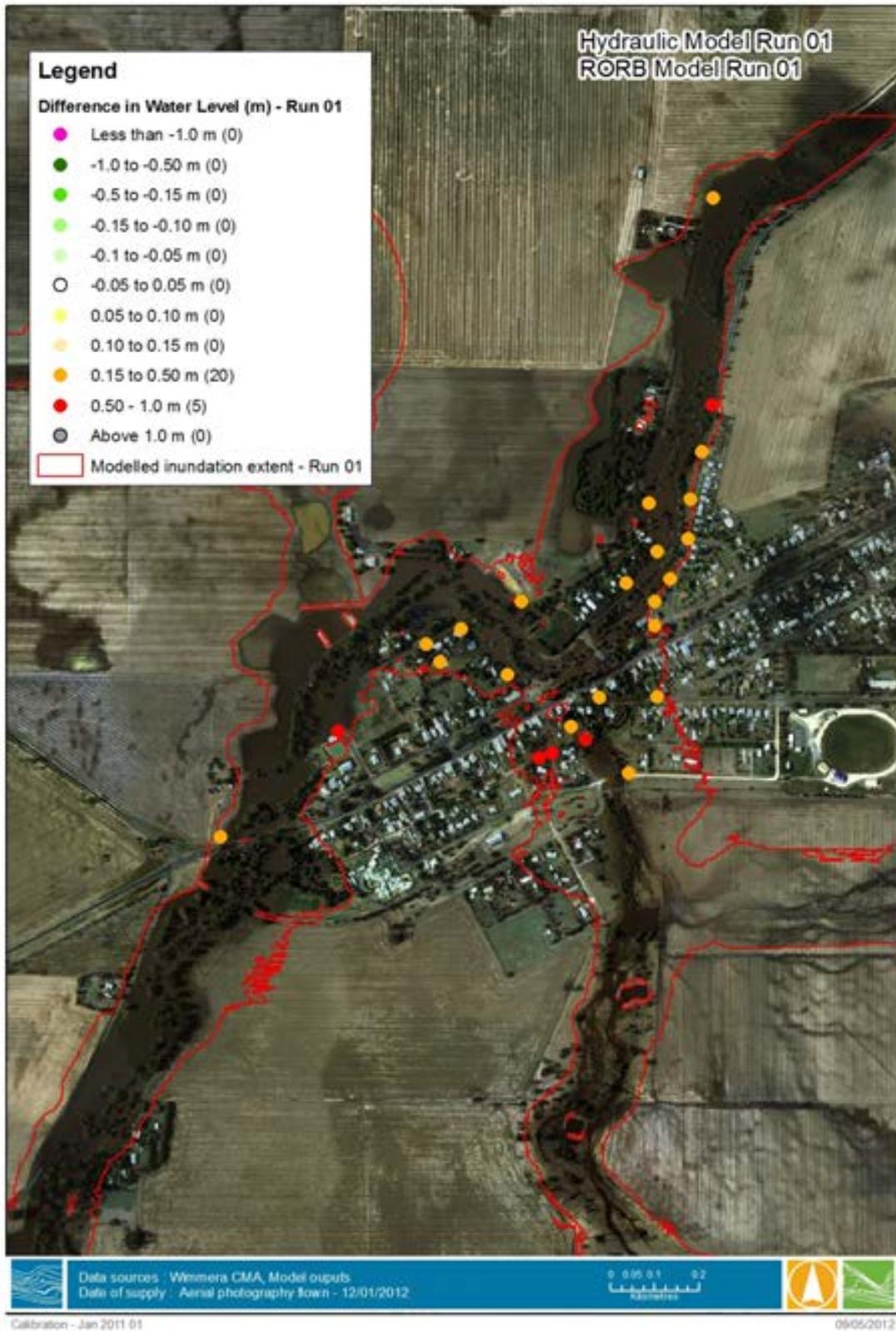
APPENDIX H RORB AND HYDRAULIC MODELLING

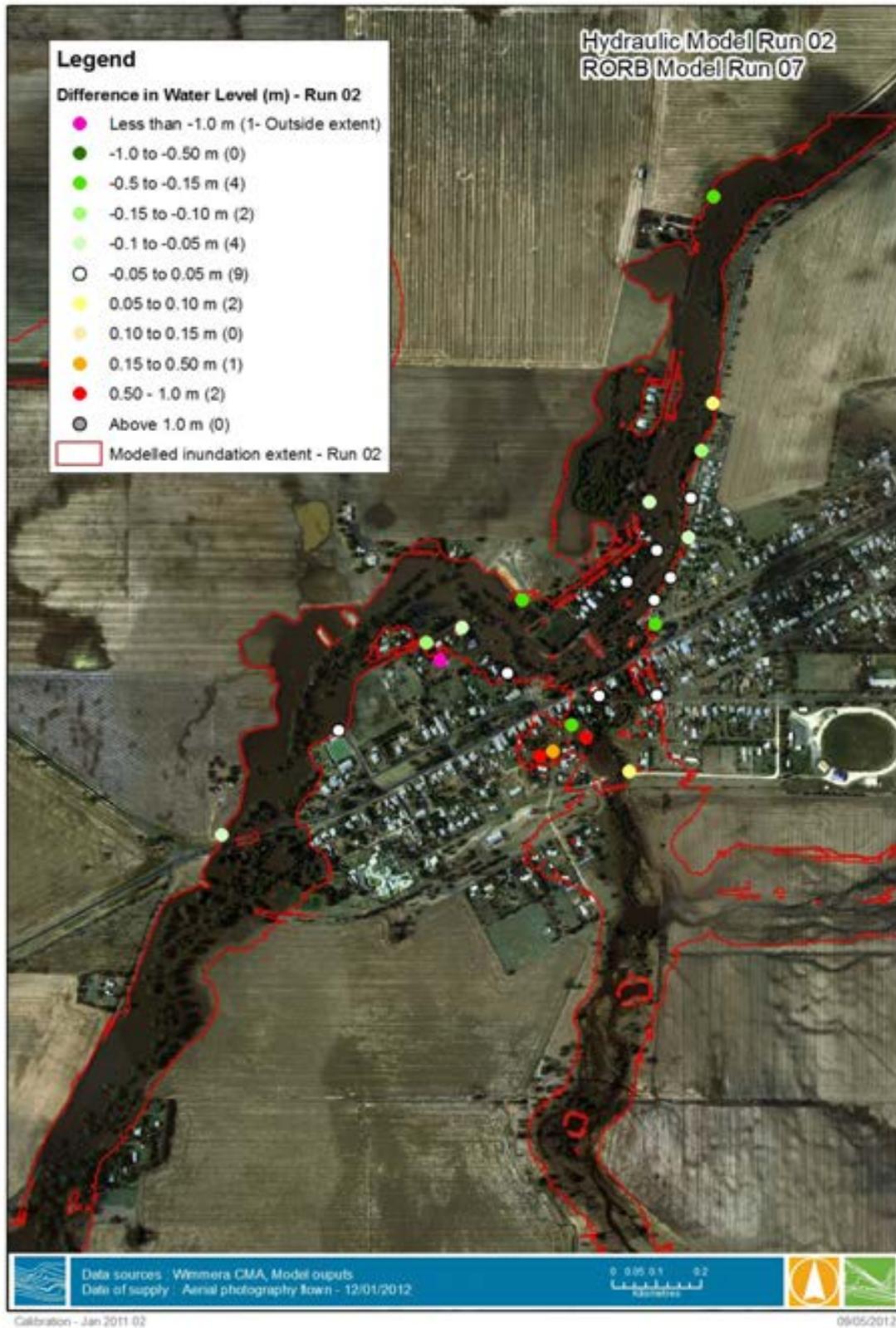
January 2011 RORB and Hydraulic Model Runs

