Regional Floodplain Database:

2014 Model Maintenance Report - Bribie Island (BRI)

Moreton Bay Regional Council

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Regional Floodplain Database
2014 Model Maintenance Report
Brisbane Coastal Creeks (BCC)

June 2015

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PROJECT DETAILS

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LIST OF ABBREVIATIONS

AEP	Annual Exceedence Probability
ARI	Average Recurrence Interval
BoM	Bureau of Meteorology
DNRM	Department of Natural Resources and Mines
DTM	Digital Terrain Model
EY	Exceedances per Year
GIS	Geographic Information System
IFD	Intensity–Frequency–Duration
LIDAR	Laser Detection and Ranging
MBRC	Moreton Bay Regional Council
MDS	MBRC Design Storm (MDS) event (1% AEP embedded storm event)
MHWS	Mean High Water Springs
PMF	Probable Maximum Flood
RFD	Regional Floodplain Database
BCC	Brisbane Coastal Creeks

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1. Introduction

Moreton Bay Regional Council (MBRC) Regional Floodplain Database (RFD) is a hydrologic and hydraulic model library that interacts with spatial databases to deliver detailed flood information throughout the MBRC area. The model library includes a total of fourteen (14) coupled hydrologic and hydraulic models that cover the greater area of the MBRC.

The RFD project and associated flood model library was originally developed and prepared between 2009 and 2012. The BCC models have not been updated since this time. This current project is the RFD 2014 Maintenance Project and represents the first maintenance of the BCC RFD model libraries undertaken since the models were originally developed.

Water Technology Pty Ltd (WT) was commissioned by MBRC to prepare the necessary RFD Maintenance tasks and upgrades to the Brisbane Coastal Creeks (BCC) minor basin areas. The report details the methodology and outcomes from the updates to both the WBNM and TUFLOW models and has been prepared in accordance with MBRC's reporting template.

2. 2014 MODEL MAINTENANCE DETAILS

2.1 RFD Maintenance Tasks

The RFD maintenance tasks associated with this project included model updates to both the WBNM and TUFLOW models. The various technical work elements for the models were specifically outlined as a series of model update tasks detailed in Council's technical project brief.

2.2 WBNM Model Updates

RFD maintenance tasks associated with WBNM model updates are summarised as follows: -

1. WBNM model files were consolidated in accordance with Council's updated naming conventions and folder structure guidelines;
2. The BCC model minor catchment boundaries were updated based on the new 2014 LiDAR data which was collected and provided by Council for this project. Minor catchment boundaries were revised and provided to Council for approval;
3. The rainfall loss rates in the WBNM model were revised to include a 15mm initial loss and 2.5mm/hr continuing loss for the 1 Exceedance Per Year (EY), 0.5EY, 20%, 10% and 5% Annual Exceedance Probability (AEP) events. Rainfall loss rates for all other design events were kept the same as that prepared in the original models;
4. Updated WBNM models were analysed for the 1EY, 0.5EY, 20%, 10%, 5%, 2%, 1%, 0.5%, 0.2%, 0.1%, 0.05%, 0.02% and 0.01% AEP events, in addition to the Probable Maximum Flood (PMF) event. In each case, the WBNM models were analysed for the full range of storm durations;
5. The WBNM model was run based on the MBRC Design Storm (MDS) event (being a 1% AEP event with a 15 minute in 270 minute embedded design storm event); and
6. The results of the updated WBNM model were then compared with previous modelling results and checked, with iterative adjustments made to the model where required.

For Item 4 of the WBNM model updates (see above), a total of 10 storm durations were identified by WT for each of the 1% AEP and 0.1% AEP design flood events based on the peak flows determined from the WBNM models. These storm durations were then presented to Council for prior approval for inclusion on the critical duration assessment required in Task D1 of the project brief. Further details on the critical duration assessment are provided in Section 3.2.1. Some of the nominated storm events for the BCC model were not available in the previous model library dataset and had not been assessed using the WBNM model developed for the original RFD Project. Accordingly, additional WBNM storm events were prepared and provided by Council for the purposes of the critical duration assessments under this project.

2.3 TUFLOW Model Updates

The RFD maintenance tasks associated with the TUFLOW model updates are summarised as follows: -

1. TUFLOW model files were consolidated in accordance with Council's updated naming conventions and folder structure guidelines.
2. The existing model was changed so that it could be run using the latest TUFLOW executable (i.e. TUFLOW Build 2013-12-AD).
3. The previous TUFLOW model was updated to include the new 2014 LiDAR data (which was collected and provided by Council for this project). In locations where 2014 LiDAR was not available 2009 LiDAR was used.
4. Breakline ZLG lines were prepared manually along the waterway centrelines to better represent the streamlines and to otherwise remove erroneous high points caused by dense vegetation. The breaklines were prepared based on careful selection of point elevations along each of the major waterways. The extent of the breakline ZLG line prepared for the BCC model is illustrated in Figure 1.
5. New or updated hydraulic structures were included in the TUFLOW model based on the structure data provided by Council. This data included GIS datasets, detailed survey as well as hardcopy structure plans, all of which were sourced and supplied by Council. For the BCC model, new and updated structures included those as summarised in Table 1. These culverts are also highlighted in Figure 1.

Table 1 - Updated structures applicable to BCC catchment

Structure ID	Road Name	Suburb	Structure Type
KED-01	Maba Crt	Everton Hills	Footbridge

   A review of the BCC model layered flow constriction data for bridge structures identified that a FLC = 0 had been applied to all bridge structures. A zero FLC value effectively ignores any energy losses associated with the bridge deck. The recommended value in TUFLOW is specified as FLC=1.56 (WBM BMT, 2010). The FLC value applied in the BCC model was raised for discussion with Council during the course of this project. Council subsequently advised that they will not be making any changes to the layer flow constriction modelling approach and parameters as part of the RFD 2014 maintenance project. Accordingly, WT have adopted the same FLC=0 in the current model updates.
6. Trunk drainage modifications were not required in the BCC model.
7. PO lines including locations and naming conventions have been reviewed and revised accordingly to match with the project conventions set by Council. This included adding significantly more PO lines in the model to aid Council in the extraction of hydraulic model results at various locations throughout the BCC model domain.
8. A review of the model investigation areas identified by council (Figure **1**) was undertaken using the updated TUFLOW model. These areas were reviewed in terms of model structure and improvements added as appropriate to provide a more representative assessment of localised

flooding in the area. A detailed description of the issues identified for each of the investigation areas along with the changes made to the model are presented in Figure **1** and are shown in Table 2.

9. Spatial definition of hydraulic roughness was reviewed in areas of significant flow conveyance and updated to reflect and be consistent with the changed landuse as provided by Council. Key areas where modified land use resulted in model roughness changes is displayed in Figure 1.
10. The method for modelling large buildings and large clusters of smaller buildings in the floodplain was considered and adjusted where necessary. In accordance with Council's instructions provided during the project, modelling of buildings within the floodplain was undertaken using either an urban block layer (where the majority of flow passed through an area of urban landuse) in addition with modelling specific building footprints themselves.
11. Revised flows from the updated WBNM model maintenance tasks were incorporated in the updated TUFLOW models. Initial test runs of the TUFLOW model were undertaken for the 5% and 1% AEP events based on a 2 hour single storm duration for the BCC model and using the 5m grid model. Initial results from the TUFLOW model were reviewed and adjustments made as necessary.

