

LOGAN CITY COUNCIL

APPROVED DOCUMENT

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MCUI/39/2017



5307-5335 Mt Lindsay Highway, Jimboomba

Jimboomba

Hydraulic Impact Assessment Report

UG Jimboomba (QLD)

DOCUMENT VERIFICATION

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APPROVAL FOR ISSUE

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1. INTRODUCTION

This Hydraulic Impact Assessment (HIA) has been prepared on behalf of UG Jimboomba (QLD) Pty Ltd and presents a high-level hydraulic assessment of the proposed development at 5307-5335 Mt Lindsay Highway, Jimboomba (the subject site).

The objective of this report is to investigate the flood risk to the site from the adjacent Logan River and quantify any external impacts due to the development. The report will:

- Calculate flood levels at the site due to flooding of Logan River and Henderson Creek;
- Demonstrate the level of impact to upstream and downstream peak flood water levels as a result of the development proposal; and
- Determine whether the development will cause any impacts to peak discharge and velocity.

This report includes the new design layout, and the modelling has also been updated to use the Logan and Albert Rivers 2021 TUFLOW model.

1.1 SITE LOCATION

The site is located at 5307-5335 Mt Lindsay Highway, (Lot 1 RP859595, Lot 52 RP887426, Lot 51 RP887425). Logan River bounds the northern edge of the site, while Henderson Creek runs through the south of the site and along the eastern boundary. The site is currently occupied by Hills International College and Hills Golf Club. The site location is displayed in Figure 1.1.



Figure 1-1 Site Location



Figure 2-2 LCC Flood Overlay

3. HYDRAULIC ASSESSMENT

In order to assess the hydraulic characteristics of the site, the Logan and Albert Rivers 2021 TUFLOW model has been supplied by Council to utilise. The supplied model includes a 'Fast Model' based on a 20m grid cell size, and a 'Detailed Model' based on a 10m grid cell size. The 10m grid 'Detailed Model' has been utilised for this assessment (which results in flood output points aligned on a 5m grid due to TUFLOW modelling schematisation).

This model encompasses the entire Logan and Albert River catchments downstream of Beaudesert. This updated model reports an increased 1% AEP flood level in the order of 1.9m at the subject site compared to the previous study.

The supplied model was run for all provided durations to determine the critical storm and it was found that the 72-hour storm produces peak flood levels for the 1% AEP and the 36-hour storm for the 10% AEP.

Table 3-1 Pre-Development Peak Flood Levels

Annual Exceedance Probability (AEP)	36 hour (m AHD)	48 hour (m AHD)	72 hour (m AHD)
0.5EY	18.22	18.99	21.07
10%	24.64	24.30	24.27
5%	27.00	27.10	26.58
2%	28.70	28.86	29.24
1%	29.76	29.63	29.80

3.1. EXISTING RESULTS

The supplied model was run for all events from the 0.5EY to the 1% AEP to establish the base case flooding characteristics utilised for analysis. Flow within the river past the site is confined to the banks until the depth reaches approximately 12 m, when the flow breaks out into the wider floodplain. During higher flow events, there is a breakout channel to the north-west which conveys flow north, short cutting the bend in the river to the north-east of the site. In events greater than the 5% AEP, flow breaks out of the Logan River to the south-west of the site and connects through to Henderson Creek.

Main channel depths to the north of the site are up to 20.5 m in the 1% AEP, and 15.3 m in the 10% AEP.

The pre-development flood depth and peak velocity plots are displayed in Figures 3.1 to 3.4.

