

17. Appendix 1

Assessment of the effect of two short road sections

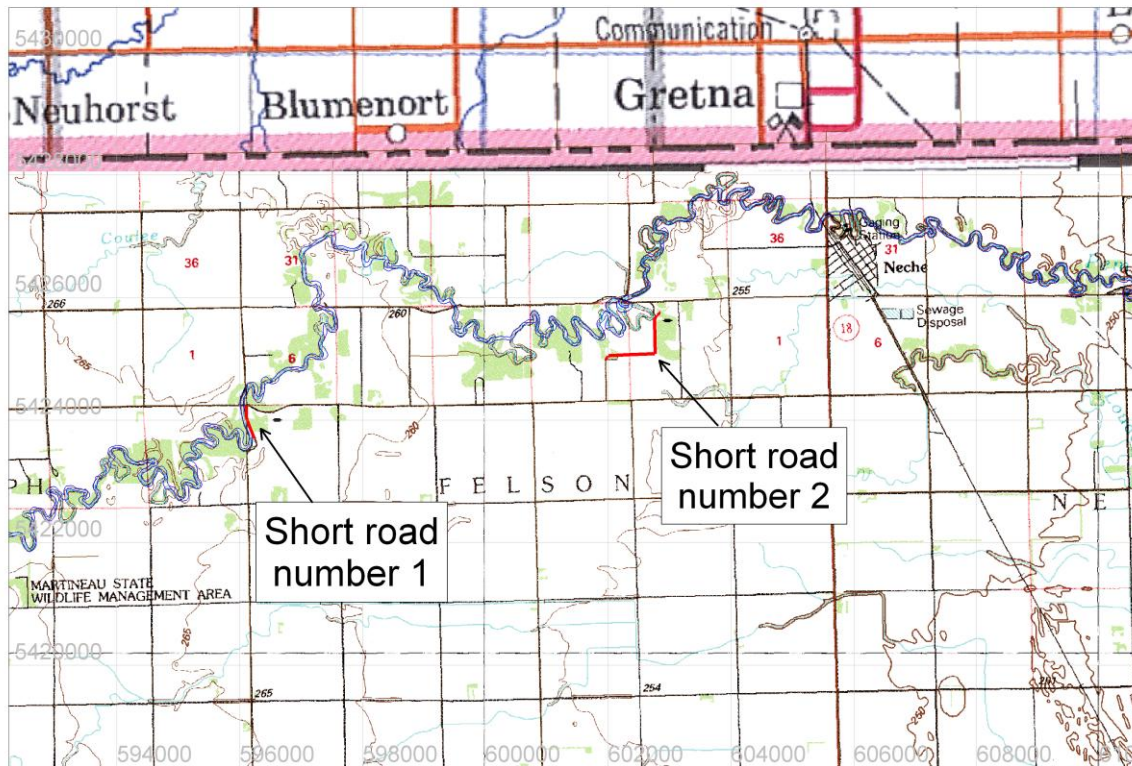


Figure 1- Location of two short roads

A field technician from Manitoba Infrastructure and Transportation (MIT) identified two short roads very close to the Pembina River (See Figure 1) which may control flooding in the existing conditions and increase flood propagation in the “natural conditions”. These short segments are not in the model. A separate investigation was performed with these two short roads inserted in the model to verify their effect in the 1:10 and the 1:50 event.

Road number 1 – Figure 2

South of the CR55 bridge, 9.6 km west of Neche

Missing road segment lowest elevation over a length of 100 m: 264.4 m, high elevation 264.7 m

“High bank” elevation: 264.45 m: These banks are therefore the controlling feature.

Flood level in main channel during 1:10 event: 264.03 m, No break out observed in the model (Figure 3). Identical flood extent with or without the road, except locally

Flood level in main channel during 1:50 event: 264.82 m, Break out observed in the model (Figure 4). The road affects only the flood locally. No significant difference elsewhere in the model.

