

Our ref: L.A11230.003.StPhilipsCC-RTS.docx

25 October 2022

St Philip's Christian College
C/O
Barr Planning
Level 11, 205 Pacific Highway
St Leonards NSW 2065

Attention: Katrina Walker

Dear Katrina

RE: RESPONSE TO SUBMISSION - ST PHILIP'S CHRISTIAN COLLEGE, CESSNOCK SSDA

The following letter report has been prepared in response to the submissions provided by various agencies which identified flood-related issues following exhibition of the State Significant Development Application (SSD-10360337) for the alterations and additions to St Philip's Christian College, Cessnock campus (the "Site"). Flood conditions at the Site (including the potential for off-site flood affectation and review of the Site's preliminary flood emergency response plan) were assessed by BMT in 2021 as documented in *St Philip's Christian College, 10 Lomas Lane, Nulkaba Flood Impact Assessment* (BMT, 2021), refer to hereafter as the "2021 FIA".

This letter provides our Response to Submission (RtS), which also includes the development of a Flood Emergency Response Plan (FERP) for the Site. The FERP has been developed and issued to you as a separate report, *St Philip's Christian College, 10 Lomas Lane, Nulkaba, Flood Emergency Response Plan* (BMT, 2022). BMT's detailed responses to the submissions are outlined in Table 1.1 in the attached document, including relevant flood maps and figures.

We trust that we have sufficiently addressed the submissions from various agencies. Please do not hesitate to contact the undersigned if further information is required.

Yours Sincerely,

BMT



Netsanet Shiferaw

Associate Principal Engineer

Attachments:

- BMT's Response to Submission Table 1.1.
- Traffic Engineer's comments on FERP, Figures B-8, C-8, E-1 to E-6 and flood risk information overlay maps along vehicular and pedestrian paths.

Table 1.1 Response to Submission

Agencies Submission	BMT Response
<u>Cessnock City Council</u>	
<i>2. Flooding</i> <i>In accordance with the Cessnock Development Control Plan 2010, Chapter C.9 Development on Flood Prone Land the following comments are noted:</i> <i>• No structures permitted in a floodway. Councils mapping differs to the flood report which shows the currently developed site as being flood affected?,</i>	The flood hydraulic categorisation map (Black Creek Stage 2 – 1 in 100 AEP) sourced from Council's online mapping service shows the predicted floodway mapped within the Site. Whilst the proposed development fill extent encroaches on the mapped floodway and offsite flood impact is predicted to occur for the 2% AEP event and above, the peak flood level increase beyond the acceptable 20mm threshold is marginal (which occurs in area subject to typical peak flood depth in excess of 1m) and the impacted extent is confined within the Black Creek corridor (negligible change in encroachment). Neither the existing residential building within the neighbouring lot (Lot 892 DP 574957) is affected nor the flood hazard of the impacted area is significantly altered (hence minimal change to existing flood risk). The flood impact assessment undertaken by BMT relies on the XP-RAFTS hydrologic and TUFLOW hydraulic model developed as part of the BMT (2017) flood impact assessment which defined the baseline flood behaviour for the Site based on the 2009 approved development conditions. The TUFLOW model was updated to incorporate the latest site survey and drainage structures information as well as representation of existing buildings. Therefore, the models utilised provide an up-to-date and more accurate representation of flood conditions on Site. Both the hydrologic and hydraulic models adopted herein have been validated against results derived from previous studies (including Council's studies), which demonstrated reasonable consistency with the previous studies results.
<i>• Onsite refuge is not permitted. The evacuation comments indicate that Onsite refuge is considered,</i>	BMT has prepared an updated Flood Emergency Response Plan (FERP) for the Site which assessed feasible evacuation routes and recommended early evacuation as the primary flood emergency response strategy. However, sheltering-in-place above the PMF level is available and retained as a secondary strategy should the primary strategy fails.
<i>• Flood free access is not demonstrated for a 1% AEP and will rely on the construction of the access in the south, TfNSW will need to agree on the southern access, and</i>	Refer to Section 5.2 of the 2021 FIA, the southern access to Wine Country Drive would be flood free up to the 0.2% AEP event. Consultation has been undertaken by the traffic engineers with TfNSW regarding the southern access