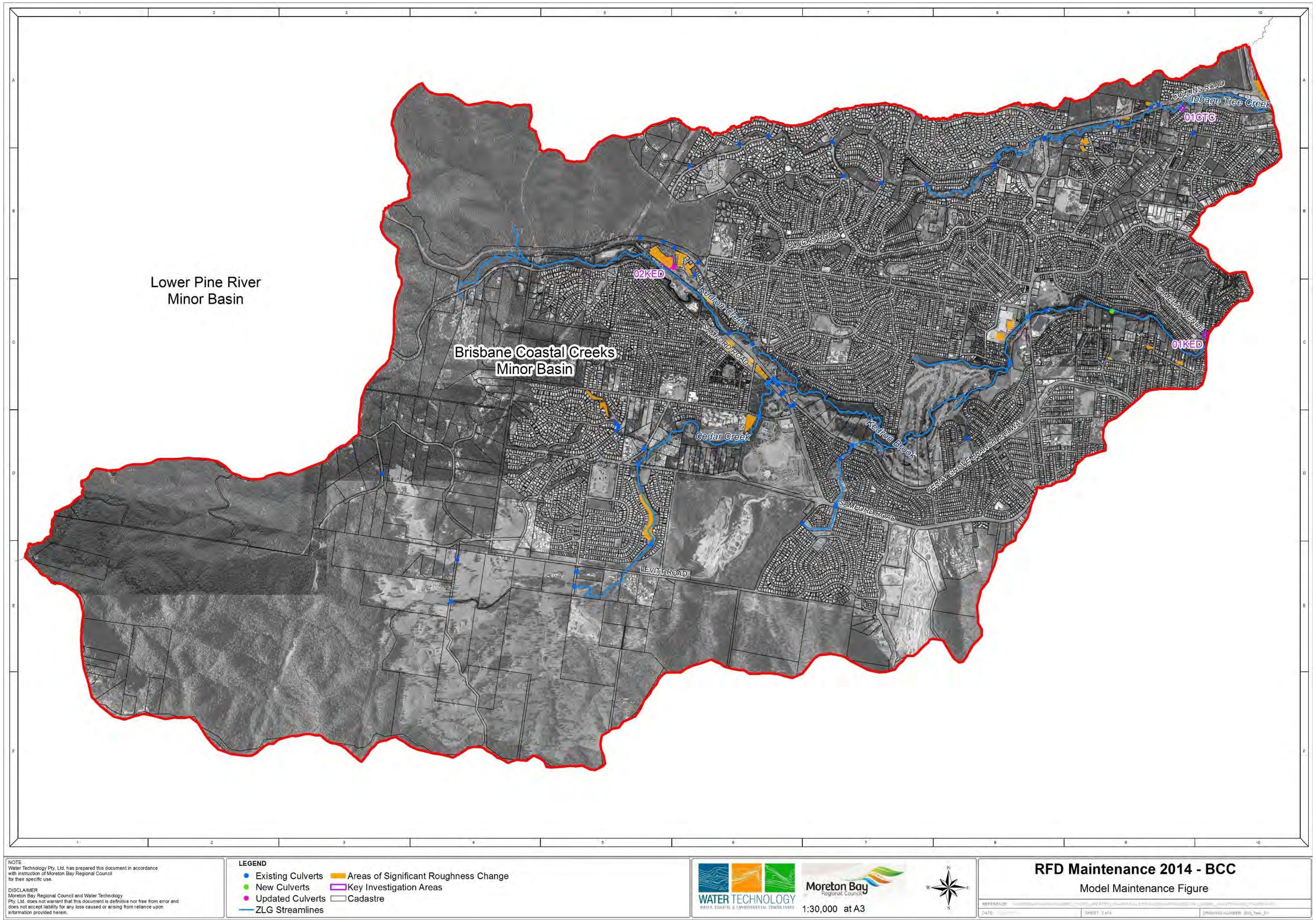

Figure 1 – BCC Model Maintenance

Table 2 – Investigation Area Summary for BCC Model

<table>
<tr><th>Minor Basin</th><th>Study Area ID</th><th>Major Catchment</th><th>No. of Properties Impacted</th><th>Study Area Name</th></tr>
<tr><td>BCC</td><td>01KED</td><td>KED</td><td>2</td><td>Camelia Ave – Everton Hills</td></tr>
<tr><td colspan="5">Updates
• Zlg added to improve model drainage downstream of Camelia Ave
• Ridge layer included to ensure peak bank height and road level is included in model topography
• Local boundary condition adjusted (KED_01_00000) to ensure correct routing
• Roughness layers adjusted to ensure entire road is included</td></tr>
<tr><td>Comments</td><td colspan="4">Improved conveyance and topography has reduced water surface levels in this area.</td></tr>
<tr><td>BCC</td><td>02KED</td><td>KED</td><td>9</td><td>Camelia Ave – Everton Hills</td></tr>
<tr><td colspan="5">• Updated to 2014 Lidar, depicts ‘Woolshed’ development more accurately than Tin provided in 2012 model
• Zlg added to better model creek drainage to the east of the development area
• Local boundary conditions adjusted (KED_09_00000) to ensure proper routing of flows through development
• Culvert 09_00000 updated to reflect latest culvert data</td></tr>
<tr><td>Comments</td><td colspan="4">Reduced flooding in new development area</td></tr>
<tr><td>BCC</td><td>01CTC</td><td>CTC</td><td>2</td><td>Caneby St – Everton Hills</td></tr>
<tr><td colspan="5">• Local boundary condition adjusted (CTC_01_00677) to ensure correct routing
• Roughness extended to include all bank vegetation
• Zlg added to improve creek continuity</td></tr>
<tr><td>Comments</td><td colspan="4">Reduced flooding in adjacent properties</td></tr>
</table>

3. MODEL SIMULATIONS

3.1 Verification

The BCC model was verified using the October 2011 event. Model verification was undertaken using a 5m grid model. Model verification results are discussed separately in Section 4.2.

3.2 Design Flood Events

3.2.1 River & Creek Critical Duration Assessment

The 10 selected storm duration events approved by Council as discussed previously in Section 2.2 have been used to undertake a critical duration assessment for the updated TUFLOW models. Table 3 summarises the 10 storm durations selected by Council for the BCC model.

To determine the critical storm durations, the TUFLOW models have been analysed using a 10m grid to model the 10 separate storm durations for each of the 1% and 0.1% AEP design events. From this, the critical duration storms were able to be determined throughout the BCC model domain. A critical storm duration map for the 1% and 0.1% AEP events was prepared and submitted to Council for the selection of the critical storm durations for each event, and are shown in Figure 2 and Figure 3.

Although there are a number of critical durations represented throughout the BCC model domain, council selected three critical design event storms from the 1% AEP event and two critical duration storms from the 0.1% AEP event, as shown in Table 3.

To determine the critical storm durations, the difference between mapped peak flood level for the selected storm durations and mapped peak flood level for the all storm durations was considered. These differences are displayed in Figure 4 and Figure 5, and show that the selected critical durations represent the maximum peak flood level throughout most of the model domain.

Table 3 – Critical Duration Assessment

Design Event	Tested Storm Durations (min)	Selected Durations (min)	Adopted Events
1% AEP	30, 45, 60, 90, 120, 180, 270, 360, 540 and 720	90, 120 and 180	1EY, 0.5EY, 20%, 10%, 5%, 2%, 1% AEP
0.1% AEP	15, 30, 45, 60, 90, 120, 180, 300, 360 and 720	120 and 60	0.5%, 0.2%, 0.1%, 0.05%, 0.02%, 0.01% AEP and PMF

