WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Report

Aura South Early Release Area Flood Assessment

Stockland

9 November 2026



Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
1	Report	Andrew Thompson	Tony McAlister	2 October 2026
2	Report	Andrew Thompson	Tony McAlister	9 November 2026

Project Details

Project Name	Aura South ERA Flood Assessment
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Document Number	27020050_R01_V02

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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.



Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*

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1 INTRODUCTION

This Flood Assessment report has been prepared on behalf of Stockland Development Pty Limited (the Applicant) in support of a Priority Development Area (PDA) development application over land located at Bells Creek Road, Coochin Creek, comprising Lot 1 on SP332399 and Lot 2 on SP357748 (the site). The application seeks approval for the Early Release Area (ERA) of Stockland's Aura South project, within the Halls Creek PDA.

The development application seeks a PDA Development Permit for:

1. Reconfiguring a Lot (962 residential lots, 2 medium density lots, parks and balance land) in accordance with a Plan of Development;
2. Operational Works in accordance with a Plan of Development; and
3. Material Change of Use in accordance with a Plan of Development.

Declaration of the Halls Creek PDA established the planning framework required to accelerate the delivery of Aura South. As the first neighbourhood within the PDA, the ERA will bring forward 1,051 new homes, including three multiple dwelling sites accommodating about 80 apartments. This crucial housing supply will be supported by local services and infrastructure, five enterprise and employment lots, a neighbourhood centre, district sports and local parks, high-quality open space areas and active transport connections, establishing strong foundations for the new Aura South community.

Together, these elements will create a highly liveable, walkable and connected community which will contribute significantly to the delivery of housing, employment and community infrastructure in the southern growth corridor of the Sunshine Coast.

1.1 Flood Assessment

The development has been the subject of a wide range of comprehensive hydrologic, hydraulic, water quality and coastal engineering impact studies to ensure non-worsening to downstream properties or receiving environments. The location of Aura South is presented in Figure 1-1.

This report presents the flood assessment for the Early Release Area (ERA), the first portion of Aura South that is planned for development, which identifies the required works for the ERA to be completed without causing adverse/unacceptable internal or external flood impacts. This report has been completed in accordance with the draft Halls Creek PDA Proposed Development Scheme.



Figure 1-1 Aura South Development

1.2 Proposed ERA Development

The proposed ERA involves establishing a master plan community comprising the following key elements:

- Up to 1,000 dwellings and approximately 4-5 hectares of Business Enterprise (light industry and commercial) uses;
- One District Sports Parks totalling 10 hectares & recreation parks; and
- Access provided to Bells Creek Arterial Road.

The extent of the ERA relative to the wider Aura South development is illustrated in Figure 1-2.

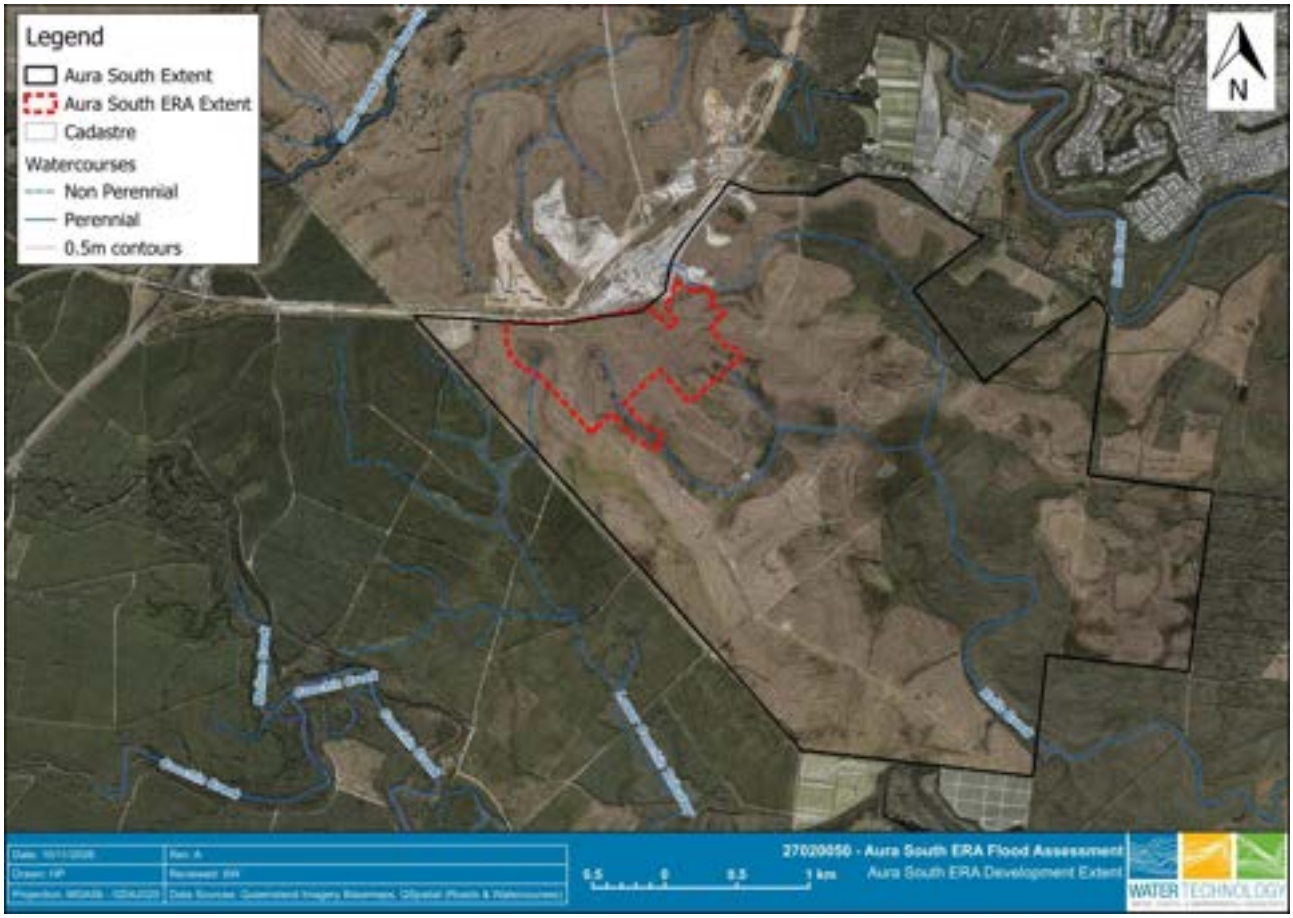


Figure 1-2 Aura South ERA Development Extent

2 BACKGROUND

2.1 Data Sources

2.1.1 Existing Flood Modelling

Water Technology has previously undertaken several broad scale flood assessments for the Aura South locality in regard to the whole of project Public Environment Report (PER), for the existing Environment Protection and Biodiversity Conservation (EPBC) approval number 2023/09548. The purpose of the PER was to undertake a detailed impact assessment of the proposed development, identifying existing site conditions and the expected impacts of the development. Water Technology's involvement with this investigation was focused on document flood impacts within the following key documents:

- *'Aura South Self-contained Masterplanned Community Draf PER Chapter 7 Impact Assessment – Water Quality and Quantity Investigations*,' dated 18 March 2025 (Water Technology, 2025).
- *'Aura South – Water Management Technical Memo,'* dated 15 July 2025 (Water Technology, 2025), and
- *'Aura South PER Supplementary Material,'* dated 11 March 2026 (Water Technology, 2026).

These documents reported on the development of two (2) individual flood models for Aura South, namely a *regional scale* model, detailed in the original PER submission in 2025 and the following tech memo, and a *local scale* model, detailed in the PER supplementary materials.

2.1.1.1 Regional Scale Flood Model

The regional model was developed as part of the PER to establish potential impacts of Aura South on flood behaviour in existing watercourses within and surrounding the Site. The development of the model was partially supported by data provided by Sunshine Coast Council (Council), who provided inflow hydrographs from the existing *Pumicestone Flood Study – Final Report*, dated 2018 (BMT, 2018) and a selection of model result outputs. Council did not however, provide the full hydrology model or the accompanying TUFLOW hydraulic model to support this assessment. It is noted that Sunshine Coast Council does not undertake flooding assessments within the LGA in accordance with ARR Version 4.2 and their approach utilises a bespoke methodology developed internally at Council. As such, the methodology adopted in Council's model is not consistent with the local model. However, its inclusion in this assessment, regardless of the adopted methodology, is critical in assessing regional flooding behaviour and in lieu of a regional model having been developed using ARR Version 4.2.

Given the above, a separate regional scale TUFLOW hydraulic model was developed to assess the impacts of earthwork changes, the outcome of which is illustrated in Figure 2-1, with a validation against the model results outputs supplied by Council.

Some of the key outcomes of this assessment as defined in the PER were as follows:

- The impacts identified by the conceptual assessment of the proposed earthworks were minor in terms of changes to flooding behaviour and spatial extent and therefore considered to be manageable;
- No interim cases were assessed for the Aura South development, which was suggested to be addressed in future assessments;
- No data was available to calibrate site-specific flood behaviour. Regardless, the modelling was undertaken in accordance with industry conventions and standards; and
- Future assessments should aim to assess the local impacts of the development hydrologically, and not just due to the bulk earthworks.

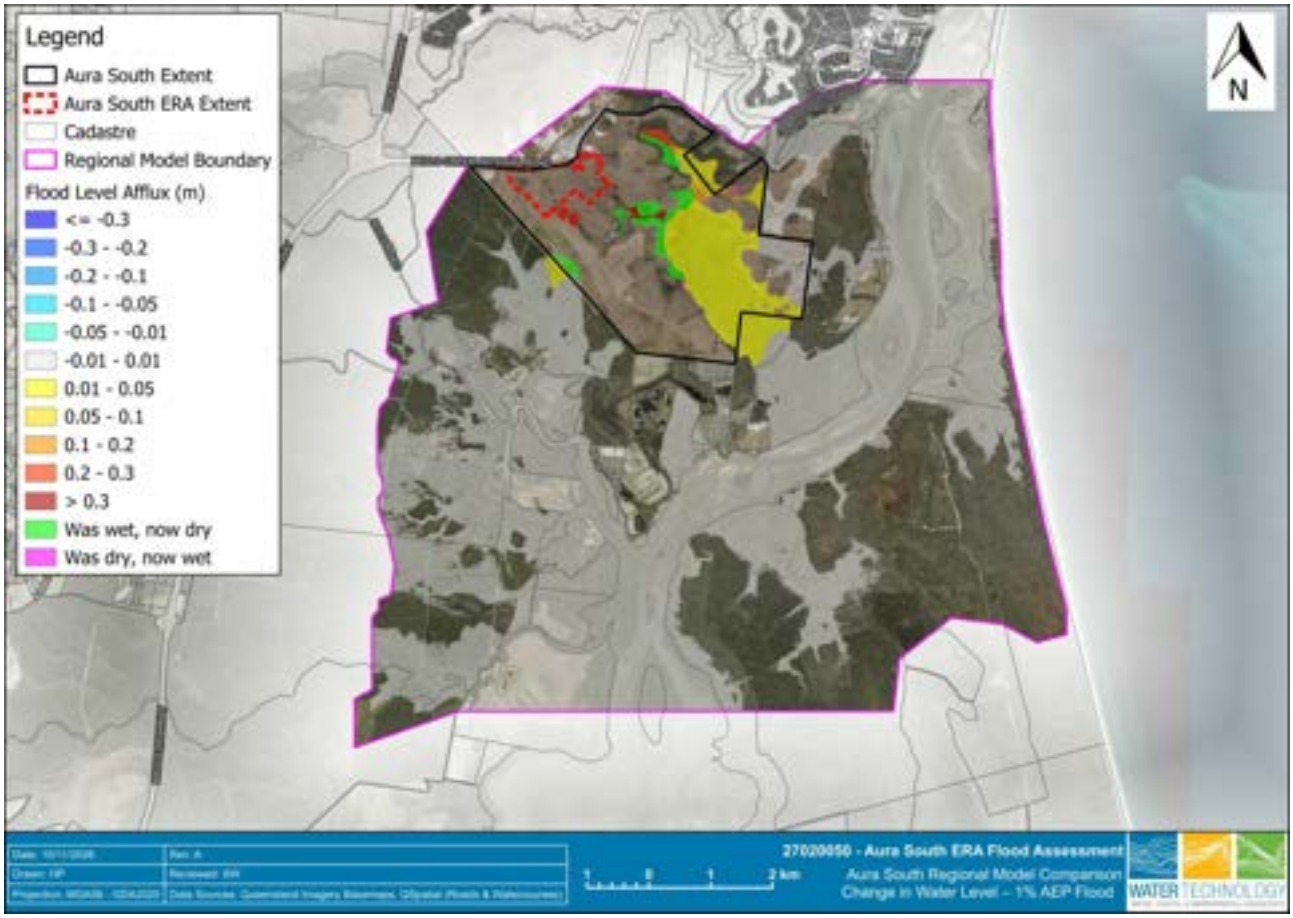


Figure 2-1 Aura South Regional Model Comparison Change in Water Level – 1% AEP Flood

2.1.1.2 Local Scale Flood Model

Following on from the regional assessment, Water Technology introduced the development of an accompanying local scale flood model, which utilised outputs from the regional model to inform tailwater conditions for the local model. The local model then utilised its own local hydrological model to allow for the assessment of the increase in urbanisation that would occur with the development of Aura South. Figure 2-2 illustrates the extent of the Aura South local model.

The outcome of the local assessment was that even when the urbanisation of the Aura South development was introduced, flood impacts were still minor in terms of increases to level and spatial extent and therefore considered to be acceptable.

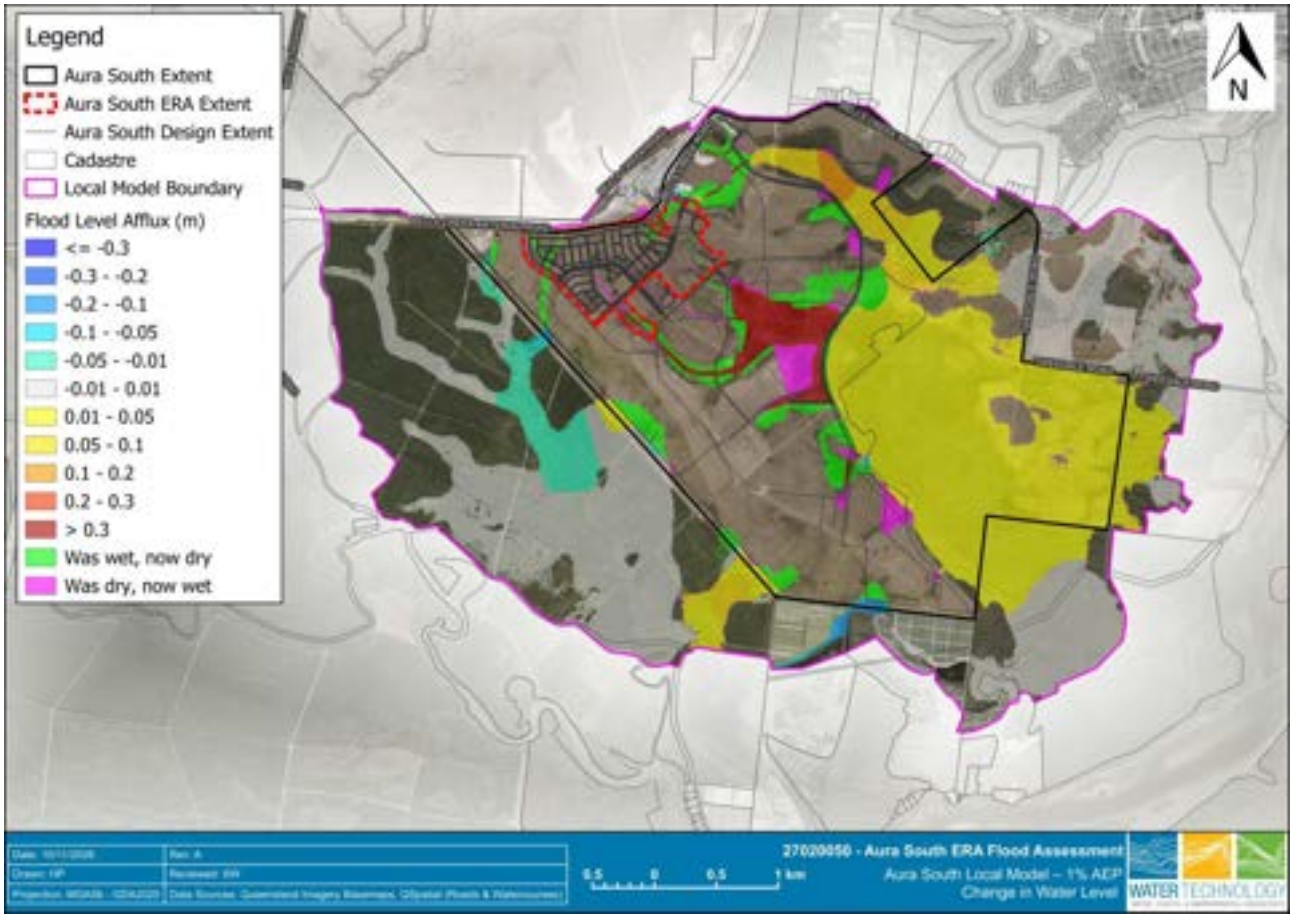


Figure 2-2 Aura South Local Model – 1% AEP Change in Water Level

2.1.2 Australian Rainfall and Runoff 2024 Version 4.2 (Ball, et al., 2019)

The Department of Climate Change, Energy, the Environment and Water (DCCEEW), in partnership with Engineers Australia have released the update to climate change consideration chapter in Australian Rainfall and Runoff (namely, ARR Version 4.2). This chapter represents a significant change in design flood estimation and addresses findings in literature that show due to experienced global warming, flood assessments can no longer assume stationarity. Additionally, the chapter results in a move from Representative Concentration Pathways (RCPs) to Shared Socio-economic Pathways (SSPs), which consider socio-economic factors that will impact future emissions.

The updated chapter now means, to assess both current and future conditions, that consideration of the impact from increasing global temperatures is required. The new draft guidance recommends the following key changes for both current and future climate conditions:

- Factoring all design rainfalls (1 EY through to the PMP) based on recommended rates of change on rainfall intensity (% / °C) are provided for different rainfall durations for different increase in global temperature since the data midpoint; and
- Factoring initial and continuing loss parameters based on recommended rates of change (% / °C) across natural resource management clusters for different increase in global temperature since the data midpoint.

For this assessment, the 2030 SSP2-4.5 scenario was adopted for the ‘current day’ climate, and the 2100 SSP3-7.0 for the ‘future day’ scenario. Adoption of the 2030 scenario is in alignment with current advice from

ARR regarding assessment of the 'current day' over either using the existing 2016 intensity-frequency-durations (IFD's) or a '2026' uplifted event.

2.2 Early Release Area Overview

The ERA is the first portion of Aura South. Figure 2-3 provides the Aura South ERA subdivision layout, provided by Place Design Group on 2 November 2026, reflecting the latest alignment for the ERA. This assessment was also completed using the latest civil design surfaces provided by KN Group on 4 November 2026, illustrated in Figure 2-4. Also highlighted are several key locations, namely the Linear Drain and its associated road crossing, the District Sports Park and its associated drain.

Details of internal stormwater infrastructure were not available at the time of this assessment, and as the modelling is focused on reviewing impacts to local waterways, model flows have been directly applied to waterways, with it being assumed that local rainfall can be successfully captured on the site and directed to these waterways. This assumption reflects a conservative approach, as the direct application of rainfall to the development area would provide some degree of attenuation of flows, reducing impacts.



Figure 2-3 Aura South ERA Subdivision Layout (source: Place Design Group)



Figure 2-4 Aura South ERA Design Surface (source: KN Group)

3 LOCAL HYDROLOGICAL MODEL DEVELOPMENT

3.1 Overview

As previously established, a local hydrological model was developed using the Watershed Boundary Network Model (WBNM) software as part of the PER supplementary material (Water Technology, 2026). The existing case version of this model has been adopted for the Aura South ERA assessment, with minor alterations made to improve sub-catchment representation within the vicinity of the ERA. This existing model was then updated to reflect the proposed ERA earthworks and urbanisation. The following sections provide further details on these two models.

3.2 General Model Parameters

Table 3-1 provides a summary of WBNM and hydrological parameters. These inputs are consistent between the existing and developed models.

Table 3-1 Summary of WBNM Parameters and Hydrological Inputs

Item	Description	Comments
Software	▪ Watershed Boundary Network Model ▪ Storm Injector	The hydrological software WBNM was used, and the Australian Rainfall and Runoff (ARR) inputs were applied, simulated and reviewed within Storm Injector.
Coordinate System	GDA 2020 MGA Zone 56	Default for the project.
LiDAR	2014 1m LiDAR	Used for sub-catchment delineation. Newer LiDAR was reviewed and no discernible changes were identified.
WBNM Parameters	▪ Lag Parameter (C) = 1.60 ▪ Impervious Lag Factor = 0.10 ▪ Flowpath Routing with Stream Lag Factor = 1.00	Due to lack of calibration data, default parameters were utilised across the board.
Design Events	▪ Events – 50%, 20%, 10%, 5%, 2%, 1% and 0.05% AEP ▪ Durations – 15m, 30m, 45m, 60m, 90m, 120m, 180m, 270m, 360m, 540m, and 720m.	The range of design events were adopted to demonstrate lack of impacts across a range of events.
Extreme Event	▪ Probable Maximum Precipitation (PMP) / Probable Maximum Flood (PMF)	Due to catchment size, the Generalised Short Duration Method (GSDM) has been utilised. The PMP rainfall has been factored using the climate scenarios.
Climate Scenario's	▪ Default Case – 2030 SSP2-4.5 ▪ Sensitivity Case – 2100 SSP3-7.0	The climate sensitivity case was only assessed for the 1% AEP event.
Design Temporal Patterns	East Coast Point Temporal Patterns.	Standard for location and catchment size.
ARR Coordinates	-26.8656, 153.0708.	Based on sub-catchment centroid, due to catchment size, spatial variation was not applied.

Item	Description	Comments
Areal Reduction Factor (ARF)	ARF was based on a catchment area of 10 km^2.	Defined by the approximate catchment size of Halls Creek.
Initial and Continuing Loss	▪ 31.00 mm ▪ 2.50 mm/hr	Default ARR losses, which were factored in accordance with the climate scenarios.
Storm Approach	Complete Storm	This approach conservatively applies pre-burst depths to all sub-catchments.

3.3 Existing Case WBNM

The previously developed Aura South existing case WBNM model was adjusted slightly within the vicinity of the ERA to provide better sub-catchment delineation and more inflow hydrographs by splitting previously several sub-catchments in half. The sub-catchments associated with the Bells Creek Arterial Road were adopted from Table B.1 of KBR's '*Bells Creek Arterial (BCA) Phase 4 Design, Drainage Design Report*', which assumes fully developed upstream catchment conditions (KBR, 2019). Figure 3-1 illustrates the sub-catchment delineation for the existing case WBNM, which was mostly derived from available 2014 LiDAR.

Fraction impervious values for sub-catchments were defined using the latest aerial imagery, remaining consistent with previous assessments.

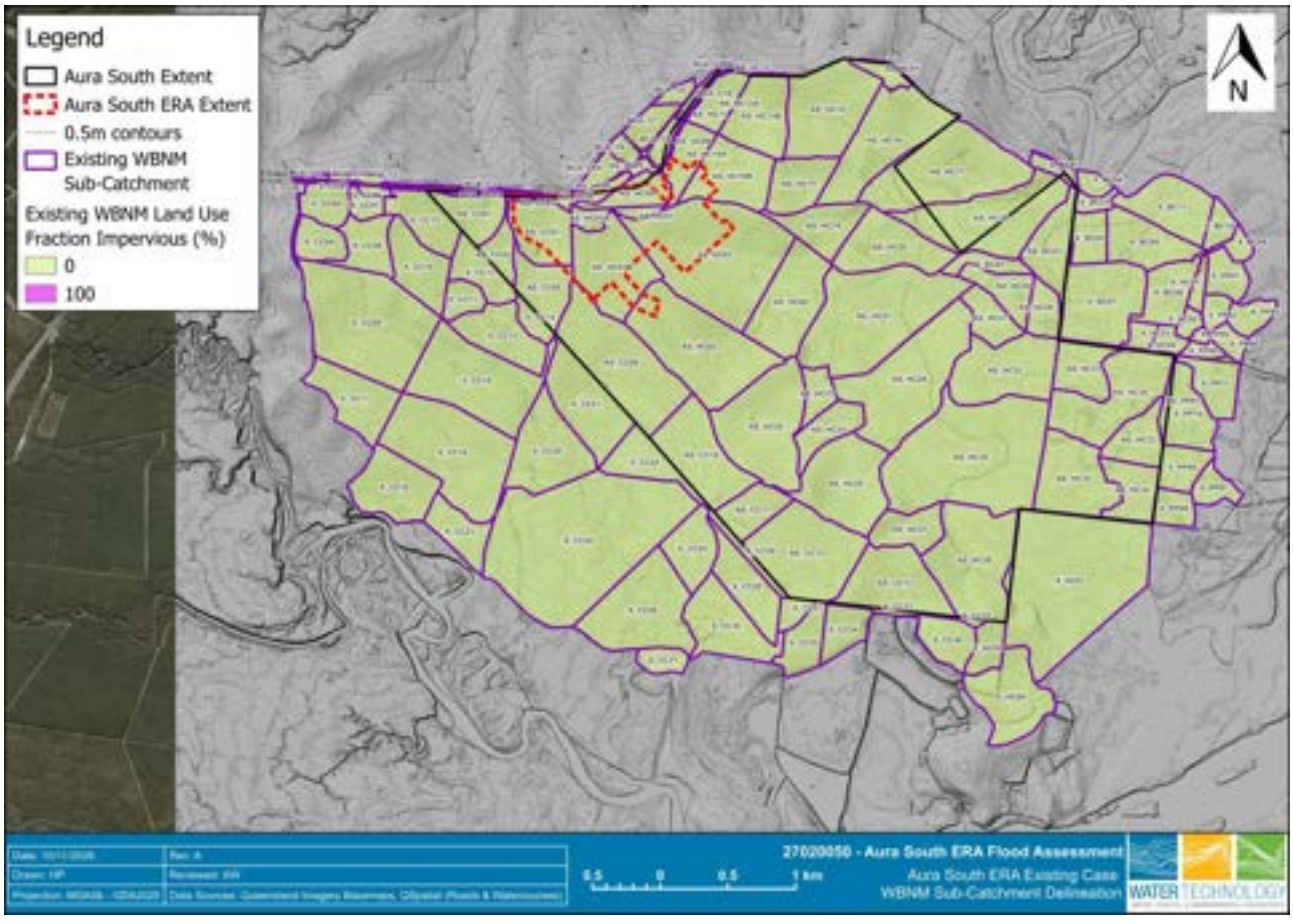


Figure 3-1 Aura South ERA – Existing Case WBNM Sub-Catchment Delineation

3.4 Developed Case WBNM

The ERA design surface and conceptual stormwater network provided by KN Group was used to define the sub-catchments for Aura South ERA. Fraction impervious values were defined using the Place Design Group subdivision plan. The modelling assumed that future commercial districts areas located outside of the official ERA footprint have not been fully constructed for this phase of the development and have only been subject to the inclusion of bulk earthworks. Figure 3-2 illustrates the sub-catchment delineation for the developed case WBNM, which is based on the KN Group design surface for the Aura South ERA extent. Locations outside of the Aura South ERA extent remain as per the existing case.