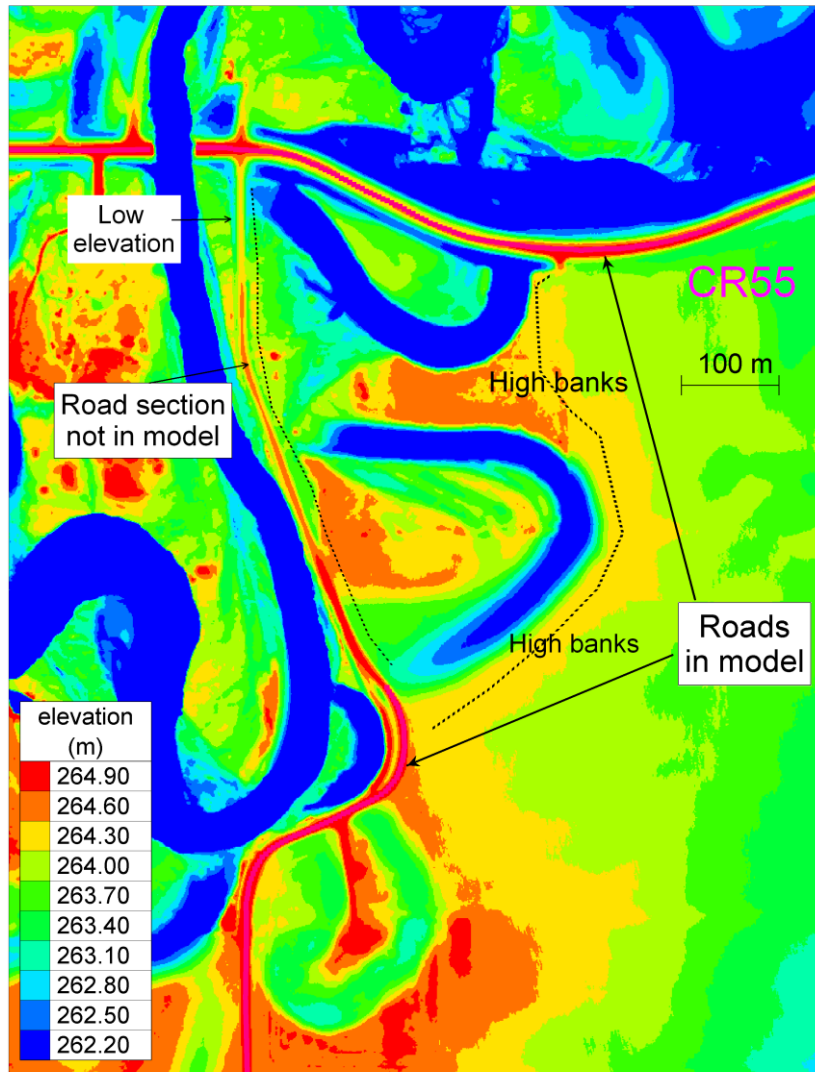


Figure 2 – 2006 LiDAR with the location of short road