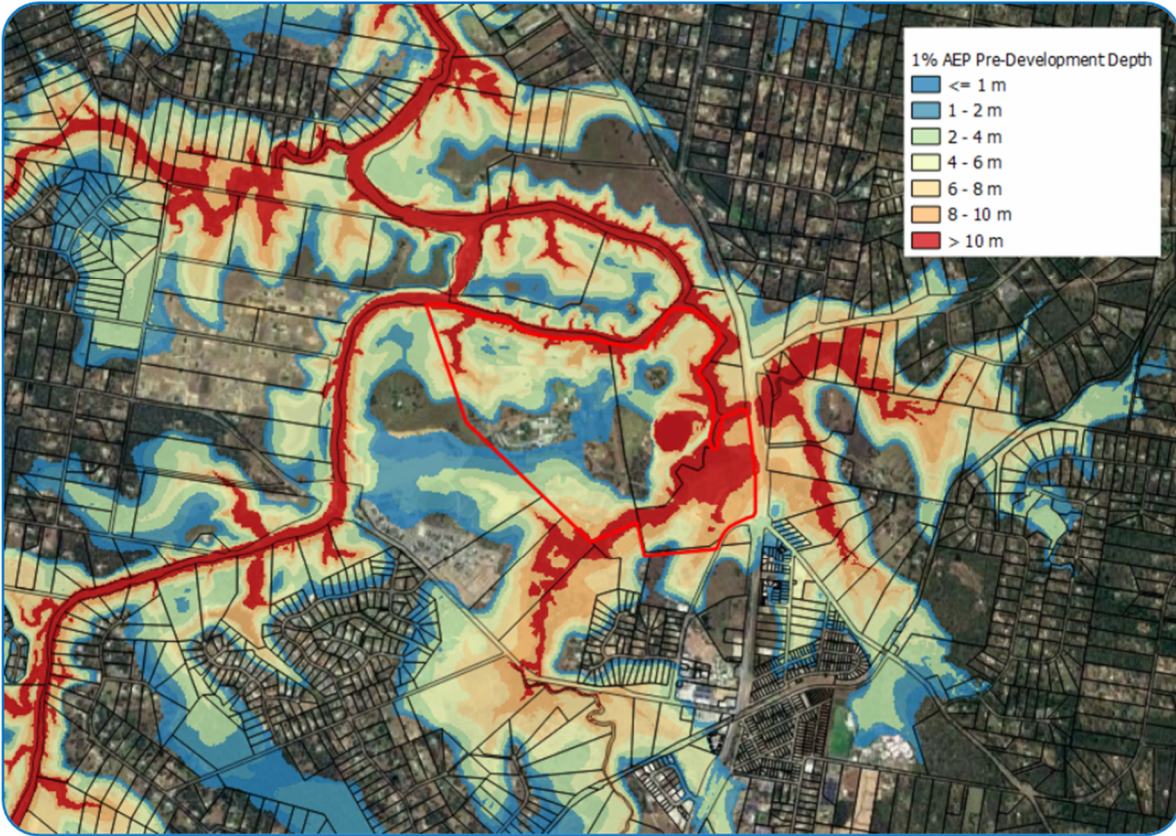


Figure 3-1 Pre-Development 1% AEP Depth

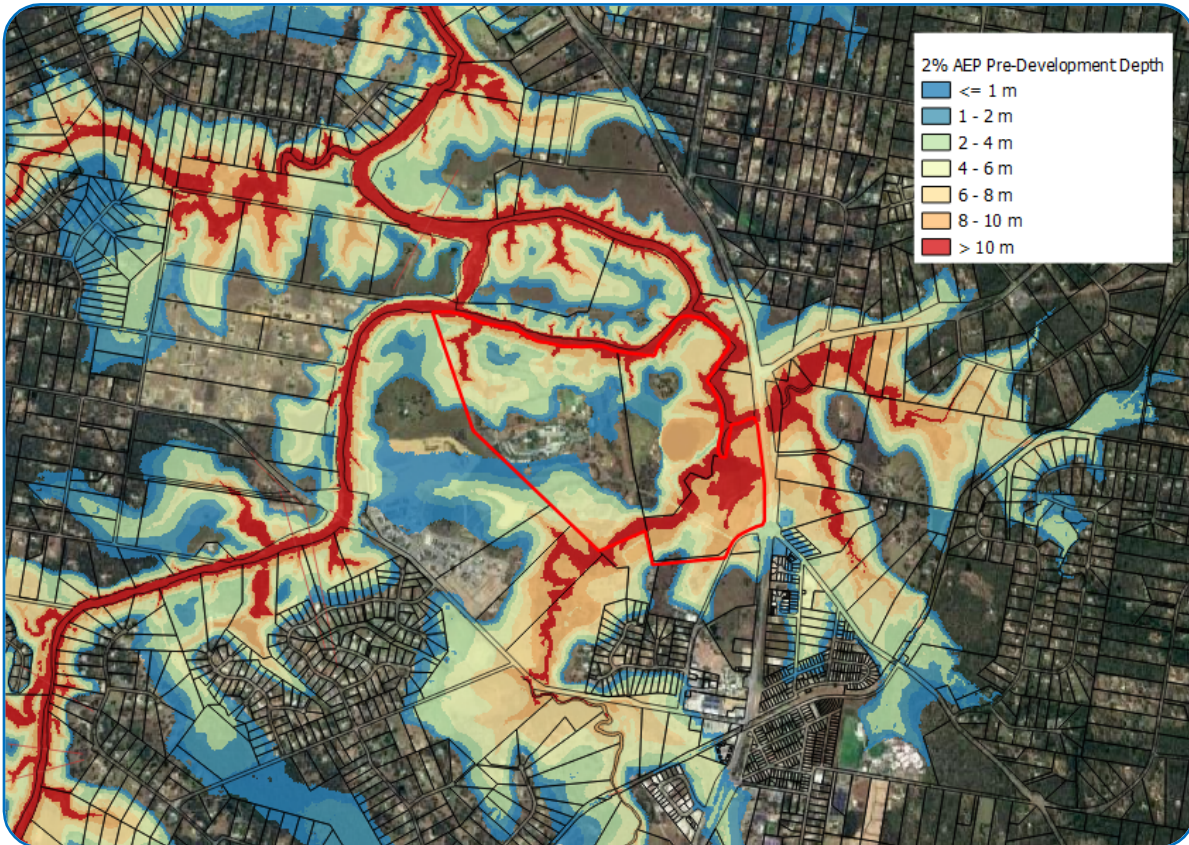


Figure 3-2 Pre-Development 2% AEP Depth

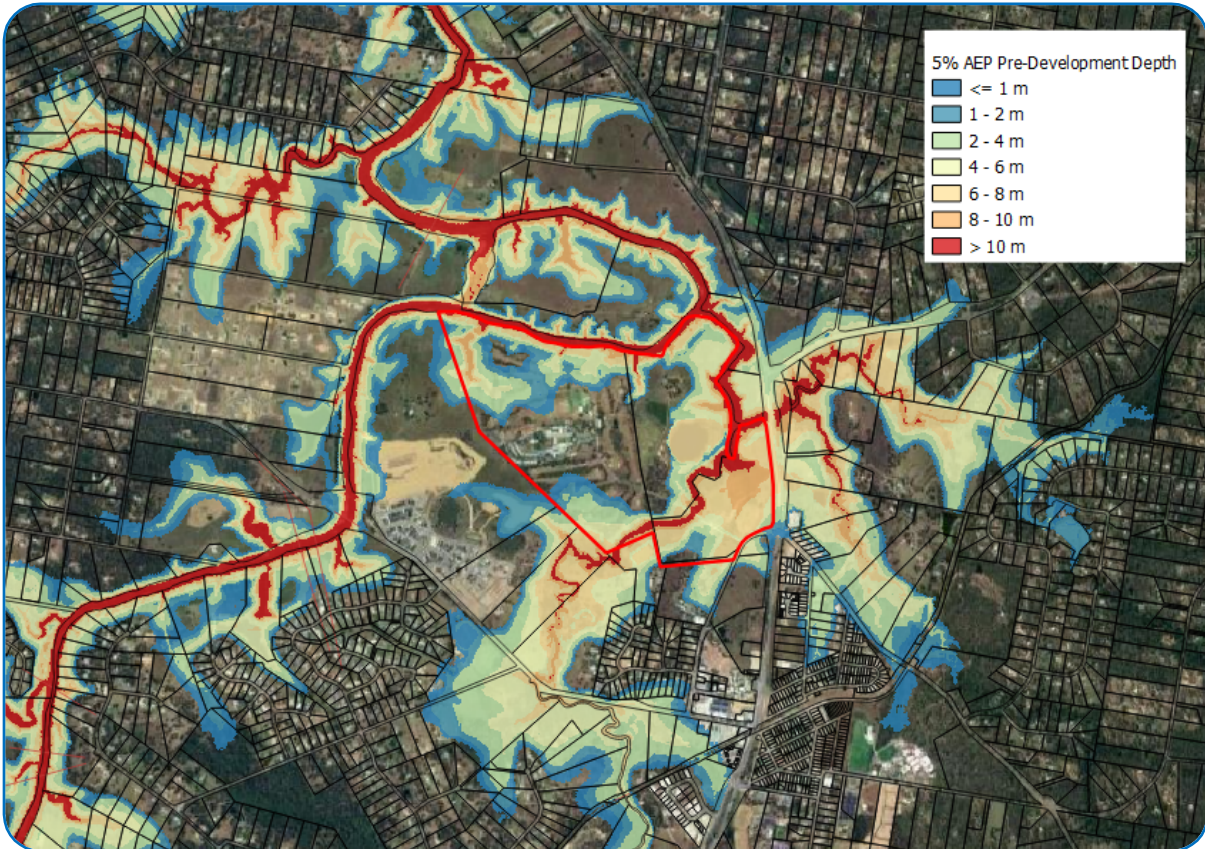


Figure 3-3 Pre-Development 5% AEP Depth

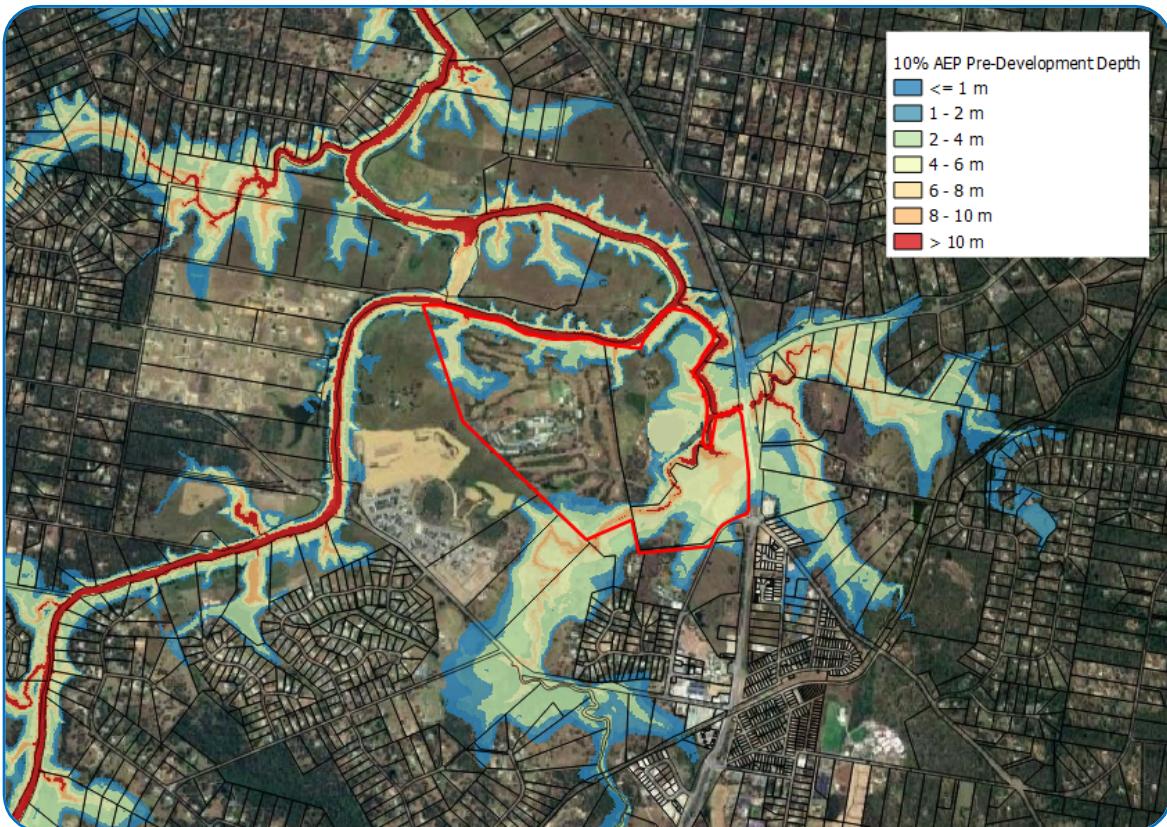


Figure 3-4 Pre-Development 10% AEP Depth

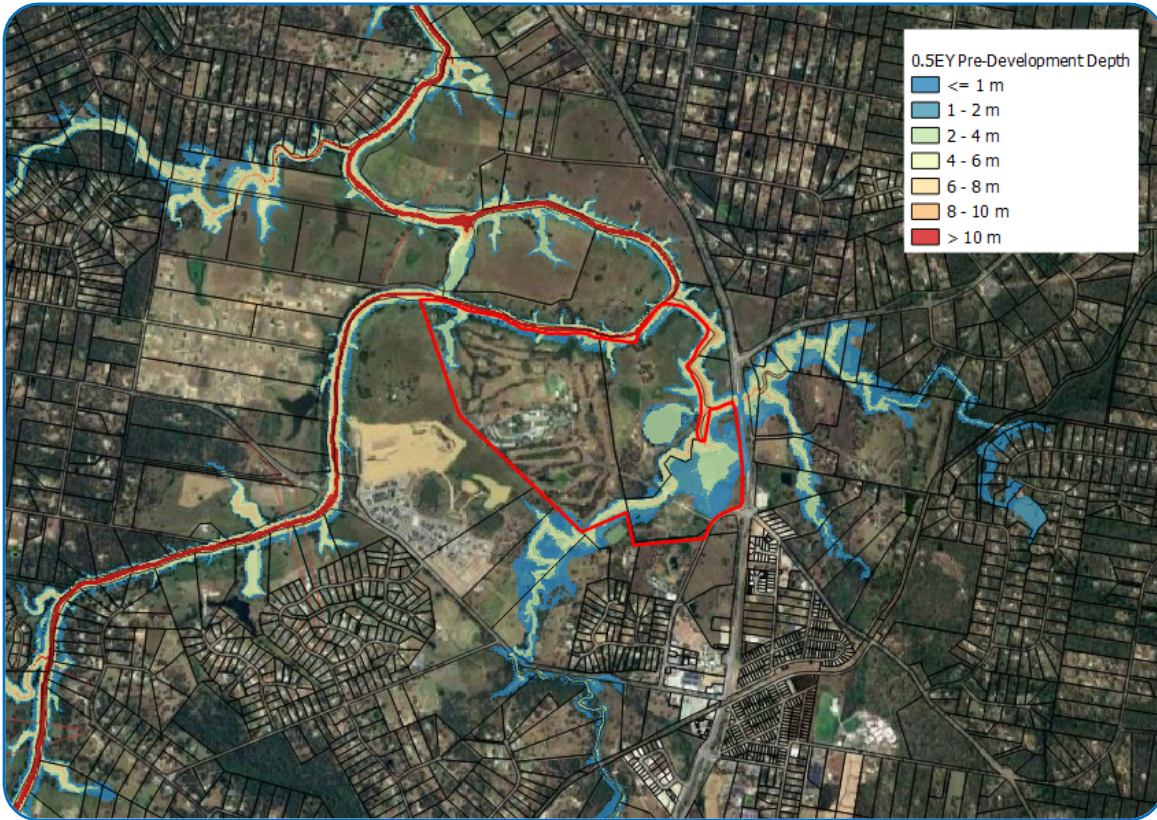


Figure 3-5 Pre-Development 0.5EY Depth

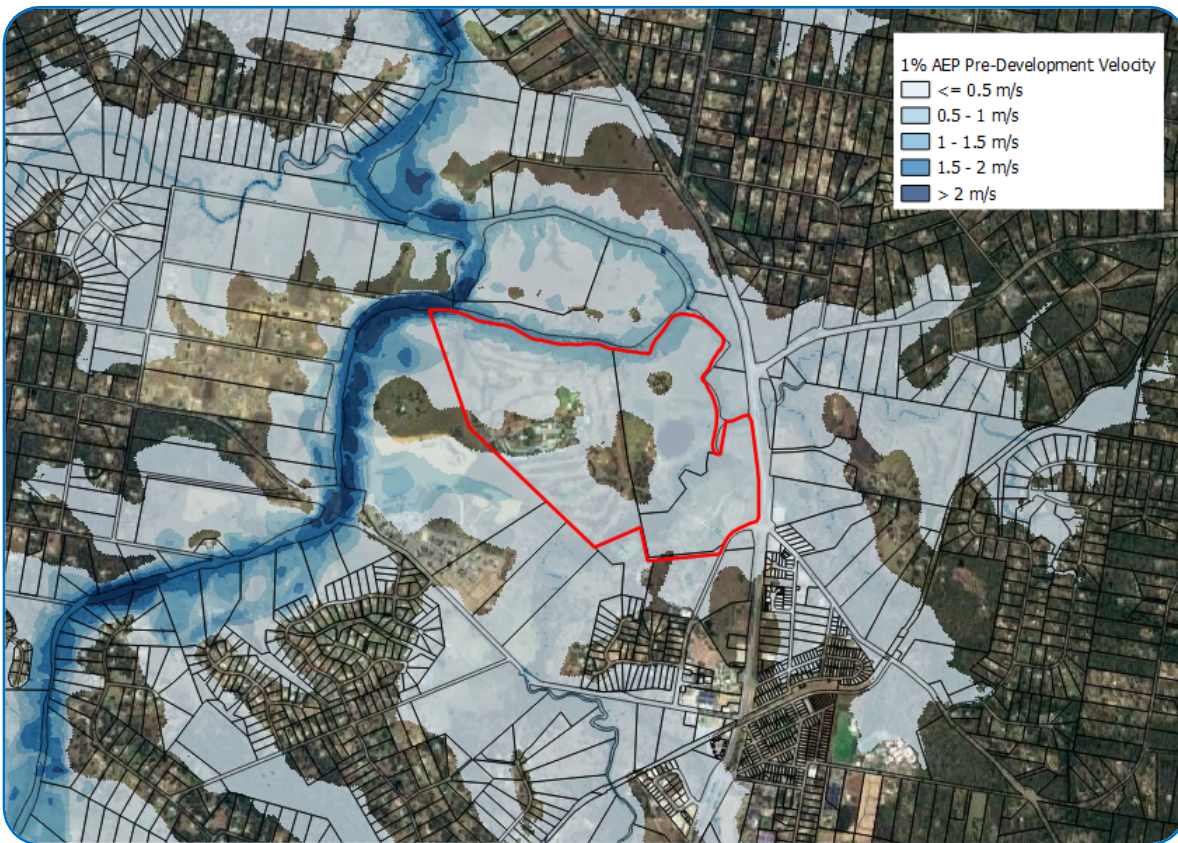


Figure 3-6 Pre-Development 1% AEP Velocity

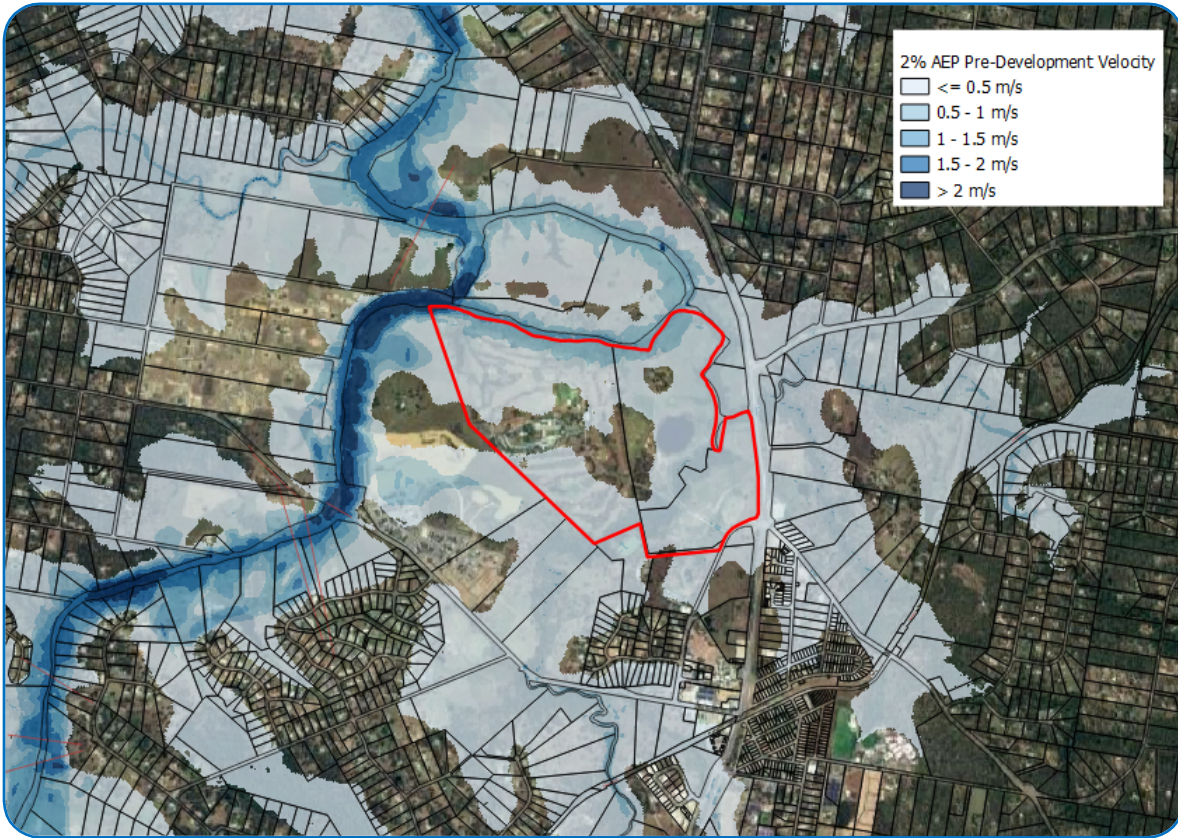


Figure 3-7 Pre-Development 2% AEP Velocity

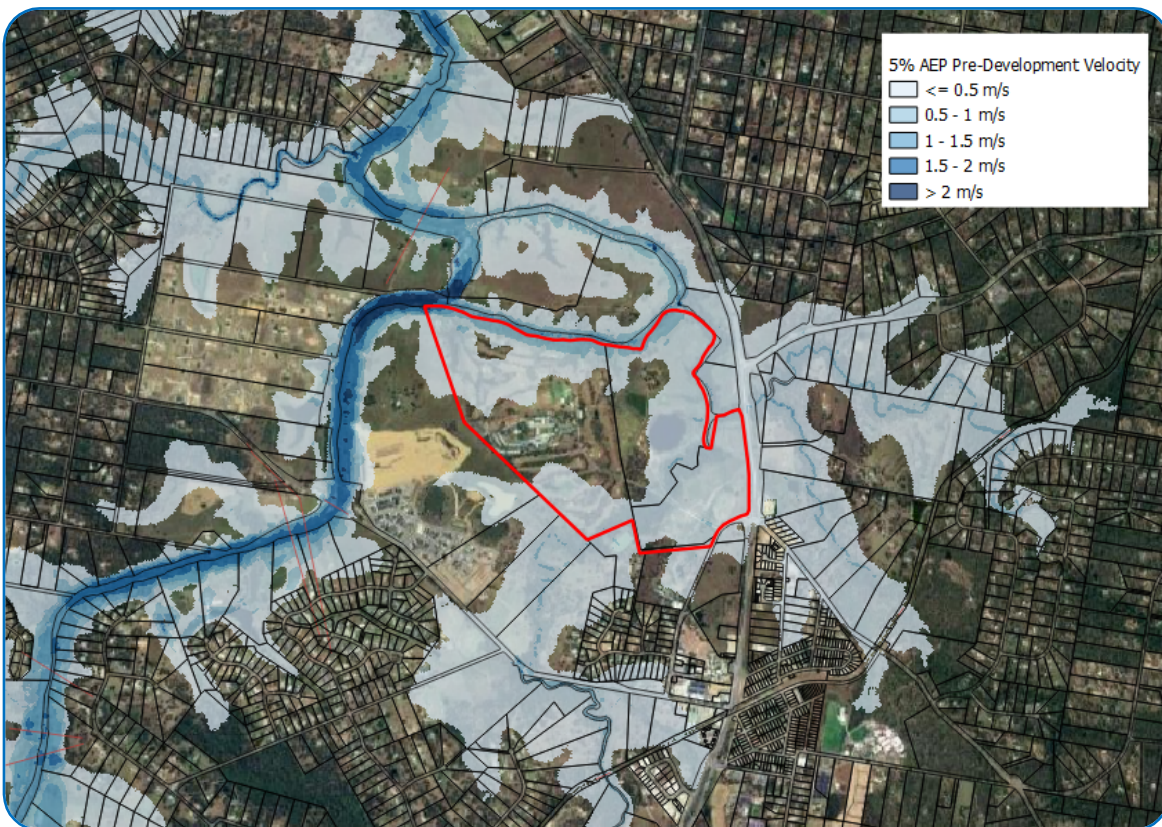


Figure 3-8 Pre-Development 5% AEP Velocity

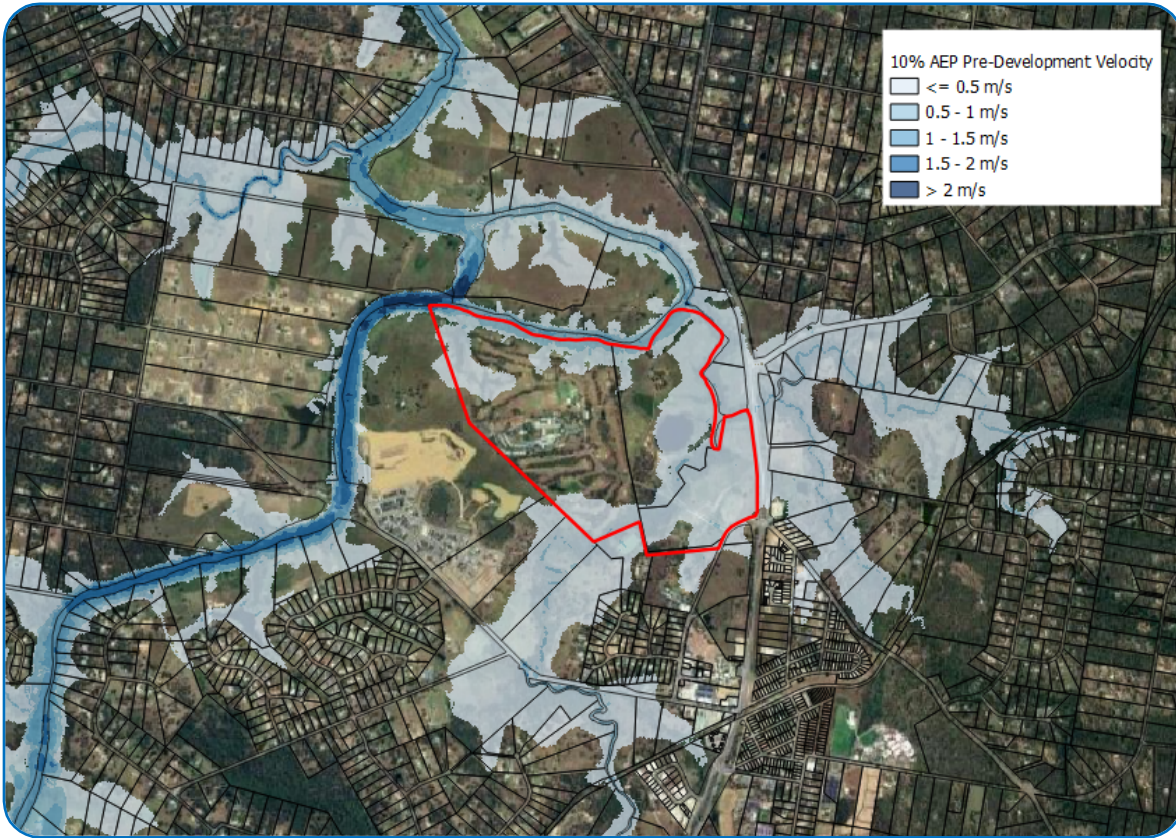


Figure 3-9 Pre-Development 10% AEP Velocity

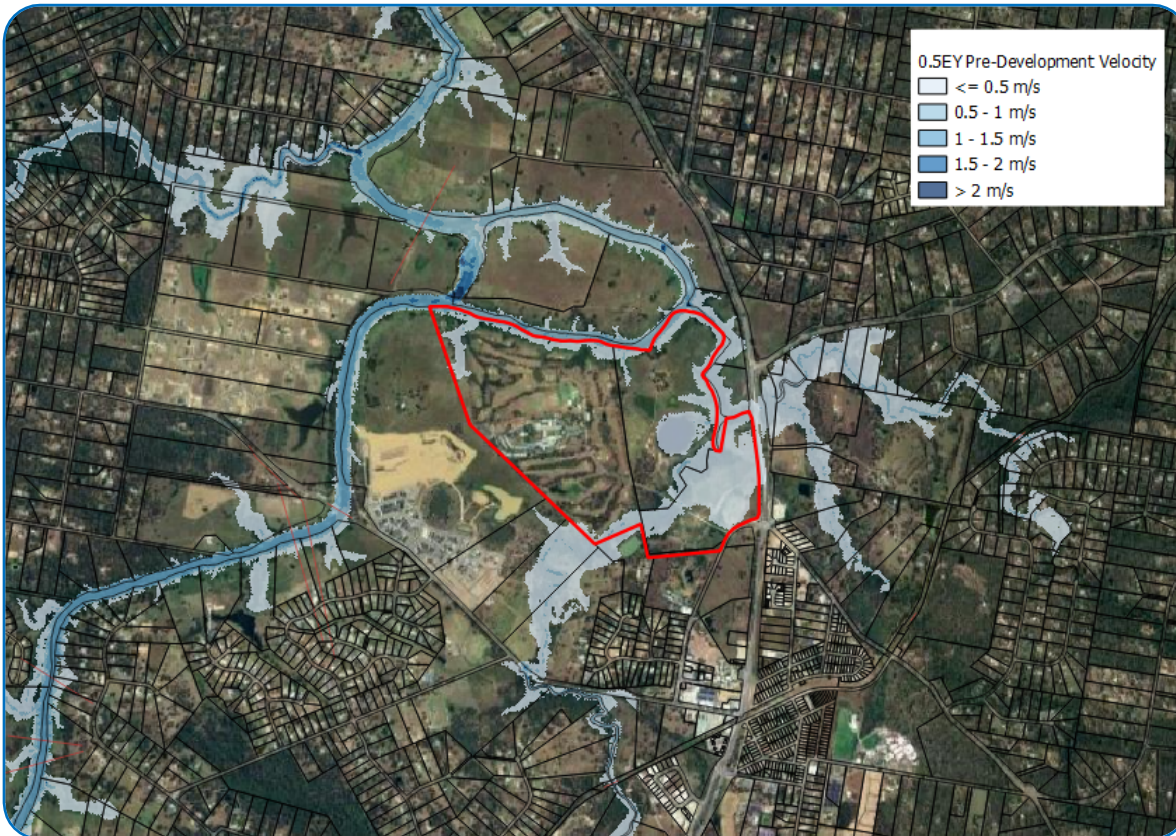


Figure 3-10 Pre-Development 0.5EY Velocity

3.2. POST-DEVELOPMENT SCENARIO

The proposed development involves filling of the centre of the site to provide flood free allotments. Compensatory cut is proposed around the edges of the site. As previously agreed with LCC, this cut can occur down to the previous flood model 10% AEP level.