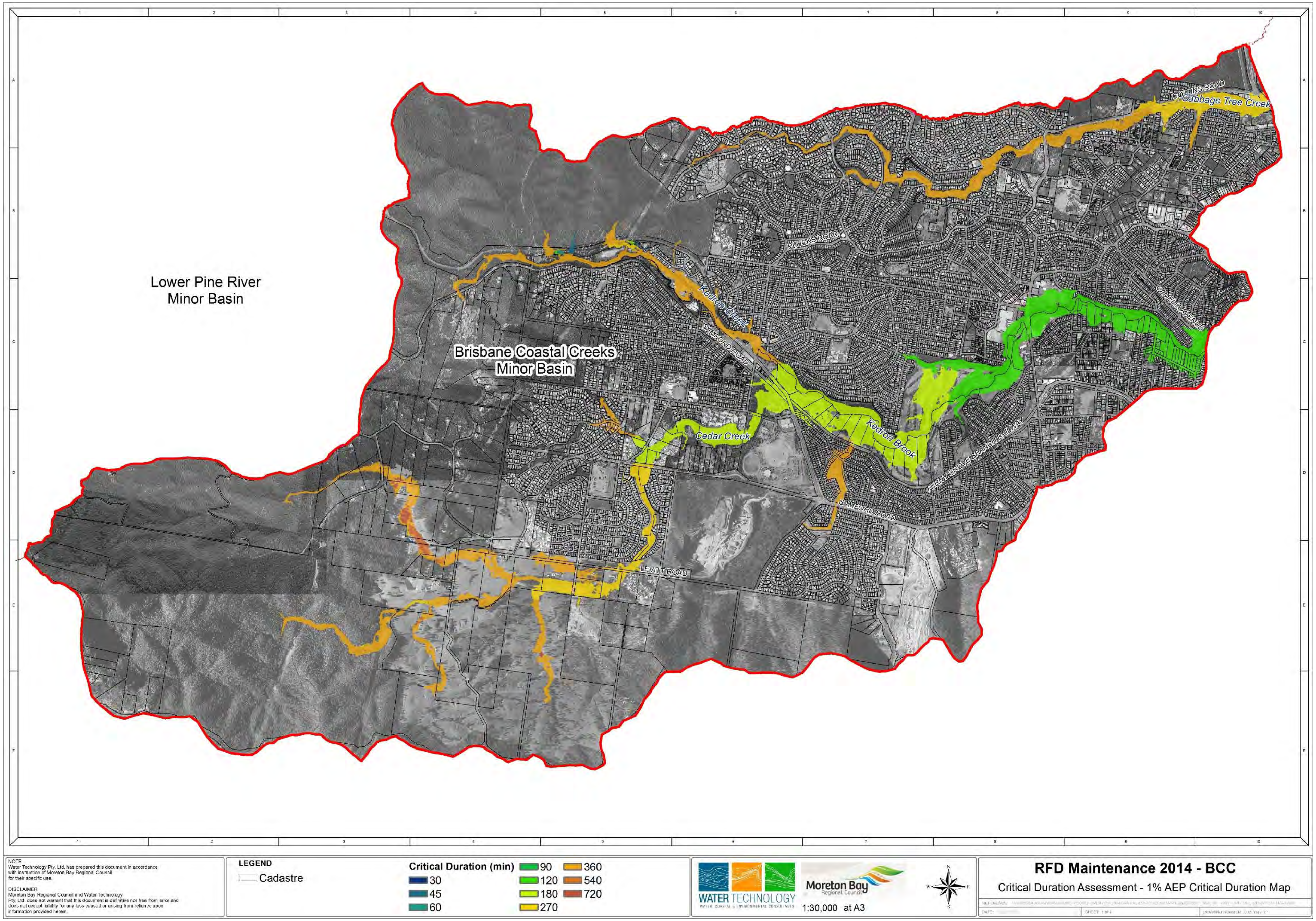

Figure 2 – BCC 1% AEP Event Critical Duration Assessment

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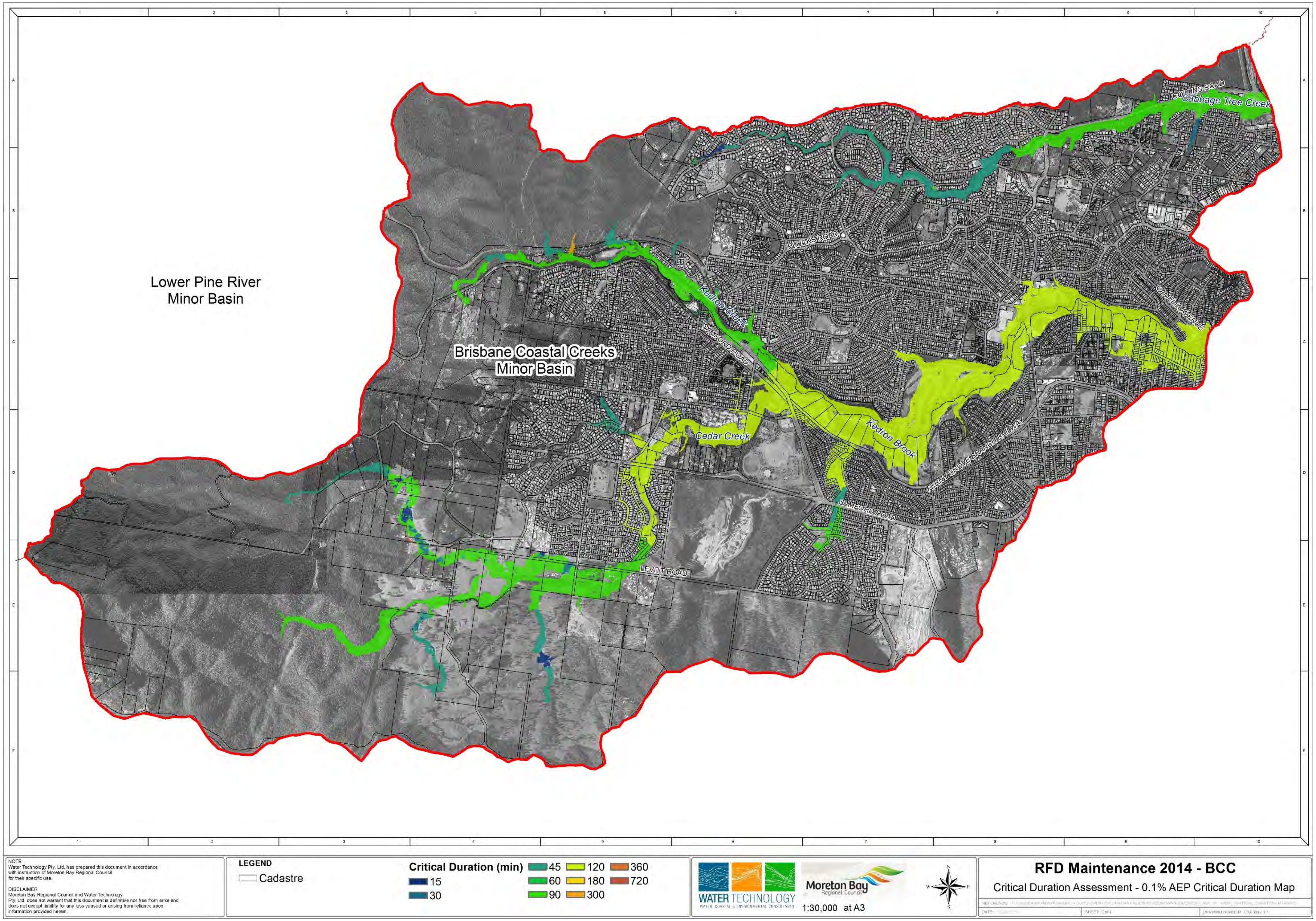

Figure 3 – BCC 0.1% AEP Event Critical Duration Assessment

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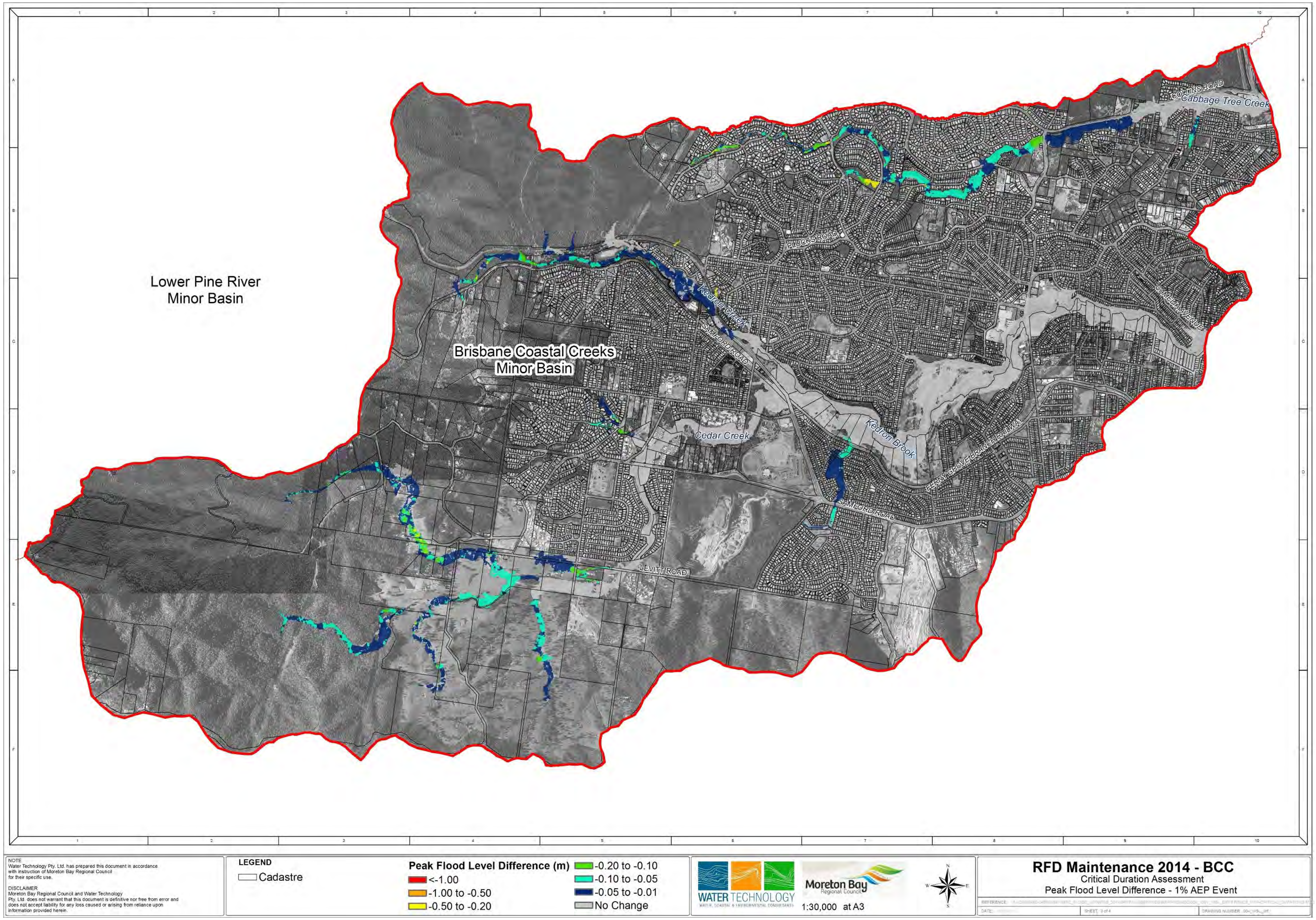