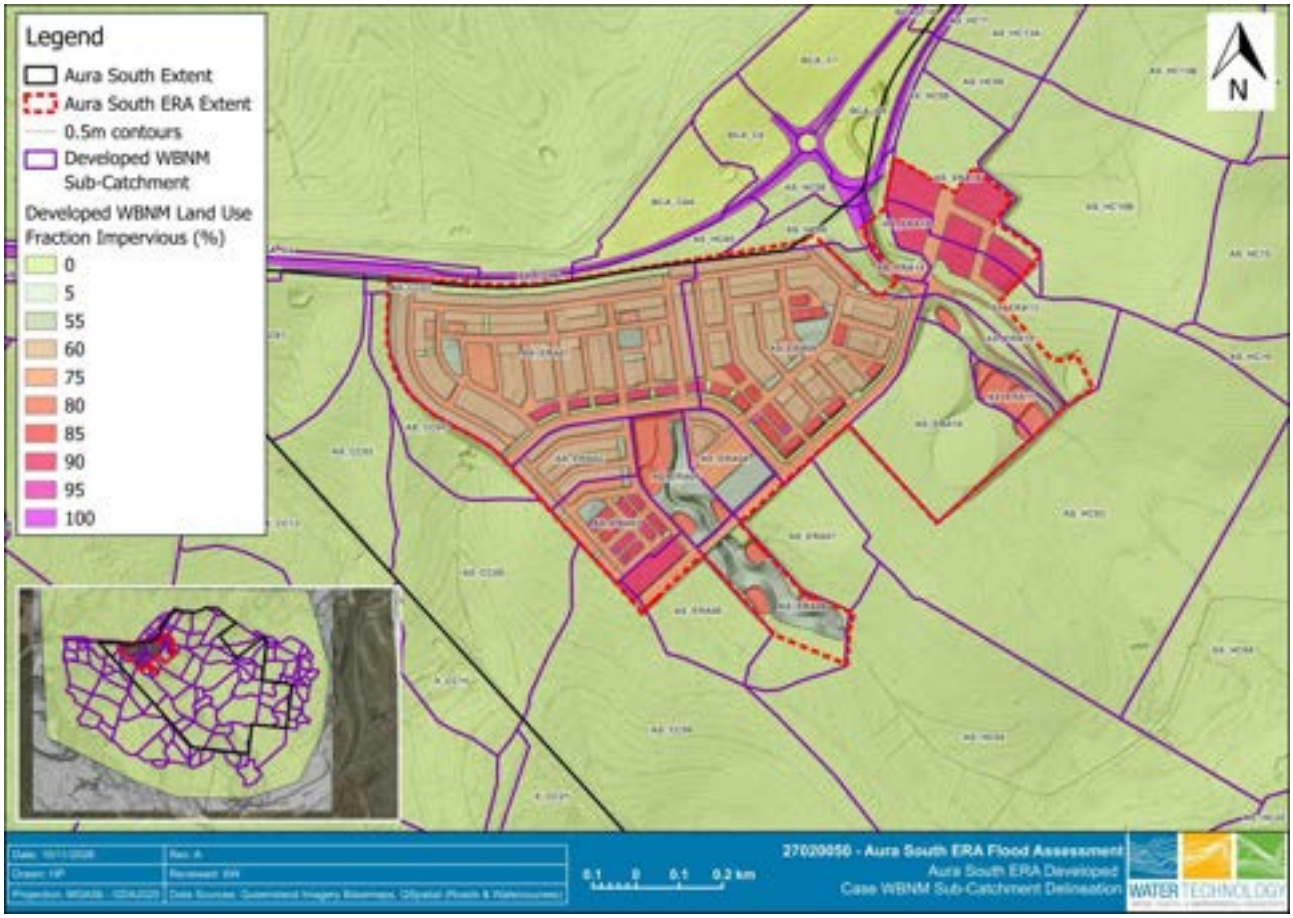


Figure 3-2 Aura South ERA – Developed Case WBNM Sub-Catchment Delineation

4 LOCAL HYDRAULIC MODEL DEVELOPMENT

4.1 Overview

A TUFLOW model was previously developed to assess flooding behaviour as part of the PER supplementary materials. This model has been adopted with minor modifications to the existing case to reflect sub-catchment changes introduced in the previous section and some changes to tailwater assumptions. This updated existing case was then used to build an Aura South ERA developed case model, with the details on the model developments provided below.

4.2 General Model Parameters

Table 4-1 summarises TUFLOW model parameters utilised for the Aura South ERA assessment.

Table 4-1 Summary of TUFLOW Parameters

Item	Description	Notes
Software	TUFLOW	Industry standard for hydraulic software, and the original Pumicestone flood study model.
Model Build	2026.0.1	The latest available at project inception.
Solution Scheme and Hardware	▪ Heavily Parallelised Compute (HPC) ▪ GPU	HPC allows for model simulations to vary timesteps, with the GPU hardware allowing faster simulations.
Coordinate System	GDA 2020 MGA Zone 56	Default for the project.
Model Resolution	Cell size – 2 m Sub-grid sampling (SGS): 1 m	Model cell size of 2 m with a SGS resolution of 1 m allows for model accuracy of 1 m without the computational time associated with it.
Model Topography	▪ 2014 1m LiDAR ▪ 2022 1m LiDAR ▪ Bells Creek Arterial Road Design Surface (KBR).	The 2014 LiDAR was utilised for most of the model extent, with the 2022 only used to represent some recent earthworks.
Manning's 'n' Roughness	Manning's 'n' roughness values from the regional model were adopted, with the delineation based on aerial imagery and the ERA design surfaces.	Refer to Table 4-2 for the roughness values.
Boundary Conditions	▪ Local Inflows: Runoff hydrographs were exported from WBNM for all sub-catchments and applied as source-area regions (2d_sa) over the corresponding sub-catchment. ▪ Downstream boundaries: Regional boundaries were defined using the regional model flood (Water Technology, 2025) levels as static tailwater boundaries.	▪ Local inflows for the ERA scenario were adjusted to apply urbanised catchment flows to their associated downstream outlet. ▪ Refer to Table 4-3 for the downstream tailwater levels adopted for the model.
Initial Water Levels	Initial water levels were based on the regional flood results.	Refer to Table 4-3 for the downstream tailwater levels adopted for the model.

Table 4-2 Aura South ERA TUFLOW Model Adopted Roughness Categories

Description	Manning's n
Watercourse/waterbody	0.025
Dirt roads	0.030
Creek Bed	0.080
Grassed Area	0.050
Agricultural Land	0.080
Medium Vegetation	0.100
Non-Vegetated Land / Open Space	0.050
Road Corridors	0.050
Medium Density Vegetation	0.120
Riparian	0.150
Urban Roads/Road Pavement	0.020
Urban Areas	0.200
Grassed Channel	0.050

Table 4-3 Aura South ERA TUFLOW Tailwater Levels – Adopted from Aura South Regional Flood Model Levels

Events	Coochin Creek	Bells Creek	Pumicestone Passage
50% - 63% AEP	1.855 mAHD	1.460 mAHD	1.205 mAHD
2% - 20% AEP	2.435 mAHD	1.869 mAHD	1.477 mAHD
1% AEP	3.215 mAHD	2.352 mAHD	1.834 mAHD
1% AEP climate sensitivity	3.565 mAHD	2.745 mAHD	2.524 mAHD
0.05% AEP	4.000 mAHD	2.735 mAHD	2.207 mAHD

4.3 Existing Case TUFLOW Model

The following section defines model inputs unique to the existing case TUFLOW model.

4.3.1 Model Topography

Figure 4-1 illustrates model topography used for the existing case TUFLOW model. For the existing case scenario, minor topographic modifications have been made to the model terrain to better represent the existing conditions. These include the following:

- Road profiles have been enforced using TUFLOW's breakline approach;
- The Pumicestone Passage floodplain outlet was not represented well in the 2014 LiDAR set; therefore, a channel has been enforced to represent it accurately and to allow conveyance;
- Several larger culvert aprons have been reinforced by lowering the local terrain to the hydraulic structures invert levels; and

- Minor in-channel blockages along the swale adjacent to the Bells Creek Road are evident. These include several include hydraulic structures that are missing. These have been represented by introducing fill across the section.

4.3.2 Boundary Conditions

Figure 4-2 illustrates the local inflow and downstream boundary locations for the existing case TUFLOW model. The placement of the local inflows is defined by the existing case sub-catchments provided in Section 3.3.

4.3.3 Model Manning's Roughness

Figure 4-3 illustrates the Manning's 'n' roughness delineation adopted for the existing case TUFLOW model. The Manning's 'n' roughness delineation adopted for the hydraulic model was based on a review of available aerial imagery for the Aura South site and defined using the different land use definitions provided in Table 4-2.

4.3.4 Hydraulic Structures

Figure 4-4 illustrates the known hydraulic structures for the existing case TUFLOW model. Details on these structures have been sourced from the following locations:

- Regional Flood Model;
- Councils Open Data Portal; and
- Bells Creek Arterial Road plans.

Any structure information that was not known (lengths, inverts, material) was estimated.

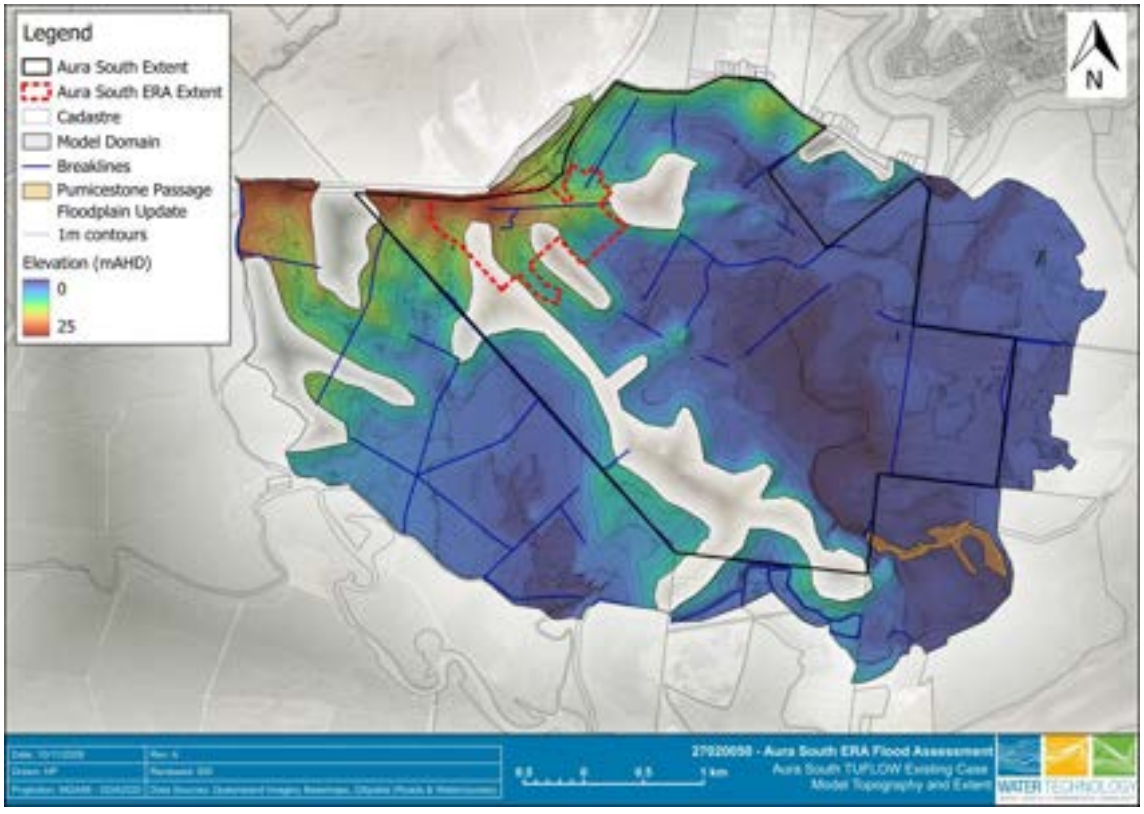


Figure 4-1 Aura South ERA TUFLOW – Existing Case Model Topography and Extent

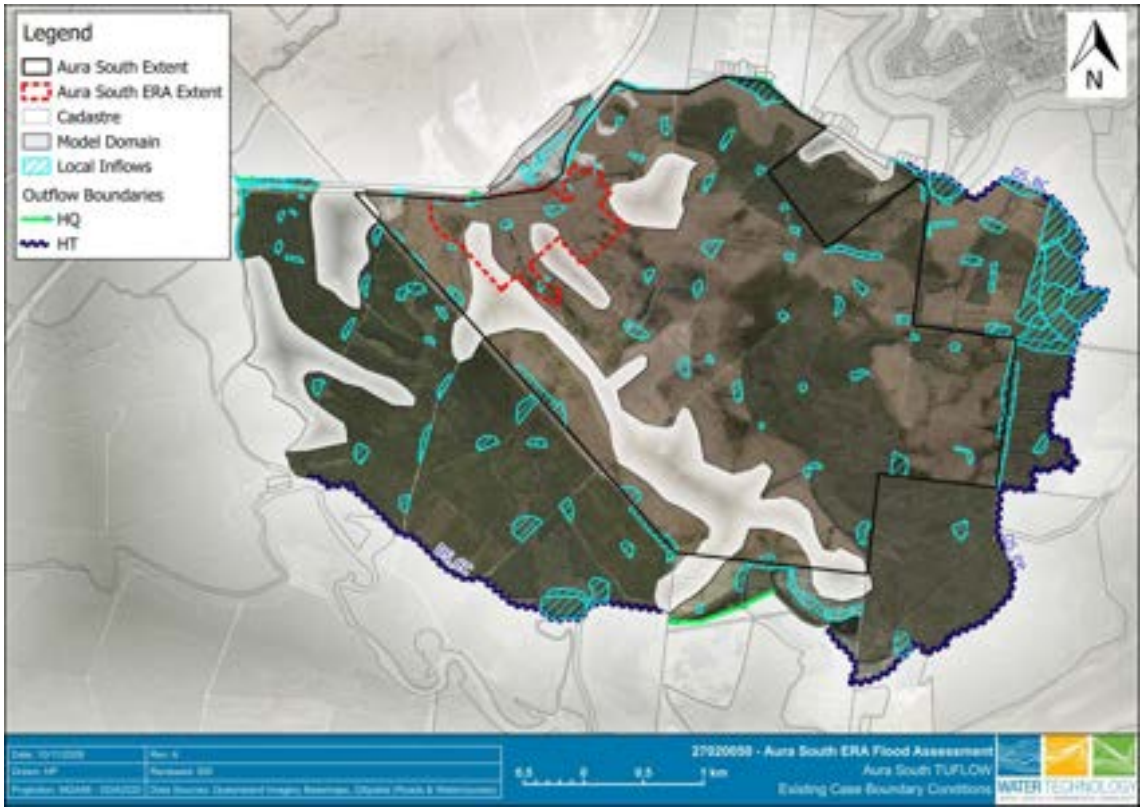


Figure 4-2 Aura South ERA TUFLOW – Existing Case Boundary Conditions

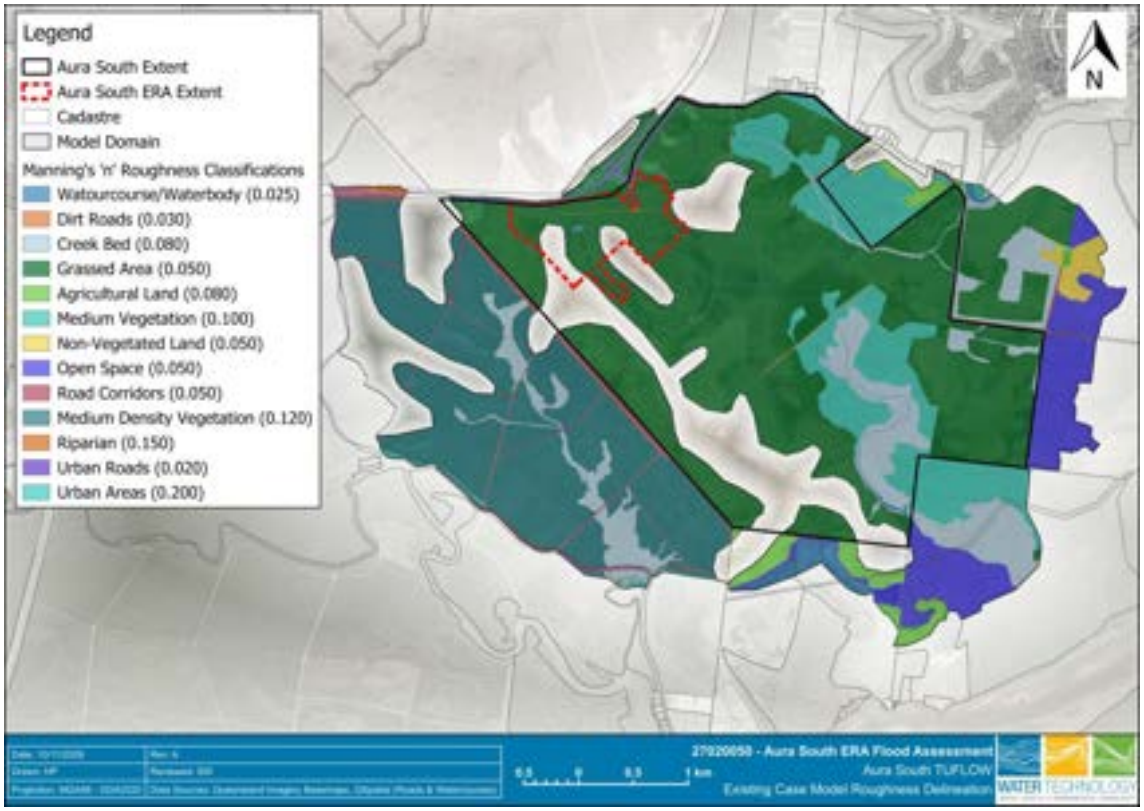


Figure 4-3 Aura South ERA TUFLOW – Existing Case Model Roughness Delineation

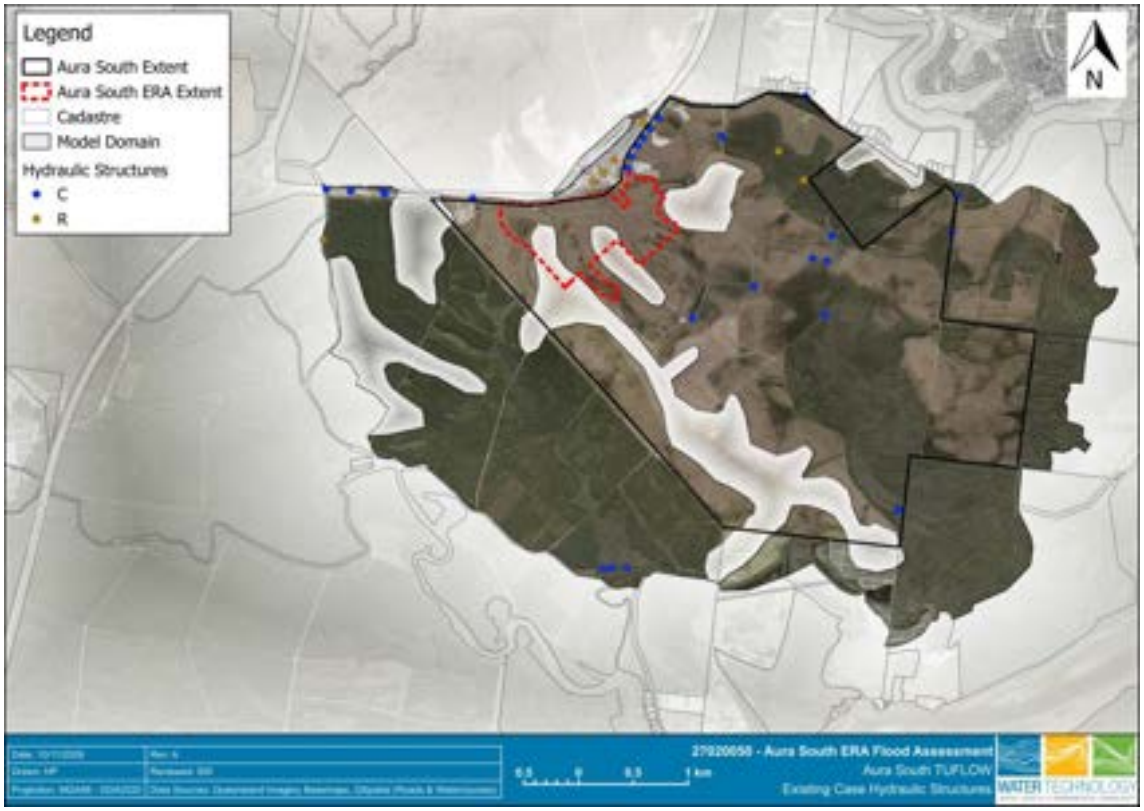


Figure 4-4 Aura South ERA TUFLOW – Existing Case Hydraulic Structures

4.4 Developed Case TUFLOW Model

The following section defines the model inputs unique to the developed case TUFLOW model. All updates are to do with the introduction of the ERA design surface and associated updates.

4.4.1 Model Topography

Figure 4-5 illustrates the model topography used for the developed case TUFLOW model. The only difference to the existing model topography is the presence of the Aura South ERA development surface which is situated within the northern centre of the model domain. Within the ERA footprint, two waterways, the Linear Drain and District Park Drain, have been introduced to provided overland flow paths within the development footprint to allow runoff from the development to drain to the downstream wetlands.

4.4.1.1 Linear Drain

The Linear Drain is located at the southern end of the ERA development, collecting runoff from approximately half of the residential area of the ERA. The Linear Drain waterway corridor also serves a dual role, with the ERA stormwater quality bioretention basins located along the waterway. The current Linear Drain design is a meandering channel approximately 300 m in length with an average channel bed slope of 1%. At the end of the Linear Drain is the Linear Drain Road, where 3 / 3000 x 1500 RCBC's are located.

Downstream of the Linear Drain Road, the Linear Drain will continue in future Aura South stages, however as of now, the drain continues as an informal only to allow for free draining. At the culvert outlet of the Linear Drain Road, the headwall is approximately 1.1 m below ground level, and so additional channel length is required to return to ground level. This required some topographic modification to the terrain surface using TUFLOW to achieve the required drainage.

4.4.1.2 District Park Drain

The District Park captures the remaining portion of runoff from the residential areas of the ERA and require transportation through the District Park to outlet to the downstream wetland. Eventually as part of the full Aura South works, this drain will have to cross through two road corridors and culvert structures before draining to the Green Heart Lake. However, for the ERA phase of the development, the District Park Drain will discharge immediately downstream of the park into the existing wetland.

The current District Park Drain has only been conceptually sized as of this assessment, with an average slope of 2% over 450 m, rock chutes will be required to provide a stable channel that will not be eroded by excessive velocities along the profile. Future ERA iterations will introduce a designed channel that caters for these requirements.

4.4.2 Boundary Conditions

Figure 4-6 illustrates the local inflow and downstream boundary locations for the developed case TUFLOW model. The arrangement of the local inflows is defined by the developed case sub-catchments provided in Section 3.4 noting that the placement of the local inflows is mostly located outside of the specific corresponding sub-catchment, as the local stormwater system for the ERA has not been analysed using this model. Instead, local sub-catchment hydrographs have conservatively been placed at their downstream outlets to the relevant outlets. Outlet conditions have not changed from the existing model.

4.4.3 Model Manning's Roughness

Figure 4-7 illustrates the model Manning's 'n' roughness delineation adopted for the developed case TUFLOW model. The Manning's 'n' roughness delineation adopted for the hydraulic model was updated from the existing case within the vicinity of the Aura South ERA design.

4.4.4 Hydraulic Structures

Figure 4-8 illustrates additional hydraulic structures introduced for the developed case TUFLOW model. This involved the following modifications to the existing hydraulic structures:

- Removal of one (1) hydraulic structure associated with Bells Creek Road.
- Addition of one (1) hydraulic structure located at the interface between the existing Bells Creek Arterial Road and the ERA design surface (2/1800x900).
- Addition of one (1) hydraulic structure located at the Linear Drain Road, located along the Linear Drain waterway (3/3000x1500).
- Addition of one (1) hydraulic structure located at the downstream end of the Bells Creek Arterial Road/Bells Creek Road channels that previously entered Aura South. This has been represented by a large pipe that allows flows through unmitigated. This alignment is conceptual and is subject to change as the development design progresses.