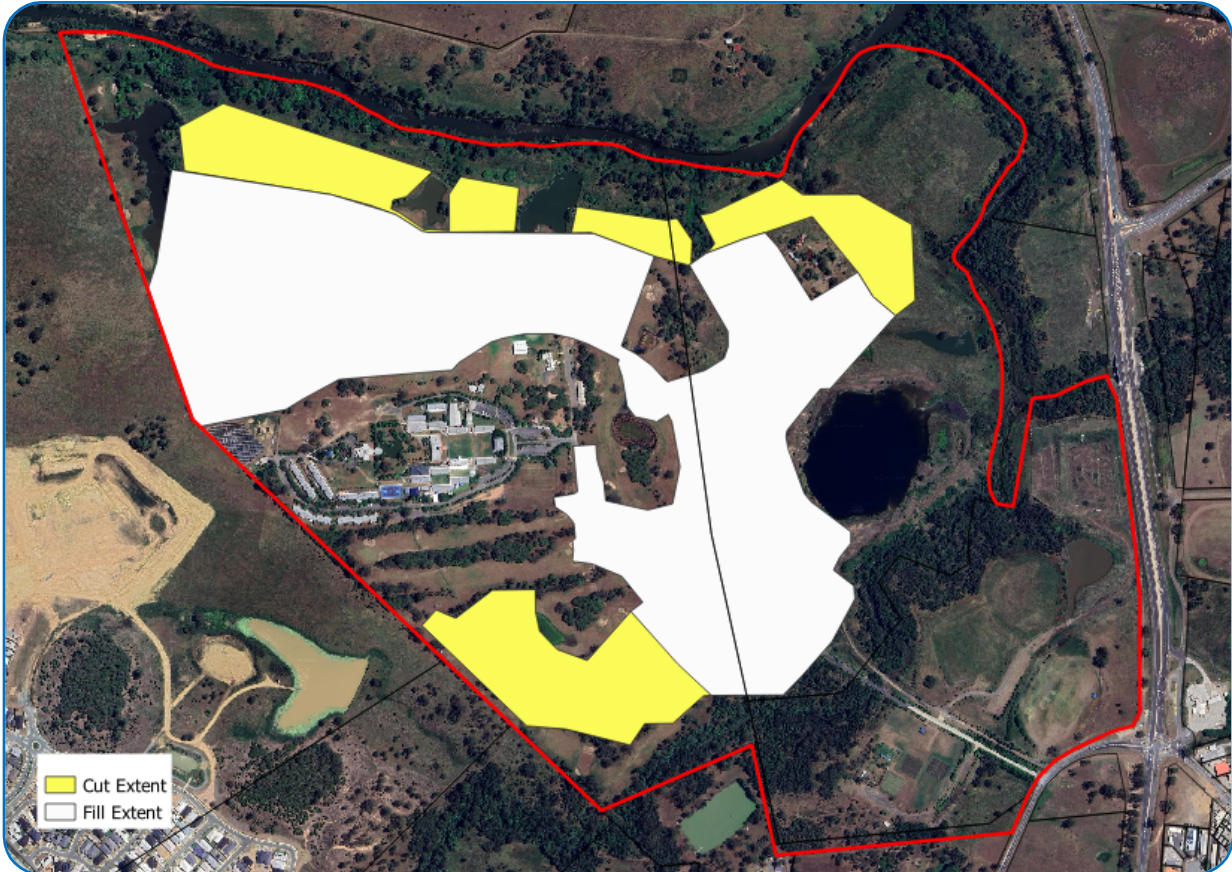


Figure 3-11 Proposed Cut/Fill Plan

The TUFLOW model was modified to create a post-development scenario by including this cut and fill layout. Note that the model for the development footprint area (shaded white in Figure 3.11 above) has been prepared based on a non-detailed solution

3.3. POST-DEVELOPMENT RESULTS

The post-development flooding characteristics are largely similar to the pre-development scenario. The fill pad provides flood immunity to the proposed allotments, while the cut provides compensatory conveyance and storage volume.

The proposed works do not block the breakout from the west to Henderson Creek, and major conveyance paths are retained. The peak levels in the post-development are noted in the following table.

Table 3-2 Post-Development Peak Flood Levels

Annual Exceedance Probability (AEP)	Peak Level (m AHD)
0.5EY	21.07
10%	24.64
5%	27.10
2%	29.24
1%	29.80