Agencies Submission	BMT Response
	(refer <i>St Philip's Christian College, Cessnock Transport and Accessibility Impact Assessment</i> (Stantec Australia Pty Ltd, 2022)).
• <i>Distribution of flood water is shown to increase between 20-50mm along the eastern boundary to Lot 892 DP 574957.</i>	Whilst offsite flood impact due to the proposed development is predicted to occur for the 2% AEP event and above, the peak flood level increase beyond the acceptable 20mm threshold is marginal (which occurs in area subject to typical peak flood depth in excess of 1m) and the impacted extent is confined within the Black Creek corridor (negligible change in encroachment). Neither the existing residential building within the neighbouring lot (Lot 892 DP 574957) is affected nor the flood hazard of the impacted area is significantly altered (hence minimal change to existing flood risk).
<u>Department of Planning and Environment</u>	
5. Flooding <i>The Department requests the RtS address the following matters in relation to flooding:</i> • <i>confirm if the Flood Impact Assessment (FIA) accounted for the 16,280 cubic metres of fill that is proposed to be imported</i>	The proposed fill as provided by Northrop (Civil designers) has been accounted for in the flood modelling and impact assessment as documented in the BMT 2021 FIA.
• <i>the FIA has identified that a Flood Emergency Response Plan (FERP) is required to be updated at a detailed design stage or prior to construction. The Department requests that this occurs as part of the RtS to enable a comprehensive flood risk assessment. The updated FERP is required to be prepared in consultation with Council and the NSW State Emergency Service.</i>	BMT has prepared an updated Flood Emergency Response Plan (FERP) for the Site in consideration of the local flood plans and has undertaken consultation with Council and NSW SES regarding the FERP proposed.
• <i>the FIA has not undertaken a detailed assessment of the flood planning levels for each of the proposed buildings to ensure that floor levels are above the 1% Annual Exceedance Probability (AEP) flood extent. Further assessment of the proposed finished floor levels across each individual building and the associated flood impacts and risks is required to demonstrate that the buildings are not impacted by the 1% AEP affecting the site.</i>	The proposed finished floor levels (FFLs) are higher than the 1% AEP peak flood level and include a minimum freeboard of 0.5m above the peak flood levels. A table listing the FFLs of the proposed buildings and the peak flood levels is included in Table 1.2.
• <i>a detailed assessment of the vehicular and pedestrian paths of travel from the car parking areas and buildings to the southern Wine Country Drive egress point is required. This should include overlays of the flood risk in the</i>	-Assessment of the vehicular pathway was previously undertaken and discussed in Section 5.2 of the 2021 FIA, whereby the southern access to Wine Country Drive would be flood free for vehicles up to the 0.2% AEP

Agencies Submission	BMT Response
<i>path of travel for a range of flood events up to the probable maximum flood (PMF).</i>	event. This has been summarised in the attached Table 1.4 and flood risk overlay maps. -Evacuation via the pedestrian pathway is not recommended as the proposed pathway would be inundated in the 10% AEP event and above. The results are summarised in the attached Table 1.4 and flood risk overlay maps.
<i>• the 2009 FERP concluded there would be an effective warning time of 1 to 1.5 hours during a Probable Maximum Flood (PMF) event and that flood levels during the PMF would be expected above the 1% AEP for approximately 6 hours. The strategy of seeking on-site refuge for this period of time is not supported, particularly for vulnerable users of site including minors and young children. The Department requests the updated FERP includes detailed arrangements for the full evacuation of the site.</i>	BMT has prepared an updated Flood Emergency Response Plan (FERP) for the Site which assessed feasible evacuation routes and recommended early evacuation as the primary flood emergency response strategy. Detailed arrangements for the full evacuation of the Site are included in the updated FERP. However, sheltering-in-place above the PMF level is available and retained as a secondary strategy should the primary strategy fails.
<i>• the Department requests that the existing arrangements for evacuating school students be analysed and the future evacuation methods be provided in detail and compared to the existing evacuation methods. It should be noted that the school students will not be able to self-evacuate. Consequently, the FERP must include analysis of scenarios where parents would arrive to pick up children prior to a flood event impacting access routes to the site and what impact that would have on the surrounding roads.</i>	BMT has prepared an updated Flood Emergency Response Plan (FERP) for the Site which assessed feasible evacuation routes and recommended early evacuation as the primary flood emergency response strategy. Detailed arrangements for the full evacuation of the Site are included in the updated FERP. Also attached herein is the Traffic Engineer's commentary on the feasibility of the FERP.
<i>• Council's submission raised concern that the Council's mapping of flood prone land differs to that shown in the submitted FIA. The Department requires you to address Council's concerns as part of a revised FIA, including the following matters:</i> <i>○ no structures are permitted within the floodway.</i> <i>○ on-site refuge during flood events is not supported.</i> <i>○ flood free access is not demonstrated for a 1% AEP.</i> <i>○ flood water is shown to increase by 20-50mm along the eastern boundary of Lot 892 DP 574957.</i>	As per previous responses for Cessnock City Council
<u>DPE Water</u>	
<i>3.0 Surface water impact</i>	Based the NSW River Styles Database, Black Creek has fine grained bed.
<i>3.1 Recommendation – Prior to determination</i>	

