

REPORT



FLOOD IMPACT AND RISK ASSESSMENT (FIRA)

CUDGEN CONNECTION

741 Cudgen Road,
Cudgen, NSW

Contact us to design
the sustainable
towns and cities
of tomorrow.



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1. Introduction

A flood impact and risk assessment (FIRA) has been undertaken as part of a planning proposal for 741 Cudgen Road, Cudgen, NSW, Lot 61 on DP1305734 (herein known as “Cudgen Connection”). The purpose of this Flood Impact and Risk Assessment is in support of a Planning Proposal (rezoning) at 741 Cudgen Road, Cudgen (Cudgen Connection).

Requested information from the NSW Department of Planning, Housing and Infrastructure includes:

- A Flood Impact and Risk Assessment (FIRA) in accordance with 9.1 Ministerial Direction 4.1 – Flooding, and the Flood Risk Management Manual 2023 and supporting guidelines
- Consideration of the full range of flood events and impacts up to the PMF
- Consideration and justification for the scale of residential development in areas of high hazard risks, including justification for or against potentially reducing the density of development in those high hazard areas
- Identification of evacuation locations above PMF
- The proposal to demonstrate consistency with the Shelter in Place Guidelines

The flood assessment will determine the extent, height, velocity, peak depth, and hazard of floodwaters in relation to the proposed development, including any potential impacts of the proposed changes within the floodplain.

The key objectives of the project are to:

- Truncate and calibrate a base case 1D/2D TUFLOW Hydraulic model to the subject site in accordance with ARR2019
- Assess all design events up to and including the 1% AEP (Annual Exceedance Probability), 1% AEP_CC (Climate Change) and PMF (Probable Maximum Flood) design events.
- The hydraulic assessment will determine the maximum height, depth, velocity, and hazard assessment
- An afflux assessment will be undertaken to determine if the proposed development will impact the floodplain's existing hydrodynamics
- Reduce flood risk where possible

The land area of the subject site is approximately 5.68ha (Figure 1)



A **Flood Emergency Management Plan (FEMP)**, as detailed in Appendix C, is a formal document that outlines structured procedures for preparing for, responding to, and recovering from flood events. It clearly defines roles and responsibilities, warning and monitoring systems, evacuation routes and shelter arrangements, resource allocation, and coordination among emergency services, government agencies, and the community.

The development site — including all site access and egress — is located above the Probable Maximum Flood (PMF) level. The subject site is not classified as a flood island. In addition to the services provided by the Cudgen Connection, the site adjoins the Tweed Valley Hospital, providing access to emergency health services, and is located within 650 m of the NSW TAFE Kingscliff campus, which serves as the local emergency evacuation centre.

Although the FIRA adopts the term *shelter-in-place*, the future population is not required to evacuate the site to avoid floodwaters or flood risk. Equally, the future population is not confined to the site, nor restricted from accessing essential or other critical services during a flood event.

By adopting and implementing this plan, flood-related risks can be significantly reduced and managed effectively, thereby protecting lives, minimising injuries and property damage, safeguarding critical infrastructure, and enhancing overall community resilience.





Figure 1 Subject Site



Figure 2 Cudgen Connection Concept Masterplan (As Exhibited)

1.1. Finished Surface Analysis

The maximum variation in elevation for filling is 3m, occurring over a minor portion of the site. This peak decreases to prevailing elevation differences of less than 2m to provide site access and egress above the PMF level (Figure 3). The surface level comprises a combination of earthworks (such as fill to raise the northernmost east-west road) and habitable floor levels, with undercroft/semi-basement car parking below. The ‘floor’ of the undercroft/semi-basement car parking areas will generally be located at or close to the existing ground level. The analysis confirms that the extent of the site between elevations of 2 and 3m is 7% of the site area. As shown, the majority of this area coincides with the footprint of a future undercroft carpark. Accordingly, the extent of physical earthworks will be notably lower than 7% of the site area.

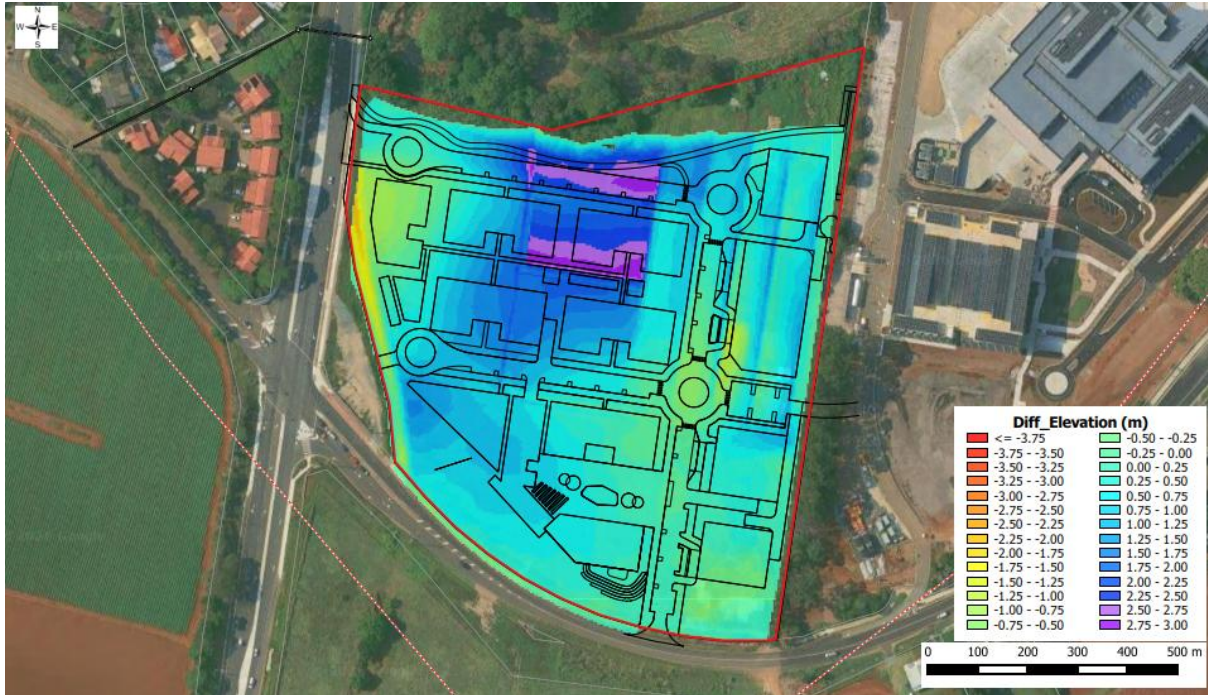


Figure 3 Finished Surface Analysis

2. Hydrodynamic Flood Assessment

2.1. Objectives

This flood assessment aims to determine the flood levels for all design events up to and including the 1% AEP (Annual Exceedance Probability), 1% AEP_CC (Climate Change) and PMF (Probable Maximum Flood) design events, and to demonstrate that the proposed development does not significantly alter the existing hydrodynamic function of the floodplain.

The 1D/2D TUFLOW modelling software used in this assessment is an industry-standard two-dimensional river analysis model that estimates flood characteristics, including flood level, velocity, and depth, and assesses the impacts of the proposed development on surrounding properties. TUFLOW incorporates the study area's design terrain (i.e., Digital Terrain Model) as a series of grid points (2D cells). This allows flows that exceed the 1D channel or pipe network capacity to spill out and continue along the floodway in the 2D domain, as dictated by the topography. The hydraulic structures (i.e., the minor culvert network) are represented as 1D elements (ESTRY) that are dynamically linked to the 2D elements. The TUFLOW model computes the capacity of the 1D element, and once exceeded, the surcharged flow is transferred to the 2D model. Flood levels, discharge and velocity can be extracted from the model as functions of time at required locations.

2.2. 2D Model Set Up

2.2.1. Model Extent

The extents of the TUFLOW model are presented in Figure 4, and were set at an appropriate distance from the subject site. The downstream boundary rating curve has been extracted from the Council flood model (*Tweed Valley Flood Study Update and Expansion, 2024*).



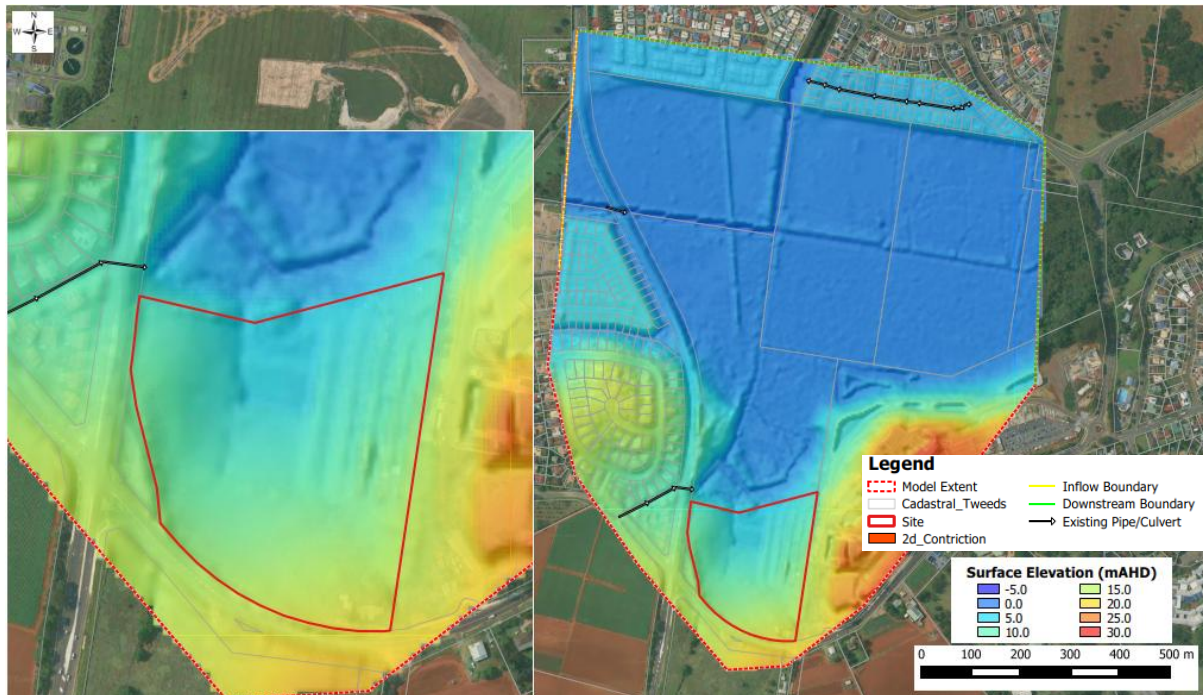


Figure 4 TUFLOW Model Extents

2.2.2. Resolution and Time Step

The TUFLOW model used an 8m primary grid, 4m sub-grid sampling, and a HPC computational solution for all scenarios. The grid size is determined by the model's efficiency and by constraints on the model extent.

2.2.3. Topography

The digital elevation model (DEM) was derived from the *Tweed Valley Flood Study Update and Expansion, 2024*, and was supplemented by ground survey and an earthworks model (Planit Consulting) for the existing case and developed case flood assessments. The topography used in the pre-development and post-development scenarios is shown in Figure 5 and Figure 6.



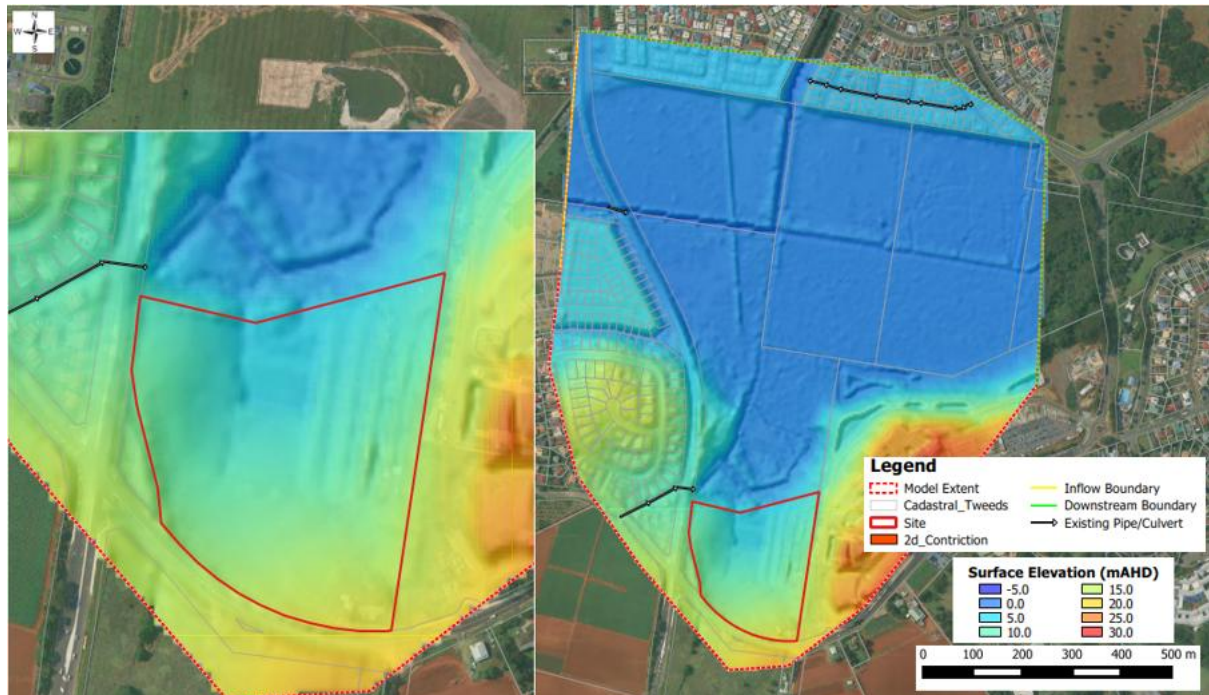


Figure 5 Existing Case Surface Elevation Data

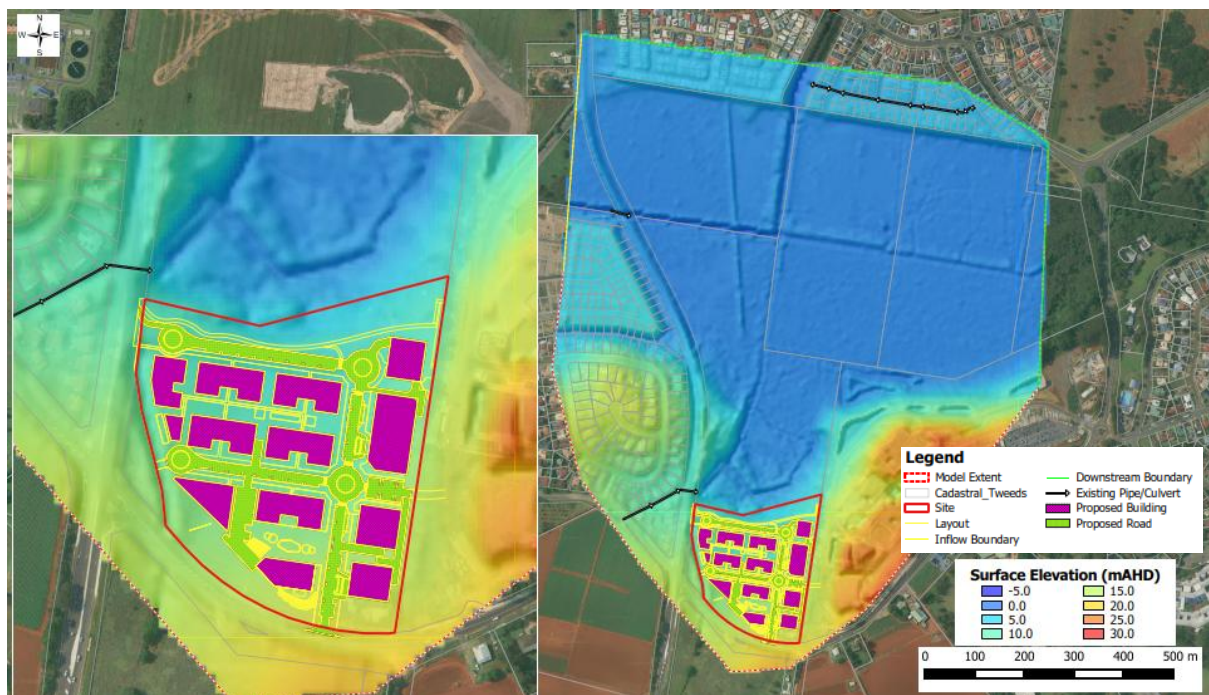


Figure 6 Developed Case Surface Elevation Data

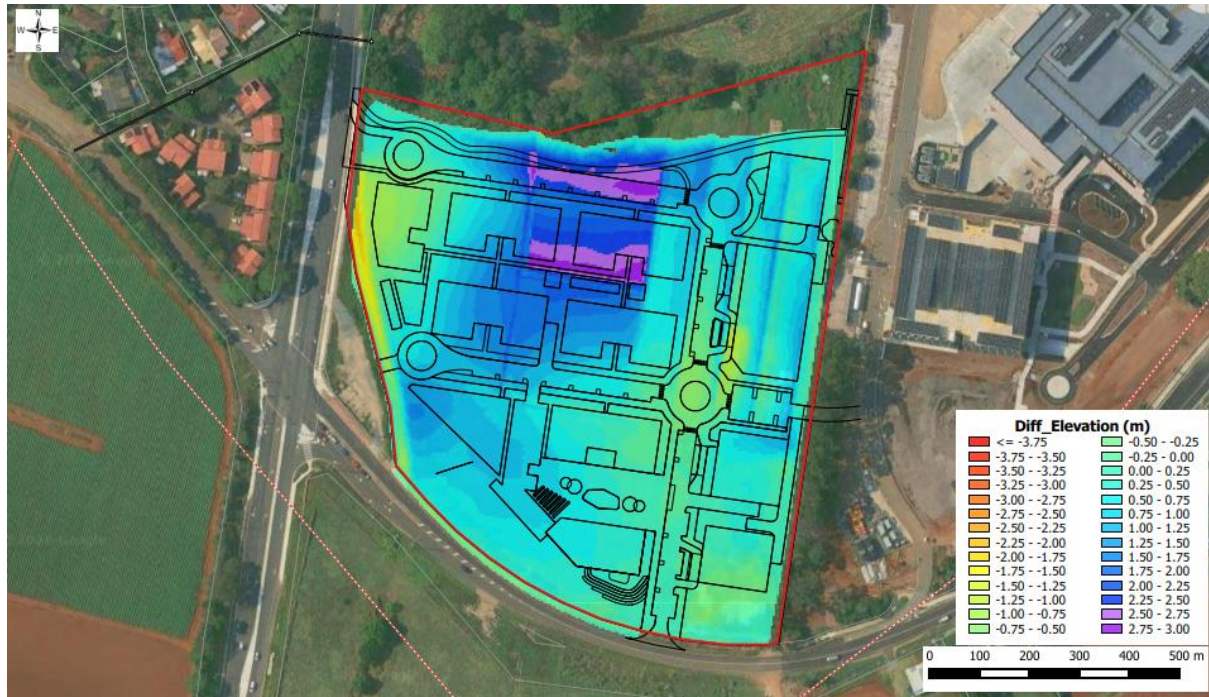


Figure 7 Difference in Elevation between the Developed Case and the Existing Case

2.2.4. Roughness

Manning n roughness values adopted for the Existing and Developed case hydraulic models are shown in Figure 8 and Figure 9.