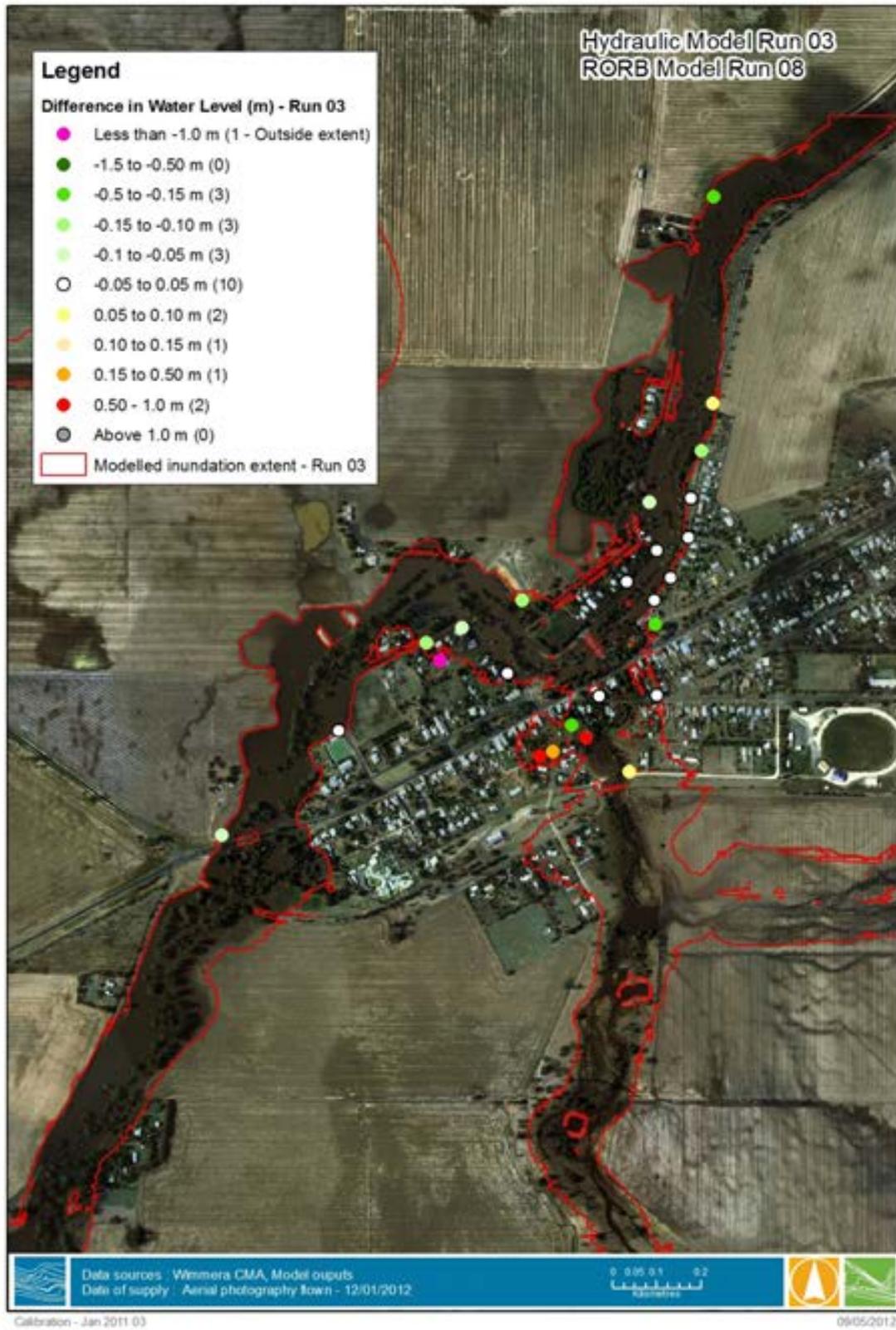
The below table shows each of the RORB model iterations and highlights each iteration modelled in the hydraulic model. The hydraulic model results follow the table to demonstrate the impact of changes to kc and losses have on water levels through Natimuk and their accuracy to observed heights and extents. Results have been generated using the Polkemmet Road temporal rainfall distribution.