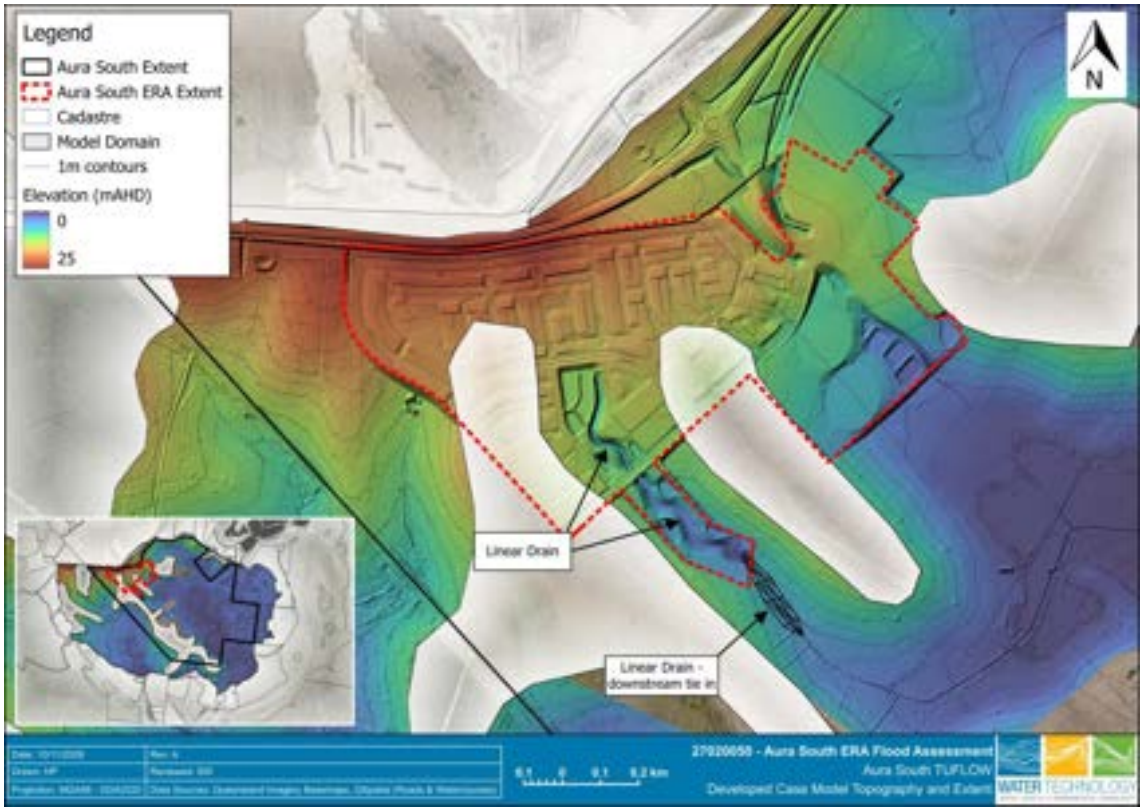


Figure 4-5 Aura South ERA TUFLOW – Developed Case Model Topography and Extent

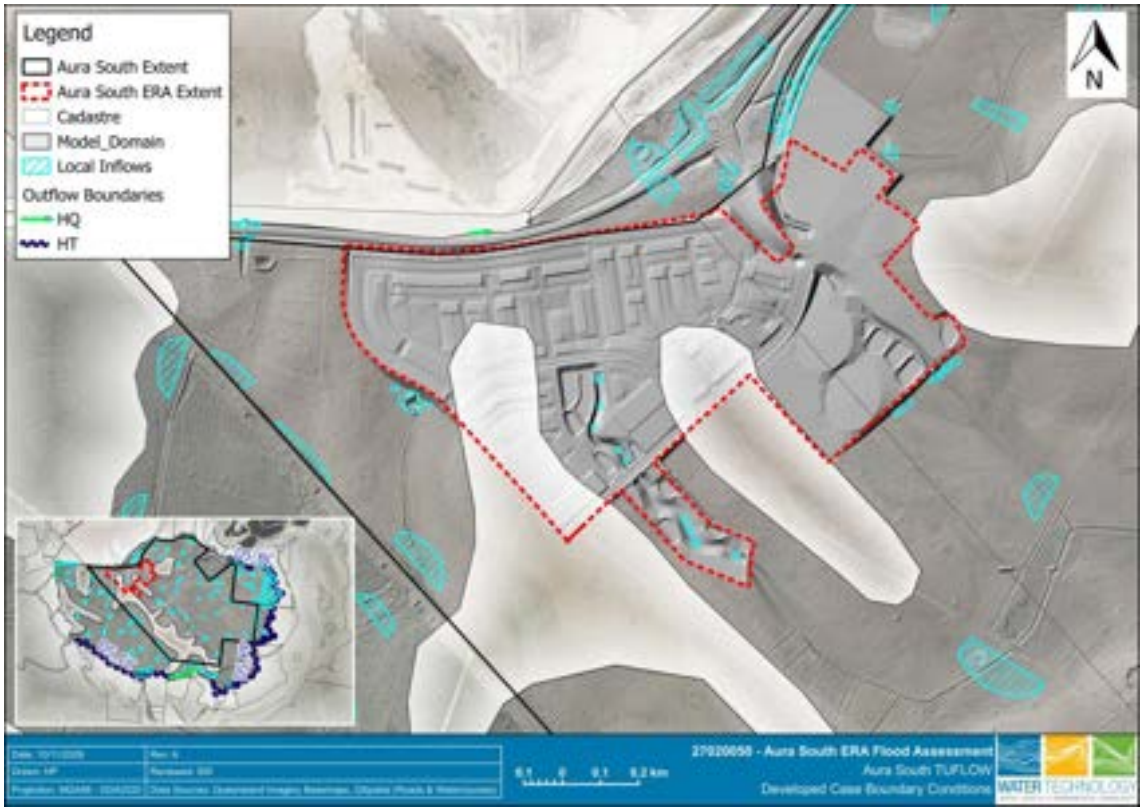


Figure 4-6 Aura South ERA TUFLOW – Developed Case Boundary Conditions

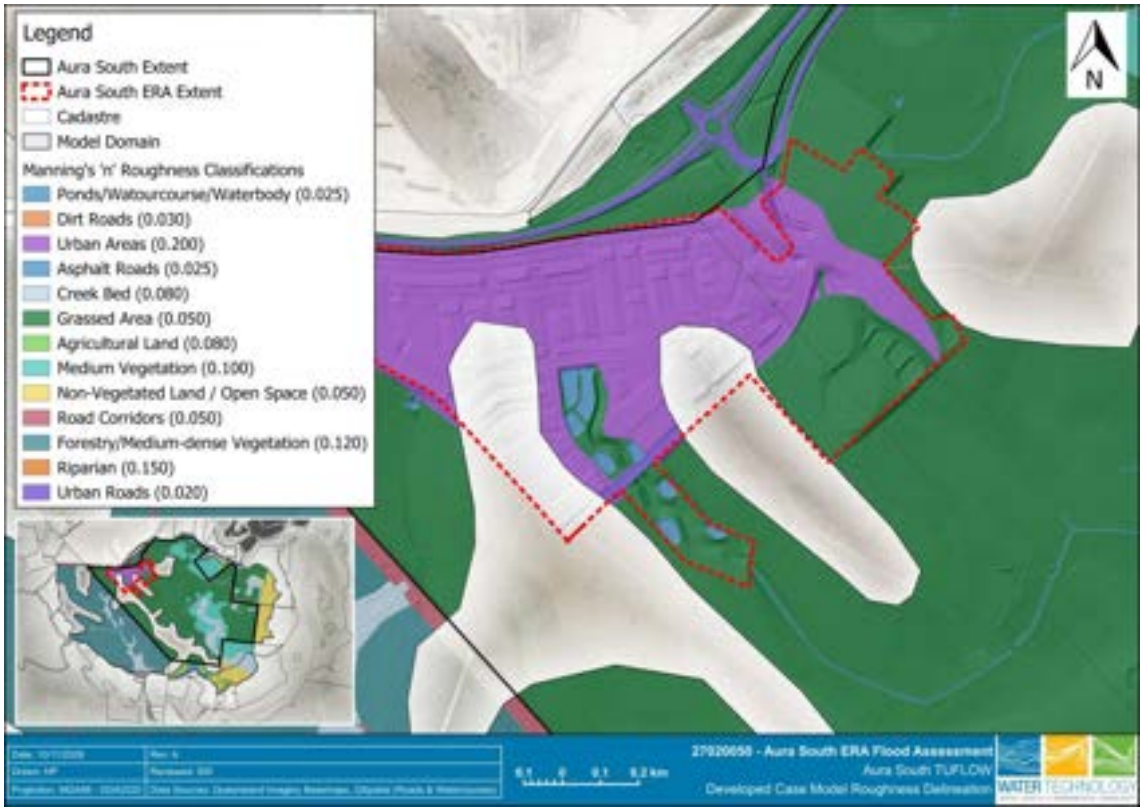


Figure 4-7 Aura South ERA TUFLOW – Developed Case Model Roughness Delineation

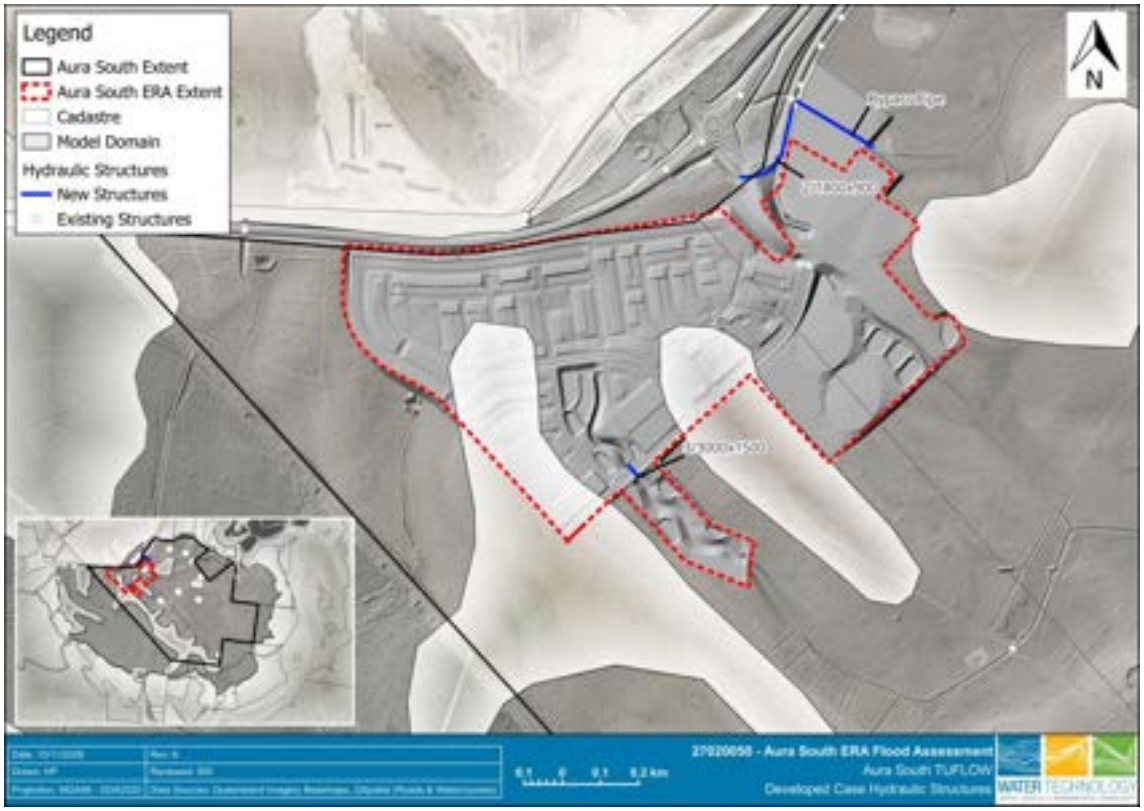


Figure 4-8 Aura South ERA TUFLOW – Developed Case Hydraulic Structures

4.5 Climate Change Sensitivity Assessment

The developed case Aura South ERA model was assessed for a 1% AEP future climate case, which made the following modifications to the current day developed model:

- The 2100 SSP3-7.0 climate scenario was adopted, updating rainfall IFD depths, and losses; and
- The 1% AEP climate change tailwater condition provided in Table 4-3 was adopted. This scenario reflected the adoption of the 2100 SSP3-7.0 climate scenario for the regional model, and sea level rise of 0.8 m.

4.6 Critical Event Analysis

The original PER regional flood assessment relied on the utilisation of existing hydrology to define the critical events, duration and temporal pattern combinations using the hydrology model. Due to the nature of the downstream floodplain that the ERA drains to, it was determined that a hydraulic assessment should be undertaken to ensure that the influence of the floodplain is captured.

The process of determining the critical duration was as follows:

4. 1%, 10% and 50% AEP events were assessed for all temporal patterns for all durations between 15 minutes and 12 hours. The events chosen were selected due to them each representing a different set of temporal patterns, which was as follows:
    a. 1% AEP – rare temporal patterns;
    b. 10% AEP – intermediate temporal patterns; and
    c. 50% AEP – frequent temporal patterns.
5. Post simulation, each event/duration was processed to generate a median flood height grid, which represented the median storm out of the 10 temporal patterns for each event for every result cell.
6. The median grids were reviewed to identify the portion of each temporal pattern that governed the median grid results (i.e. what percentage of the total flood height grid area is represented by temporal pattern 1, 2, 3…). This was undertaken to identify which temporal pattern for each event and duration was the best representative of the median flood grid. Table 4-4, Table 4-5 and Table 4-6 provide these results for the rare, intermediate and frequent temporal pattern groups respectively.
7. All median duration flood height grids were then processed to generate a max-median flood height grid, representing the maximum flood height out of the set of median duration grids. Figure 4-9, Figure 4-10 and Figure 4-11 provide the max-median flood height source grid, which identified the durations that were critical at various locations for the rare, intermediate and frequent temporal pattern groups respectively.
8. The max-median grids were then reviewed to identify which durations governed the max-median grid results (i.e. what percentage of the total flood height grid is represented by the 15-minute, 30-minute…). This was undertaken to identify whether the critical duration had been simulated for each event, and which durations dominate the overall event. Table 4-7 provides a summary of this assessment for all temporal pattern groups.
9. Once the previous steps were completed for all events, a review of the identified critical temporal pattern and duration combinations, identified in step 3, was undertaken, and a maximum grid was generated using these identified patterns for each event only. An afflux grid was generated comparing these identified critical patterns to the max-median grid generated in step 4. Figure 4-12, Figure 4-13 and Figure 4-14 provide the flood height afflux results, for the rare, intermediate and frequent temporal pattern groups respectively.
10. A review of the difference grid generated in step 6 was then completed to identify areas with ±50 mm difference to the max-median flood height grid. Where discrepancies outside these bounds were identified,

a review of the relevant duration and temporal pattern was undertaken to determine if a different temporal pattern would provide a better validation outcome. Once a revised pattern was identified, critical duration flood height and afflux grids were regenerated, replacing the pattern identified in step 3 with the one that provided a better fit to the max-median grid. This process was iterated until no discrepancies greater than ±50 mm occurred. The revised temporal patterns are provided in Table 4-4, Table 4-5 and Table 4-6.

11. These identified critical temporal patterns were used to simulate the design events for the existing and developed model scenario.

A summary of this assessment is as follows:

- It was identified that the widespread inundation at the downstream extent of the model, which is under significant influence from the regional flood model inputs, dominated the critical duration selection, which typically sat at 6 hrs for the max-median grids. The durations adopted for the impact assessment, however, was not reduced from the original range (15 m to 12 hr), to ensure that minor waterways were still accurately represented. This will help ensure that impacts will be accurately represented across the site.
- All assessed events noted some discrepancies with longer durations, due to these typically being critical in the Pumicestone Passage floodplain, and when adopted in the upper reaches of the catchment, resulted in differences greater than 50 mm. Step 7 of the above process was introduced to ensure that this was not resulting in undue influence over the model.
- In lieu of a detailed understanding of internal stormwater arrangements, the existing model scenario has been used to select the critical events for the design case. The increase in urbanisation and redirection of flows to consolidated outlets in the developed case is expected to result in the possibility of shorter duration flows becoming more critical within the model. To this end, this is why the existing case has simulated short storm durations, even though Table 4-7 identifies that storms less than 1 hr register less than 4% of the critical duration grids. Additionally, an adoption of a different group of temporal patterns between the two scenarios will result in reported afflux that is due to difference in timings of different temporal pattern distributions. Given flooding behaviour within the assessment area, it can be deduced that a change in critical duration is unlikely to result in significant changes to the critical duration and temporal pattern.

Table 4-4 Aura South ERA Model – Rare Event (2%, 1% and 0.05% AEP) Critical TP Selection from the median flood height grid

TP	15 m	30 m	45 m	1 hr	1.5 hr	2 hr	3 hr	4.5 hr	6 hr	9 hr	12 hr
1	1.4%	0.7%	14.8%	0.4%	5.3%	7.4%	5.0%	5.9%	0.1%	26.1%	9.1%
2	4.9%	7.4%	4.5%	0.5%	33.9%	1.3%	9.6%	7.0%	1.1%	23.7%	11.4%
3	0.9%	0.9%	22.9%	5.4%	19.9%	6.3%	2.0%	44.1%	11.9%	0.3%	0.2%
4	1.0%	4.0%	2.9%	1.8%	0.3%	1.9%	6.1%	7.6%	26.4%	18.8%	7.2%
5	2.4%	11.3%	0.9%	54.4%	11.0%	16.1%	10.8%	1.2%	23.2%	0.0%	1.1%
6	64.0%	5.5%	15.8%	1.4%	2.8%	11.5%	21.9%	8.0%	4.3%	27.5%	9.9%
7	2.5%	59.4%	23.5%	2.8%	2.0%	33.5%	2.1%	7.2%	6.9%	0.2%	7.2%
8	0.7%	4.0%	10.1%	6.6%	19.4%	20.0%	8.2%	9.1%	0.3%	0.6%	9.0%
9	19.0%	2.6%	0.4%	12.6%	4.7%	0.9%	34.1%	5.1%	10.2%	1.9%	44.8%
10	3.2%	4.1%	4.2%	14.1%	0.7%	1.1%	0.2%	4.7%	15.6%	0.8%	0.0%
Adopted Pattern	6	7	7	5	2	7	9	3	4	~~6~~ (8)	~~9~~ (1)

Table 4-5 Aura South ERA Model – Intermediate Event (5% and 10% AEP) Critical TP Selection from the median flood height grid

TP	15 m	30 m	45 m	1 hr	1.5 hr	2 hr	3 hr	4.5 hr	6 hr	9 hr	12 hr
1	0.2%	0.8%	0.3%	1.3%	0.6%	0.4%	5.1%	1.2%	36.5%	1.3%	14.9%
2	0.3%	0.6%	1.0%	0.1%	3.8%	2.0%	1.3%	0.2%	3.4%	6.5%	0.0%
3	9.6%	4.8%	5.6%	5.6%	0.1%	0.3%	2.6%	3.8%	3.6%	21.9%	3.5%
4	3.1%	22.6%	1.9%	0.1%	0.1%	1.0%	18.5%	7.6%	3.5%	5.7%	8.1%
5	2.7%	0.8%	66.4%	8.6%	4.1%	8.9%	0.2%	11.1%	10.3%	12.8%	5.3%
6	4.3%	4.5%	7.6%	1.9%	76.5%	3.3%	10.1%	3.5%	1.3%	3.5%	1.7%
7	2.4%	1.7%	9.3%	2.9%	8.9%	8.8%	6.4%	8.0%	8.4%	4.6%	27.0%
8	74.5%	59.5%	4.0%	72.9%	2.1%	11.3%	48.6%	38.8%	4.2%	2.2%	38.2%
9	2.6%	0.3%	2.0%	6.3%	2.6%	31.6%	4.5%	21.4%	9.9%	27.4%	0.1%
10	0.2%	4.6%	1.9%	0.3%	1.1%	32.3%	2.8%	4.4%	18.8%	14.0%	1.2%
Adopted Pattern	**8**	**8**	**5**	**8**	**6**	**10**	**8**	**8**	~~1~~ (**9**)	**9**	**8**

Table 4-6 Aura South ERA Model – Frequent Event (20% and 50% AEP) Critical TP Selection from the median flood height grid

TP	15 m	30 m	45 m	1 hr	1.5 hr	2 hr	3 hr	4.5 hr	6 hr	9 hr	12 hr
1	5.8%	0.2%	0.9%	0.6%	12.1%	0.6%	5.6%	3.6%	5.1%	0.5%	0.7%
2	5.2%	0.3%	1.5%	1.0%	4.3%	1.7%	3.0%	0.6%	0.6%	3.8%	11.5%
3	1.8%	0.3%	5.0%	0.6%	2.8%	7.1%	13.7%	7.6%	19.4%	2.8%	6.6%
4	7.9%	5.1%	27.6%	38.7%	24.5%	13.4%	35.6%	3.1%	6.6%	28.1%	44.6%
5	19.7%	2.9%	2.3%	49.2%	19.1%	8.0%	5.3%	20.1%	5.9%	23.1%	3.0%
6	24.4%	2.3%	33.9%	5.3%	2.8%	8.3%	6.8%	36.9%	25.8%	7.8%	9.0%
7	16.3%	1.4%	26.5%	2.9%	18.7%	4.7%	6.1%	8.1%	9.6%	7.9%	4.6%
8	7.1%	1.6%	1.4%	1.1%	12.8%	50.3%	7.3%	12.1%	1.0%	2.0%	3.2%
9	5.6%	84.8%	0.4%	0.2%	2.0%	4.6%	10.1%	5.7%	24.3%	9.6%	13.7%
10	6.4%	1.1%	0.4%	0.4%	0.7%	1.2%	6.5%	2.2%	1.5%	14.3%	3.1%
Adopted Pattern	**6**	**9**	**6**	**5**	4 (**3**)	~~8~~ (**6**)	**4**	**6**	~~6~~ (**4**)	4 (**6**)	**4**

Table 4-7 Aura South ERA Model – Critical Duration Breakdown for each Temporal Pattern Array from the max-median flood height grid

Duration	Rare	Intermediate	Frequent
15 m	0.48%	0.38%	0.66%
30 m	1.09%	0.41%	0.25%
45 m	1.82%	1.89%	0.01%
1 hr	0.01%	0.05%	0.01%
1.5 hr	6.92%	2.35%	3.91%
2 hr	15.54%	6.41%	2.58%

Duration	Rare	Intermediate	Frequent
3 hr	0.00%	16.61%	15.48%
4.5 hr	19.92%	3.71%	18.35%
6 hr	51.52%	54.78%	28.33%
9 hr	2.69%	13.42%	9.22%
12 hr	0.03%	1.11%	21.22%