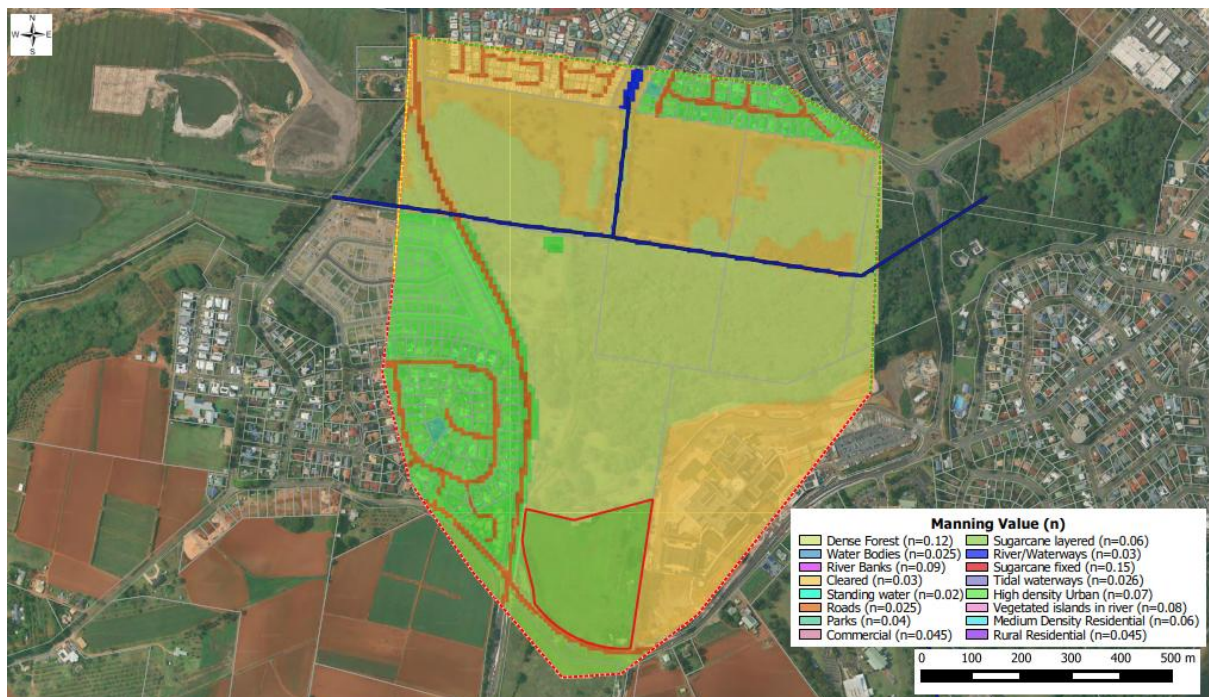


Figure 8 Existing Case Roughness Map

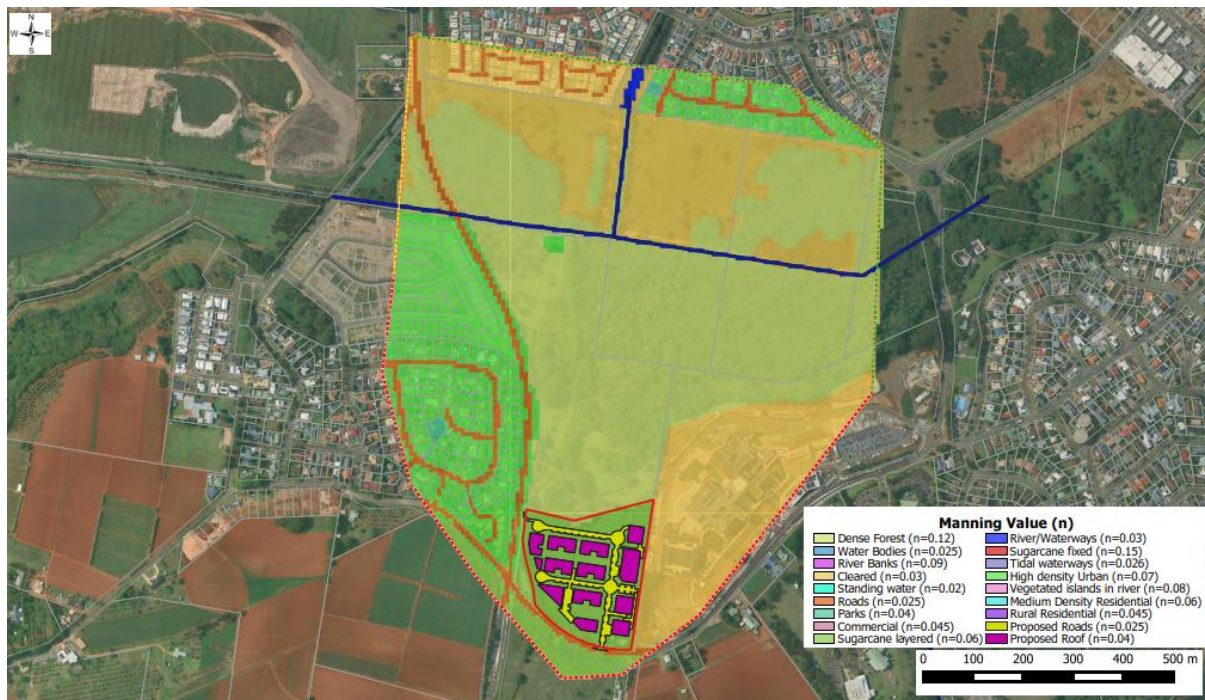


Figure 9 Developed Case Roughness Map

2.2.5. Inflows

Model inflows were extracted directly from the Council's TUFLOW model (*Tweed Valley Flood Study Update and Expansion 2024*), as shown in Figure 5.

2.2.6. Climate Change

The Flood Impact and Risk Assessment (FIRA) undertaken by Floodworks utilised the latest *Tweed Valley Flood Study Update and Expansion 2024* model, including the 1% AEP climate change (1% AEP_CC) model runs. Results are presented in Figures A09 to A11, Appendix B.

The *Tweed Valley Flood Study Update and Expansion 2024* incorporates guidance from *Australian Rainfall and Runoff 2019*, including provisions for climate change. In addition, Council's adopted *Interim Flood Planning Levels Policy* applies a climate change allowance to ensure new development is safer and more resilient. To provide a reasonable allowance for climate change, Tweed Shire Council has adopted the 0.2% AEP (1 in 500 year ARI) flood level from the *Tweed Valley Flood Study Update and Expansion 2024* as the defined flood across the Shire. As shown in Figures A05 to A08, Appendix B, the subject site is not affected by the 0.2% AEP flood event.

2.3. TUFLOW Model Validation

The Existing case TUFLOW model was compared against the *Tweed Valley Flood Study Update and Expansion 2024* for the 1% AEP design event, achieving a satisfactory calibration as shown in Figure 10.



Figure 10 Calibration Results for the 1% AEP Design Event

2.4. Existing Case

The existing case PMF design event peak water level, depth, velocity and hazard are shown in Figure 11 to Figure 14. The peak water level, depth, velocity and hazard for other events are shown in Appendix B.

A summary of the existing case results (in the north of the site) is as follows:

- Maximum water level for the PMF event is 7.23 mAHD
- Maximum water depth for the PMF event is less than 6.13m
- Maximum water velocity for the PMF event is 0.05m/s
- Maximum flood hazard for the PMF event is between H1 (low) and H5 (high)

Please refer to Appendix B for the complete drawing set.