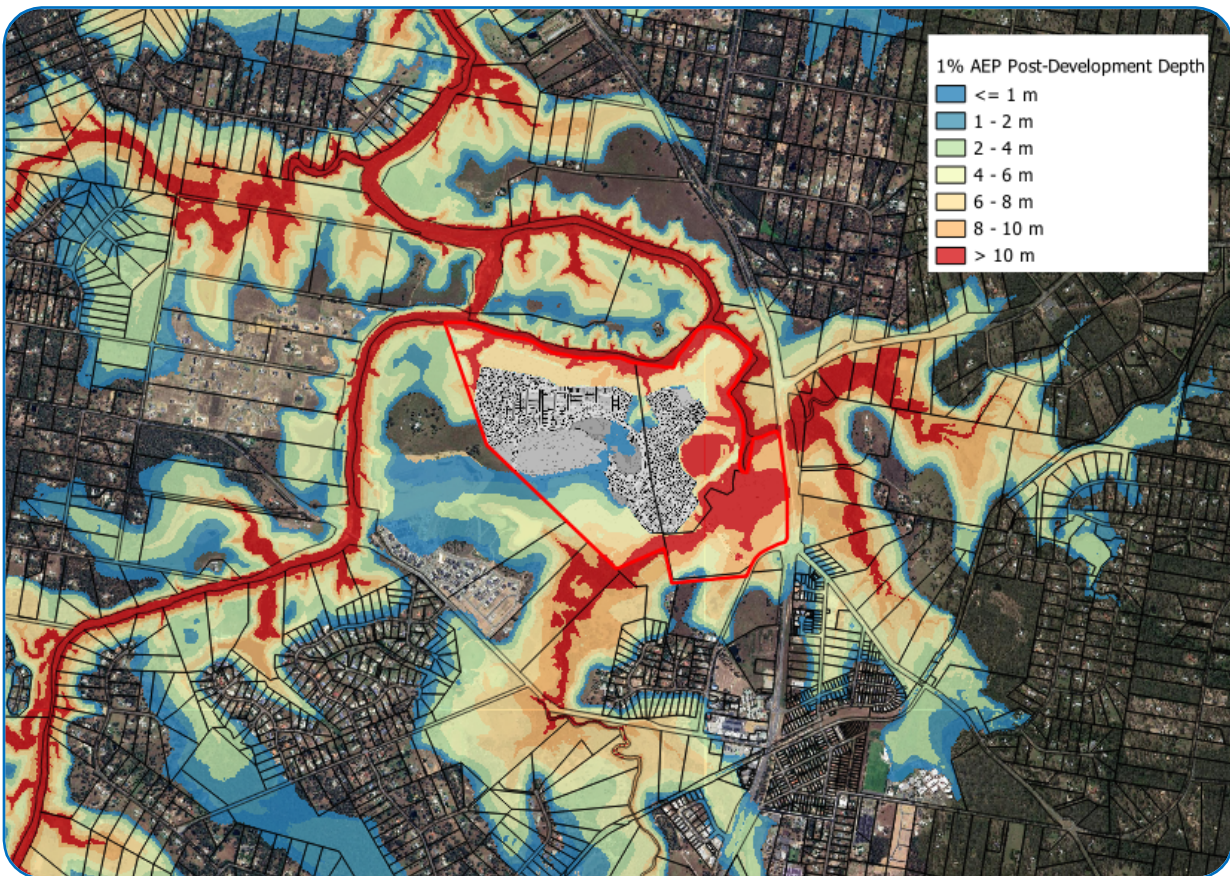


Figure 3-12 Post-Development 1% AEP Depth

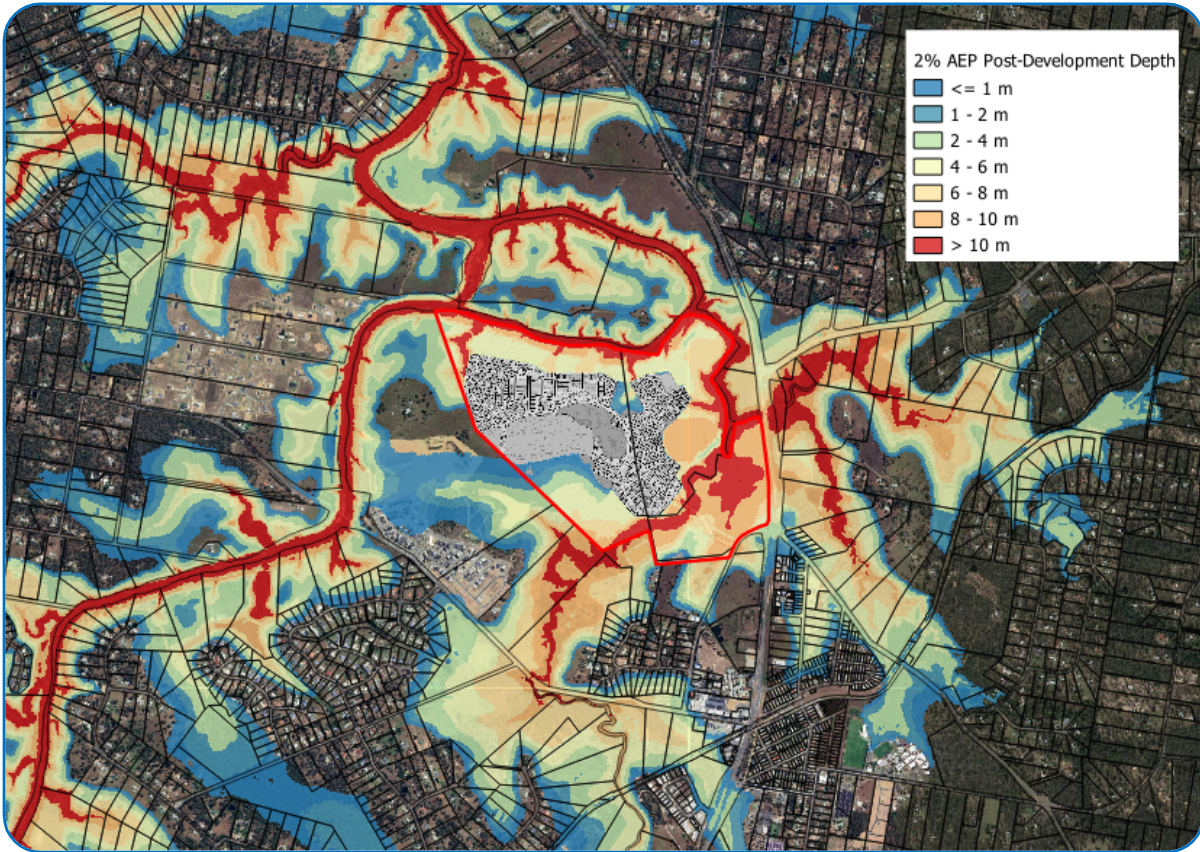


Figure 3-13 Post-Development 2% AEP Depth

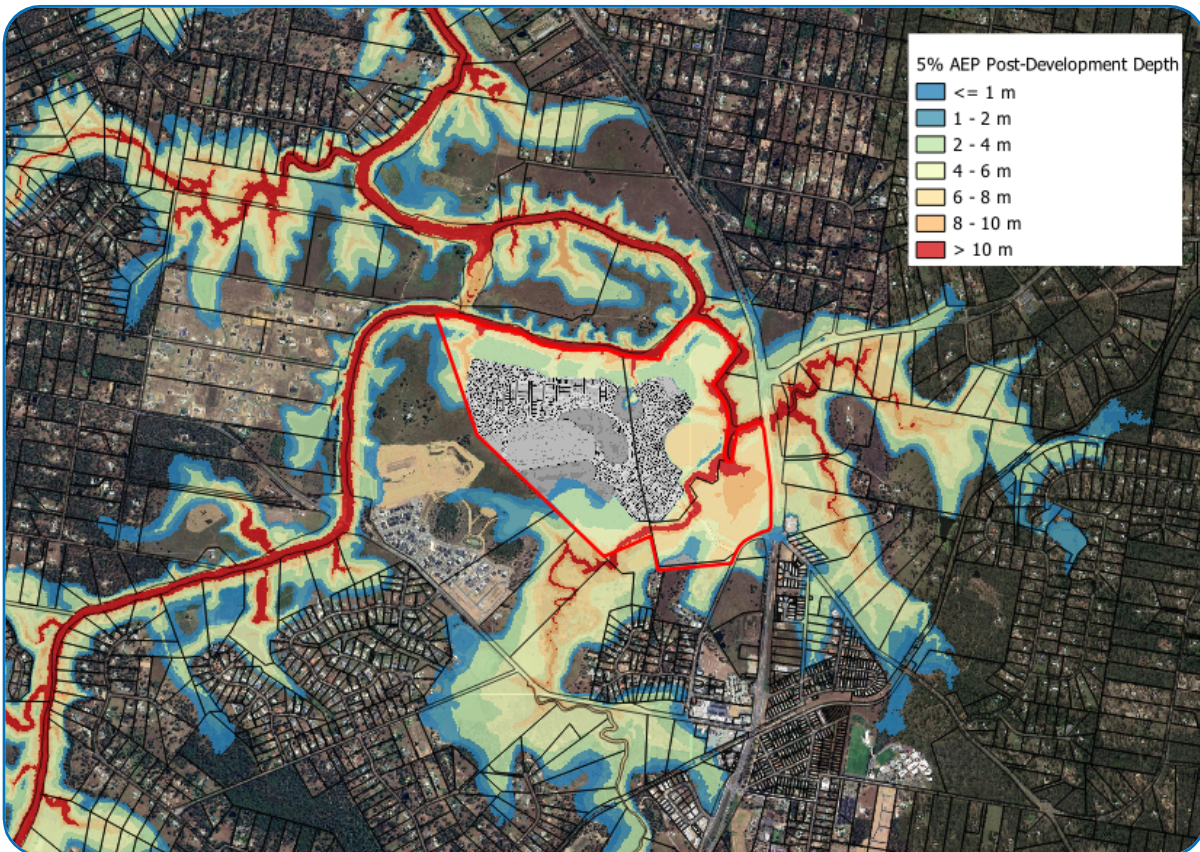


Figure 3-14 Post-Development 5% AEP Depth

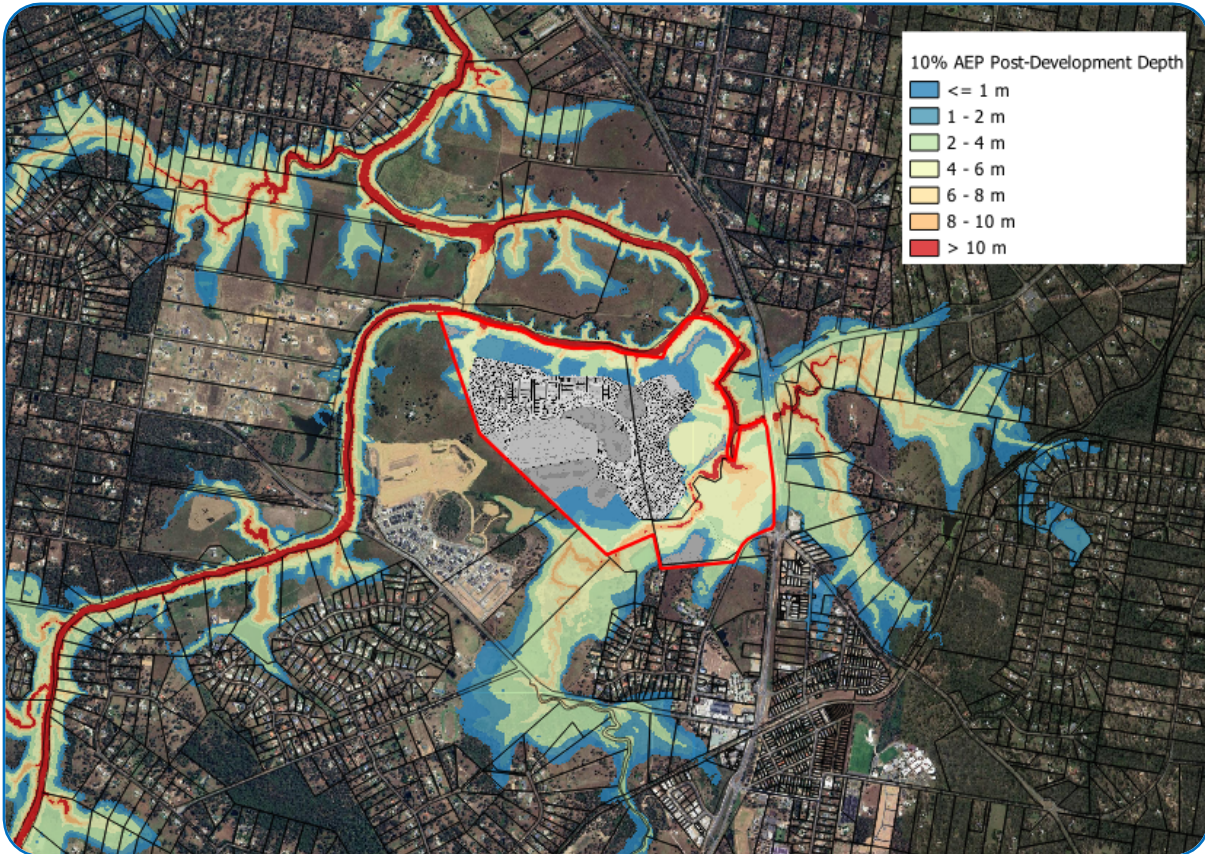


Figure 3-15 Post-Development 10% AEP Depth

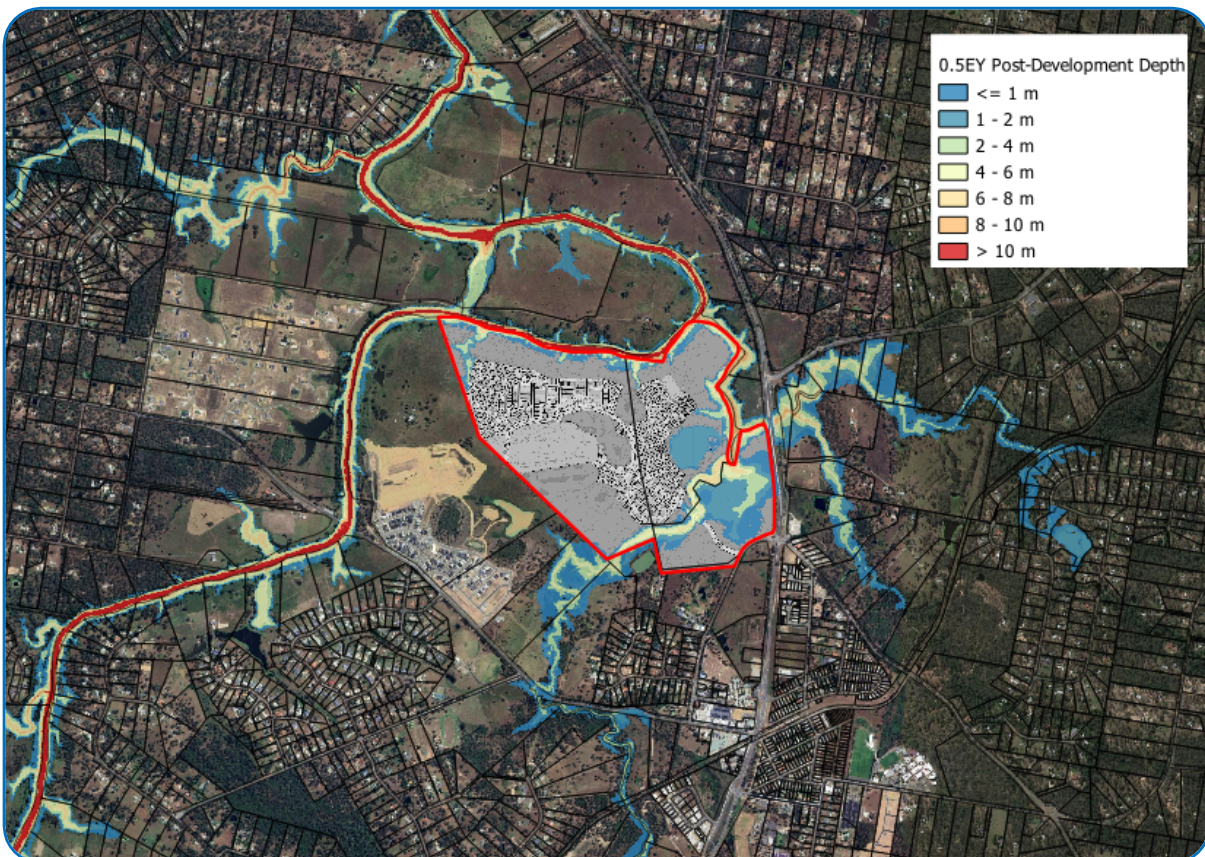


Figure 3-16 Post-Development 0.5EY Depth

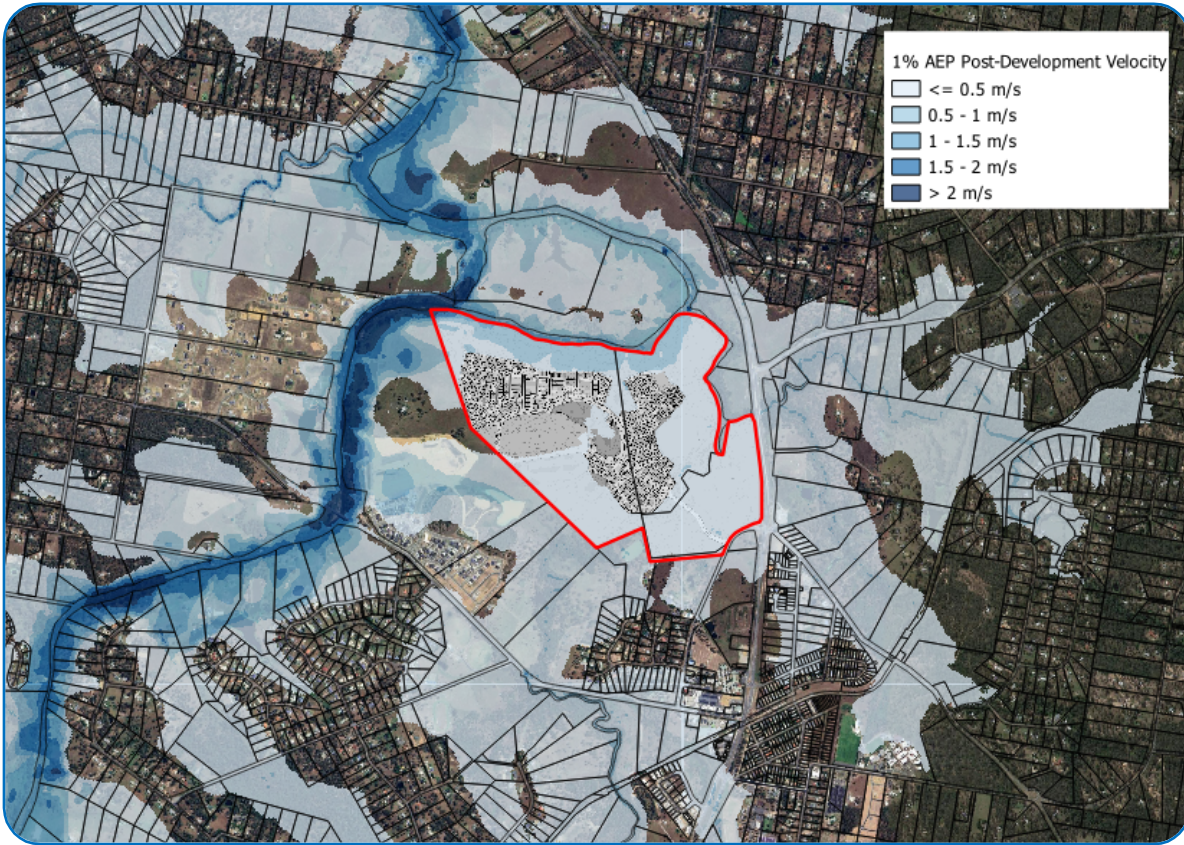


Figure 3-17 Post-Development 1% AEP Velocity

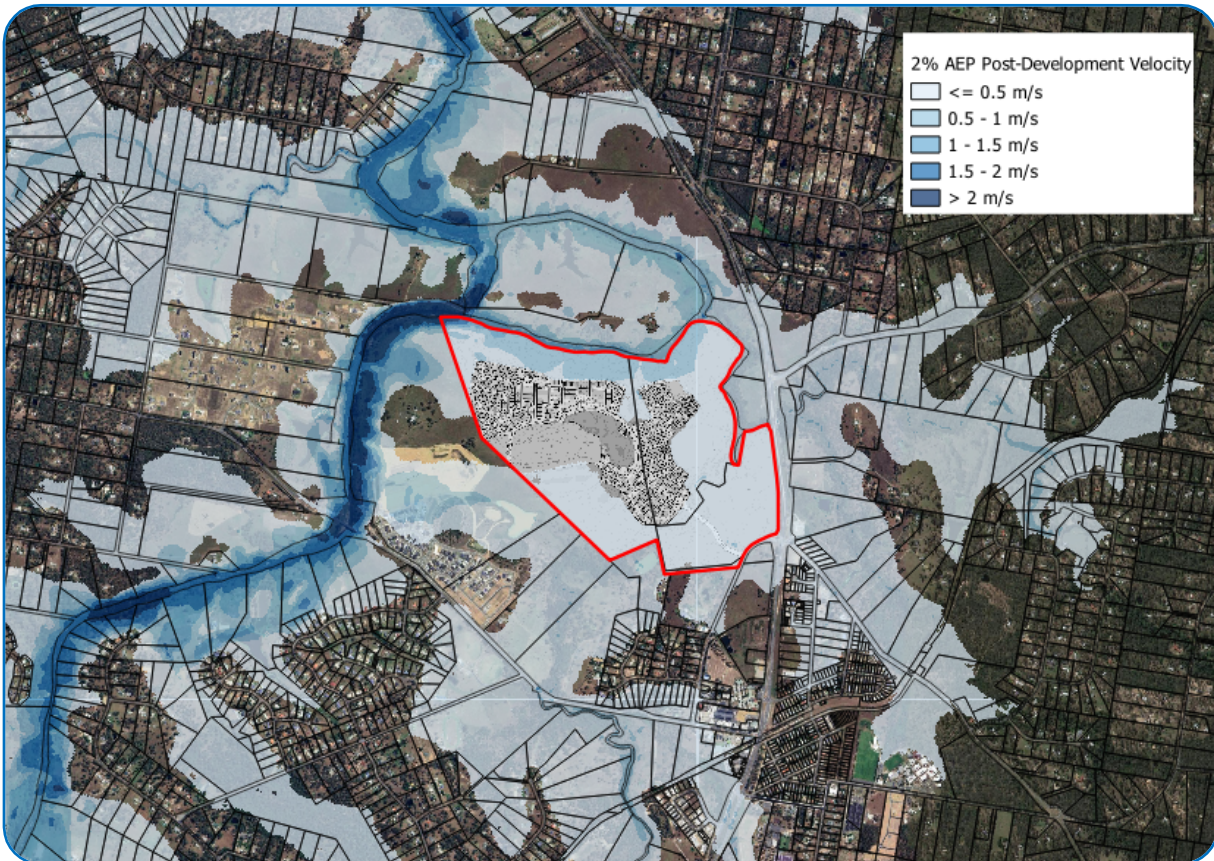


Figure 3-18 Post-Development 2% AEP Velocity

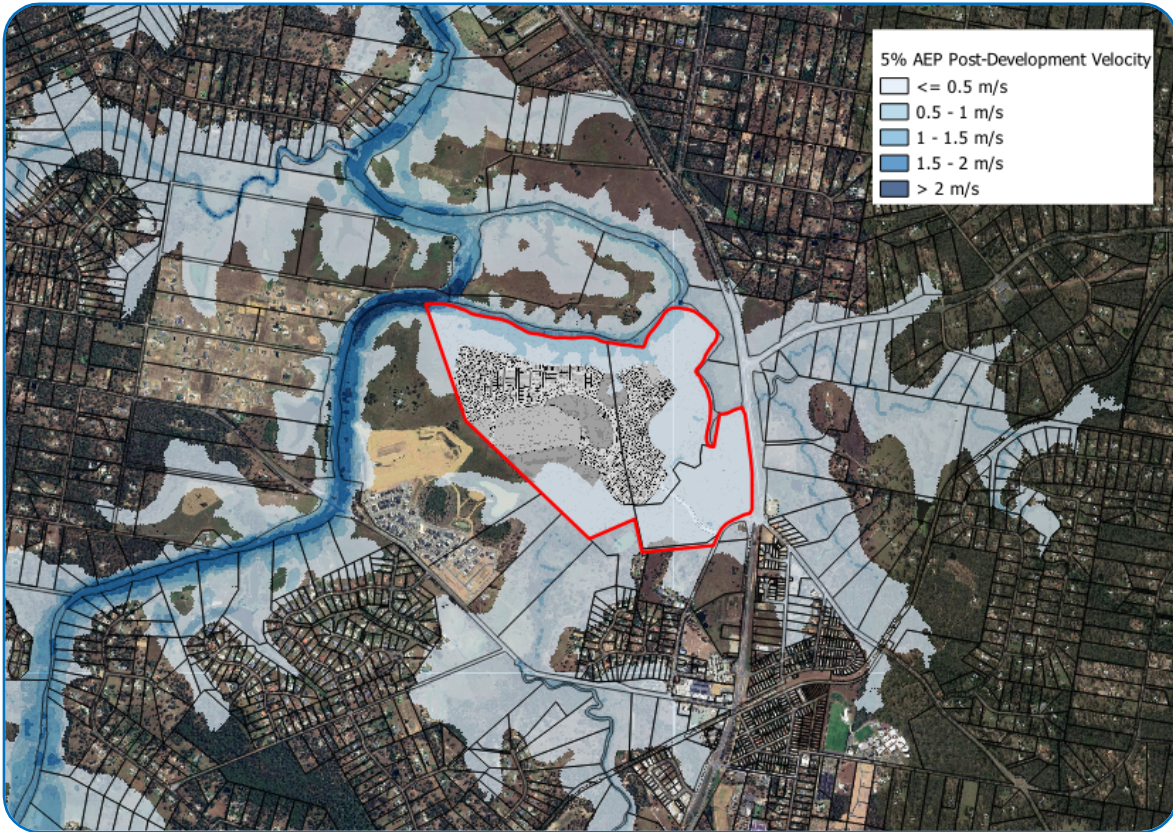


Figure 3-19 Post-Development 5% AEP Velocity