Agencies Submission	BMT Response
<i>That the proponent refer to the NSW River Styles Database and confirm if likely geomorphic impacts of the project on downstream environments may occur and identify mitigation options to prevent incision, erosion and infrastructure damage.</i>	To assess the potential geomorphic impacts of the proposed development, the following hydraulic indicators have been assessed: • Peak Flow Impact: Table 1.3 presents the predicted peak flows for the pre-development and post-development scenarios downstream of the site for the 38%, 2% and 1% AEP events. The results indicate that the proposed development will not result in an increase in peak flow in Black Creek downstream of the site. • Velocity Impact: Figures E-1 to E-3 show predicted peak velocity impacts downstream of the site for the 38%, 2% and 1% AEP events. These demonstrate that the proposed development will not result in an increase in peak velocity in Black Creek downstream of the site. • Bed Shear Stress Impact: Figures E-4 to E-6 show predicted peak bed shear stress impacts downstream of the site for the 38%, 2% and 1% AEP events. These demonstrate that the proposed development will not result in an increase in peak bed shear stress in Black Creek downstream of the site. Given the above results, the proposed development is not anticipated to increase scour potential and hence unlikely to cause geomorphic impacts in the creek.
3.3 Explanation <i>The EIS does not adequately consider the requirements of the Water Management Act 2000. Section 4.11.2 of the EIS notes that as a SSD, the project is exempt from approval under that Act. However, the development is not exempt from being consistent with the Act and must address the requirements in the SEARs which includes surface water and watercourse impacts.</i> <i>The EIS has considered off-site flood impacts, but not potential geomorphic impacts arising from increased flood flow velocities. With 24,500 cubic metres of fill into the site, the floodplain for Black Creek will in effect be constricted by the new building footprints. The effects of such constrained flow during peak flood events has not been explored. The proponent should, with reference to the NSW River Styles Database, consider the likely geomorphic impacts of the project on downstream environments, most notably the broad bridge crossing</i>	Based the NSW River Styles Database, Black Creek has fine grained bed. To assess the potential geomorphic impacts of the proposed development, the following hydraulic indicators have been assessed. • Peak Flow Impact: Table 1.3 presents the predicted peak flows for the pre-development and post-development scenarios downstream of the site for the 38%, 2% and 1% AEP events. The results indicate that the proposed development will not result in an increase in peak flow in Black Creek downstream of the site. • Velocity Impact: Figures E-1 to E-3 show predicted peak velocity impacts downstream of the site for the 38%, 2% and 1% AEP events. These demonstrate that the proposed development will not result in an increase in peak velocity in Black Creek downstream of the site. • Bed Shear Stress Impact: Figures E-4 to E-6 show predicted peak bed shear stress impacts downstream of the site for the 38%, 2% and 1% AEP events. These demonstrate that the proposed development will not result in

Agencies Submission	BMT Response
<i>Black Creek on Lomas Lane. Mitigation options to prevent incision, erosion and infrastructure damage may need to be explored.</i>	an increase in peak bed shear stress in Black Creek downstream of the site. Given the above results, the proposed development is not anticipated to increase scour potential and hence unlikely to cause geomorphic impacts in the creek.
<u>Biodiversity and Conservation Division (BCD)</u>	
<i>4. BCD advises that the proponent should provide further information as to the flood risk, including any changes to the timing of the inundation of Lomas Ln and any accessways to properties from that road.</i>	The afflux maps provided show there's minimal peak flood level impact on Lomas Lane. The timing of inundation of Lomas Lane has not changed as a result of the development. Figure 1.1 shows the inundation duration in Lomas Lane at the adjacent to the eastern access to the school.
<i>5. BCD recommends that the proponent review and amend the current detailed flood emergency response plan (FERP). It is suggested that any approvals for further development of the site be contingent on a review of the adequacy of an amended detailed FERP.</i>	BMT has prepared an updated Flood Emergency Response Plan (FERP) for the Site which assessed feasible evacuation routes and recommended early evacuation as the primary flood emergency response strategy. Detailed arrangements for the full evacuation of the Site are included in the updated FERP.
<i>6. BCD recommends that additional colour graduations, above 60.25m are added to Figures B8 and C8 in the flood impact assessment.</i>	Attached to this letter report are the corresponding flood maps with revised colour graduations.
<i>7. BCD recommends that the estimated climate change impact on flood levels, for the design life of the development, be included in the 1% AEP flood level. The minimum floor level should be based on the 1% AEP flood level (including climate change) plus 500mm freeboard.</i>	The FFLs of the proposed buildings have a minimum freeboard of 0.5m above the 1% AEP peak flood levels. A table listing the FFLs of the proposed buildings and the peak flood levels is included in Table 1.2. Whilst BCD's recommendation is acknowledged, the nominated Flood Planning Levels (FPLs) are in accordance with Council's DCP requirements (i.e, the 1% AEP peak flood level plus a minimum freeboard of 0.5m). Section 5.3 of the 2021 FIA presented an assessment of impact of climate change on the 1% AEP peak flood levels which demonstrated that climate change will result in a maximum flood level increase of 0.3m within the site. This demonstrates that the nominated FFLs would remain flood-free under climate change scenario with a minimum freeboard of 0.2m. Notwithstanding, all FFLs of the proposed buildings have freeboard beyond the minimum 0.5m required by Council's DCP as shown in Table 1.2.