number 1 at CR55

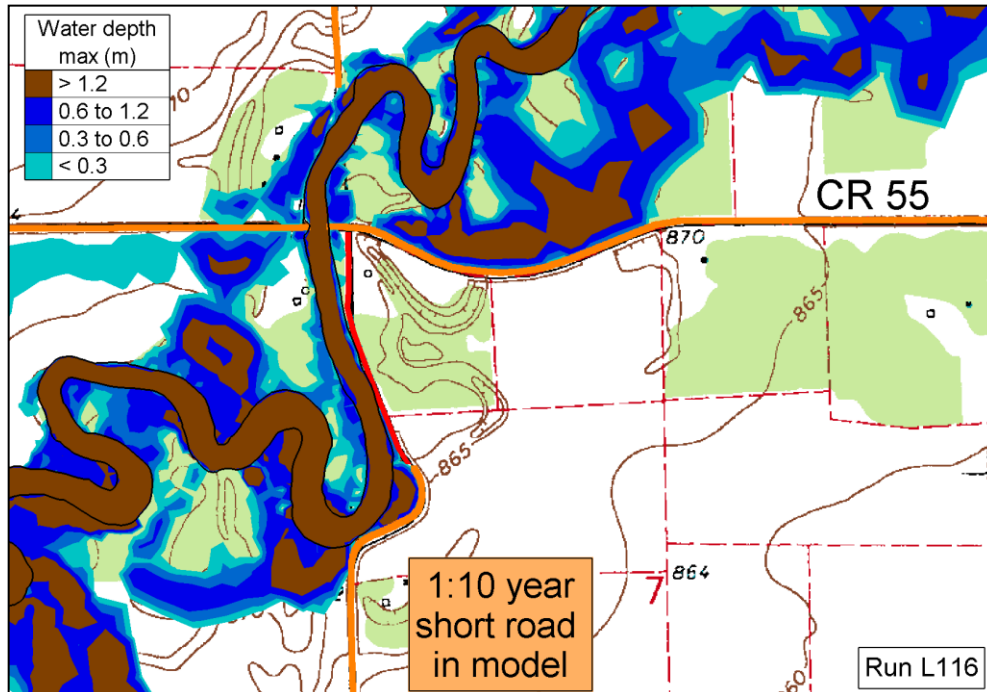
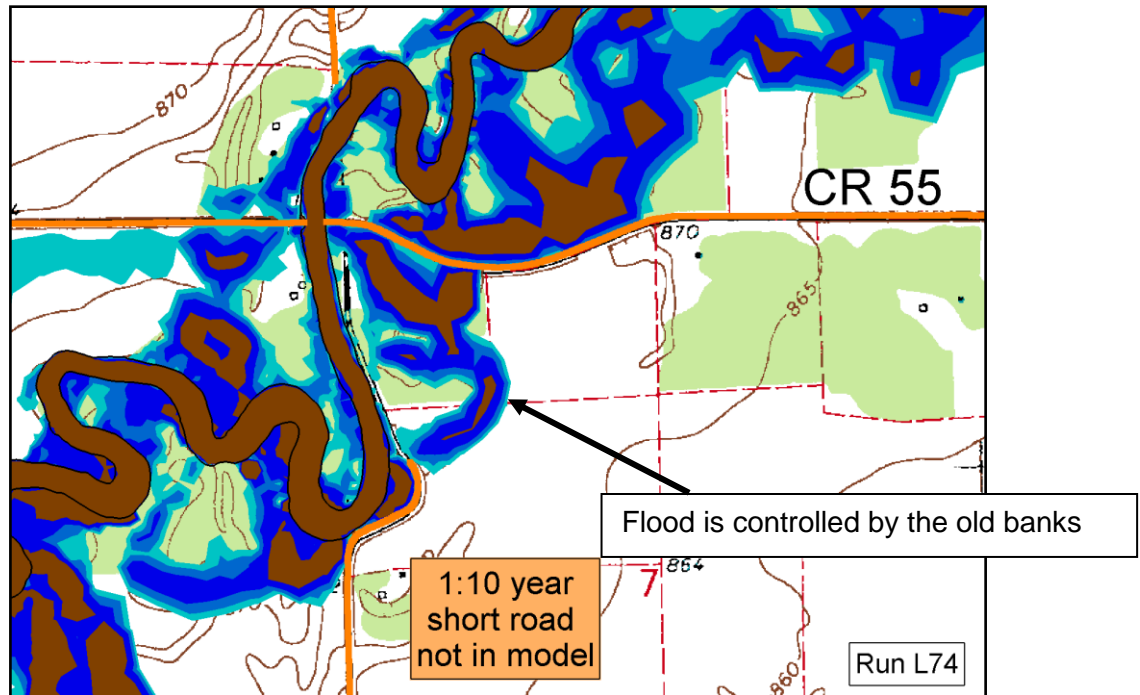


