



STORM FLOOD

PLANS AND DOCUMENTS
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DEVELOPMENT APPROVAL

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Government

FLOOD IMPACT ASSESSMENT REPORT

Ripley Valley State High School
54 Wensley Road and 581–617 Ripley Road, Ripley QLD
Prepared for Department of Education

Ref: SF-24-0658-001

Revision 2

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RPEQ Certification

As a Registered Professional Engineer of Queensland (RPEQ), engaged on behalf of StormFlood Engineering Pty Ltd, I certify that based on the provided data, and/or modelling undertaken as part of this projects requirements, that the assessment has been undertaken in accordance with the relevant assessment authorities, and in accordance with current engineering best practices.

RPEQ Name	RPEQ Number	Document Version	Signature
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1 Executive Summary

This Flood Impact Assessment (FIA) has been prepared on behalf of the State of Queensland, represented by the Department of Education (Applicant), in support of a Priority Development Area (PDA) development application over land located at 54 Wensley Road and 581-617 Ripley Road, Ripley QLD 4306 and described as Lots 190 and 191 on SL18 (site). This PDA development application seeks approval from the MEDQ for a development permit for a material change of use for educational establishment, community facility, indoor sport and recreation and outdoor sport and recreation.

The Applicant proposes a State secondary school for Years 7-12, delivered in Stages:

- Stage 1 opening in 2029 with capacity for 917 enrolments.
- Stage 2 opening in 2031 with a cumulative enrolment capacity for 1,813.
- Further undefined stage to provide a cumulative enrolment capacity of 2,043.

The site is contained in the Ipswich City Council (ICC) Local Government Area and thus has been prepared in accordance with the relevant codes and standards pertaining to all relevant assessment authorities.

The site has not been mapped in the Development Scheme as constrained by flooding, and therefore the site has been assessed utilising ICC's OV12 Overland Flow Path Planning Area and Flood Risk Overlay. Accordingly, an assessment against the overland flow flood source has been undertaken to understand flow behaviour under pre-development and post-development conditions is warranted to appropriately inform civil design decisions. This is demonstrated through the development of an independently built TUFLOW model, with the modelling methodology and assumptions consistent with current best practice (ARR 2019).

The following key outcomes have been determined:

- The Flood Planning Level (FPL) for the subject site is the 0.5% AEP, plus 300 mm freeboard in accordance with Table 8.2.10.3.4 of the ICC Planning Scheme Flood Risk and Overland Flow Overlay Code. The proposed development can comply with the FPL requirements, on the basis that the design consideration items noted in this report are adhered to;
- It is deemed that the LGA FPL will govern over the minimum floor level prescribed by the DoE Design Standards (May 2025), which requires a Finished Floor Level at or above the 1% AEP peak flood level plus 500 mm freeboard. The peak flood level from the nearest defined flow path has been adopted in determining the flood planning level across individual building footprints.
 - o Consideration of the 2090 climate change scenario (SSP5-8.5) has also been adopted, in accordance with the State Planning Policy;
- No material adverse flood level impacts are predicted beyond the site boundaries under the post-development scenario, satisfying the performance outcomes of the ICC Planning Scheme Flood Risk and Overland Flow Overlay Code.
- Trafficable egress is maintained via Wensley Road up to and including the 1% AEP 2090 design event, assuming the Wensley Road upgrades as per the ICC *Ripley Road Upgrade Stage 2* (Project No: INFO4658 by BG&E) plans are completed. However, as a secondary precaution, an alternative vehicle access design option has been provided from Ripley Road (concept only for consideration), which can be designed to a higher immunity if required. This has been further discussed within the report for future detailed design consideration.

This assessment is based on information provided by the DoE, as well as publicly available datasets sourced from the Local Government Authority (ICC) and relevant Queensland Government departments. It is noted that the flood risks and flood levels discussed herein are based on the available data, and the responsibility for managing any residual flood risk lies with the Department of Education, within the scope and limitations of this assessment.

2 Site Information

2.1 Site Background

The subject site is located at 54 Wensley Road and 581–617 Ripley Road, which is formally known as Lots 190 and 191 on SL18 (here within the 'subject site') and contains an overall land area of 32.29ha (Source: ICC Interactive Mapping). The ICC Property Lot Report designates the site as part of the 'Local Framework – 18; Ripley Valley' and 'Ripley Valley Priority Development Area' and is contained in Appendix A.

An image of the site, surrounding properties and roads have been shown in Figure 1 below. The ICC OV12 Overland Flow Path Flood Planning Area has been highlighted in Figure 1.

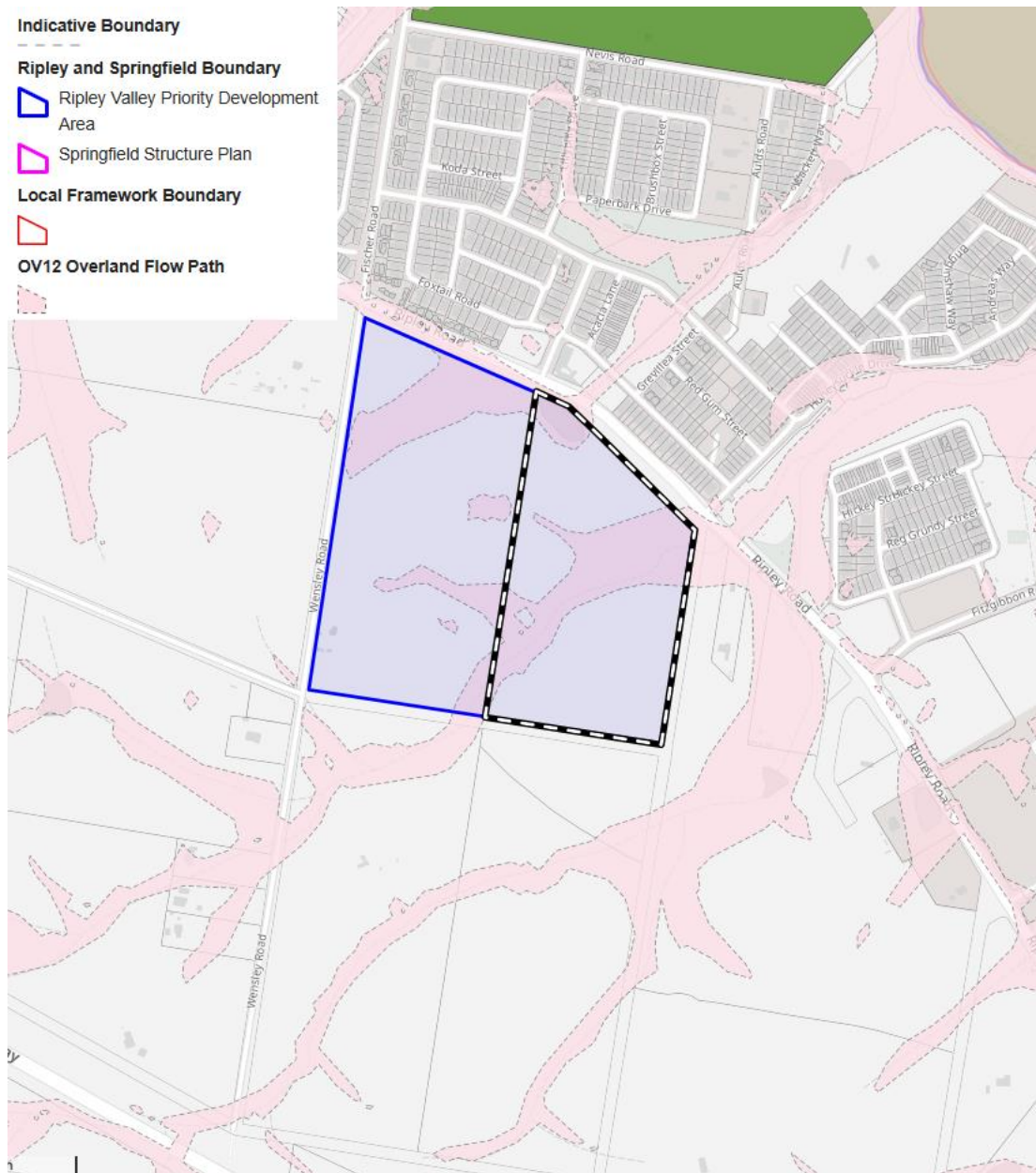


Figure 1: ICC Overland Flood Planning Scheme Overlay-Subject Site

2.2 Site Characteristics

The site is currently predominantly undeveloped, but contains a dwelling house, and is proposed to accommodate the future Ripley Valley State High School.

The site topography generally falls from south-west to north-east, with the high point located along the western boundary (approximately 70 m AHD) and the low point in the northeastern portion of the site (approximately 47 m AHD). A natural drainage corridor traverses the south-central portion of the site in a broadly south-to-north direction, consistent with the mapped OV12 Overland Flow Path shown on the Ipswich City Plan 2025. This is referred to as the 'Southern Tributary' herein.

Overland flows generated from the catchment to the north and west, including the established residential areas of Ripley, drain through the site and continue eastward, forming a confluence with the Southern Tributary. A natural drainage pathway is observed within the site, conveying flows eastward from the western local catchment, forming a confluence with the Southern Tributary. The broader catchment ultimately drains toward Bundamba Creek.

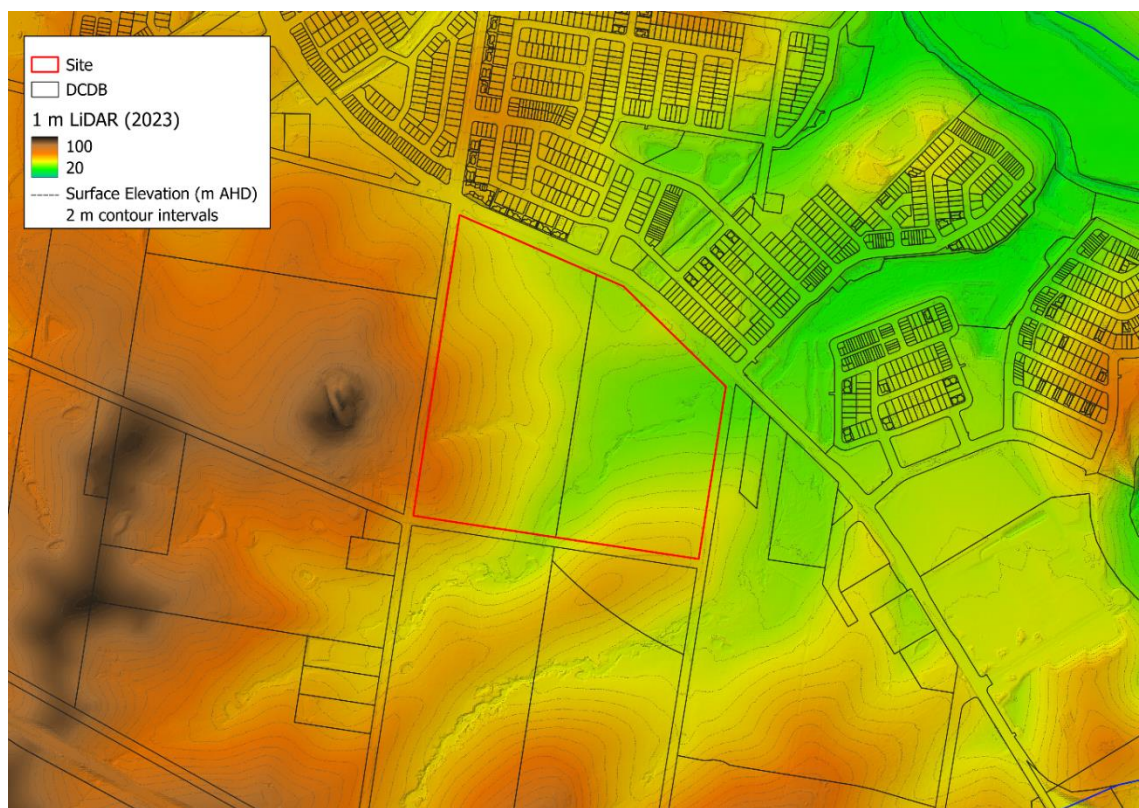


Figure 2 Topography and Subject Site

2.3 Ripley Road Upgrade

The Ripley Road Stage 1, 2 & 3 Road Upgrade (ICC Project No. INF04658) constitutes a significant piece of infrastructure along the northern boundary of the subject site, which has been incorporated into the model, as it is deemed this would amend the outcome for the site significantly.

The upgrade was designed by BG&E Pty Ltd on behalf of Ipswich City Council Technical Services and was Issued for Construction in February 2026. The works span the full length of Ripley Road from the Cunningham Highway interchange eastward through to the Fischer Road / Wensley Road intersection, encompassing the full frontage of both the western (54 Wensley Road) and eastern (581–617 Ripley Road) sites.

The road upgrade introduces material changes to overland flow routing within the local catchment. Key drainage features incorporated as part of the upgrade include:

- A redesigned roadside stormwater drainage network comprising kerb drainage, roadside swales gully pits, and a network of RCP stormwater pipes ranging from 375 mm to 1050 mm diameter, conveying flows west-to-east along the Ripley Road corridor;
- Wensley Road Crossing: Culvert L39, a twin (2×) 1800 mm × 600 mm RCBC culvert, as detailed on IFC drawing INF04658-05103 and INF04658-05220.
- Swale and channel realignments adjacent to the site frontage, referred to as the 'Northern Drainage Channel' herein, directing upstream catchment flows toward the sag point along Ripley Road

The Design TIN for the road upgrade (Ripley_MGA2020_Zone56.tif) was provided by Northrop Consulting Engineers on 29 April 2026. This design surface has been incorporated into the hydraulic model as part of the pre-development (base case) terrain, reflecting the as-constructed road geometry and drainage infrastructure at the site frontage.

2.4 Proposed Development

The proposed development comprises the construction of the Ripley Valley State High School, including multiple learning and administration buildings, a multipurpose hall, car parking and access, hardcourt areas, and sports fields. The proposed development has been designed with buildings and car parking concentrated on the higher northern and western portions of the site, with sports fields and open space positioned within the lower southeastern portion of the site.

Architectural drawings of the proposed development have been prepared by Group GSA Pty Ltd and are contained in Appendix B.

2.4.1 Conceptual Northern Swale Design

A conceptual northern swale design has also been modelled, to determine if an alternative access point from Ripley Road can be achieved. Additionally, by adopting and extending the swale to the larger Bundamba Creek catchment to the east, further developable land is available within 581-617 Ripley Rd.

Further discussion is provided in Section 3.3 of this report, which conceptually supports this outcome for future detailed design considerations.

2.5 Adopted Data

The following data has been adopted for analysis:

- Site and Architectural Plans for Ripley Valley State School, prepared by Group GSA (provided in Appendix B) [Project Number: A252264, Drawing No: 1150];
- Ripley Road Stage 1, 2 & 3 Road Upgrade Design TIN and IFC Civil Drawings (Project No. INF04658), prepared by BG&E Pty Ltd on behalf of ICC Technical Services (Issued for Construction, 12 February 2026) – provided by Northrop Consulting Engineers on the 29th of April 2026)
- 1 m LiDAR data (QLD DNRME 2023), obtained via ELVIS – Queensland Department of Natural Resources and Mines;
- BOM LIMB 2020 IFD Data for subject site coordinates;
- Australian Rainfall and Runoff DataHub 2019;
- ICC Planning Scheme, Interactive Mapping and GIS Open Data; and
- Queensland Urban Drainage Manual (QUDM) 2017

3 Hydraulic Assessment

3.1 Model Overview and Study Implications

The modelling methodology pertaining to the hydrological and hydraulic model development is captured in the sections below. A 1D/2D hydraulic model was developed using TUFLOW (Version 2025.1.2) as the software package for this assessment.

3.1.1 Hydrology

Rainfall-On-Grid (ROG) modelling has been adopted as the preferred method, given the topography of the region and the ability to demonstrate the concentration of overland flows within the area of interest.

BOM LIMB 2020 Intensity–Frequency–Duration (IFD) design rainfall data was extracted using the ARR TUFLOW Plugin and prepared into hyetographs for a range of durations and temporal events from 10 minutes to 2-hour durations. All temporal pattern and duration storm events were run via a coarse-grid fast model and post-processed to determine the critical duration(s) for detailed assessment.

Design events modelled include the 39%, 10%, 1%, 0.5% AEP events, each with 2090 SSP5-8.5 climate change scaling applied in accordance with ARR guidelines and the State Planning Policy.

3.1 Hydraulic Model Setup

3.1.1 Digital Terrain Model

The Digital Terrain Model (DTM) for the different flood source models has adopted the latest 1m resolution LiDAR source (Source: QLD Department of Natural Resources and Mines, 2023).

A 2 m grid cell size has been adopted throughout the model domain. The terrain model layers, as configured in the adopted model, are captured in Table 1 below.

Table 1: Digital Terrain Model Layers Adopted

Item	Layer	File / Source	Purpose
1	Base Topography	ICC_2023_LiDAR.tif	Baseline 1 m LiDAR topography covering the full model domain. All grid cells initialised prior to overlay of design surfaces.
2	Ripley Road Design TIN (ICC Project No. INF04658)-	Ripley_MGA2020_Zone56.tif (provided by Northrop / ICC, 29 April 2026, converted from Terrain 2001 to MGA2020 via 12D/GDA2020)	IFC Design TIN for the Ripley Road Stage 1, 2 & 3 Road Upgrade, representing the constructed/proposed road surface, drainage channels, and culvert infrastructure at the northern site boundary. Incorporated as part of the pre-development (base case) and post-development scenarios.
3	Post - Development Design TIN	RIPLEY DESIGN MODEL_260508.tif (provided by Northrop 8 May 2026, converted from Terrain 2001 to MGA2020 via 12D/GDA2020)	Proposed earthworks, building platforms, stormwater basin, access road, and carpark levels for the school development. Incorporated in the post-development scenario only. Topographic amendments such as concept block walls have been applied, to contain carpark flows, given the concept stage design of the carpark.



Figure 3: TUFLOW Model - Post Development Scenario

The Ripley Road IFC Design TIN (Item 2) was provided by Northrop Consulting Engineers on 29 April 2026, following a coordinate datum conversion facilitated via Ipswich City Council. The original TIN file was provided in Terrain 2001 horizontal datum by ICC, and subsequently converted to MGA2020 (Zone 56) using 12D software. This surface has been incorporated as part of the base-case terrain, adjacent to the site frontage.

3.1.2 2D Surface Roughness and Adopted Infiltration Roughness

Manning's 'n' roughness values were applied across the 2D grid based on land use. The study area was delineated based on the following land uses, manning's values and adopted infiltration values (Initial Losses and Continuing Losses):

• Road/Concrete	n = 0.025	IL = 0mm	CL=0mm/hr
• Light Vegetation (default)	n = 0.035	IL = 0mm	CL=0.8mm/hr
• Urban Areas	n = 0.100	IL = 0mm	CL=0.8mm/hr
• Dense Veg/Woodlands	n = 0.080	IL = 0mm	CL=0.8mm/hr
• Buildings	n = 0.300	IL = 0mm	CL=0.0mm/hr

The manning's (n) roughness values adopted are consistent with the ICC Flood Planning Scheme Policy and ARR requirements.

For an appreciation of the adopted manning's 'n' roughness values applied, refer to Figure 4 for the pre-development scenario, and Figure 5 for the post-development scenario.

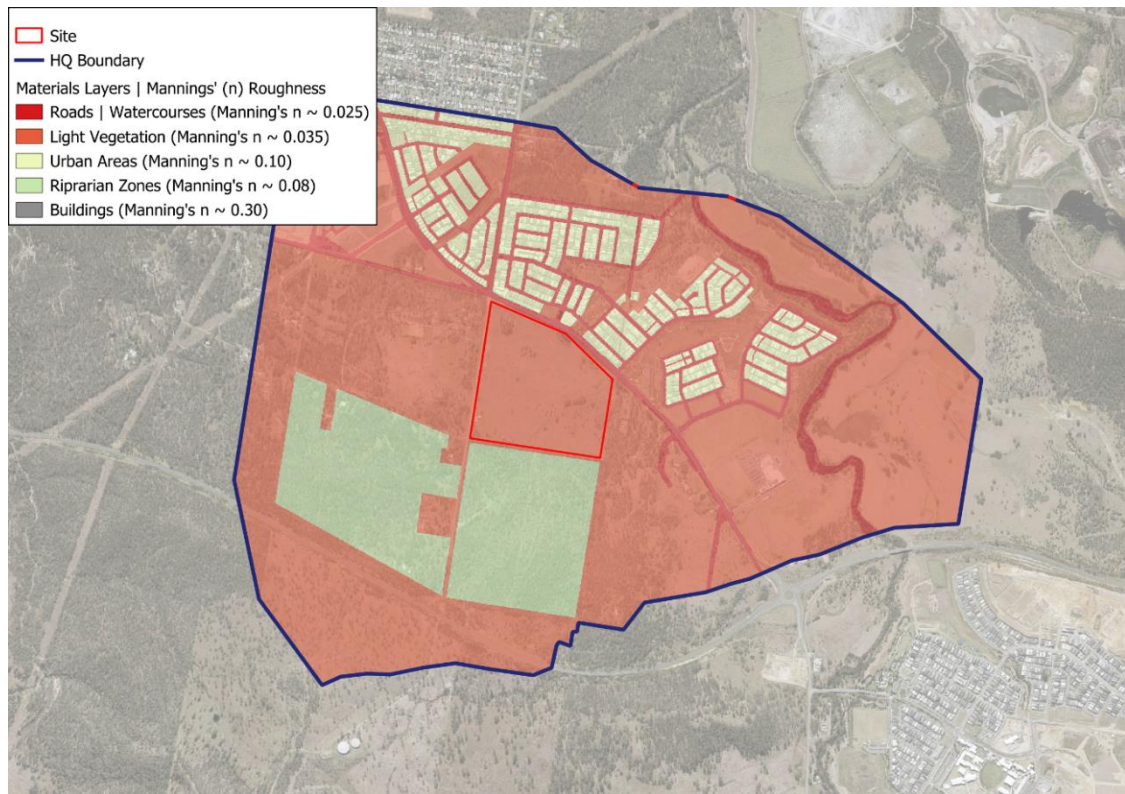


Figure 4: Model Domain and Land Use Delineation (Pre-Development Scenario)

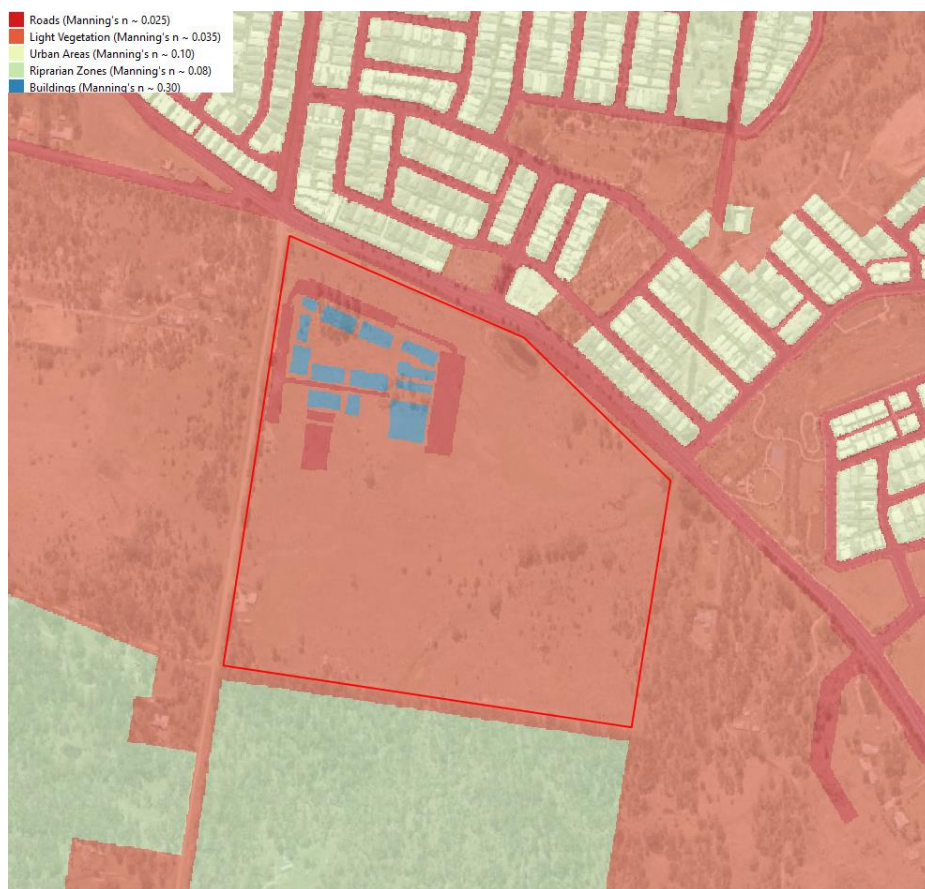


Figure 5: Model Domain and Land Use Delineation (Post-Development Scenario)

3.1.3 Boundary Conditions

The model adopted a Rainfall-On-Grid (ROG) approach, which has been iteratively adjusted, until a suitable ROG boundary was established for the contributing overland flow catchment. Design rainfall inputs were generated via the ARR TUFLOW plugin, which extracts 2020 IFD rainfall depths and converts these to event hyetographs for application to the hydraulic model.