Table 1.2 Finished Floor Levels vs 1% AEP Peak Flood Levels and Flood Planning Levels

Building	Finished Floor Level (FFL) at Entry (mAHD)	1% AEP Peak Flood Level (mAHD)	Flood Planning Level (FPL)/1% AEP Peak Flood Level + 0.5m (mAHD)	Difference between FFL and FPL (m)
A - Junior School*	59.40	58.48	58.98	0.42
B - Middle School	59.50	58.23	58.73	0.77
C - Senior School, Library & chapel*	59.50	58.80	59.30	0.20
D - Admin / Welcome Centre	59.50	58.85	59.35	0.15
E - Trade Training Centre*	59.70	58.85	59.35	0.35
F - The Hub*	59.10	58.51	59.01	0.09
G - Performing Arts Centre	59.50	58.51	59.01	0.49
H - Sports Hall*	59.70	58.84	59.34	0.36
J – Narnia	59.80	58.92	59.42	0.38
K - Welcome Café*	59.50	58.85	59.35	0.15
N2 – Dale	59.70	59.07	59.57	0.13
O - Aquatic Centre	60.50	59.43	59.93	0.57
Q - Waste Depot	62.465	59.78	60.28	2.205

* Alteration/addition to existing buildings

Table 1.3 Peak Flows Downstream of Site

AEP	Immediately downstream of Lomas Lane		Immediately upstream of Lovedale Road	
	Pre-development Flow (m³/s)	Post-development Flow (m³/s)	Pre-development Flow (m³/s)	Post-development Flow (m³/s)
38%	72.73	72.76	111.85	111.89
2%	234.42	234.42	340.53	340.48
1%	276.23	276.25	401.15	401.22