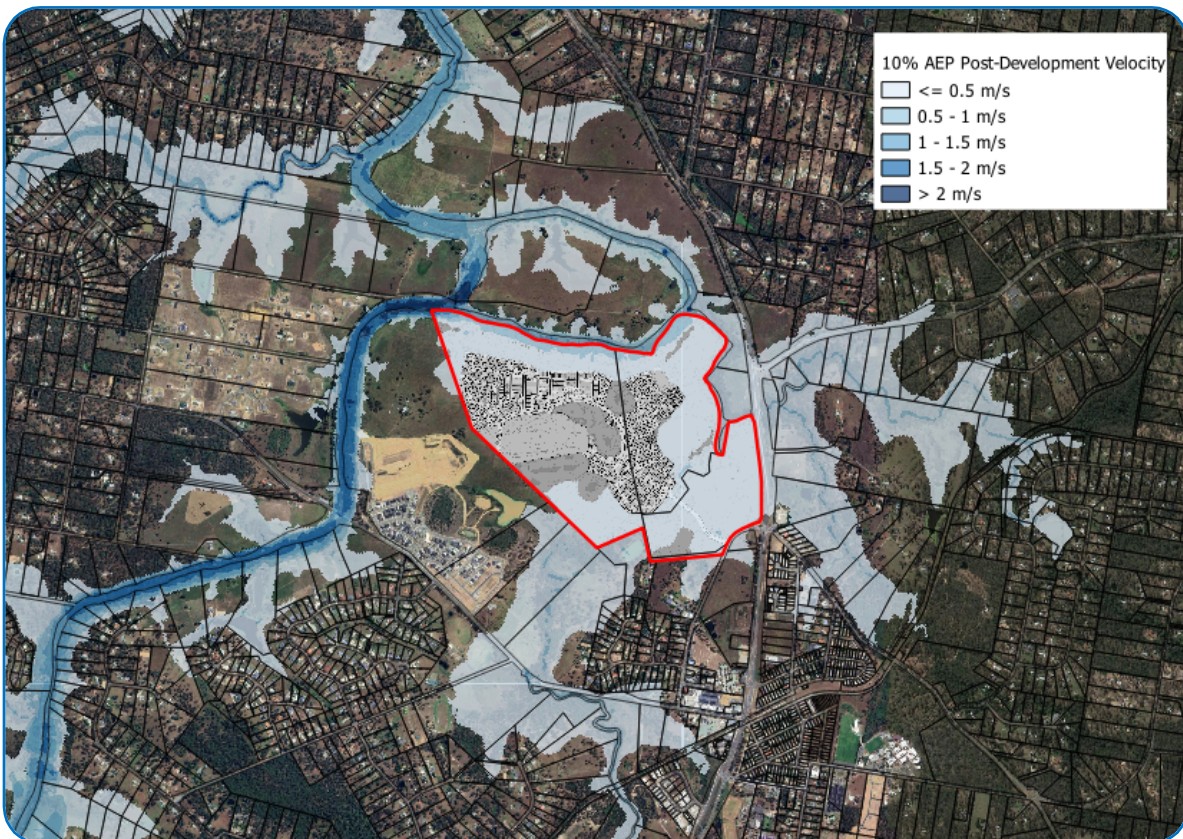


Figure 3-20 Post-Development 10% AEP Velocity

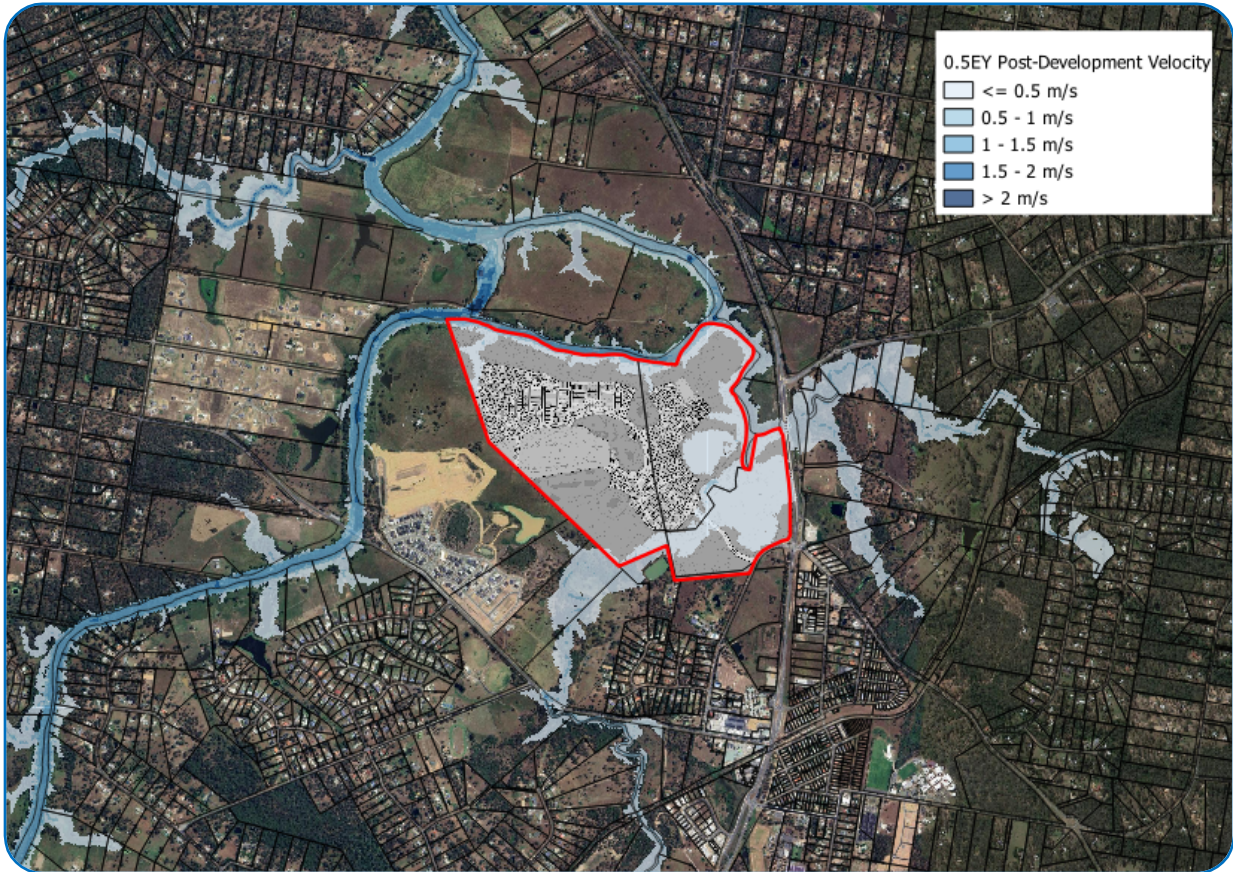


Figure 3-21 Post-Development 0.5EY Velocity

4. IMPACT ASSESSMENT

In order to illustrate the impact of the proposed works on peak flood levels, a spatial analysis of the pre and post-development results has been prepared.

The results of the modelling indicate that the proposed works will have no impact on flood levels greater than 10mm external to the site. Figures 4.1 to 4.5 illustrate the expected flood level afflux. Figures 4.6 – 4.10 illustrate the expected flood velocity afflux, indicating no impacts external to the site.