The downstream model boundary adopts dynamic tailwater conditions, with the longitudinal slope of the underlying channel adopted as the hydraulic grade. The boundary has been located sufficiently downstream of the site such that it is not expected to induce backwater effects at the site. The balance of the model domain has been assumed a free-draining HQ boundary of 0.1.

Reference should be made to Figure 4 above, which demonstrates the boundary conditions adopted within the TufLOW modelling.

3.1.4 Hydraulic Infrastructure

Hydraulic infrastructure pertinent to the study area has been included within the hydraulic model. This comprises:

- Ripley Road upgrade drainage network (ICC INF04658): The Stage 2 stormwater drainage network, designed by BG&E Pty Ltd, was incorporated into the model. This includes roadside swales, stormwater pipes, and cross-drainage culvert infrastructure along the Ripley Road frontage of the subject site. Key cross-drainage infrastructure incorporated includes:
 - o Wensley Road Crossing: Culvert L39, a twin (2x) 1800 mm x 600 mm RCBC culvert, as detailed on IFC drawing INF04658-05103 and INF04658-05220.
 - o Ripley Road drainage: predominantly RCP Class 4, ranging from 375 mm to 1050 mm diameter.
- Existing ICC trunk stormwater infrastructure surrounding the sites: ICC stormwater pipes represented as 1D ESTRY elements dynamically linked to the 2D domain via gully pits and/or manholes. Pipe invert levels were obtained from the ICC GIS database where available, or otherwise back-calculated as appropriate.
- Post-development drainage: Due to the conceptual nature of the design, stormwater infrastructure is yet to be detailed for the internal drainage of the site, and in particular the Wensley Road carpark and driveway. In-lieu of this detail, a conceptual drainage design was provided, to ensure overland flooding was not misrepresented with the ROG approach.
 - o Despite this approach, consideration is to be provided for future flow capture and conveyance away from the site, as part of any future detailed drainage design requirements. Further flow rates to consider have been provided in sections below.

An overview of the pre-development ESTRY network, boundary conditions and model domain is shown in Figure 6. The post-development scenario (zoomed in) of the hydraulic infrastructure is shown below in Figure 7.

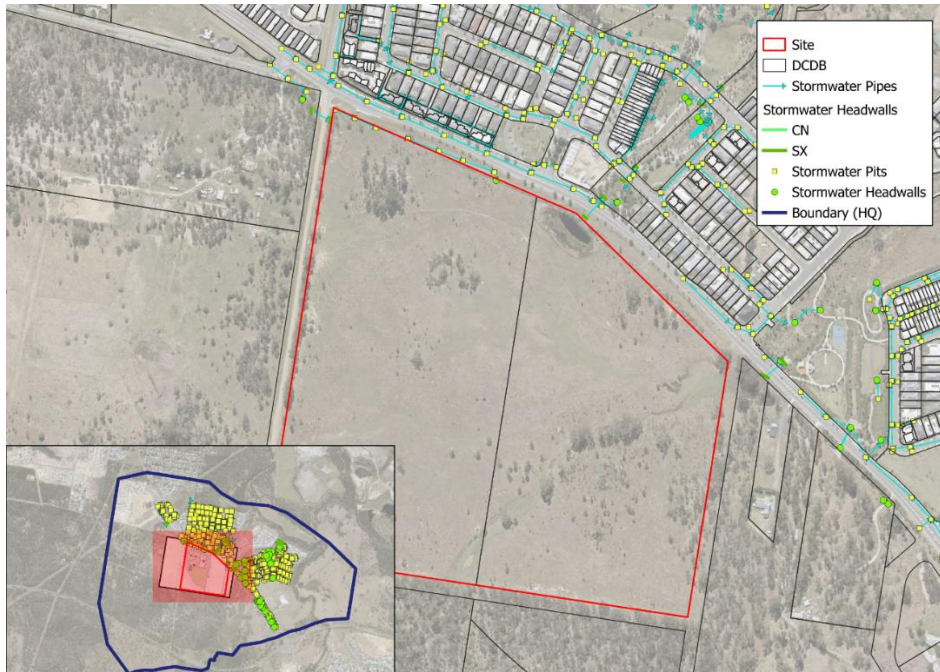


Figure 6 Adopted Hydraulic Infrastructure – Pre-Development Tuflow Model

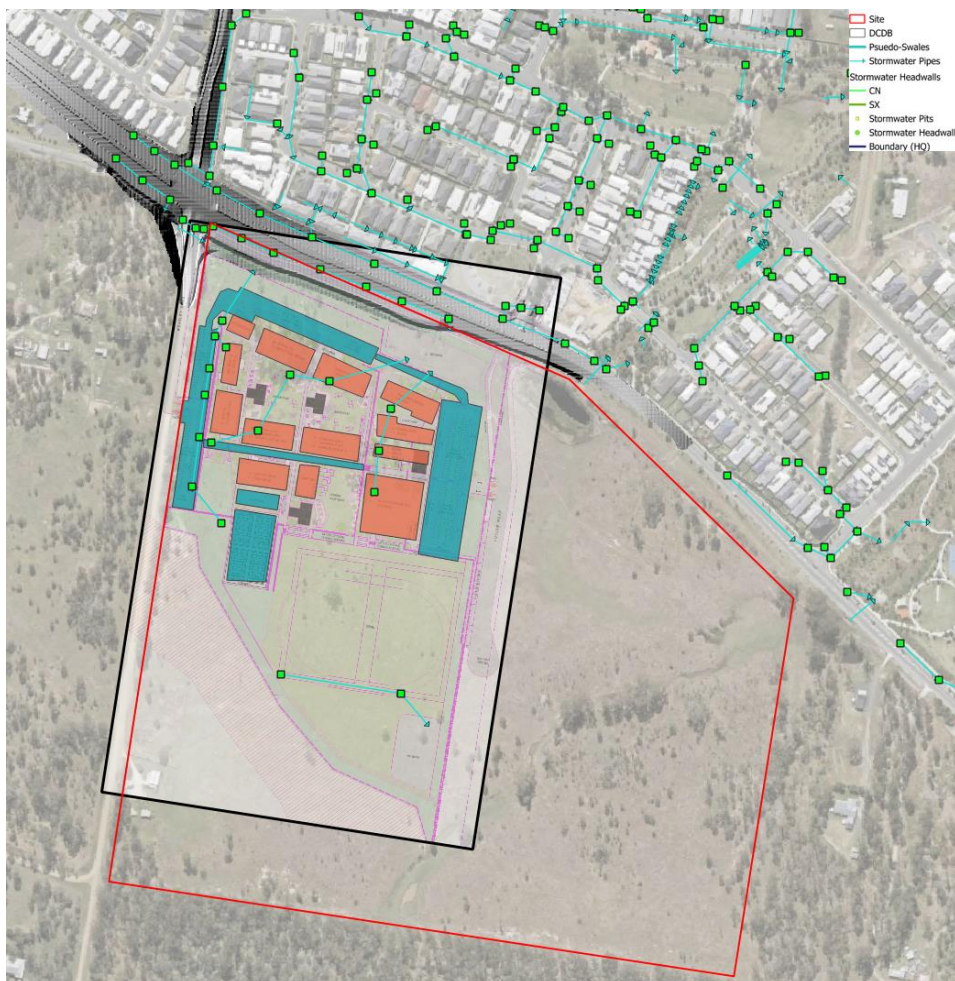


Figure 7 Adopted Hydraulic Infrastructure – Post-Development Tuflow Model

3.2 Peak Flood Map Results and Processing

3.2.1 Peak Flow Depth and Flood Level

Pre-development DFE Scenario

The 0.5% AEP design event was adopted as the basis of design and forms the focus of the Flood Planning Assessment (refer to Section 4). The modelling indicates that under pre-development conditions for the 0.5% AEP design event:

- Overland flow depths up to 1.10 m are conveyed along the Northern Drainage Channel, with the peak flood level ranging from ~54.0 m AHD to 48.5 m AHD near the north-eastern apex of the site boundary (before entering the smaller pond to the north-east).
- The peak flood depth over the kerb and channel over Ripley Road is less than 300mm, but in the general range of between 200mm and 300mm. It is noted that the northern drainage channel conveys the majority of upstream flow from the external upstream catchment to the west. Accordingly, flows are generally conveyed via kerb and channel, rendering Ripley Road trafficable in the 0.5% AEP design event.
- Overland flow depths up to 0.15 m traverse the western boundary along Wensley Road, with flows conveyed eastward via a sheet flow characteristic to the north-eastern apex of the site.
- Overland flow depths of up to 1.0 m are conveyed along the Southern Tributary.

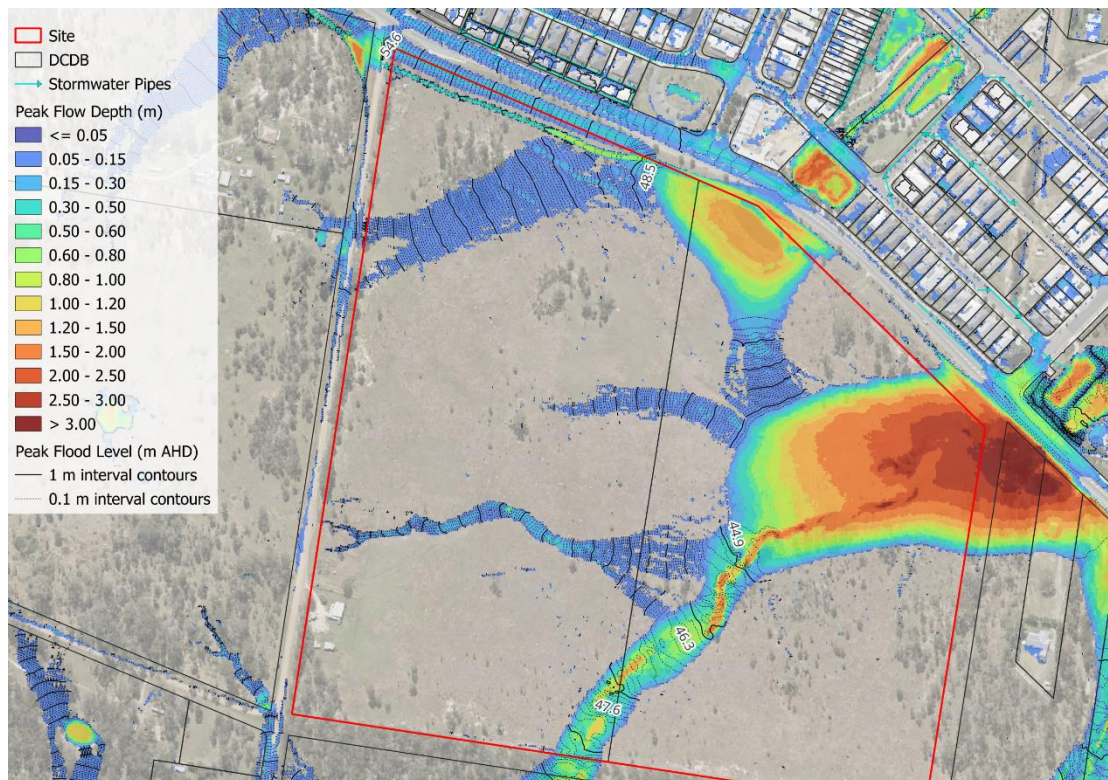


Figure 8: Pre-development Scenario Peak Flow Depth and Flood Level for the 0.5% AEP Design Event

Post-development DFE Scenario – Current Design without Eastern Road Access

The modelling indicates that under the 0.5% AEP peak post-development conditions:

- Proposed Carpark area along the west is to capture and convey flows to the northern channel, whilst ensuring no flows overtop and enter the school (based on detailed civil design). The current concept design has assumed at least 4.2m³/s is captured and conveyed in the 0.5% AEP event, and discharged to the northern channel. In this situation there is less than 300mm of peak flood depth ponding within the carpark, which has a hazard of H1, thus compliant for a concept design. Further refinement at detailed design is to ensure the carpark generally complies with this outcome.
- It has been assumed all internal stormwater will capture and convey flows within the school and building areas, and discharged to the basin for treatment.
- On that basis, no flood planning levels are set from the western carpark areas or internal ponded areas, and therefore FPL's are to be set from the northern channel peak flood levels.
- Flooding of up to 350mm is expected in the southern oval area, however this is deemed to be appropriate as it is not envisaged any personnel will be in this location during the peak of the 0.5% AEP event. Despite this, further refinement of this portion of the site can improve flooding if desired.

Trafficability

- The Wensley Road entrance is trafficable in the 10% AEP CC event, however has a higher H2 hazard categorisation for inbound access (but a H1 hazard for outbound traffic) for the 1% AEP CC event scenario. Despite this H2 hazard, the time of inundation is less than 30 minutes, and does not impede larger vehicles from access (ie. school buses) thus a low flood risk.

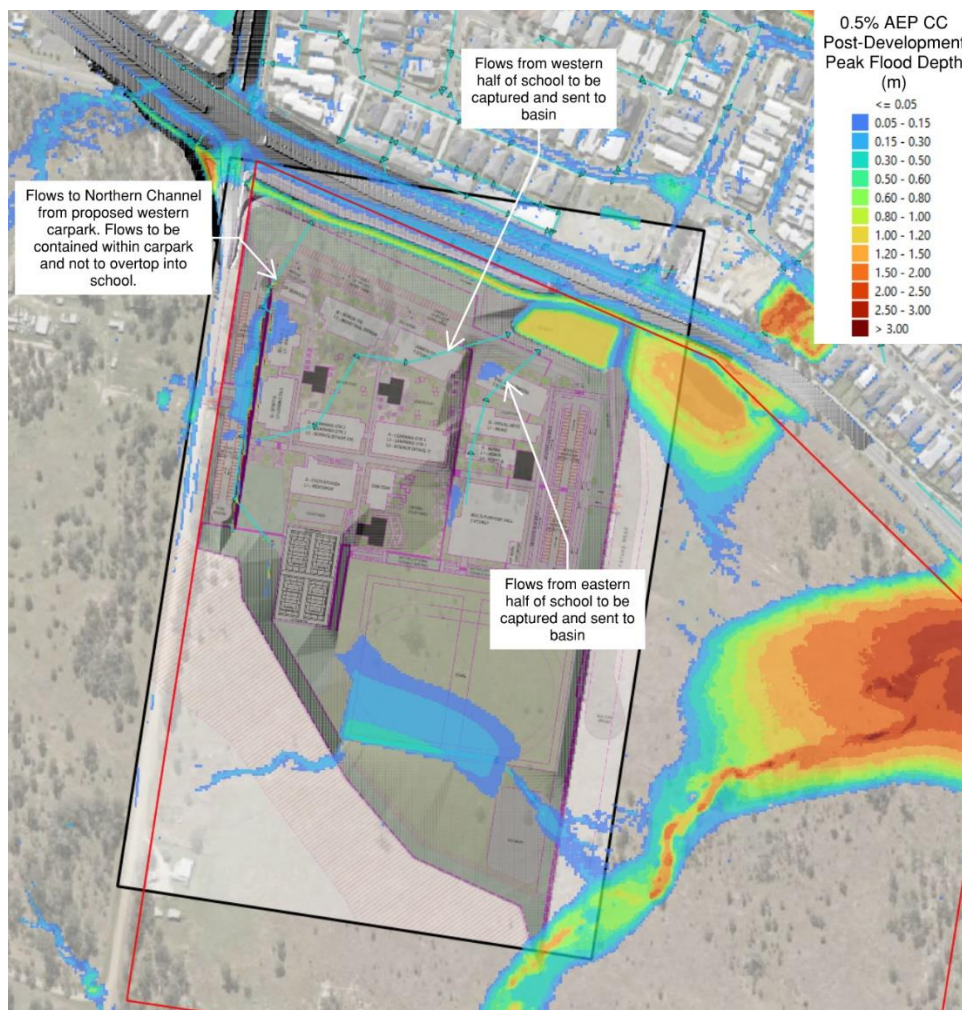


Figure 9: Post-development Scenario Peak Flow Depth and Flood Level for the 0.5% AEP Design Event

3.2.2 Change in Peak Flood Level

As typically required under the ICC Flood Hazard Overlay Code, a peak flood level impact assessment has been undertaken for the 1% AEP Climate Change scenario peak design event and is provided in Figure 10.

The peak flood level impact assessment demonstrates that no adverse flood level impacts are modelled external to the site. Localised increases in peak flood depth are modelled within the site boundary, with minor and non-actionable localised impacts observed in the Northern Drainage Channel. These outcomes are anticipated given the earthworks design and positioning of the stormwater basin. No material increase in the peak flood level is observed along Ripley Road. Any impacts are expected to be localised and short-duration, consistent with the brief duration of the design flood event.

Flood maps showing peak flow depth, peak flow velocity, peak flood hazard (depth–velocity product) and hazard rating (Australian Institute of Emergency Management) for both the pre-development and post-development scenarios for the 39%, 10%, 1% AEP and 0.5% events (2090 SSP5-8.5 climate change) are provided in Appendix C.

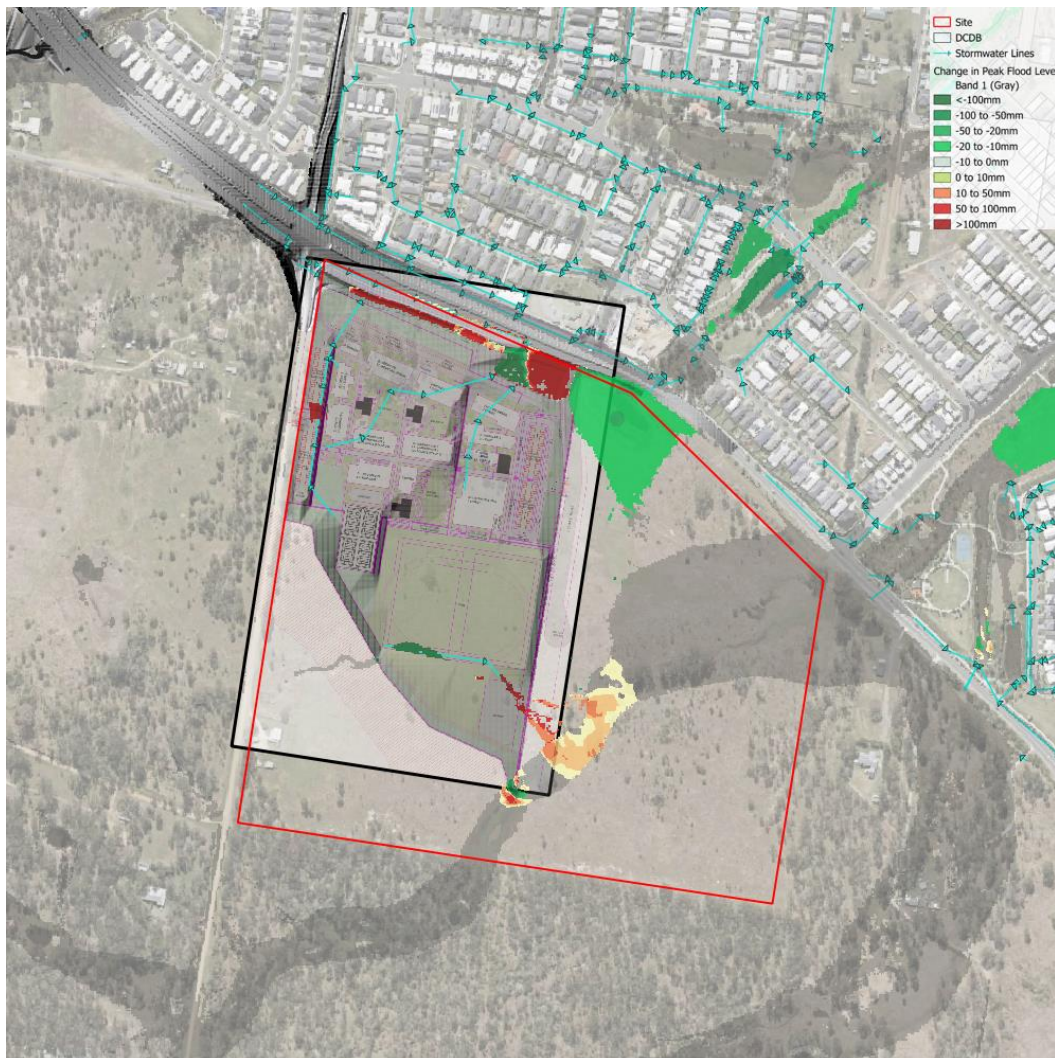


Figure 10: Change in Peak Flood Level for the 1% AEP CC design event

3.3 Alternative Design Option

An alternative design option has been considered to provide a flood free access point from Ripley Road, whilst also improving the existing flood extents within the site. This section discusses the concept design requirements and updated extent, if this design approach is adopted and detailed further.

3.3.1 Design Requirements

This scenario has been designed to the 1% AEP CC scenario, to ensure conceptually no adverse impacts would occur from this road access improvement design.

On this basis, it had been determined that a minimum 12m wide swale design along the northern boundary would assist in reducing the flood extent between the two major waterbodies, thus a residual improvement for the site, as seen below in Figure 11.