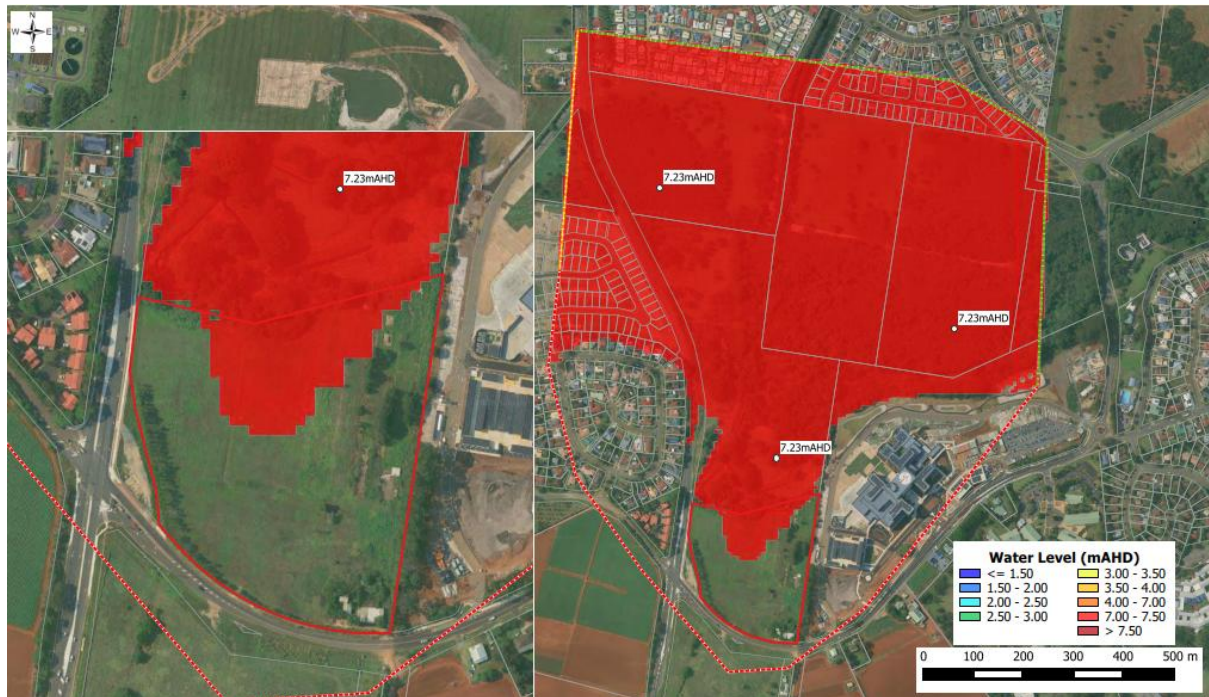


Figure 11 Existing Case Maximum Water Level – PMF event

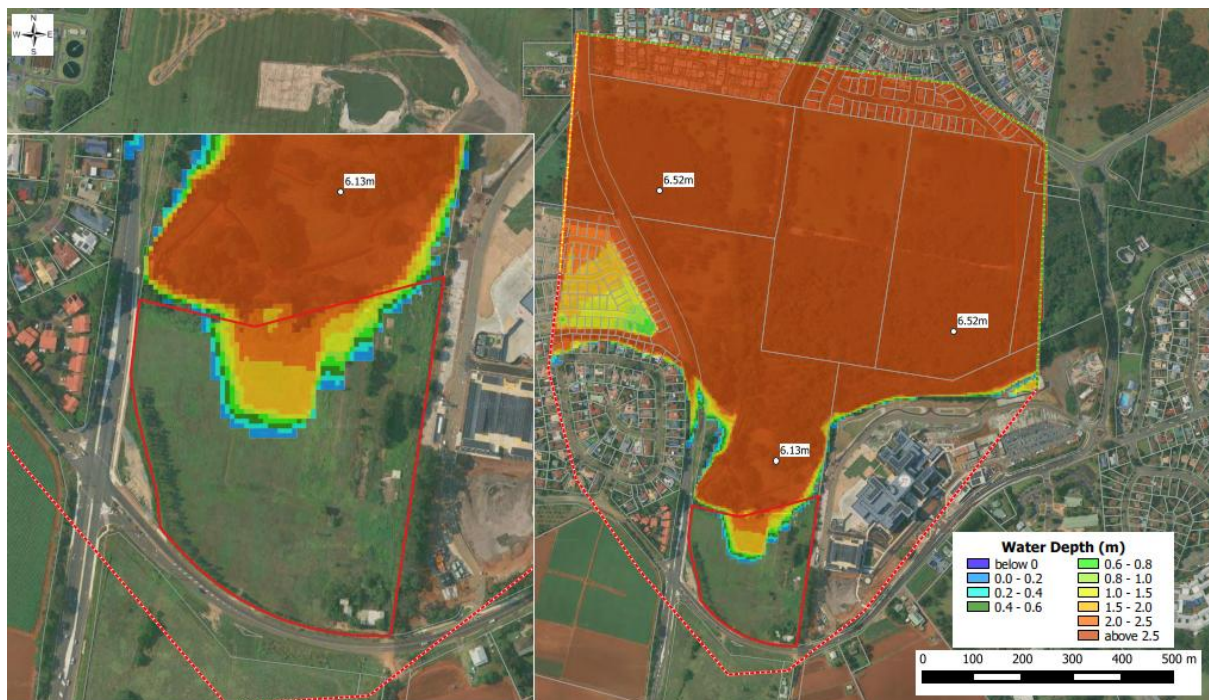


Figure 12 Existing Case Maximum Depth – PMF event

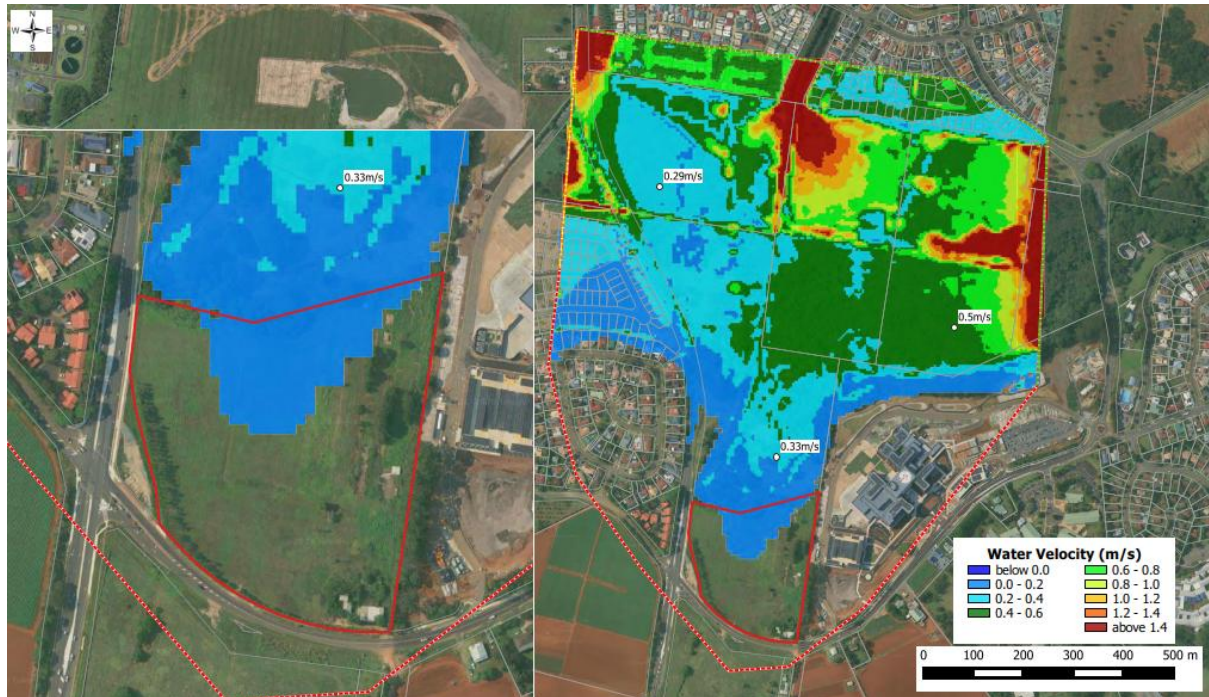


Figure 13 Existing Case Maximum Velocity – PMF event

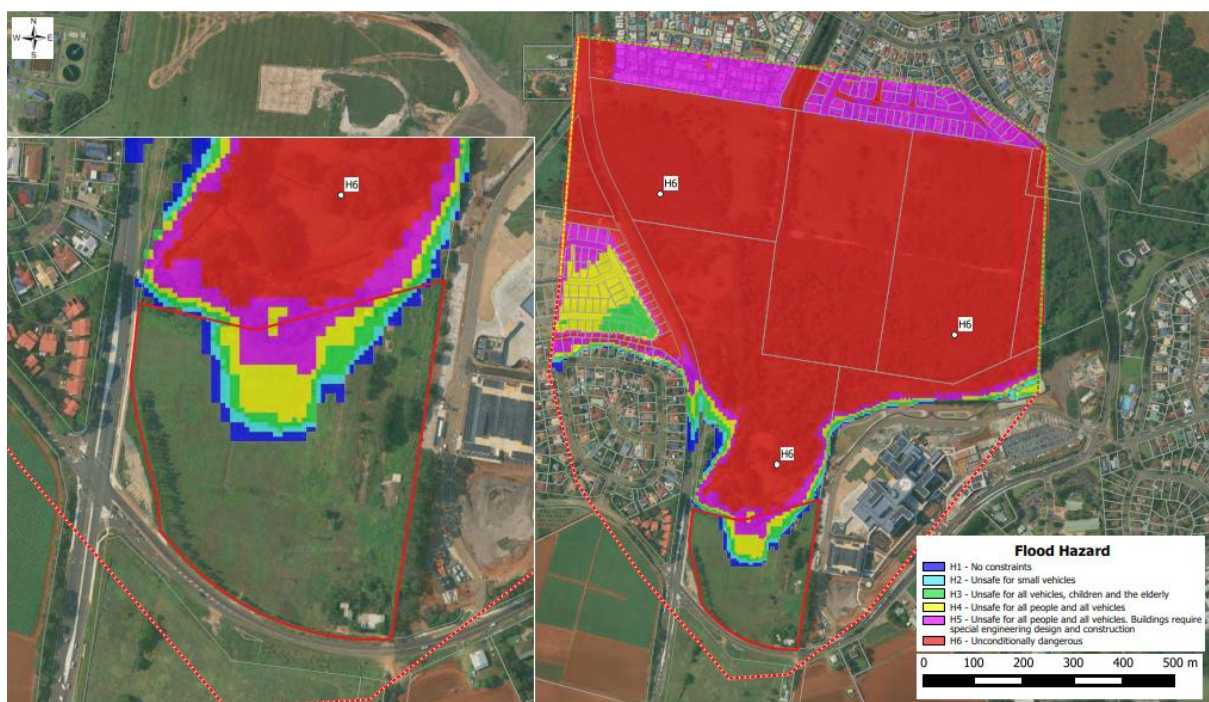


Figure 14 Existing Case Maximum Flood Hazard – PMF event

2.5. Developed Case

The developed case PMF design event peak water level, depth, velocity and hazard are shown in Figure 15 to Figure 18. The peak water level, depth, velocity and hazard for other events are shown in Appendix B.

It is acknowledged that the proposed case is conceptual in nature. While this Planning Proposal does not seek formal development consent for the Cudgen Connection Concept Masterplan, nor incorporate the “masterplan” as a detailed, binding element of the application, the Concept Masterplan serves as a comprehensive working blueprint for the site. It outlines the intended long-term outcomes and illustrates the proposed high-level land-use framework and development vision for the subject land.

A summary of the developed case results (in the north of the site) is as follows:

- Maximum water level for the PMF event is 7.23 mAHD to the north of the site. No floodwater is expected to encroach into the development area due to the rising topography and proposed earthworks.
- Maximum water depth for the PMF event is less than 6.13m along the northern fringe (unchanged) and does not enter the development pad. No floodwater is expected to encroach into the development area due to the rising topography and proposed earthworks.
- Maximum water velocity for the PMF event is 0.04m/s along the northern fringe. No floodwater is expected to encroach into the development area due to the rising topography and proposed earthworks.
- Maximum flood hazard for the PMF event is H1 (low) – H5 (high hazard) along the northern fringe of the site. No floodwater is expected to encroach into the development area due to the rising topography and proposed earthworks.

Please refer to Appendix B for the complete drawing set.



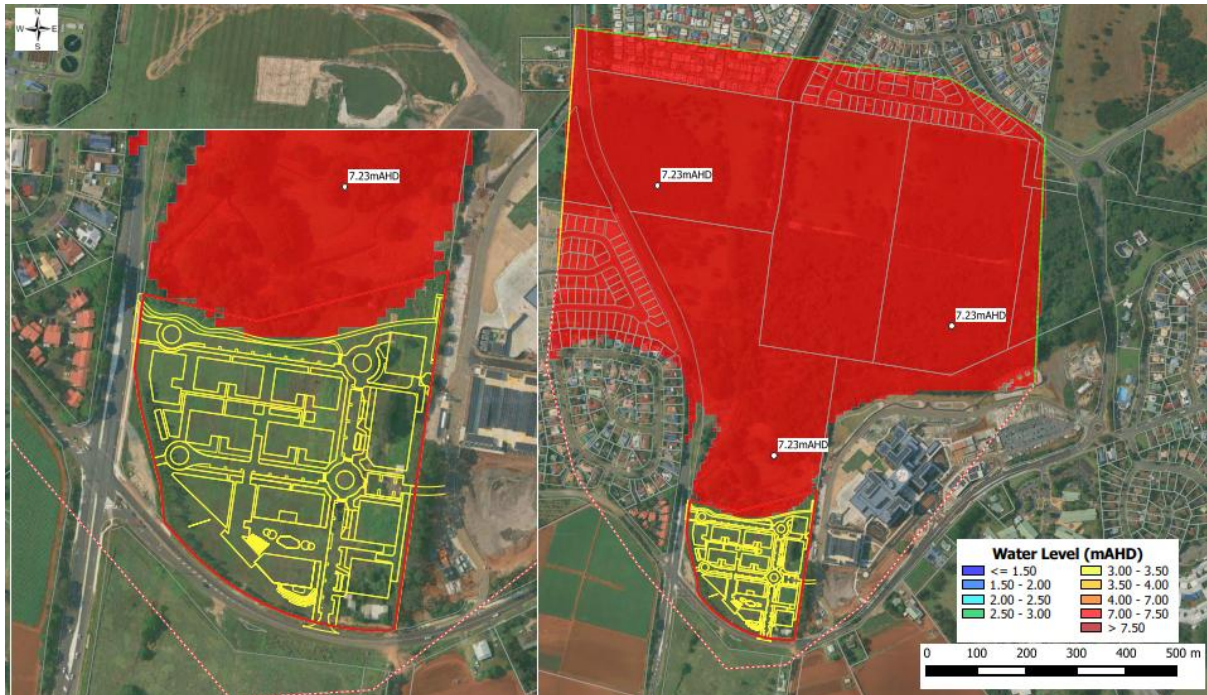


Figure 15 Developed Case Maximum Water Level – PMF event

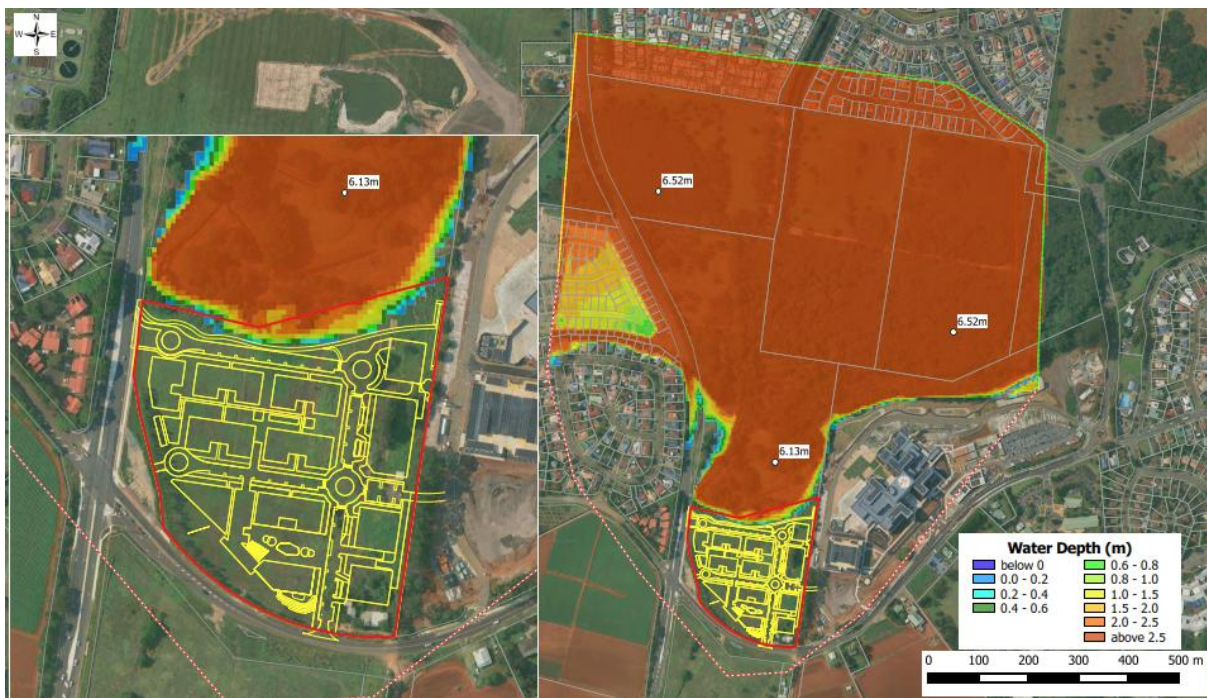


Figure 16 Developed Case Maximum Depth – PMF event

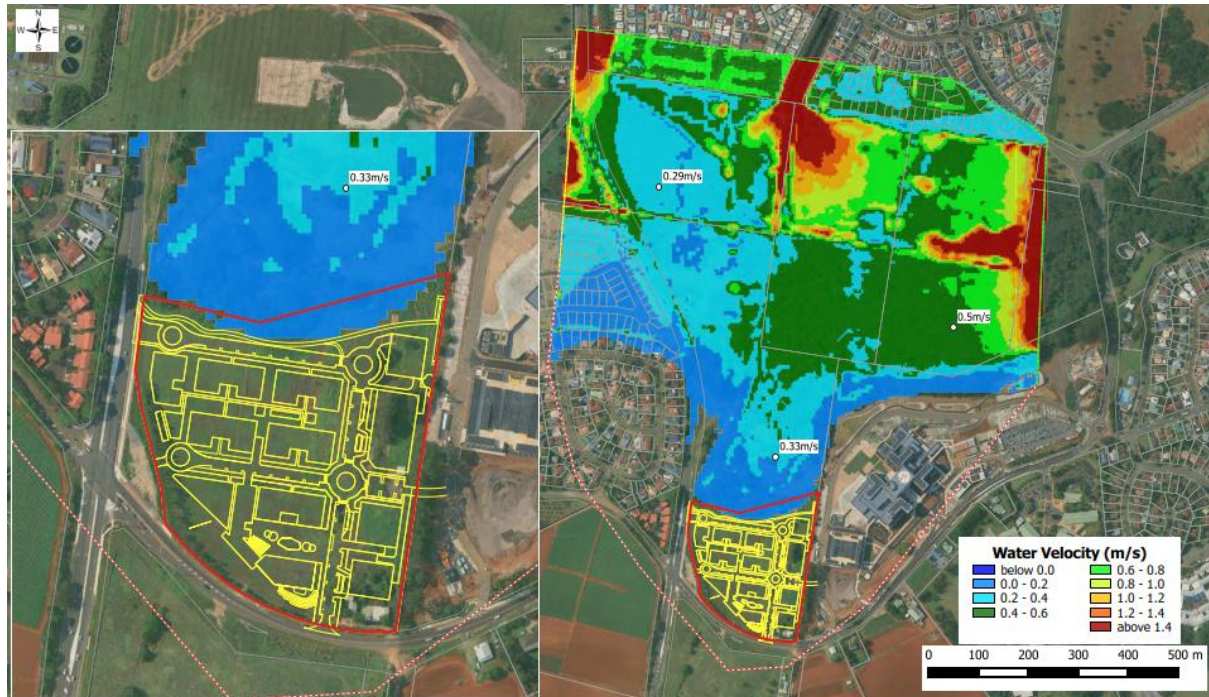


Figure 17 Developed Case Maximum Velocity – PMF event

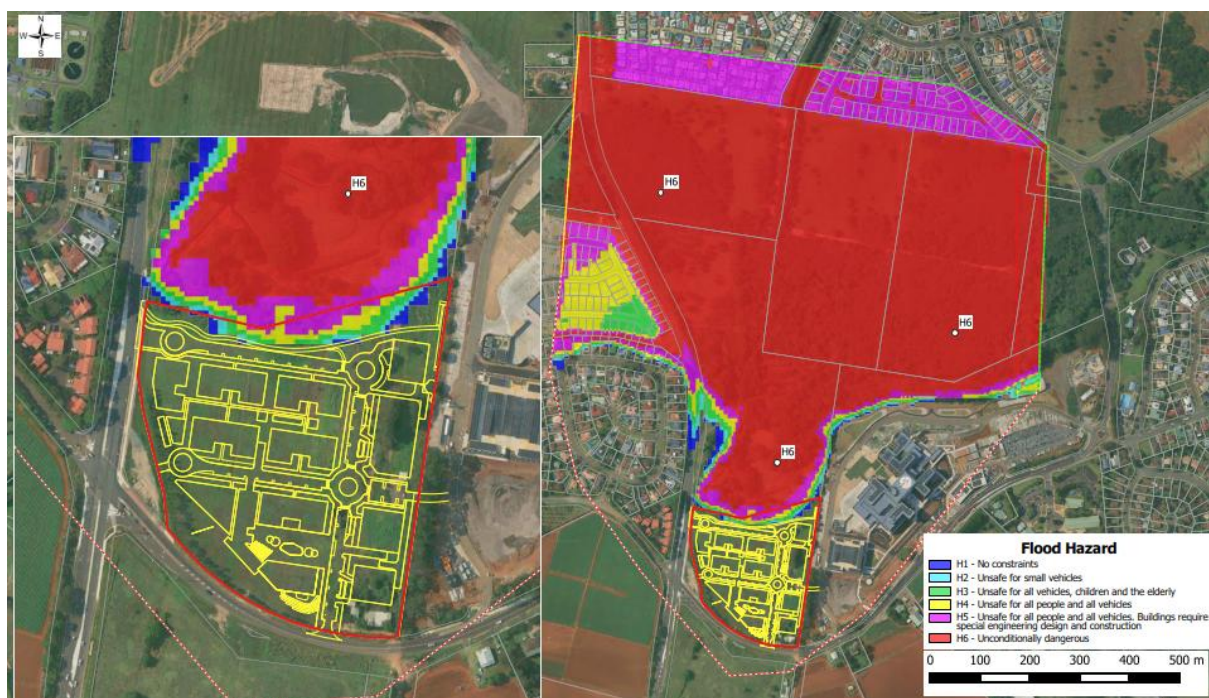


Figure 18 Developed Case Maximum Hazard – PMF event

2.6. Flood Hazard Assessment in Australian Rainfall and Runoff (ARR 2019)

Australian Rainfall and Runoff (ARR 2019) provides guidance on flood hazard assessment in Book 6 (Flood Hydraulics), Chapter 7 (Safety Design Criteria). Flood hazard is evaluated primarily through the interaction of flood depth (d , in metres) and velocity (v , in m/s), with the product depth $\times$ velocity ($d \times v$, in m^2/s) serving as the key metric for instability and risk to people, vehicles, and structures.

Hydraulic modelling is used to generate depth and velocity grids for design flood events (e.g., 1% AEP or Probable Maximum Flood). These are combined to classify provisional hydraulic hazard vulnerability categories (H1 to H6).