Figure 3 – Effect of the road number 1 in the model for the 1:10 event

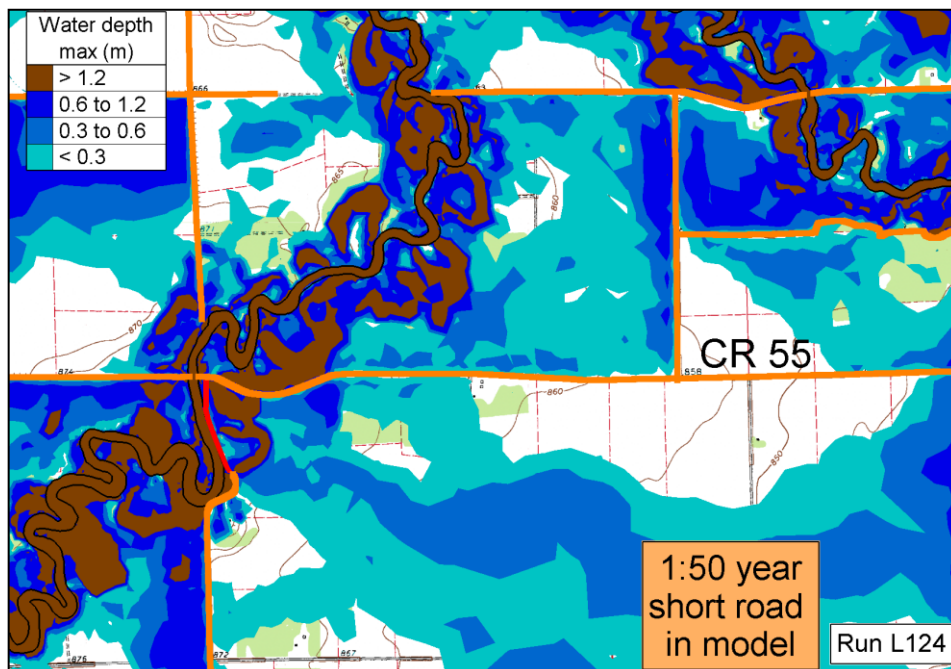
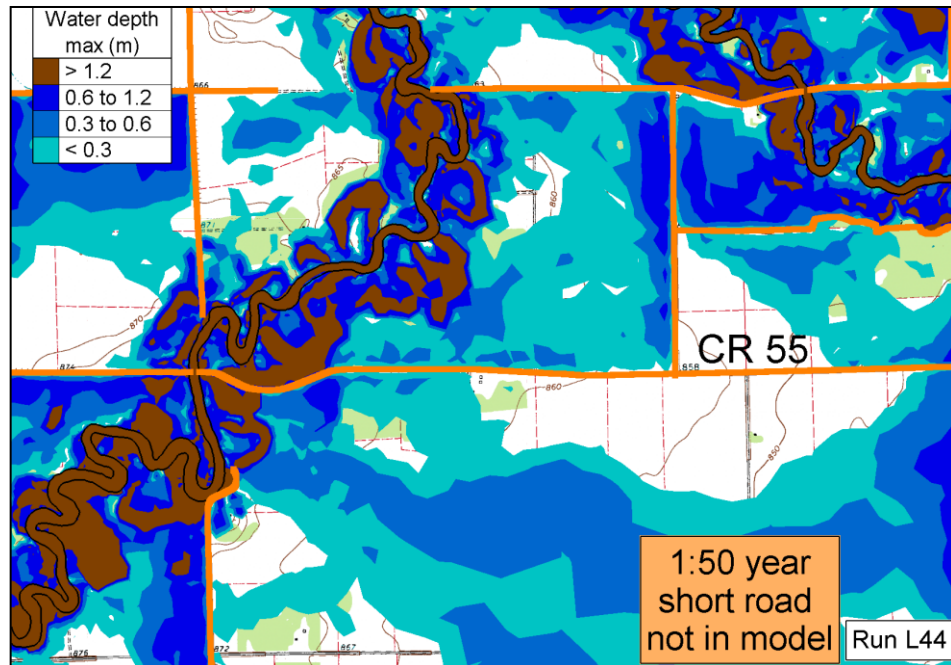


Figure 4 – Effect of the road number 1 in the model for the 1:50 event

Road number 2 – Figure 5

3.2 km west of Neche, 800 m north of CR55

Missing road segment elevation: between 255.7 and 256.8 m

Old banks elevation at about same level as the road: between 256.6 and 256.9 m.