To gain flood free access from Ripley Road, a swale design is required to further extend the existing channel along the northern boundary to connect into the existing middle waterbody. The driveway crossover culvert or bridge design is to allow for a conveyance of at least $8.12\text{m}^3/\text{s}$ (assuming a min. swale bed IL of RL47.3m AHD).

An additional swale extension from the middle waterbody to the larger eastern waterbody with a conveyance capacity of at least $2.92\text{m}^3/\text{s}$ is required. This is conceptual in nature and may require a wider width/setback to tie back into existing levels, pending future detailed civil design, however has been provided for consideration as a potential net-positive solution for the overall site.

An impact assessment of the 1% AEP CC scenario has also been provided below in Figure 12, which confirms no adverse impacts external to the site.

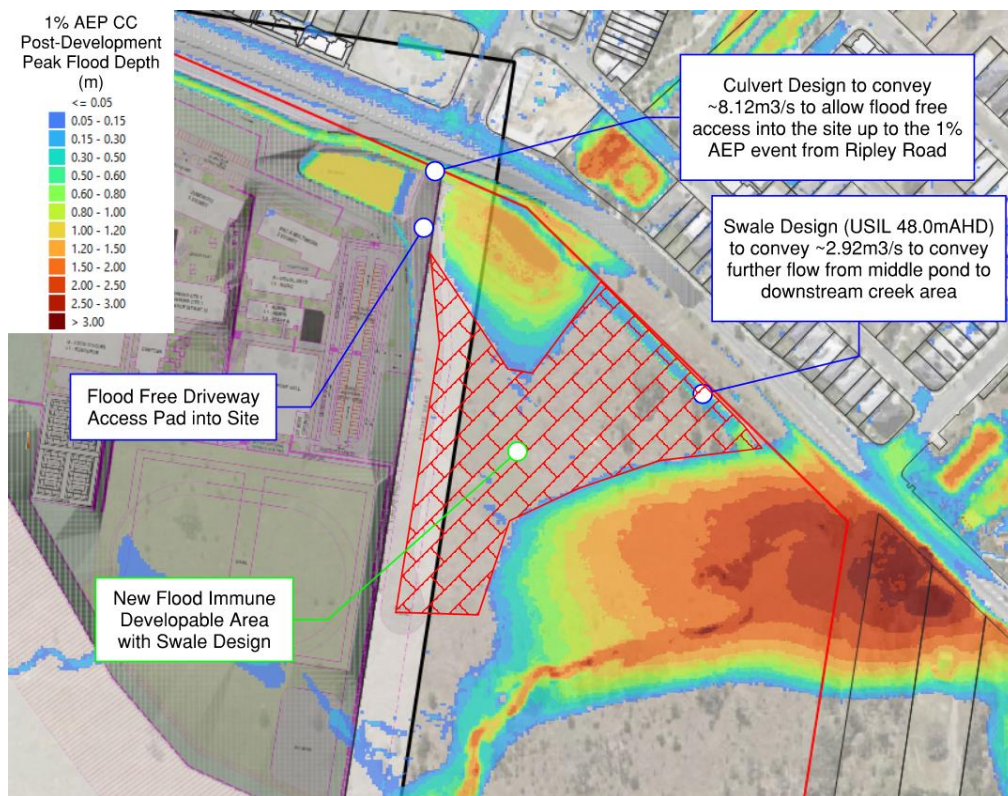


Figure 11: Post-development Scenario Peak Flow Depth for Alt. Design - 1% AEP CC Design Event



Figure 12: Change in Peak Flood Level for the 1% AEP CC design event – Alternative Design

4 Flood Planning Assessment

4.1 ICC Flood Overlay Code

As identified in previous sections, the Ipswich City Council (ICC) Planning Scheme's Flood Risk and Overland Flow Overlay Code would typically be triggered for this site, given the mapped ICC overland flow path overlay through the site. However, given the site is under the jurisdiction of the Department of Education, the higher of the ICC Flood Risk and Overland Flow Overlay Code and DoE Design Standards for Department of Education Facilities (May, 2025) was considered as the relevant assessment items, as addressed below.

4.1.1 Flood Planning Levels

The proposed development is subject to overland flow from:

- Northern Drainage Channel: conveying flow eastward to the sag point along Ripley Road. The drainage channel and stormwater infrastructure forms part of the Ripley Road Stages 1, 2 & 3 (Project No. INF04658)
- Southern Tributary: conveying flow northeast and forming a confluence with flows from the Northern Drainage Channel.
- Wensley Road: Flows conveyed across the Wensley Road road reserve and collected via local stormwater measures. This requires a dynamic response for flood immunity considerations, whereby designing stormwater infrastructure to scale is of equal importance, in parallel with the use of flood-resilient building materials where ponding may occur around structures.

The Ipswich City Council Planning Scheme's Flood Risk and Overland Flow Overlay Code notes the defined flood event to be considered for the purposes of planning is the 1% AEP design event, with rainfall depths projected to SSP5-8.5 to a 2090 time-horizon. Table 8.2.10.3.4 of the Flood Risk and Overland Flow Overlay Code notes that for educational establishments the 0.5% AEP peak flood level plus 300mm of freeboard is to be adopted in determining the flood planning level for the site.

A performance-based assessment is required in determining the flood planning level for the site, whereby the peak flood level observed at the nearest defined watercourse.

For simplicity of compliance, two major channel locations (conservatively picked) have been adopted for the eastern and western half proposed buildings within the site, as illustrated below in Figure 13.

The peak 0.5% AEP design event flood levels have been extracted at these locations, to provide flood planning levels for each proposed building, as summarised in Table 2.

It is also noted that peak flow depths of less than 150mm are illustrated throughout the site, however this is based on a highly conceptual earthworks design, and has not considered detailed internal stormwater network design as yet. Internal ponding areas are to be anticipated within a Rainfall On Grid model, and therefore could be removed or reduced, in order to negate flood planning level requirements within the minor ponded regions, and base all flood planning levels off major overland flow paths on the fringes of the site.



Figure 13: Post-development Scenario 0.5% AEP Peak Flood Level Location Points

Table 2: Modelled Peak Flood Levels and Flood Planning Levels to be adopted as part of the RVSHS Development

Building	Peak Flood Level (mAHD)	Flood Planning Level (m AHD)	Adopted Pad Level (mAHD)	Complies?
OP Services	55.25	55.55	56.15	Yes
Staff B / Staff C	55.25	55.55	56.35	Yes
Senior ITD / Industrial Design	55.25	55.55	56.20	Yes
Junior ITD (1 Storey)	55.25	55.55	56.20	Yes
PAC & Multimedia (2 Storey)	50.15	50.45	52.62	Yes
Staff D / Learning Centre 3	55.25	55.55	56.35	Yes

Learning Centre 2 / Science (Stage 2/3)	55.25	55.55	56.30	Yes
Canteen	55.25	55.55	56.40	Yes
Visual Arts / Music	50.15	50.45	52.62	Yes
Learning Centre 1 / Science (Stage 1)	50.15	50.45	56.30	Yes
Administration / Staff A	50.15	50.45	52.62	Yes
Food Studies / Resource	55.25	55.55	56.40	Yes
Multi-Purpose Hall (2 Storey)	50.15	50.45	52.62	Yes
Administration / Staff A	50.15	50.45	52.62	Yes

The proposed earthworks design for the site renders it immune from flooding up to and including the 0.5% AEP design event (SSP5-8.5 to a 2090 time horizon), with:

- Flows along the northern drainage channel generally contained to the channel, with overflows collected via kerb and channel via Ripley Road;
- Flows along the south-eastern tributary contained to the natural drainage channel.
- Internal drainage is designed to convey flows up to and including the Defined Flood Event.

For the purposes of planning, the ICC Planning Scheme Flood Risk and Overland Flow Overlay Code requirement governs over the DoE Design Standards minimum floor level criterion. The flood planning level is therefore determined in accordance with Table 8.2.10.3.4, being the 0.5% AEP (SSP5-8.5, 2090) peak flood level plus 300 mm freeboard.

The proposed building pad levels demonstrate compliance with the flood planning level requirements.

4.1.2 DoE Peak Flood Level Requirements – Educational Establishment

The DoE Design Standards (May 2025) note that building floor levels must be set at least 500 mm above the 1% AEP peak inundation level as a minimum. However, this requirement does not take precedence over the ICC Flood Risk and Overland Flow Overlay Code, which adopts a more onerous criterion for educational establishments - the 0.5% AEP peak flood level plus 300 mm freeboard - and is therefore the governing requirement for this assessment.

The DoE Design Standards Handbook emphasises the need to design with climate change in mind, adopting a risk-based approach to future flood impacts. All design events simulated as part of this assessment have had rainfall depths and losses factorised consistent with Shared Socioeconomic Pathway SSP5-8.5, projected to 2090. It can therefore be concluded that the recommended floor level and proposed stormwater measures are resilient to climate change impacts.

5 Conclusion

This Flood Impact Assessment (FIA) has been prepared on behalf of the State of Queensland, represented by the Department of Education (Applicant), in support of a Priority Development Area (PDA) development application over land located at 54 Wensley Road and 581-617 Ripley Road, Ripley QLD 4306 and described as Lots 190 and 191 on SL18 (site). This PDA development application seeks approval from the MEDQ for a development permit for a material change of use for educational establishment, community facility, indoor sport and recreation and outdoor sport and recreation.

The overland flow behaviour of the local catchment has been modelled to provide recommendations to the DoE and inform civil design decisions. A key feature of this assessment is the incorporation of the ICC Ripley Road Stage 1, 2 & 3 Road Upgrade (Project No. INF04658) Design TIN as part of the base-case model terrain, reflecting the material influence of this infrastructure on overland flow routing adjacent to the site.

The site is contained in the Ipswich City Council (ICC) Local Government Area and thus has been prepared in accordance with the relevant codes and standards pertaining to all relevant assessment authorities.

In accordance with the ICC Planning Scheme Flood Risk and Overland Flow Overlay Code (Table 8.2.10.3.4), the governing flood planning level for educational establishments is the 0.5% AEP peak flood level plus 300 mm freeboard. This requirement is deemed to be more reasonable to govern over the DoE Design Standards (May 2025) minimum criterion of the 1% AEP peak flood level plus 500 mm freeboard.

Modelling has been undertaken for the full suite of design events from the 39% AEP to the 0.5% AEP, with all events projected to the 2090 SSP5-8.5 climate change scenario. This determined the peak flood levels and minimum flood planning levels applicable across individual building footprints.

Based on the provided plans and civil earthworks design, the design demonstrates that it complies with the flood planning level requirements.

To demonstrate how the proposal complies against the relevant provisions of the ICC Flood Risk and Overland Flow Overlay Code, responses to the Performance Outcome requirements have been included as part of Appendix D to support the application.

An alternative design approach has also been provided for consideration, to provide flood resilient access into the site from Ripley Road, as documented in Section 3 of this report. This concept design would require further detailed refinement to confirm the outcomes remain compliant.

This report outlines the adopted data, modelling approaches and outcomes which allows the above conclusion to be derived.

6 Qualifications

Our analysis and overall approach has been specifically catered for the requirements of Department of Education (c/o Group GSA) and may not be applicable beyond this scope. This report should not be read in isolation and for this reason, any other third parties are not authorised to utilise this Report without further input and advice from StormFlood Engineering.

StormFlood Engineering has relied on the information as outlined in Section 3 of this Report, and therefore any information provided within this Report is limited to the data provided.

While StormFlood Engineering's Report assesses peak flows from design storms in accordance with best-practice and current industry standards and guidelines, future observed flows may vary from that predicted. For these reasons appropriate freeboards should be adopted.

Appendices

Appendix A	ICC Property Lot Report
Appendix B	Proposed Plans
Appendix C	Pre and Post -Development Scenario Peak Flood Mapping
Appendix D	ICC Planning Scheme Flood Risk and Overland Flow Overlay Code Responses

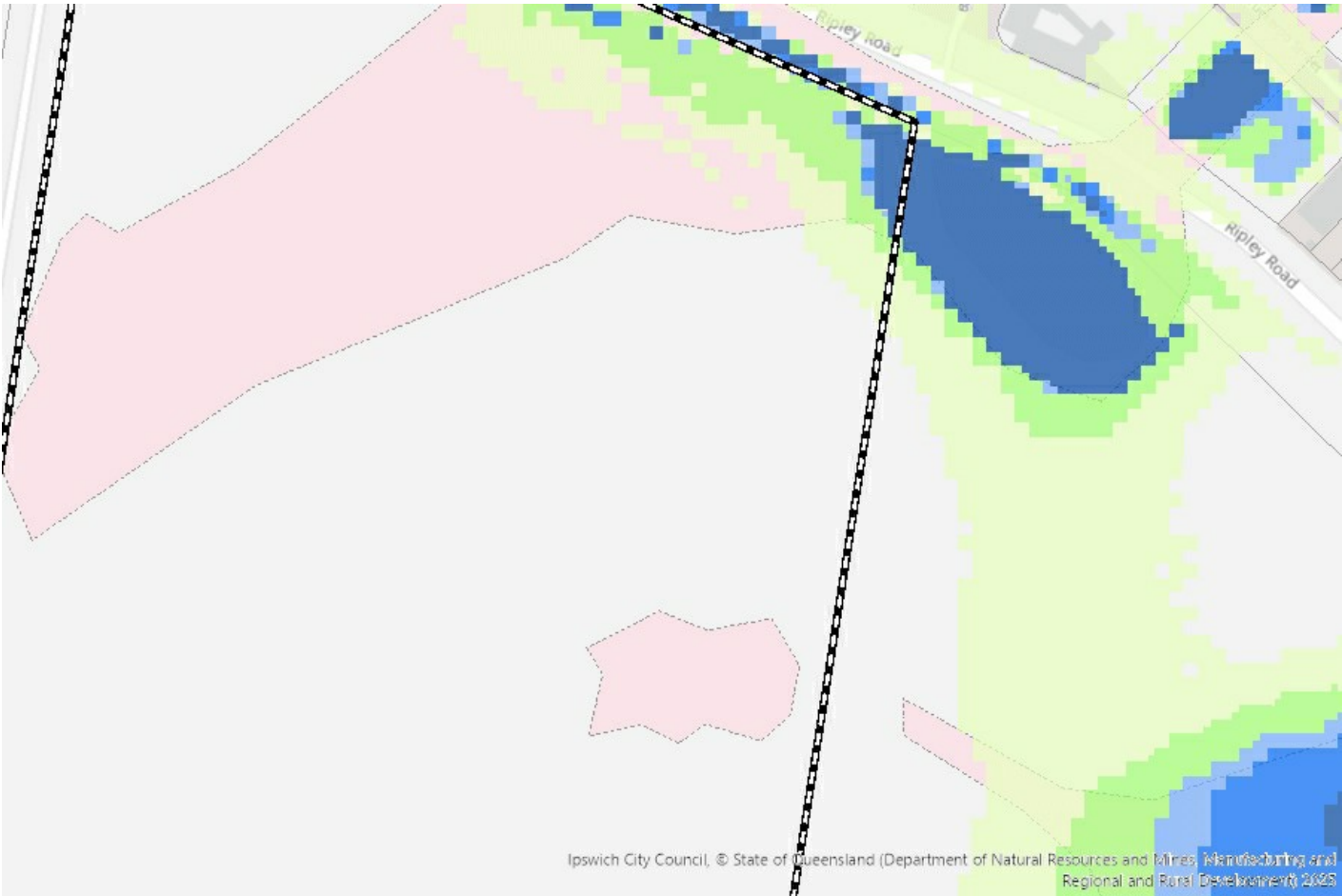
Appendix A

ICC Property Lot Report



Property Details

Address	54 WENSLEY ROAD RIPLEY QLD 4306
Plan Area	180,240 m ²
Lot / Plan	191SL18



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Zones and Precincts

Zone - Note: Refer to Ripley Valley Urban Development Area Development Scheme

Local Area Framework - 18; Ripley Valley



Overlays, OV1 Biodiversity

OV1 MSES QLD Waterways for Waterway Barrier Works

OV1 MSES Regulated Vegetation Intersecting a Watercourse

Overlays, OV2 Waterway Corridors and Wetlands

OV2 Minor Waterway

OV2 Minor Waterway Buffer



Overlays, OV7A Operational Airspace Height Restriction Zone and Obstruction Clearance Surface

OV7A RAAF Height Restriction Zone 90m

OV7A RAAF Obstruction Clearance Surface - Obstruction Clearance Surface - Outer Horizontal Surface RL 176.5



Overlays, OV7B Wildlife Attraction and Lighting Issues

OV7B RAAF Wildlife Hazard Buffer Zone - Wildlife Hazard Buffer Zone 13km

OV7B RAAF Wildlife Hazard Buffer Zone - Wildlife Hazard Buffer Zone 8km



Overlays, OV7D Explosive Storage Public Safety Restricted Areas Purga Rifle Range

OV7D RAAF BRA AOI 90m AHD



Overlays, OV10 Bushfire Prone Areas

OV10 Bushfire Prone Areas - High Potential Bushfire Intensity

OV10 Bushfire Prone Areas - Medium Potential Bushfire Intensity

OV10 Bushfire Prone Areas - Potential Impact Buffer



Overlays, OV11 Difficult Topography and Landslide

OV11 Slope 15% to 25%



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Overlays,OV12 Flood Risk and Overland Flow

OV12 Overland Flow Path

OV12 Flood Risk Category Very Low Risk

OV12 Flood Risk Category Low Risk

OV12 Flood Risk Category Medium Risk

OV12 Flood Risk Category High Risk

OV12 Flood Risk Category Extreme Risk



Overlays,OV13 Regional Infrastructure

OV13 Future Railway Corridor



Overlays,OV15 Water Resource Catchments

OV15 Minor Waterway

OV15 Minor Waterway Buffer



Local Government Infrastructure Plan (LGIP)

LGIP AICR Charge Area References

LGIP Districts

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Further information on these layers can be found in the FACTSHEETS on shapeyouripswich.com.au/new-ipswich-planning-scheme

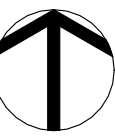
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Appendix B

Proposed Plans



Amendments		
Issue	Description	Date
A	FINAL CMP ISSUE	02/04/2026
B	ISSUE FOR PLANNING APPROVAL	07/04/2026
C	REVISED ISSUE FOR PLANNING APPROVAL	15/05/2026



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Consultant Details

Consultant
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Consultant Details

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Consultant Details

Client
PC BUNDLE - RIPLEY VALLEY
Client Details

GROUP GSA

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architecture interior design urban design landscape
nom architect Lisa-Maree Carrigan 5696

Project Title
RIPLEY VALLEY SHS

Drawing Title

90% CMP OVERALL

Scale 1 : 1200

Drawing Created (date) AUGUST 2025

Drawing Created (by) GM

Plotted and checked by GM

Verified LM

Approved LM

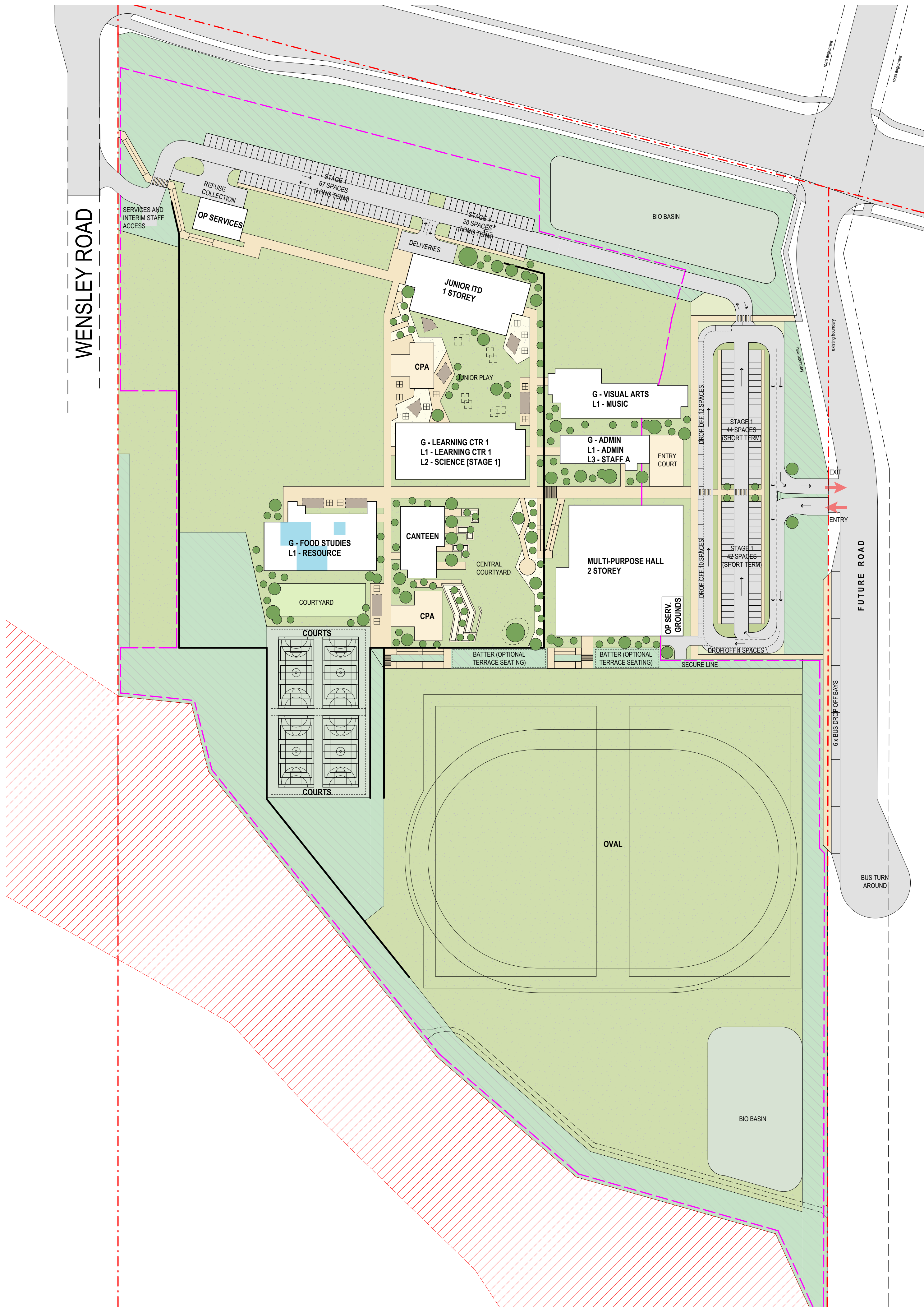
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Amendments		
Issue	Description	Date
A	FINAL CMP ISSUE	02/04/2026
B	ISSUE FOR PLANNING APPROVAL	07/04/2026
C	REVISED ISSUE FOR PLANNING APPROVAL	15/05/2026