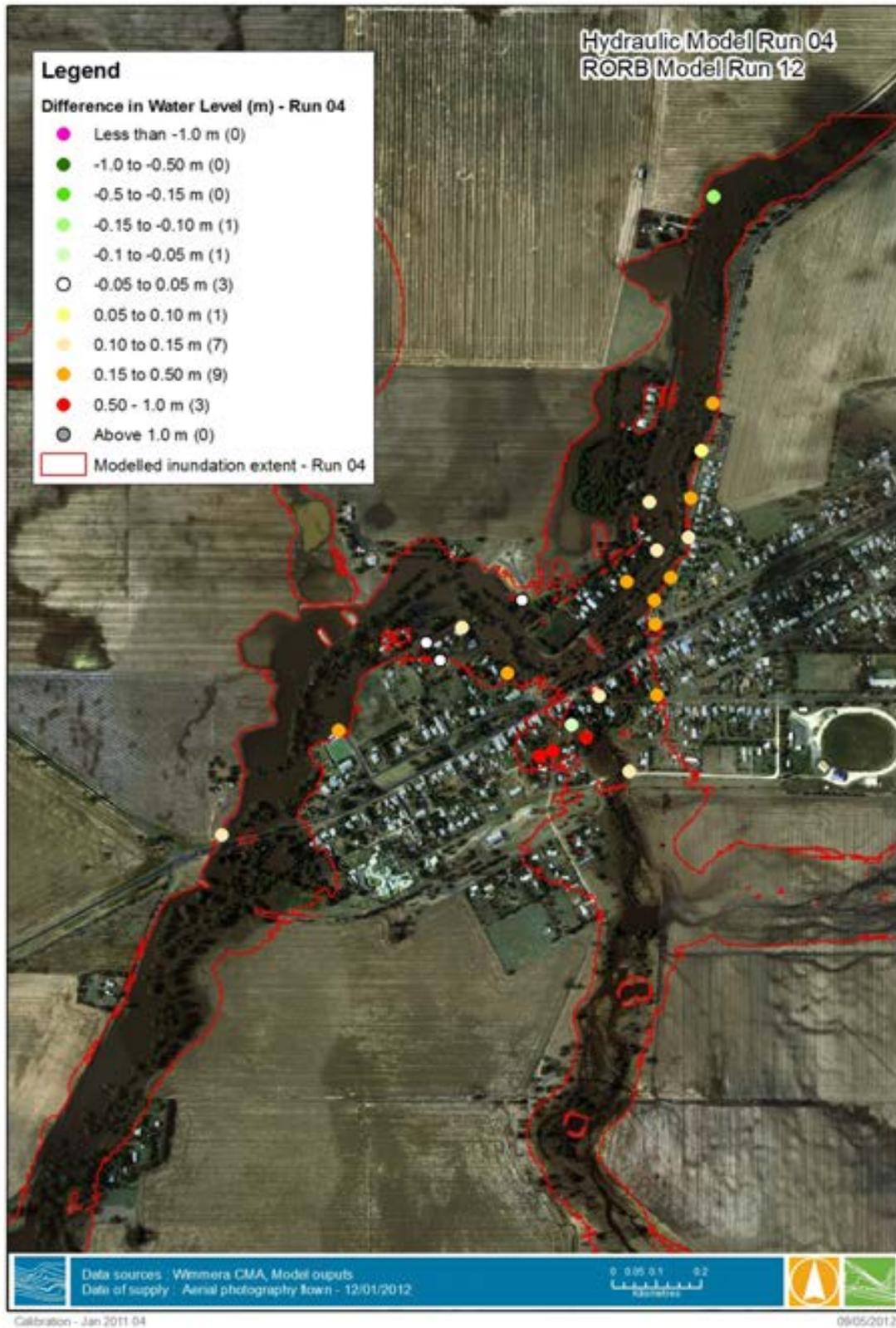
RUN	m	kc	II	CI	Peak Flow (m3/s)	
					Natimuk Creek	Little Natimuk Creek
1*	0.8	21.1	10	2.5	208.1	83.5
2	0.8	24.71	10	2.5	180.7	71.4
3	0.8	27.53	10	2.5	167.8	64.5
4	0.8	26.61	10	2.5	172.6	66.7
5	0.8	21.1	37.7	4.5	106.6	44.2
6	0.8	24.71	37.7	4.5	99.0	37.1
7*	0.8	27.53	37.7	4.5	91.1	32.4
8*	0.8	26.61	37.7	4.5	93.2	33.8
9	0.8	26.61	15	2.5	161.4	61.8
10	0.8	26.61	20	2.5	153.2	58.9
11	0.8	26.61	25	2.5	141.8	53.0
12*	0.8	26.61	30	2.5	129.9	47.2
13	0.8	26.61	35	2.5	117.5	41.4
14	0.8	24.71	25	4.5	131.0	52.3
15	0.8	26.61	25	4.5	124.4	48.3
16	0.8	24.71	30	4.5	117.0	46.3
17	0.8	26.61	30	4.5	112.2	42.5
18	0.8	24.71	30	3.5	125.4	48.8
19*	0.8	24.71	35	4.5	105.3	40.3
20*	0.8	26.61	35	4.5	99.6	36.8

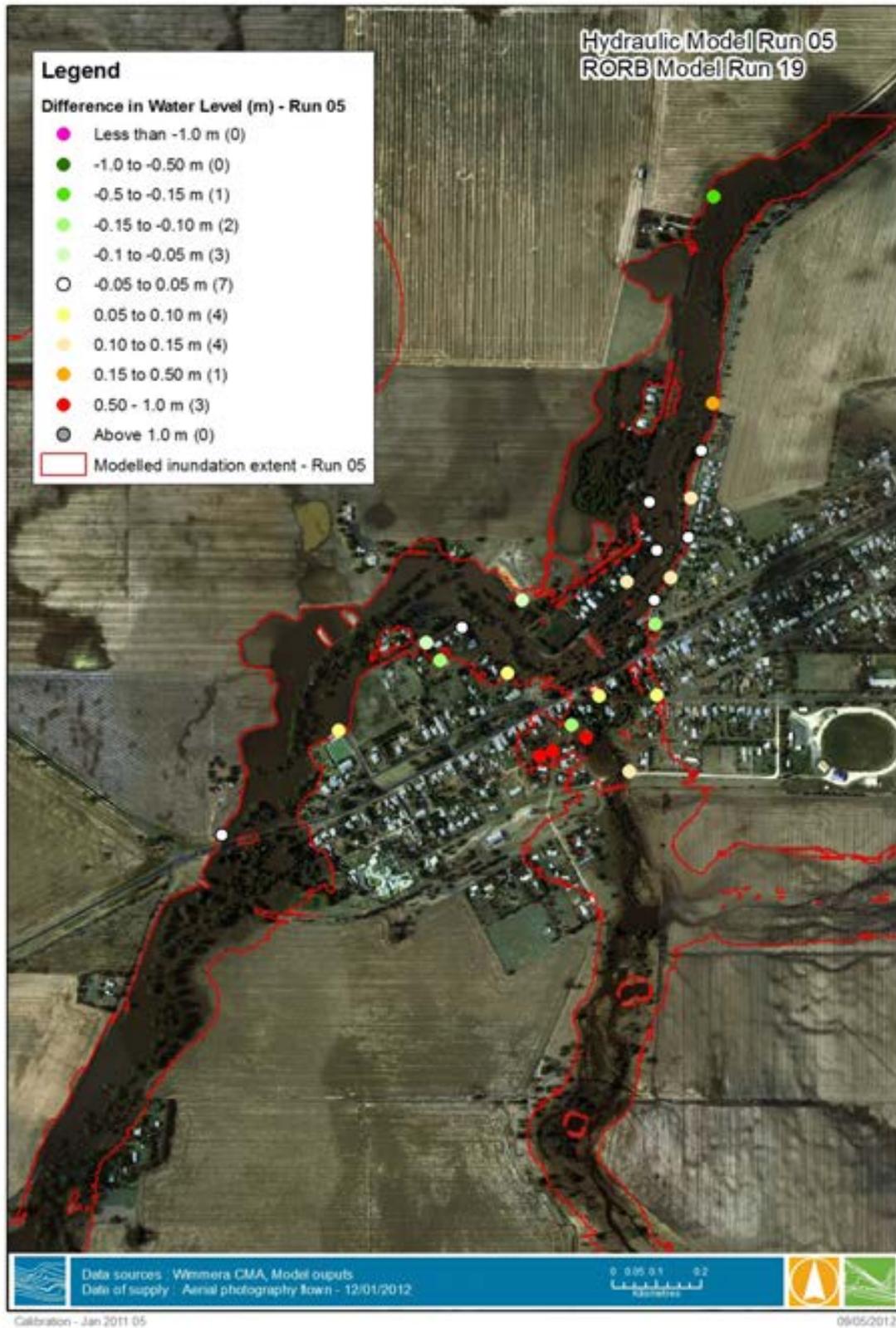
* Results routed through hydraulic model