Figure 4 – Change in 1% AEP Peak Water Surface Levels

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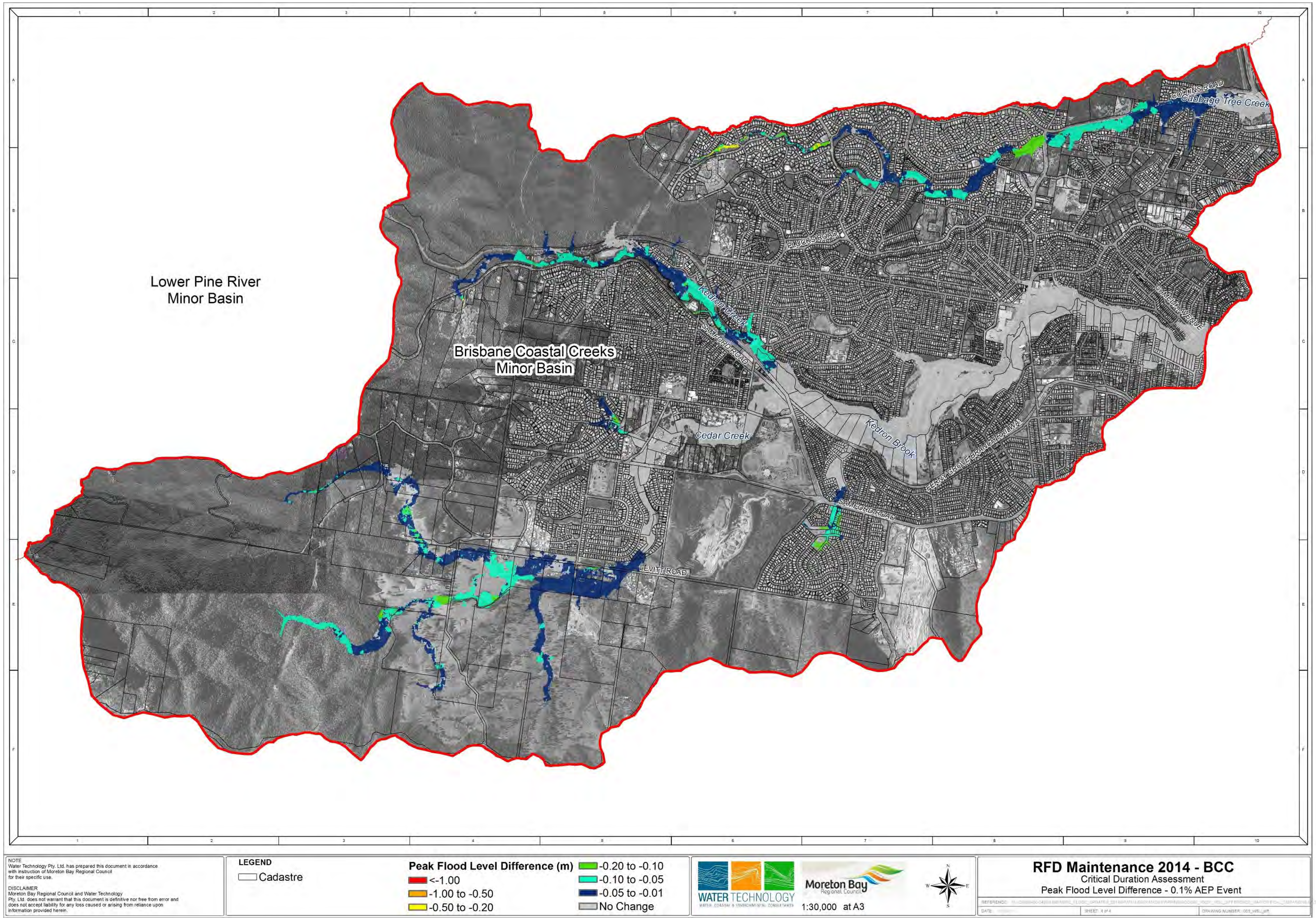

Figure 5 – Change in 0.1% AEP Peak Water Surface Levels

3.2.2 River & Creek Design Event Simulations

The updated BCC TUFLOW models were analysed for the 1EY, 0.5EY, 20%, 10%, 5%, 2%, 0.5%, 0.2%, 0.05%, 0.02%, 0.01% AEP events, in addition to the PMF event. The model simulations have been undertaken based on the following storm durations: -

- 90, 120 and 180 minute storms for the 1EY to 1% AEP events; and
- 60 and 120 minute storms for the 0.5% AEP event through to the PMF event.

A 5m grid model has been used for all design event simulations.

In addition to the above design simulations, the updated TUFLOW model has also been used to run the MBRC Design Storm (MDS) event (i.e. a 1% AEP event with a 15 minute in 270 minute 'Embedded Design Storm'). The analysis of the 1% AEP MDS event has also been undertaken based on a 5m grid model.

All results relating to the design event simulations have been provided to Council in a digital format and include post processed result files for all events analysed. There was no requirement to provide any GIS mapping for any of the design event simulations as part of the project technical specification.

3.2.3 Storm Tide Design Event Simulations

There was no requirement to undertake any storm tide modelling for the BCC model as part of project technical specification.

3.3 Sensitivity Analysis

A range of sensitivity, climate change and future landuse scenario simulations were undertaken using the updated BCC TUFLOW model. The specific scenarios analysed as part of this project are outlined separately below. In all cases, the updated TUFLOW 5m grid model prepared for BCC was applied based on the MDS event. The sensitivity scenarios are detailed in Table 4.

Table 4 – Sensitivity Analysis Summary

ID	Description	Section
R01	Roughness	3.3.1
R02	Blockage	3.3.2
R03	Climate Change - Rainfall	3.3.3
R04	Climate Change – Increased Tailwater Level	3.3.3
R05	Climate Change – Rainfall and Increased Tailwater Level	3.3.3
R08	Vegetated Floodplain	3.3.4
R09	Future Residential Development	3.3.4
R10	Vegetated Floodplain and Future Residential Development	3.3.4

3.3.1 Hydraulic Roughness Analysis

The following hydraulic roughness sensitivity assessment has been undertaken as part of this study:

- R01 – Increased Manning's "n" roughness by 20%.

All Manning's 'n' values in the model were increased by 20%.

3.3.2 Structure Blockage Scenario

The following structure blockage sensitivity assessment has been undertaken as part of this study:-

- R02 – Inclusion of structure blockage (moderate blockage).

The adopted blockage parameters were outlined in the SKM report (SKM, 2012a). For the moderate blockage case, this includes: -

- Full blockage (100% blockage) for culverts and pipes with a width equal to or less than 2.4 m; and
- Partial blockage (15% blockage) blockage for culverts and pipes with a width greater than 2.4 m.

The moderate blockage case applies to the 1d culvert layers (culverts).

3.3.3 Climate Change and Downstream Boundary Conditions

The following climate change sensitivity assessments have been undertaken as part of this study:-

- R03 – Increased rainfall by 20% in WBNM model and re-run of hydraulic model based on revised flows;
- R04 – Increased downstream tailwater boundary. For the BCC model, this includes raising the tailwater boundary to be equivalent to the 0.02% AEP event; and
- R05 - A combination scenario based on cases R03 and R04.

The technical methodology relating to methodology for the climate change sensitivity testing is contained within the SKM report (SKM, 2012b).

3.3.4 Future Landuse Analysis

The following future land use change sensitivity assessments have been undertaken as part of this study:-

- R08 – Increased vegetation (i.e. medium dense vegetation types were changed to high dense vegetation and low grass/grazing vegetation types changed to medium dense vegetation);
- R09 – Increased residential development based on an update of the WBNM fraction imperviousness provided by Council; and
- R10 - A combination scenario based on cases R08 and R09.