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Project Title

RIPLEY VALLEY SHS

Drawing Title

90% CMP STAGE 1

Scale 1 : 1000

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Drawing Created (by) GM

Plotted and checked by GM

Verified LM

Approved LM

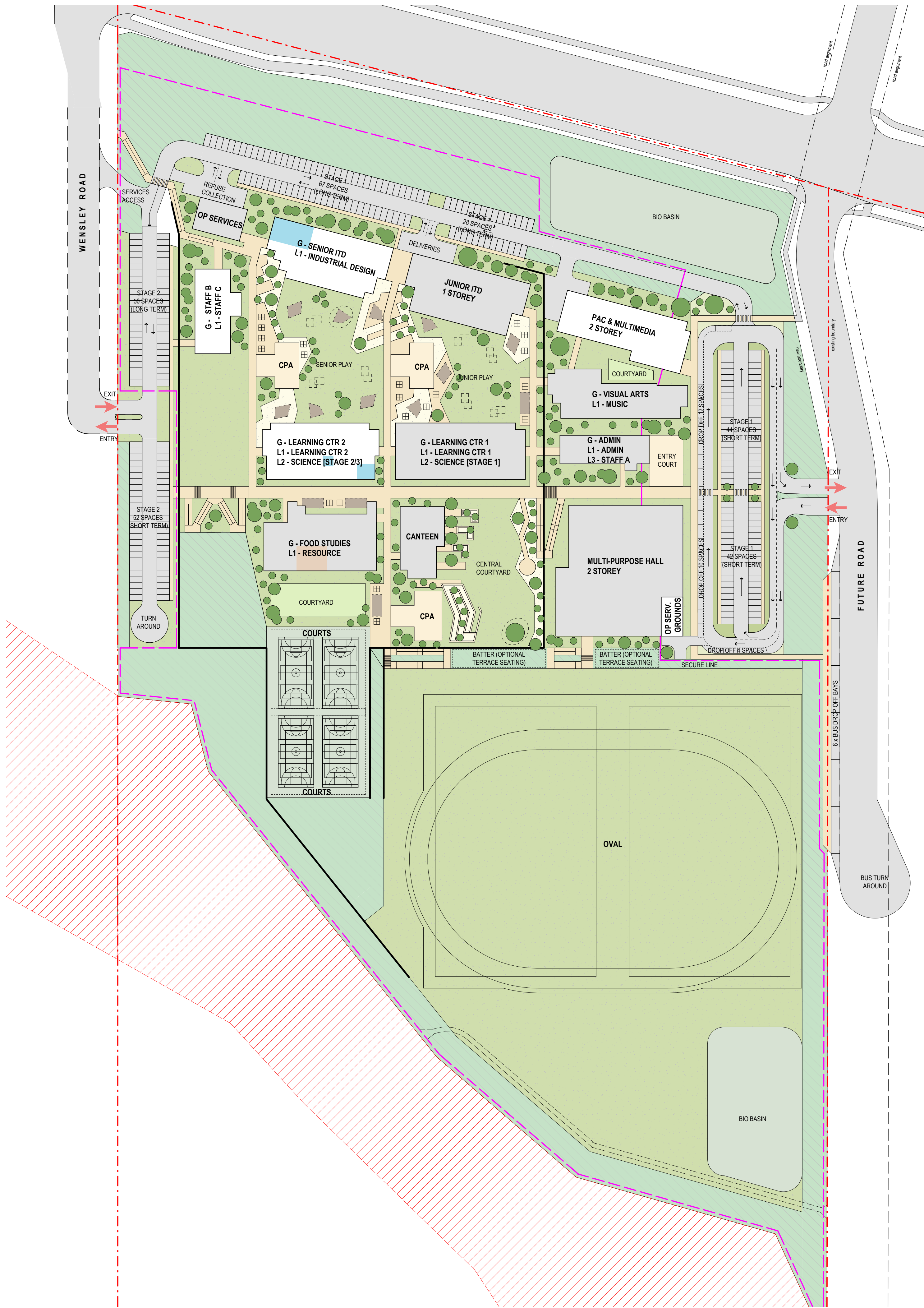
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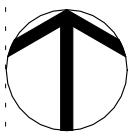
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Amendments		
Issue	Description	Date
A	FINAL CMP ISSUE	02/04/2026
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C	REVISED ISSUE FOR PLANNING APPROVAL	15/05/2026



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Project Title

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Drawing Title

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Scale 1 : 1000

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Drawing Created (by) GM

Plotted and checked by GM

Verified LM

Approved LM

Project No Drawing No Issue

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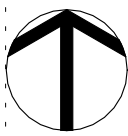
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B	ISSUE FOR PLANNING APPROVAL	07/04/2026
C	REVISED ISSUE FOR PLANNING APPROVAL	15/05/2026



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Project Title

RIPLEY VALLEY SHS

Drawing Title

90% CMP STAGE 3

Scale 1 : 1000

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Verified LM

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Project No Drawing No Issue

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Appendix C

Pre and Post-Development Scenario Peak Flood Mapping

Figure C1
39% AEP Pre-Development
Peak Water Depth

Peak Depth (m)

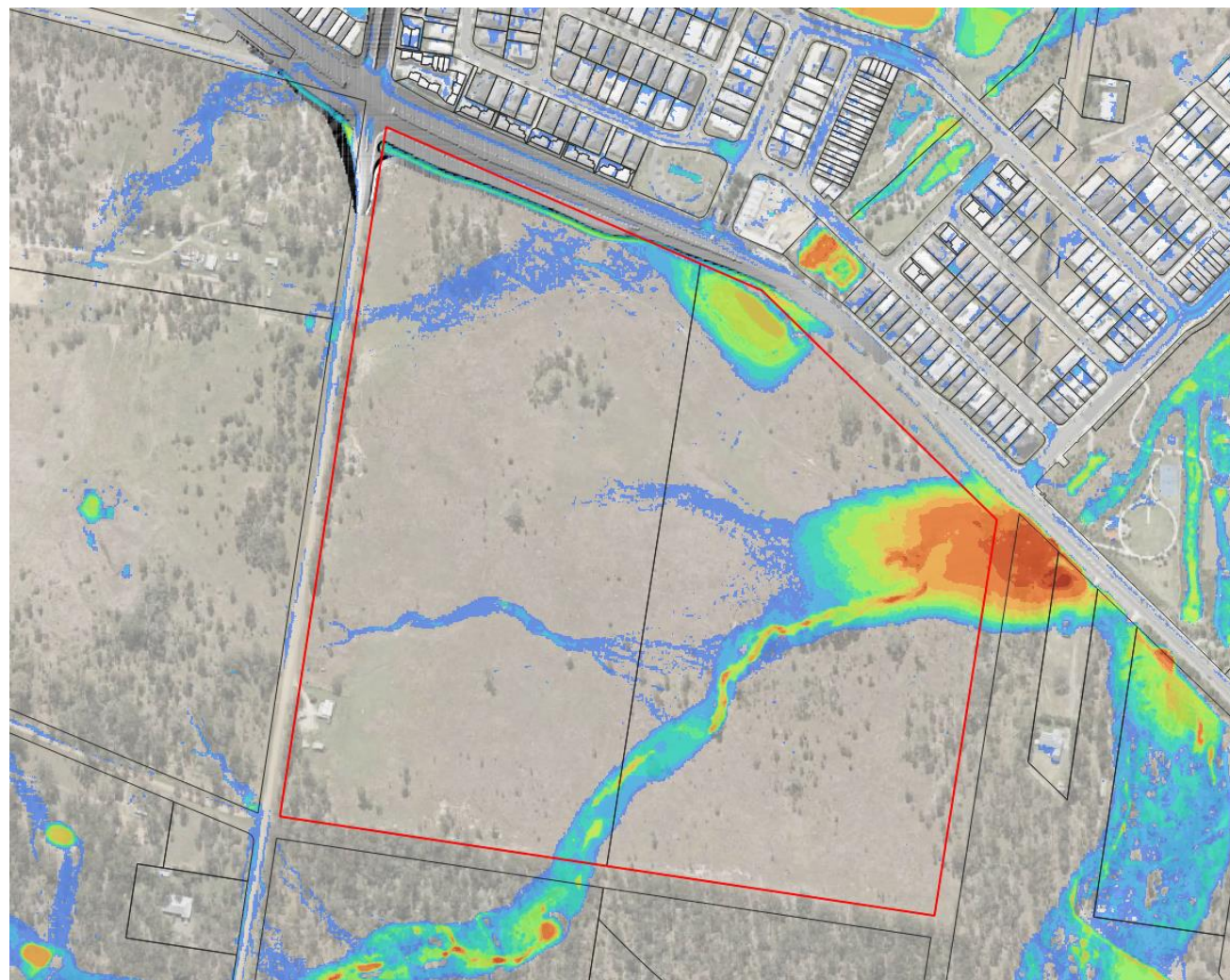
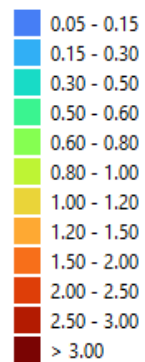


Figure C2
39% AEP Pre-Development
Peak Water Velocity

Peak Velocity (m/s)

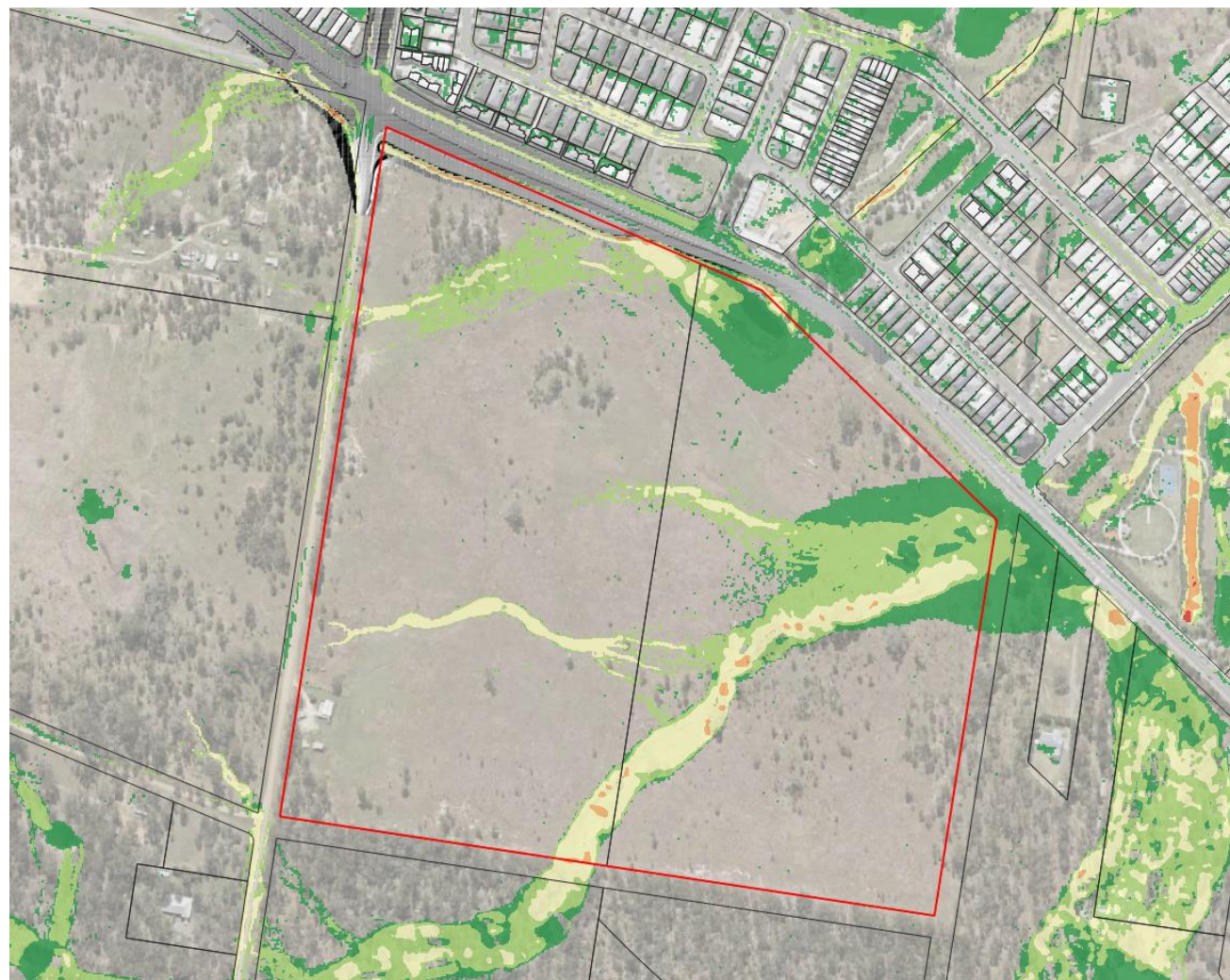
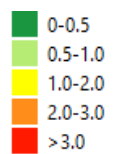


Figure C3
39% AEP Pre-Development
Peak Water Hazard Classification

Peak Hazard Classification
H# (AEMI Categorisation)

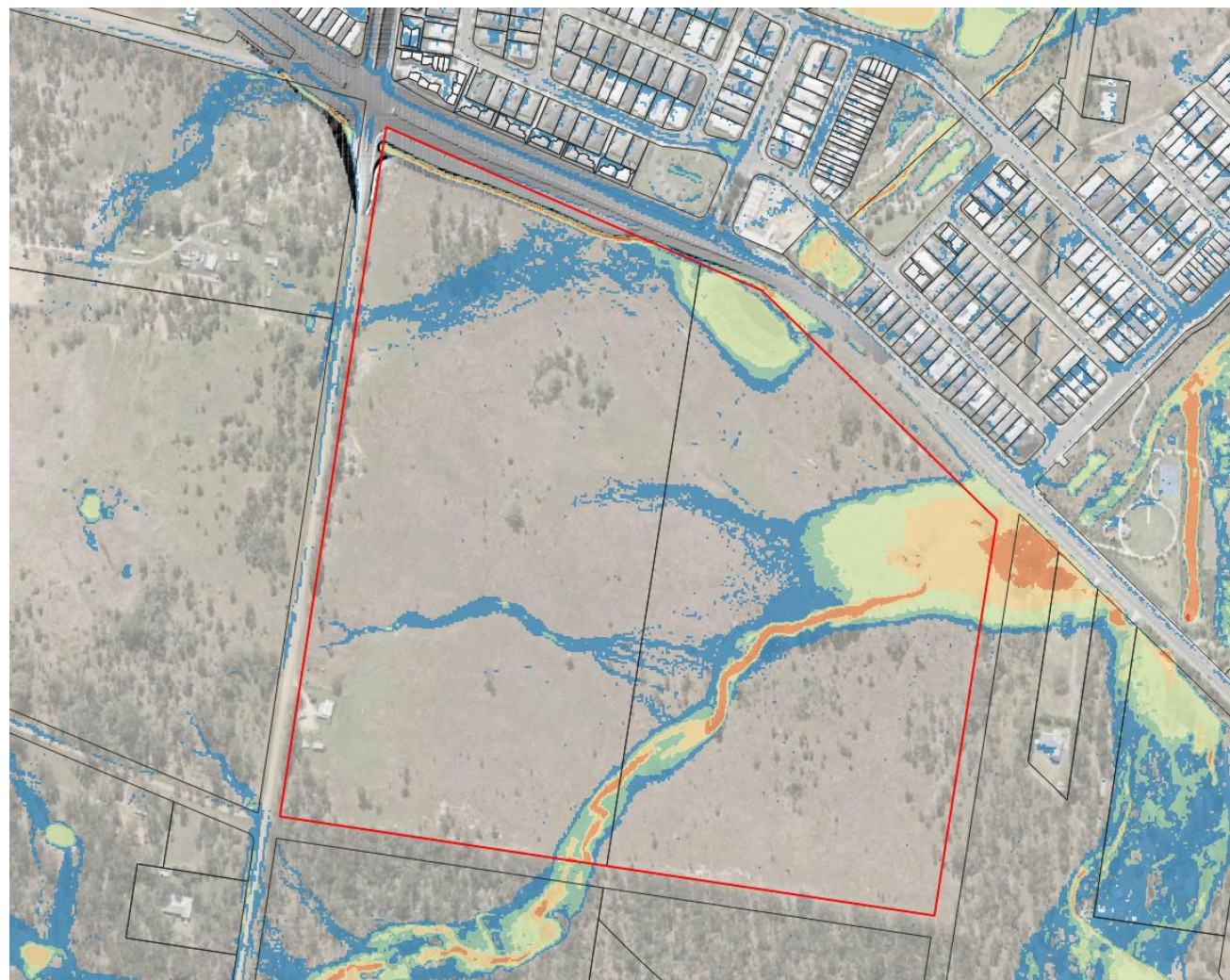
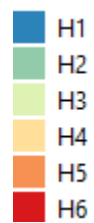


Figure C4
39% AEP Post-Development
Peak Water Depth

Peak Depth (m)

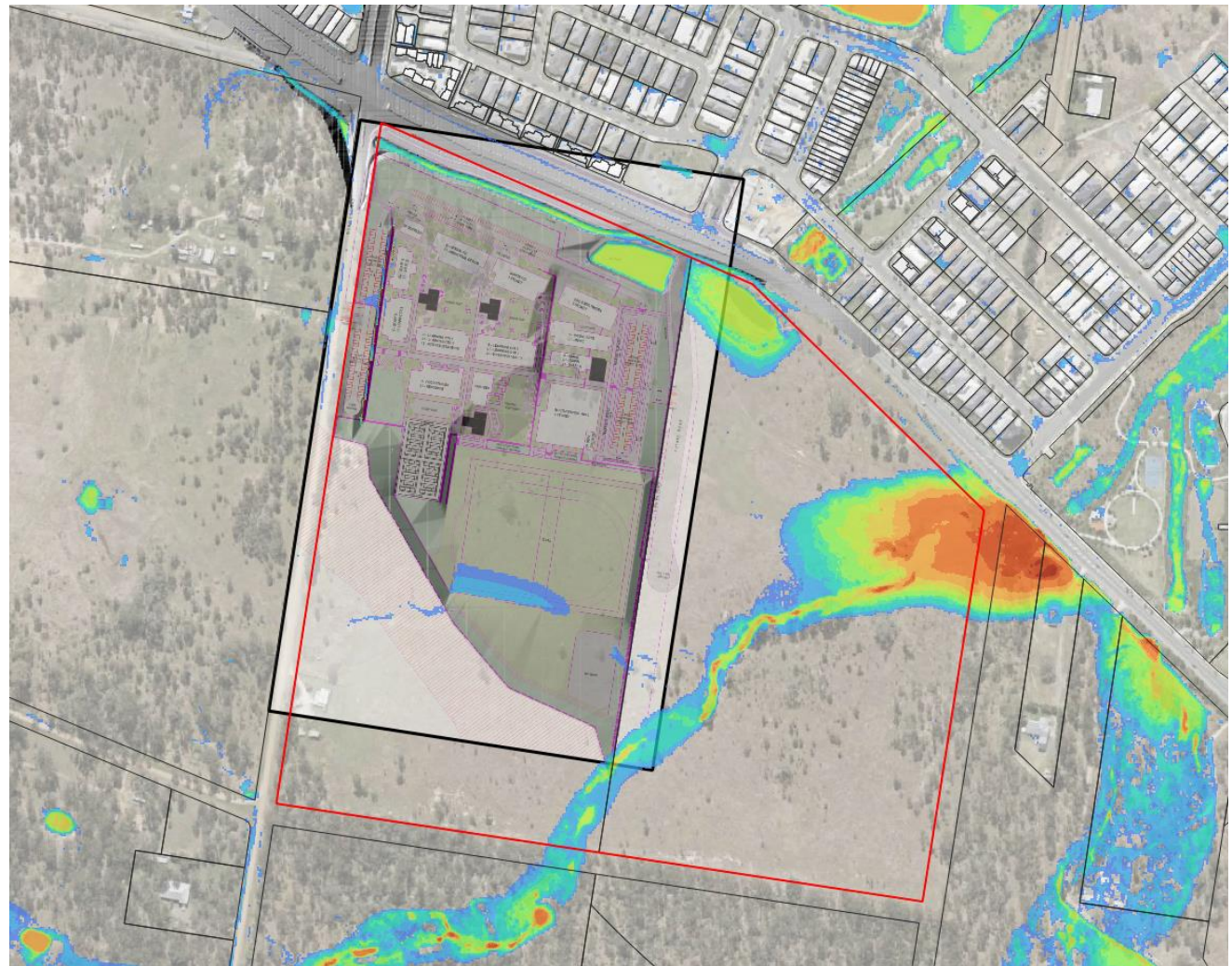
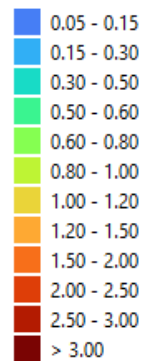


Figure C5
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Peak Water Velocity

Peak Velocity (m/s)

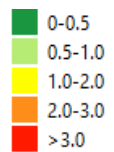


Figure C6
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Peak Water Hazard Classification

Peak Hazard Classification
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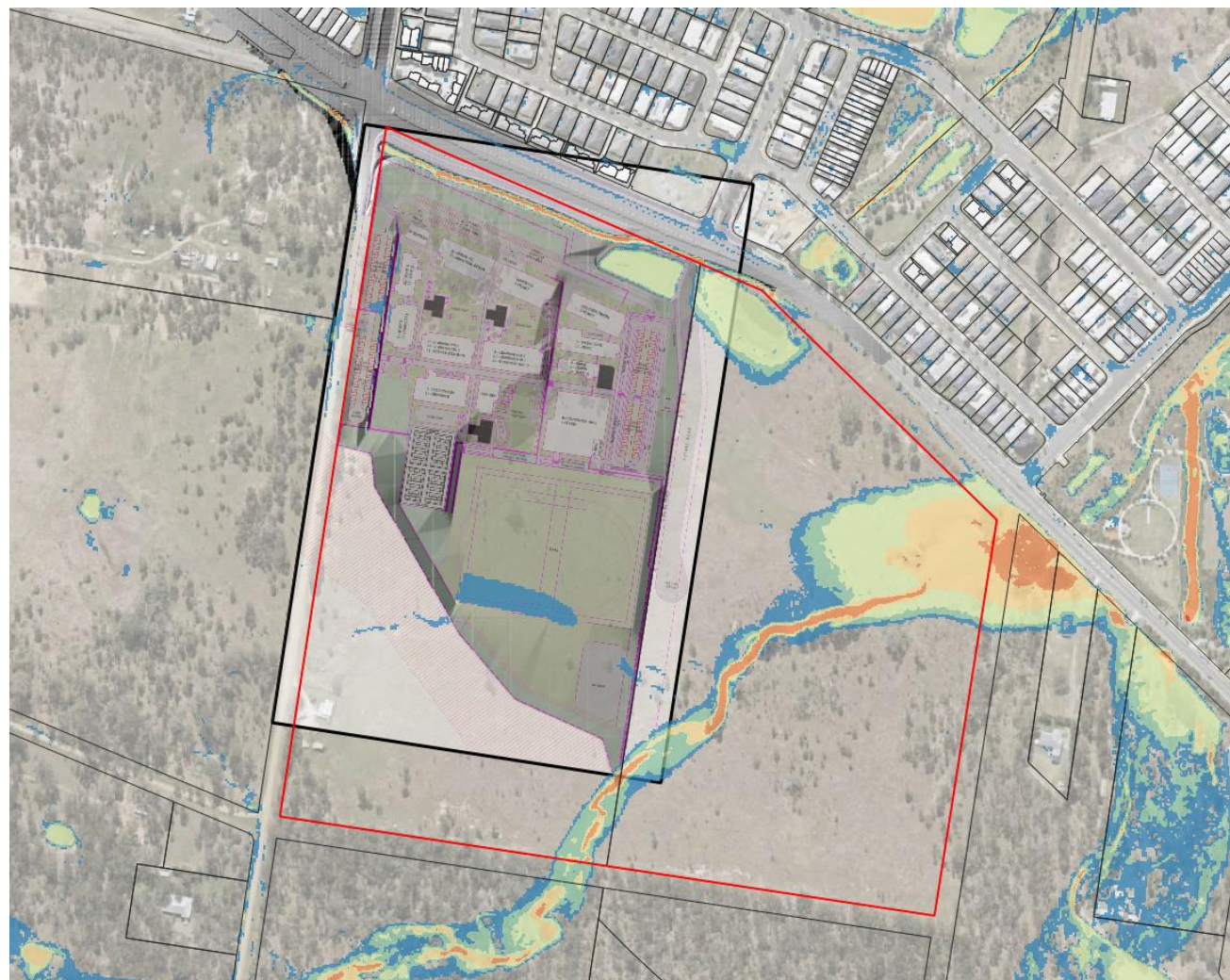
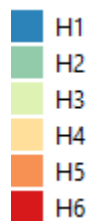