The road is not a major controlling factor compared to the banks.

Flood level in main channel during 1:10 event: 256.78 m. Banks slightly overtopped (Figure 6)

Flood level in main channel during 1:50 event: 256.9 m. Banks strongly overtopped (Figure 7)

The road affects only the flood locally. No significant difference elsewhere in the model

Peak water levels

With the two short roads in the model:

Peak level at Neche increased by: 1 mm for 1:10 event

1 mm for 1:50 event

Peak level 8 km downstream from Neche increased by: 1.8 cm for 1:10 event

2 mm for 1:50 event

Conclusion:

Not having these two short segments in the model did not change significantly the model results.

Thierry Faure, 10 April 2012

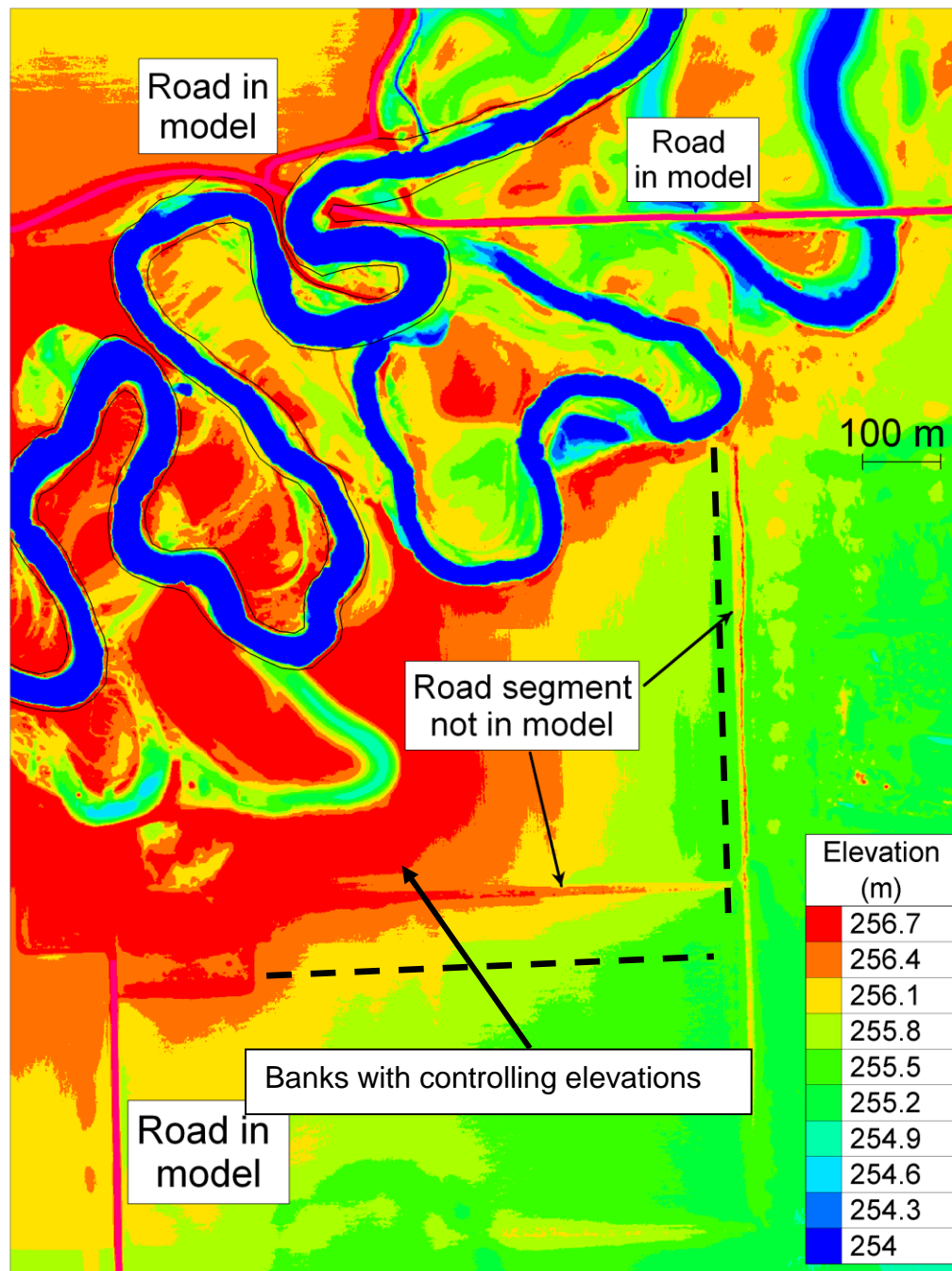


Figure 5 - 2006 LiDAR with the location of short road number 2, 1/2 mile north of CR55

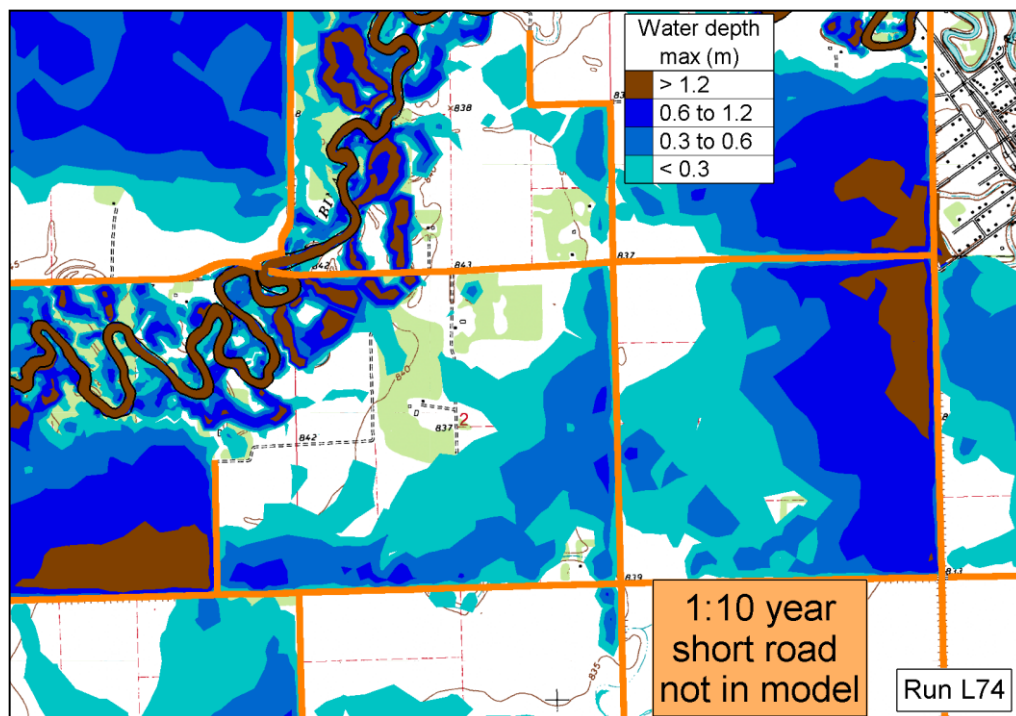
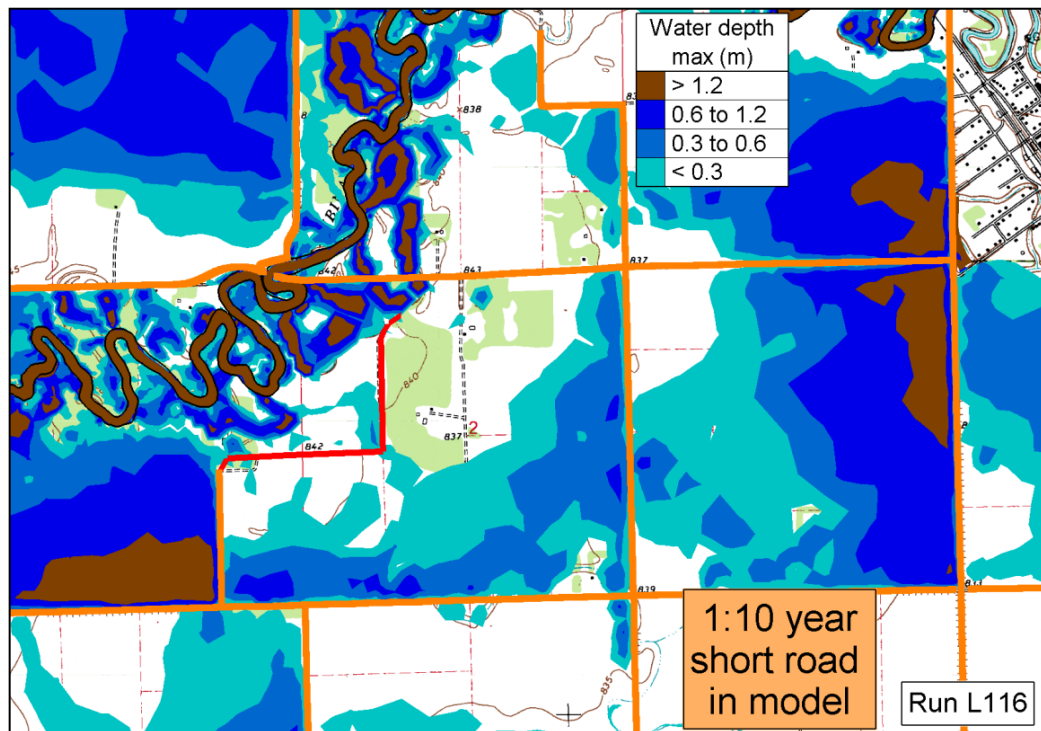