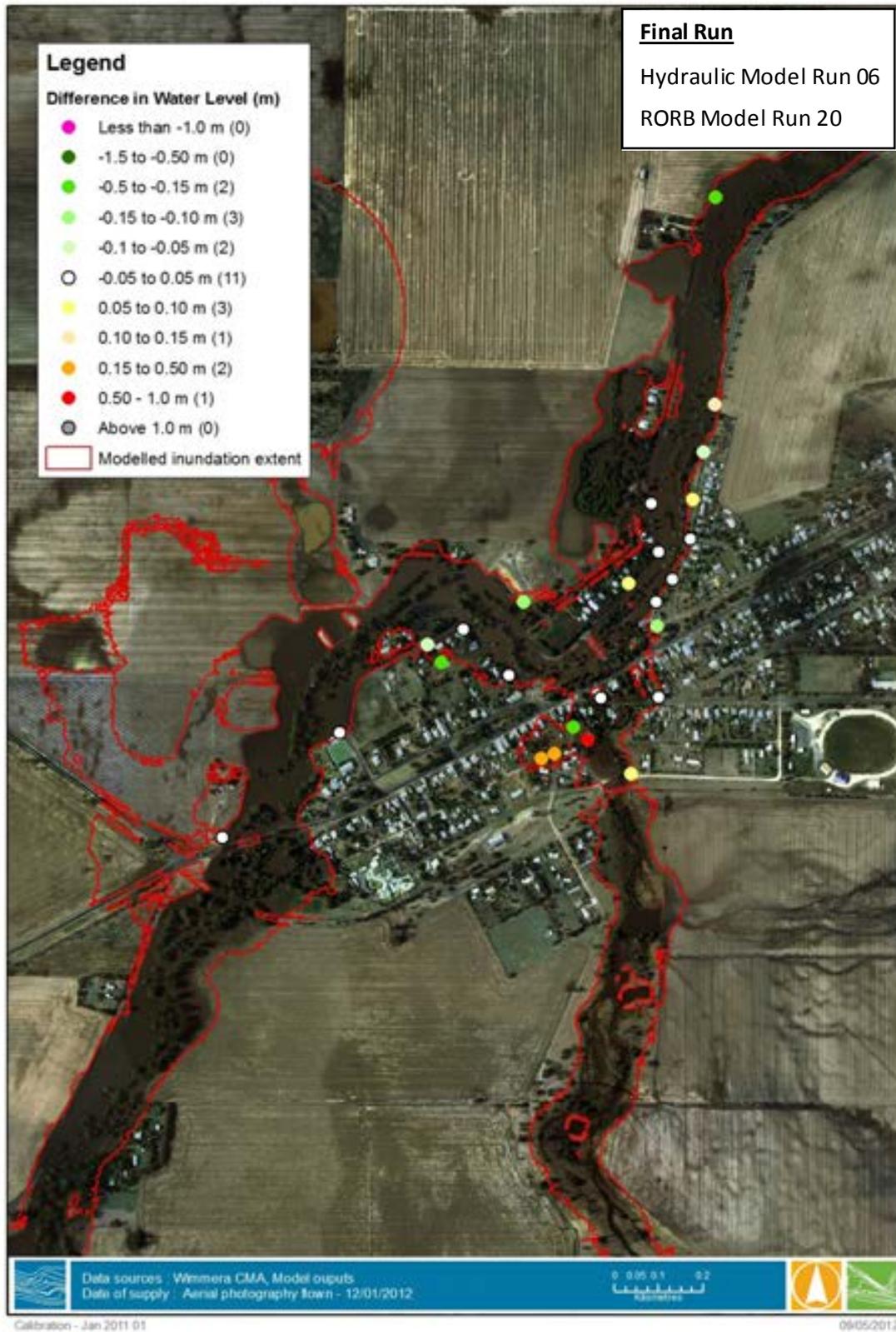










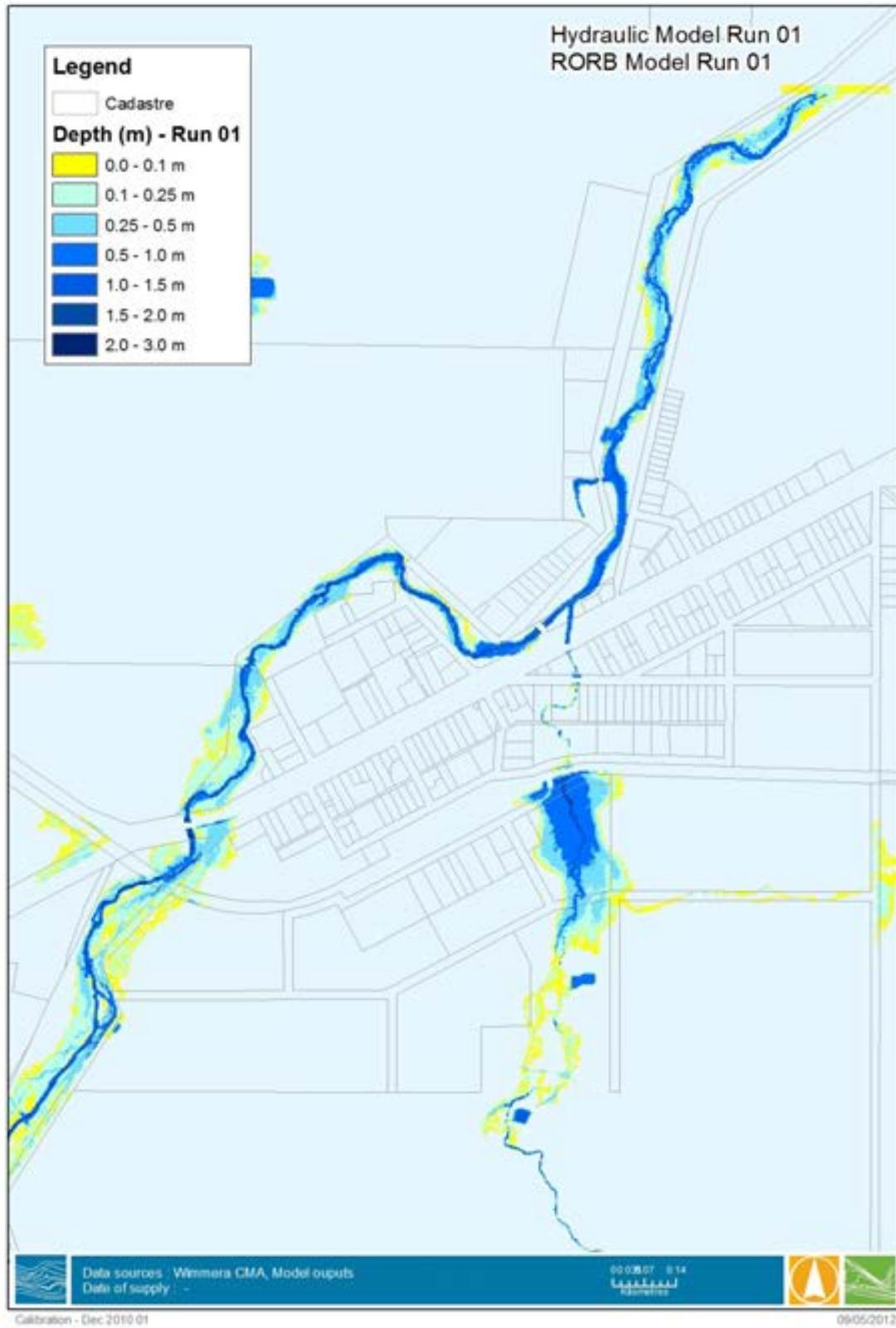