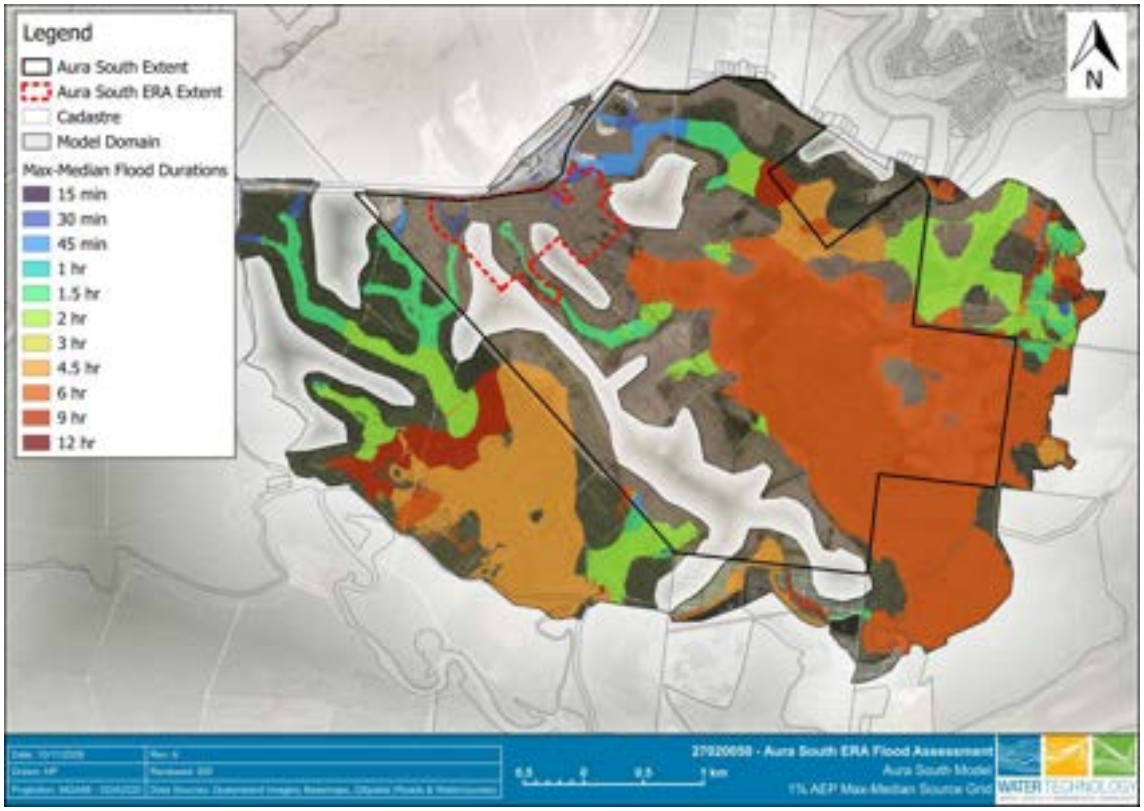


Figure 4-9 Aura South ERA Model – 1% AEP Max-Median Source Grid

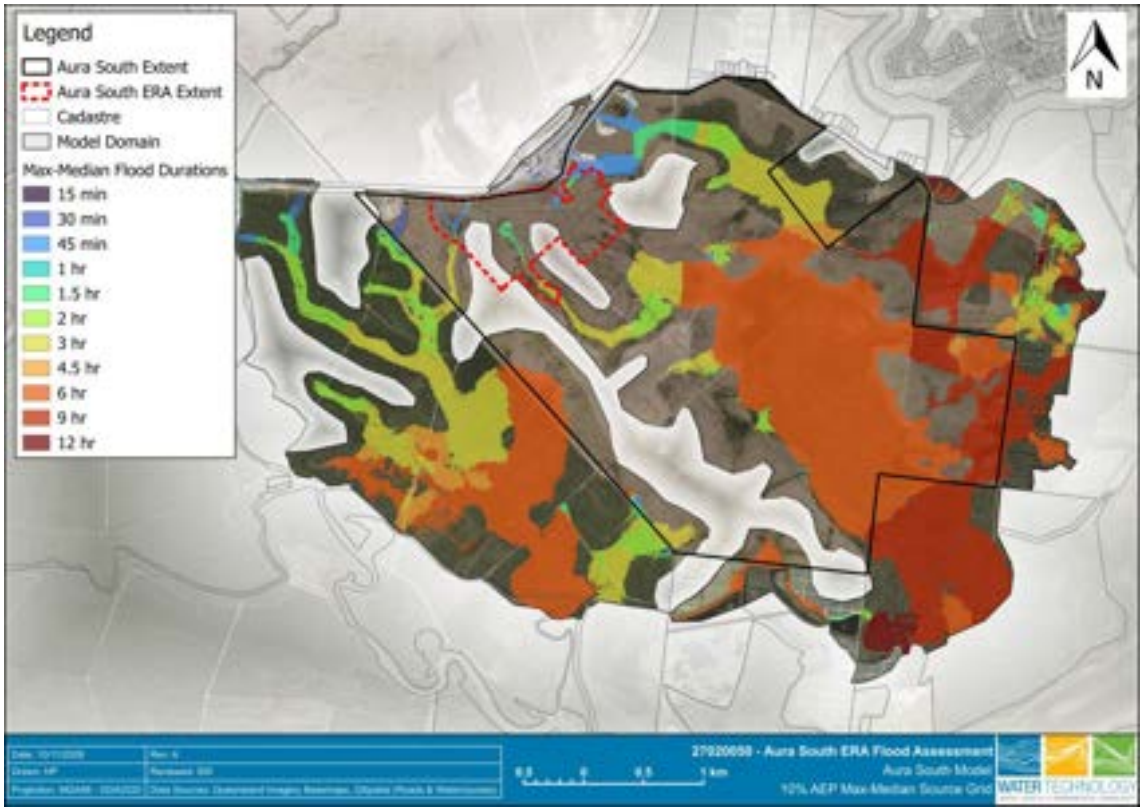


Figure 4-10 Aura South ERA Model – 10% AEP Max-Median Source Grid

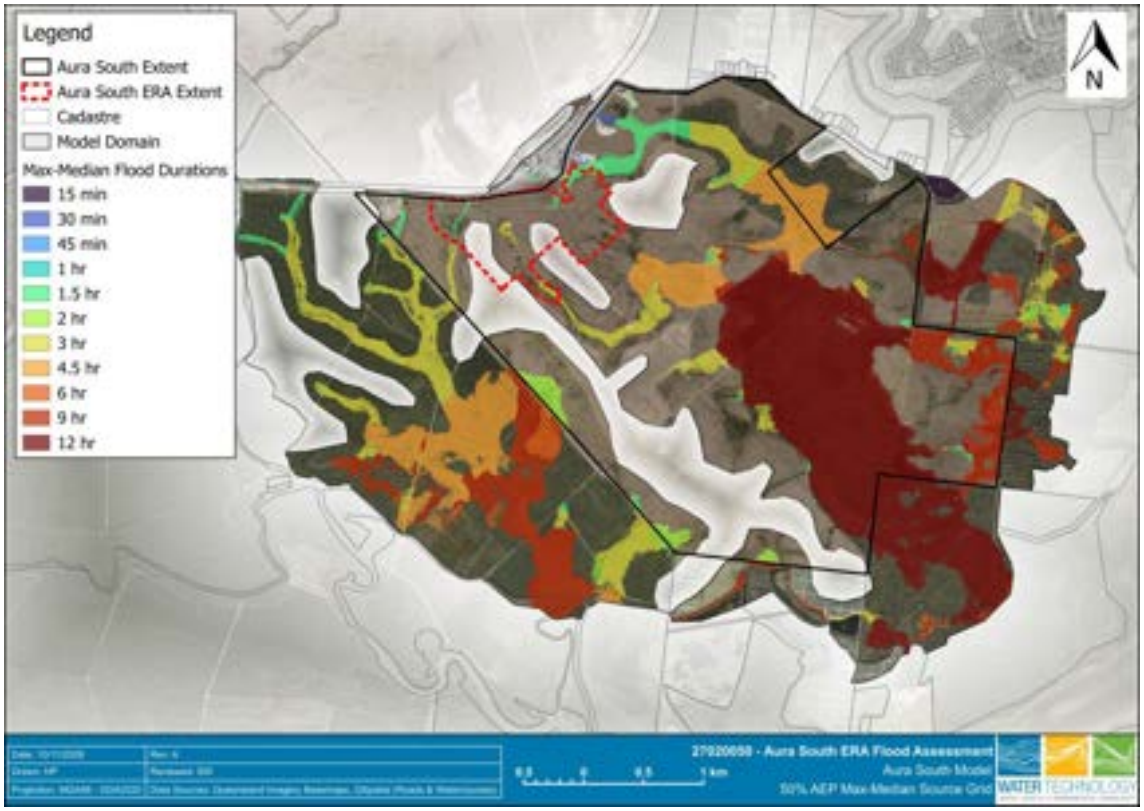


Figure 4-11 Aura South ERA Model – 50% AEP Max-Median Source Grid

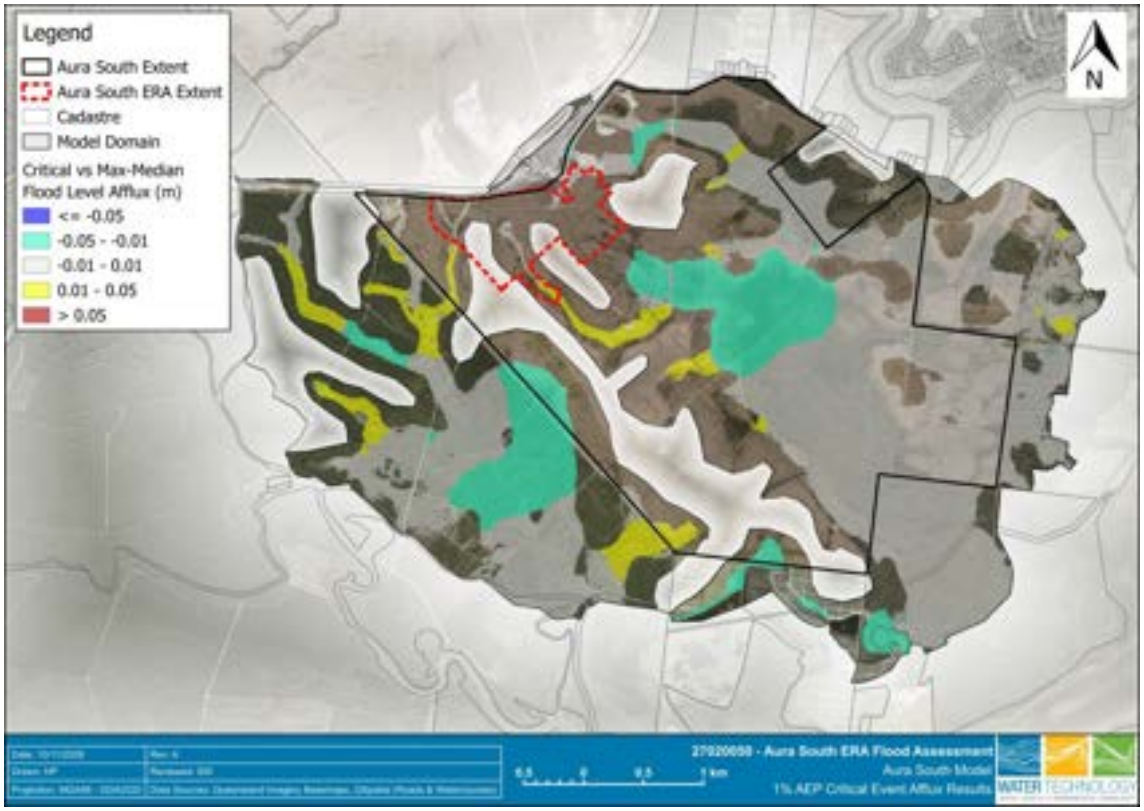


Figure 4-12 Aura South ERA Model – 1% AEP Critical Event Afflux Results

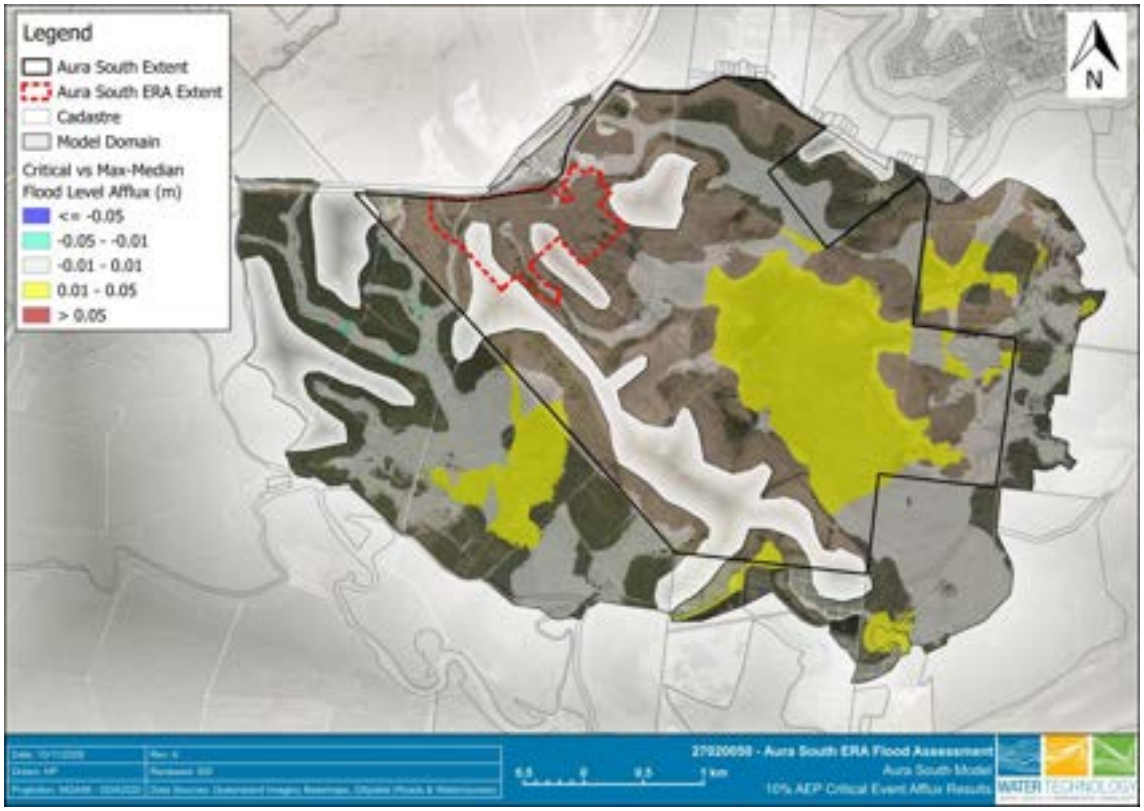


Figure 4-13 Aura South ERA Model – 10% AEP Critical Event Afflux Results

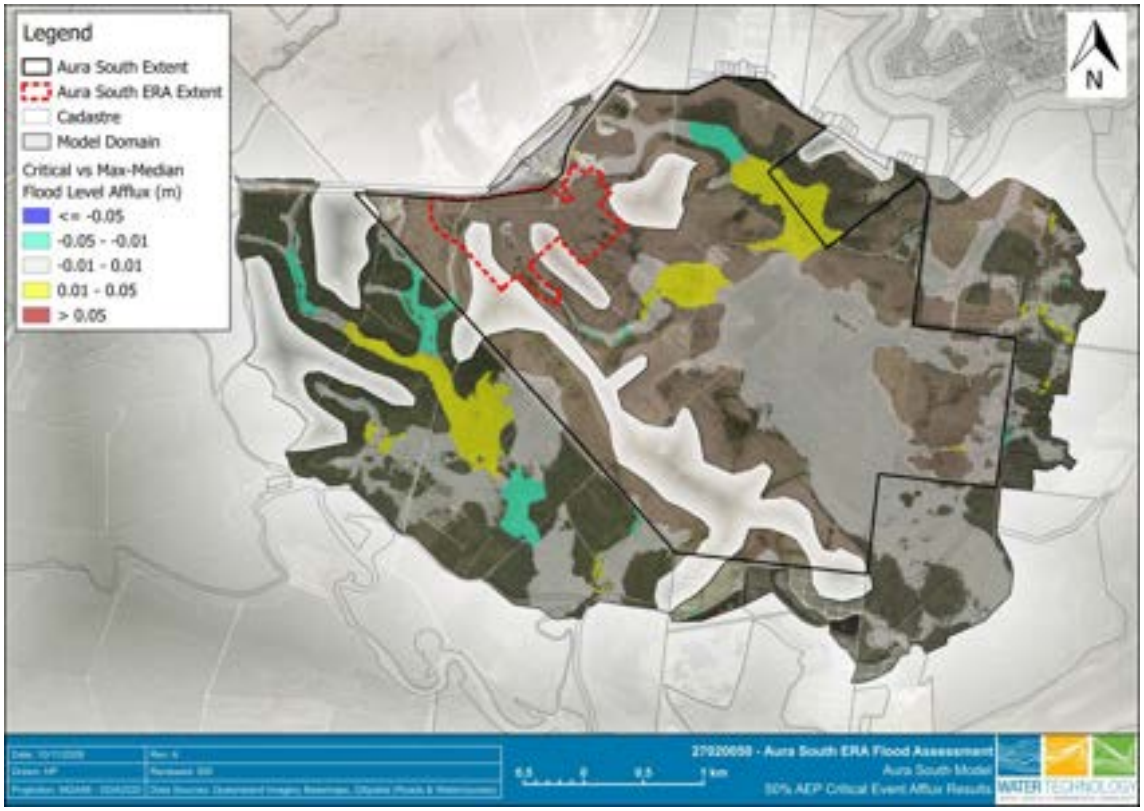


Figure 4-14 Aura South ERA Model – 50% AEP Critical Event Afflux Results

5 LOCAL HYDRAULIC MODEL RESULTS

The purpose of this assessment is to provide a revised existing case model that allows for a comparison against the Aura South ERA developed case assessment.

5.1 Existing Case Model Results

Flood maps illustrating existing case model results (flood depth, height, velocity and hazard) are provided in Appendix A.

The flow regime within the model boundary can be divided into two (2) distinct regions, the catchment reaches along Bells Creek Arterial Road including the central ridgeline that runs along the south-western boundary and the regionally influenced lower catchment that is predominantly controlled by regional tailwater assumptions.

The upper portions of the Bells Creek and Lower Coochin Tributary catchments were defined by short, sharp flows, with the critical flood event tending to be one of the shorter assessed durations, typically around the 1-hour duration for the 1% AEP event. The upper Bells Creek catchment will undergo the most significant changes in the developed case results where the increase in urbanisation is expected to result in a more frequent critical duration for these locations. It is expected that the Lower Coochin catchment will see a reduction in peak flows, as a portion of the catchment will now be part of the ERA, and directed towards the Linear Drain.

The lower portions of the model domain are defined by the tailwater conditions; within the Lower Coochin catchment flow is predominately contained to the southern model boundary due to a bund along the southern boundary containing most flow events. Due to the tailwater at the Bells Creek outlet, flows in the 1% AEP event and greater have backflow from the Bells Creek that enters Halls Creek which then drains via the Halls Creek outlet. In more frequent events this can be contained by Tweedale Road, which separates the two systems.

The local flood model provides a good representation of the extent of existing flooding across the site and immediately downstream where they integrate with regional flood results within the wetland. A summary of the critical peak flows for the design events are provided in Table 5-1, and the locations of the critical flow extractions are provided in Figure 5-1. These locations were chosen as the Coochin Outflow and Halls Creek locations represent the total flows leaving the site, whilst the Linear Drain and Northern Outlet each reflect the locations where flows are expected to increase in the developed case.

Table 5-1 Aura South ERA – Existing TUFLOW Model Critical Flows (m^3/s)

Event	Coochin Outflow (PL_069)	Linear Drain (B2)	Northern Outlet (A7)	Halls Creek (C5)
PMF	321.5	47.8	266.8	614.9
0.05% AEP	104.1	16.7	84.3	246.8
1% AEP	58.9	10.3	48.2	147.2
2% AEP	49.9	9.0	41.7	104.8
5% AEP	45.0	7.0	36.4	86.8
10% AEP	37.4	5.9	29.8	68.8
20% AEP	31.7	4.3	25.9	29.0
50% AEP	19.0	2.9	14.2	8.3

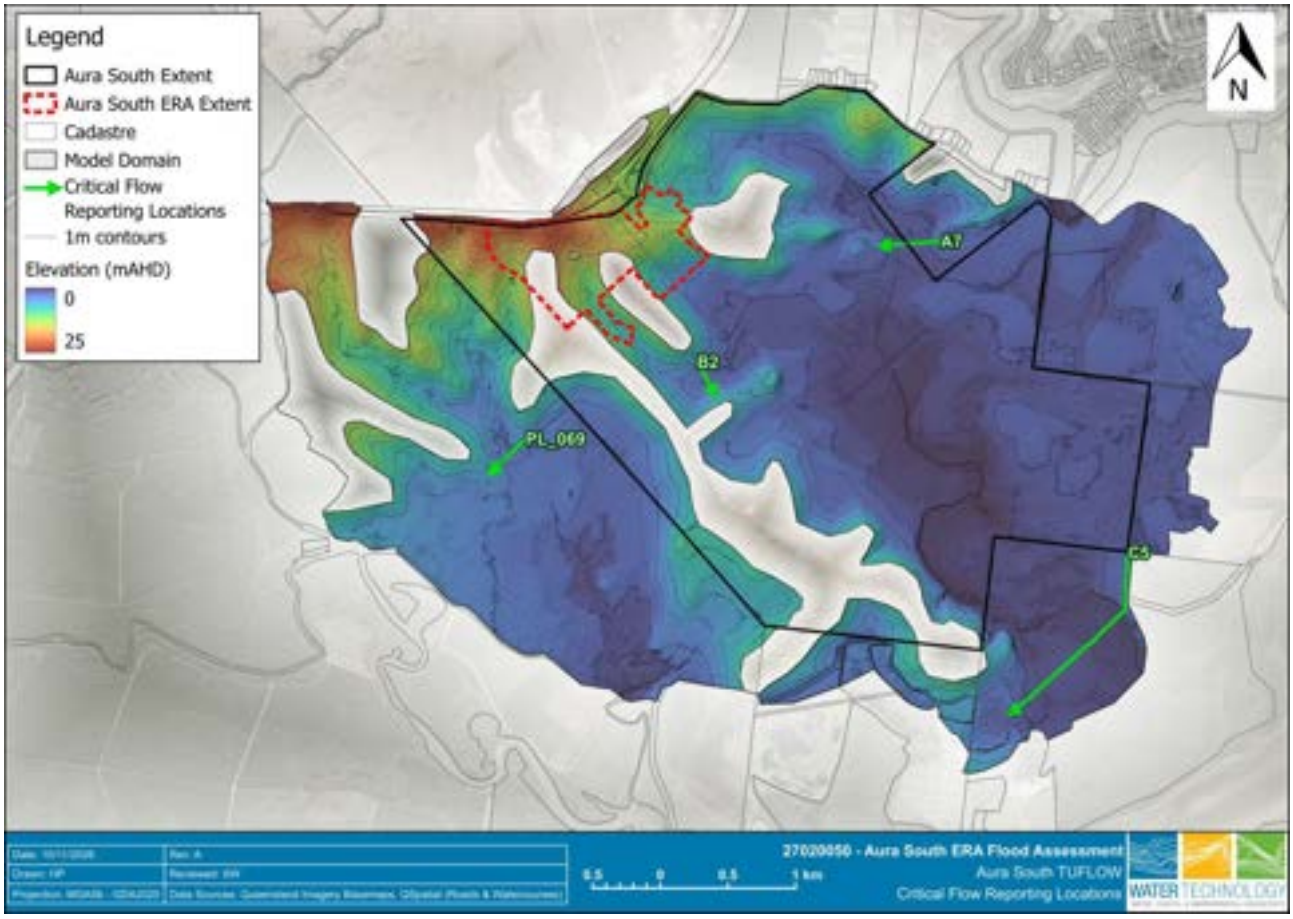


Figure 5-1 Aura South ERA TUFLOW Model – Critical Flow Reporting Locations

5.2 Developed Case Model Results

Flood maps illustrating developed case model results (flood depth, height, velocity and hazard) are provided in Appendix B.

The model development process was such that the urbanised areas have had their outflow hydrographs applied directly to the relevant downstream locations, assuming no internal mitigation of flows via stormwater network or basins has occurred, providing a conservative outcome for the assessment regarding peak flows, whilst still maintaining correct storm runoff volumes. For most of the ERA development, these flows have then been applied at either the Linear or the District Park Drains, which have been sized and assessed for ensure they can contain the modelled events. The remaining portions of the ERA development have been directly applied to the downstream waterways.

As with the existing case results, critical design flows have been provided in Table 5-2, extracted at four reporting locations, the same identified in Figure 5-1. Differences between existing and developed cases are explored further in Section 5.3.

Table 5-2 Aura South ERA – Developed TUFLOW Model Critical Flows

Event	Coochin Outflow (PL_069)	Linear Drain (B2)	Northern Outlet (A7)	Pumicestone Passage (C5)
PMF	303.2	93.9	245.8	628.4
0.05% AEP	97.0	35.2	80.0	250.4
1% AEP	54.4	21.6	45.7	149.7
2% AEP	46.4	18.7	39.7	107.4
5% AEP	42.2	16.6	34.8	89.9
10% AEP	35.1	13.8	28.5	71.6
20% AEP	29.8	10.9	24.7	30.9
50% AEP	17.8	7.3	13.6	9.2

5.3 Flood Impact Assessment

Flood maps illustrating the developed vs existing flood level afflux results are provided in Appendix C. Table 5-3 provides the difference in peak flows at the reporting locations previously identified in Figure 5-1 between developed and existing cases. The following section provides details on the outcome of the flood impact assessment for the various reporting locations. These locations can generally be divided into the Coochin Creek Tributary, and Pumicestone Passage, as the model domain is split in two between the two hydraulic outlets.

Generally, impacts identified in the following section are minor in terms of afflux and increases to runoff and are considered acceptable.

5.3.1 Coochin Creek Tributary

The ERA has resulted in a minor reduction in catchment area draining towards the Coochin outlet, due to the new landform directing additional catchment to the Linear Drain. The existing Bells Creek Arterial Road sub-catchments that drain towards the Coochin outlet have been assumed to still be draining in this direction. This was modelled by moving the inflow boundaries downstream of the ERA footprint.

The impacts of the ERA within the Coochin portion of the model domain demonstrate a reduction in peak flow, and a reduction in flood level, and therefore are acceptable.

5.3.2 Pumicestone Passage

5.3.2.1 Linear Drain

The Linear Drain outlet is one of the two main outlet locations where the urbanised ERA development is discharging to Pumicestone Passage. This is reflected in the increase in runoff shown in Appendix C. The reported impacts of this increase in runoff dissipate once the regional tailwater influence is introduced. Furthermore, whilst the existing channel downstream of the Linear Drain is experiencing this increase in runoff, the future Aura South stages will continue to progress the Linear Drain further south and replace the existing channel with an engineered drain. Changes in flows are presented in Table 5-3 and are visually represented in Appendix C.

5.3.2.2 District Sports Park

Similar impacts as shown in the Linear Drain were seen downstream of the District Sports Park, which not only receives the outlet of the sports park and the associated basins, but the remaining portion of the Aura South ERA development that is not directed to the Linear Drain. As with the Linear Drain, these impacts are both temporary in nature due to the planned future downstream development, but also, impacts are limited to the downstream regionally constrained floodplains.

5.3.2.3 Commercial Zone

The future commercial zone that is located outside of the ERA extent is only undergoing bulk earthworks, with the remainder of the commercial zone within the ERA extent being redirected to the District Sports Park outlet. To this end, the results are like the Coochin outlet whereby there is a reduction in catchment area being directed to this outlet, and therefore a reduction in flood levels and peak runoff.

5.3.2.4 Wetland

Once the flows from each of the three ERA outlet locations combine within the downstream Aura South wetland, there is a general reduction in flood level afflux results, as well as in the different in peak flows, with the following main observations being observed:

The 2%, 1% and 0.05% AEP events all demonstrate no afflux greater than 10 mm outside of the Aura South extent. The 50%, 20%, 10% and 5% AEP events all demonstrate minor afflux within Lot 105 AP22476, between 10 and 20 mm. Note that from aerial imagery that the entire lot is dominated by the wetland.

Peak flow is observed to have increased at the reporting location for all events, ranging from a 1% to 10% increase in runoff. This magnitude of increase runoff however in the floodplain does not result in unacceptable afflux increases.

Table 5-3 Aura South ERA – Developed vs Existing TUFLOW Model Critical Flow Difference

Event	Coochin Outflow (PL_069)	Linear Drain (B2)	Northern Outlet (A7)	Halls Creek (C5)
PMF	-6%	49%	-9%	2%
0.05% AEP	-7%	53%	-5%	1%
1% AEP	-8%	52%	-5%	2%
2% AEP	-8%	52%	-5%	2%
5% AEP	-7%	58%	-5%	3%
10% AEP	-7%	57%	-5%	4%
20% AEP	-6%	61%	-5%	6%
50% AEP	-7%	60%	-4%	10%

5.4 Extreme Event Analysis

The PMF / PMP flood event was simulated to identify potential flood hazard concerns, and the influence they have on infrastructure.

The two main locations of note for this were changes to Bells Creek Arterial Road and the new Linear Drain Road, the flood hazard results for each provided in Figure 5-2 and Figure 5-3 respectively. The key results for each location were as follows:

- Bells Creek Road:
  - The existing case Bell Creek and Bells Creek Arterial Road were already inundated in the existing case modelling.
  - Bells Creek Arterial Road maintains a consistent level of flood hazard (<0.3 m^2/s) in the ERA developed scenario.
  - Bells Creek Road does report increases in flood hazard, but as the existing crossing was already non trafficable (>0.3 m^2/s) this does not constitute a change in immunity and trafficability.
- Linear Drain Road
  - The linear drain overtops the road in the PMF event but remains trafficable (<0.3 m^2/s).