Future fraction imperviousness for hydrologic modelling was provided by council based on future land use planning.

4. Model Results and Outcomes

4.1 2014 Model Maintenance

The results of the initial runs were provided to Council for review and approval. Results from the initial TUFLOW model runs including comparisons to previous model results are shown in Figure 6 and Figure 7 for the 1% and 5% AEP events respectively. The storm durations used in creating a combined envelope for the two models and events are shown in Table 5.

Table 5 – Storm duration comparison for 5% and 1% AEP events

Event	Storm Durations for 2012 Model	Storm Durations for 2014 Maintenance Model
5% AEP	90, 120 and 180m	90, 120 and 180m
1% AEP	90, 120 and 180m	90, 120 and 180m

Significant reductions in the extent of flooding and flood levels were achieved when compared with the 2012 RFD model in the 5% event. Flood levels impacts were less obvious in the 1% event, with some water level increases and decreases. Negative values in the figures mean that the 2014 BCC maintenance model results are lower than the 2012 BCC model results and vice versa.

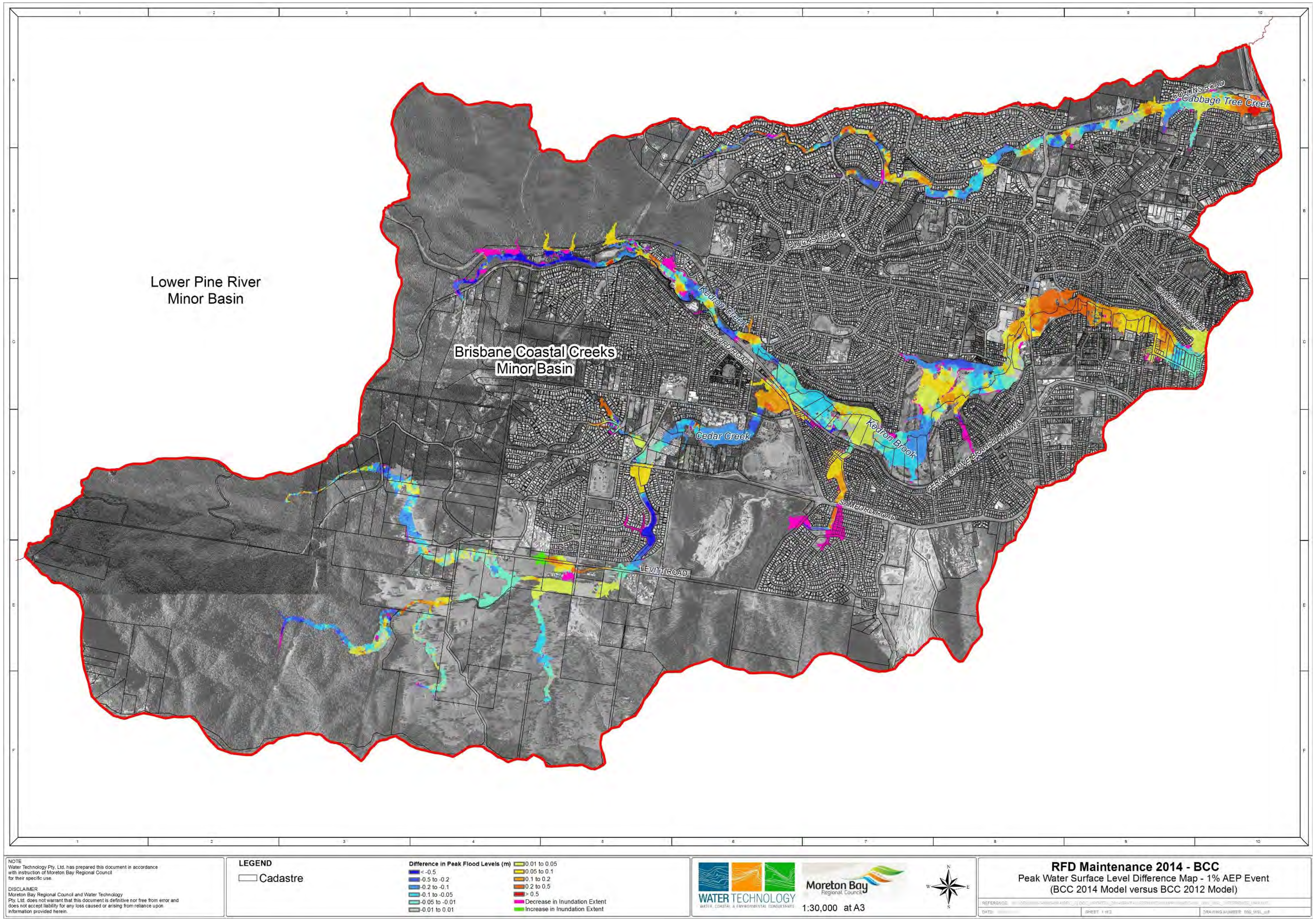

Figure 6 – BCC 1% AEP Event Water Surface Level Difference Map

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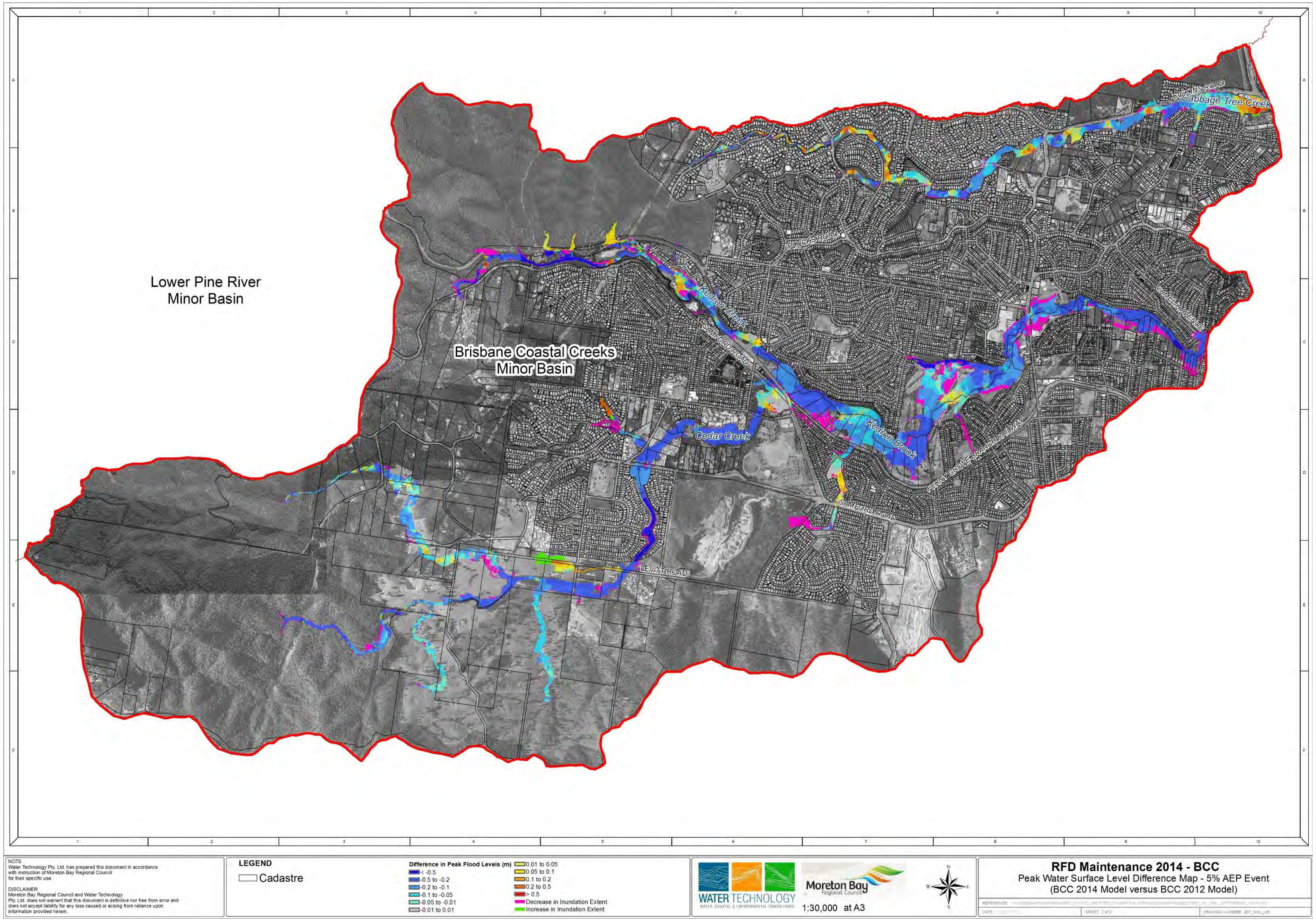

Figure 7 – BCC 5% AEP Event Water Surface Level Difference Map

4.2 Verification

Verification of the BCC model was undertaken for the October 2010 flood event. The previously prepared October 2010 WBNM model was used to inform inflows to the BCC TUFLOW hydraulic model, with the WBNM model sub-catchments and landuse changes undertaken as detailed previously in Section 2. Historical rainfall depths as well as temporal patterns in the WBNM model remained unchanged.