Figure C7
10% AEP Pre-Development
Peak Water Depth

Peak Depth (m)

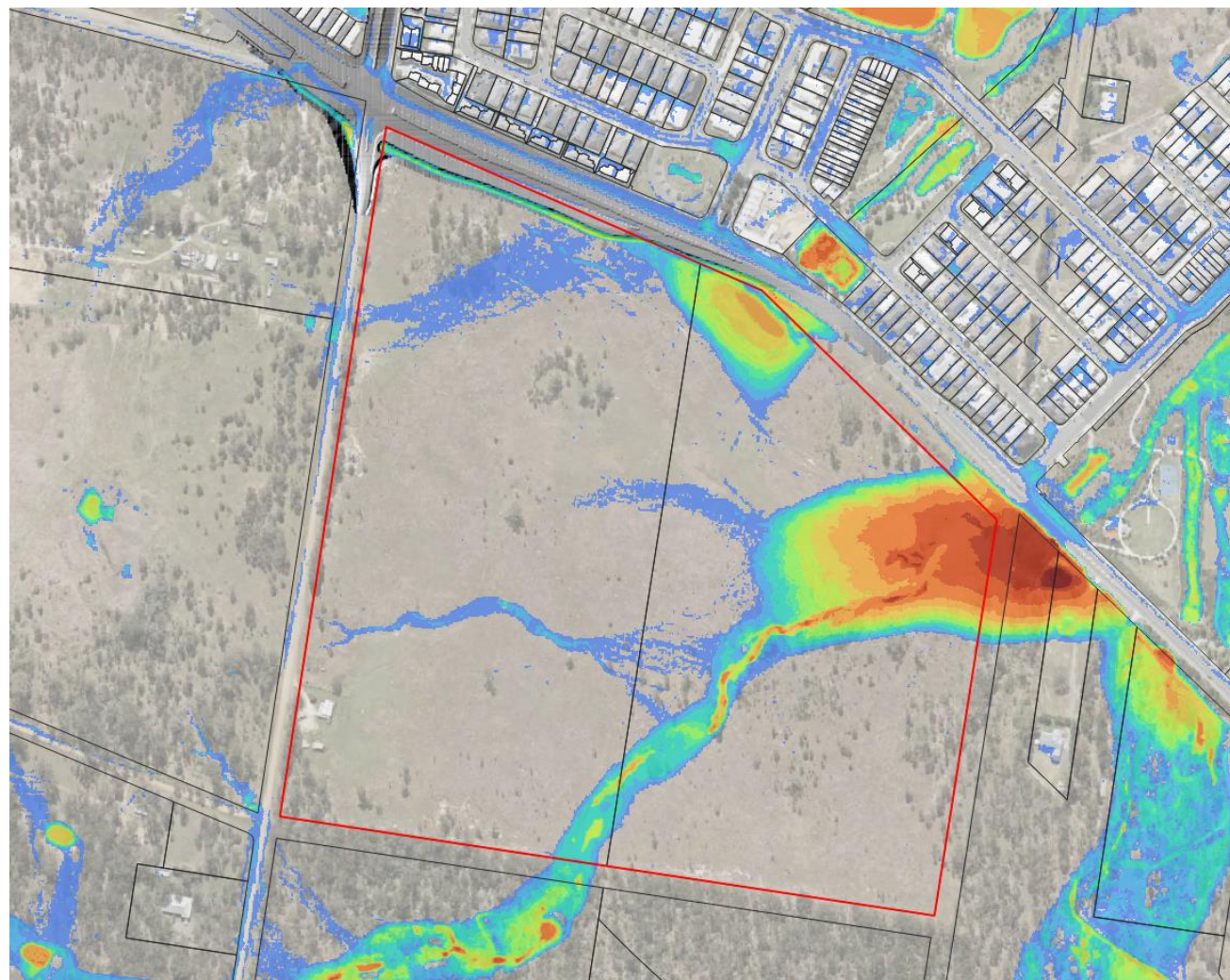
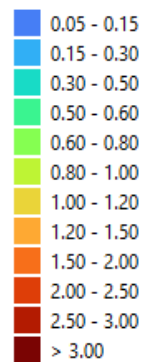


Figure C8
10% AEP Pre-Development
Peak Water Velocity

Peak Velocity (m/s)

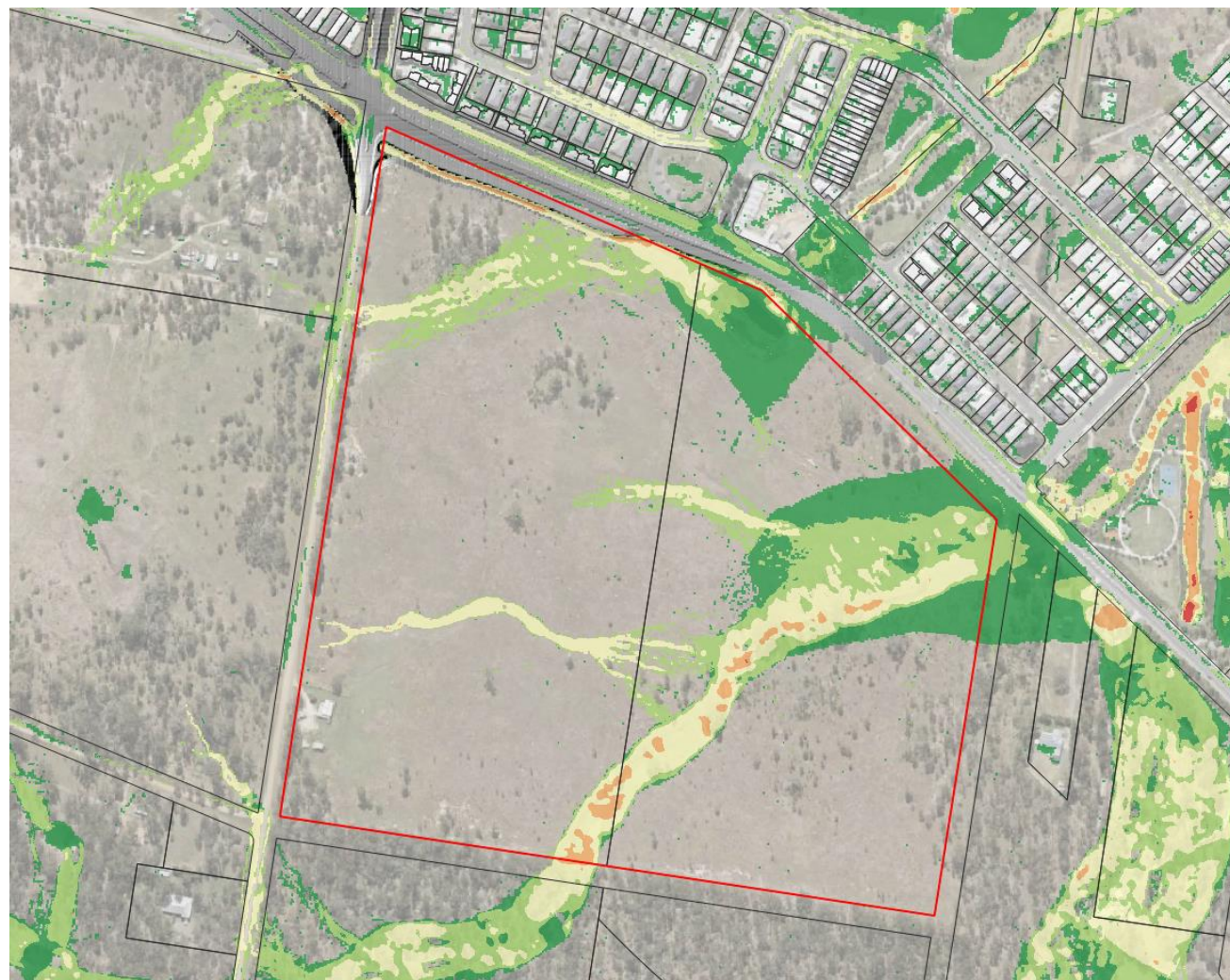
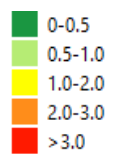


Figure C9
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Peak Water Hazard Classification

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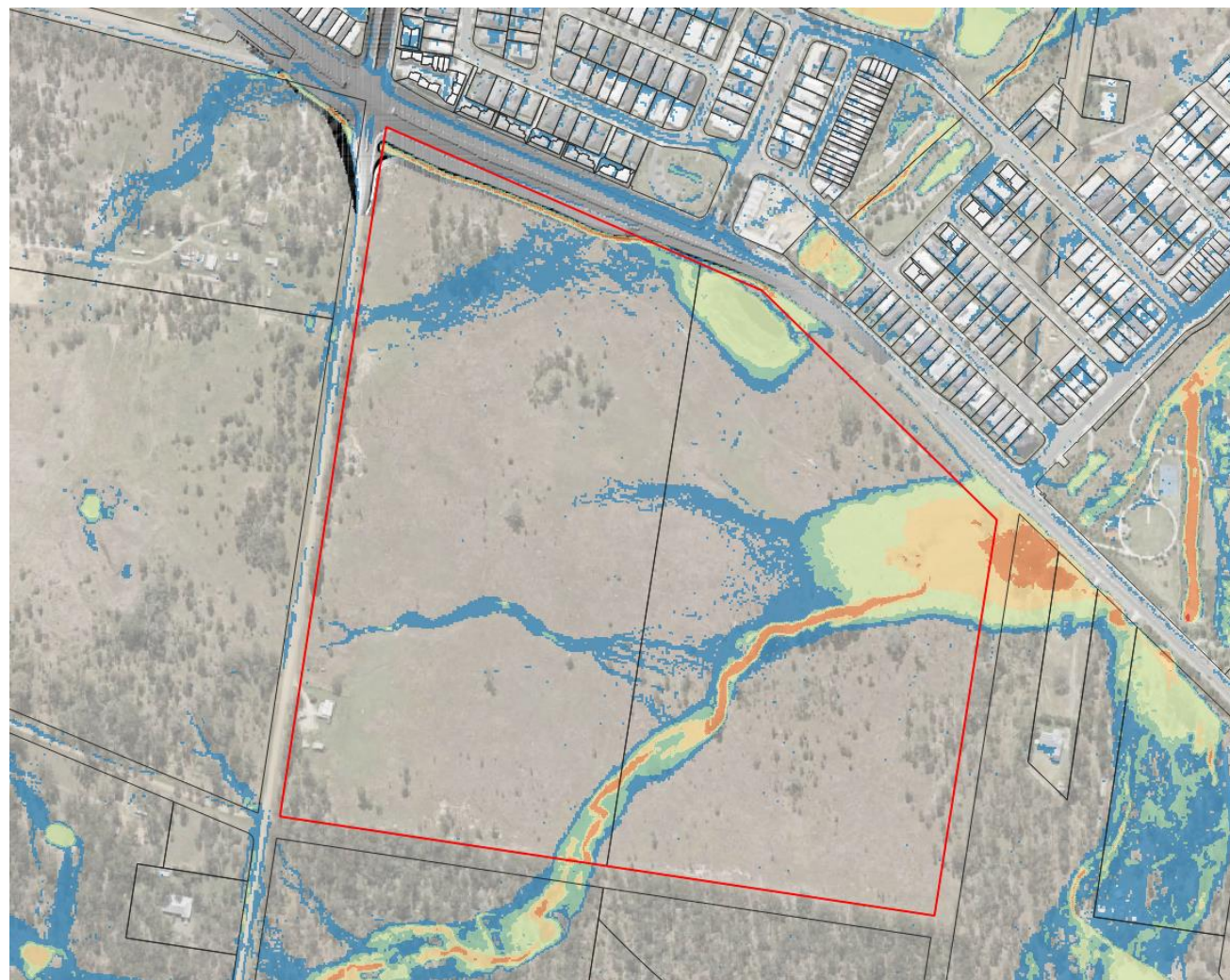
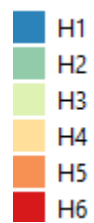


Figure C10
10% AEP Post-Development
Peak Water Depth

Peak Depth (m)

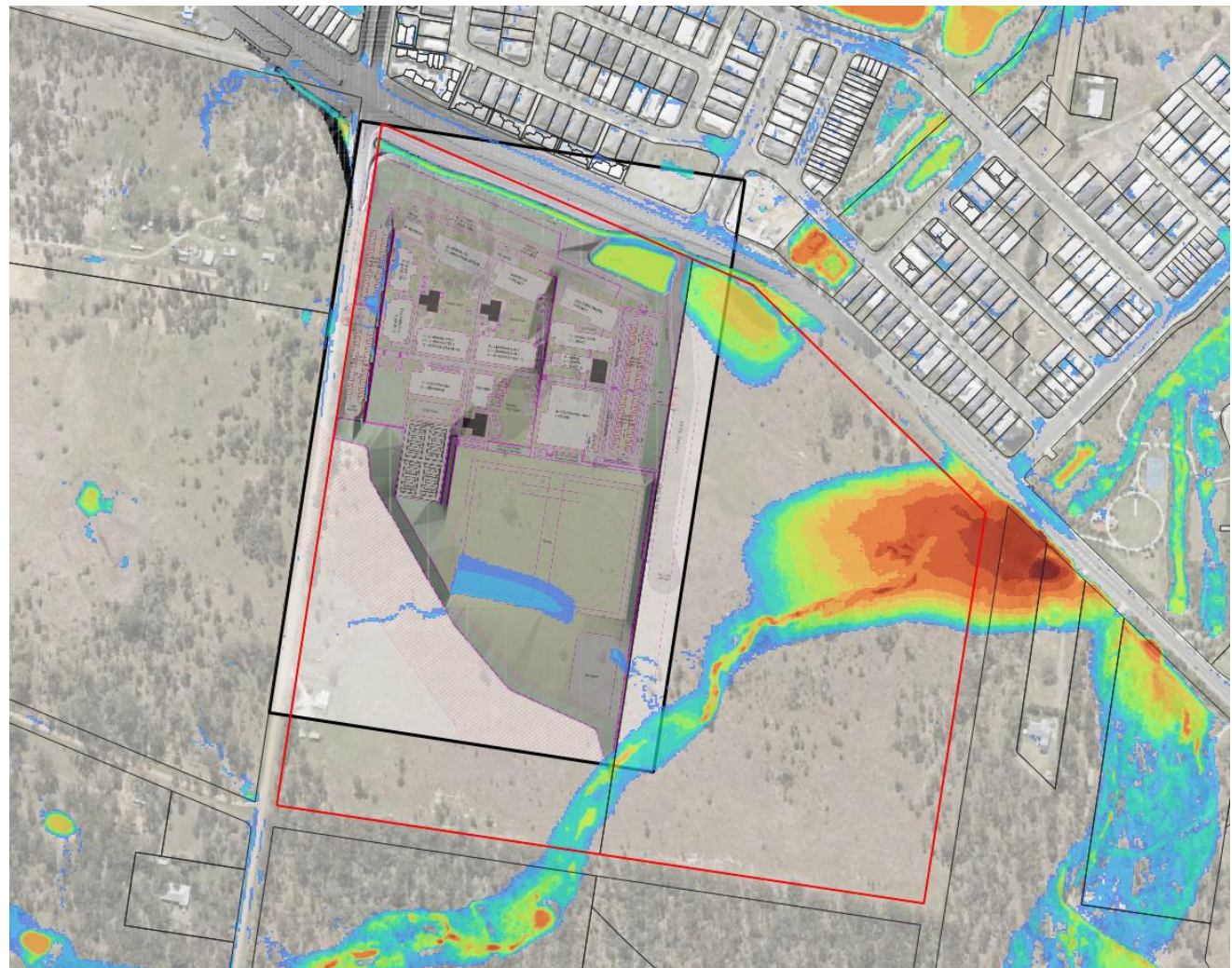
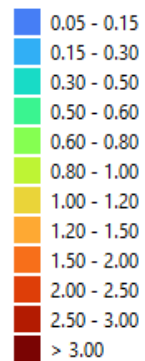


Figure C11
10% AEP Post-Development
Peak Water Velocity

Peak Velocity (m/s)

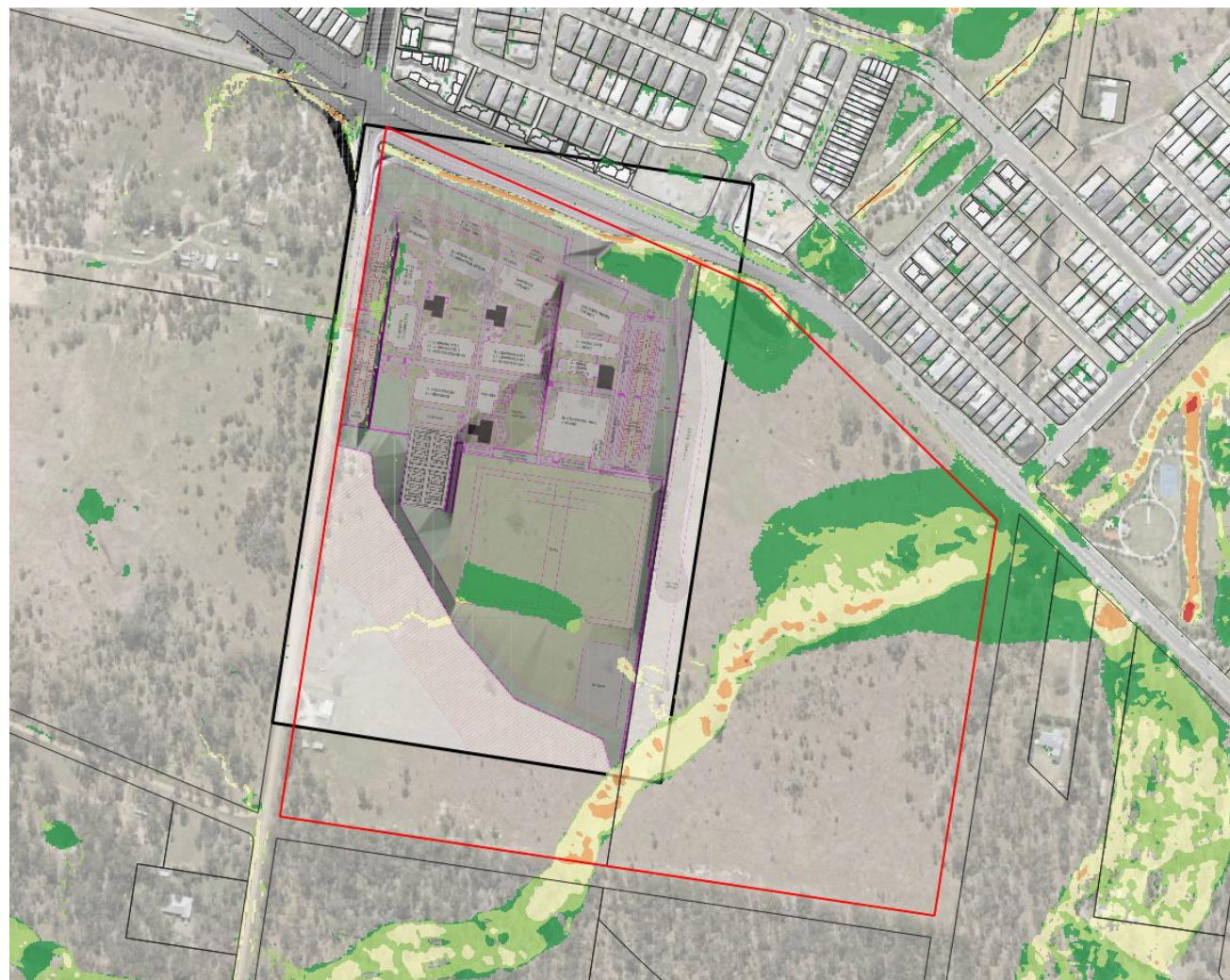
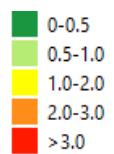


Figure C12
10% AEP Post-Development
Peak Water Hazard Classification

Peak Hazard Classification
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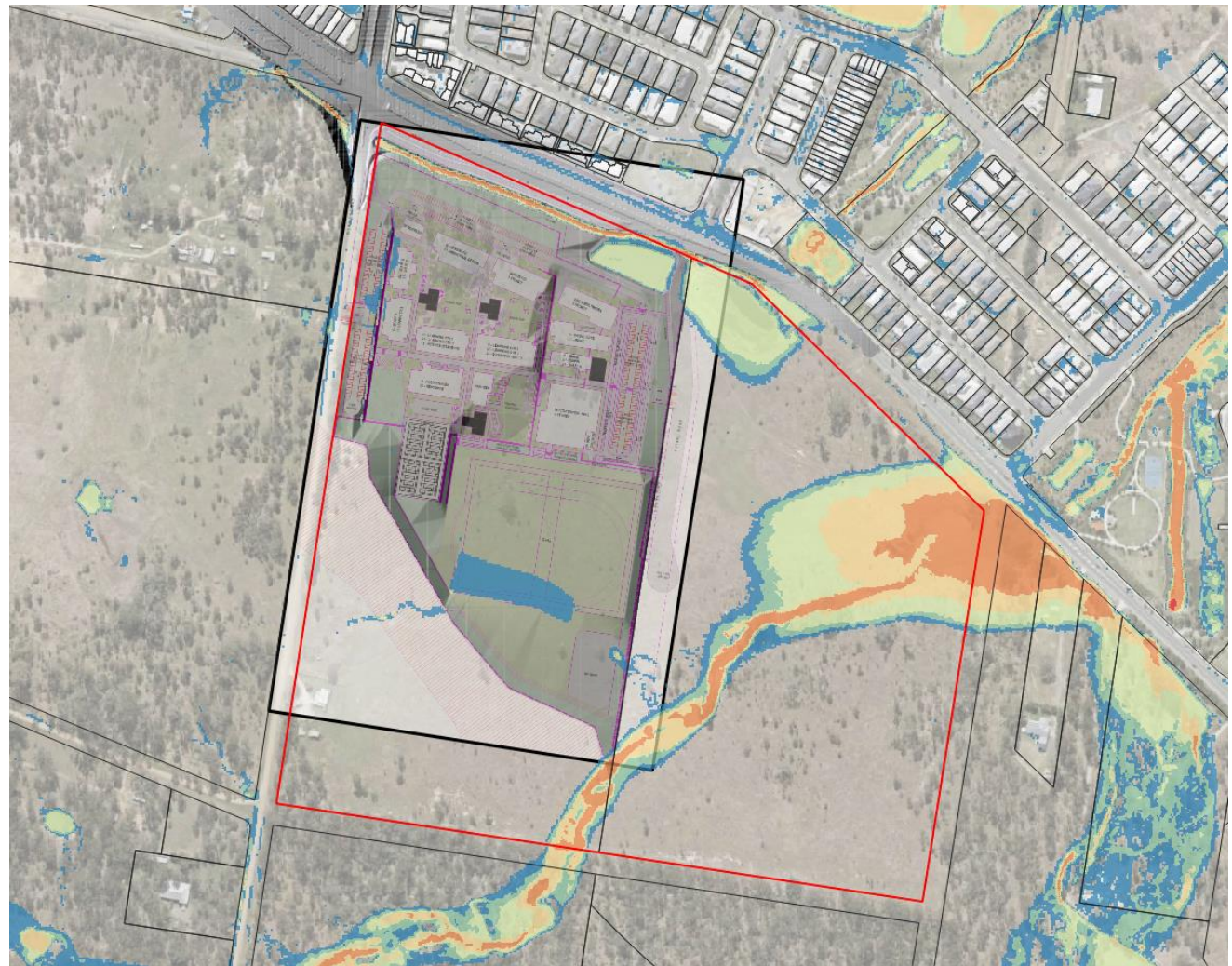
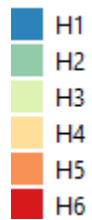