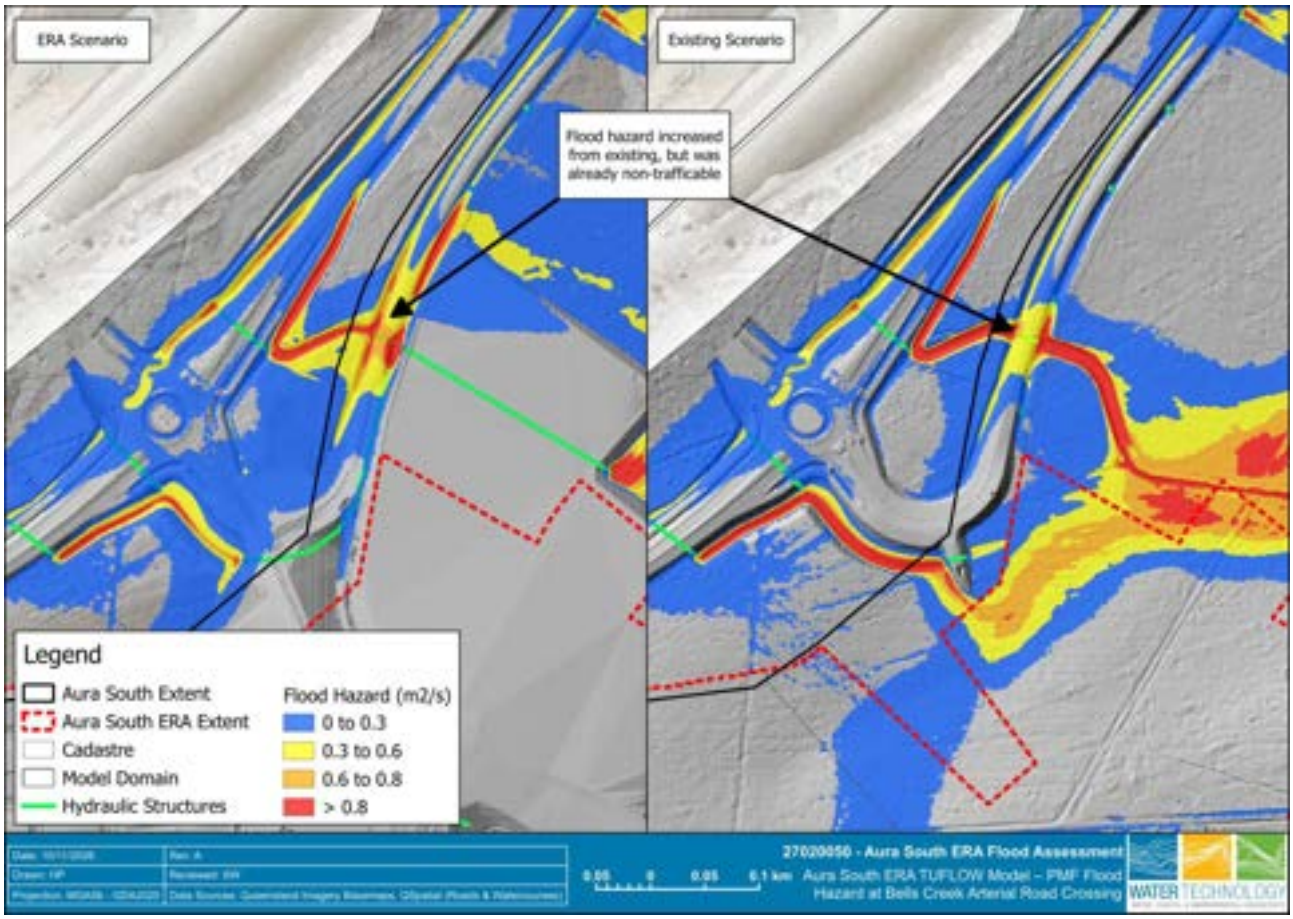


Figure 5-2 Aura South ERA TUFLOW Model – PMF Flood Hazard at Bells Creek Arterial Road Crossing

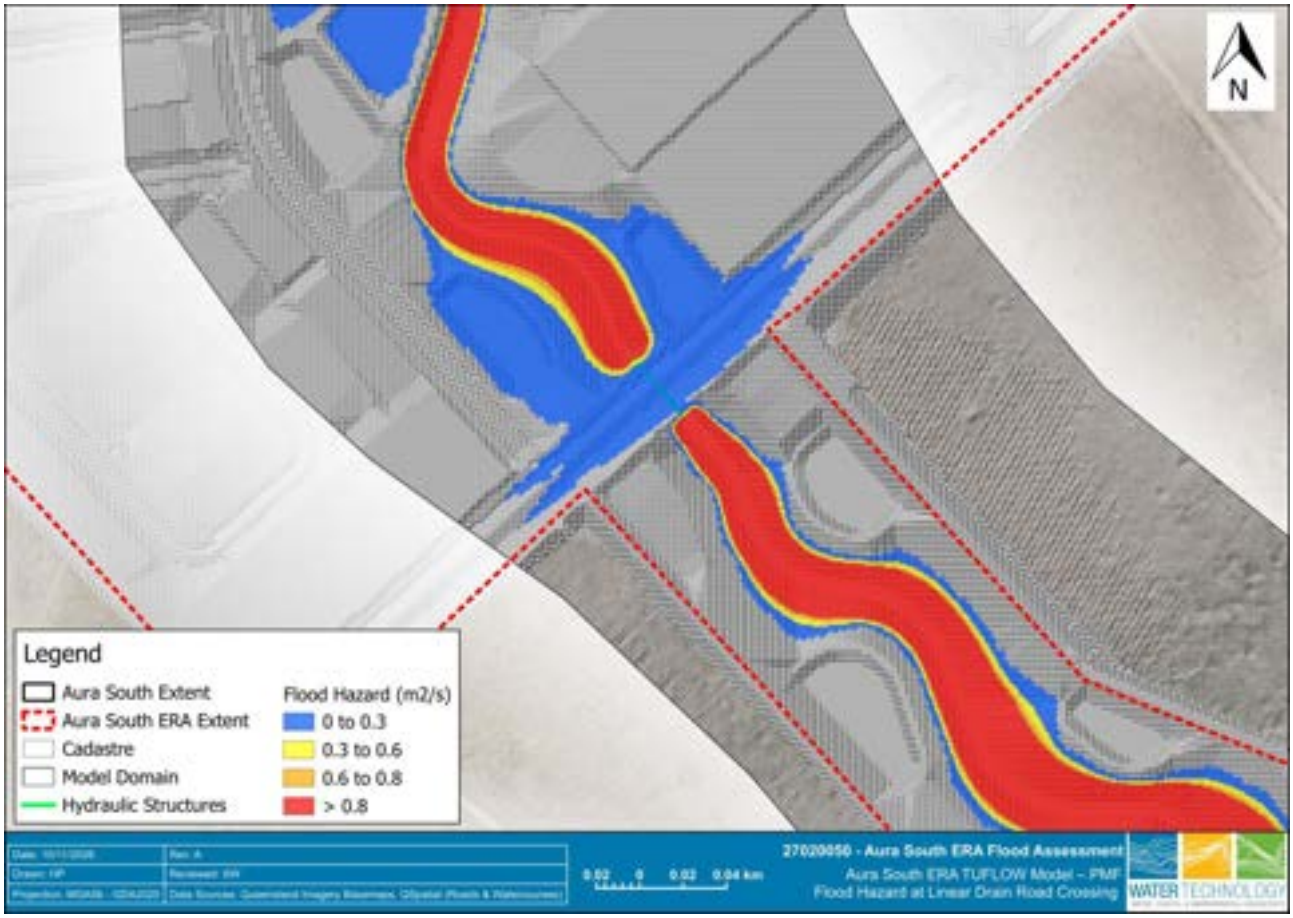


Figure 5-3 Aura South ERA TUFLOW Model – PMF Flood Hazard at Linear Drain Road Crossing

5.5 Climate Change Sensitivity Results

The 1% AEP developed case climate change sensitivity flood level afflux results are provided in Figure 5-4. The mapping indicates that, as expected, flood levels increase across the entire site due to the increase in rainfall depths and the tailwater level increase. Changes within the model domain can be summarised as follows:

- Flood levels within the Pumicestone Passage wetland have increase by approximately 470 mm, predominately driven by the increases in regional tailwater level.
- Within the ERA Linear Drain, levels have increased between 100 – 300 mm in flood depth. This is insufficient to impact the Linear Drain Road crossing or the surrounding basin.
- The modelling does not indicate any impacts to the Aura South ERA development due to the adoption of the climate change scenario.
- Table 5-4 provides the peak flow estimates for the developed case climate sensitivity scenario for the same locations identified in Figure 5-1. The results indicate an increase in peak flows of approximately 30 – 40% between the 2030 SSP2-4.5 and 2100 SSP3-7.0, which aligns with the approximate difference in rainfall increase depth.

Table 5-4 Aura South ERA – Developed Climate Sensitivity TUFLOW Model Critical Flows

Event	Coochin Outflow (PL_069)	Linear Drain (B2)	Northern Outlet (A7)	Pumicestone Passage (C5)
1% AEP 2100 SSP3 Peak Flow	83.6	32.3	75.8	220.5
Difference	35%	33%	40%	32%

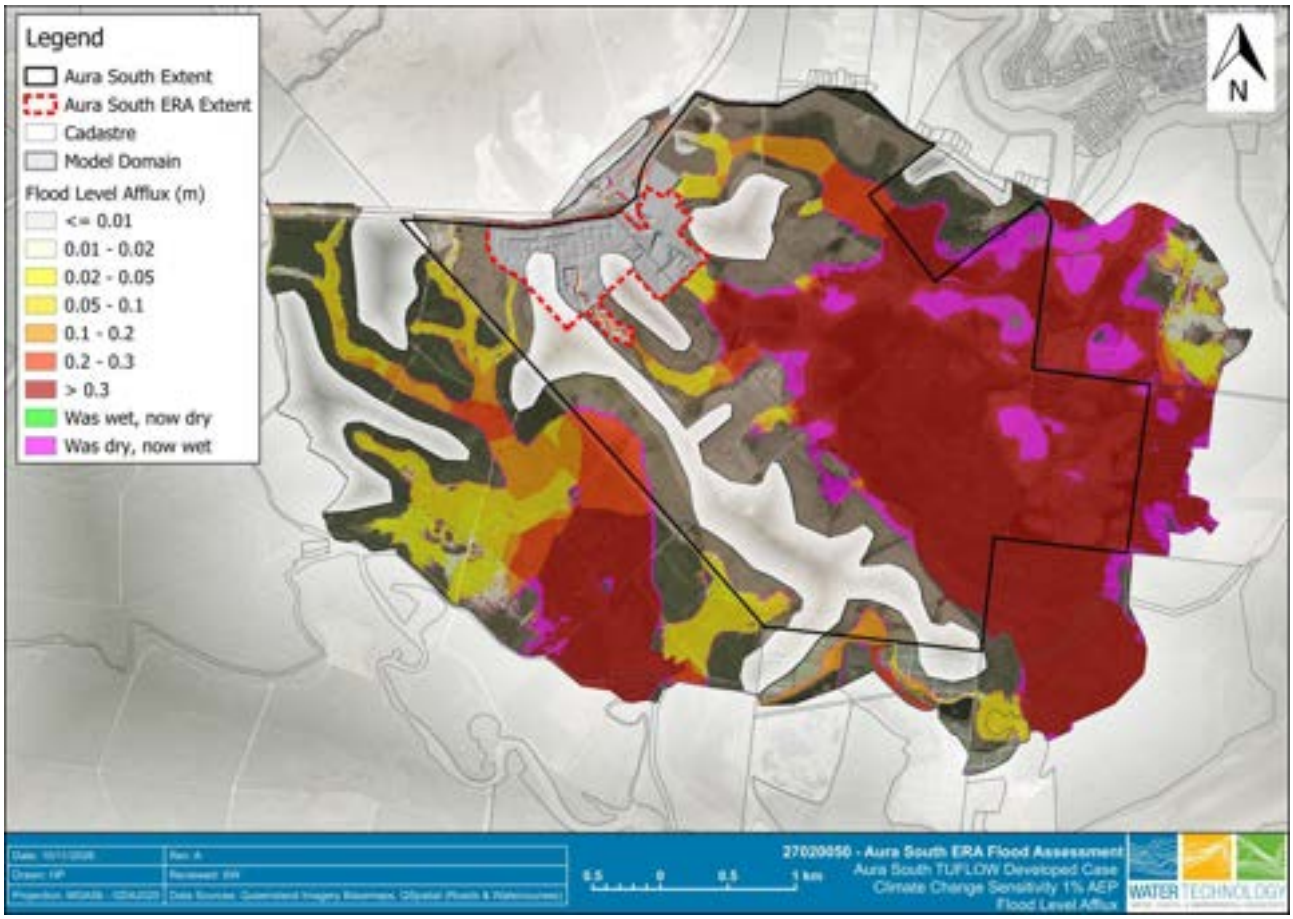


Figure 5-4 Aura South ERA – Developed Case Climate Change Sensitivity 1% AEP Flood Level Afflux

6 HALLS CREEK PDA PROPOSED DEVELOPMENT SCHEME

A draft Halls Creek PDA Proposed Development Scheme was released for consultation purposes in September 2026. This scheme was reviewed to identify any relevant components for the Aura South ERA development, which requires compliance with Section 2.5.2.3 Flood Risk Management of the proposed development scheme, which states the following:

Development minimises the risk to life, property, community, economic development and the environment from the flood hazard by:

1. *avoiding flood hazard areas or incorporating mitigation measures to protect people from flood events up to and including the probable maximum flood level,*
2. *protecting floodplain storage, maintaining waterway flood conveyance capacity, retaining or enhancing vegetation that mitigate flood hazard,*
3. *avoiding an increase hazard exposure or severity and preventing potential damage on the site or to surrounding properties and infrastructure,*
4. *supporting disaster management operations, and not hindering or unduly burdening response or recovery capacity and capability,*
5. *ensuring essential network and community infrastructure maintains effective function during, and immediately after, future flood and storm-tide events*[35]*,*
6. *avoiding risks to public health and safety and the environment by appropriately locating hazardous materials and preventing their release during flood events,*
7. *providing a flood resilient public realm, and*
8. *ensuring habitable rooms and non–habitable rooms achieve an acceptable level of flood immunity.*

33 See Council's most up to date flood mapping, available via Council's website, as amended from time to time. It is recommended that applicants contact Council for confirmation of the most up to date pre-development mapping for assessment purposes.

34 See the requirements, standards and guidance identified in the Planning Scheme Flood overlay code and Flood planning scheme policy for guidance. Flood reports and plans are to be prepared by a suitable qualitied Registered Professional Engineer Queensland.

35 See EDQ PDA guideline no. 15: Protection from flood and storm tide inundation.

The Aura South development in relations to Section 2.5.2.3 has been assessed to date as part of the following two documents:

- *'Aura South Self-contained Masterplanned Community Draf PER Chapter 7 Impact Assessment – Water Quality and Quantity Investigations*,' dated 18 March 2025 (Water Technology, 2025),
- *'Aura South Early Release Area Flood Assessment*,' dated 9 November 2026 (Water Technology, 2026).
- *'Aura South ERA – Waterway Stability Assessment,'* dated 3 November 2026 (Water Technology, 2026).

The PER documentations have undertaken preliminary modelling of the entirety of the Aura South development, the ERA flood assessment has assessed in detail the first proposed stage of the development and the Waterway stability assessment (attached as Appendix D) provides documentation on the current status of the waterways downstream of Aura South. All documents demonstrate compliance with Section 2.5.2.3 of the Halls Creek PDA Proposed Development Scheme documentation.

7 CONCLUSION

Water Technology has been commissioned to undertake a flood assessment for Aura South. Aura South is a part of the wider Aura development, being undertaken by Stockland. This flood assessment has assessed the potential flood impacts associated with the proposed Aura South Early Release Area (ERA) through the application of detailed local hydrological and hydraulic modelling. The assessment builds upon previous Aura South flood investigations undertaken for the Public Environment Report (PER) process and subsequent supplementary studies, while incorporating updated hydrological inputs, refined catchment delineation, detailed ERA design information and contemporary climate change guidance.

The assessment involved development of updated WBNM hydrologic and TUFLOW hydraulic models representing existing and developed conditions. The developed case incorporated the current ERA design surface, proposed drainage arrangements, revised catchment boundaries and associated increases in urbanisation.

Modelling demonstrates that the ERA results in only minor changes to flood behaviour across the model domain. Changes in peak flow are generally confined to locations immediately downstream of proposed development outlets where catchment redistribution and increased imperviousness alter the distribution of runoff volumes.

Assessment of developed versus existing conditions indicate that flood level impacts are generally negligible across the broader receiving environment. For the rarer flood events assessed (2%, 1% and 0.05% AEP), no flood level increases greater than approximately 10 mm were identified outside the Aura South footprint. For more frequent events, minor afflux is predicted within downstream wetland areas, generally limited to approximately 10 to 20 mm and occurring predominantly within existing wetland environments that are already subject to inundation. These impacts are minor in magnitude, remain contained within the broader Aura South floodplain system and do not represent an unacceptable increase in flood risk to adjoining properties or infrastructure.

It is noted that the adopted modelling methodology is conservative. In the absence of completed detailed stormwater infrastructure design for portions of the ERA, runoff hydrographs from developed catchments were applied directly to downstream receiving waterways rather than being routed through future detention, drainage and stormwater management infrastructure. This approach excludes the attenuation benefits that would typically be provided by a fully developed stormwater network and therefore is likely to overestimate peak discharge rates and associated downstream impacts. The resulting assessment therefore represents a conservative estimate of flood impacts associated with the proposed development.

Based on the outcomes of the hydrological and hydraulic modelling undertaken, it is concluded that the proposed Aura South ERA satisfies the objectives of avoiding unacceptable off-site flood impacts and can proceed from a flood behaviour perspective, subject to ongoing refinement of detailed drainage and stormwater infrastructure design during subsequent stages of project development.

8 REFERENCES

Ball, J., Babister, M., Nathan, R., Weeks, W., Weinmann, E., Retallick, M., & Testoni, I. (2019). *Australian Rainfall and Runoff: Guide to Flood Estimation Version 4.2.* Geoscience Australia.

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APPENDIX A
EXISTING CASE FLOOD RESULTS





Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix A1 - Aura South Existing Case Flood Results

50% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A2 - Aura South Existing Case Flood Results

20% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A3 - Aura South Existing Case Flood Results

10% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A4 - Aura South Existing Case Flood Results

5% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

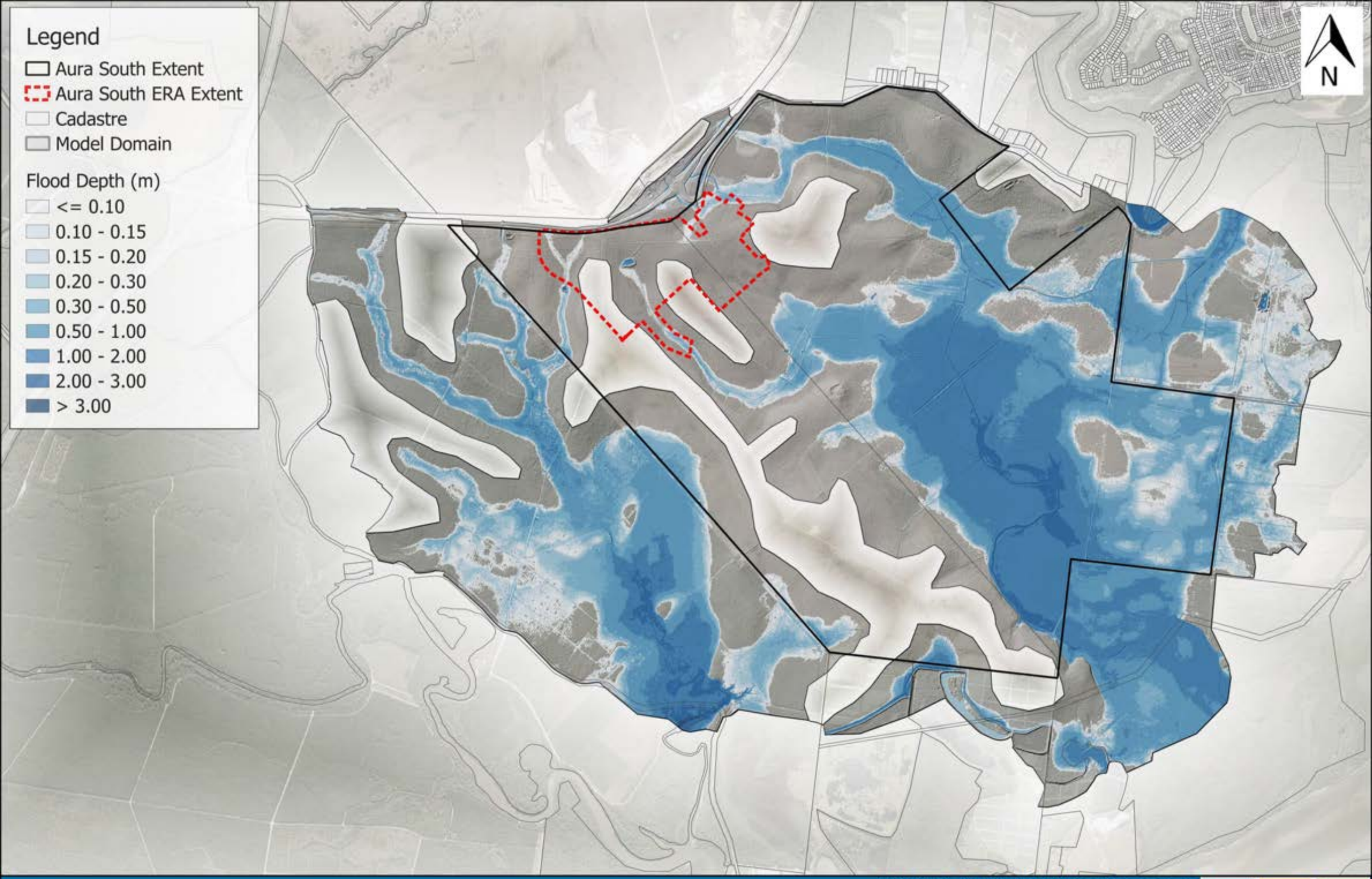
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A5 - Aura South Existing Case Flood Results

2% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix A6 - Aura South Existing Case Flood Results

1% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A7 - Aura South Existing Case Flood Results

0.05% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A8 - Aura South Existing Case Flood Results

PMF Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix A9 - Aura South Existing Case Flood Results

50% AEP Water Surface Level

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix A10 - Aura South Existing Case Flood Results

20% AEP Water Surface Level

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A11 - Aura South Existing Case Flood Results

10% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A12 - Aura South Existing Case Flood Results

5% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A13 - Aura South Existing Case Flood Results

2% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix A14 - Aura South Existing Case Flood Results

1% AEP Water Surface Level

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A15 - Aura South Existing Case Flood Results

0.05% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A16 - Aura South Existing Case Flood Results

PMF Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A17 - Aura South Existing Case Flood Results

50% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A18 - Aura South Existing Case Flood Results

20% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A19 - Aura South Existing Case Flood Results

10% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

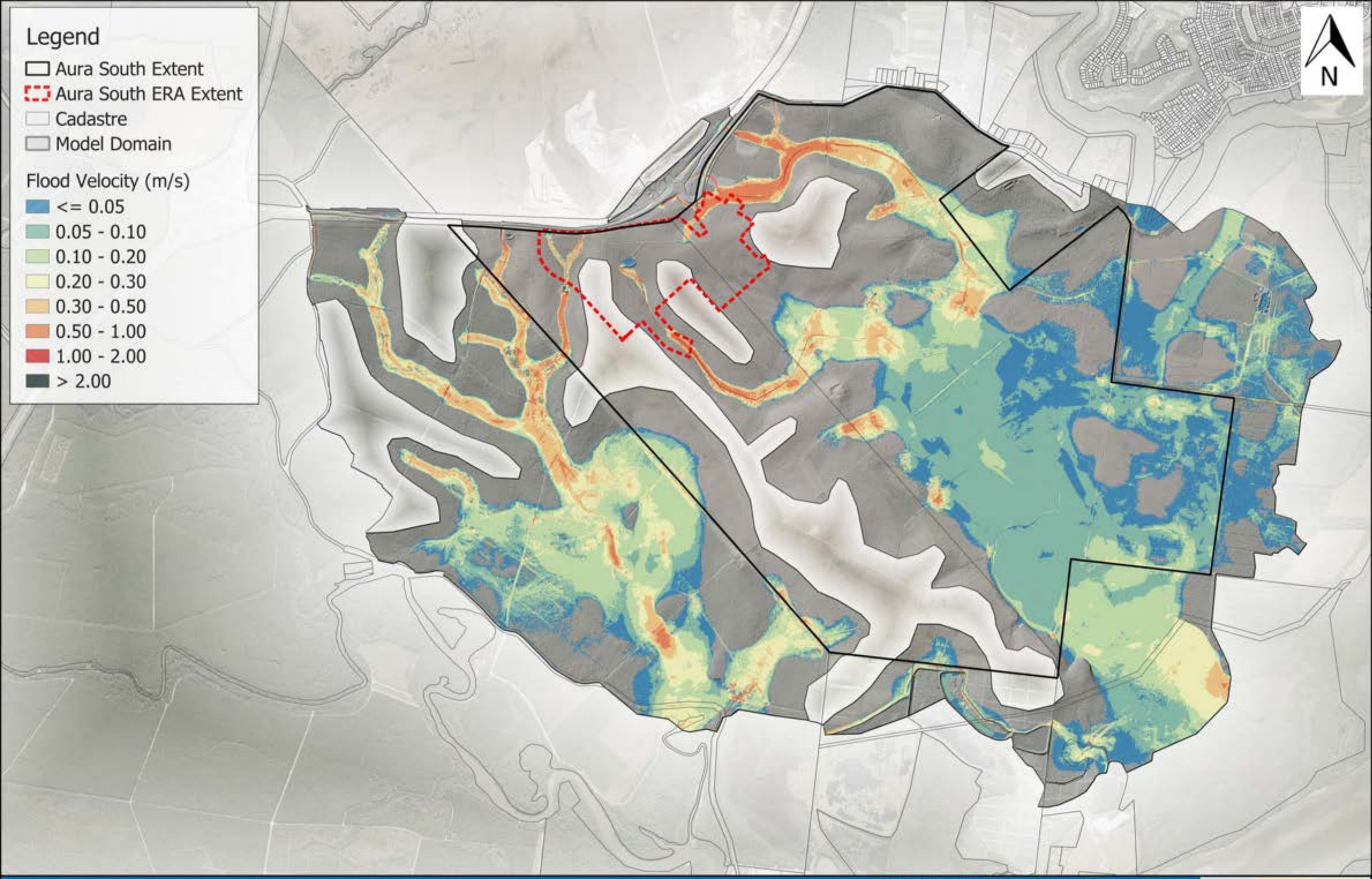
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A20 - Aura South Existing Case Flood Results

5% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A21 - Aura South Existing Case Flood Results

2% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

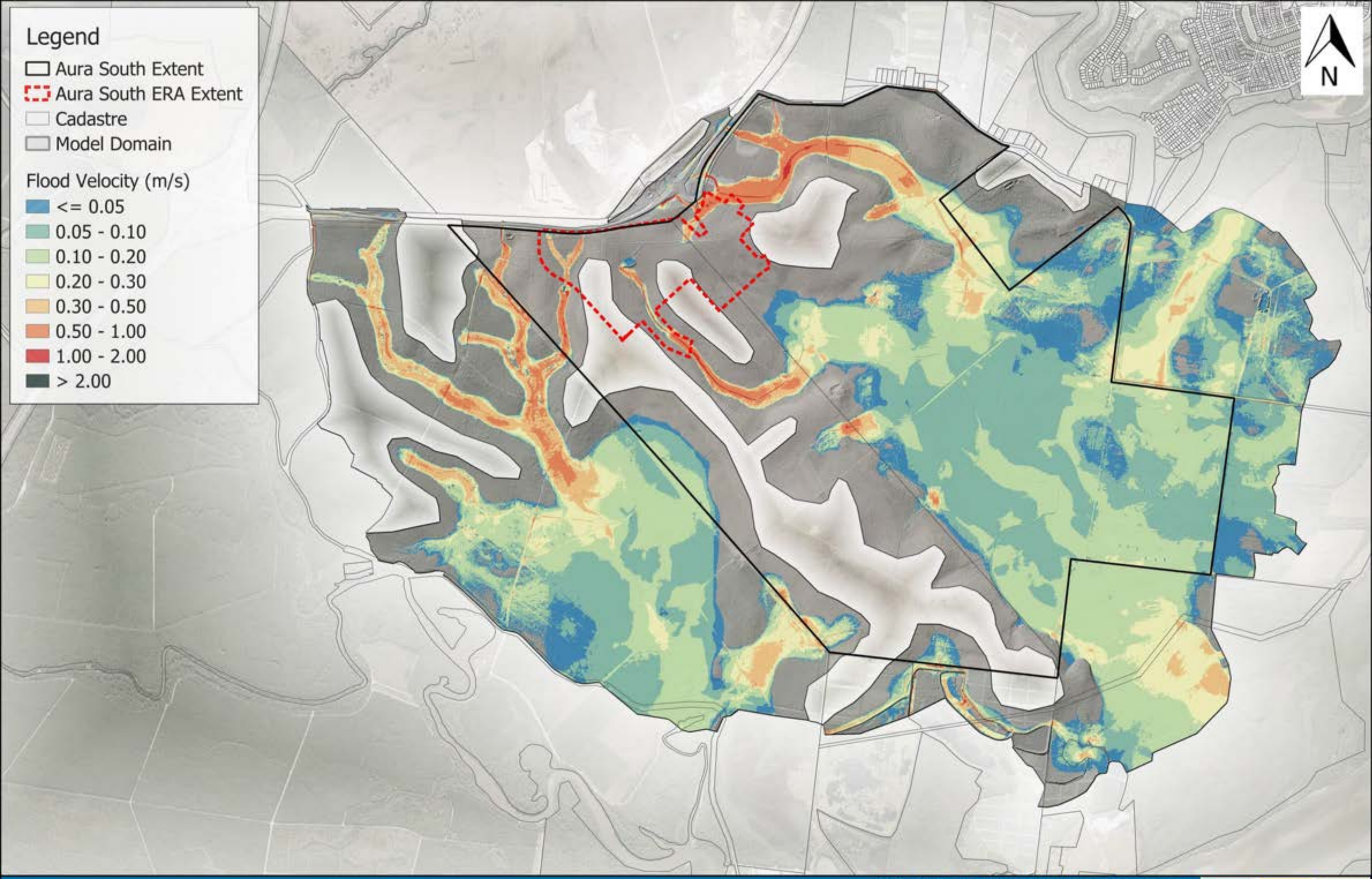
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A22 - Aura South Existing Case Flood Results

1% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A23 - Aura South Existing Case Flood Results

0.05% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A24 - Aura South Existing Case Flood Results

PMF Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A25 - Aura South Existing Case Flood Results

50% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

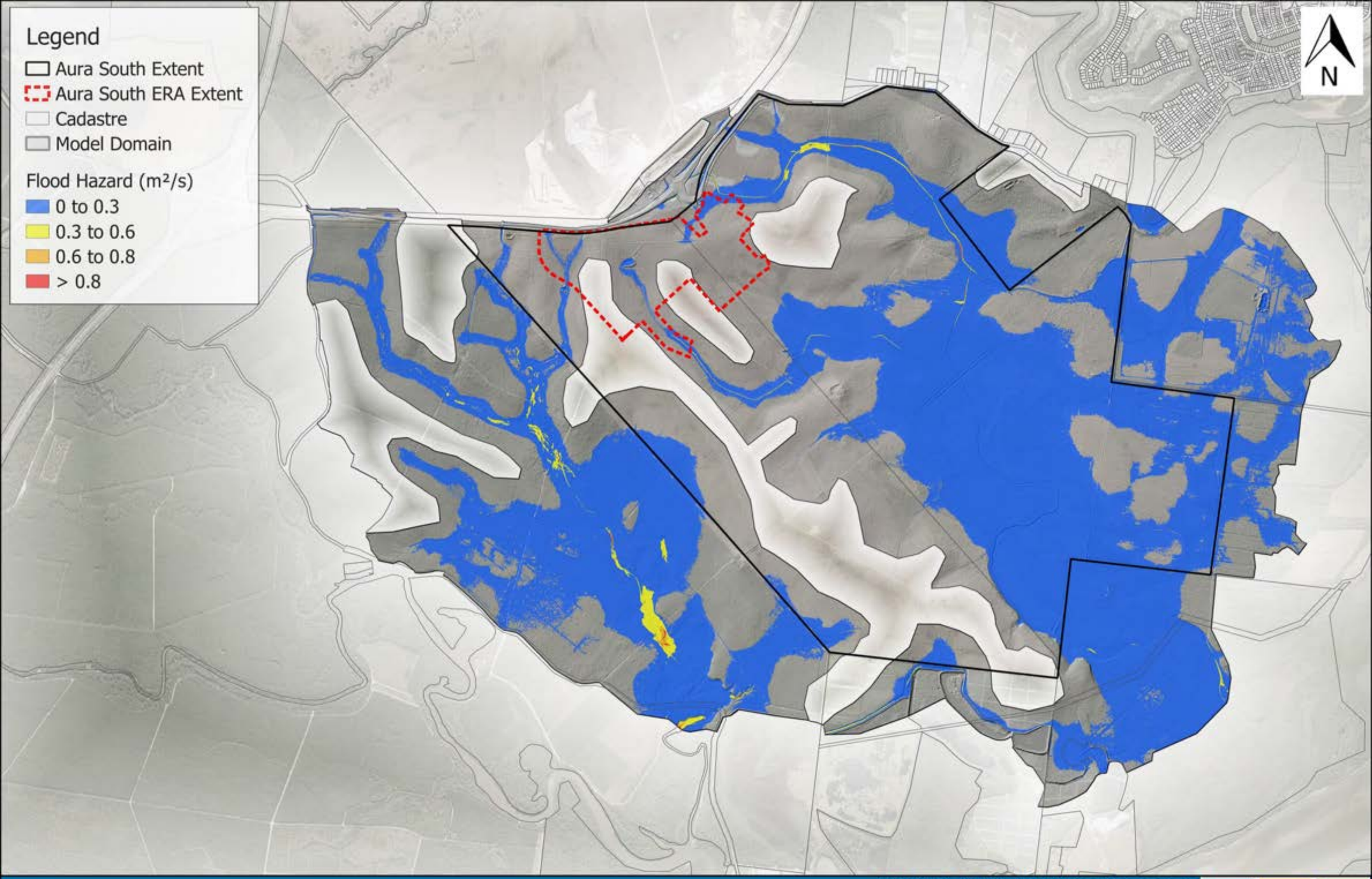
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A26 - Aura South Existing Case Flood Results

20% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A27 - Aura South Existing Case Flood Results

10% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A28 - Aura South Existing Case Flood Results

5% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A29 - Aura South Existing Case Flood Results

2% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A30 - Aura South Existing Case Flood Results

1% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A31 - Aura South Existing Case Flood Results

0.05% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix A32 - Aura South Existing Case Flood Results

PMF Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX B
DEVELOPED CASE FLOOD RESULTS





Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B1 - Aura South Developed Case Flood Results

50% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B2 - Aura South Developed Case Flood Results

20% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B3 - Aura South Developed Case Flood Results

10% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B4 - Aura South Developed Case Flood Results

5% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B5 - Aura South Developed Case Flood Results

2% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B6 - Aura South Developed Case Flood Results

1% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Depth (m)

- <= 0.10
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- 2.00 - 3.00
- > 3.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

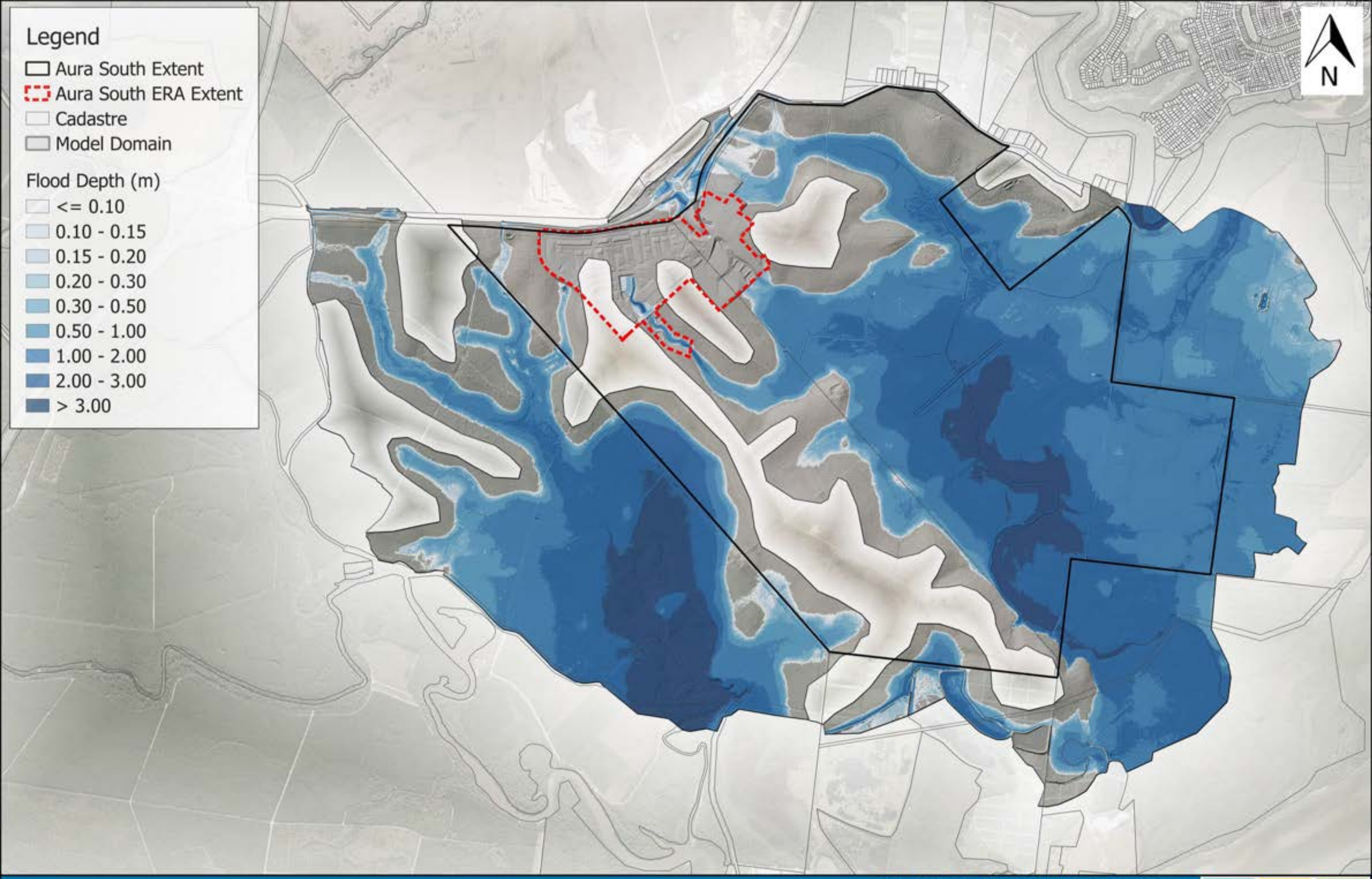
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B7 - Aura South Developed Case Flood Results

0.05% AEP Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B8 - Aura South Developed Case Flood Results

PMF Flood Depth

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B9 - Aura South Developed Case Flood Results

50% AEP Water Surface Level

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B10 - Aura South Developed Case Flood Results

20% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B11 - Aura South Developed Case Flood Results

10% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B12 - Aura South Developed Case Flood Results

5% AEP Water Surface Level

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B13 - Aura South Developed Case Flood Results

2% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B14 - Aura South Developed Case Flood Results

1% AEP Water Surface Level

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B15 - Aura South Developed Case Flood Results

0.05% AEP Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Height (mAHD)

0

18

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

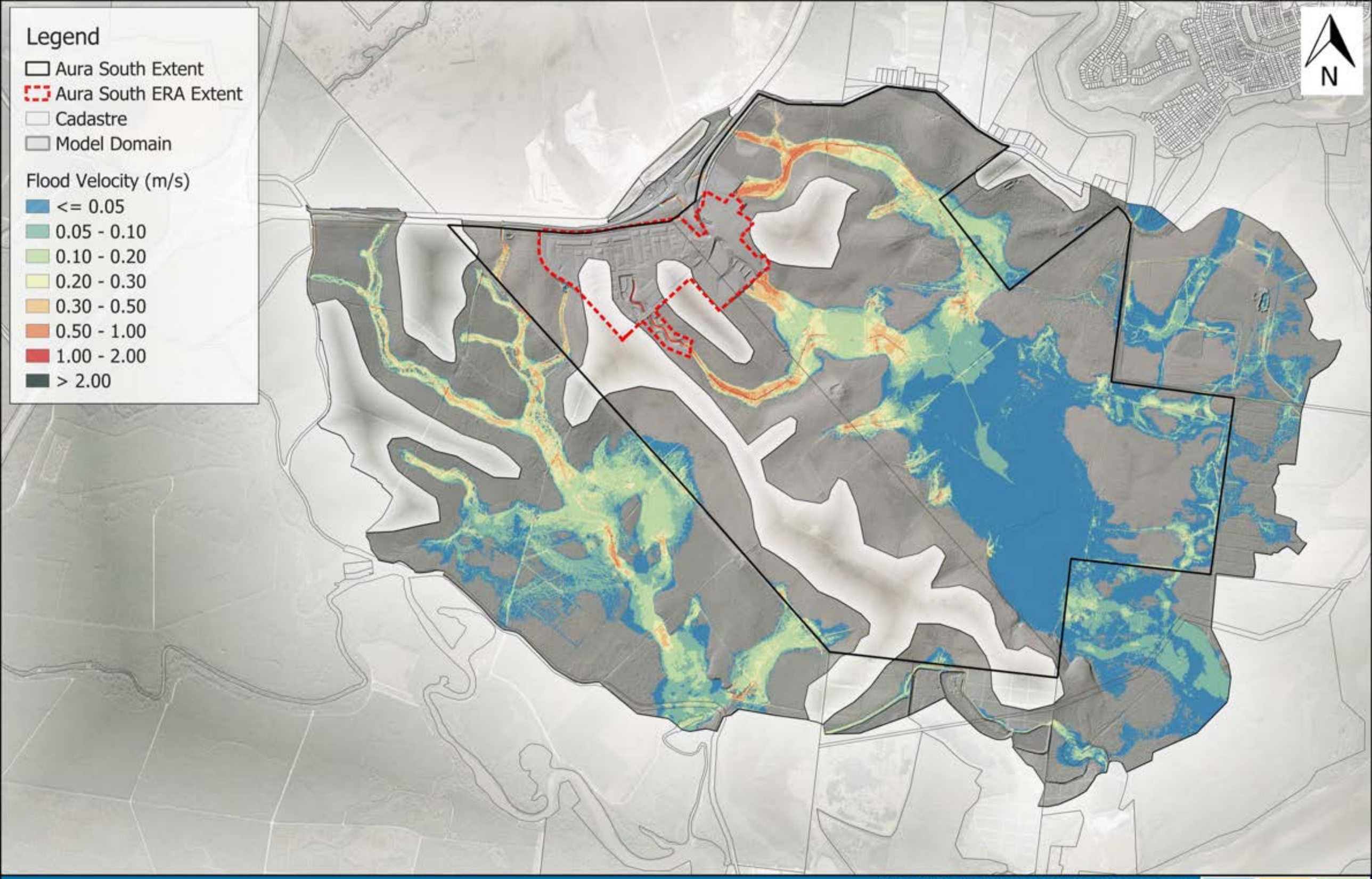
27020050 - Aura South ERA Flood Assessment

Appendix B16 - Aura South Developed Case Flood Results

PMF Water Surface Level

WATER TECHNOLOGY

WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

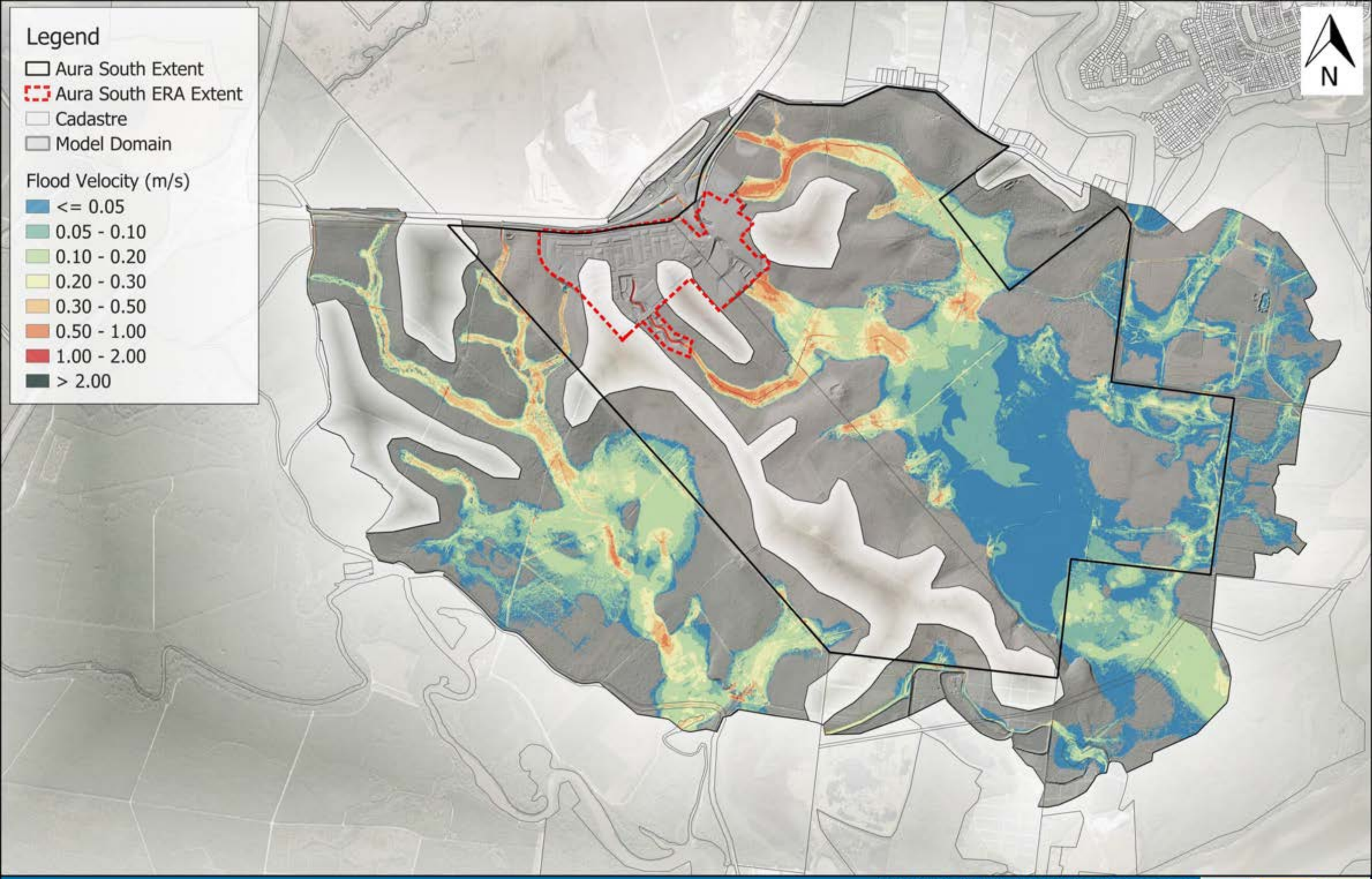
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B17 - Aura South Developed Case Flood Results

50% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

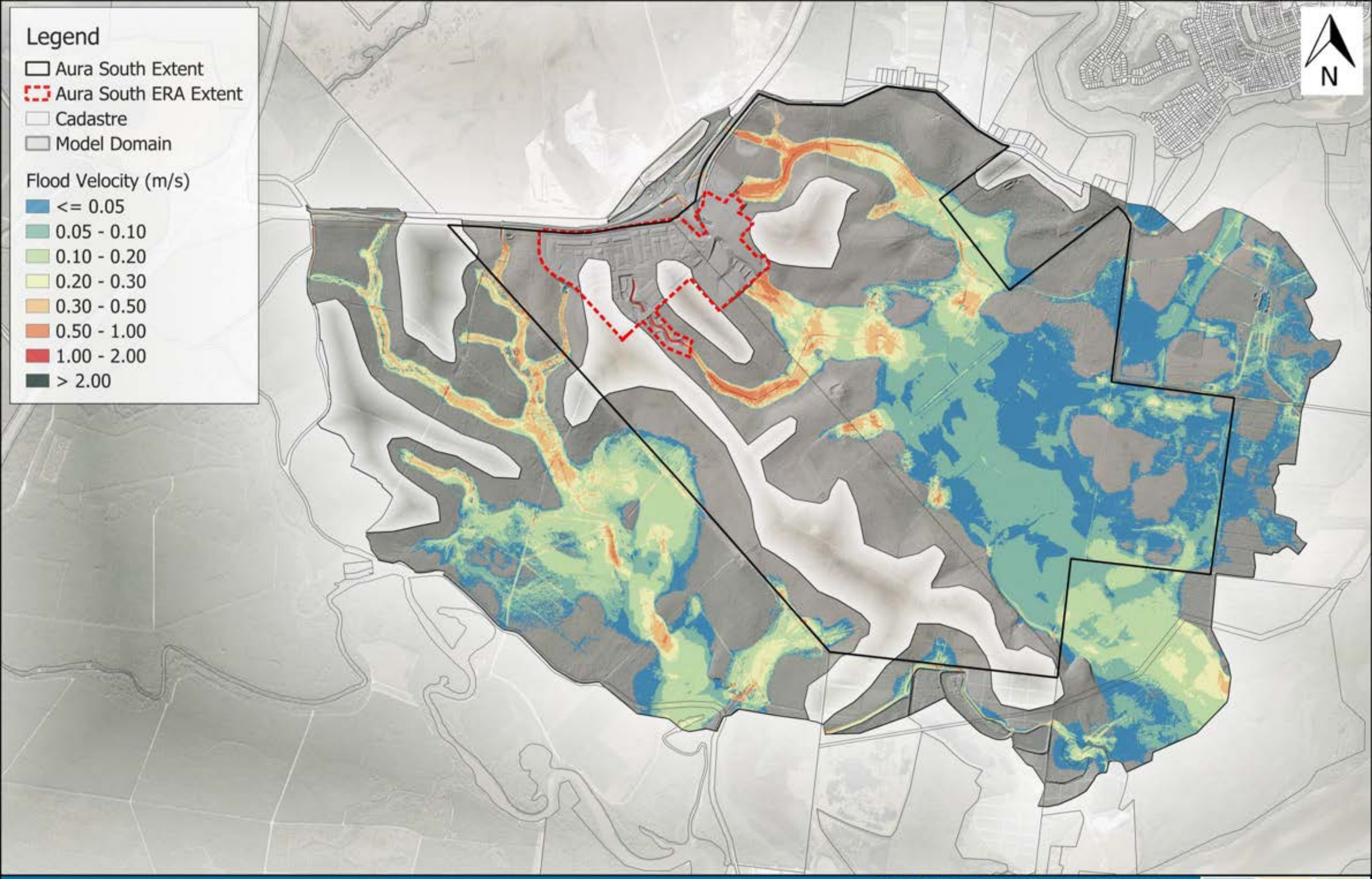
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B18 - Aura South Developed Case Flood Results

20% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

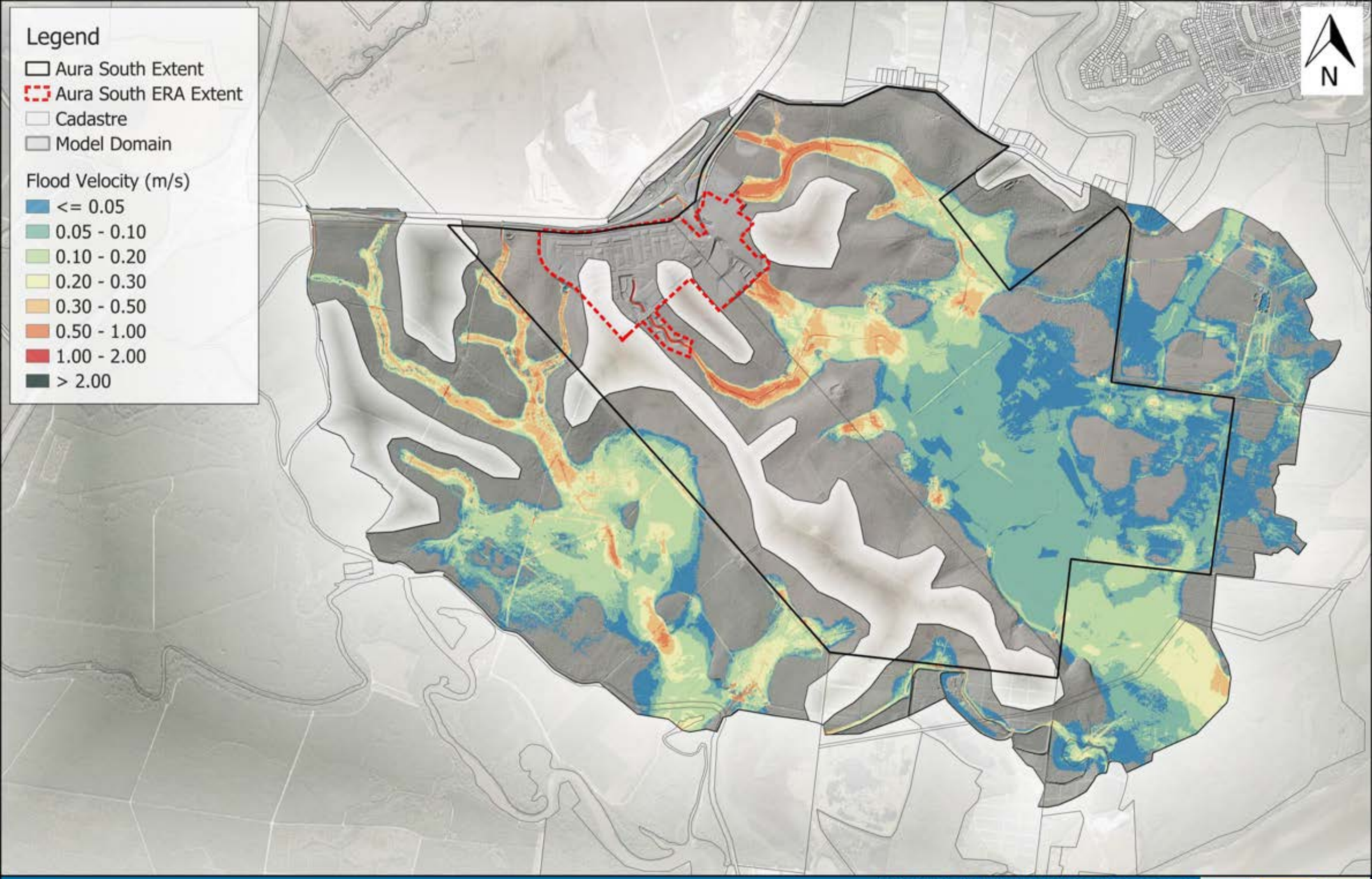
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B19 - Aura South Developed Case Flood Results

10% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B20 - Aura South Developed Case Flood Results

5% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B21 - Aura South Developed Case Flood Results

2% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B22 - Aura South Developed Case Flood Results

1% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B23 - Aura South Developed Case Flood Results

0.05% AEP Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Velocity (m/s)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B24 - Aura South Developed Case Flood Results

PMF Flood Velocity

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

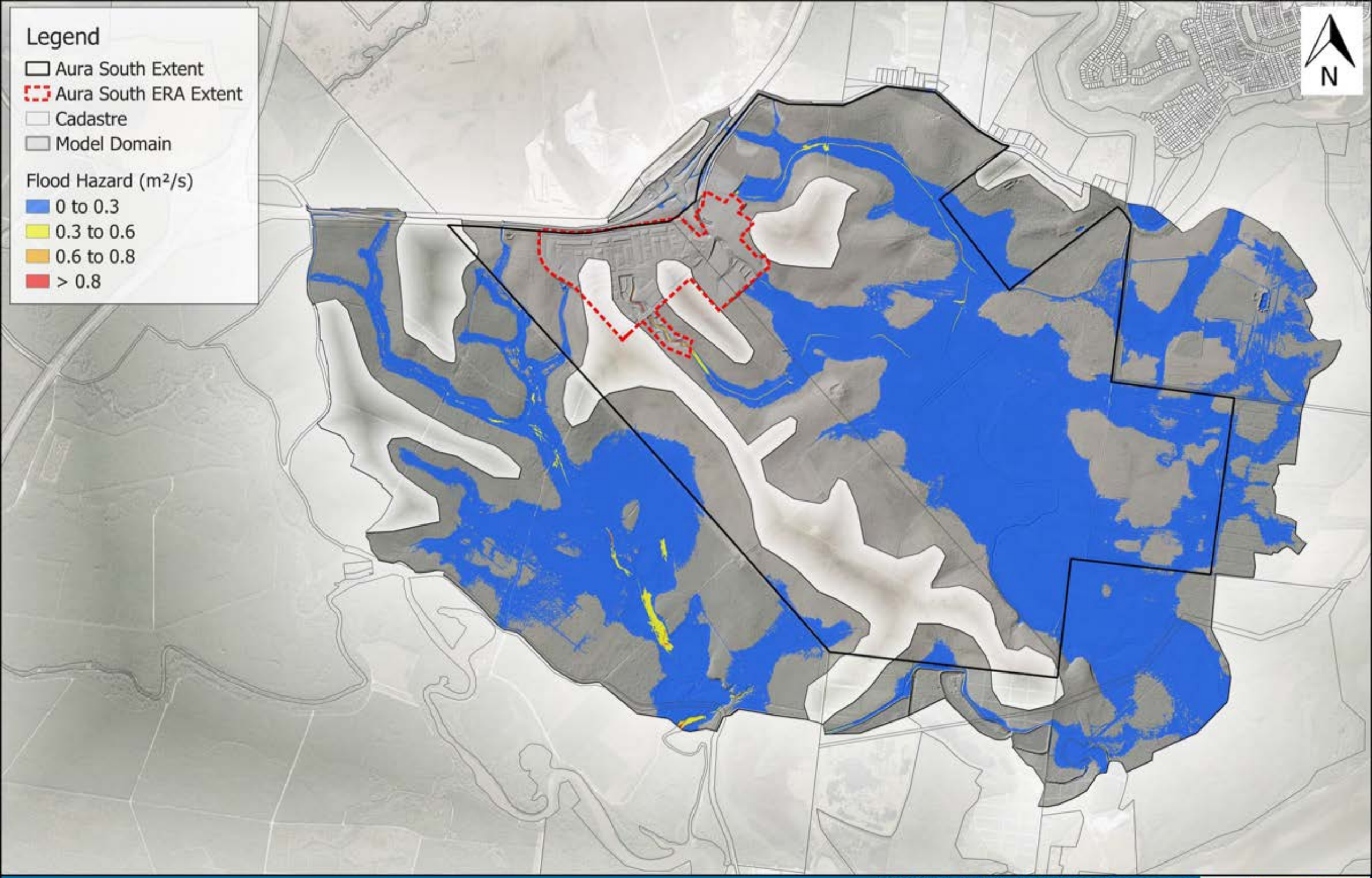
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B25 - Aura South Developed Case Flood Results

50% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B26 - Aura South Developed Case Flood Results

20% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

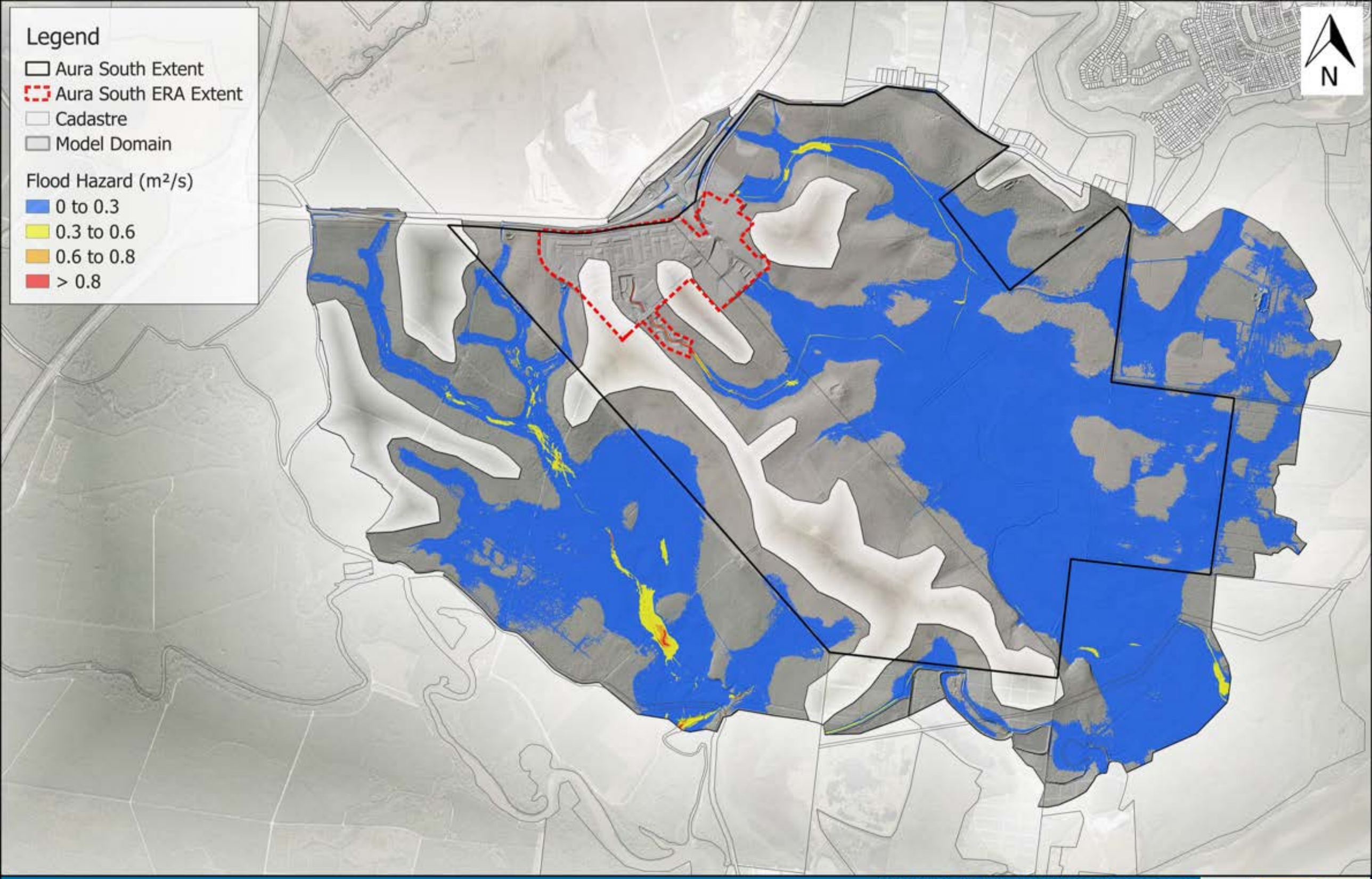
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B27 - Aura South Developed Case Flood Results

10% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment

Appendix B28 - Aura South Developed Case Flood Results

5% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B29 - Aura South Developed Case Flood Results

2% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B30 - Aura South Developed Case Flood Results

1% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix B31 - Aura South Developed Case Flood Results

0.05% AEP Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Hazard (m²/s)

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 0.8
- > 0.8

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

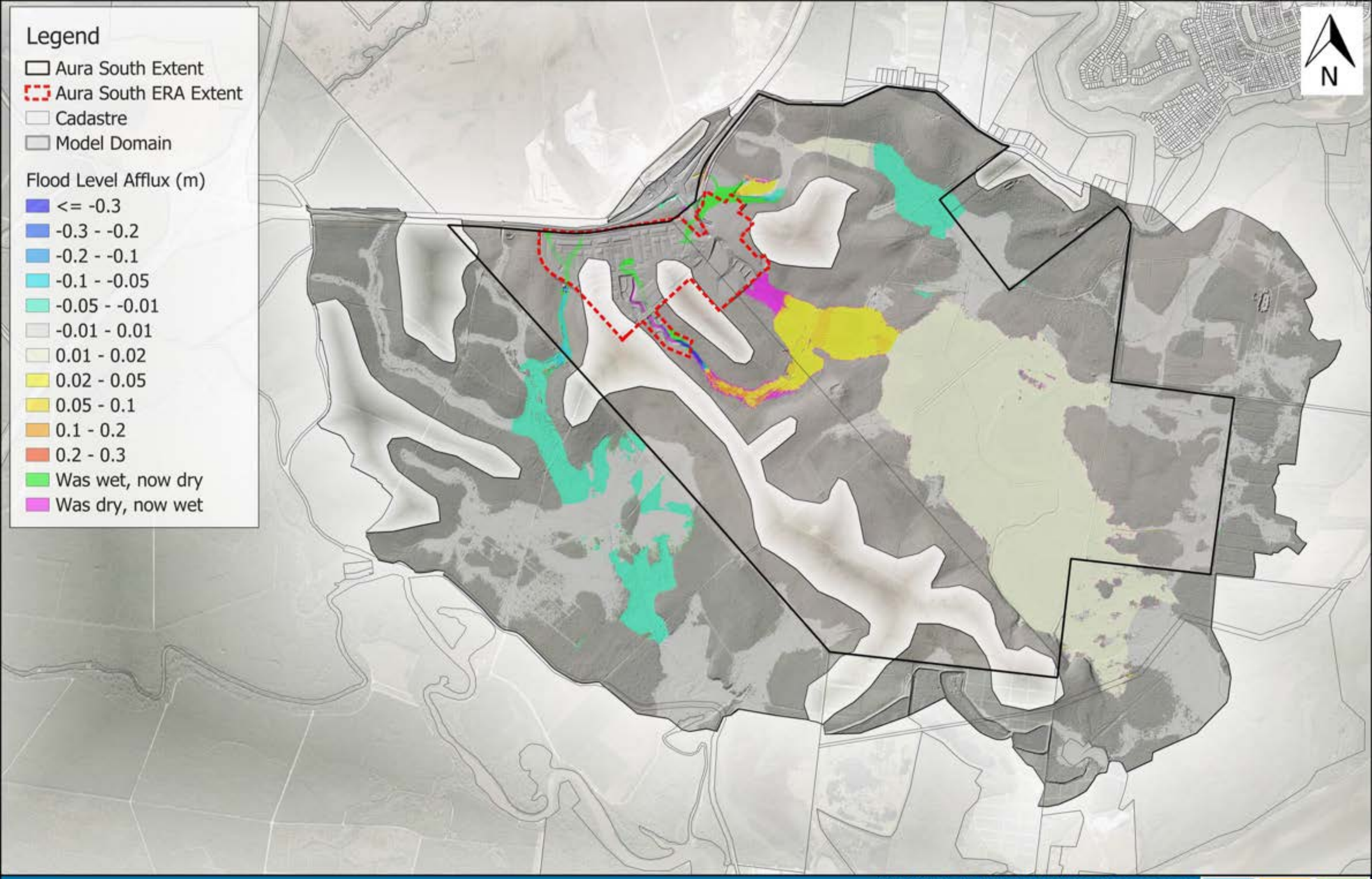
Appendix B32 - Aura South Developed Case Flood Results

PMF Flood Hazard

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX C
DEVELOPED VS EXISTING FLOOD AFFLUX RESULTS





Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix C1 - Aura South Developed vs Existing Afflux Flood Results

50% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Level Afflux (m)

- <= -0.3
- -0.3 - -0.2
- -0.2 - -0.1
- -0.1 - -0.05
- -0.05 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- Was wet, now dry
- Was dry, now wet

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

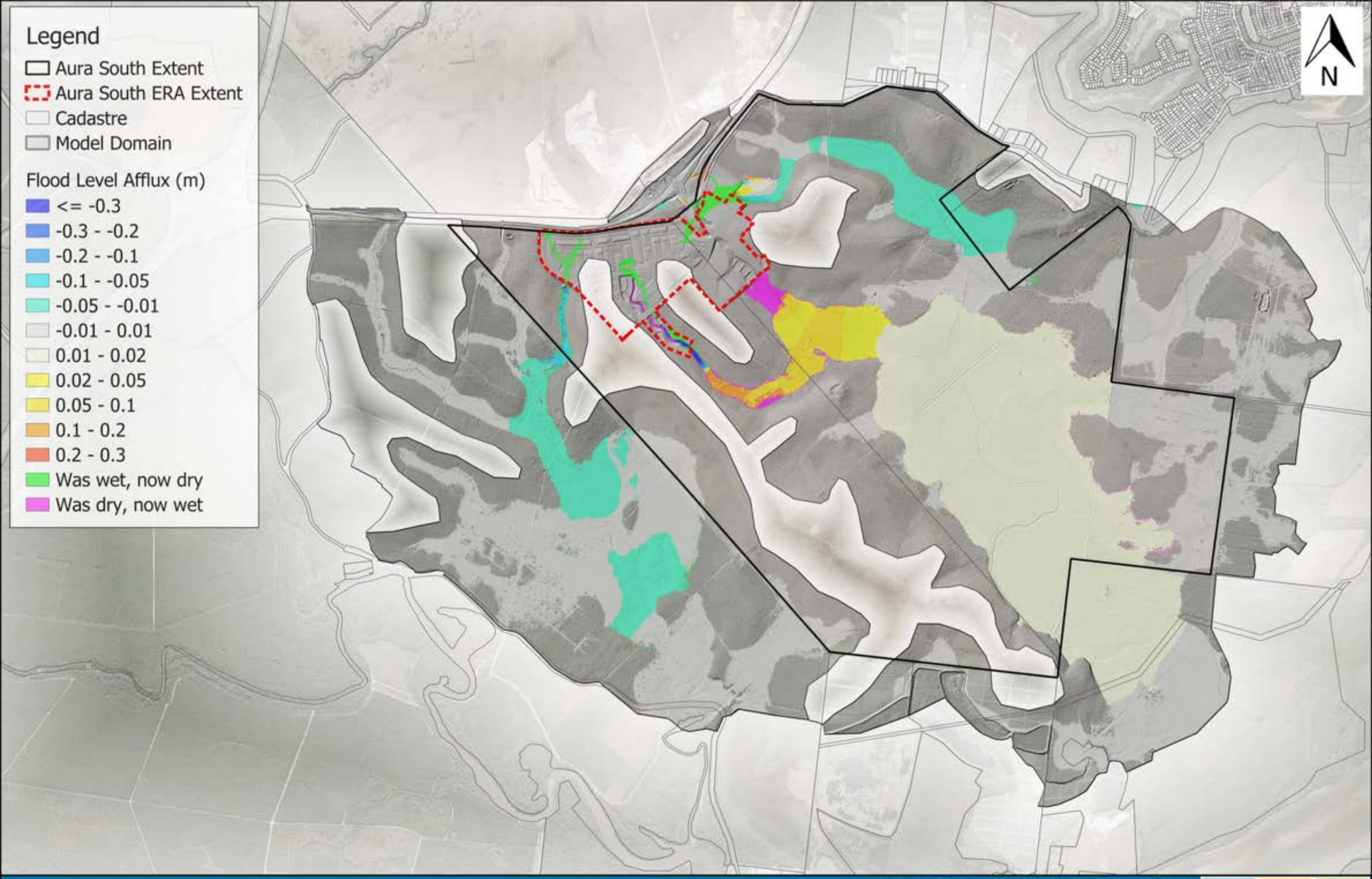
0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix C2 - Aura South Developed vs Existing Afflux Flood Results

20% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

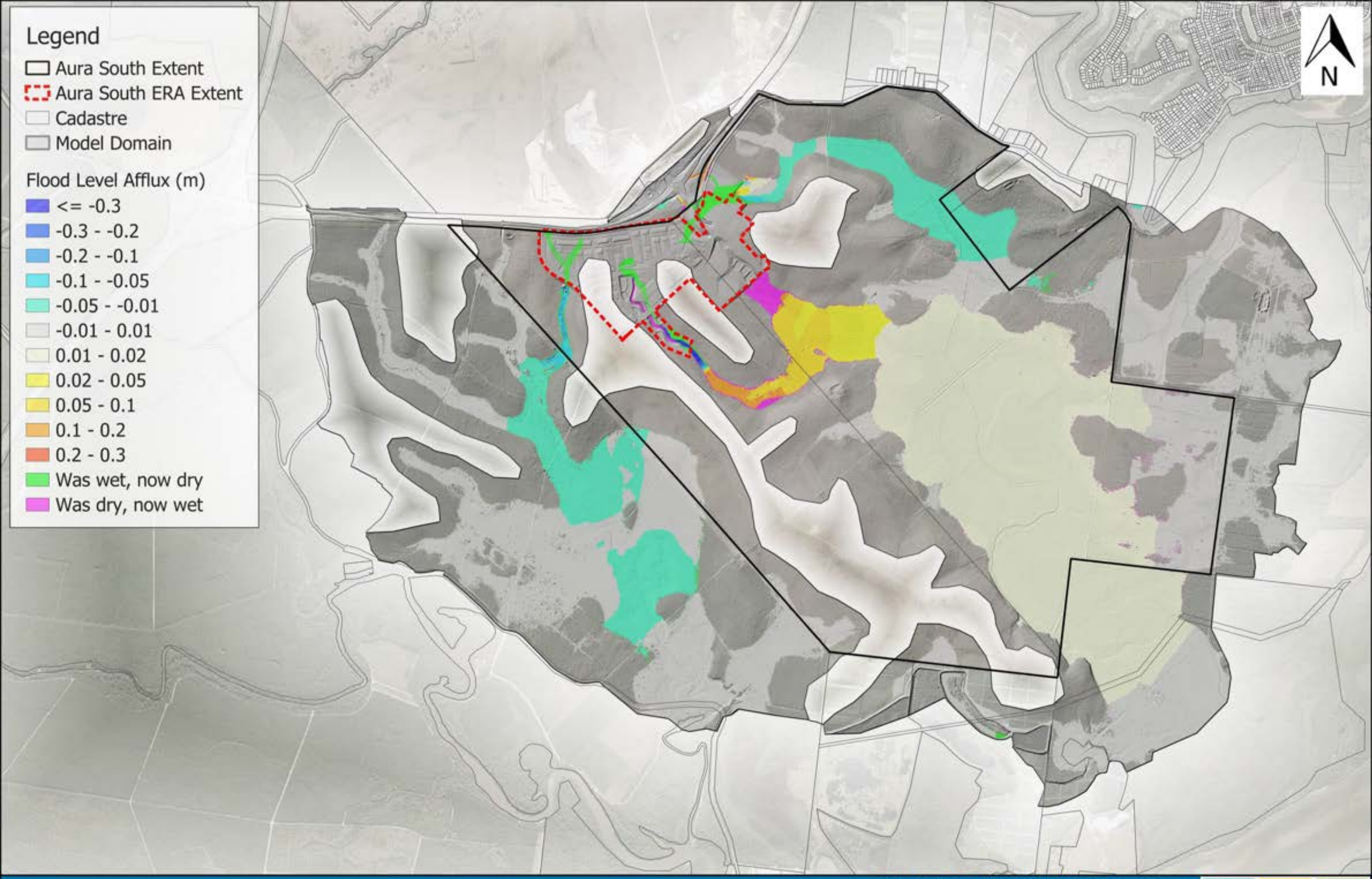


Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment
Appendix C3 - Aura South Developed vs Existing Afflux Flood Results
10% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

27020050 - Aura South ERA Flood Assessment
Appendix C4 - Aura South Developed vs Existing Afflux Flood Results
5% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Legend

- Aura South Extent
- Aura South ERA Extent
- Cadastre
- Model Domain

Flood Level Afflux (m)

- <= -0.3
- -0.3 - -0.2
- -0.2 - -0.1
- -0.1 - -0.05
- -0.05 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- Was wet, now dry
- Was dry, now wet

N

Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment

Appendix C5 - Aura South Developed vs Existing Afflux Flood Results

2% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment
Appendix C6 - Aura South Developed vs Existing Afflux Flood Results
1% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment
Appendix C7 - Aura South Developed vs Existing Afflux Flood Results
0.05% AEP Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS



Date: 10/11/2026	Rev: A
Drawn: HP	Reviewed: SW
Projection: MGA56 - GDA2020	Data Sources: Queensland Imagery Basemaps, QSpatial (Roads & Watercourses)

0.5 0 0.5 1 km

27020050 - Aura South ERA Flood Assessment
Appendix C8 - Aura South Developed vs Existing Afflux Flood Results
PMF Flood Height Afflux

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX D
AURA SOUTH ERA WATERWAY STABILITY ASSESSMENT



MEMORANDUM

To	Mark Stephens | Stockland
From	Dr. Daryl Lam | Water Technology
Date	4 November 2026
Subject	Aura South ERA – Waterway Stability Assessment
Our ref	27020113_M01V03_Waterway Stability Assessment

1 OVERVIEW

Water Technology has been engaged by Stockland to provide a waterway stability assessment of two unnamed drainage channels within the Aura South ERA (henceforth referred to as Project Reaches) and the potential geomorphic and waterway stability impacts associated with the proposed development. This memo will provide advice in relation to requirements of the State Planning Policy (SPP), including mitigation measures required to maintain long-term waterway stability.

The project area is outlined in Figure 1, and is located directly south of Bells Creek Arterial Road and north-west of a Threatened Ecological Community (TEC) wetland.