Verification of the BCC model to the October 2010 event was undertaken based on the comparison of predicted versus recorded historical flood levels throughout the model domain and at the Collins Road and Osbourne Rd gauges. The results of the model verification to the October 2010 event are presented in Figure 10 and Figure 11. General reductions in flood level compared to the 2012 model are visible throughout Cabbage Tree Creek, with decreases of up to 350mm. However, different parts of the catchment also show water surface level increases. Cedar Creek and Kedron Brook both display water level increases and decreases, with increases being more prevalent and up to 200mm in magnitude. A summary of the model verification results based on gauge level comparison points is provided in Table 6.

Table 6 – Flood Gauge Level Comparison Points – October 2010 Verification Event

Survey Mark ID	Recorded Peak Water Level (m AHD)	Modelled Peak Water Level (m AHD)	Difference (m)
270 – Dawson Parade	40.95	41.61	0.66
280 – Pearse Street	45.21	45.51	0.30
290 – Kuringal Drive	48.59	48.49	-0.10
300 – Samford Rd	56.20	56.26	0.06
310 – Rangleigh St	60.57	61.21	0.64
Collins Rd Gauge	44.28	44.19	-0.09
Osborne Rd Gauge	33.32	34.18	0.86

Verification of the BCC model to the October 2010 event was found to provide a reasonable match to historical survey marks. The verified BCC TUFLOW model was subsequently adopted for the purposes of this project.

4.2.1 Hydrograph Comparison

To demonstrate differences in flood levels between the 2012 and 2014 BCC models, this section presents the hydrographs at the river gauge locations from the BCC model runs for the October 2010 event.

Two river gauges recorded flood levels during the October 2010 event in the BCC catchment. Hydrographs covering this event (11-12 October) are shown in Figure 8 and Figure 9 below.

A description of the graphs is provided below:

- The timing (i.e. the shape of the hydrographs) at both gauges compares very well between the recorded and the modelled flood levels throughout the event.
- The model under predicted the peak flood level at the Collins Rd Alert gauge by 0.09m (0.18m overestimation in the 2012 model).
- The model over predicted the peak flood level at the Osborne Rd gauge by 0.86m (also 0.86m in the 2012 model). The difference between recorded and modelled results at this gauge follows the general trend of floodwater overestimation in the lower reach. This has been previously reported (Aurecon, 2012) as being due to the presence of a confined channel in this region, which has not undergone detailed bathymetric survey and is therefore underestimating floodwater conveyance.
- Differences between the 2012 and 2014 model are likely due to the improved tributary conveyance afforded by the topographic updates and inclusion of ZLG lines in the 2014 model.