Figure C13
1% AEP Pre-Development
Peak Water Depth

Peak Depth (m)

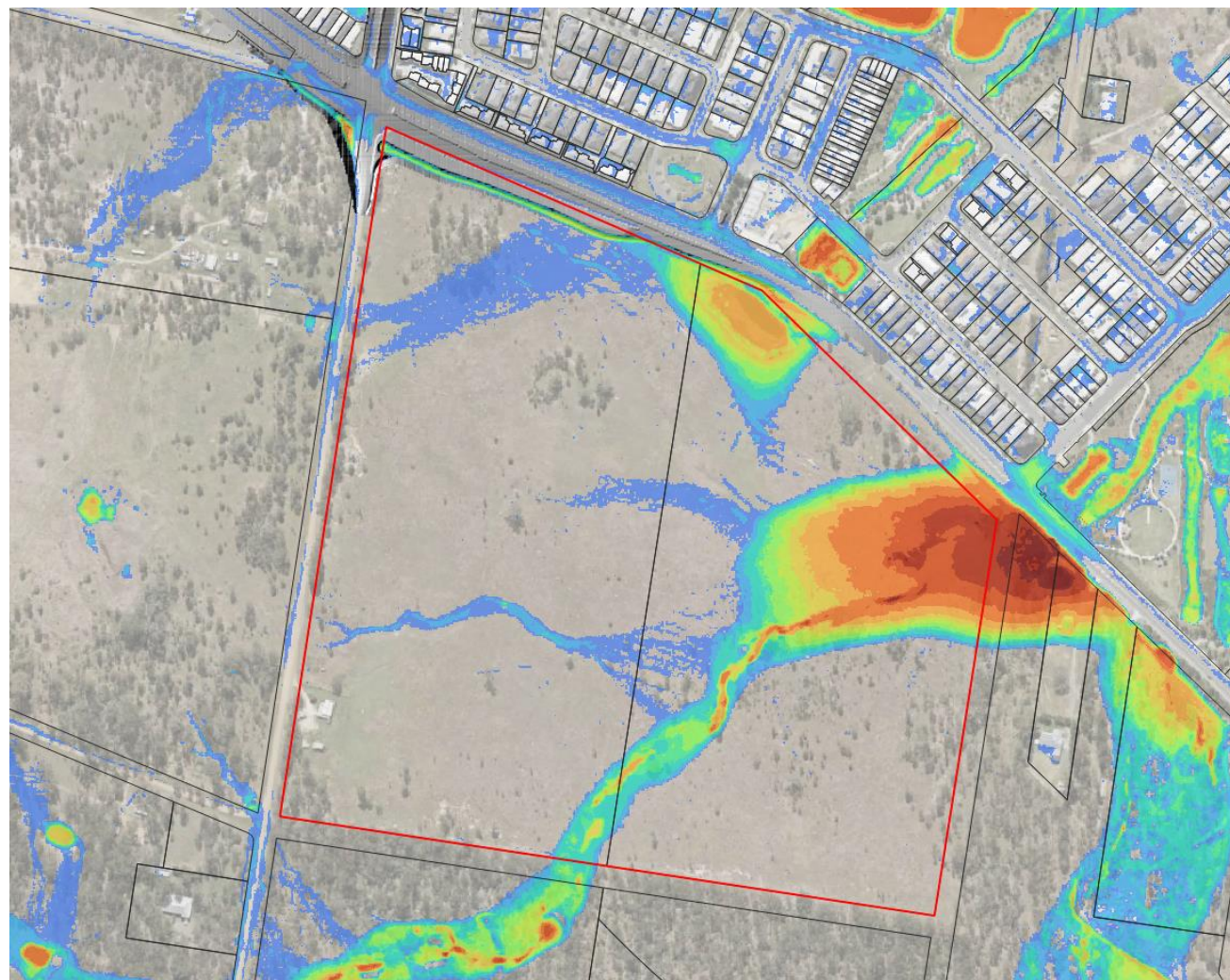
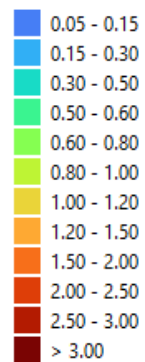


Figure C14
1% AEP Pre-Development
Peak Water Velocity

Peak Velocity (m/s)

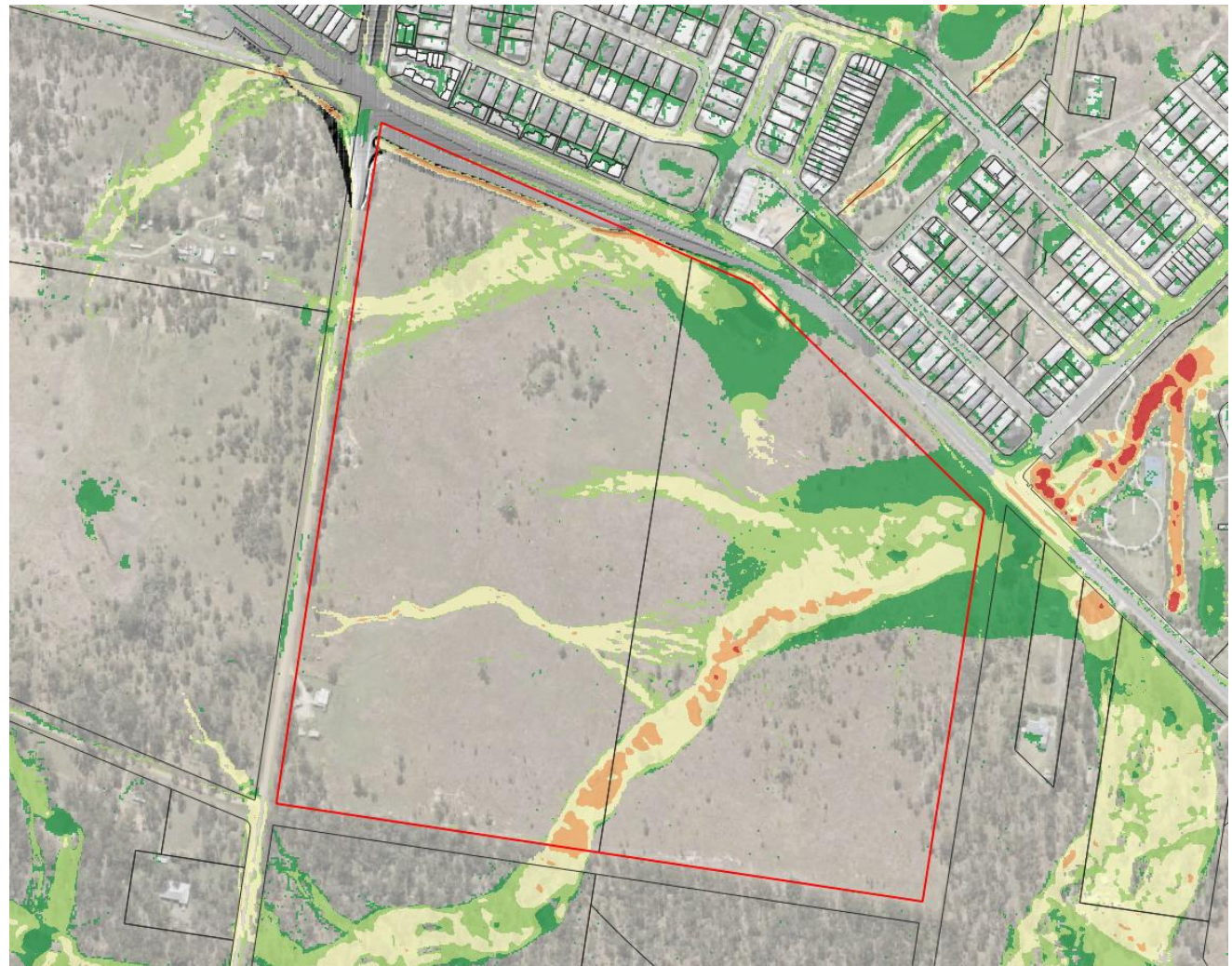
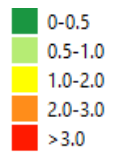


Figure C15
1% AEP Pre-Development
Peak Water Hazard Classification

Peak Hazard Classification
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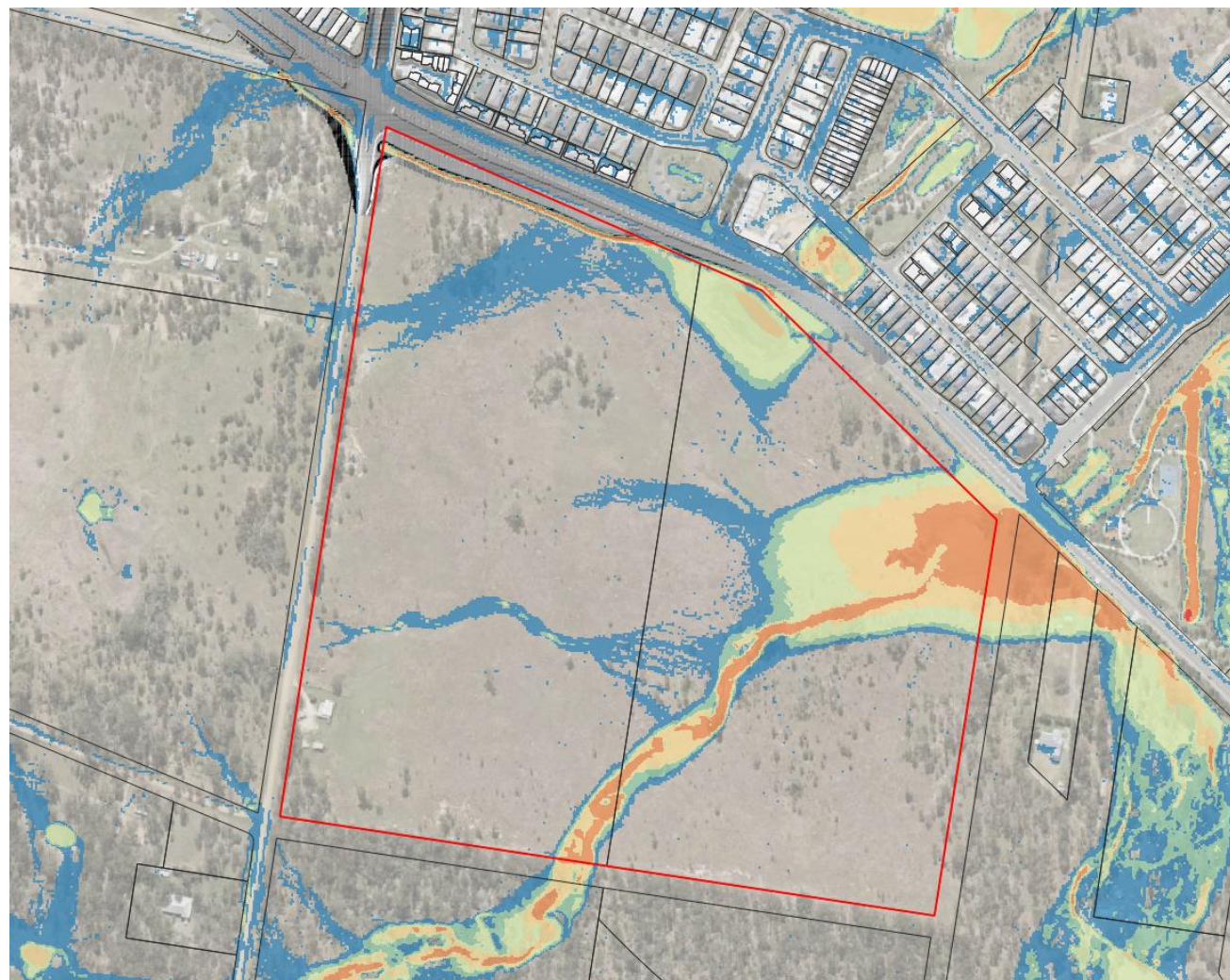
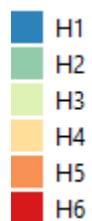


Figure C16
1% AEP Post-Development
Peak Water Depth

Peak Depth (m)

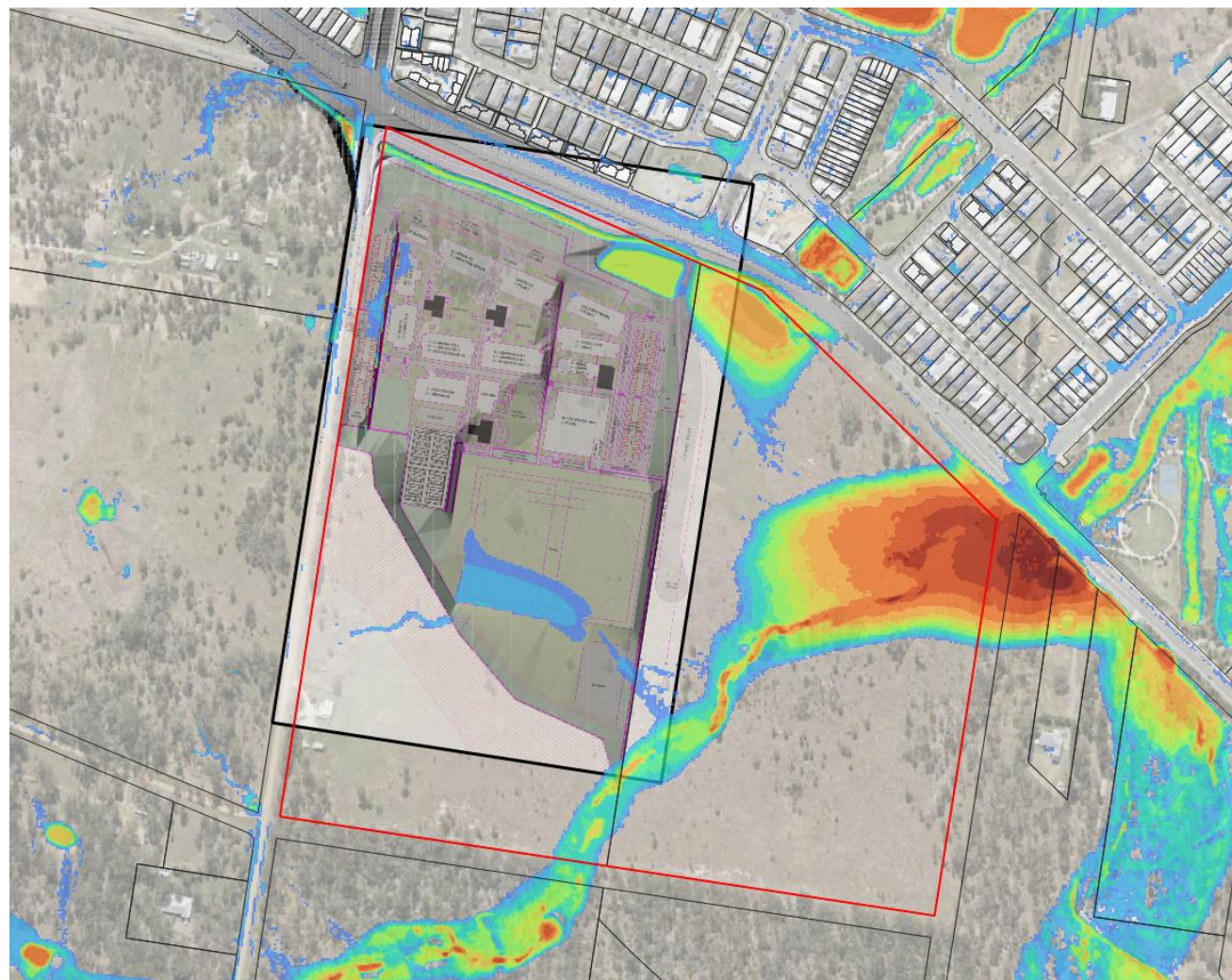
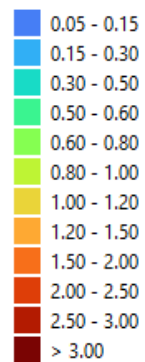


Figure C 17
1% AEP Post-Development
Peak Water Velocity

Peak Velocity (m/s)

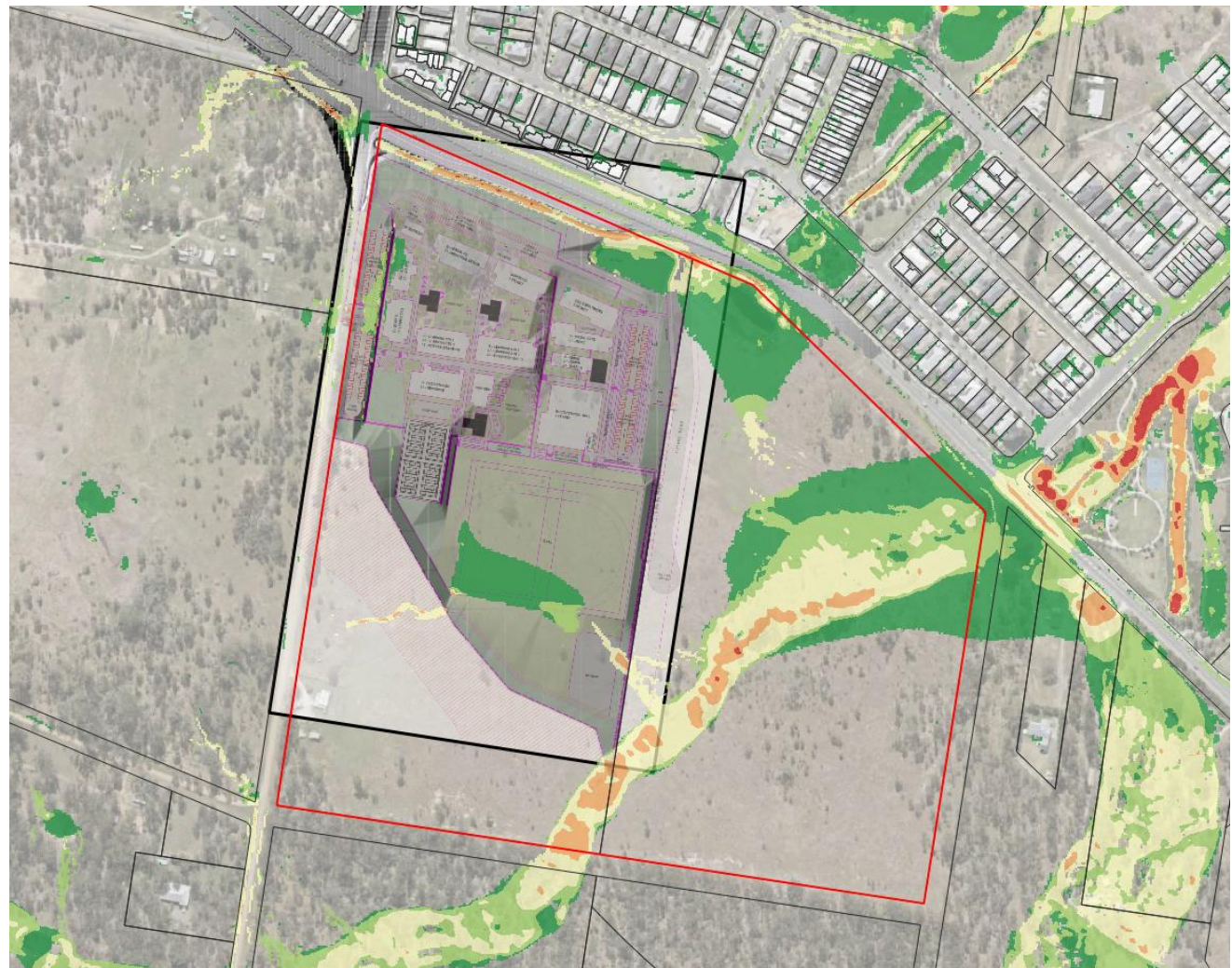
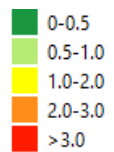


Figure C18
1% AEP Post-Development
Peak Water Hazard Classification

Peak Hazard Classification
H# (AEMI Categorisation)