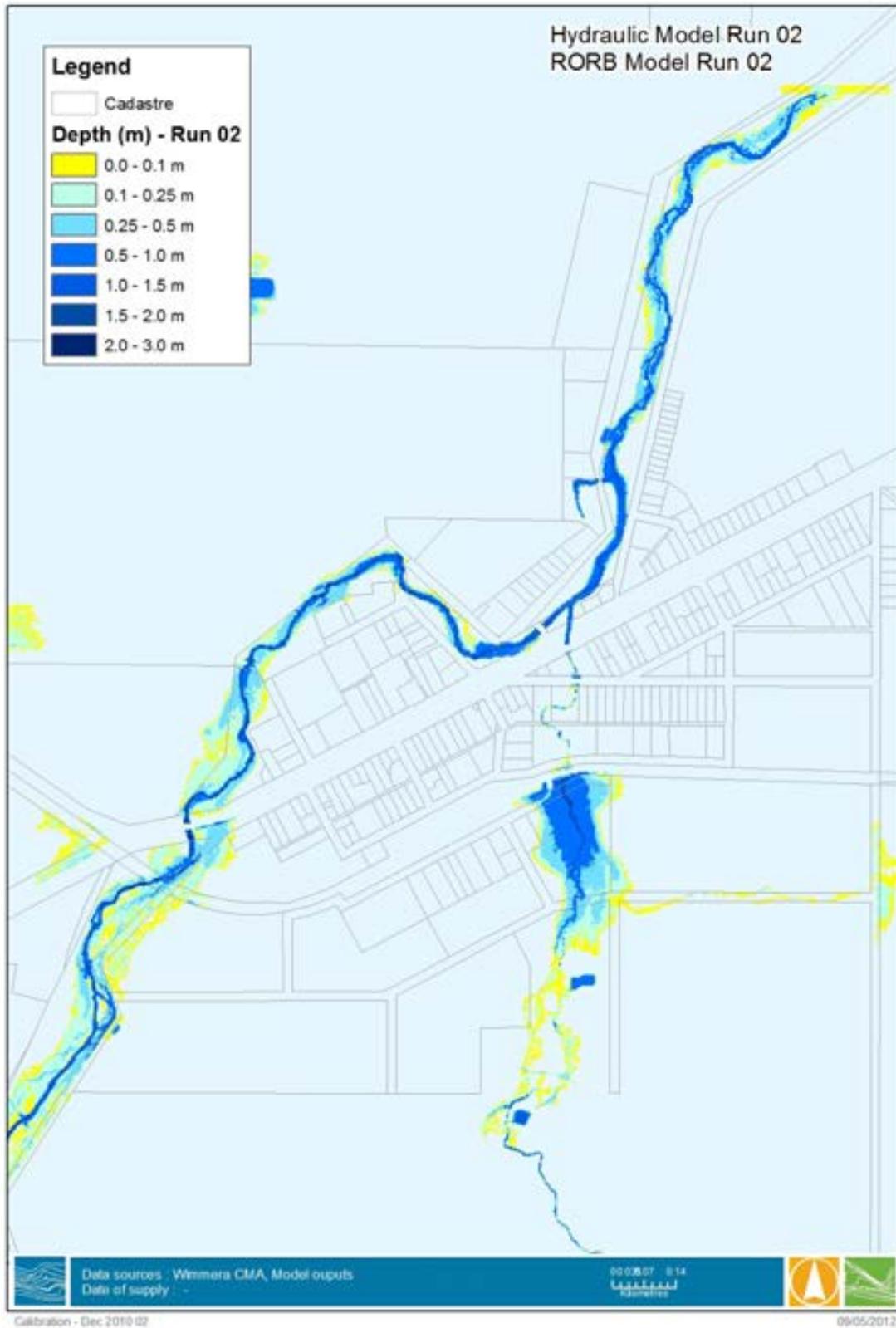
December 2010 RORB and Hydraulic Model Runs