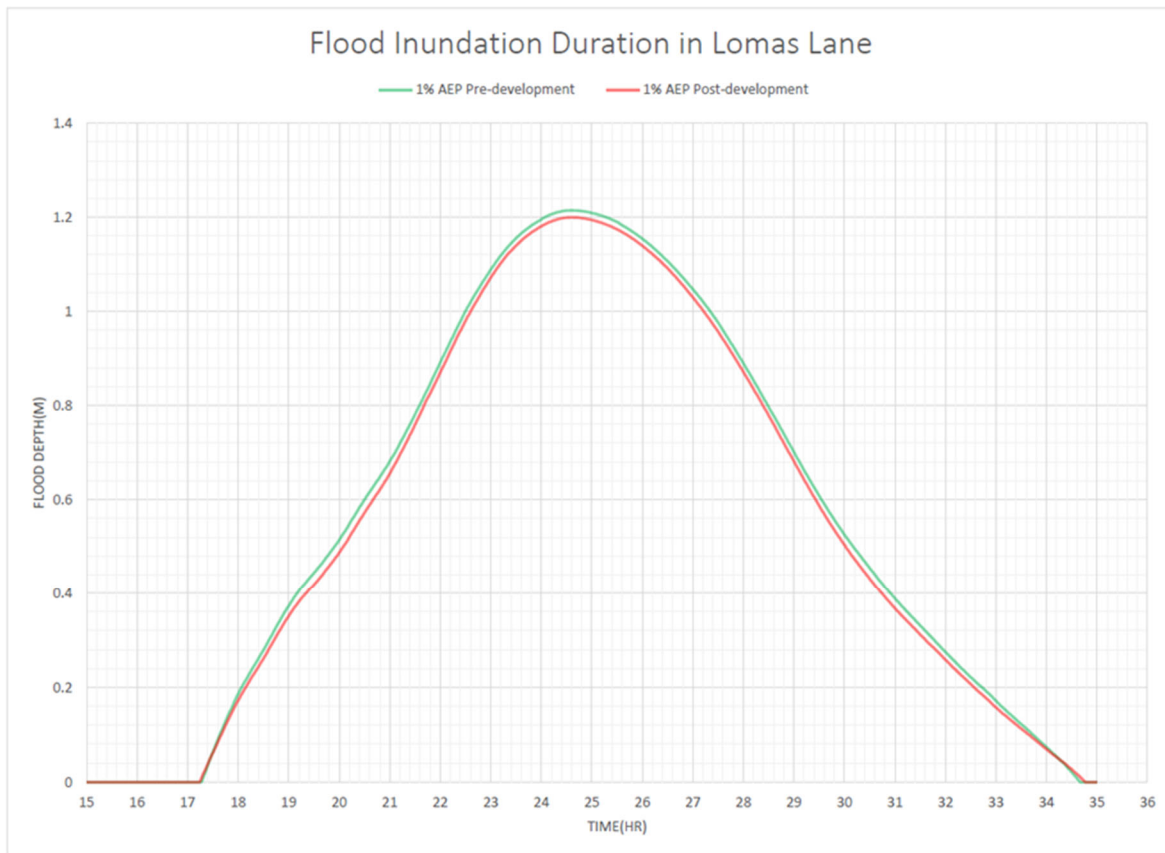


Figure 1.1 1% AEP Flood Inundation Duration in Lomas Lane

Nathan Cheah

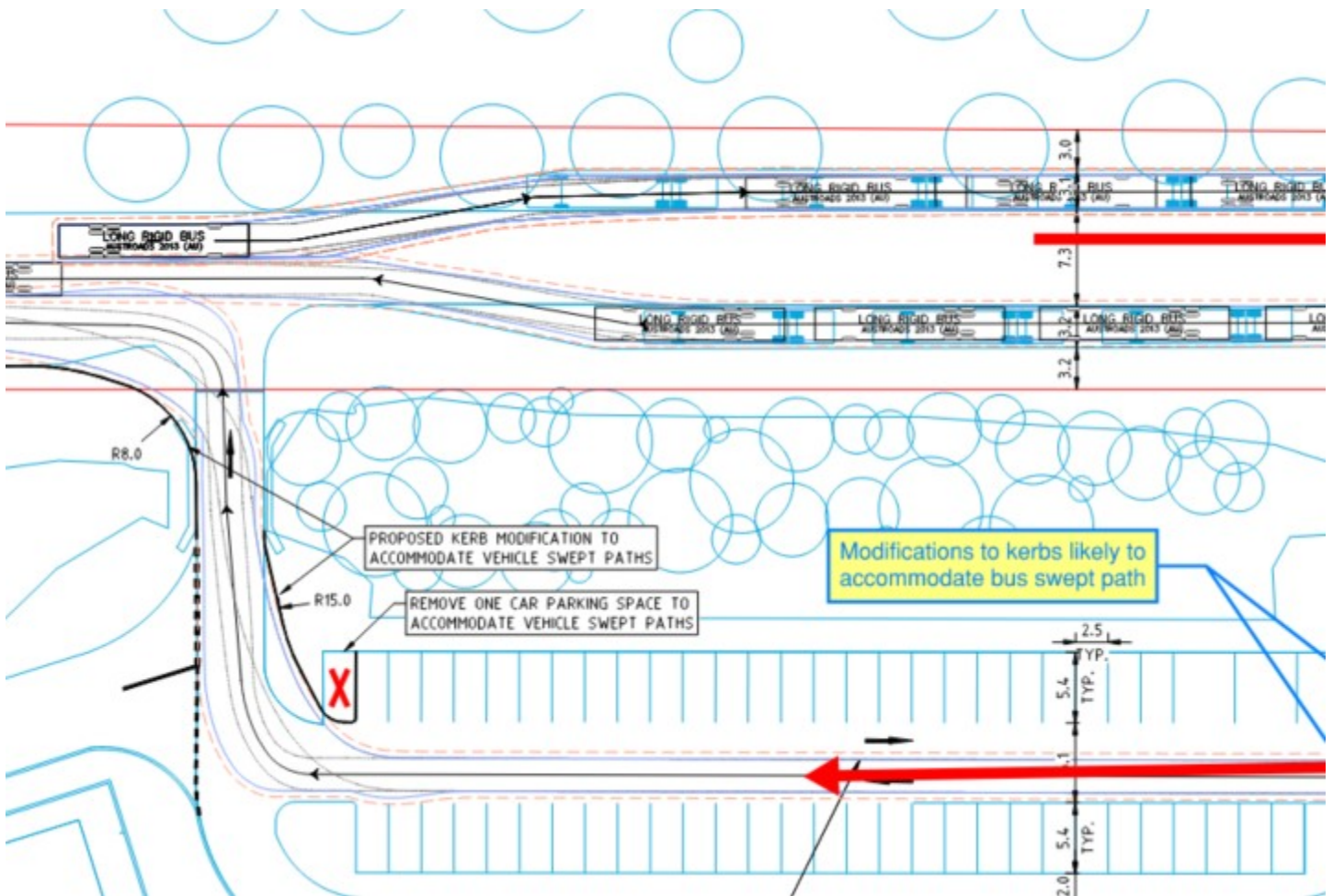
From: Hazell, Rhys <rhys.hazell@stantec.com>
Sent: Friday, 15 July 2022 4:31 PM
To: Rebecca Johnston; Bradley, Carla
Cc: David Price; Katrina Walker; Nathan Cheah
Subject: [External] RE: SPCC Cessnock - Flood Emergency Management Plan - Stantec comments

Hi Rebecca,

Following review of the Flood Emergency Response Plan, we have the following comments from a traffic perspective:

- Minor modifications will be required for the central access to allow buses to turn around, with the bus loop to the east anticipated to be flooded.
 - Subject to swept paths, kerbs to be amended and may potentially result in the loss of one parking space and the marked crossing would likely need to be extended – refer below bus route in red.
 - If buses are part of the FERP, pick-up can be facilitated in the car park – to be managed during evacuation, some cars may be held/block to allow safe passage for pedestrians.
- Bus access can already be accommodated at the WCD access with any pick-up to occur in the car park near the senior school.
- A flood evacuation period of 5 hours is considered adequate to accommodate full evacuation, with the first two hours able to accommodate access and entry via Lomas Lane.
 - With five hours before WCD access/egress is cut off, flood trigger would need to occur before 1pm (assuming after school care finishes at 6pm) otherwise all students would have a planned departure during the evacuation period anyway.

Overall, we are comfortable with the FERP and support from a traffic perspective.