The drainage channels flow southwest from their headwaters in the Aura South ERA to Halls Creek through a laterally unconfined valley setting. The Project Reach located on the western portion of Aura South ERA (Reach A) is approximately 760 m in length while the eastern reach (Reach B) is approximately 40 m.

It is understood that the latest layout plan for the proposed development within the ERA consists of two designed waterways. Accordingly, this assessment has been undertaken to determine whether the proposed development is likely to adversely affect long-term waterway stability.

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Figure 1 Overview of the Project Area

2 HISTORICAL CHANGE

Historical aerial imagery indicates that the project area was cleared between 1967 and 1972 for use as a pine plantation until the land use transitioned to grazing in 2010 (Figure 2). Riparian vegetation, consisting primarily of in-channel shrubs and some trees, have been establishing since 2010. Prior to 1967, the site was a woodland area featuring low-lying areas and poorly defined drainage lines. By 1972, these were dredged into the drainage channels present today. A dam was subsequently built at the top of Reach A prior to 2003 and subsequently removed in 2020 (Figure 3).

DEMs of Difference (DoD) were produced using 2008, 2014, and 2022 LiDAR datasets. DoDs compares the difference in elevation between two temporal LiDAR datasets. The elevation data from an earlier DEM was subtracted from a later DEM. Negative and positive values typically indicate erosion and deposition respectively. It is of note that changes within -0.5 and 0.5 m are excluded from interpretation to removal potential noises in the LiDAR datasets. The DoDs are presented in Figure 4 and Figure 5. Owing to the relatively narrow channel widths, the 1 m LiDAR resolution was insufficient to accurately characterise the Project Reaches. Consequently, channel changes of less than approximately 1 m may not be represented.

Reductions in floodplain and dam elevation between 2008 and 2014 are primarily attributed to pine plantation clearing and differences in water levels at the time of LiDAR acquisition. Limited changes in floodplain elevation occurred between 2014 and 2022. The excavation of the dam wall and infilling of the dam are evident in the DoD results. In addition, the establishment of dense in-channel vegetation along Reach A and Reach B likely contributed to part of the observed elevation increase in the 2014-2022 DoD.

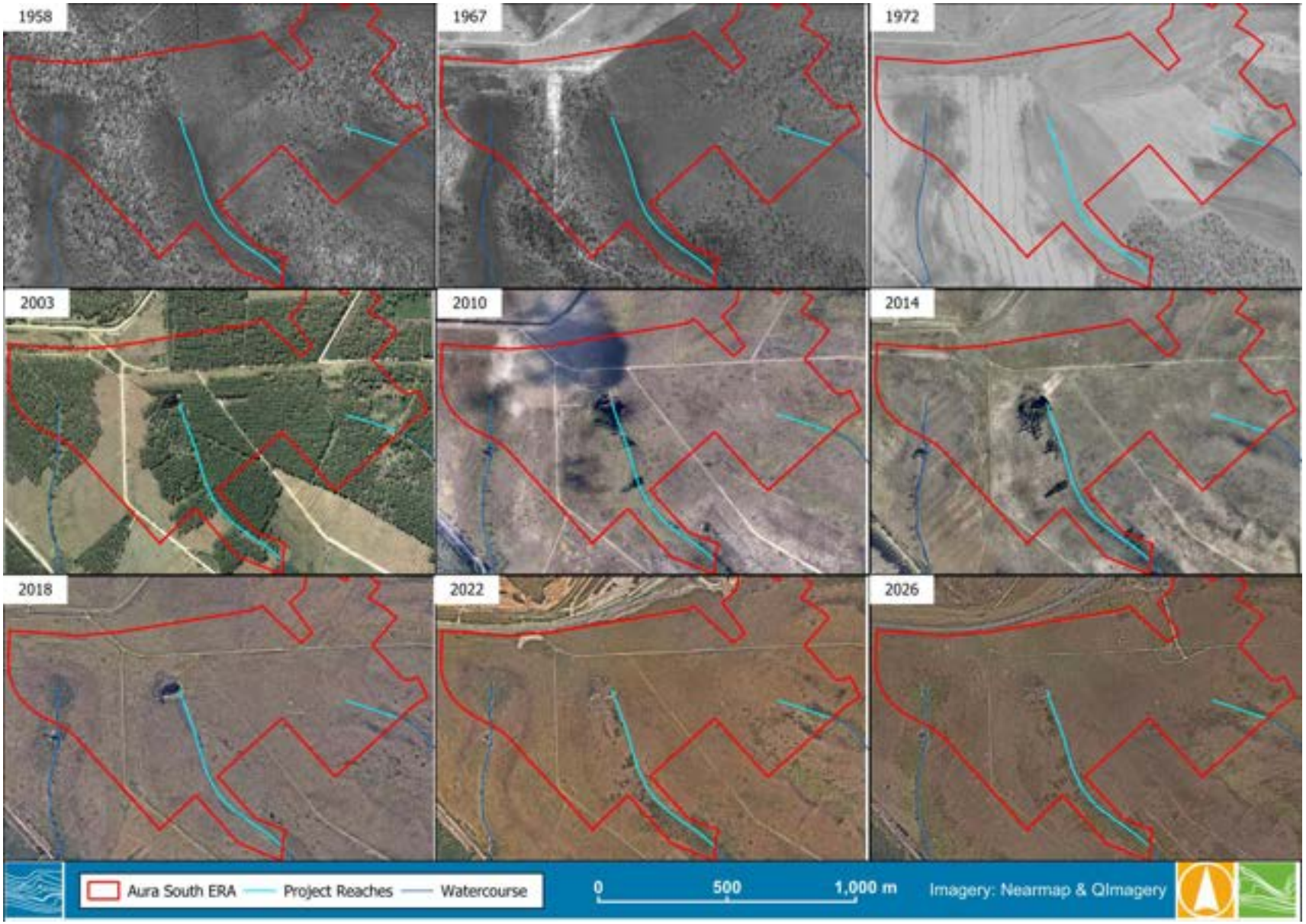


Figure 2 Historical imagery from 1958 to 2026



Figure 3 Aerial imagery of dam in 2003 and 2020

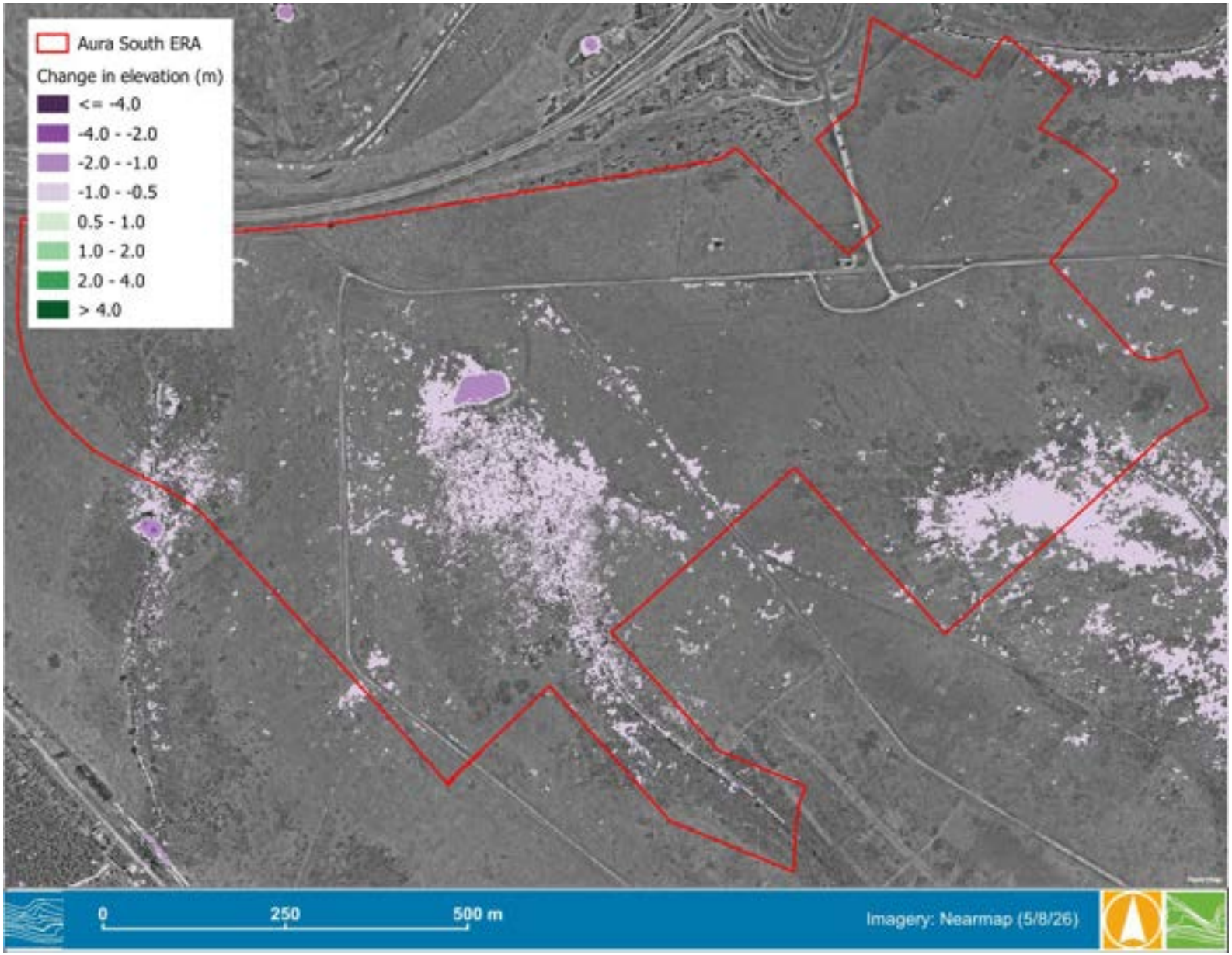


Figure 4 DoD between 2008 and 2014

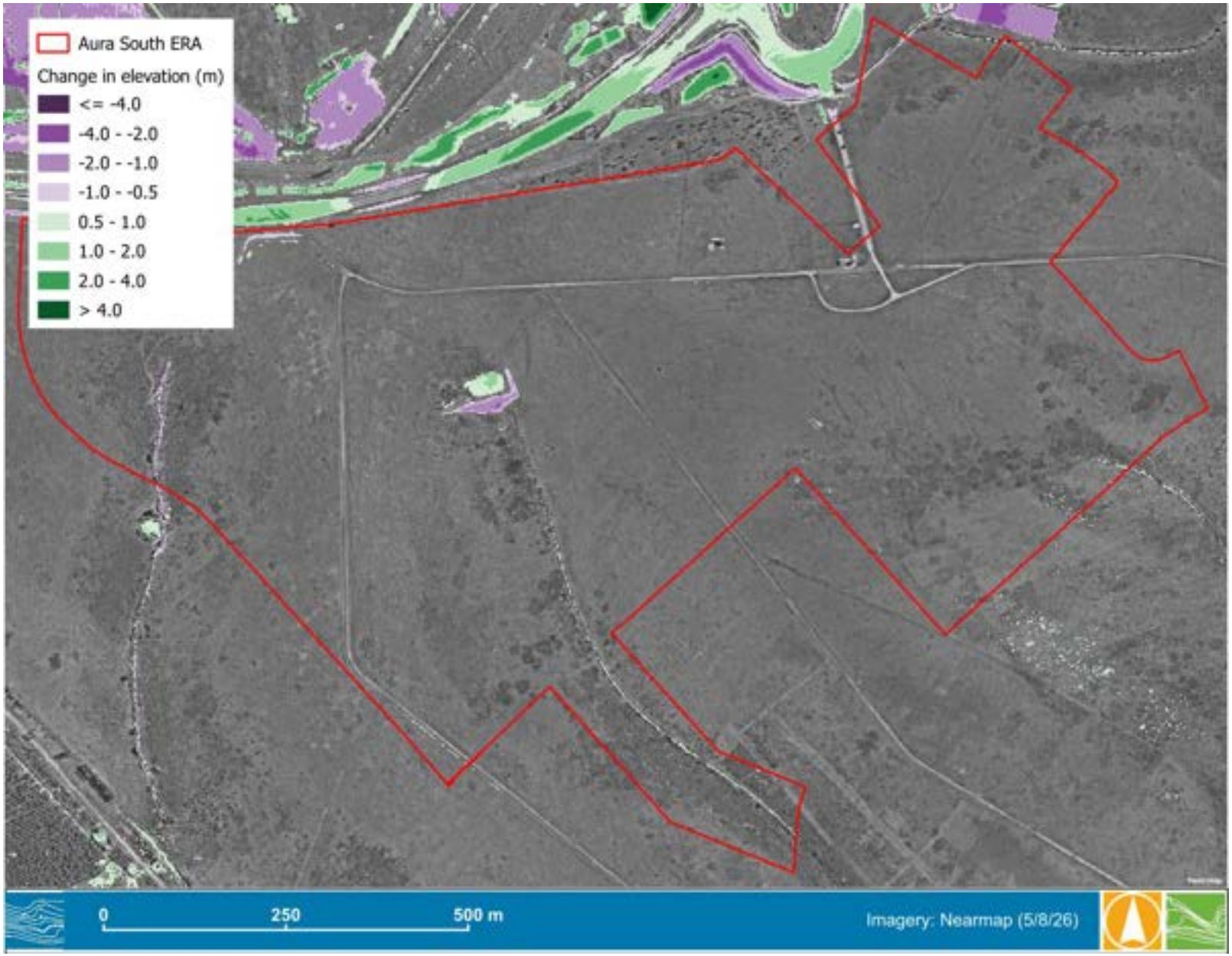


Figure 5 DoD between 2014 and 2022

3 EXISTING CONDITION

In addition to the desktop assessment, a site assessment was undertaken on the 8th of October 2026 to assess the current condition of Reach A and B. Table 1 provides a summary of the general site observation and observed geomorphic conditions.

Overall, both Reach A and B comprise straight, narrow (<1m to 2 m), shallow (maximum 0.4 m), highly modified drainage channels with limited hydraulic capacity. Some sections are well-defined with small pools (Figure 6), while other sections are infilled or have had their banks collapsed due to livestock access, resulting in a poorly defined channel morphology (Figure 7 & Figure 8).

Both Reach A and B consist of dense shrubs and intermittent trees within their channel and along the top of banks (Figure 9 & Figure 10). The dense riparian vegetation is occasionally separated by pockets with minimal riparian vegetation, typically stock access or crossing points (Figure 8).

Isolated minor bank erosion are observed along Reach A and are caused by stock access (Figure 11). No significant bed deepening was observed along both Project Reaches.

Table 1 Observations of the site and geomorphic conditions

Geomorphic Conditions/Factors	Reach A	Reach B
Stream width and variability	Varying width between 1 to 2 m.	
Stream depth	Varying depth with infilled sections and pools; max depth of approximately 0.4 m	
Cross-sectional shape	Varies between poorly defined to a well-defined U-shaped channel.	
Channel slope/bed grade	Low to moderate (1.1%)	Low (0.5%)
Degree of incision	None.	
Hydraulic control	None.	
Sinuosity	Low (1.04)	Low (1.0)
Bank and bed material	Silty loam.	
Bank slope stability	Generally stable.	
Vegetation cover	Shrubs and grasses on channel banks. Intermittent trees.	
River planform	Single-thread man-made drainage channel.	
Anthropogenic disturbances	Historical vegetation clearing, channelisation, and cattle and 4WD crossing points.	Historical vegetation clearing and channelisation.
Instream geomorphic complexity	Low to Moderate: Localised pools and dense in-channel vegetation provide some geomorphic complexity, although overall channel form remains highly modified.	



Figure 6 **Pool along Reach A immediately upstream an infilled cattle crossing**



Figure 7 **Varying cross-sectional shape along Reach A**



Figure 8 Cattle crossing along Reach A resulting in bank collapse and trampled vegetation



Figure 9 Drone imagery of Reach A



Figure 10 Drone imagery of Reach B



Figure 11 Minor bank erosion due to stock access

4 EXPECTED TRAJECTORY OF EXISTING CHANNELS

Both Reach A and B are generally stable and are not expected to experience any significant changes to its planform nor channel size. Minor erosion of pockets of Reach A's bank is likely to continue should livestock continue to access the channel.

5 DEVELOPMENT CONSIDERATIONS AND RECOMMENDATIONS

It is our understanding that the latest available development layout for the ERA (Figure 12) includes a design of a natural waterway to replace Reach A and a series of bio-retention basins (with an adjacent channel to be designed) to replace Reach B. An in-progress update of Reach B consists of a new channel extending further up the catchment and connecting with the series of bio-retention basins (Figure 13). It is of note that the drainage line located in the western corner of the ERA will be infilled. It is assumed that flow from this catchment will be piped and drained into Reach A.



Figure 12 ERA Design Layout – 28 August 2026

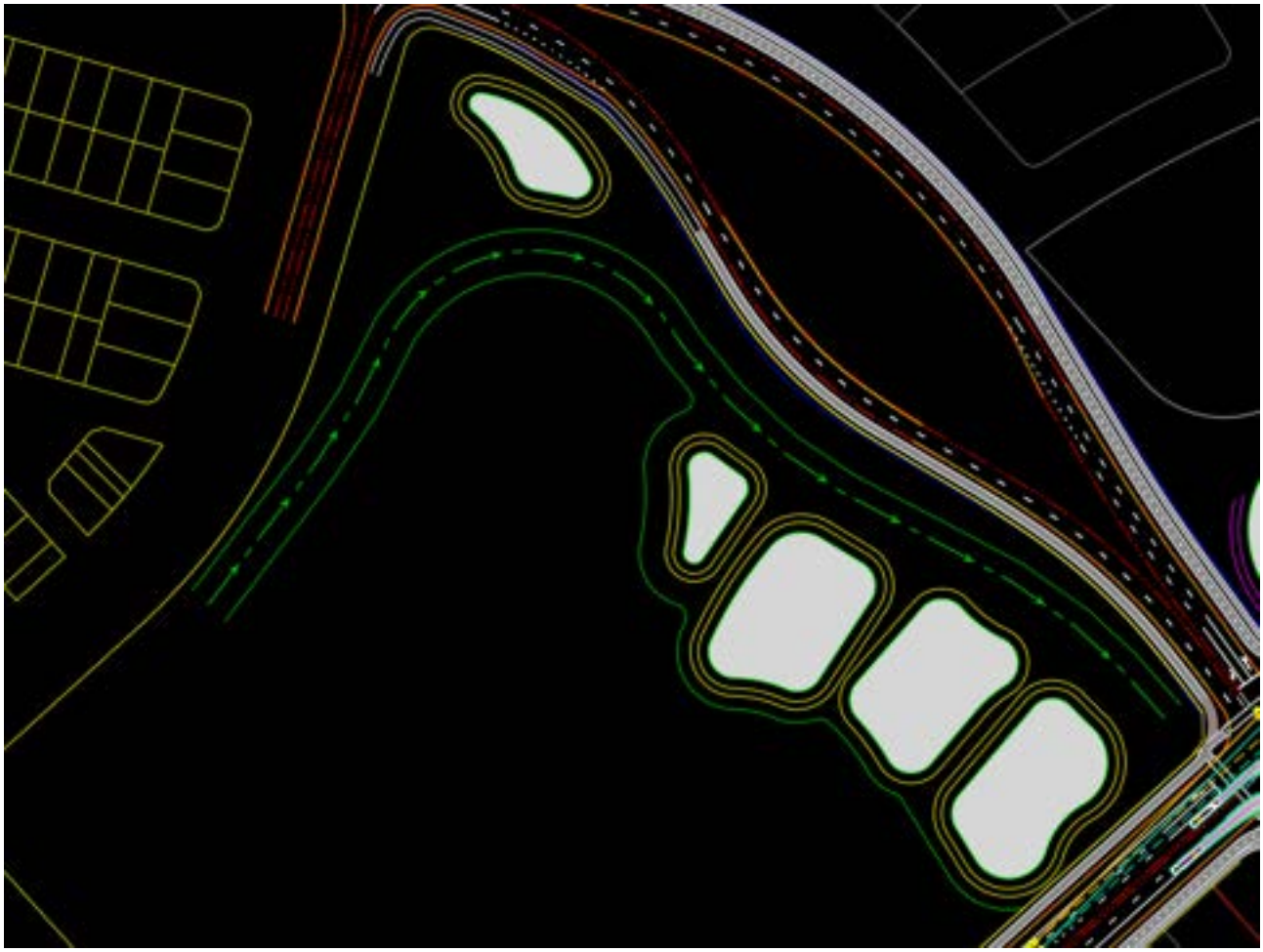


Figure 13 In progress new channel layout for Reach B shown in green arrows

5.1 Reach A

Based on the latest available design, the proposed Reach A waterway will be a realigned meandering waterway with a 1% channel slope and a 1-in-4 bank slope. There are eight detention basins proposed on the edge of the waterway within the linear corridor. It is assumed that there will be a spillway and an outfall for each of these detention basins draining into the waterway. There is a proposed road crossing approximately halfway along Reach A. It is understood that the proposed initial development of the ERA will likely be up to this road crossing with the downstream section of Reach A to be constructed at a later stage.

Hydraulic modelling results of the developed scenario for design events ranging from the 63.2% AEP event to the 1% AEP event showed bed shear stress (BSS) and velocity values (Figure 14 and Figure 15) indicates that bed shear stress (BSS) and velocity values are generally within accepted stability thresholds for densely vegetated channels supporting mature trees, shrubs and grasses. There are two exceptions for the 1% AEP velocity in Reach A, first of which is located at the upstream and downstream of the proposed crossing in the middle of the reach and second a location near the bottom end of Reach A. The latter is likely an artefact of the change in channel slope and design layout configuration causing some constriction within the channel.

5.1.1 Recommendation for Reach A

The following recommendations are to be considered for subsequent iteration of the design and changes to the layout plan:

- Maintain channel slope of no more than 1%.
- Maintain bank slope of 1-in-4.
- Incorporate a sequence of pools and riffles into the channel design to increase geomorphic complexity, improve habitat value and promote localised energy dissipation during frequent flow events.
- Ensure all drainage and stormwater outfalls (including those from the detention basins) are properly integrated into the waterway without negatively impacting channel stability. Ensure scour protection or appropriate energy dissipation measures are included at these locations where necessary.
- Ensure landscape management plan is in place that provides the appropriate native vegetation types and planting density within the channel bed, channel banks and adjacent floodplain area.
- Ensure scour protection on both upstream and downstream of the road culvert crossing.
- Assuming the initial stage of the ERA construction terminates at the road crossing, i.e. only the upstream section of Reach A, interim scour protection needs to be considered and constructed accordingly to ensure scouring does not occur. Scouring can develop headcuts and migrate upstream undermining the culvert crossing.

5.2 Reach B

Based on the latest available design information, the proposed Reach B waterway will have a channel slope ranging between 0.5% to 2.4%, a 1-in-4 bank slope and a channel bed width of 10m. The detention basins proposed adjacent to the waterway are assumed to have at least a spillway and an outfall draining into the waterway. There is a proposed road crossing at the bottom end of Reach B. It is understood that the proposed initial development of the ERA will likely not include the construction of this road. The current design surface at the end of Reach B is at least 1.5m above the existing surface immediate downstream.

Hydraulic modelling results of the developed scenario for design events between and including 63.2% and 1% AEP events showed bed shear stress (BSS) and velocity values (Figure 14 and Figure 15) generally within thresholds range for dense native in-channel vegetation including mature trees, shrubs, and grasses. There are a few locations on the lower section of the reach with isolated spots where velocity may be outside the threshold. This includes the proposed crossing in the bottom of the Reach B but is likely an artefact of the current design layout configuration causing some constriction within the channel at this location.

5.2.1 Recommendation for Reach B

- Maintain channel slopes at or below 1% where practicable. Where steeper gradients are unavoidable, incorporate grade-control measures such as rock chutes to limit erosion potential.
- Maintain bank slope of 1-in-4.
- Incorporate a sequence of pools and riffles into the channel design to increase geomorphic complexity, improve habitat value and promote localised energy dissipation during frequent flow events.
- Ensure all drainage and stormwater outfalls (including those from the detention basins) are properly integrated into the waterway without negatively impacting channel stability. Ensure scour protection or appropriate energy dissipation measures are included at these locations where necessary.
- Ensure landscape management plan is in place that provides the appropriate native vegetation types and planting density within the channel bed, channel banks and adjacent floodplain area.

- Ensure scour protection on both upstream and downstream of the road culvert crossing.
- If the initial construction phase, does not include the construction of the road on the downstream end of Reach B, a temporary grade control structure, such as a rock chute should be put in place.



Figure 14 ERA Developed Scenario – 1% AEP Event - Velocity



Figure 15 ERA Developed Scenario – 1% AEP Event - Bed Shear Stress

5.3 SPP Requirement for Waterway Stability

Based on the State Panning Policy (2017), the stormwater management design objectives for waterway stability management require that the **developed scenario peak 63.2% AEP event discharge of the receiving environment does not exceed the pre-development peak 63.2% AEP discharge**.

Table 2 demonstrates that peak discharges increase under the developed scenario for all assessed events, including the critical 63.2% AEP event so a performance solution is proposed to maintain waterway stability.

Reaches A and B will ultimately discharge into the Greenheart Lake prior to discharge to the receiving environment. The proposed channel will have to be designed such that it will safely convey the developed scenario flow from the ERA in both the interim and ultimate scenarios to ensure BSS is with erosion thresholds.

Table 2 Receiving Environment Pre and Post Development Discharge

% AEP	Receiving Waterway Discharge (m^3/s) - Reach A		Receiving Waterway Discharge (m^3/s) - Reach B	
	Existing	Developed	Existing	Developed
1	10.7	22.7	15.6	25.1
2	9.3	20.2	13.3	22.0
5	7.1	17.1	11.6	17.4
10	6.0	14.3	9.5	14.6
20	4.4	11.9	7.8	10.6

% AEP	Receiving Waterway Discharge (m^3/s) - Reach A		Receiving Waterway Discharge (m^3/s) - Reach B	
	Existing	Developed	Existing	Developed
50	3.0	8.1	4.6	7.1
63.2	**2.6**	**6.7**	**3.6**	**6.1**

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