The categories are defined by combined vulnerability curves and absolute limits, as follows:

Category	Description	$d \times v$ Limit (m^2/s)	Limiting Depth (m)	Limiting Velocity (m/s)
H1	Generally safe for vehicles, people and buildings	≤ 0.3	0.3	2
H2	Unsafe for small vehicles	≤ 0.6	0.5	2
H3	Unsafe for vehicles, children and the elderly	≤ 0.6	1.2	2
H4	Unsafe for people and vehicles	≤ 1.0	2	2
H5	Unsafe for vehicles and people; buildings vulnerable to structural damage	≤ 4.0	4	4
H6	Unsafe for vehicles and people; all building types vulnerable to failure	> 4.0	-	-

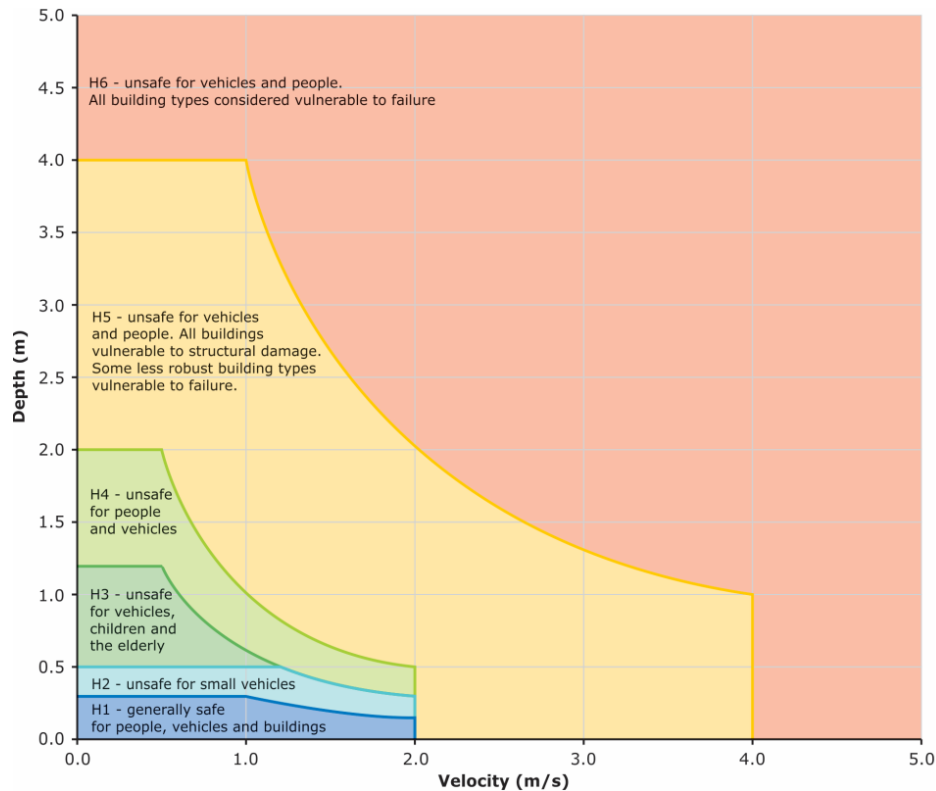


Figure 19 Flood Hazard Ratings (ARR2019)

The pre-development hazard rating for the PMF event with H1 (low) to H5 (high) has been reduced for the subject site to H1–H2 (low hazard) by the proposed fill of the northern access road to 7.3 mAHD (greater than the probable maximum flood 7.23m AHD). The Concept Masterplan anticipates the proposed earthworks to accommodate built structures and localised filling in the lower portions of the site to 'tie-in' access, parking, and infrastructure areas to this flood-immune access road. As a result, the footprint is flood-free and egress from the site is available in all flood scenarios.

All development, inclusive of floor space, will be above the flood planning level of 3.82 mAHD.

2.7. Impact Assessment

Flood modelling has been completed for the Existing and Developed case 1% AEP Climate Change event to assess potential impacts of the proposed development on the floodplain's existing hydraulic function.

A flood afflux assessment was undertaken to assess the impact of the proposed development on the floodplain by subtracting the peak water levels and velocity associated



with the existing case from those of the developed case. The results for the 1% AEP_Climate Change afflux assessment are provided from Figure 20 to Figure 21.

The assessment results demonstrate no changes in peak water levels exceeding 10mm or peak water velocities exceeding 0.1m/s associated with the proposed development for 1% AEP Climate Change design events. Affluxes are considered acceptable, indicating that the proposed development is unlikely to significantly change the existing hydrodynamic function of the floodplain upstream or downstream of the subject site.

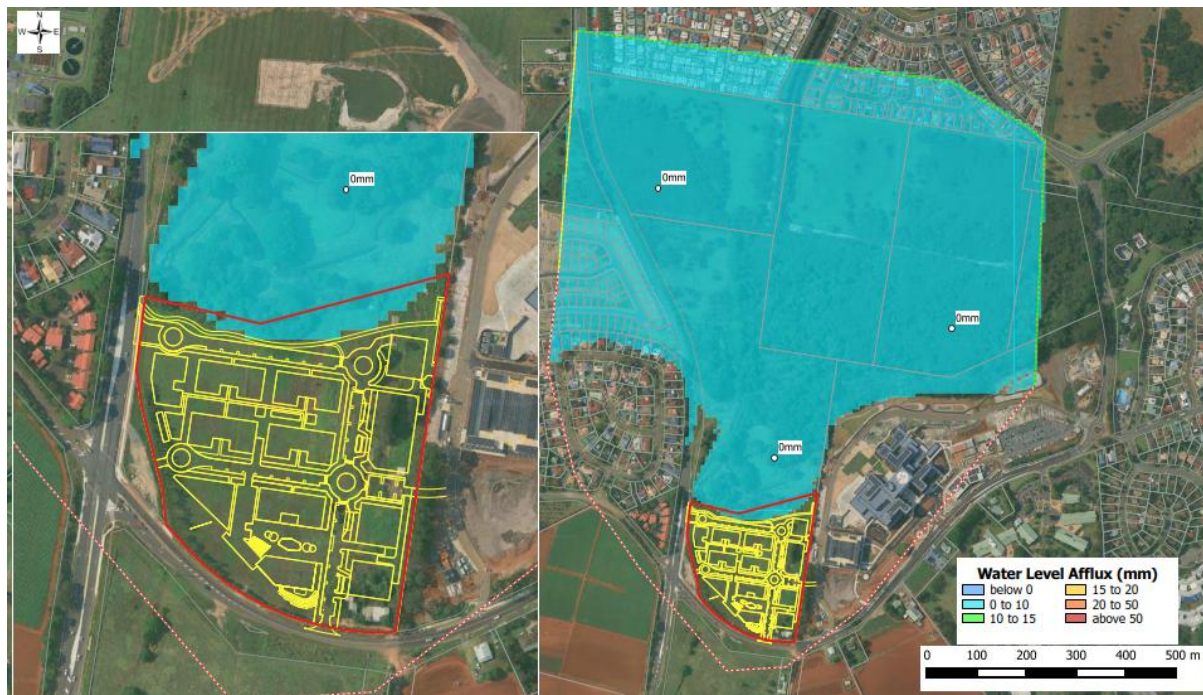


Figure 20 Developed Case Maximum Water Level Afflux – 1% AEP_CC

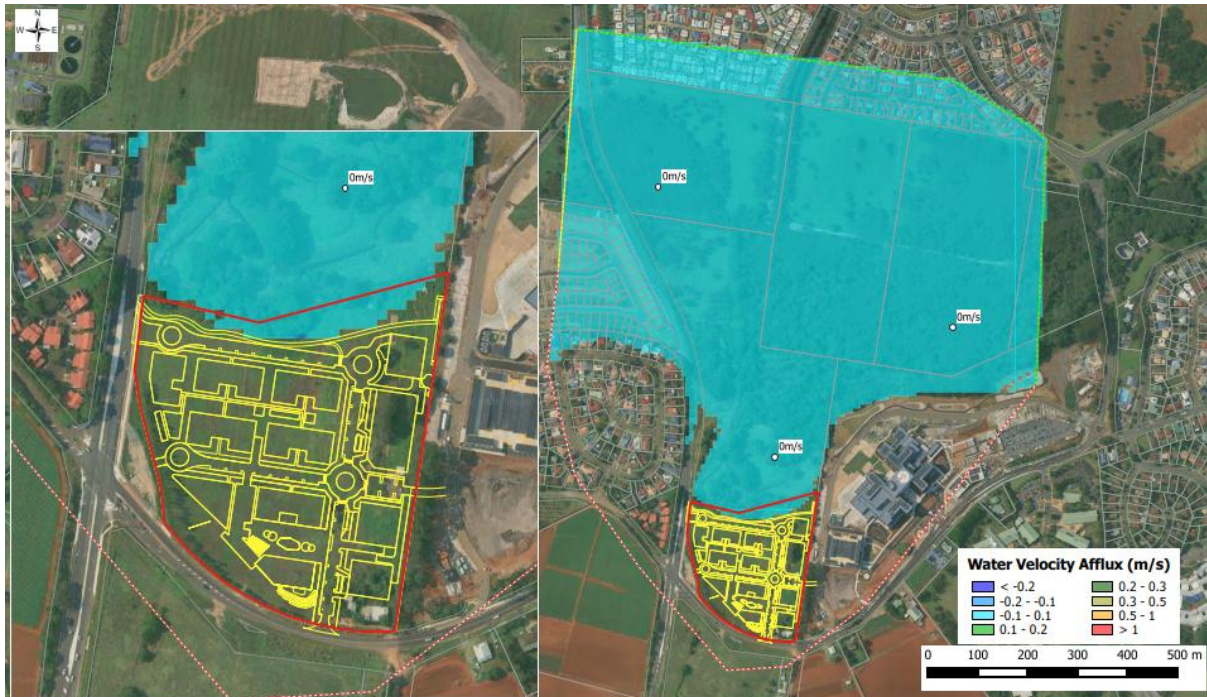


Figure 21 Developed Case Maximum Velocity Afflux – 1% AEP_CC

Floodworks has investigated the absence of afflux for all events up to the PMF event (Figure C01 to C12, Appendix B) and attributes this outcome to the following factors:

- Flow velocities across the site are low during the PMF (refer to Figure A03 Appendix B), limiting the potential for measurable backwater effects.
- The volume of proposed fill is negligible relative to the total floodplain storage capacity of the system, resulting in no discernible reduction in conveyance or storage.

This response is consistent with the expected hydraulic behaviour of flood fringe areas within the Tweed Valley.

3. Summary

A flood assessment has been undertaken as part of a Planning Proposal (rezoning) for 741 Cudgen Road, Cudgen, NSW, Lot 61 on DP1305734 (herein known as “Cudgen Connection”). The purpose of this Flood Impact and Risk Assessment is in support of a Planning Proposal (rezoning) at 741 Cudgen Road, Cudgen (Cudgen Connection).

The flood assessment determined the flooded extent, height, velocity, peak depth and hazard assessment of floodwaters in relation to the proposed development, including any potential impacts from the proposed changes within the floodplain.

The key objectives of the assessment were to:

- Truncate and calibrate a base case 1D/2D TUFLOW Hydraulic model to the subject site in accordance with ARR2019
- Assess all design events up to and including the 1% AEP (Annual Exceedance Probability), 1% AEP_CC (Climate Change) and PMF (Probable Maximum Flood) design events
- Determine the maximum height, depth, velocity, and hazard assessment
- Undertake an afflux assessment to determine if the proposed development would impact the floodplain's existing hydrodynamics
- Reduce flood risk where possible

The key flood parameters for the site are:

- Defined Flood Level (1% AEP_CC): 3.32 mAHD
- Flood Planning Level (1% AEP_CC + 500mm): 3.82 mAHD
- Probable Maximum Flood (PMF): 7.23 mAHD

A flood afflux assessment was undertaken to assess the impact of the proposed development on the floodplain by subtracting the peak water levels and velocity associated with the existing case from those of the developed case.

The assessment results demonstrate no changes in peak water levels exceeding 10mm or peak water velocities exceeding 0.1m/s associated with the proposed development for 1% AEP Climate Change design events. Affluxes are considered acceptable, indicating that the proposed development is unlikely to significantly change the existing hydrodynamic function of the floodplain upstream or downstream of the subject site.

A response to the NSW Department of Planning, Housing and Infrastructure (DPHI) request for information is provided in Table 1 below.



Table 1 Response to DPHI

REQUEST FROM DPHI	RESPONSE	ACHIEVED?
A Flood Impact and Risk Assessment (FIRA) in accordance with 9.1 Ministerial Direction 4.1 – Flooding, and the Flood Risk Management Manual 2023 and supporting guidelines	The flood impact and risk assessment has been completed in accordance with the Ministerial direction 4.1 and the Flood Risk Management Manual 2023.	Y
Consideration of the full range of flood events and impacts up to the PMF	All events from the 20%AEP to the PMF have been assessed	Y
Consideration and justification for the scale of residential development in areas of high hazard risks, including justification for or against potentially reducing the density of development in those high hazard areas	There is no basis for reducing the density of development for the following reasons: • The northern part of the site is only affected by the probable maximum flood (PMF) and not by higher-frequency floods. • The existing PMF H1-H5 high hazard at the northern extent of the site is a function of depth (not velocity) and can be easily managed by the proposed filling of the northern access road. • High-level egress is available to Tweed Coast Road, then Cudgen Road for all events up to the PMF.	Y
Identification of evacuation locations above PMF	The designated flood evacuation centre is the Kingscliff TAFE. High-level egress above the PMF is available to both the east and west of the site via Cudgen Road.	Y

REQUEST FROM DPHI	RESPONSE	ACHIEVED?
The proposal to demonstrate consistency with the Shelter in Place Guidelines	The proposed fill pad will exceed 7.3 mAHD and be above the PMF level (7.23 mAHD). All buildings and roadways will be above this level and are suitable for shelter-in-place.	Y

The proposed development complies with the Ministerial Direction 4.1: Flooding; TSC DCP Section A3: Flooding; TSC Interim Flood Policy; and LEP Sections 5.21 and 5.22.

4. References

- BOM (2018) Rainfall IFD Data System
- IPWEA 2013, Queensland Urban Development Manual (QUDM)
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
- Elevation - Foundation Spatial Data from <http://elevation.fsdf.org.au/>

Appendix A Ministerial Direction 4.1

4.1 Flooding Objectives		Comment
Objectives	The objectives of this direction are to:	
(a)	ensure that development of flood-prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and	Compliant
(b)	ensure that the provisions of an LEP that apply to flood-prone land are commensurate with flood behaviour and include consideration of the potential flood impacts both on and off the subject land.	Compliant
Application	This direction applies to all relevant planning authorities that are responsible for flood prone land when preparing a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land.	
Direction 4.1 (1)	A planning proposal must include provisions that give effect to and are consistent with:	
(a)	the NSW Flood Prone Land Policy,	Compliant
(b)	the principles of the Floodplain Development Manual 2005,	Compliant
(c)	the Considering flooding in land use planning guideline 2021, and	Compliant
(d)	any adopted flood study and/or floodplain risk management plan prepared in accordance with the principles of the Floodplain Development Manual 2005 and adopted by the relevant council.	Compliant
Direction 4.1 (2)	A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Employment, Mixed Use, W4 Working Waterfront or Special Purpose Zones.	Justifiably inconsistent. Whilst the PP seeks to amend the zone and development standards that apply to land identified as flood-prone, being land below the PMF, this Flood Impact Assessment confirms the absence of a notable/significant flood hazard to the land in both pre- and post-development scenarios. The proposed changes to zoning and development standards will not increase the population or intensity of land use below the

		PMF in the developed scenario. Specifically, earthworks and/or design responses to ensure all sensitive land uses and infrastructure are positioned above the PMF are readily available.
Direction 4.1 (3)	A planning proposal must not contain provisions that apply to the flood planning area which:	
(a)	permit development in floodway areas,	The subject site is not located within a floodway
(b)	permit development that will result in significant flood impacts to other properties,	There is no afflux resulting from the proposed development
(c)	permit development for the purposes of residential accommodation in high hazard areas,	The site is not located within a high-hazard zone
(d)	permit a significant increase in the development and/or dwelling density of that land,	N/A
(e)	permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,	N/A
(f)	permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require development consent,	Compliant. The amended zone and development standards sought do not introduce new or additional land uses able to be carried out without consent.
(g)	are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or	There is no afflux resulting from the proposed development. All development will be located above the PMF flood level (7.3 mAHd)
(h)	permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event.	N/A
Direction 4.1 (4)	A planning proposal must not contain provisions that apply to areas between the flood planning area and probable maximum flood to which Special Flood Considerations apply which:	