Figure 6 – Effect of the road number 2 in the model for the 1:10 event

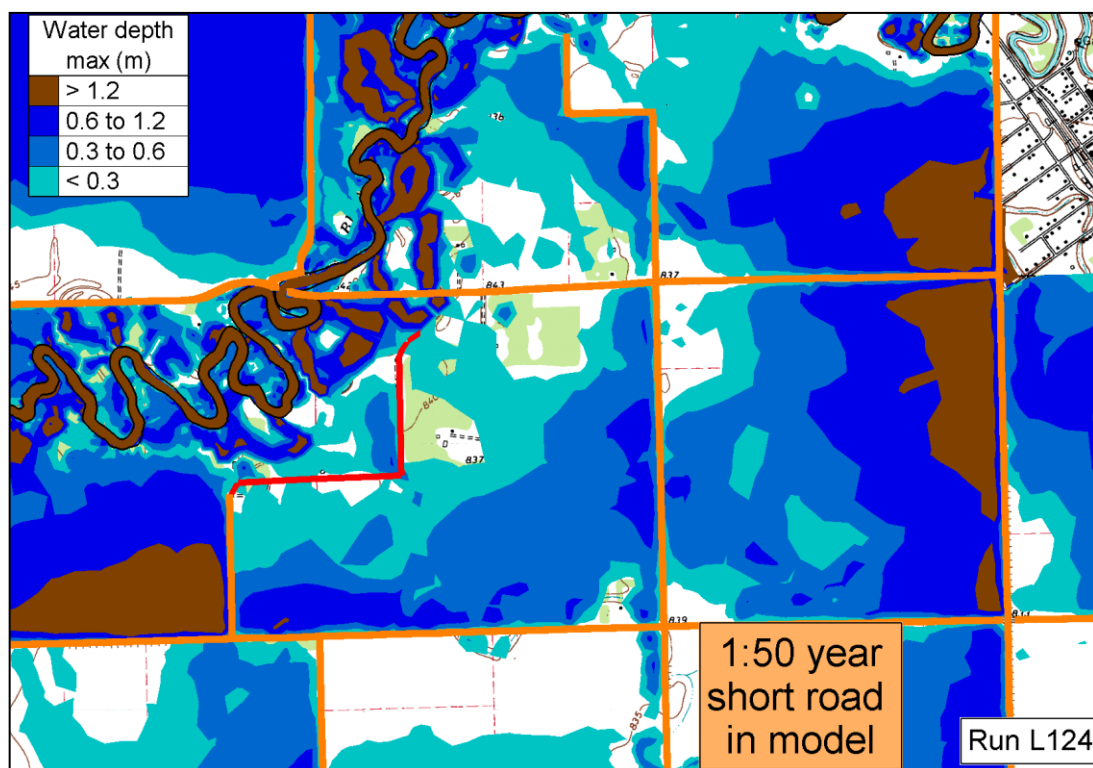
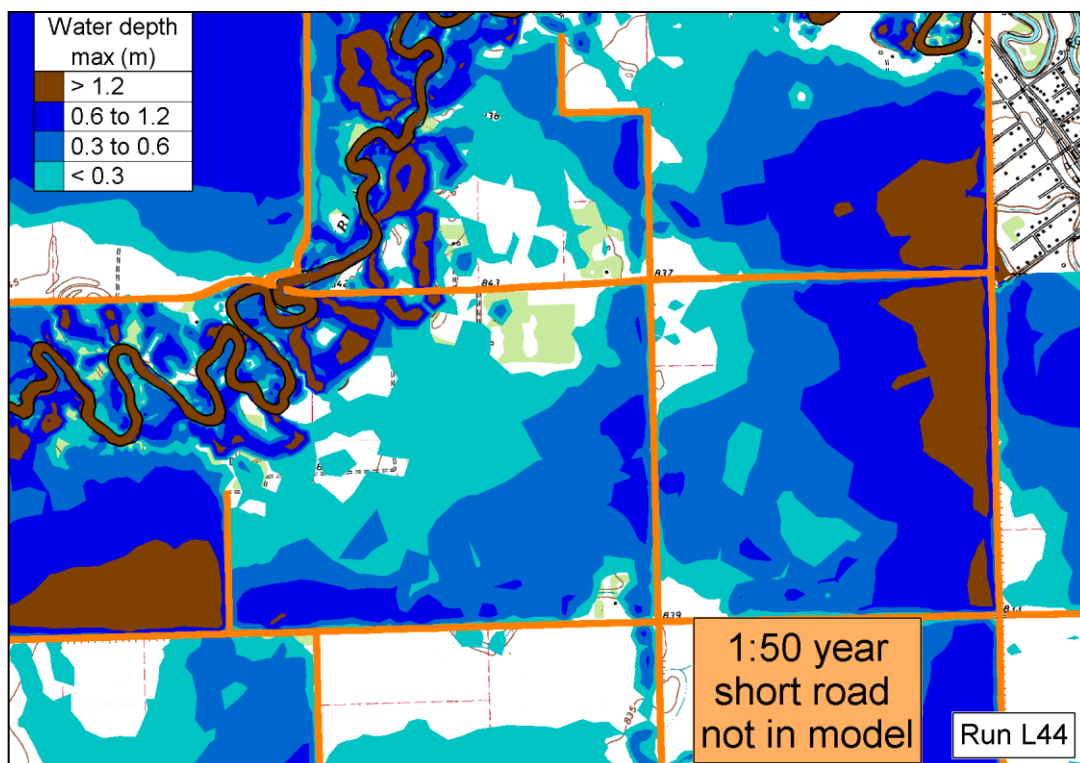


Figure 7 – Effect of the road number 2 in the model for the 1:50 event