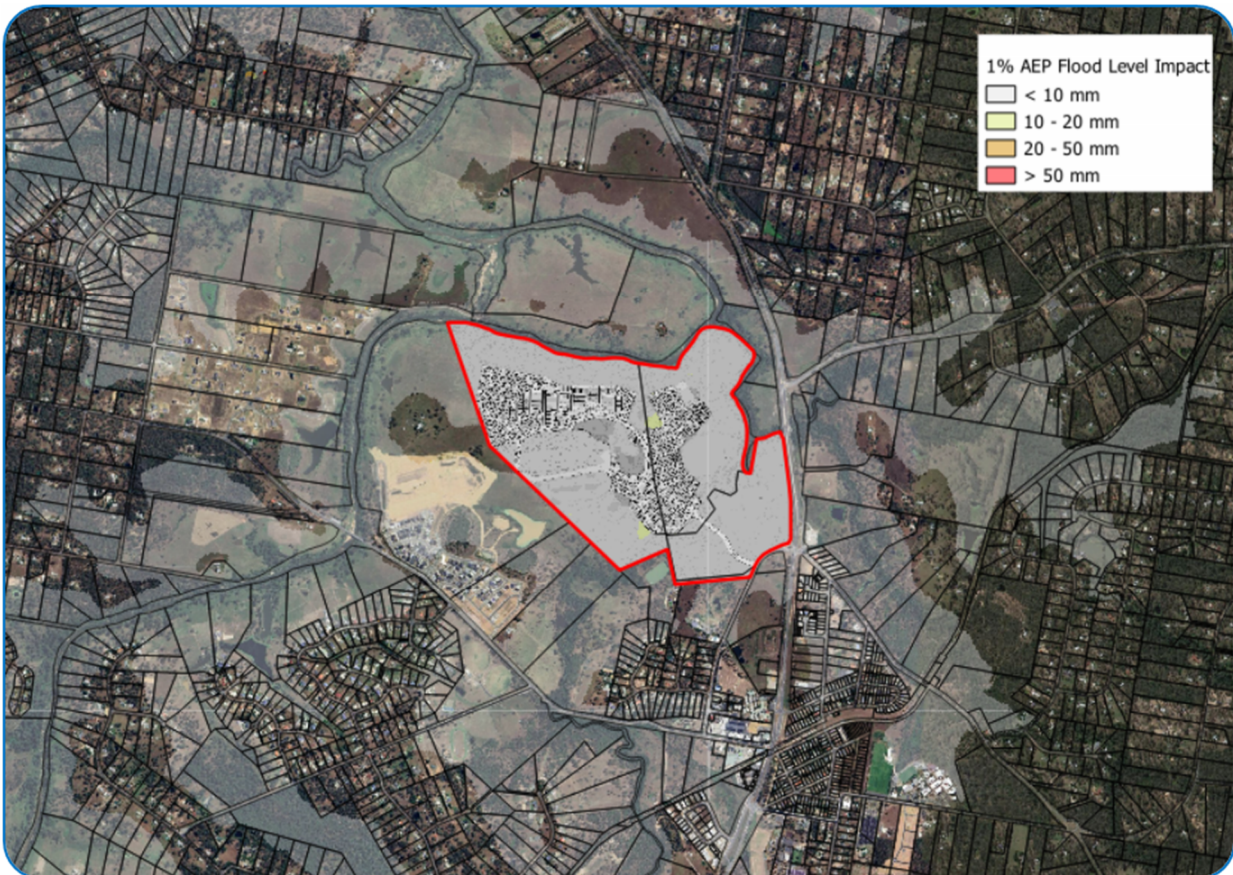


Figure 4-1 1% AEP Flood Level Impact

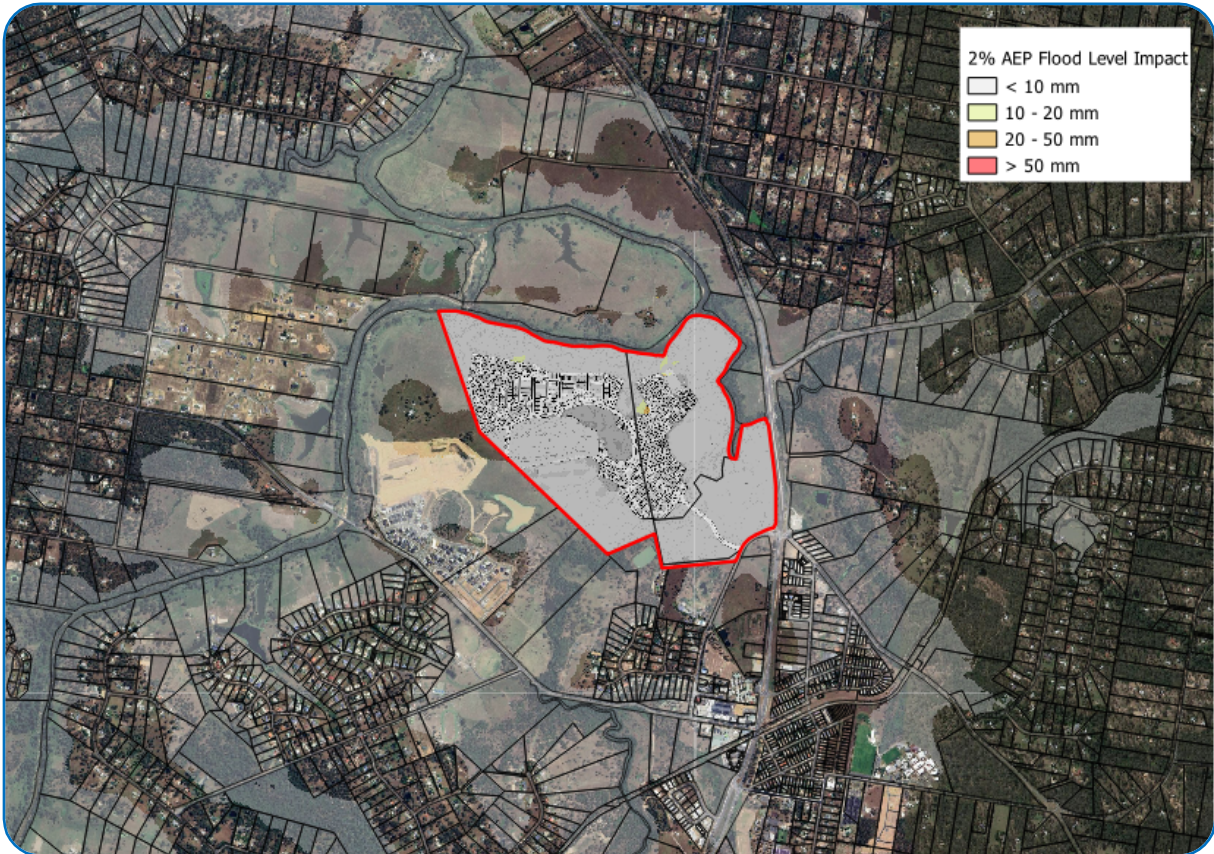


Figure 4-2 2% AEP Flood Level Impact

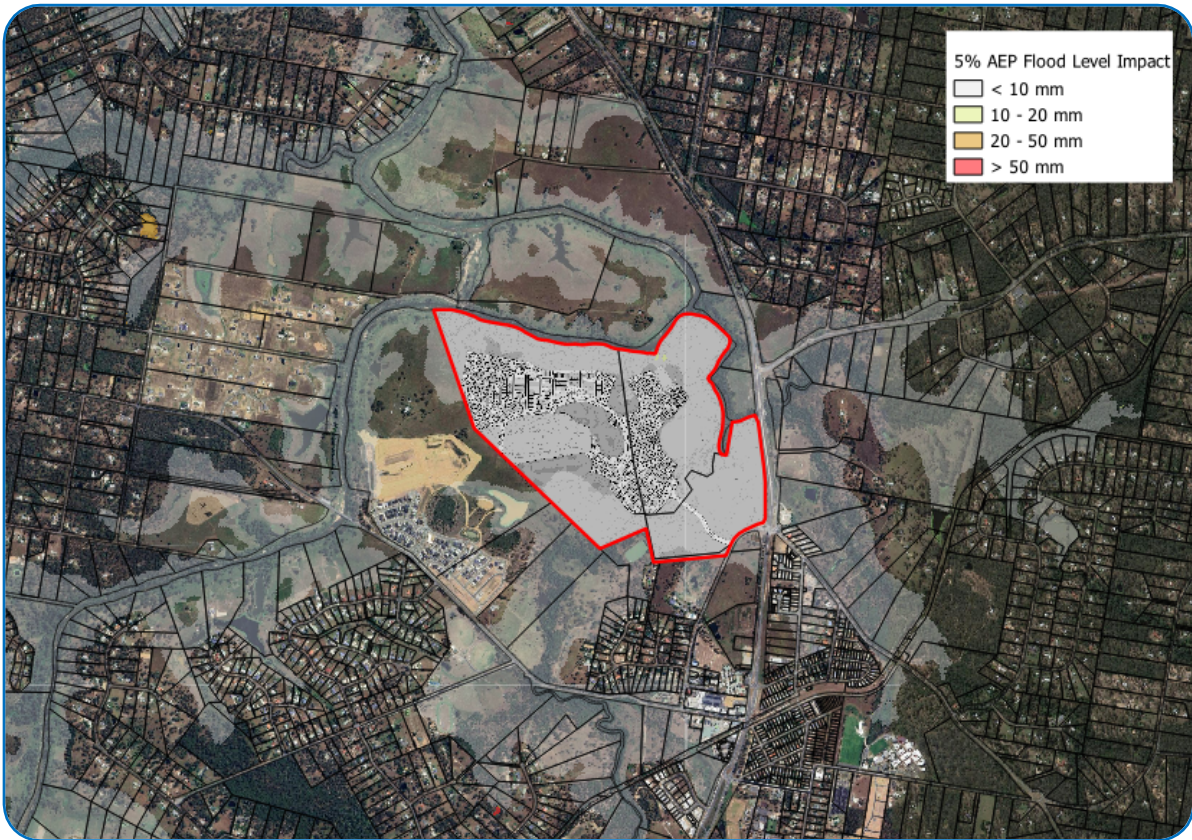


Figure 4-3 5% AEP Flood Level Impact

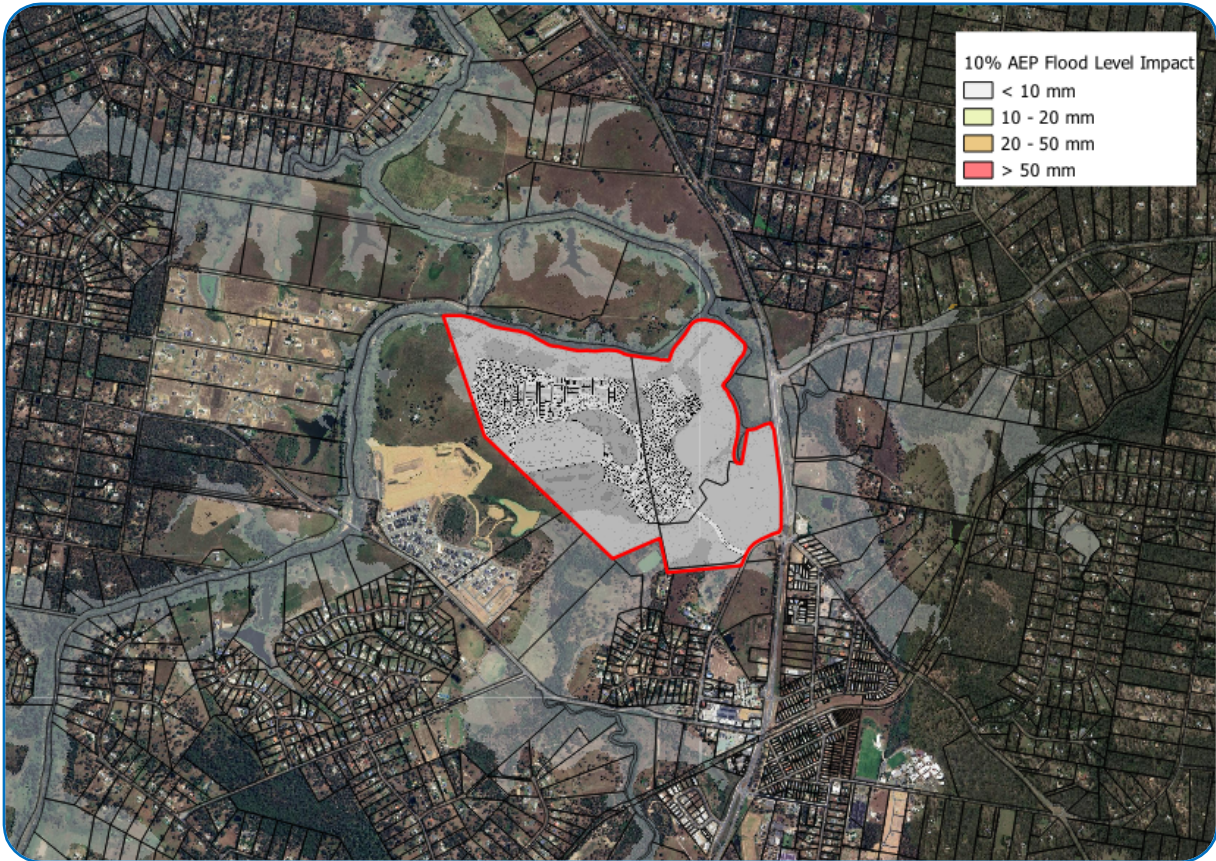


Figure 4-4 10% AEP Flood Level Impact

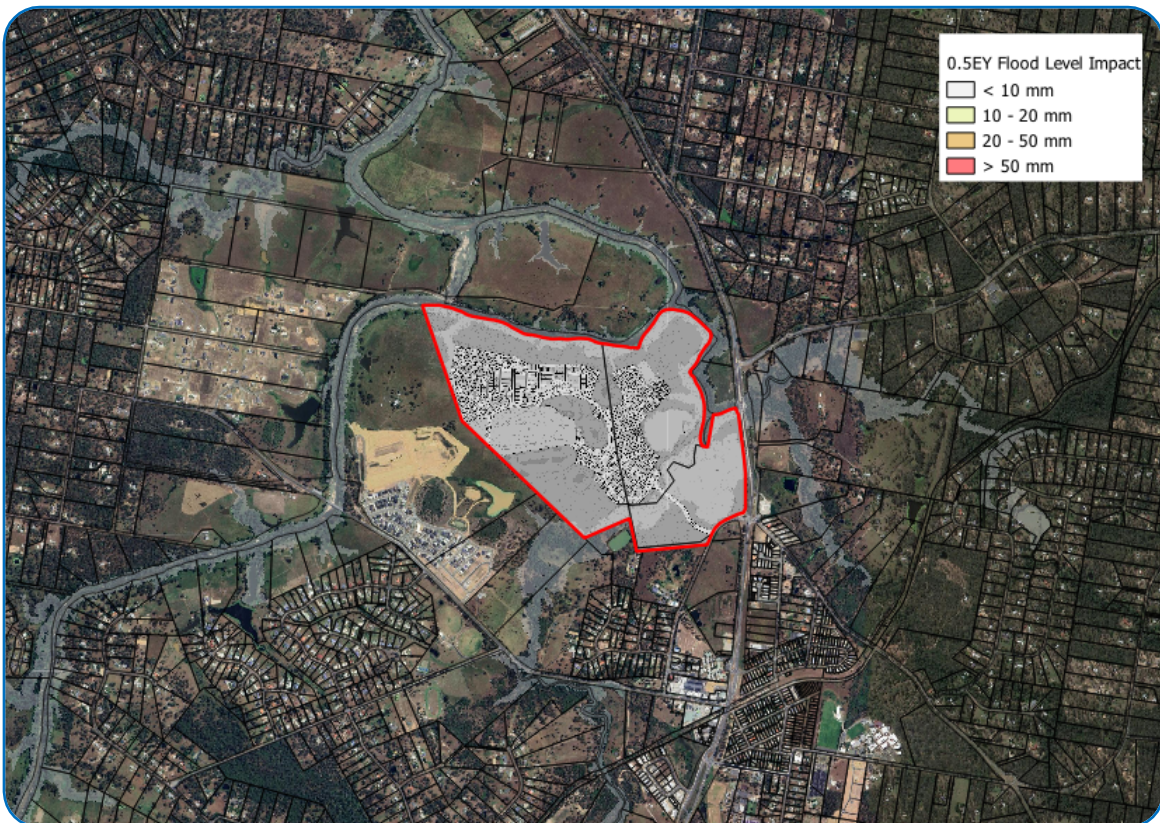


Figure 4-5 0.5EY Flood Level Impact

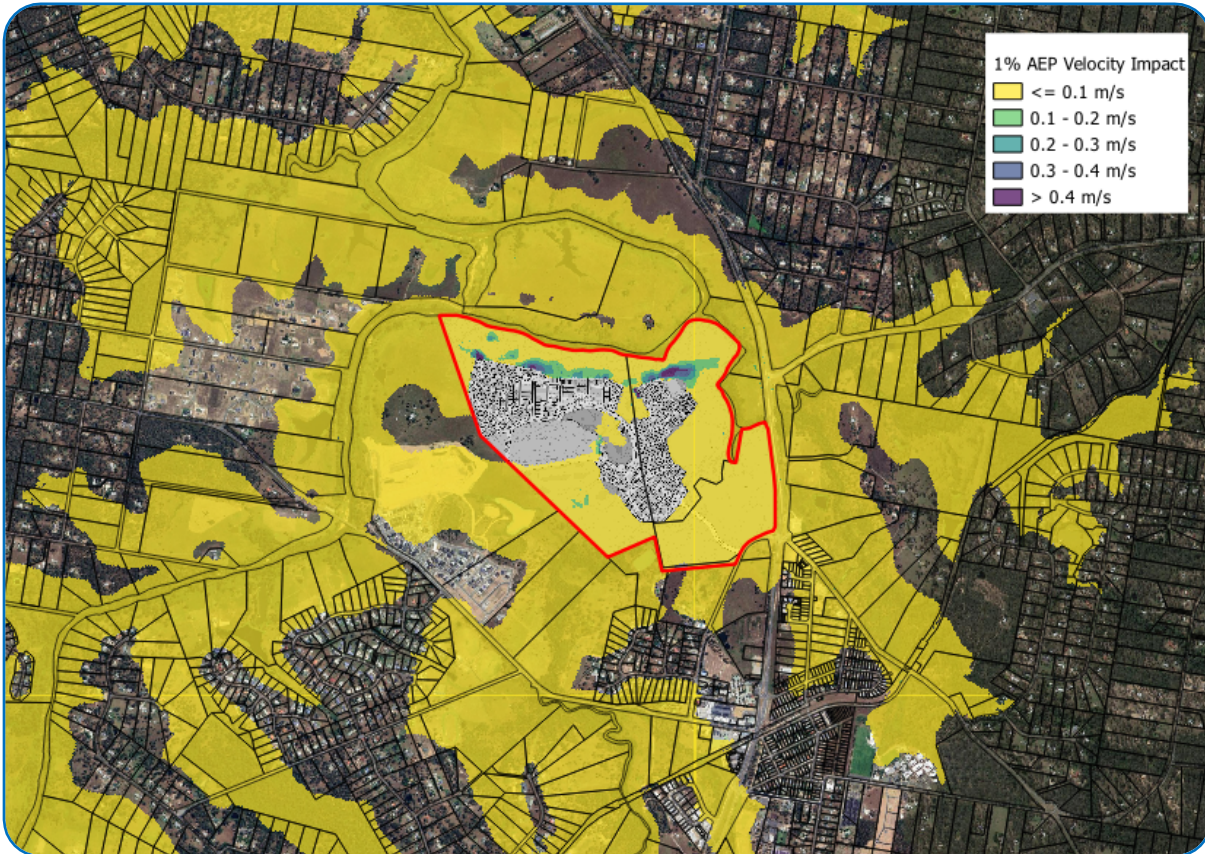


Figure 4-6 1% AEP Velocity Impact

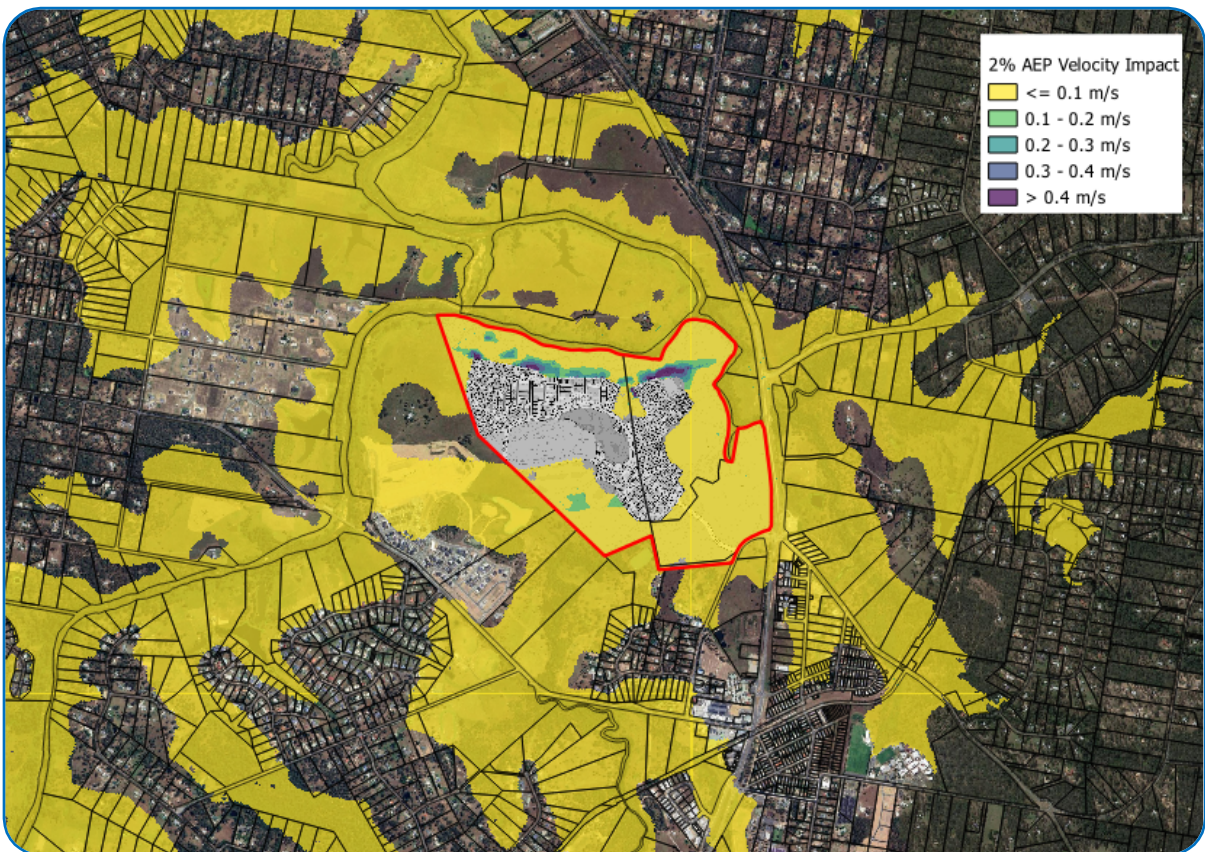


Figure 4-7 2% AEP Velocity Impact

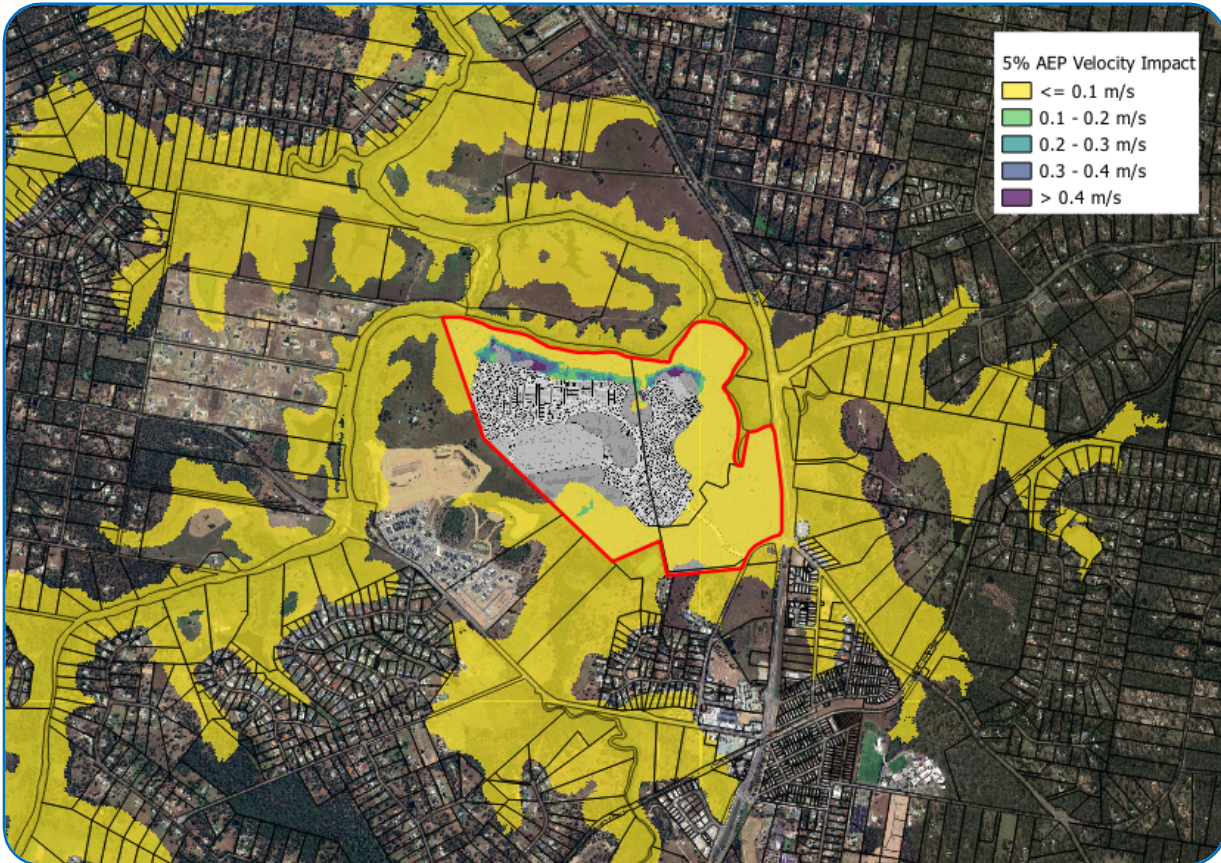


Figure 4-8 5% AEP Velocity Impact

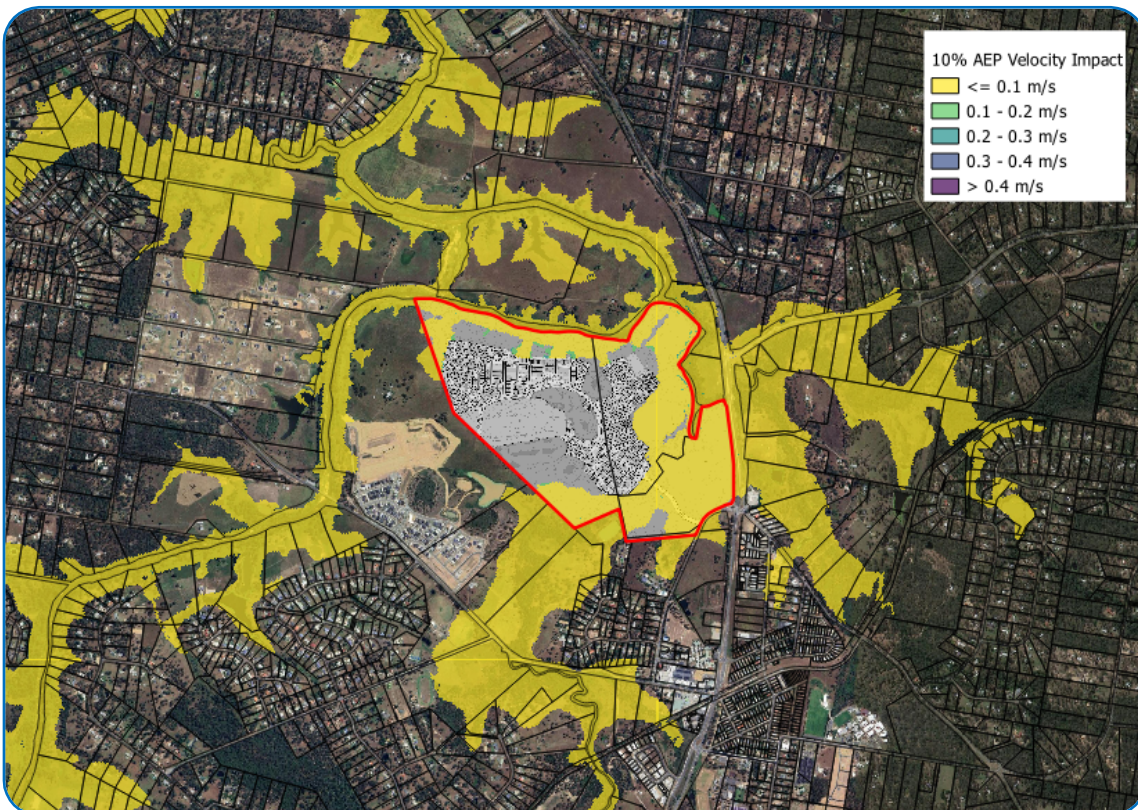


Figure 4-9 10% AEP Velocity Impact

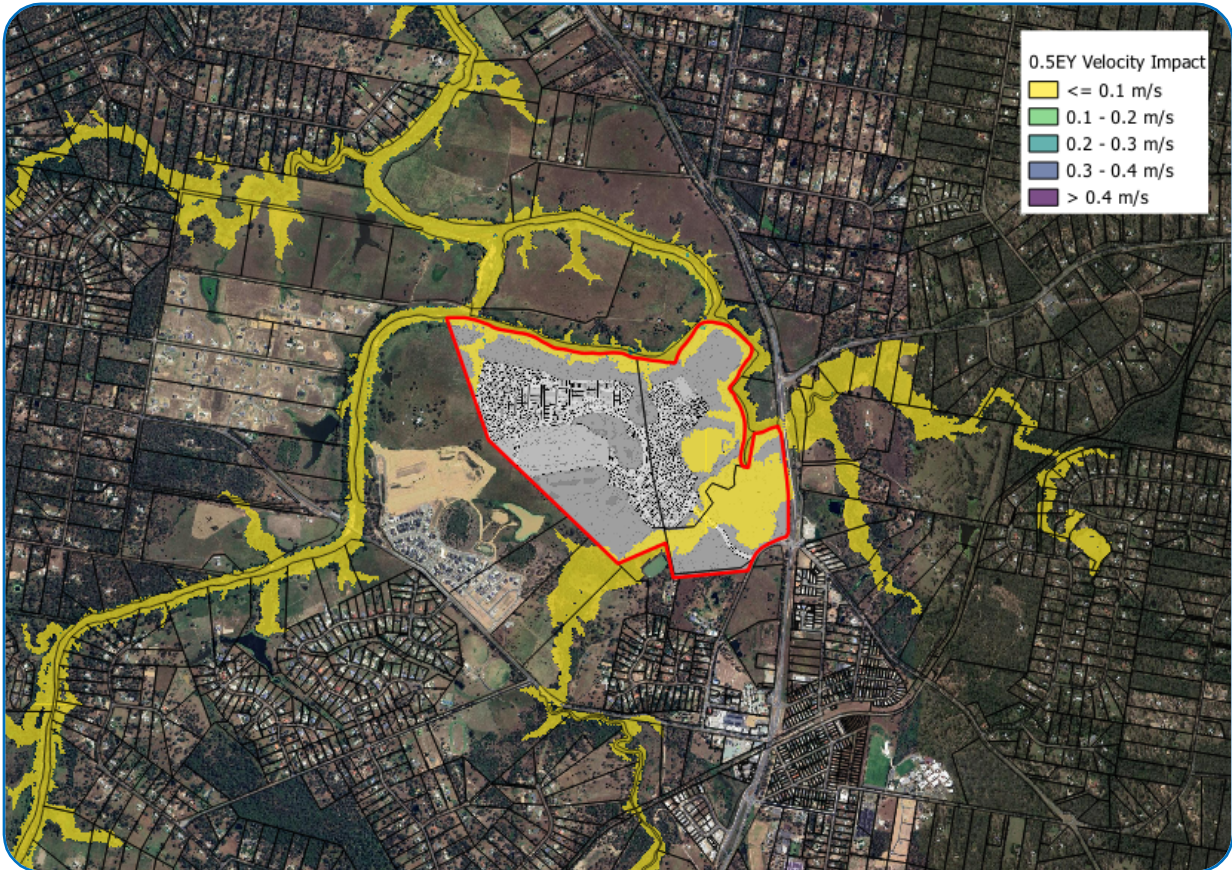


Figure 4-10 0.5EY Velocity Impact

Peak flow discharges downstream of the site have been compared for all events and are summarised in Table 4.1 below. These results indicate that changes to peak flow are negligible.

Table 4-1 Peak Flow Comparison