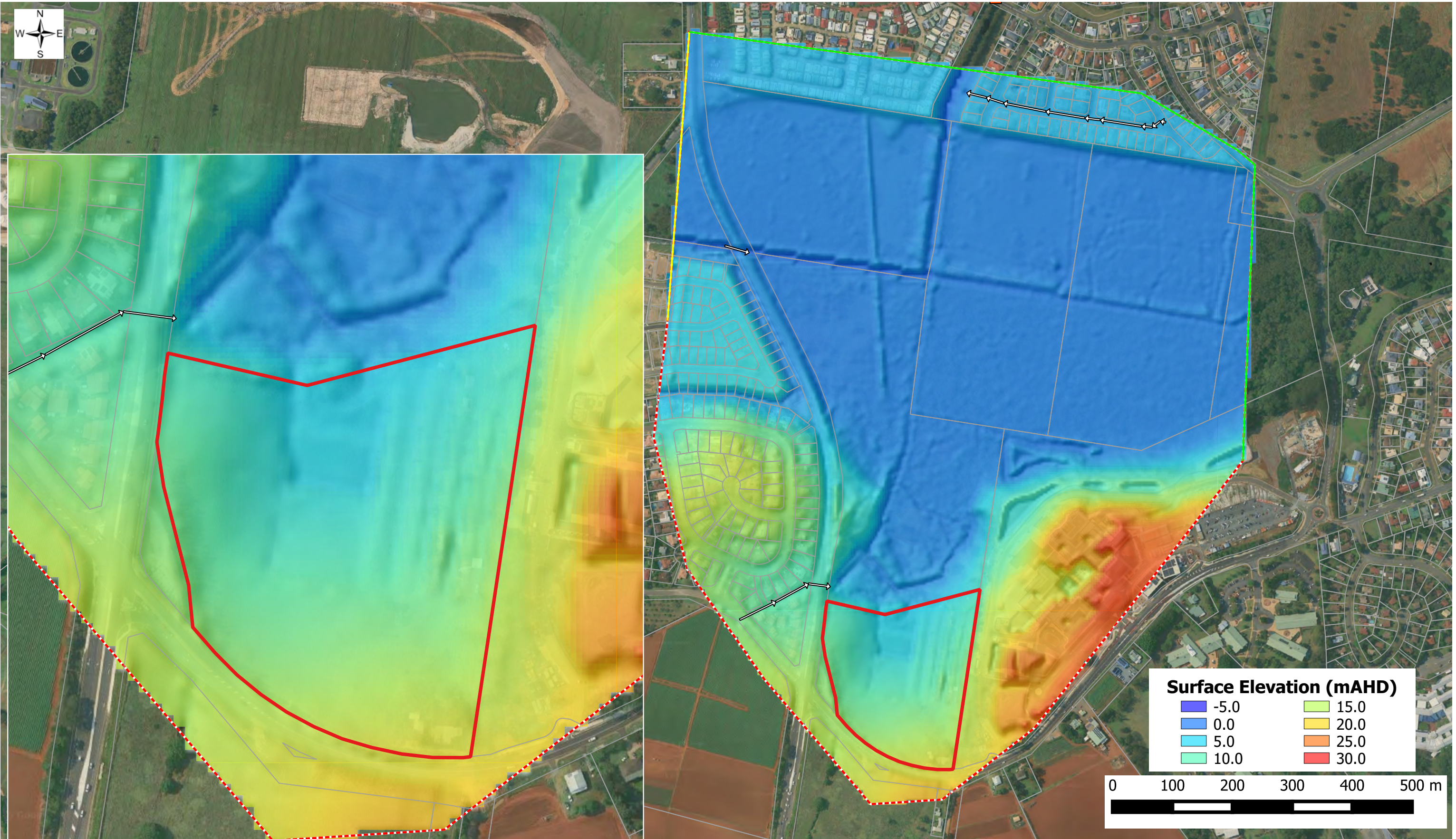
(a)	permit development in floodway areas,	All development will be located above the PMF flood level (7.3 mAHD)
(b)	permit development that will result in significant flood impacts to other properties,	There is no afflux resulting from the proposed development.
(c)	permit a significant increase in the dwelling density of that land,	Justifiably inconsistent. The PP seeks to amend the zone and development standards, which in turn will permit a significant increase in the dwelling density of the land. Notwithstanding, this Flood Impact Assessment confirms the absence of notable/significant flood hazard to the land in the post development scenario, notably confirming: • That the subject site is above the Design Flood Level (DFL) • The subject site does not contain floodway areas or high hazards areas. • The Concept Masterplan has acknowledged the flood conditions of the site, positioning the critical hospital infrastructure and community building outside of the PMF affected land, and benefits from suitable earthworks and/or design response options to ensure residential accommodation is above the PMF. • Direct and effective evacuation opportunities are identified from the site to the established evacuation centre (approximately 650m east), promoting efficient evacuation should evacuation ever be required.
(d)	permit the development of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,	N/A
(e)	are likely to affect the safe occupation of and efficient evacuation of the lot, or	The site above the PMF has flood-free access to Cudgen Road.

(f)	are likely to result in a significantly increased requirement for government spending on emergency management services, and flood mitigation and emergency response measures, which can include but not limited to road infrastructure, flood mitigation infrastructure and utilities.	There is no afflux resulting from the proposed development. All development will be located above the PMF flood level (7.3 mAHD)
Direction 4.1 (5)	For the purposes of preparing a planning proposal, the flood planning area must be consistent with the principles of the Floodplain Development Manual 2005 or as otherwise determined by a Floodplain Risk Management Study or Plan adopted by the relevant council.	Compliant

Appendix B TUFLOW Results



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**FIG 01 EXISTING CASE
TUFLOW MODEL FEATURE**

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

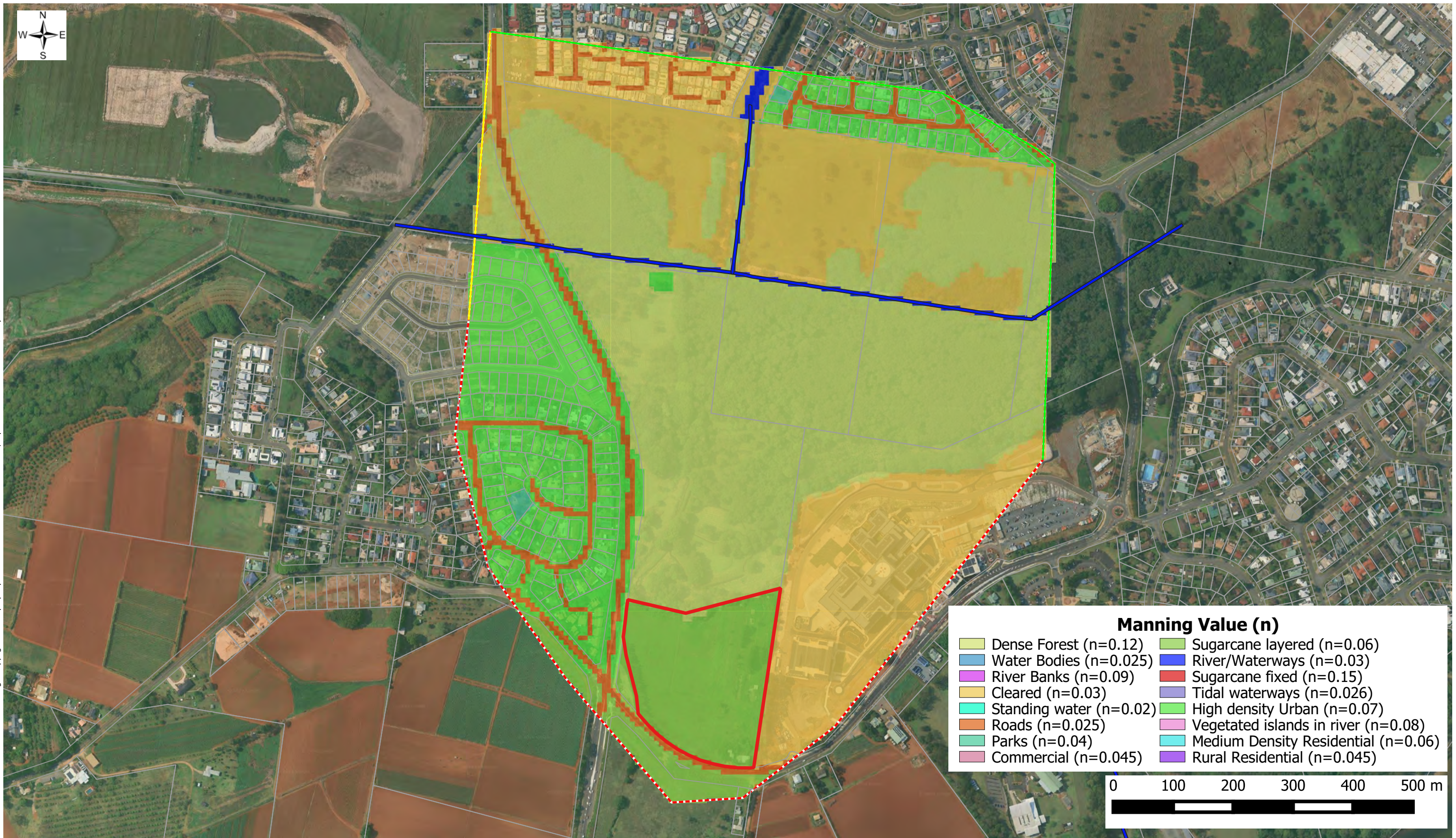
- Model Extent
- Cadastral_Tweeds
- Site
- 2d_Constriction
- Inflow Boundary
- Downstream Boundary
- Existing Pipe/Culvert



Client

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**FIG 02 EXISTING CASE
TUFLOW MANNING MAP**

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Cadastral_Tweeds
- Site
- Inflow Boundary
- Downstream Boundary

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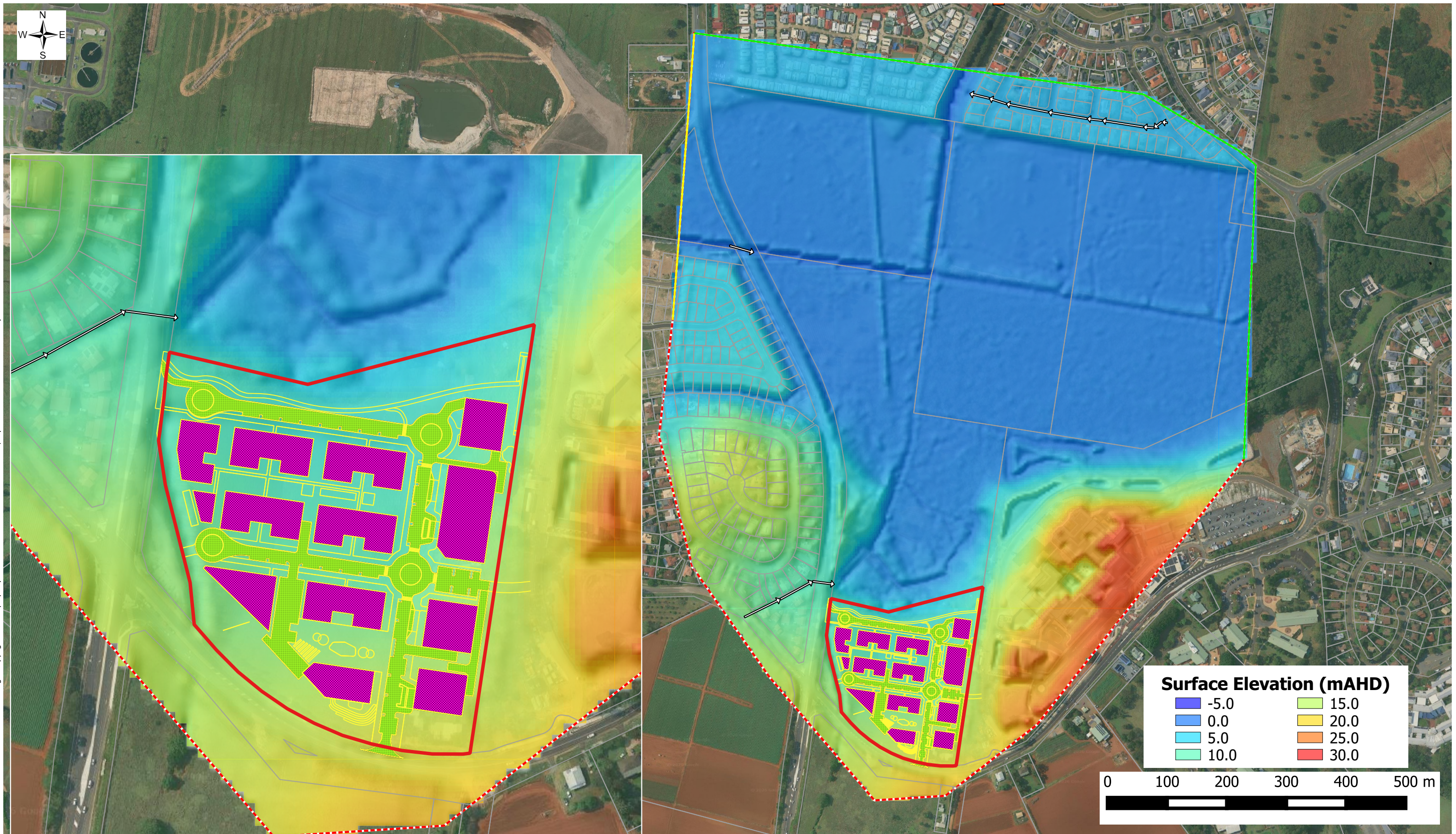


FIG 03 DEVELOPED CASE TUFLOW MODEL FEATURE

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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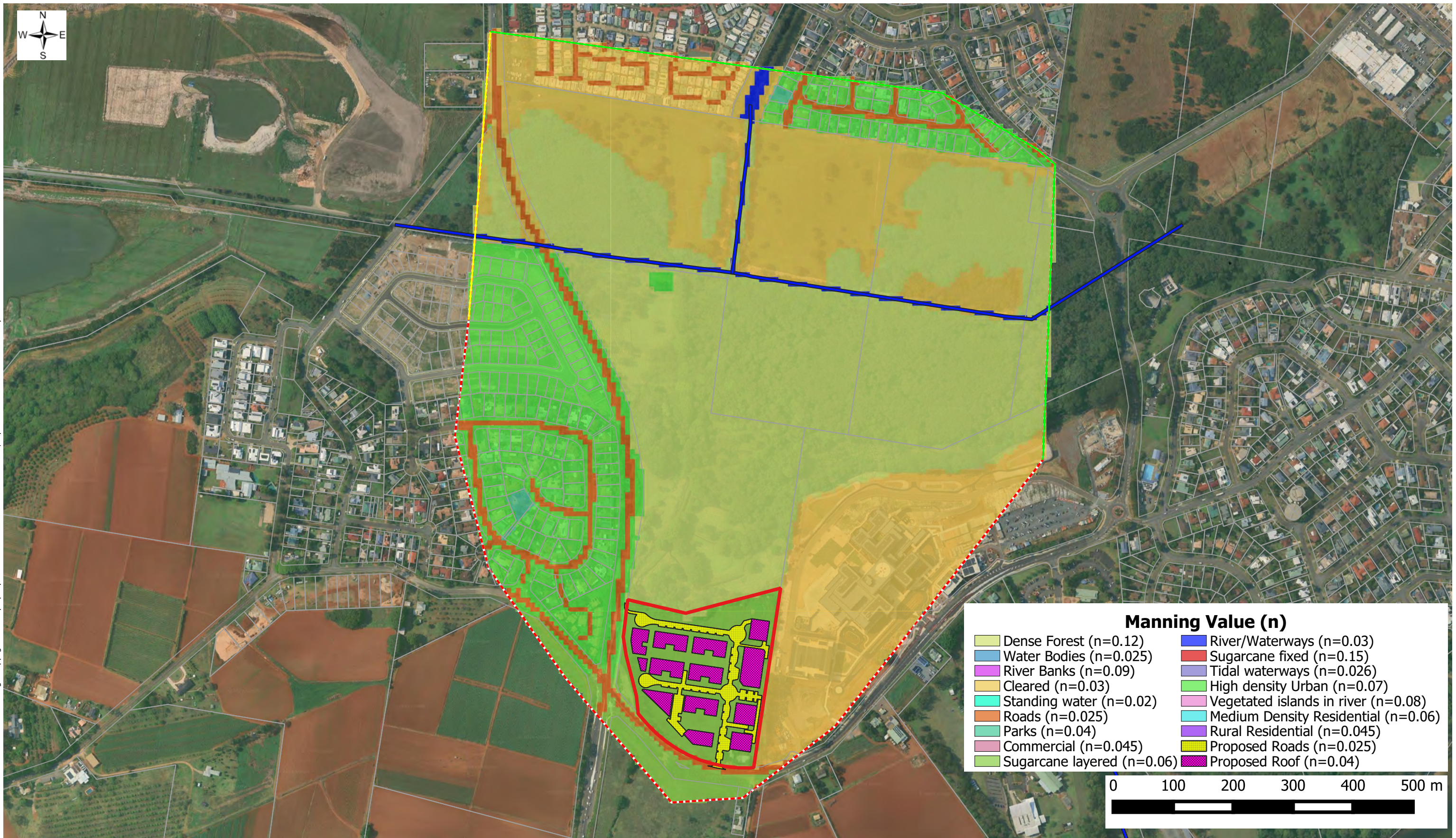


FIG 04 DEVELOPED CASE TUFLOW MANNING MAP

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Cadastral_Tweeds
- Site
- Inflow Boundary
- Downstream Boundary