Regards

Rhys Hazell

Senior Principal Transportation Planner

Direct: +61 2 8448 1800

Mobile: +61 431 426 532 or +61 459 952 112

rhys.hazell@stantec.com

Stantec

Level 16, 207 Kent Street

Sydney NSW 2000



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From: Rebecca Johnston <rjohnston@barrplanning.com.au>

Sent: 15 July 2022 15:47

To: Hazell, Rhys <rhys.hazell@stantec.com>; Bradley, Carla <carla.bradley@stantec.com>

Cc: David Price <david@spcc.nsw.edu.au>; Katrina Walker <kwalker@barrplanning.com.au>; Nathan Cheah <nathan.cheah@bmtglobal.com>

Subject: FW: SPCC Cessnock - Flood Emergency Management Plan

HI Rhys

Just chasing an update this task for SPCC Cessnock and info needed to finalise the Flood Emergency Evac Plan.

If you could please liaise directly with Nathan Cheah at BTM nathan.cheah@bmtglobal.com, that would be great.

Dr Nathan Cheah
Associate Principal Engineer

Direct: +61 (02) 9195 1502

Regards

REBECCA JOHNSTON
PARTNER & PLANNING MANAGER



0420 660 085



RJOHNSTON@BARRPLANNING.COM.AU



BARRPLANNING.COM.AU



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REBECCA JOHNSTON



PLANNING
THE FUTURE

From: Rebecca Johnston

Sent: Thursday, 7 July 2022 4:49 PM

To: Hazell, Rhys <rhys.hazell@stantec.com>

Cc: David Price <david@spcc.nsw.edu.au>

Subject: SPCC Cessnock - Flood Emergency Management Plan [Filed 07 Jul 2022 16:51]

Hi Rhys

Sorry to have missed your call earlier today.

As discussed, a today's meeting with BMT on the Flood Emergency Management Plan, your input to test the assumptions made by BMT on the evacuation timeframes is required. If you could please provide some analysis based on the known split of travel modes for staff and students, this would assist.

If you could please provide to me by early next week this would be appreciated.

Regards

REBECCA JOHNSTON

PARTNER & PLANNING MANAGER



0420 660 085



RJOHNSTON@BARRPLANNING.COM.AU



BARRPLANNING.COM.AU



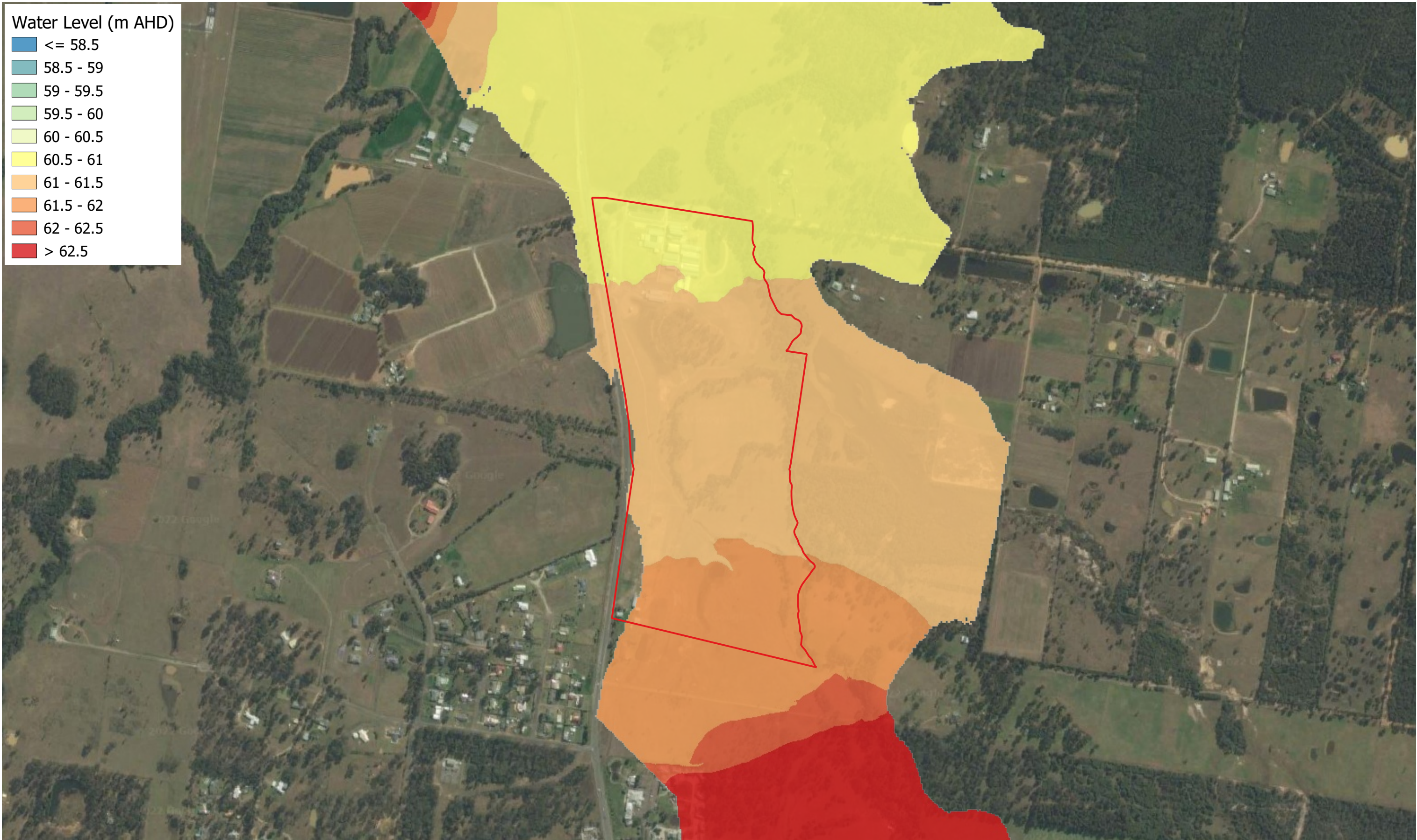
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REBECCA JOHNSTON