Annual Exceedance Probability (AEP)	Pre-Development (m ³ /s)	Post-Development (m ³ /s)	Difference (m ³ /s)
0.5EY	677.2	677.2	0.0
10%	1547.6	1546.9	-0.5
5%	2326.4	2330.0	3.6
2%	3894.7	3903.6	8.9
1%	4309.5	4315.6	6.1

5. HENDERSON CREEK ASSESSMENT

An additional scenario has been analysed based on flooding of Henderson Creek only, without the influence of Logan River flooding. This assessment has been based upon a cut-down version of the full Logan River model which includes inflow from only the Henderson Creek catchment. The cut-down model extent and layout is shown below in Figure 5.1.

This model has been run for all storm durations provided, and the 9 hour storm was found to produce peak flood levels at the site.

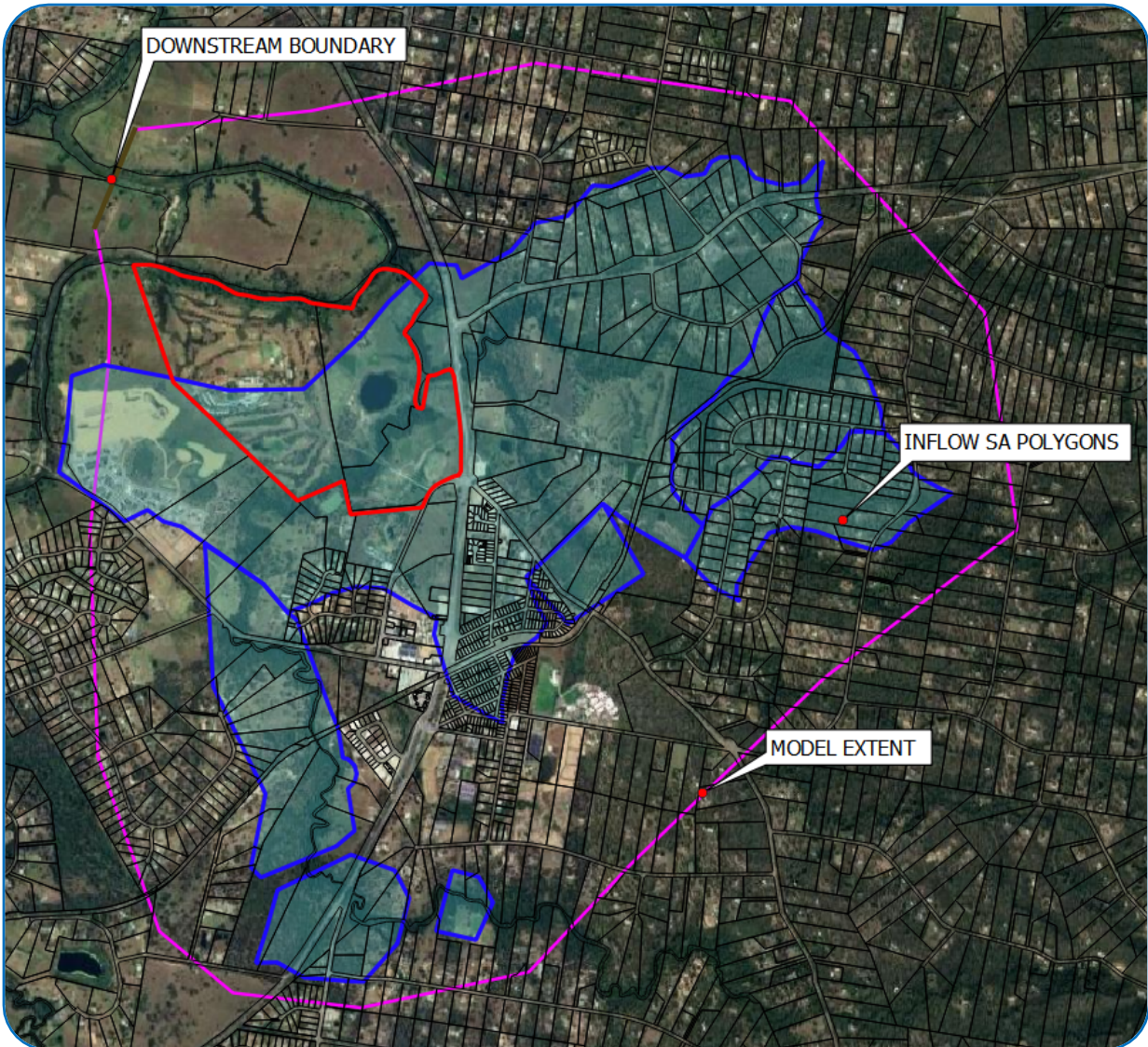


Figure 5-1 Henderson Creek Model Extent

5.1. HENDERSON CREEK MODEL RESULTS

The main flow path of Henderson Creek enters the site along the southern boundary and joins the Logan River at the north-eastern corner of the site. Another tributary joins along the eastern boundary from under the Mt Lindsay Highway.