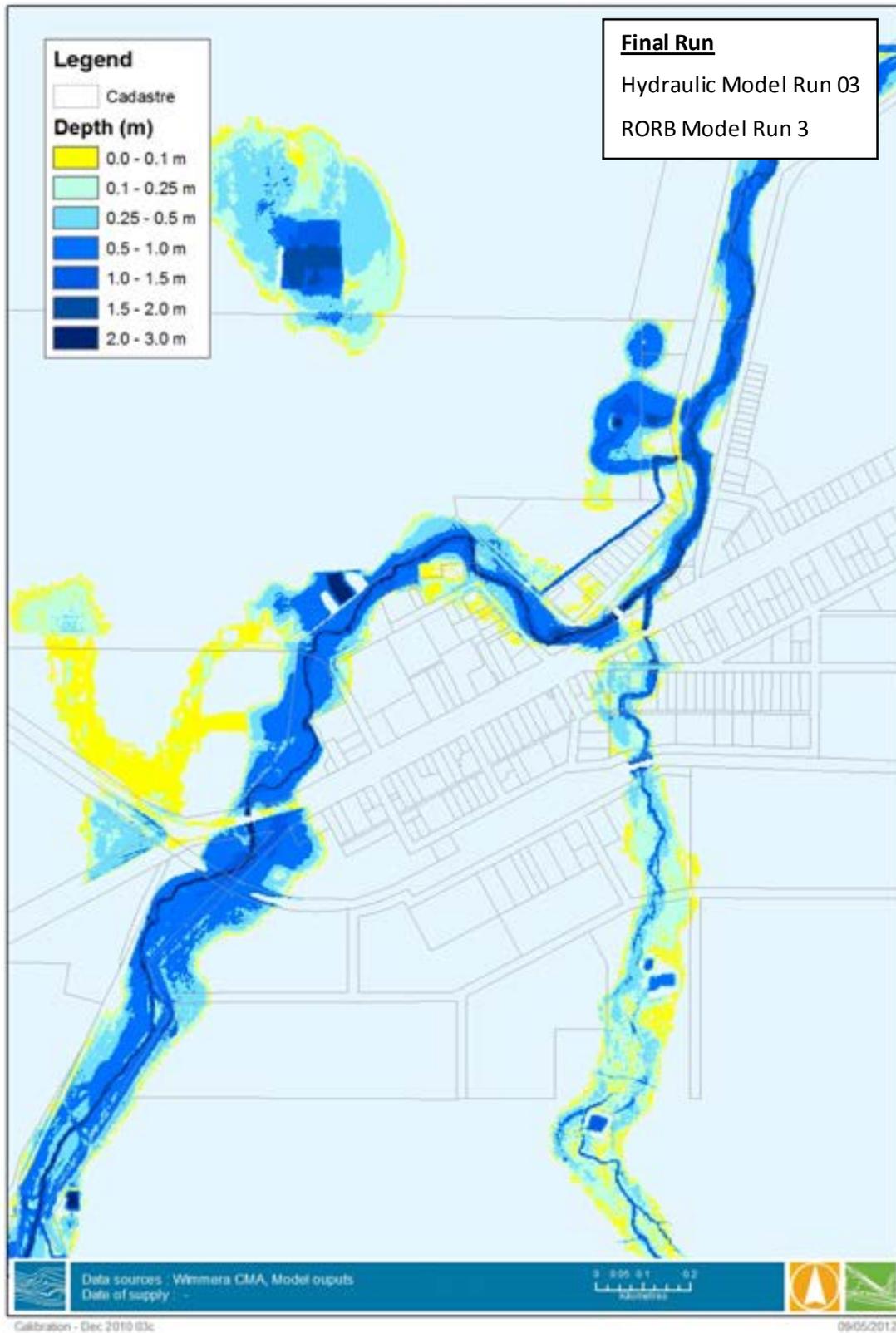
The below table shows each of the RORB model iterations and highlights each iteration modelled in the hydraulic model. The hydraulic model results follow the table to demonstrate the impact of changes to kc and losses have on water levels through Natimuk.

RUN	M	kc	II	CI	Peak Flow (m ³ /s)	
					Natimuk Creek	Little Natimuk Creek
1*	0.8	26.61	35	4.5	24.6	7.5
2*	0.8	26.61	5	4.5	72.9	27.3
3*	0.8	26.61	10	4.5	71.7	28.9
4	0.8	26.61	20	4.5	46.3	18.4
5	0.8	26.61	30	4.5	24.6	9.1
6	0.8	26.61	5	4.5	78.8	32.0
7	0.8	26.61	4.5	4.5	78.8	32.0
8	0.8	26.61	4.5	3.5	81.5	33.1
9	0.8	26.61	0	4.5	86.6	35.2
10	0.8	26.61	0	0	112.0	46.1

* Results modelled in hydraulic model







APPENDIX I COMMUNITY COMMENTS POST THE FINAL COMMUNITY MEETING



File Ref: Natimuk Mitigation Options – community consultation notes
Our Ref: (z:\jobs\2120_natimuk\docs\report
\study report\final\2120-
01r06v03.doc)
Contact: Paul Fennell
Date: as stated in document

FILE NOTE

Alan Ogden 8/11/12

41 Lake Ave

Older home mainly on stumps with a slab on parts. Generally happy with proposal of levees really wanting to understand the limitations of planning scheme amendments should they happen and also what is currently possible in terms of development.

Steve Monks 13/11/12 08:00

Has chatted with all residents along Lake Ave

- Visual concerns with levee (particularly along Lake Ave)
- Height is the main concern
- Concern with widening of the levee.
- Concern with the bywash losing vegetation that had been recently planted with the option presented.
- Concern with the naturalness of the overall result

Separate concern (personal) with the 10m easement on the NW side of Steve's block, no easement for east – west flows back into the creek

Martin Bryde 19/11/12 16:15

Has had discussions with;

- Richard Emmerson – don't care about levee,
- aesthetic appeal is important.
- Glydey – wants creek diverted from the township. Anything that stops the water is good.
- Glenn – no comment

Gareth Llewelin 21/11/12 14:30 0466 660 886

31 Lake Ave and also owns blocks 27-29

Water came up to the floorboards of 31 Lake Ave.