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Legend

 Site Boundary

Title:

PMF Pre-development Peak Flood Level

Drawing:

B-8

Rev:

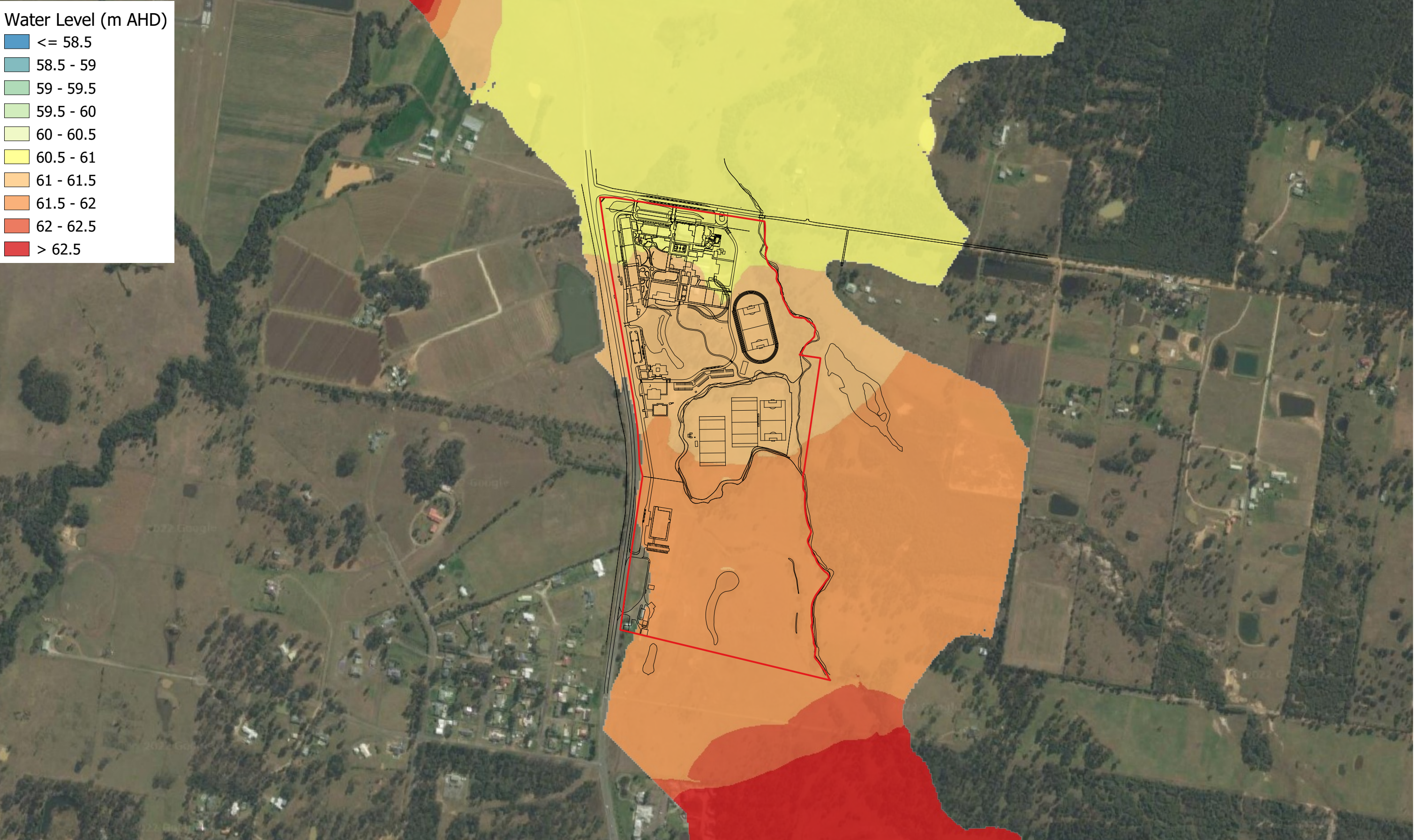
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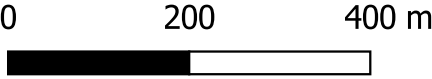