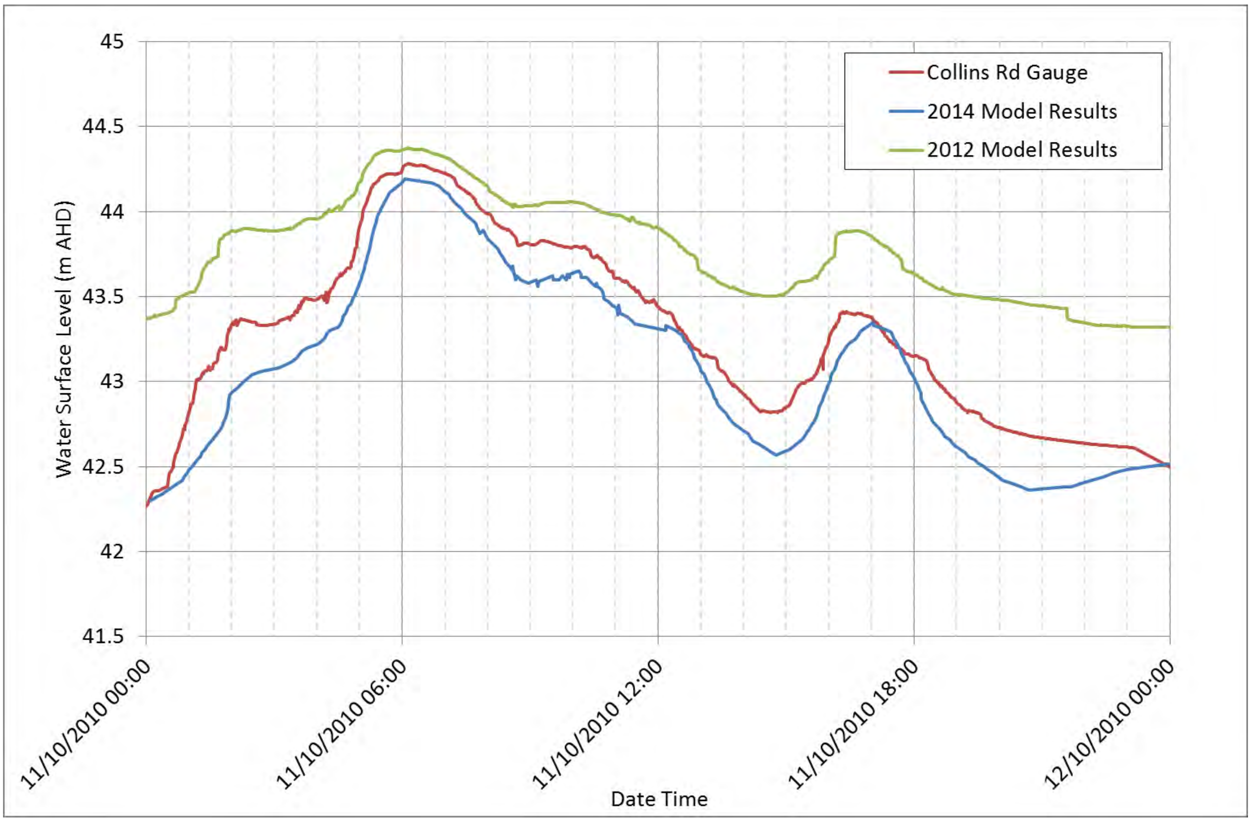

Figure 8 – Recorded and Modelled Hydrographs at Collins Road Alert Gauge

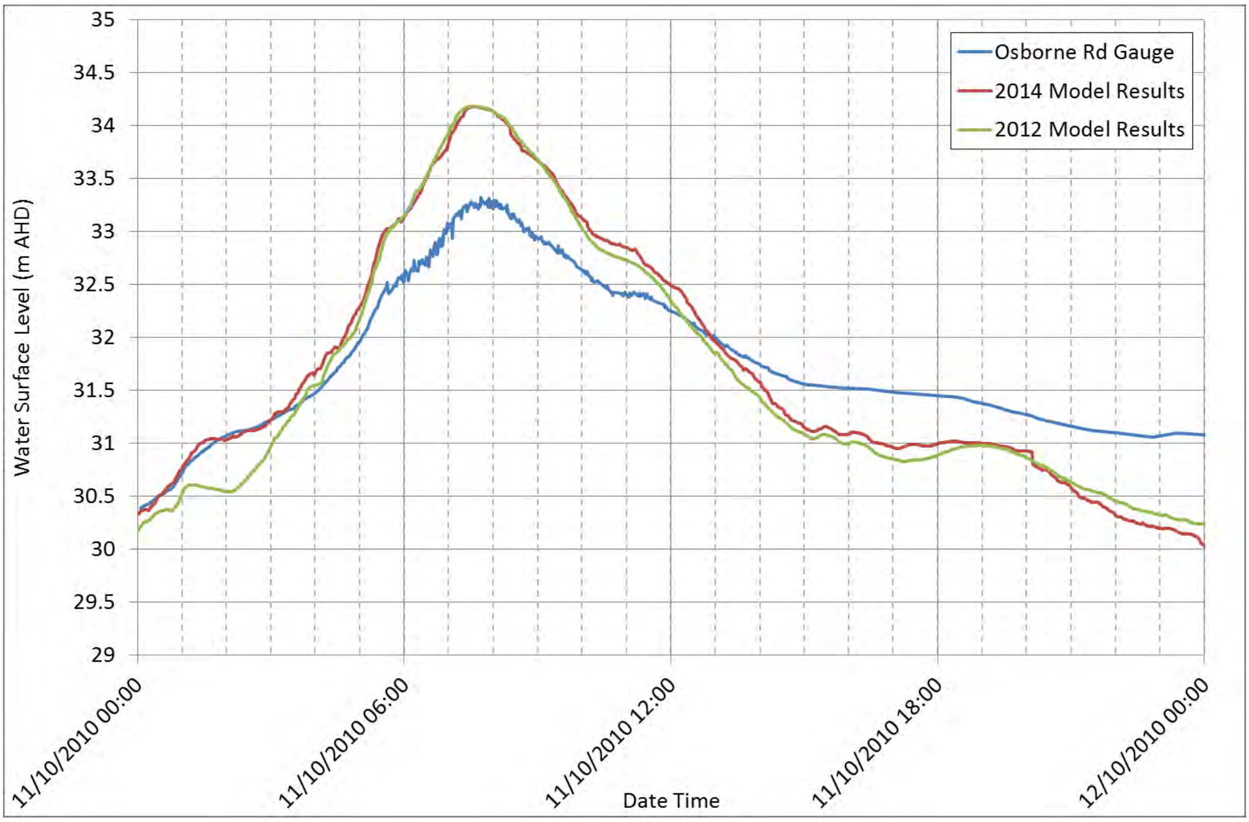

Figure 9 – Recorded and Modelled Hydrographs at Osborne Rd Alert Gauge

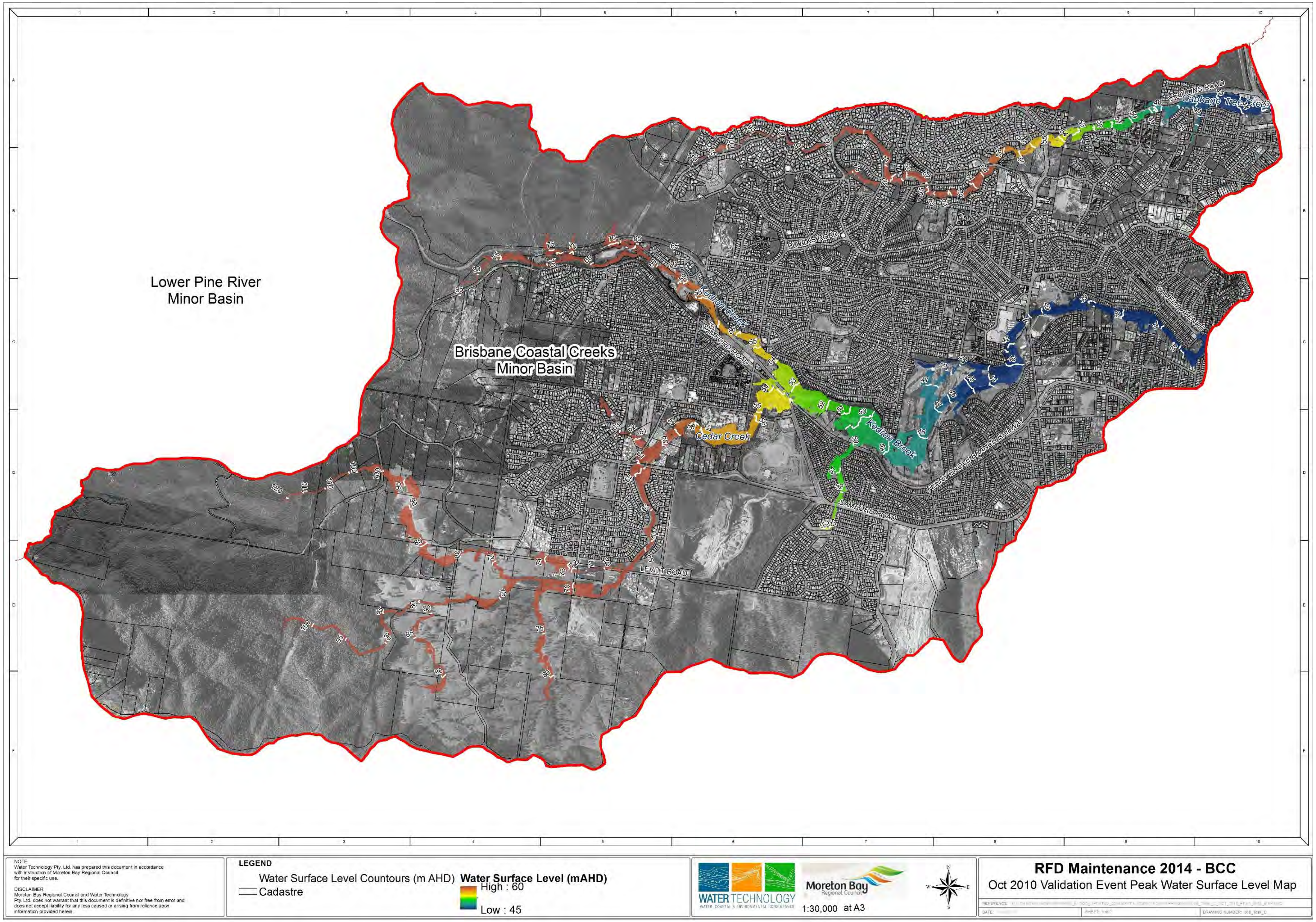

Figure 10 – Peak Water Surface Level and Extent Map, Verification Event, October 2010

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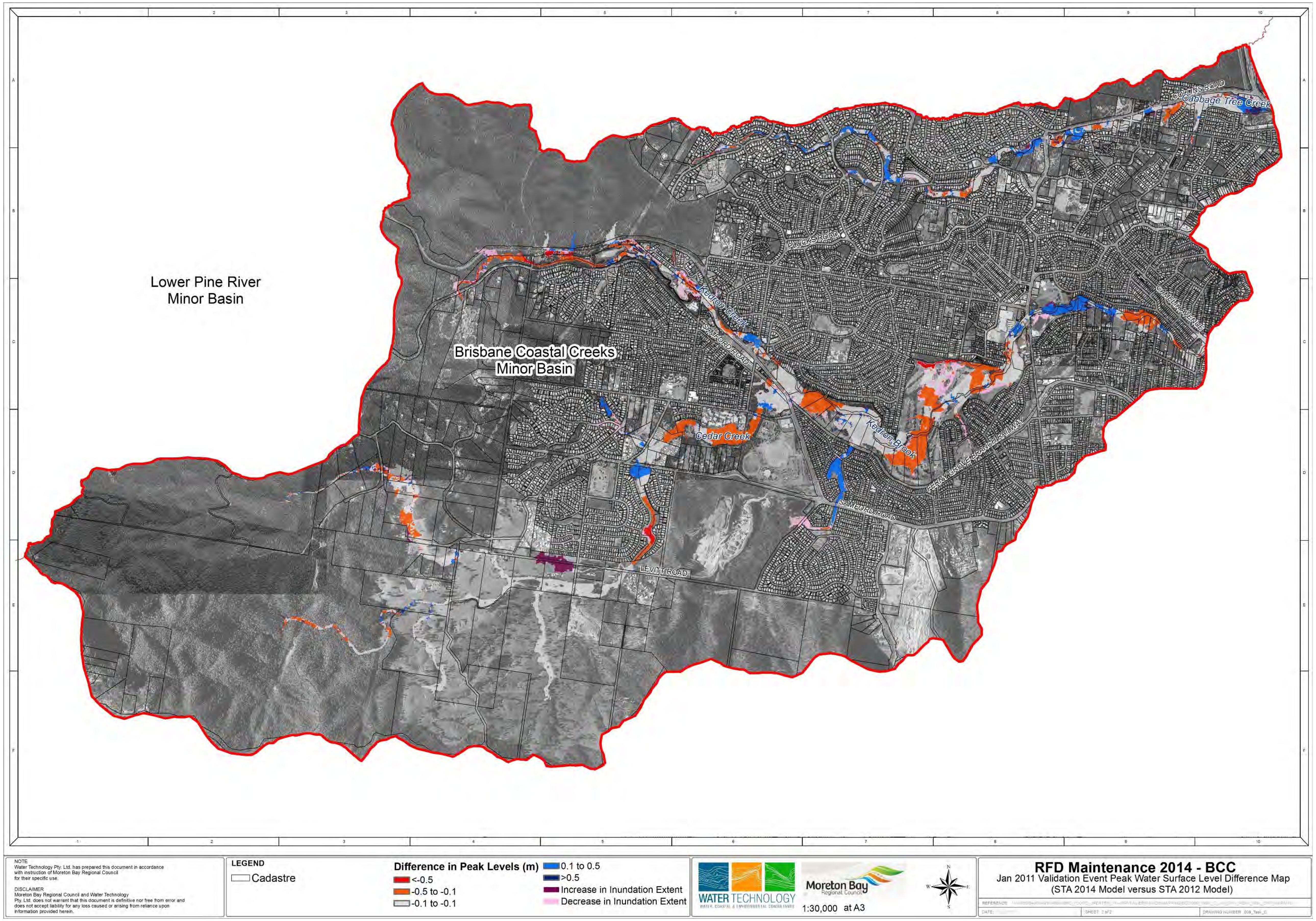