Elmes St levee seems reasonable. Raising of houses in Lake Ave would be the preference due to costs. Argument that 10 houses at \$25-\$30k is far cheaper.

Zoe Wilkinson

Suggests we should be looking at the Facebook site of Natimuk local discussion for an insight into the community discussion on the options promoted.

Also suggests we should be speaking with Melissa Morris to get a better idea of impacts of costs and cost benefit analysis from a council perspective.

Overall not really in support of the Lake Ave approach due to cost, height of structure on Lake Ave and the extreme width of the by-wash channel.

Has provided formal response. – 80/20 #27537

Kieran Lawton – 26/11/12 9:00 nw end of Lake Ave.

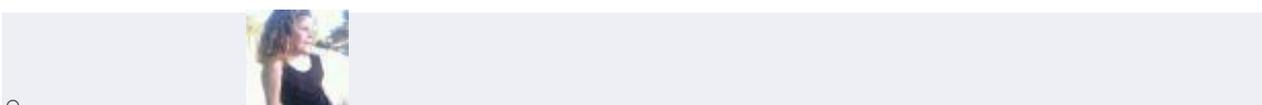
Both options are pushing water onto his land so therefore he is not in support of either.

Facebook – Nati Noticeboard



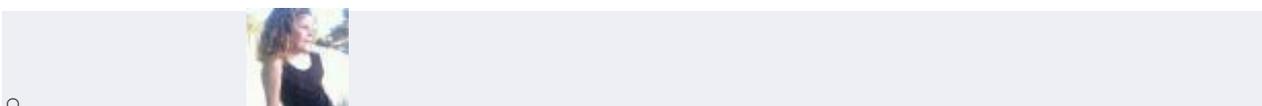
Maree Schmidt I believe they should clean the both creeks out by removing all the built up weed, fallen branches etc etc... even maybe deepen it a little more

November 13 at 12:40pm



Maree Schmidt As then the flow will be free to go.

November 13 at 12:40pm



Maree Schmidt The levee idea could make the other side re Lake Road flood levels higher too, so I do not like the idea of levee banks.

November 13 at 12:41pm



Brisette Koch Hi Maree, you need to comment on the options proposed to CMA. You can also ask for the plan to be integrated in a more comprehensive long term community plan. :)

November 13 at 12:49pm



Maree Schmidt ohk ... got a few days to do it !!

November 13 at 12:52pm



Gareth Llewellyn They did some modeling where the creek was "cleaned out" and it had very little impact on the flooding. One iteration cleared out the creek all the way out to the lake and hardened the surface (concrete) and after all that the 100 year theoretical level dropped only 6cm!! I agree with you about the levee.

November 13 at 1:18pm, via mobile



Wendy Eden Maree, all the studies show that cleaning out the creek will not prevent flooding. It has been suggested before and investigated, and it will not help. Feel free to ask the council for the studies and see for yourself.

November 13 at 1:26pm · 1



Maree Schmidt hmmm....Still believe it would not help with the flow... Not asking for trees to be removed, just all the fallen debris and the weeds to be taken out, any of the big logs down that have native habitat can be moved out of the creek and securely stabilised alongside the creek bed so if and when the creeks get a strong flow, it will not chdke the pathway of the water... if money is an issue, get the "work for the dole " program in, so then only have to pay for appropriate equipment and resources.....

November 13 at 1:36pm



Heather Phillips One problem with any deepening of creek or the overflow is that the water table is only about a metre down and all sorts of problems occur when that happens. Ask Noddy! The Elmes St levee as drawn is over the gutter which is where all the services run. Water from Kitchings corner also drains to my corner then into the creek, so the levee would have to wrap around David's and some fancy foot work to supply internal drainage through the levee..

November 13 at 1:36pm · 1



Maree Schmitz Plus get rid of all the weed and debris will be preventing rabbits and fire too !!!!

November 13 at 1:37pm · 1



Maree Schmitz also that little pathway they built across the creek in Lake Rd/Lake Av... was a stupid design..... sorry ... but that could of been designed in a way to allow the water to freely go underneath !!!!

November 13 at 1:40pm



Heather Phillips Hi Maree, I assume you mean the reeds when you say weeds? It is a rather magnificent plant at removing unnecessary nutrients from the water, so helping to prevent all those blue/green algae outbreaks, we actually need more of them not less if we want good clean water.

November 13 at 1:46pm



Brigitte Koch Tks for clarification about the deepening of the overflow. Did not think of that. Basically, their proposal is a waste of time then, oui? The rest of the letter we plan to send deals with the need to integrate any option in a comprehensive community plan

November 13 at 1:57pm · 2



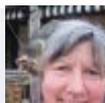
Brigitte Koch FURTHERMORE, it is my assumption from reading the website information that this study and the resulting recommendations are based solely on water flow alone (and on the 100 year flood statistics). IF these recommendations HAVE NOT been part of a long-term, comprehensive community development plan for the greater region, taking into consideration application of sustainability technologies, self-reliance, self-sufficiency, etc. then I believe that this decision should be postponed until such time that a long-term, comprehensive community development plan has been accomplished, looking at all aspects of "quality of life" for our current and future generations that the community & region can agree to. Perhaps there are other solutions that can actually become opportunities to increase the quality of life (economic opportunities, long-term jobs, agricultural practices/nutrition...), including currently unknown opportunities, which would be identified should all the appropriate resources and variables be taken into account with a community development plan...according to responsible current and inevitable future technologies. (Etc)

November 13 at 2:06pm



Kaia Hood Paul Colrate Well heather the reeds and weeds are way over grow and look terrible and is a snake haven which snakes should not be living in town! If my front garden looked like that I would be fined. If I had a choice between not having snakes fire flood and a eyesore or to keep the reeds and weeds for algae control well It pretty obvious what I would pick!!!

November 13 at 2:25pm via mobile · 1



Heather Phillips It was an interesting meeting. Since the flood the channel system has been decommissioned so water flow, particularly from Little Natimuk Creek that is totally mixed up in the channel system, is a bit of an unknown. Also the farmers are very against any water being able to spread out before it gets to town. Many wetlands that used to exist are now excellent crop growing areas. No one wants to talk about whole catchment stuff, just houses. Very few people who were actually affected were at the meeting. Others who have opinions about mitigation sort of forget that the reason we live near the creek is the rural lifestyle it creates and the quality of life & serenity it provides. The veg garden did really well after the flood!