Legend

-  Site Boundary
-  Development Layout

Title:
PMF Post-development Peak Flood Level

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Drawing:
C-8

Rev:
A





Legend

- ▲ Reporting Point
- Site Boundary
- Development Layout

Title:

38% AEP Post-development Velocity Impact

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Drawing:

E-1

Rev:

A





Legend

-  Reporting Point
-  Site Boundary
-  Development Layout

Title:

2% AEP Post-development Velocity Impact

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Drawing:

E-2

Rev:

A



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Legend

- ▲ Reporting Point
- Site Boundary
- Development Layout

Title:

1% AEP Post-development Velocity Impact

Drawing:

E-3

Rev:

A

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-  Site Boundary
-  Development Layout

Title: 38% AEP Post-development Bed Shear Stress Impact		Drawing: E-4	Rev: A
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Legend

▲ Reporting Point

□ Site Boundary

— Development Layout

Title: 2% AEP Post-development Bed Shear Stress Impact		Drawing: E-5	Rev: A
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Legend

- ▲ Reporting Point
- Site Boundary
- Development Layout

Title: 1% AEP Post-development Bed Shear Stress Impact		Drawing: E-6	Rev: A
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Vehicular and Pedestrian Path Flood Risk Information and Overlay Maps

Table 1.4 Flood Hazard Categories (AIDR, 2017) Along Vehicular and Pedestrian Paths

Path	Flood Hazard Category (H1 to H6)							
	1 in 5 AEP	1 in 10 AEP	1 in 20 AEP	1 in 50 AEP	1 in 100 AEP	1 in 200 AEP	1 in 500 AEP	PMF
Pedestrian	Flood-free	H1	H1	H2	H2	H3	H3	H3 to H5
Vehicular	Free-free							H3 to H5

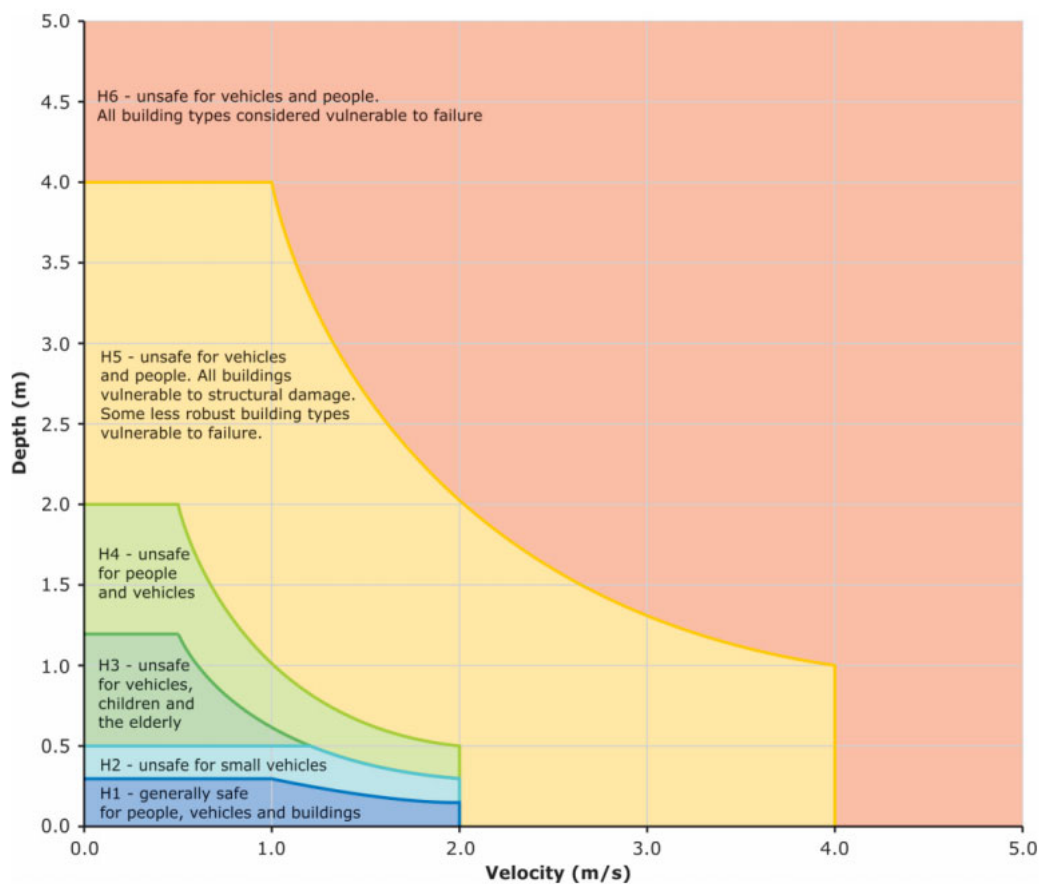


Figure 1.1 Flood Hazard Classification (AIDR, 2017)