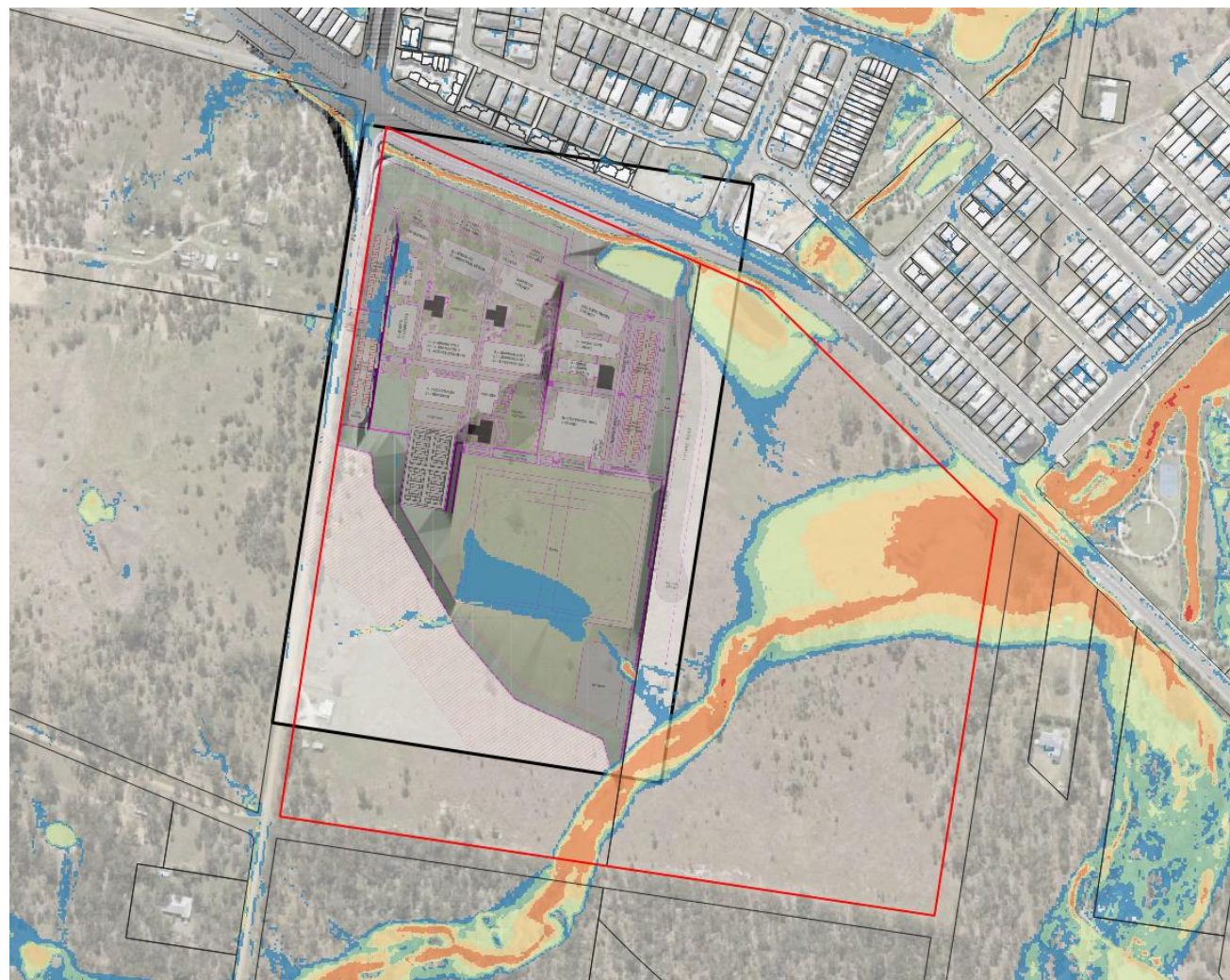
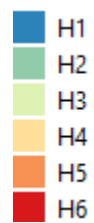


Figure C19
0.5% AEP Pre-Development
Peak Water Depth

Peak Depth (m)

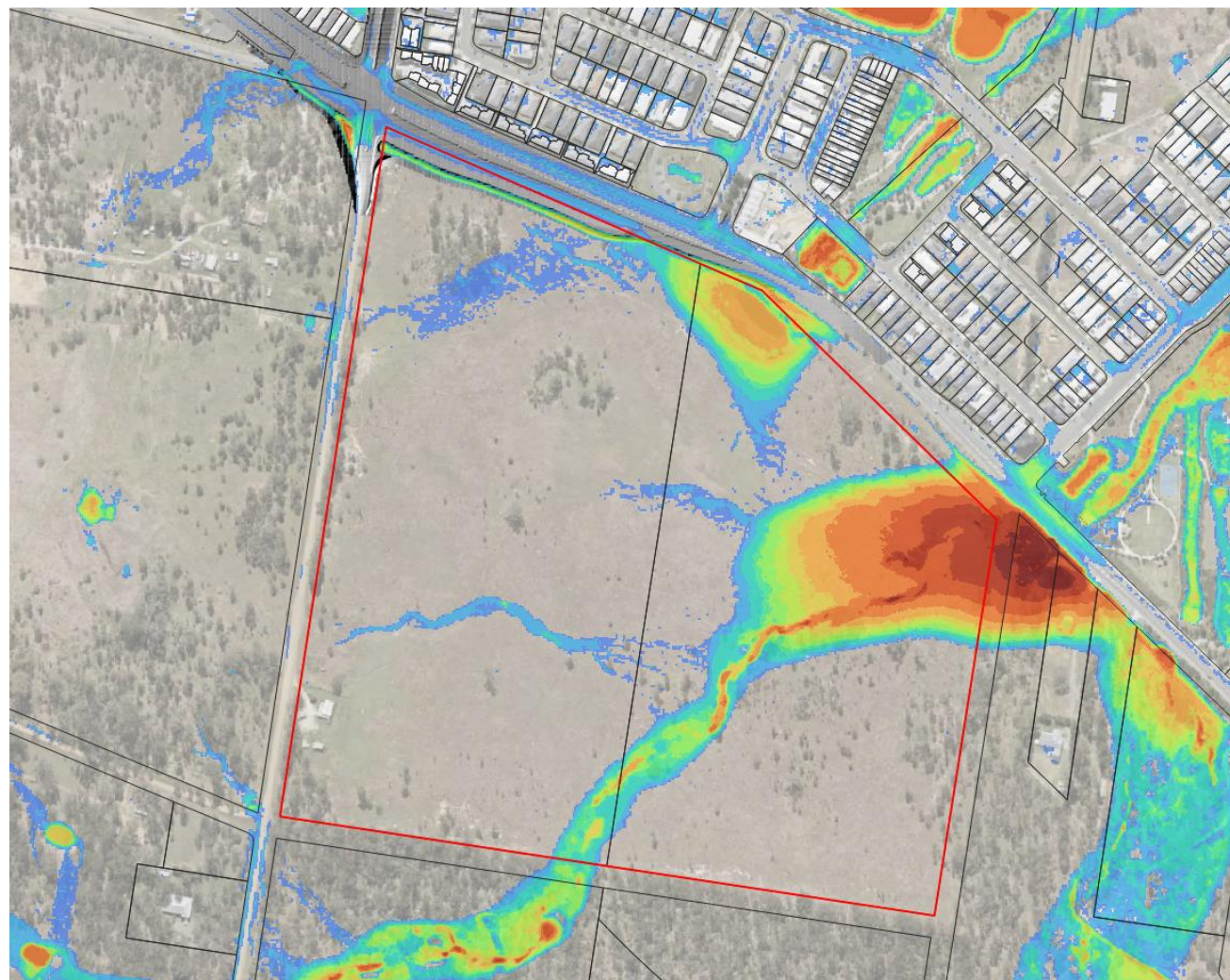
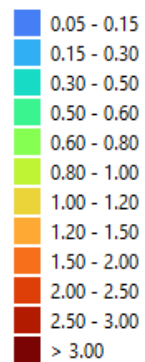


Figure C20
0.5% AEP Pre-Development
Peak Water Velocity

Peak Velocity (m/s)

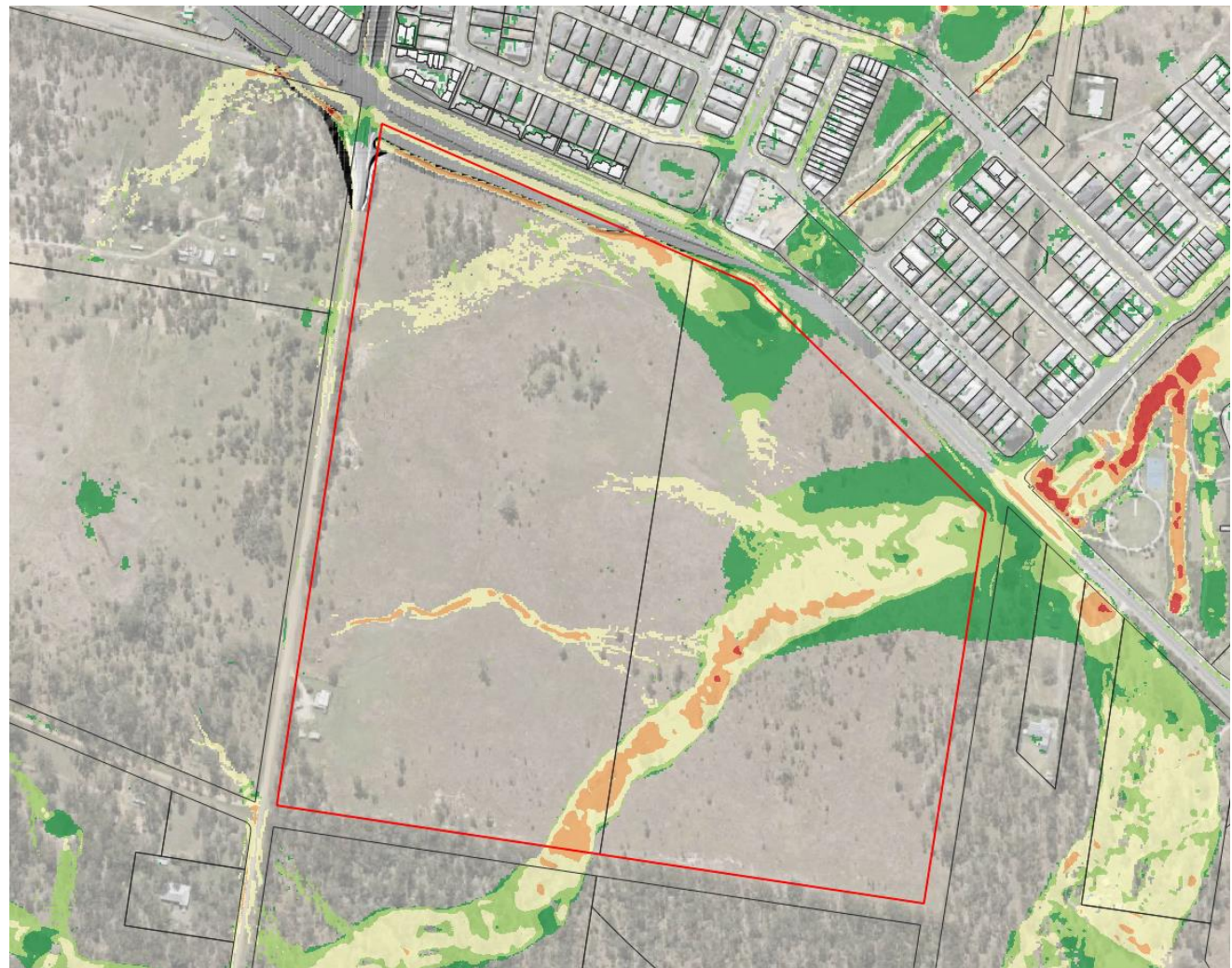
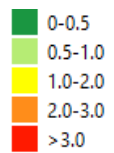


Figure C21
0.5% AEP Pre-Development
Peak Water Hazard Classification

Peak Hazard Classification
H# (AEMI Categorisation)

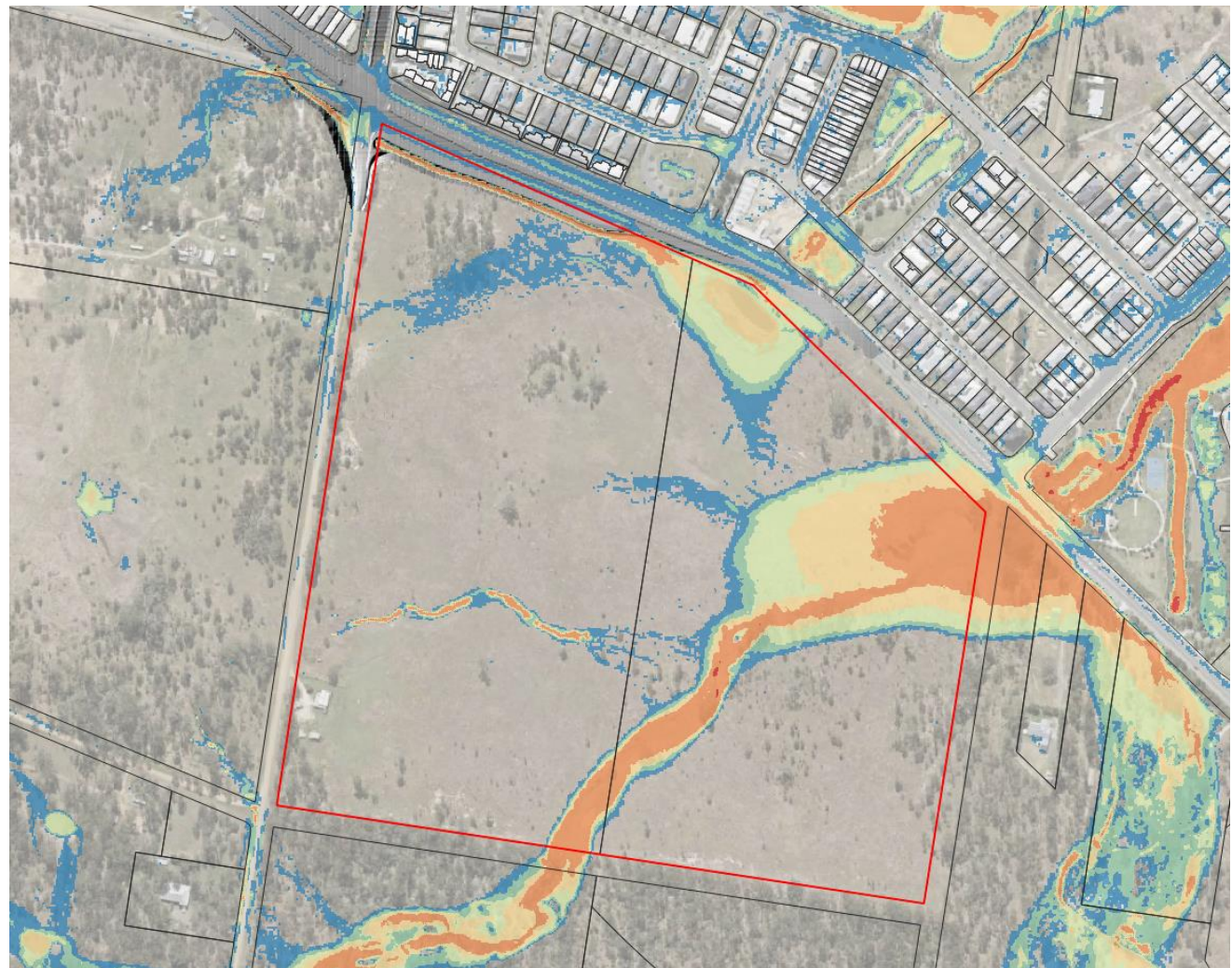
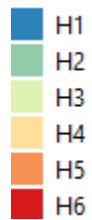


Figure C22
0.5% AEP Post-Development
Peak Water Depth

Peak Depth (m)

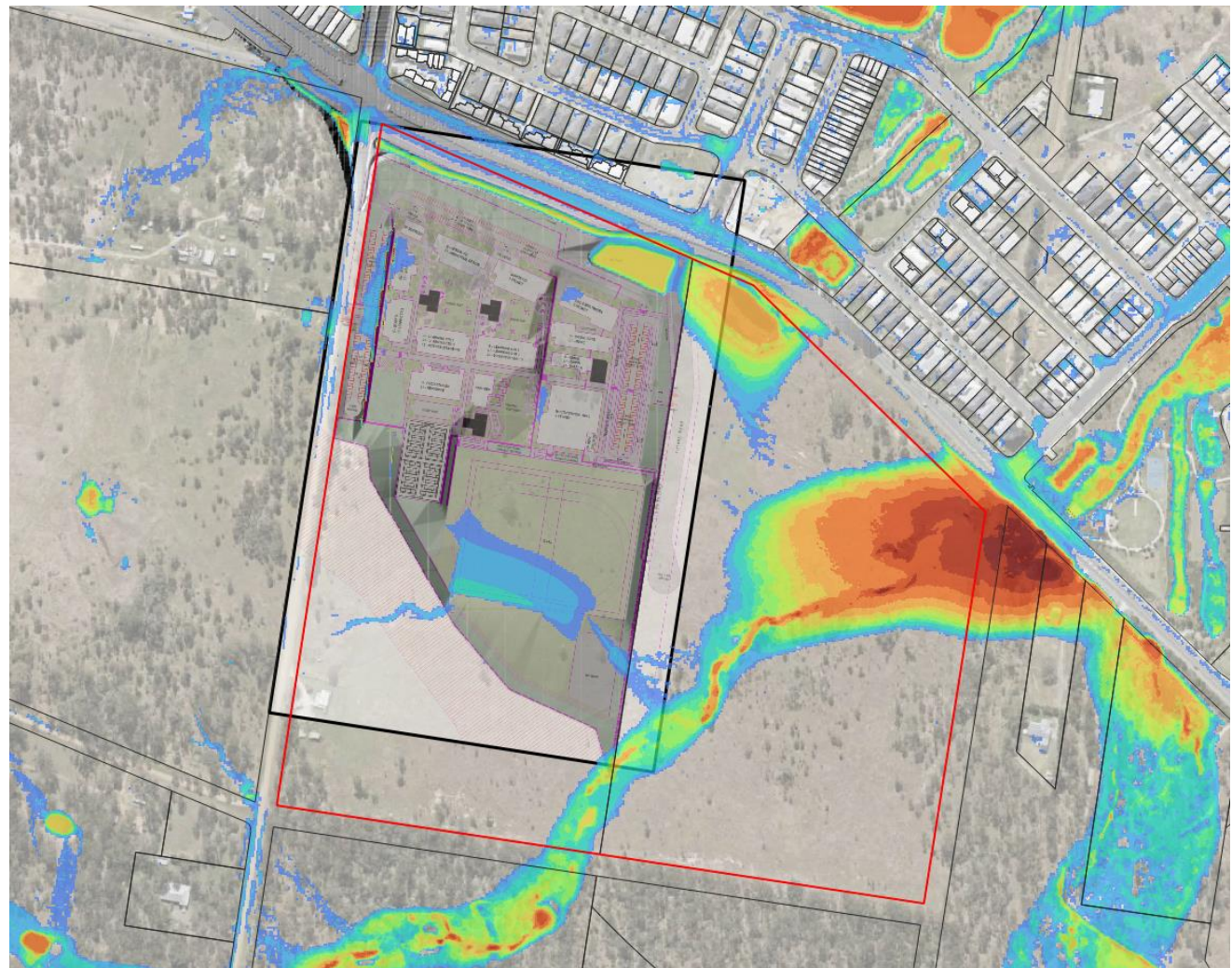
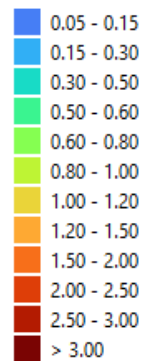


Figure C23
0.5% AEP Post-Development
Peak Water Velocity

Peak Velocity (m/s)

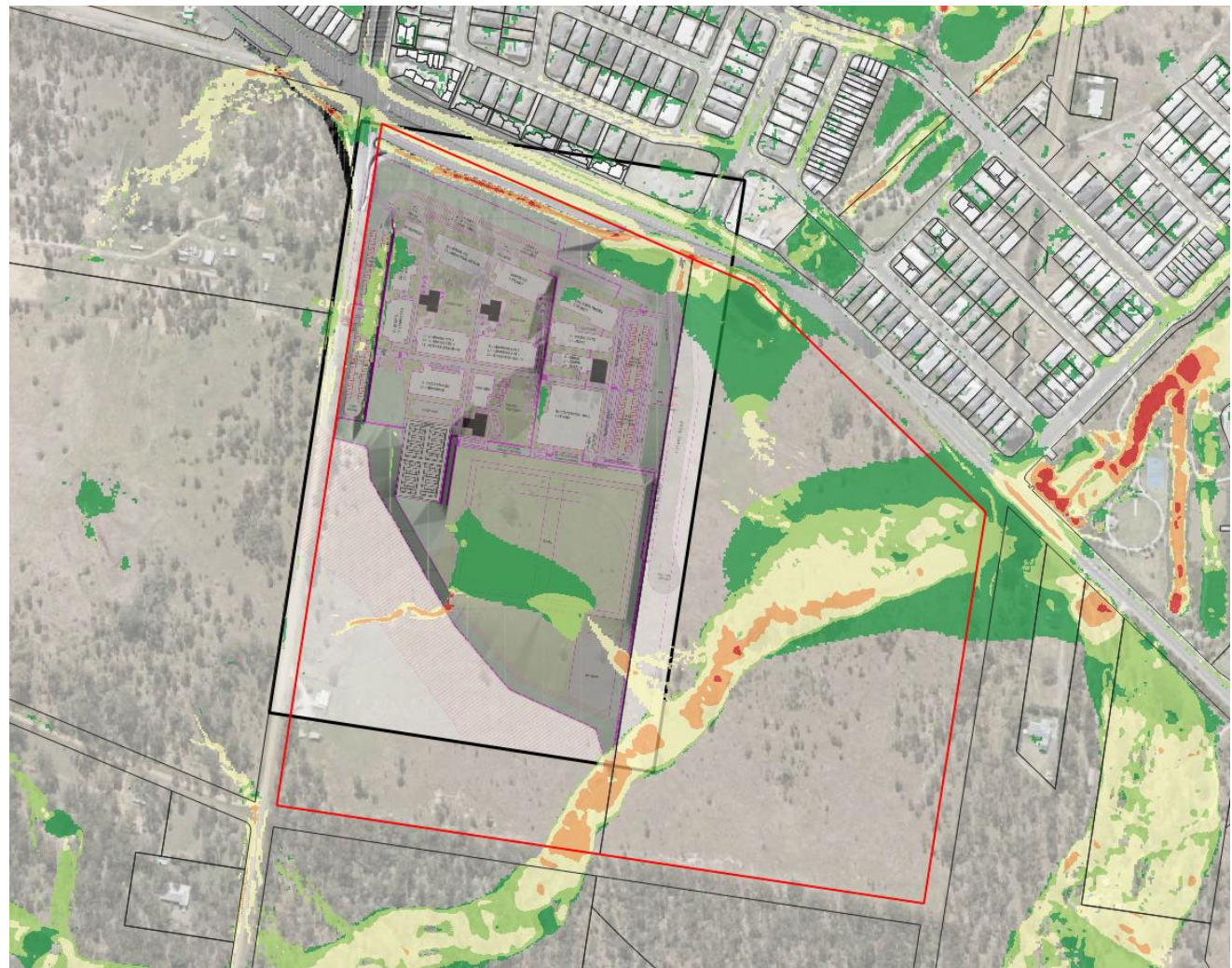
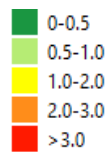
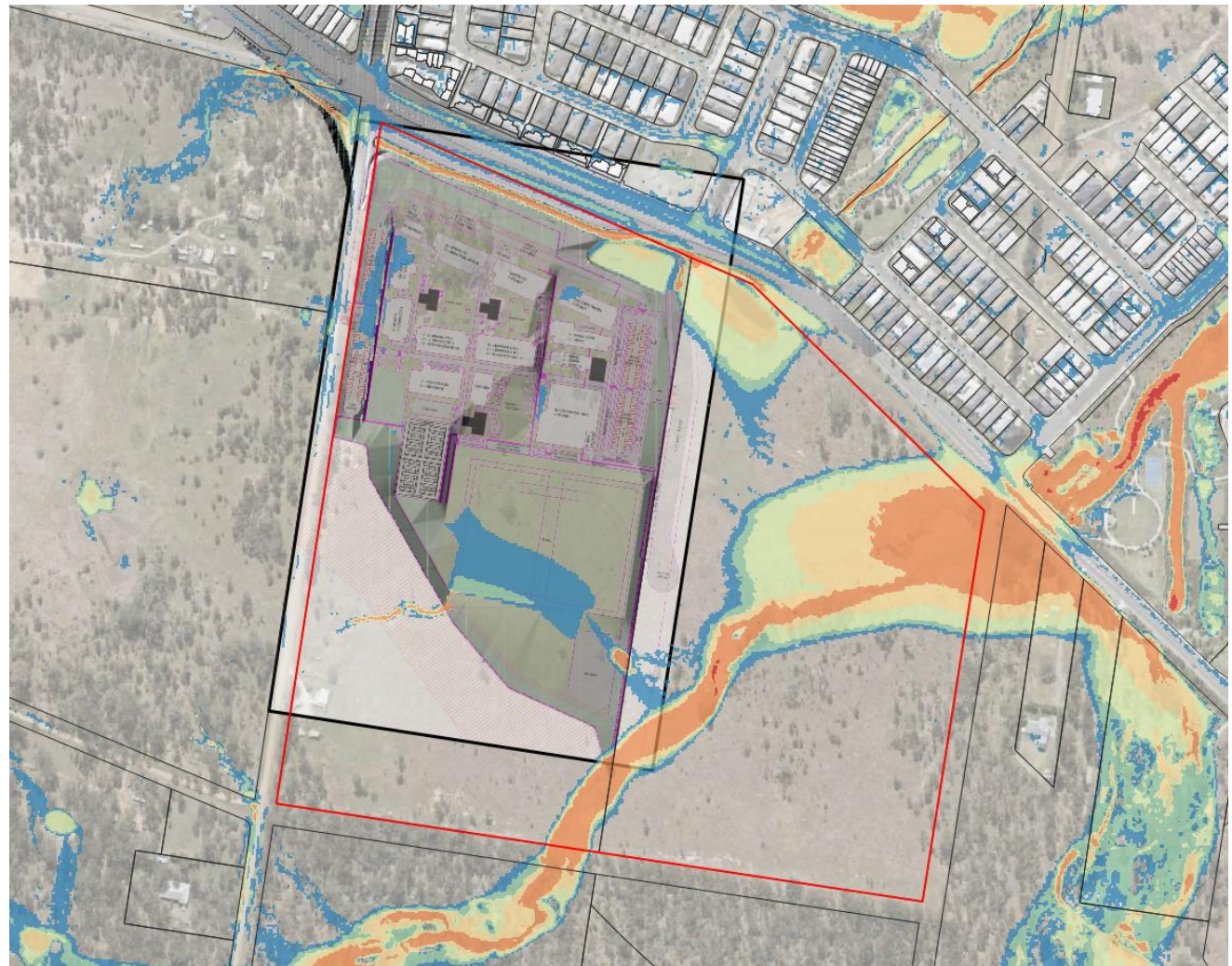
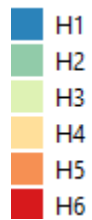