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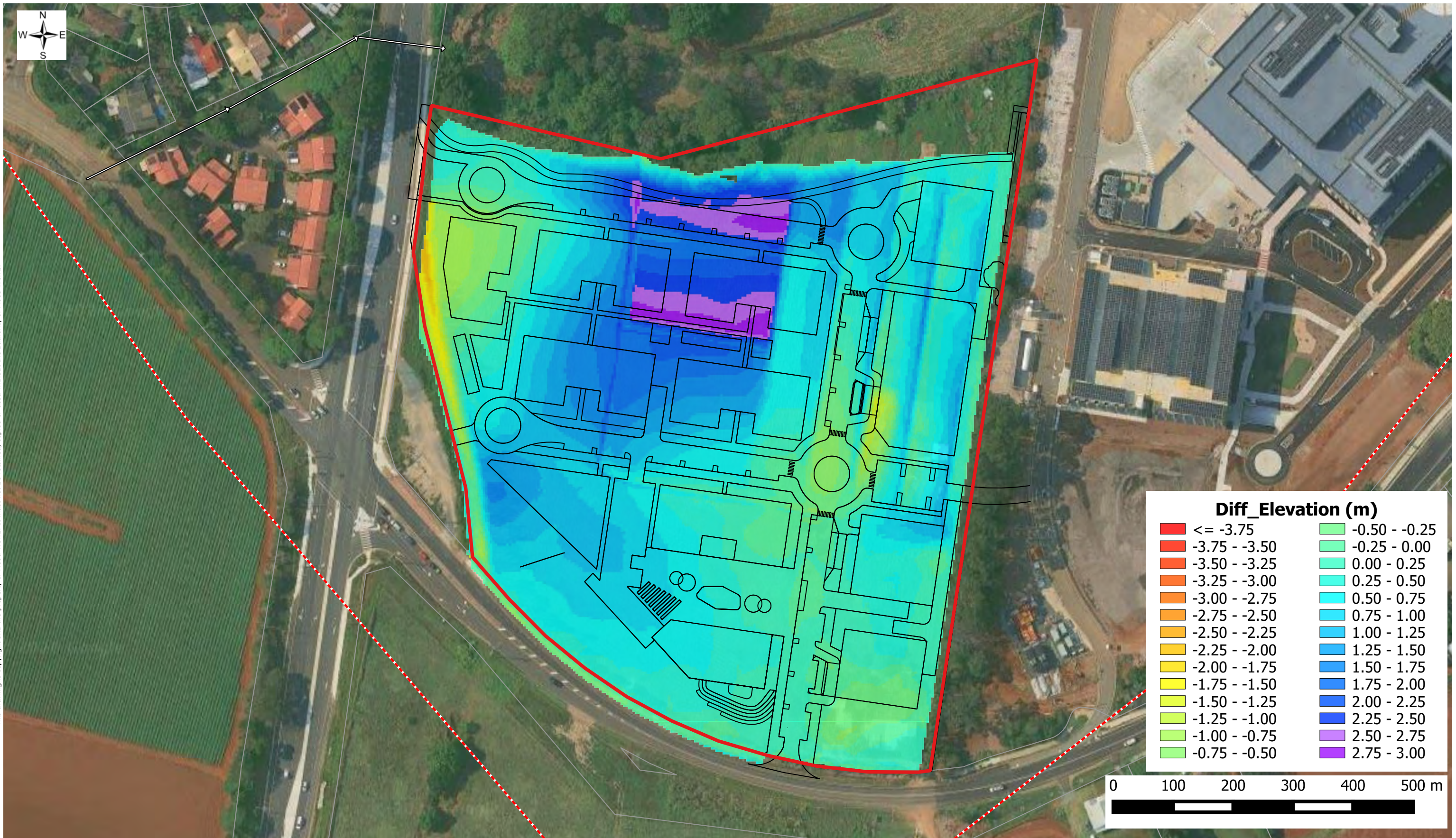


FIG 05 DIFFERENCE ELEVATION BETWEEN DEVELOPED CASE AND EXISTING CASE

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Cadastral_Tweeds
- Site
- Layout
- Downstream Boundary
- Inflow Boundary
- Existing Pipe/Culvert

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FIG 06 CALIBRATION 1% AEP BETWEEN TUFLOW MODEL AND COUNCIL MODEL

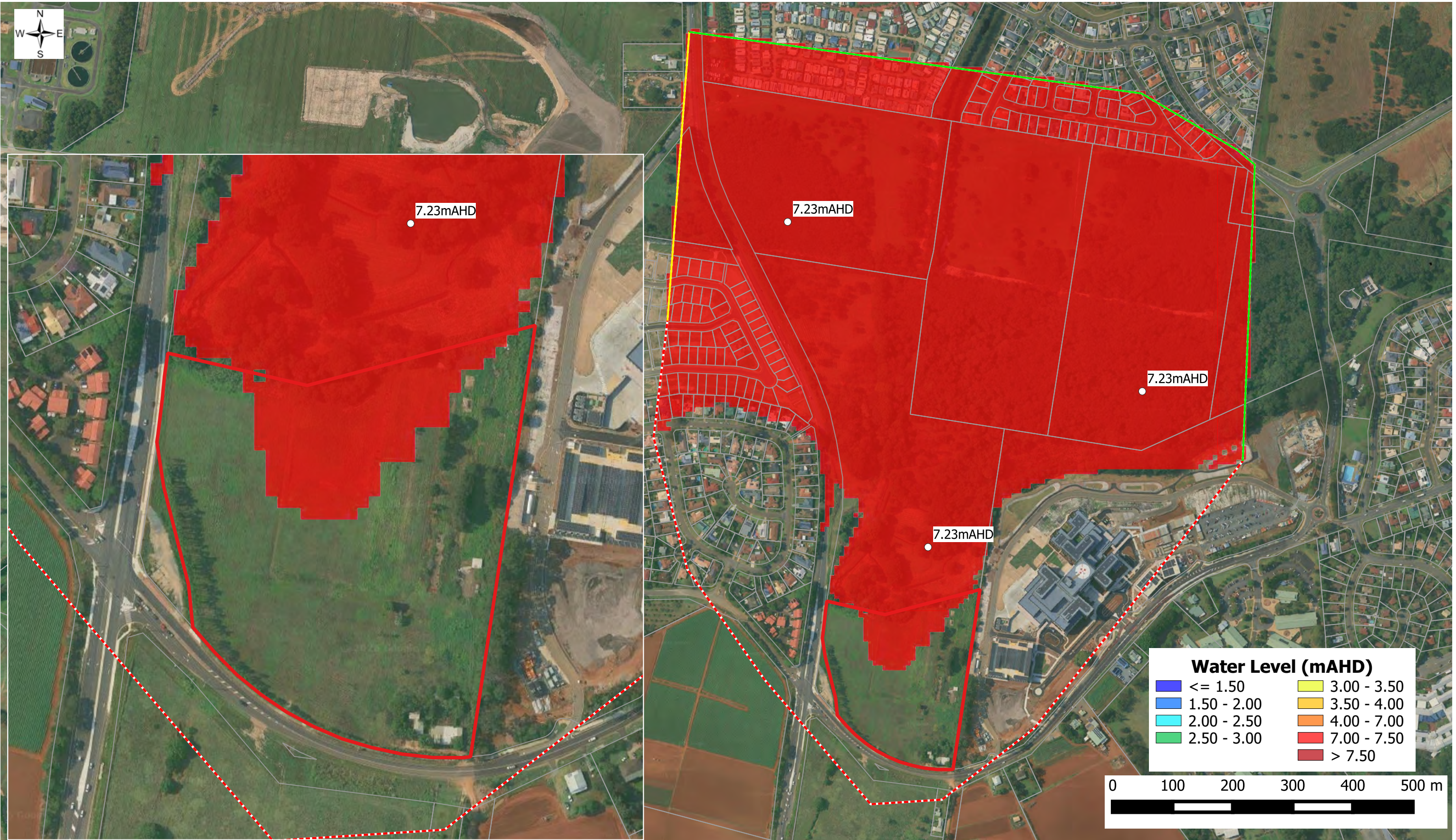
PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Downstream Boundary
- Inflow Boundary
- Cadastral_Tweeds
- TuFlow model Result
- Council Model Result

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**FIG A01 EXISTING CASE
PMF EVENT
FLOOD WATER LEVEL**

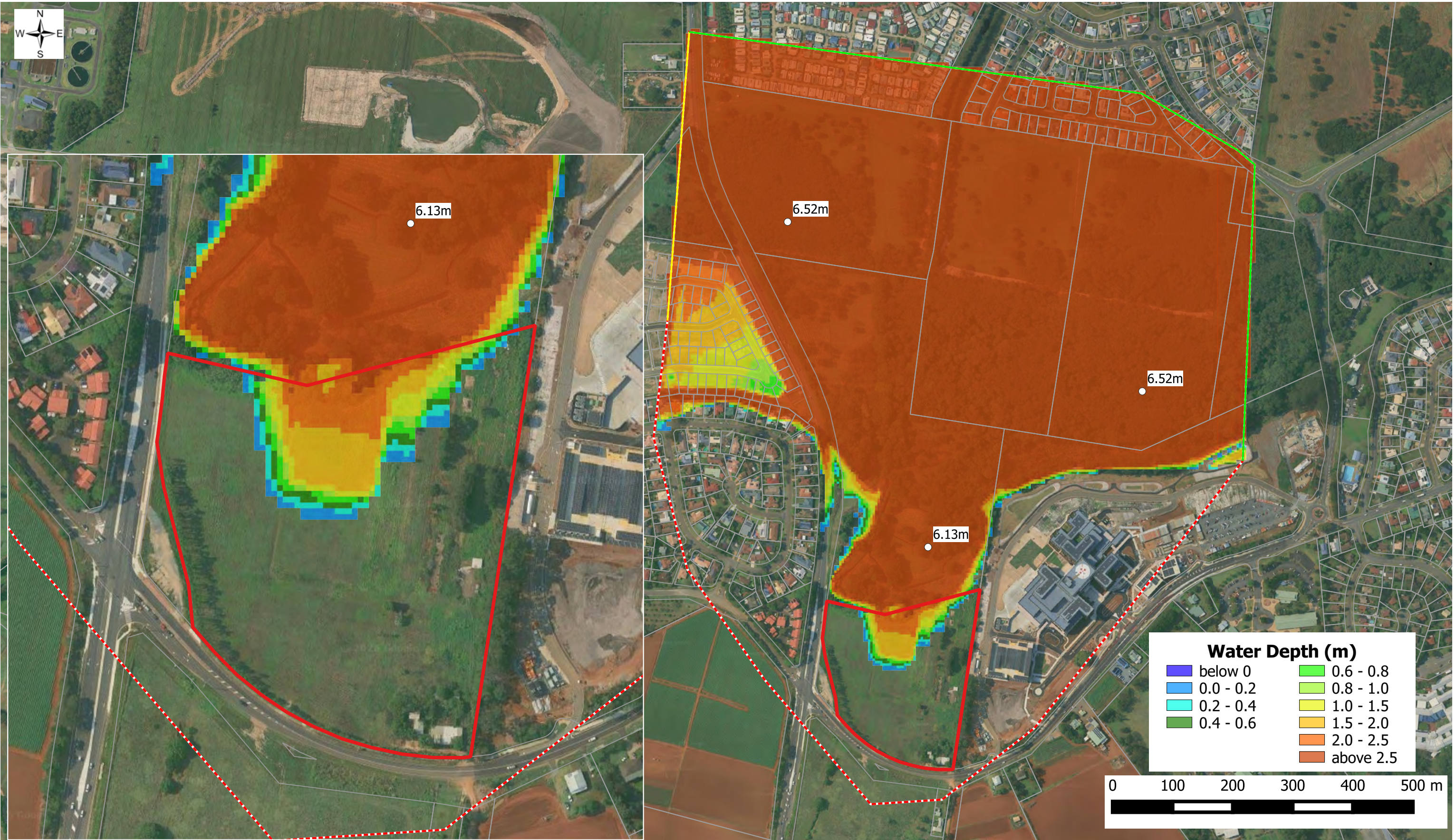
PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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**FIG A02 EXISTING CASE
PMF EVENT
FLOOD WATER DEPTH**

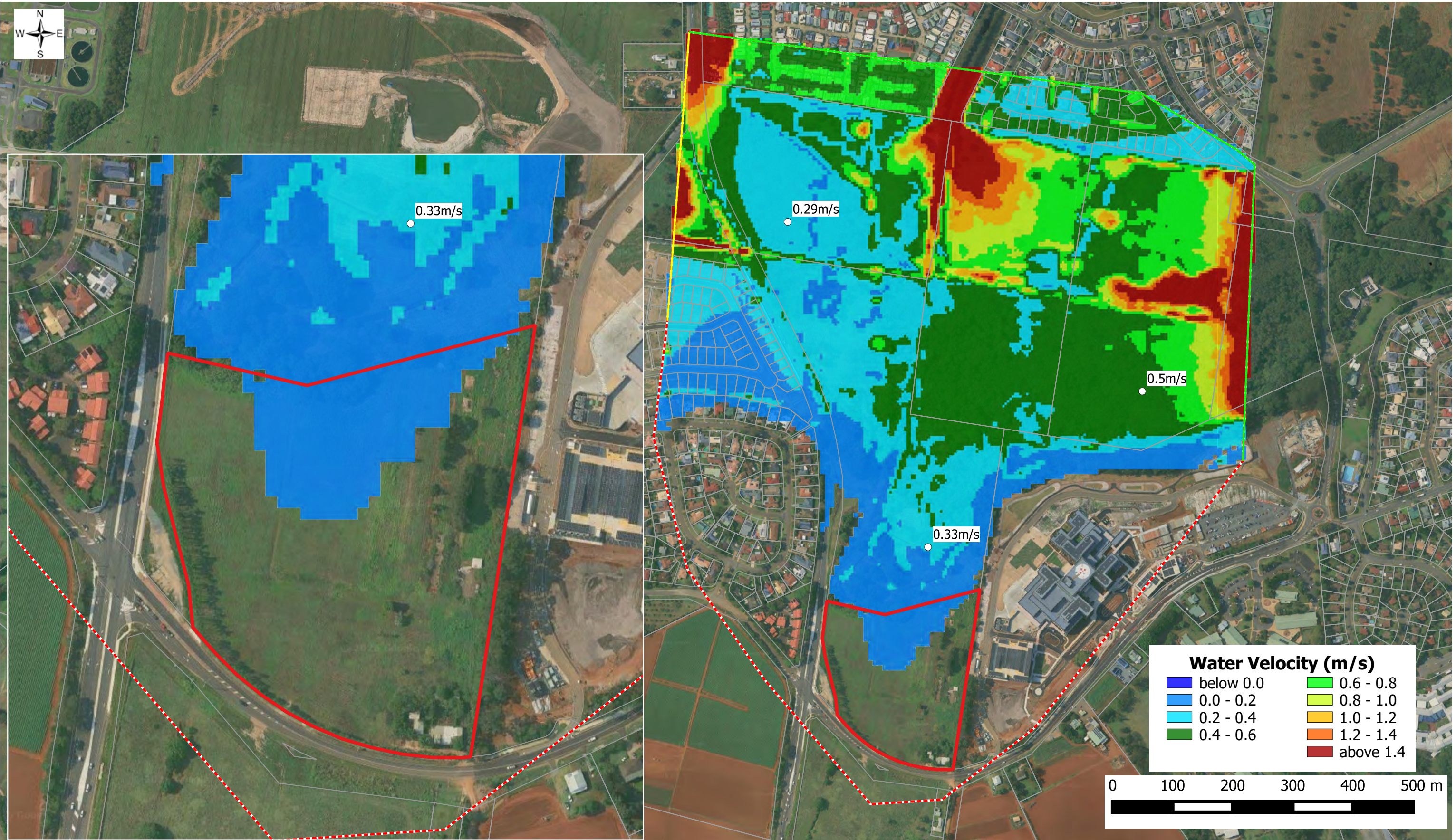
PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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**FIG A03 EXISTING CASE
PMF EVENT
FLOOD WATER VELOCITY**