Figure 11 –Peak Water Surface Level Difference and Extent Map - 2014 Model vs 2012 Model, October 2010

4.3 Design Flood Behaviour

TUFLOW outputs (xmdf format) were provided to council for all simulations, which saved at 20 minute intervals. Peak value grids were also provided for each event and variable. The output variables include:

- Water Surface Level (H)
- Water Depth (D)
- Water Velocity (V)
- Water Depth Velocity Product (Z0)
- Hazard (ZMBRC, ZQRA)
- Stream Power (SP)

4.3.1 River & Creek

A maximum float grid was derived using the envelope of all critical storm (section 3.2.1) durations for each event and all the TUFLOW outputs listed in Section 4.3 above. Results for the 5%, 1% and 0.1% AEP events are available on Council's website (www.moretonbay.qld.gov.au/floodcheck) as PDF suburb maps or in the Flood Explorer interactive mapping tool.

4.3.2 Storm Tide

There was no requirement to undertake any storm tide modelling for the BCC model as part of project technical specification.

4.4 Sensitivity Analysis Results

The Moreton Bay Design Storm (MDS) was used as a base case for the sensitivity analysis. The results of the sensitivity analysis are summarised in sections 4.4.1 to 4.4.4. The MDS flood level compares closely with the 1% AEP event flood level, with differences less than 50mm.

4.4.1 Hydraulic Roughness Analysis

Increasing Manning's 'n' by 20% resulted in a few localised increases of up to 300mm in Cedar Creek, increases generally less than 200mm in Kedron Brook and up to 150mm in Cabbage Tree Creek. In most of the model domain the impact of Manning's 'n' was generally less than 100mm.

4.4.2 Structure Blockage Analysis

The structure blockage analysis shows that peak flood levels increase upstream of blocked structures and the extent of flooding also increases. These local impacts varied throughout the model, generally less than 150mm but some impacts were recorded of up to 1000mm. Decreases in peak flood levels of up to 100mm are observed downstream of some of the blocked structures, especially in Cabbage Tree Creek.

4.4.3 Climate Change and Downstream Boundary Condition Analysis

Climate change has a significant impact on flood levels especially in the lower catchment.

Increase in Rainfall Intensity of 20%

An increase in rainfall throughout the catchment increased flood levels by between 50 - 300mm in most parts of the catchment.

Increased downstream boundary to the 0.02% AEP event

An increase in downstream boundary increases flood levels in Cabbage Tree Creek by up to 700mm and in Kedron Brook by up to 1400mm. The flooding extent increase is confined to the downstream end of the creeks.

Increase in rainfall intensity and increase in downstream boundary to the 0.02% AEP event

Combining the above two scenarios affects the entire catchment with increases in flood levels of generally between 200 - 400mm in the Kedron Brook and Cedar Creek streams, and 50 - 200 in the Cabbage Tree Creek catchment. Some small increases in flood extent are also noted.

4.4.4 Future Land use Analysis

Increasing the vegetation in the floodplain

Increasing the vegetation in the floodplain generally increases flood levels, especially in the downstream Kedron Brook area. In this area flood levels are increased by up to 800mm.

Increased residential development

Increased residential development has no significant impact on peak flood levels in the catchment.

Increased vegetation in the floodplain and residential development

Combining the two scenarios above does not have an additional impact over and above the individual scenarios.

4.5 Model Limitations and Quality

The RFD maintenance tasks prepared by WT have been undertaken based on the specific project briefing and technical requirements as outlined by MBRC. The 2014 maintenance tasks prepared by WT are therefore limited in nature to undertaking:-

- Model revisions and updates in accordance with the project specifications and Council instructions; and
- Model revisions and updates performed without undertaking an extensive review or check of the overall structure and configuration of the originally developed models.

The model updates and revisions undertaken have culminated in overall model improvements compared to the models originally developed in 2012.

The following limitations apply to the updated WBNM and TUFLOW models prepared for this project:

- The same model limitations identified and discussed by Aurecon (Aurecon, 2012) as part of the original development of the BCC models equally apply to this study.
- The topography of the floodplain has been represented based on 2009 and 2014 LiDAR survey data provided by Council. The LiDAR data is subject to accuracy statements and these same accuracy statements will therefore equally apply to the models updated as part of this study.
- Bathymetric survey of the river or creek has not been undertaken for this study. The topography of the waterways has been defined using LiDAR data. LiDAR data is unable to pick up ground levels below the water surface, and therefore the invert of the waterways is not precisely represented.
- Watercourses have been represented in the 2D domain based on a grid resolution of 5m. A 3d breakline in the form of a ZLG layer has also been included in the TUFLOW model to aid in channel continuity and conveyance. The representation of the watercourses in the model may lead to the model over or underestimating conveyance and indirectly affecting modelled flood levels.
- The TUFLOW model uses a head verse discharge relationship for tailwater level which is based on a water slope relationship derived by Aurecon (Aurecon, 2012). By virtue of the boundary condition applied, the model results immediately adjacent to the boundary may not be representative due to the artificial effects of the boundary condition applied at the model domain.
- Model verification has only considered one historical event. This method of verification does not replace full model calibration.
- The BCC model includes a FLC=0 model parameter that has been applied to all bridge structures modelled as a layered flow constriction. A zero FLC value effectively ignores any energy losses associated with the bridge deck. The recommended value in TUFLOW is specified as FLC=1.56 (BMT WBM, 2010). Modelled flood levels in the areas of bridge structures may therefore be lower than would otherwise be the case where appropriate energy losses were applied to the bridge structures.

4.6 Model Specification and Run Times

Table 7 provides a brief summary of the BCC TUFLOW model specification and run times. BCC is a one of the smaller catchments within the MBRC RFD study area, encompassing 73.9km^2 and 2,956,176 grid cells (at 5m cell size).

Table 7– BCC Model Specification and Run Times

Event	Model Grid Size	Model Run Time (hours)	2d Model Memory (RAM) [Gb]
1EY (180m)	5m	7.0	3.1
1% AEP (180m)	5m	7.2	3.1
0.1% AEP (120m)	5m	12.0	3.1
0.01% AEP (120m)	5m	13.5	3.1
MDS	5m	5.8	3.1

5. Conclusion

A range of WBNM and TUFLOW model updates and revisions have been prepared and documented in this report. These revisions and model updates have been prepared in accordance with the technical project specification prepared by MBRC. One of the key aspects for the model updates was the inclusion of new LiDAR data collected by Council in 2014.

Following the model updates, initial model tests have been undertaken as well as model verification tasks. The model was then used to complete a critical duration assessment which directed the design flood event assessments for the full range of events from the 1 EY event through to the PMF event. Multiple storm durations as well as Council's Design Storm (MDS) Event were also assessed for the range of design events. Additionally, a number of sensitivity scenarios have also been assessed and includes future land use impacts, climate change scenarios, increased roughness, consideration of structure blockage as well as various combinations of the same.

The Regional Floodplain Database Project is focused on structuring model input and output data in a GIS database held by Council. Consequently, all model input and output data has been prepared and provided to Council in a digital format at the completion of the study. The data includes all model files for all the design events, sensitivity analysis, climate change assessment and future landuse scenarios, and includes all associated post-processing of model results as required.

The RFD Maintenance 2014 Project undertaken for the BCC minor basin as documented in this report has been successful in addressing the overall objectives of the study.

It is recommended that Council continue to progressively upgrade and revise the BCC models and digital data on a continual basis to maintain model performance and to ensure that the model outputs are appropriately representing the flooding behaviour of the BCC floodplain.

6. References

Aurecon (2012). Regional Floodplain Database: Hydrologic and Hydraulic Modelling – Brisbane Coastal Creeks (BCC).

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