Figure C24
0.5% AEP Post-Development
Peak Water Hazard Classification

Peak Hazard Classification
H# (AEMI Categorisation)



Appendix D

ICC Planning Scheme Flood Risk and Overland Flow Overlay Code Responses

8.2.10 Flood Risk and Overland Flow Overlay Code – Responses by StormFlood

8.2.10.3 Specific Benchmarks for Assessment

Table 8.2.10.3.2 — Benchmarks for Assessable Development

1 Flood Risk Compatibility		Comments
PO1.1 Development for an accommodation activity (other than a hazard vulnerable use) is avoided on the part of the land subject to the high to extreme flood risk category shown on Map OV12.	AO1.1 No accepted outcome provided.	N/A
PO1.2 All buildings and structures within the very low to medium flood risk category shown on Map OV12 are located and designed to: a. avoid an intolerable level of flood risk; and b. mitigate the risk to people and property from the flood hazard to an acceptable or tolerable level. Note: Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO1.2.1 Development complies with the minimum flood immunity standards relative to the use shown in Table 8.2.10.3.4. Note: A property specific flood risk report can be accessed through www.ipswich.qld.gov.au . AO1.2.2 Any enclosure of areas below the flood planning level do not include habitable rooms.	<u>Satisfies the intent of AO1.2.1 and AO1.2.2</u> The proposed development can comply with the minimum flood immunity standard for an Educational Establishment as prescribed in Table 8.2.10.3.4 (0.5% AEP + 300 mm freeboard), with the adoption of peak flood levels as provided within the attached flood report. In accordance with the ICC Planning Scheme and the performance-based assessment documented in this report, the Flood Planning Level (FPL) is determined from the modelled peak flood level at the building interface. All habitable and non-habitable building floor levels are to be set at or above the adopted FPL.
PO1.3	AO1.3 No accepted outcome provided.	N/A

The reconfiguration of land to create additional lots or realignment of boundaries of existing lots is avoided on land within the high to extreme flood risk categories shown on Map OV12.		
2 Hazard Vulnerable Uses and Community Infrastructure		
PO2.1 Development for a hazard vulnerable use is avoided in the medium to extreme flood risk categories shown on Map OV12.	AO2.1 No accepted outcome provided	Complies with AO2.1 Proposed development works (hardstand and buildings) are located outside of medium to extreme flood risk categories.
PO2.2 Development for, or the expansion of, a hazard vulnerable use is: a. compatible with the level of risk associated with the natural hazard; and b. there is an overriding need for the vulnerable use.	AO2.2.1 Development is located outside of the PMF. OR AO2.2.2 Where unable to locate outside of the PMF, development for, or expansion of, a hazard vulnerable use, the following is demonstrated: a. the development does not place additional burden on disaster management capacity; b. the development complies with the minimum flood immunity standards relative to the use shown in Table 8.2.10.3.4, or an appropriate finished floor level has been selected considering events rarer than the 1% AEP and climate change through a Flood Risk Assessment prepared by a suitably qualified engineer; c. the development will not create a sudden change in flow distributions, flood level or velocity that could result in increased flood hazard to the surrounding area;	Complies with AO2.2.2 Proposed development works (hardstand and buildings) are located outside of very low to extreme flood risk categories. The provided flood report has established the potential overland flood risks, and will require a detailed civil design to address any drainage issues within the carpark entry access from Wensley Road, to ensure QUDM compliance. Despite the above, flood risks are low within the proposed development portions of the site, and does not increase the chance of unacceptable risks. Complies with AO2.2.3 and AO2.2.4

	d. permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people during a range of floods including rarer than the 1% AEP event is possible; and e. ensure the safe evacuation of the premises in accordance with a site-specific Flood Emergency Management Plan can occur. Note: • Compliance with this acceptable outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy. • A Flood Emergency Management Plan must be prepared by a suitably qualified and experienced person in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy. AO2.2.3 Any portion of a permitted structure below the flood planning level (or finished floor level determined in AO2.2.2(b) above) must be constructed of materials capable of resisting damage, deterioration or decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. Note: Deemed to satisfy wet-proofing contained within Clause 2.8 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas</i> achieves this requirement. AO2.2.4 Any permitted structure (including foundations and support), must include information from a suitably	With the adoption of the minimum flood planning levels, compliance with AO2.2.3 and AO2.2.4 can be achieved.
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	qualified engineer confirming that the structure can withstand the likely conditions experienced during the DFE (or other relevant design event determined in AO2.2.2(b) above without suffering structural failure.	
PO2.3 Development for community infrastructure and essential services: a. remains functional to serve community needs during and immediately after the defined flood event; b. is designed, sited and operated to avoid adverse impacts on the community or the environment due to the impacts of flood inundation on infrastructure, facilities or access and egress routes; c. retains essential site access during the defined flood event; d. is able to remain functional even when other infrastructure or services may be compromised in the defined flood event; and e. the development complies with the minimum flood immunity standards relative to the use shown in Table 8.2.10.3.4, or an appropriate finished floor level has been selected considering events rarer than the 1% AEP and climate change. Note: Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO2.3 No accepted outcome provided.	<u>Satisfies the intent of PO2.3.</u> An Educational Establishment is classified as Community Infrastructure and Essential Services building type. The proposed development has been designed to comply with the minimum flood immunity standard of the 0.5% AEP + 300 mm freeboard (Table 8.2.10.3.4). The proposed earthworks render the development immune from overland flooding up to and including the 0.2% AEP 2090 SSP5-8.5 design event, with overland flows along the northern drainage channel and south-eastern tributary contained within defined flow paths. Internal drainage is designed to convey flows up to and include the Defined Flood Event. Site access and egress via Wensley Road is maintained up to the 1.0% AEP 2090 design event, consistent with the requirements of Table 8.2.10.3.4 and Table 8.2.10.3.5. The design or critical storm for the Wensley Road crossing is of short duration, with flood waters anticipated to quickly recede (<1hr) after occurring.

		Therefore, the development is well positioned to serve the community, and remain functional during and immediately after the DFE.
PO2.4 a. Development for a Community use is compatible with the level of risk associated with the natural hazard and complies with the minimum flood immunity standards relative to the use shown in Table 8.2.10.3.4. Note: A Flood Risk Assessment prepared by a suitably qualified and experienced engineer in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy should be prepared to demonstrate compliance with this performance outcome.	A02.4 No accepted outcome provided.	<u>Satisfies the intent of PO2.4.</u> Refer to response for PO2.3. The proposed Educational Establishment complies with Table 8.2.10.3.4 minimum flood immunity requirements.
3 Resilient Design		
PO3.1 At or below the flood planning level, development that is for a new or extension to a building or replacement of an existing building that can be classed as infill development: a. must not create a sudden change in flow distributions, flood level or velocity that could result in increased flood hazard to the surrounding area b. maintains a functional and attractive relationship with the adjacent street frontage;	A03.1.1 The areas below the flood planning level within a high to extreme flood risk category shown on Map OV12 are not to be enclosed and: a. are to be left open so as not to impede flood flows; b. may be used for the parking of vehicles or the storage of large items that are readily able to be moved in the event of a flood; c. may be screened for security purposes, where such screening does not impede flood flows; and	<u>Complies with AO3.1.1</u> Proposed development located outside of the high to extreme flood risk category. <u>Complies with AO3.1.2</u> If the future building design adopts an undercroft style design, it is to adopt the requirements of AO3.1.2. <u>Complies with AO3.1.3</u> Proposed development located outside of the very low to extreme flood risk category. <u>Complies with AO3.1.4</u>

c. provides ground level engagement and activation where in centre zones and other urban environments where an active frontage is desired; d. avoids the need to rebuild structures and replace materials after a flood event up to and including the flood planning level; and e. ensures any portion of a permitted structure below the flood planning level is constructed of flood compatible (flood damage resistant) materials. Note: • This is particularly relevant for commercial uses in centres with a strong 'town-centre' pedestrian realm that also may be affected by flood, or for character areas to maintain an attractive presentation to the street. • Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	d. may use gates such that the gates do not impede flood flows, avoiding the use of solid fill gates, roll-a-doors or tilt doors. AO3.1.2 Development for commercial, industrial and other non-residential uses that includes an undercroft ensures that the building and site design allows floodwaters and flood debris to pass predominantly unimpeded under the structure and: a. the design of the undercroft does not increase flood risk; b. the predevelopment flood risk profile is not varied as a result of development; c. the undercroft area is stabilised, resistant to erosion and scour, and designed to drain freely in accordance with Clause 2.3 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas</i>; d. may be screened for security purposes where such screening does not impede flood flows; and e. may use gates that do not impede flood flows, avoiding the use of solid fill gates, roll-a-doors or tilt doors. Note: • Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer. • The <i>Queensland Development Code Mandatory Requirements 3.5 — Construction of buildings in flood hazard areas</i>, provides residential design and siting provisions in accordance with Clause 2.3 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas</i>, which apply to residential development within the designated flood hazard area under this planning scheme.	If the future building design adopts an undercroft style design, it is to adopt the requirements of AO3.1.4. Complies with AO3.1.5 Proposed buildings will be at the minimum FPL. Complies with AO3.1.6 If the future building design adopts this type of design, it is to adopt the requirements of AO3.1.6.
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	A03.1.3 Any enclosure of areas below the flood planning level only occurs within a very low to medium flood risk category shown on Map OV12 and does not exceed: a. 2.0 metre of depth above the finished floor level; b. 1.5 metres/second maximum flow velocity; or c. a H3 flood hazard classification in the DFE. A03.1.4 Openings are provided to allow for automatic entry and exit of floodwater up to the defined flood level. Note: Buildings are to be designed in compliance with Clause 2.6 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas</i>. The <i>Queensland Development Code Mandatory Requirements 3.5 — Construction of buildings in flood hazard areas</i>, provides Acceptable solution 1 which requires compliance with Clause 2.6 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas only for class 1-4 and Class 9a and 9c buildings</i>. This accepted outcome applies to all development. A03.1.5 Non-structural materials used below the defined flood level must be capable of resisting damage, deterioration or decay taking into account the likely time the material would be in contact with flood water and the likely time it would take for the material to subsequently dry out. Note: Deemed to satisfy wet-proofing contained within Clause 2.8 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas</i> achieves this requirement. A03.1.6	
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	Walls without cavity spaces and flood resistant materials are used to minimise the need for replacement and repair and to provide for ease of cleaning in the event of a flood. Note: Buildings are to be designed in compliance with Clause 2.8 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas</i>. The <i>Queensland Development Code Mandatory Requirements 3.5 — Construction of buildings in flood hazard areas</i> provides Acceptable solution 1 which requires compliance with Clause 2.8 of the <i>ABCB Handbook: Construction of Buildings in Flood Hazard Areas only for class 1-4 and Class 9a and 9c buildings</i>. This accepted outcome applies to all development.	
PO3.2 Development is resilient to flood events by ensuring the design and layout of buildings accounts for the potential risks of flooding. Note: Compliance with this performance outcome will be achieved through a Flood Risk Assessment prepared by a suitably qualified and experienced engineer.	AO3.2.1 As far as practicable, the layout of commercial uses provides for retail, office and service areas above carparking areas to increase flood immunity. AO3.2.2 As far as practicable, the design and layout of buildings provide for: - the incoming power supply, including all metering equipment to be located above the flood planning level; - all wiring, power outlets and switches to be above the flood planning level; - all conduits located below the flood planning level installed so that they will be self-draining; - heating and air conditioning systems to be above the flood planning level; and - a backup power source to be provided and located above the flood planning level	<u>AO3.2.1 does not apply</u> <u>Satisfies the intent of AO3.2.2</u> The building design considers all incoming power supply (including metering), wiring, power outlets and switches, conduits, heating, air conditioning systems, and backup power sources are located above the flood planning level. This is to be confirmed at detailed design stage.

	where the basement relies on a pumping solution to manage floodwater ingress, or for dewatering after a flood.	
PO3.3 Development with underground or undercroft parking is designed to minimise operational disruption post an event and be resilient to the intrusion of flood waters up to the defined flood event.	AO3.3.1 Underground parking is located on land in the very low to medium flood risk category shown on Map OV12 and is designed: a. to be waterproof, with: i. walls and floors impermeable to the passage of water; and ii. for all basement entry points and services to be located a minimum height of 300mm above the defined flood level and incorporate a bund or similar barrier to avoid, minimise or prevent flood inundation (i.e. flood gates); or b. to include a backup power source that is located above the flood planning level for access control or where the basement relies on a pumping solution to manage flood inundation or dewatering. AO3.3.2 Underground or undercroft parking is designed to experience no more than a medium degree of flood hazard inundation in accordance with Table 8.2.10.3.5.	<u>N/A.</u> No underground or undercroft carparking is proposed as part of the development.
4 Siting, Access and Isolation		

PO4.1 The concentration of people in areas that may be at risk of isolation is avoided unless it can be demonstrated that: a. the development and residual risk is tolerable for all flood risk factors that affect the site; b. permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people during a range of floods including the 1% AEP at 2100 is possible; and c. ensure safe evacuation of the premises in accordance with a site-specific Flood Emergency Management Plan. Note: A Flood Emergency Management Plan must be prepared by a suitably qualified and experienced person in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy.	AO4.1 Development does not provide for further intensification of residential uses, net gain in population or increase the number of people likely to need evacuation within: a. a priority evacuation area shown on Map OV12; or b. on land that is identified as a low flood island. Note: Refer to SC6.3 Flooding Risk and Overland Flow Planning Scheme Policy to determine whether the land is subject to a low flood island.	<u>Complies with AO4.1</u> The proposed development does not increase the number of people likely to require evacuation within a priority evacuation area or low flood island.
PO4.2 Development for or associated with reconfiguring a lot to create new lots, or reconfigure the boundary of existing lots, has a suitable area of land above the flood planning level to accommodate the intended use. Note: Outbuildings and recreational structures do not need to be accommodated in the area available above the flood planning level.	AO4.2 No accepted outcome provided.	<u>N/A</u>
PO4.3 Development siting and layout responds to the flood risk and maintains personal safety at all	AO4.3.1 Development is located and designed to ensure personal safety at all times from risk of isolation	<u>Satisfies the intent of AO4.3.1</u> Hydraulic modelling confirms that access and egress via Wensley Road is maintained up to

times, such that the access and egress avoids isolation in a flood event and does not impede evacuation.	from flood events up to and including the defined flood event by ensuring that access and egress is subject to no more than a low flood hazard in accordance with Table 8.2.10.3.5. AO4.3.2 Access routes are designed for self-evacuation or alternative emergency evacuation routes are provided so that in a flood event occupants can safely escape by vehicle to a safe and secure area.	the 1.0% AEP 2090 design event, with flood hazard along the access route not exceeding a Low Degree of Flood Hazard (Table 8.2.10.3.5) during the Defined Flood Event. The design or critical storm for the Wensley Road crossing is of short duration, with flood waters anticipated to quickly recede (<1hr) after occurring. <u>Satisfies the intent of AO4.3.2</u> Self-evacuation is achievable via Wensley Road.
5 Flood Storage and Conveyance		
PO5.1 Development for filling or excavation does not directly, indirectly or cumulatively cause any material increase in flood risk or hydraulic hazard outside the site, including: a. loss of flood storage; or b. loss of or changes to flow paths; or c. an increase in water flow velocity or level; or d. reduction in flood warning times; or e. an increase in potential erosion, scour or flood damage on the premise or on other premises, public land, watercourses, roads or infrastructure. Note: Compliance with this performance outcome will be achieved through a Hydraulic Impact Assessment prepared in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy.	AO5.1.1 No filling or excavation occurs on land within the high to extreme flood risk categories shown on Map OV12. AO5.1.2 Development maintains the flood storage capacity of the site up to the defined flood level. Note: The preferred method is for balance cut and fill earthworks to be used to maintain the capacity of on-site flood storage refer to SC6.3 Flood Risk and Overland Flow Planning Scheme Policy. Note: A Hydraulic Impact Assessment prepared by a suitably qualified and experienced engineer in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy should be prepared to demonstrate compliance with this acceptable outcome. AO5.1.3	<u>Satisfies the intent of PO5.1</u> The hydraulic impact assessment demonstrates no material adverse increases in the peak flood level are predicted beyond the site boundaries under post-development conditions (refer to Section 3). Impacts are localized to the Northern Drainage Channel, with no increase in the peak flood level modelled along Ripley Road, up to and including the Defined Flood Event. The critical storm event is of short-duration; therefore, impacts are anticipated to be short-lived, and unlikely to change the overarching nature of the catchment.

	Development in a greenfield area protects a flood conveyance area by providing an easement or reserve over the area of the site up to the area of the flood planning level.	
PO5.2 Development within the overland flow path: a. maintains the conveyance function of flood waters to allow flow and debris to pass predominately unimpeded through the site; b. does not concentrate, intensify or divert floodwater onto upstream, downstream or adjacent properties; and c. will not result in a material increase in flood levels or flood hazard on upstream, downstream or adjacent properties to ensure no change in the hydraulic risk profile. Note: Compliance with this performance outcome will be achieved through a Site Based (Localised) Overland Flow Study prepared in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy by a suitably qualified and experienced engineer.	AO5.2.1 Development is not located within an identified overland flow path shown on Map OV12. OR AO5.2.2 Development provides an open undercroft area below the flood planning level from natural ground level for the site. Note: Any Development Application for a permitted structure (including foundations and support), must include information from a Registered Professional Engineer Queensland that certifies the development confirming that the structure can withstand the likely conditions without suffering significant damage. AO5.2.3 Development which creates a new overland flow path or significantly modifies an existing overland flow path via earthworks does not materially worsen hydraulic hazard or the hydraulic risk profile on the site or downstream receiving sites from existing conditions. Note: Compliance with this acceptable outcome will be achieved through a Site Based (Localised) Overland Flow Study prepared in accordance with SC6.3 Flood Risk and Overland Flow Planning Scheme Policy by a suitably qualified and experienced engineer.	<u>Satisfies the intent of PO5.2, and AO5.2.3 and AO5.2.4</u> The site is identified within the OV12 Overland Flow Path Planning Area. Several overland flow paths have been identified to traverse the site. The proposed earthworks and drainage design demonstrate that overland flow conveyance is maintained through and around the site. The hydraulic impact assessment (Section 3) demonstrates that the post-development scenario does not materially worsen flood hazard or flood levels on upstream, downstream, or adjacent properties (Satisfying the intent of AO5.2.3). The proposed drainage infrastructure conveys internal flows to the Northern Drainage Channel, with flow conveyance unimpeded up to the DFE, and therefore, during the 1% AEP design event (Satisfying the intent of AO5.2.4). An easement can be provided over the major flow paths if required, upon a detailed design being completed.

	AO5.2.4 Development protects the conveyance of flood hazard area by providing an easement over the: a. 2% AEP flood extent for overland flow flooding; or b. 1% AEP at 2100 flood extent for waterway flooding. Note: Mapped overland flow and Local Catchment flooding may intersect, in such instances (b) will prevail.	
6 Environmental Values		
PO6.1 Development occurs in a way that maintains or enhances the protective function of landforms, vegetation and natural processes in managing the effects of flooding.	AO6.1 The clearing of native vegetation within a watercourse or designated wetland is avoided. Note: OV2 Waterway Corridors and Wetlands provides mapped extents of watercourses, wetlands and riparian buffer areas.	<u>Complies with AO6.1</u> The proposed earthworks and civil design maintain the protective function of landforms and vegetation.
PO6.2 Flood mitigation measures required to meet other assessment benchmarks in this code do not create significant impacts on environmental values on the premises or on other premises or land within the floodplain.	AO6.2 No accepted outcome provided.	<u>Complies with AO6.2</u> No measures have been proposed that would create significant adverse impacts on environmental values on or adjacent to the subject site.
7 Storage and Handling of Hazardous Materials		
PO7.1 Development involving the storage and handling of hazardous materials avoids or minimises the risk of contamination to the environment and public health and safety, by:	AO7.1.1 Development does not result in the storage of hazardous materials or hazardous chemicals at a hazardous chemical facility on land in the high to extreme flood risk category on Map OV12.	<u>N/A</u>

a. locating hazardous or noxious materials or chemicals and their manufacturing equipment as far as practicable on the highest part of the site, and within areas designed to prevent the intrusion of floodwaters; or b. ensuring hazardous or noxious materials are readily able to be moved in a flood event; or c. where not hazardous or noxious, do not comprise materials that may cause a deleterious effect on the environment if discharged in a flood event; and d. in all cases, where capable of creating a safety hazard by being shifted by flood waters, are contained in order to minimise movement in times of flood.	A07.1.2 Development does not result in the storage of hazardous materials or hazardous chemicals at a hazardous chemical facility below the flood planning level.	
	A07.1.3 Within the very low to medium flood risk category shown on Map OV12, structures used for the manufacture or storage of hazardous materials or chemicals are designed to prevent the intrusion of flood waters up to at least a 0.2% AEP flood event.	