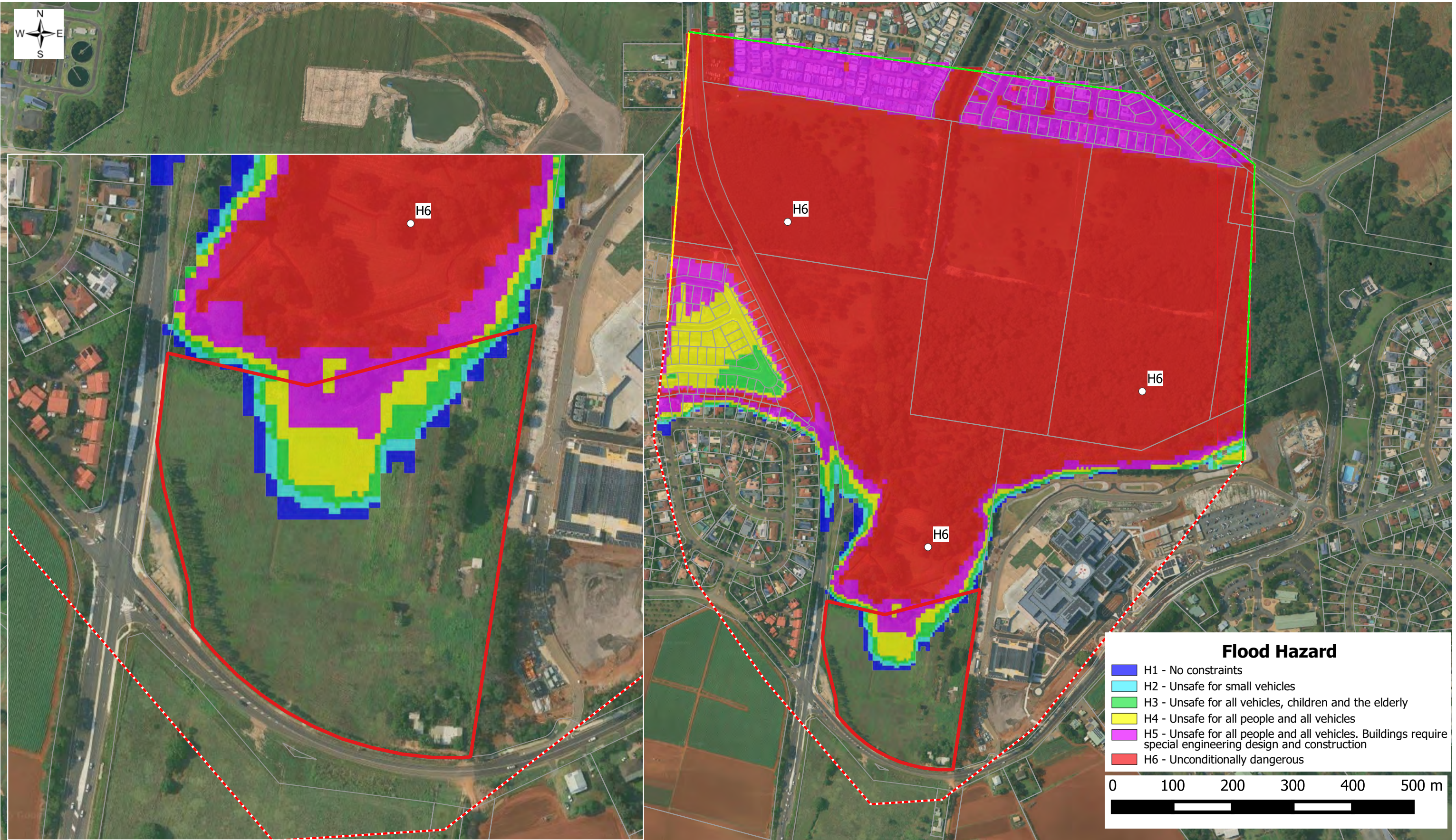
PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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**FIG A04 EXISTING CASE
PMF EVENT
FLOOD HAZARD**

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

- Legend**
- Model Extent
 - Site
 - Inflow Boundary
 - Downstream Boundary
 - Cadastral_Tweeds
 - Interrogation Point



Client

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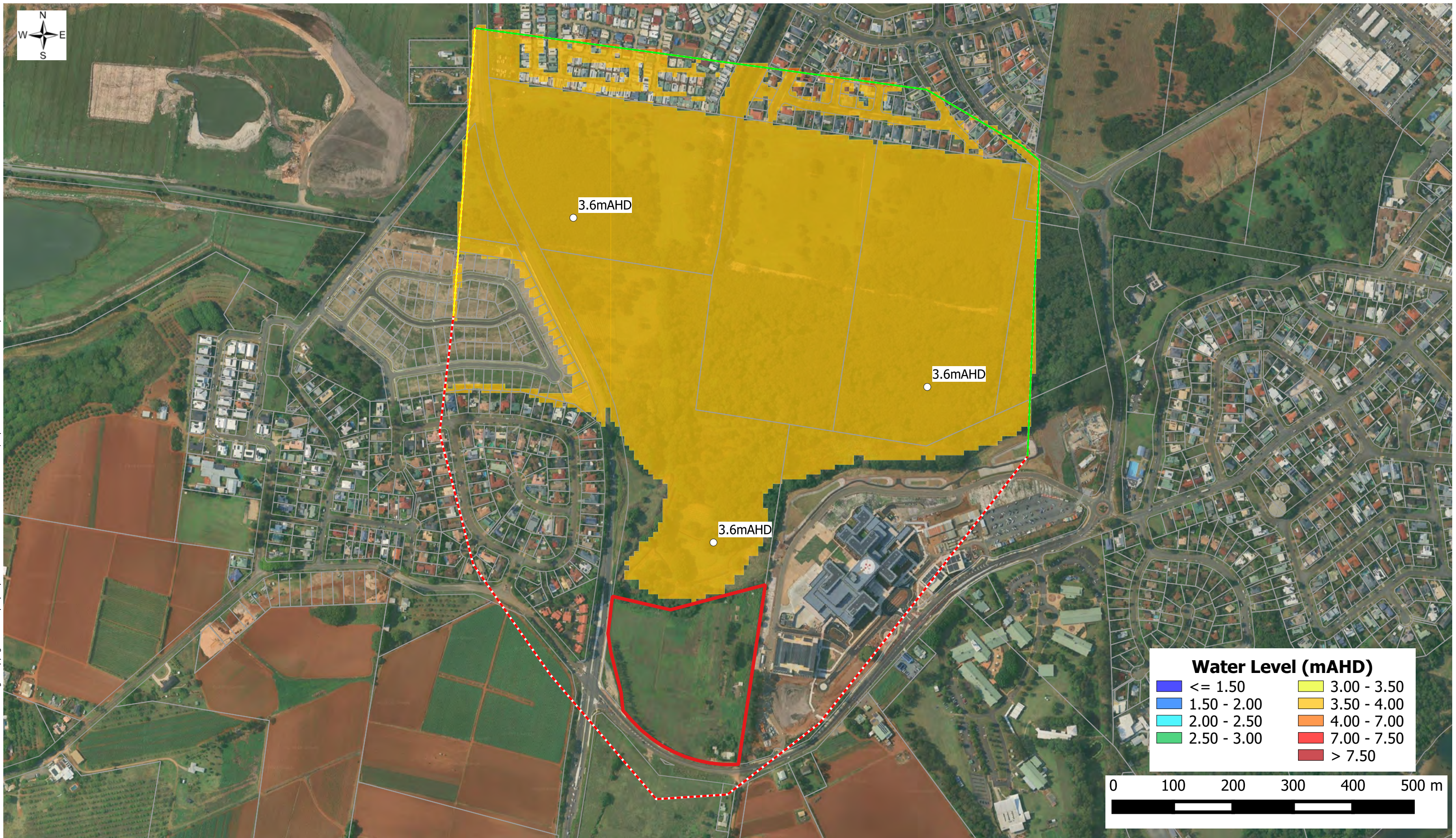


FIG A05 EXISTING CASE 0.2%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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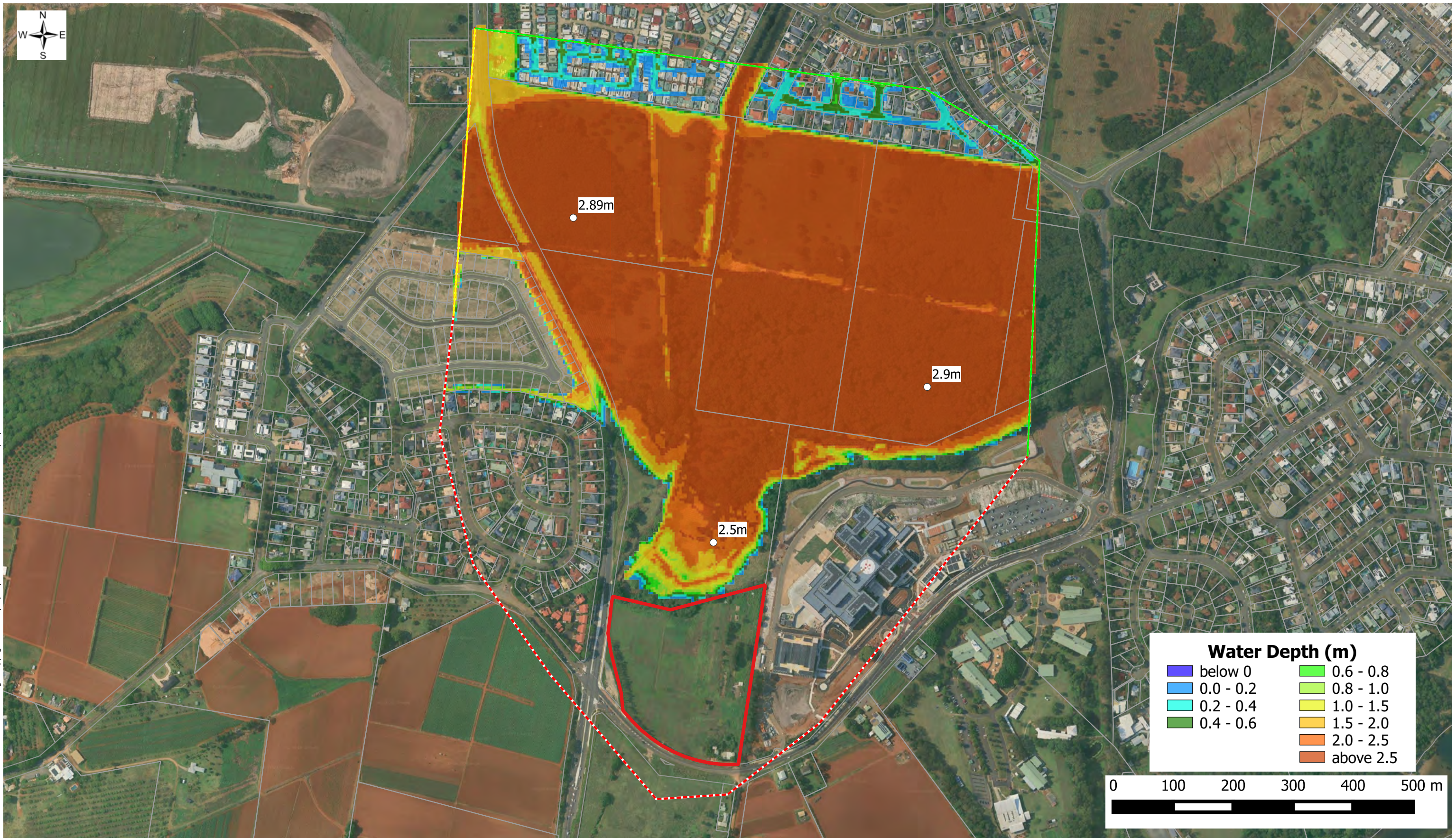


FIG A06 EXISTING CASE 0.2%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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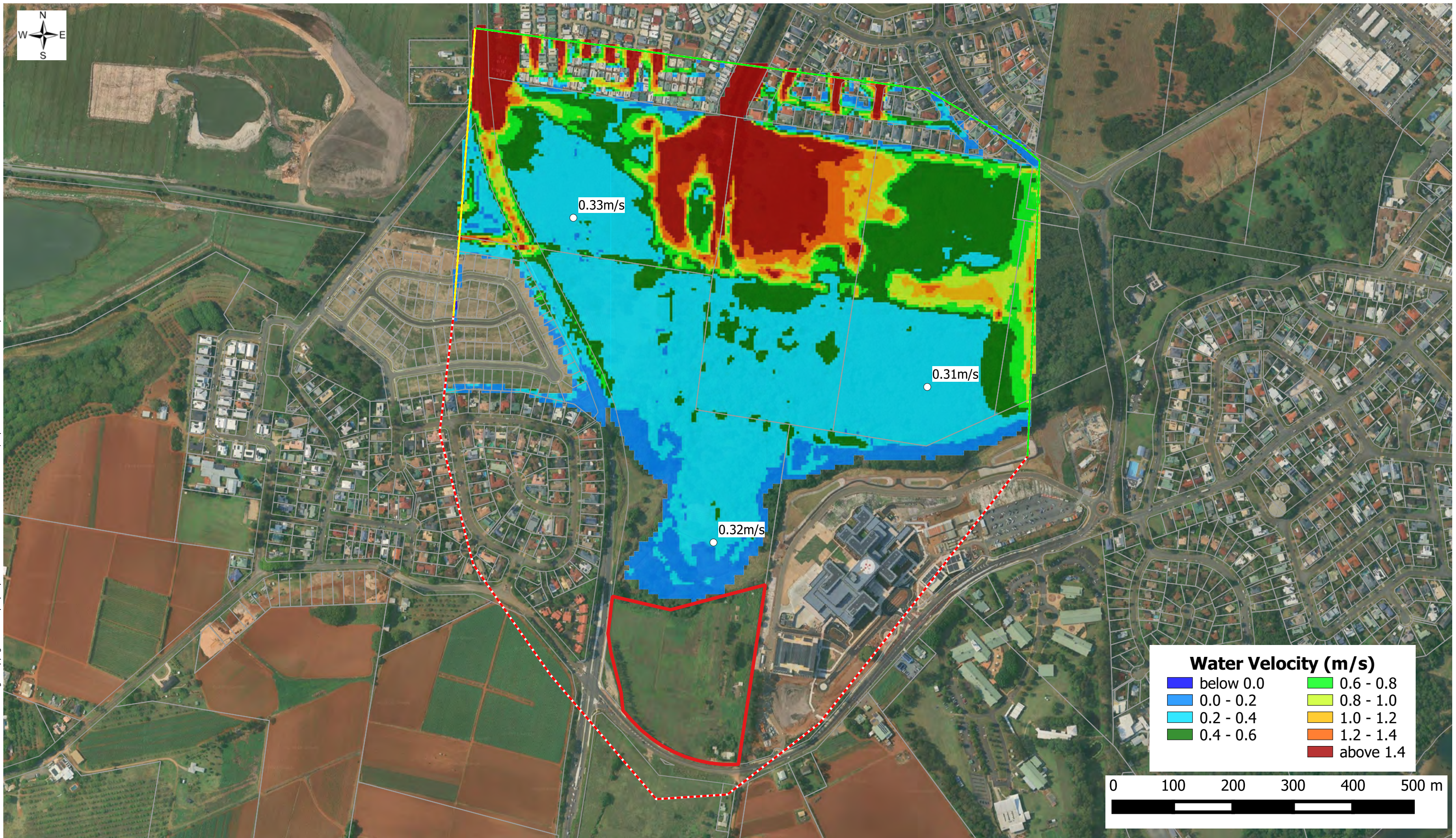


FIG A07 EXISTING CASE 0.2%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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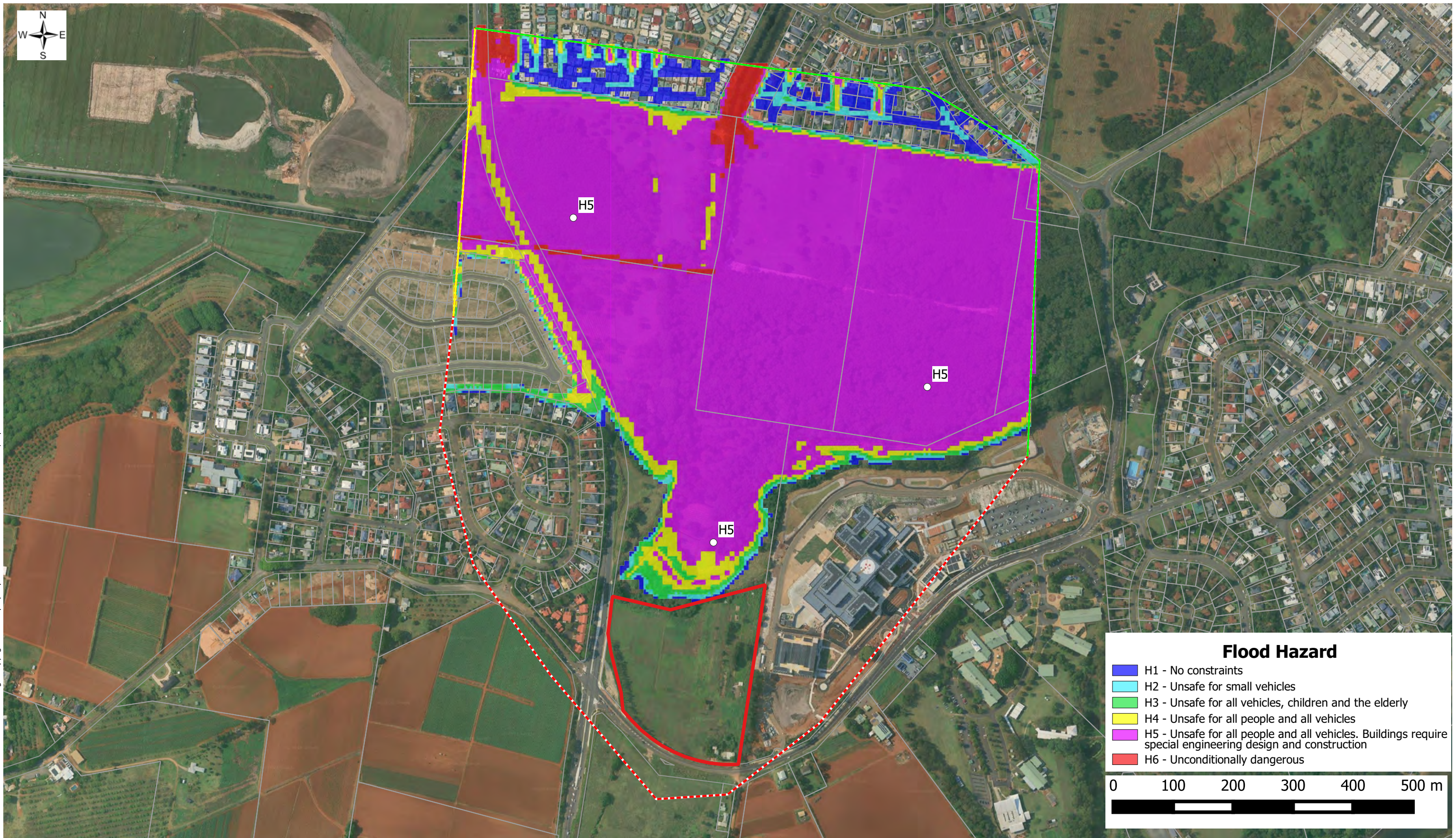