November 13 at 2:33pm · 1



Maree Schmidt Hit the nail on the head there Brigette... Seeing the council/community can not: . deepen or widen the creek . clean the creek from the weed/debris . redesign that pathway in Lake rd & Lake av . take the topsoil or a inch or so from the base of the actual lake (next time dry) and use the excess soil to build a island for birds etc... and allow more water into the lake before going to the overfill. Oh well.... May as well leave the creek and lake to become eyesores and rabbit havens and good for fire....

November 13 at 3:50pm via mobile · 3



Heather Phillips Good point **Kalla Hood Paul Colgate**... beauty is in the eye of the beholder. I think the reeds look great and thankfully provide somewhere for the snakes that is not in your yard. Given the choice I'd prefer them out along the creek where they belong. I also agree that replacing the weeds with native perennial grass species that have a lower flammability would be great in an ideal world. Talk to the CFA guys/girls about how we can slowly make this happen... and lower our fire hazard.

November 13 at 8:34pm



Genevieve Lilley my 2 cents: why after all the info we submitted for the inquiry, does the map show my place, the gallery and doug's as being flooded to "under floor level"? Seem to recall 4 inches of water in the house..

November 13 at 9:58pm · 1



Kalla Hood Paul Colgate How about we just dig the creek out!

November 13 at 11:36pm via mobile



Britte Koch @Genevieve. did you send them a letter to tell them what you think about the recommendations? wca@wcmavic.gov.au

November 14 at 4:39am



Britte Koch AND mention the dodgy map?!

November 14 at 4:39am · 1



Maree Schmidt Dodgy is not the describing word I would be using **Britte** !! Lol...

November 14 at 1:46pm via mobile · 1

Steve Monks & Zoe Wilkinson
59 Lake Avenue
Natimuk
Vic 3409
zoe.wilkinson@me.com
steve monks2@gmail.com
0403 323819
Nov 21st 2012

Paul Fennell
Catchment Analysis Team Leader
Wimmera Catchment Management Authority
26 Darlot St
Horsham
Vic 3402

Dear Paul,

Comments on the Natimuk Flood Investigations recommendations

Firstly we'd like to acknowledge the thoroughness of the investigation and thank the WCMA and HRCC for instigating the project for the benefit of the Natimuk community. We welcome the opportunity to comment on the recommendations of the study.

We very much support the recommendation of the study to develop a better warning system for flooding in the Natimuk township including installation of automated rainfall intensity gauges within the catchment. A creek height gauge in the township showing key levels as benchmarks for comparison such as the Jan 2010 level is another good idea. We are also supportive of the recommendation to develop a flood intelligence plan to better inform the emergency flood response.

As regard the recommendation for levees we would be broadly supportive of the Elmes St levee as we believe there is a reasonable cost benefit justification for this. We feel that the views of residents of Elmes street should be the main consideration for this recommendation.

However we are less supportive of the proposal for the Lake Avenue levees. We feel that the cost, both financial and in visual and environmental impact, outweigh the benefit of this flood mitigation proposal. We are not supportive of the proposal to enlarge the by wash to 18m wide and 2.2m deep. With a substantial proportion of the by wash running entirely within our property the widening would greatly impact on the use of our property. We are also aware that the water table is just below the surface and any deepening works may result in undesirable salinity related consequences.

The modelling also shows that the occurrence of a flood event causing inundation above floor level of the properties in Lake Avenue is relatively infrequent. – ie a 1 in 50 year flood is predicted to result in over floor flooding in 8 houses. As residents of one of the lower lying properties on Lake Avenue we are prepared to accept the cost of damage to our property of such a statistically infrequent event. To further mitigate the risk to our property we are looking into the feasibility of various other options independently. With regard to this we will be seeking clarification in the near future on how the proposed changes to the planning scheme may impact on these options.

Notwithstanding our own feelings about the levee we would be influenced to reconsider if the majority of the residents were in favour of this recommendation as we believe in the advantage of a consensual approach.

Finally with regard to the cost benefit analysis we believe that this could benefit from some further work to provide a more complete picture of the costs and benefits. We suggest Melissa Morris, Community Development Manager, at the HRCC may be able to assist with this.

Thank you again for the opportunity to comment on the flood investigation recommendations.

We look forward to hearing a summary of the feedback and how this has been incorporated.

Yours sincerely

Steve Monks and Zoe Wilkinson

Sent: Tuesday, 27 November 2012 10:06 PM
To: Paul Fennell (WCMA Catchment Analysis Team Leader)

Hi Paul,

I guess I should give you feed back on the mitigation options as Elmes Street residents. While our property was flooded in only a very minor and inconsequential way, and so wouldn't directly benefit from a levee, the indicative levee shown in the mitigation options report is shown just to our property, so we want to comment on that basis.

This email is from both Melissa and I.

We don't object to the concept of the levee in Elmes Street, if that is the preferred mitigation option, subject to the following points.

- 1 We would like to see detailed design of the levee, so that we can be assured that, once constructed, the levee does not become a potential rabbit infestation area. A long term maintenance schedule for the level should ensure this matter is monitored and addressed when required. We'd be keen to see detailed plans of the location, height, and form of the levee.
- 2 We expect that the level will make allowance for each property to have vehicle access where desired by the residents, and that this vehicle access is designed and constructed with a view to the long term maintenance of the levee. These vehicle access points will be included in the construction budget of the levee, and there will be no cost to residents.
- 3 The costs outlined in the mitigation report for construction of the levee seems to be quite low. We would like to see an updated budget for construction and maintenance of the levee, inclusive of points 1 and 2 above.
- 4 Subject to the outcomes of point 3, above, a reassessment of the benefit cost ratio may be required, to give a better understanding of the likelihood of this measure being adopted/funded.
- 5 We also consider that upstream rain gauges should be a first priority as they provide a level of protection to all dwellings affected by flooding, and considering that a number of dwellings will not benefit from the mooted levees, this action will have an equitable outcome and benefit.

Thank you for your efforts in conducting this project, we appreciate the complexities of these matters, and look forward to continuing to be of assistance where we can.

Your sincerely

Edwin Irvine and Melissa Morris