Peak flood levels range from RL 20.98 m AHD at the southern boundary to RL 17.62 m AHD at the confluence with the Logan River.

The pre-development 1% AEP flood extent is outside of any proposed cut or fill works, therefore flooding behaviour of the Henderson Creek catchment will be unaffected by the proposed development.

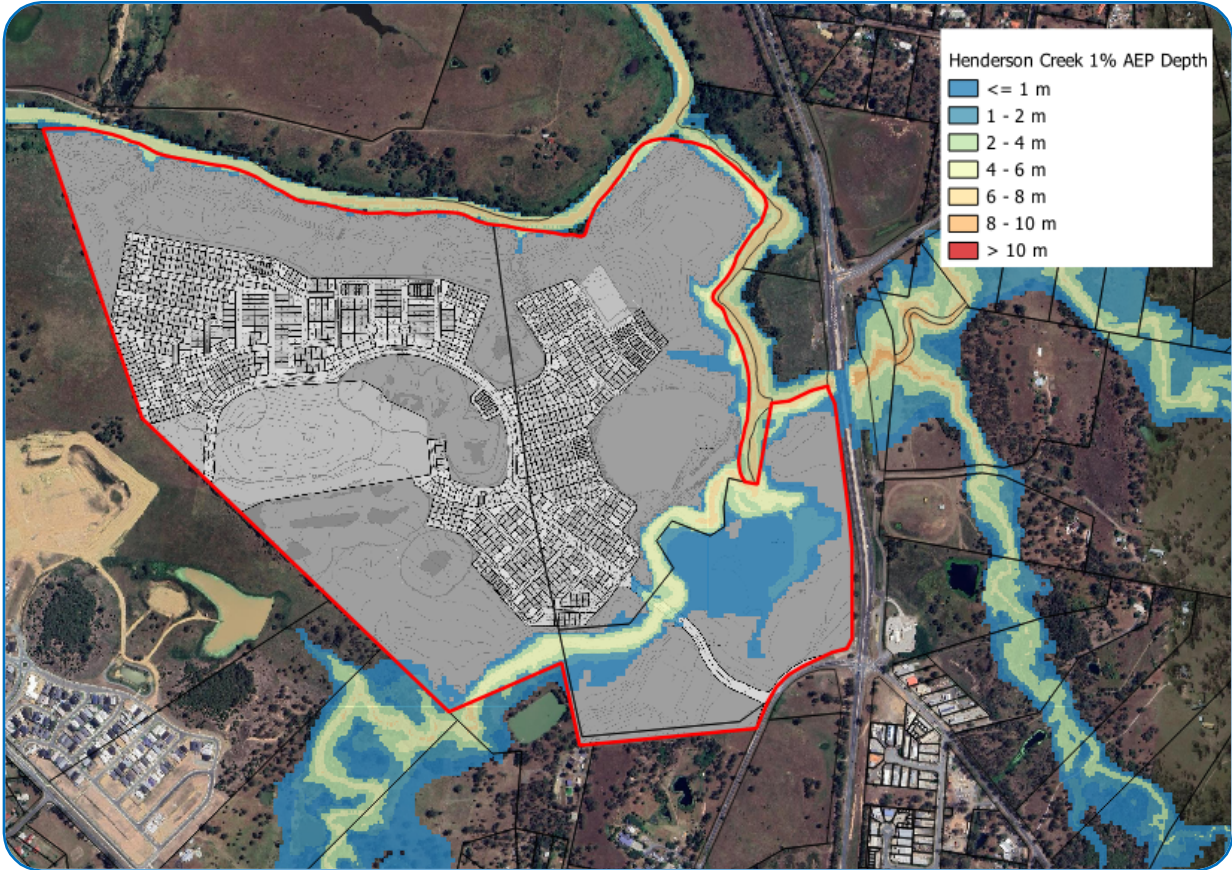


Figure 5-2 Henderson Creek 1% AEP Flood Depth

6. CONCLUSIONS

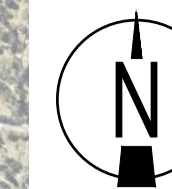
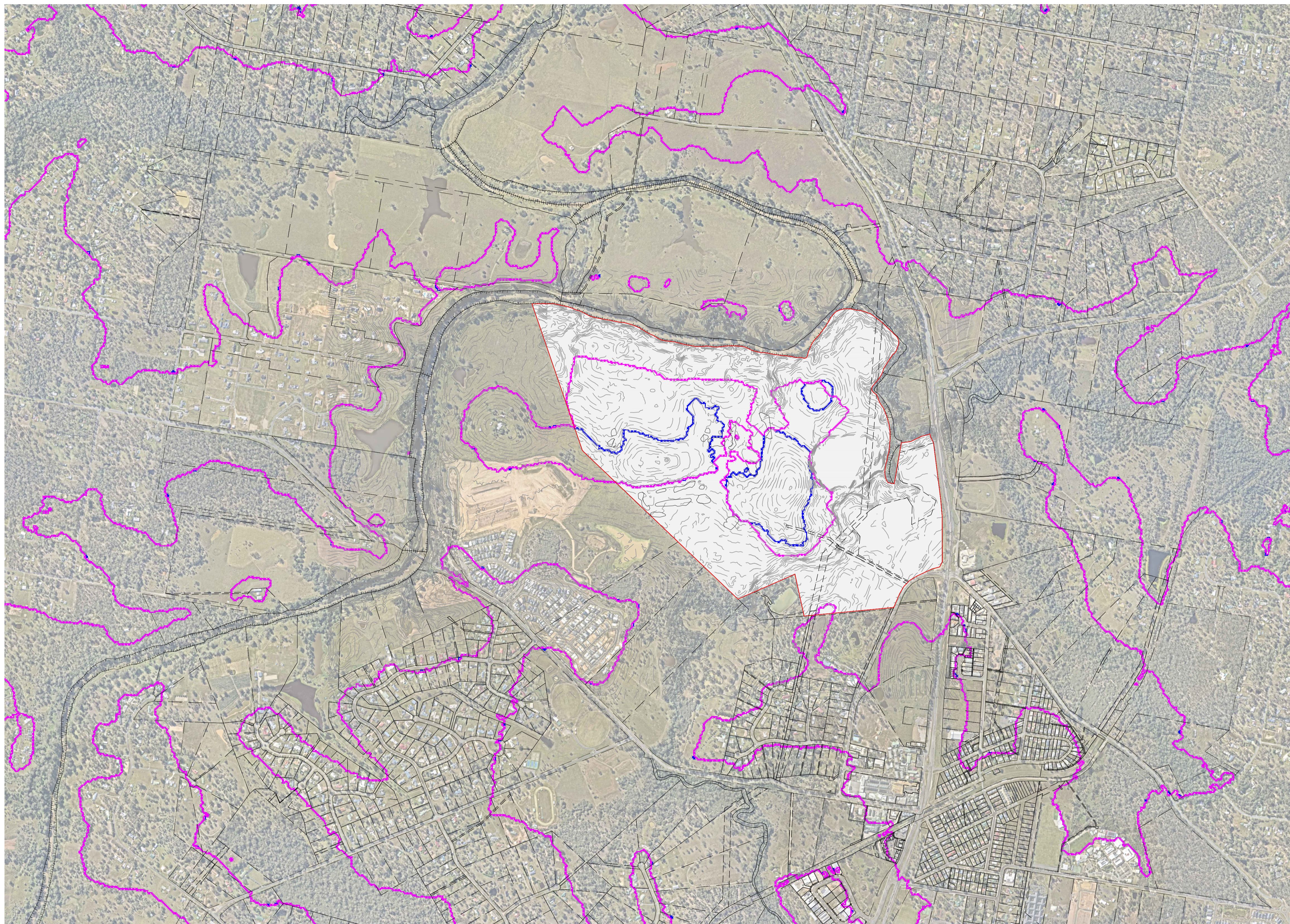
The hydraulic behaviour of Logan River and Henderson Creek have been assessed based on the existing Logan City Council TUFLOW model. This model has been modified to represent the post-development earthworks and an assessment of the impacts undertaken.

The results of the modelling indicate:

- The 1% AEP flood level at the site is RL 29.80 m AHD;
- Flooding depths of up to 20.5 m are predicted adjacent to the site during the 1% AEP flood event within Logan River;
- The proposed earthworks provide flood immunity to the proposed lots;
- The compensatory earthworks proposed maintain major conveyance flow paths;
- The proposed earthworks are not expected to significantly increase peak flood levels or velocities external to the site for all modelled storm events. There are no expected increases greater than 10mm external to the site;
- There is minimal change to peak discharge within the Logan River downstream of the site; and
- The Henderson Creek flood extent is outside of any proposed earthworks.

This hydraulic impact assessment has demonstrated that the proposed development will not materially change the flooding behaviour in the vicinity of the site.

APPENDIX A: PRE & POST DEVELOPMENT 1% AEP FLOOD

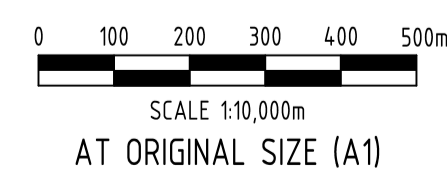


LEGEND

- PRE-DEVELOPMENT Q100 FLOOD LINE
- POST-DEVELOPMENT Q100 FLOOD LINE

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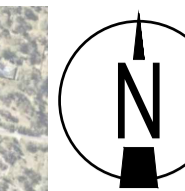
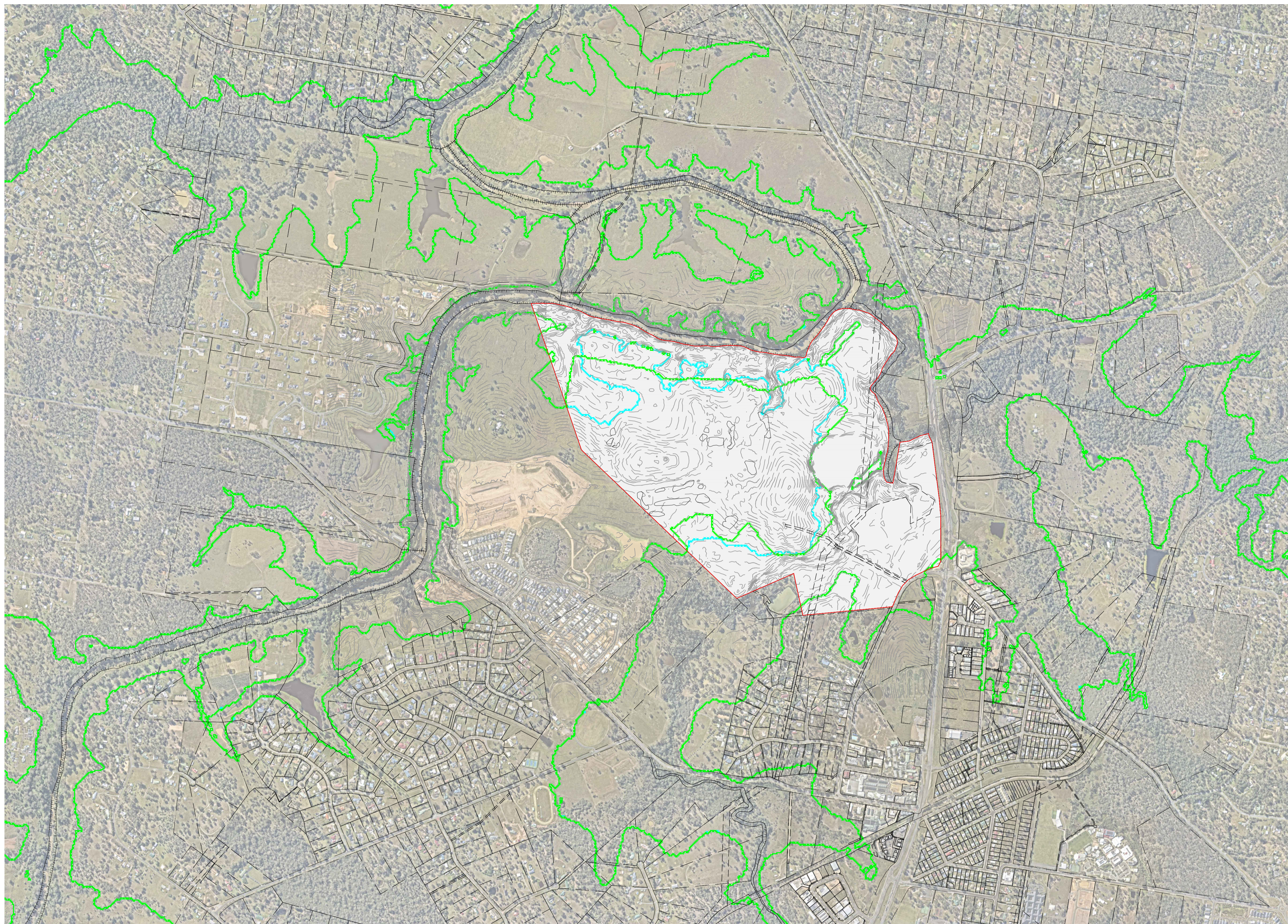
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 UG JIMBOOMBA PTY LTD

Project Name
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 JIMBOOMBA QLD 4280

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Title Q100 PRE & POST DEVELOPMENT FLOOD LINES		Drawing No. SK01	Revision 01
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APPENDIX B: PRE & POST DEVELOPMENT 10% AEP FLOOD

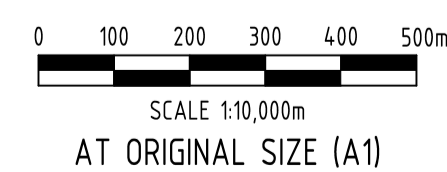


LEGEND

- PRE-DEVELOPMENT Q100 FLOOD LINE
- POST-DEVELOPMENT Q100 FLOOD LINE

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UG JIMBOOMBA PTY LTD

Project Name
**PROPOSED RESIDENTIAL SUBDIVISION
5307 - 5335 MT LINDSAY HWY
JIMBOOMBA QLD 4280**

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Title Q10 PRE & POST DEVELOPMENT FLOOD LINES	Revision 01
Drawing No. SK02	

APPENDIX C: LETTER OF CERTIFICATION



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Toowong QLD 4066, Australia
PO Box 1492, Toowong BC QLD 4066

1300 657 402

www.adgce.com

7 May 2024

Logan City Council
Attention: Katie Parsons
150 Wembley Road
Logan Central QLD 4114

Dear Katie,

Re: 5307 – 5335 MT LINDSAY HIGHWAY, JIMBOOMBA
HYDRAULIC IMPACT ASSESSMENT
21182.003 / C L006, BRISBANE

We confirm that the development design in accordance with the ADG's Hydraulic Impact Assessment Report (Ref 21182 C R003 Rev 02) dated 7th May 2024, will result in no increase in peak flowrates downstream of the site, no increase in flood levels external to the site and no loss of flood storage for modelled flood events. The modelled flood events include the 1%AEP, 2%AEP, 5%AEP, 10%AEP and the 0.5EY events.

Modelling results are based on the "100YCC4p5" scenario within the Logan City Council supplied Logan & Albert Rivers Flood Study TUFLOW model, and includes allowances for climate change at the year 2100.

Kind regards,

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