FIG A08 EXISTING CASE 0.2%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral Tweeds
- Interrogation Point



Client

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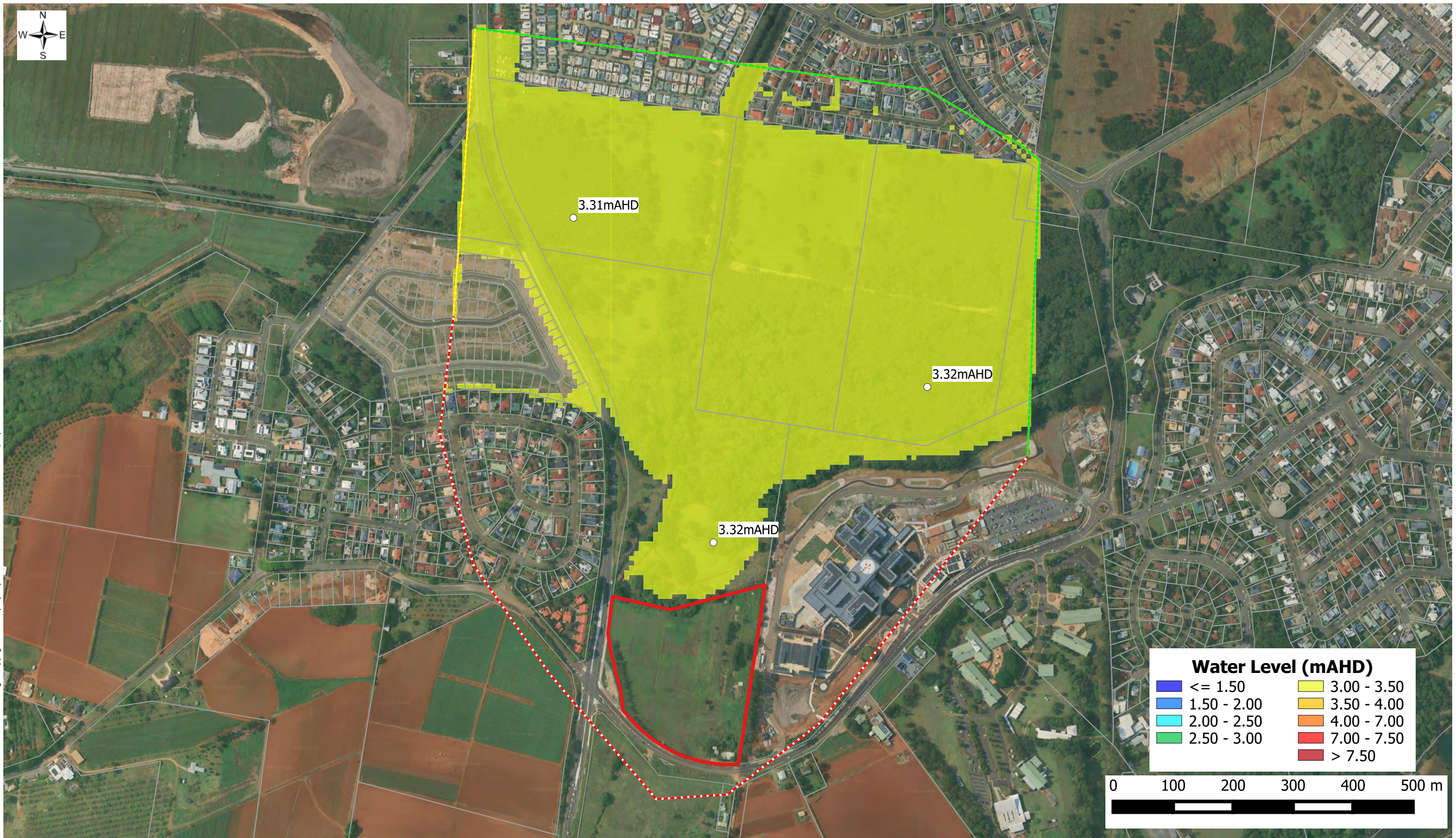


FIG A09 EXISTING CASE 1%AEP_CLIMATE CHANGE FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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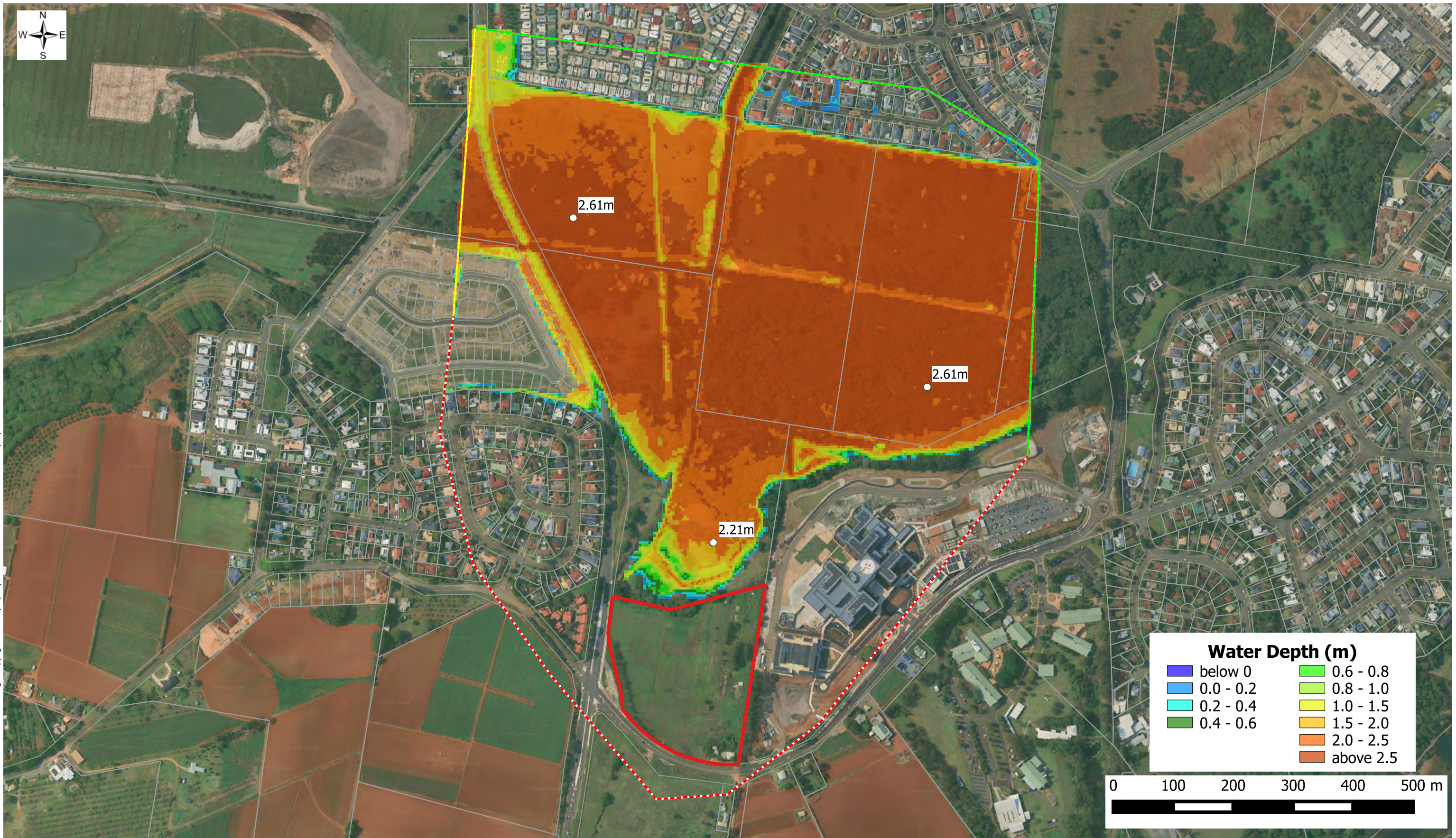


FIG A10 EXISTING CASE 1%AEP_CLIMATE CHANGE FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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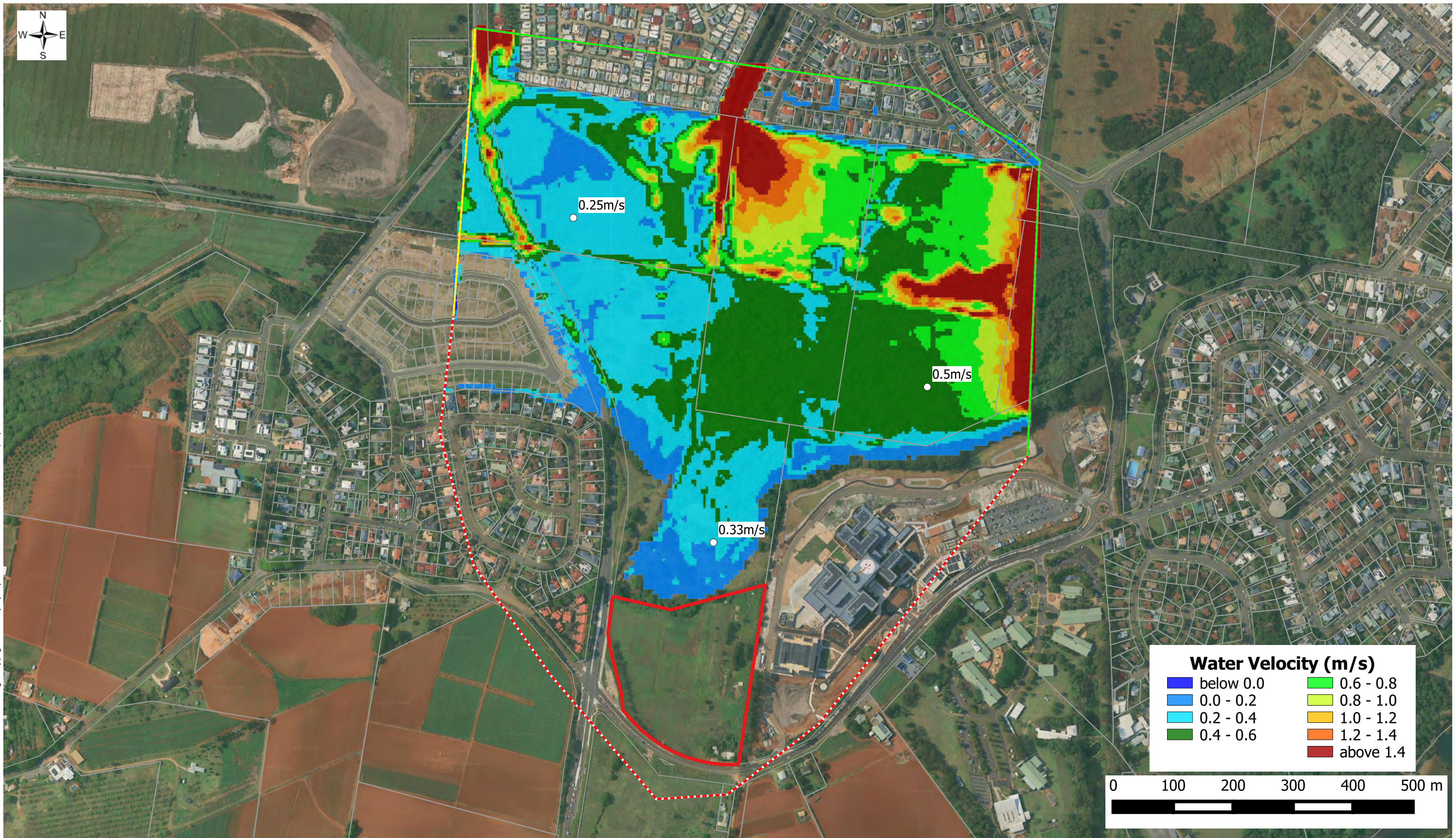


FIG A11 EXISTING CASE 1%AEP_CLIMATE CHANGE FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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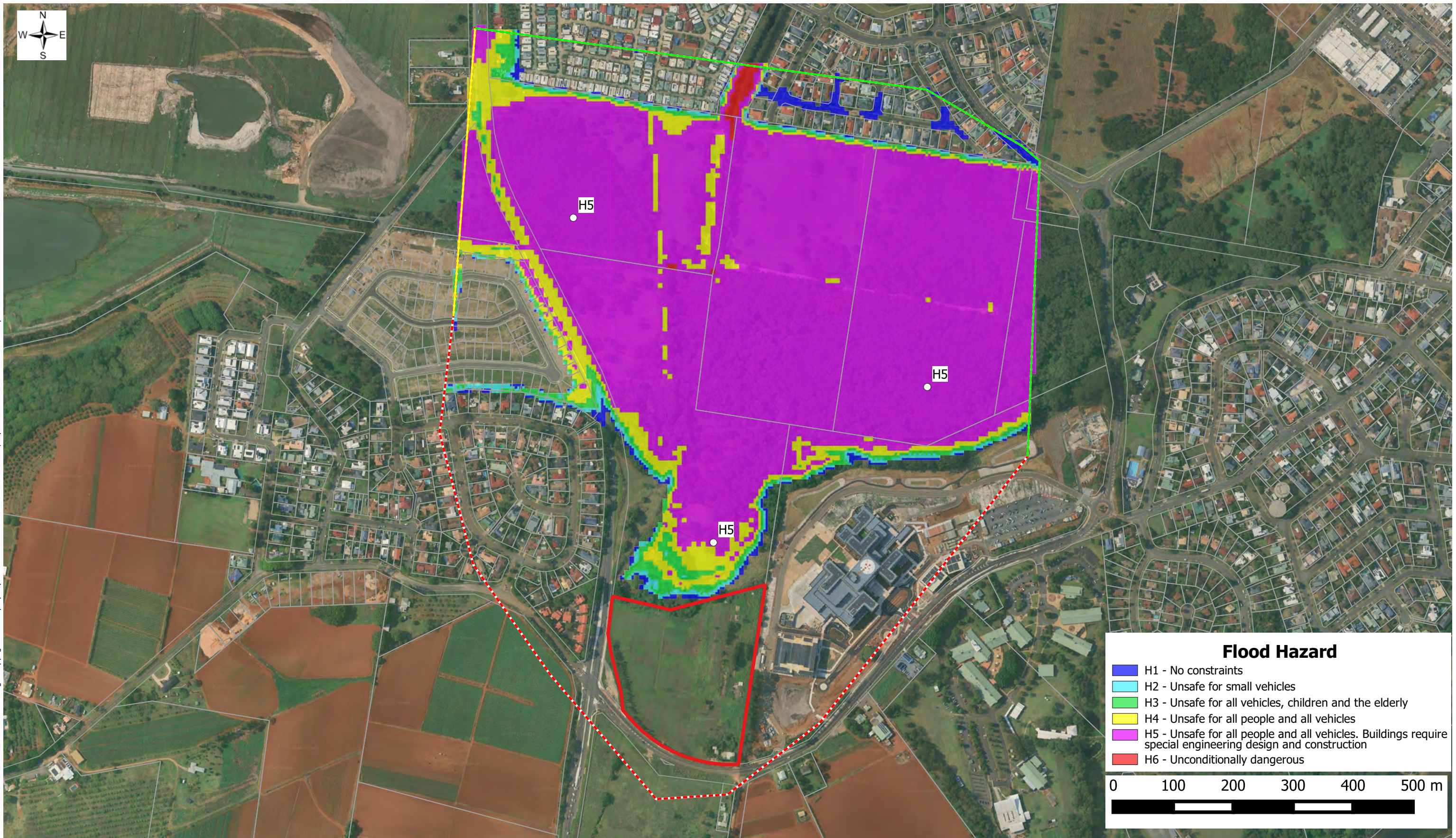


FIG A12 EXISTING CASE 1%AEP_CLIMATE CHANGE FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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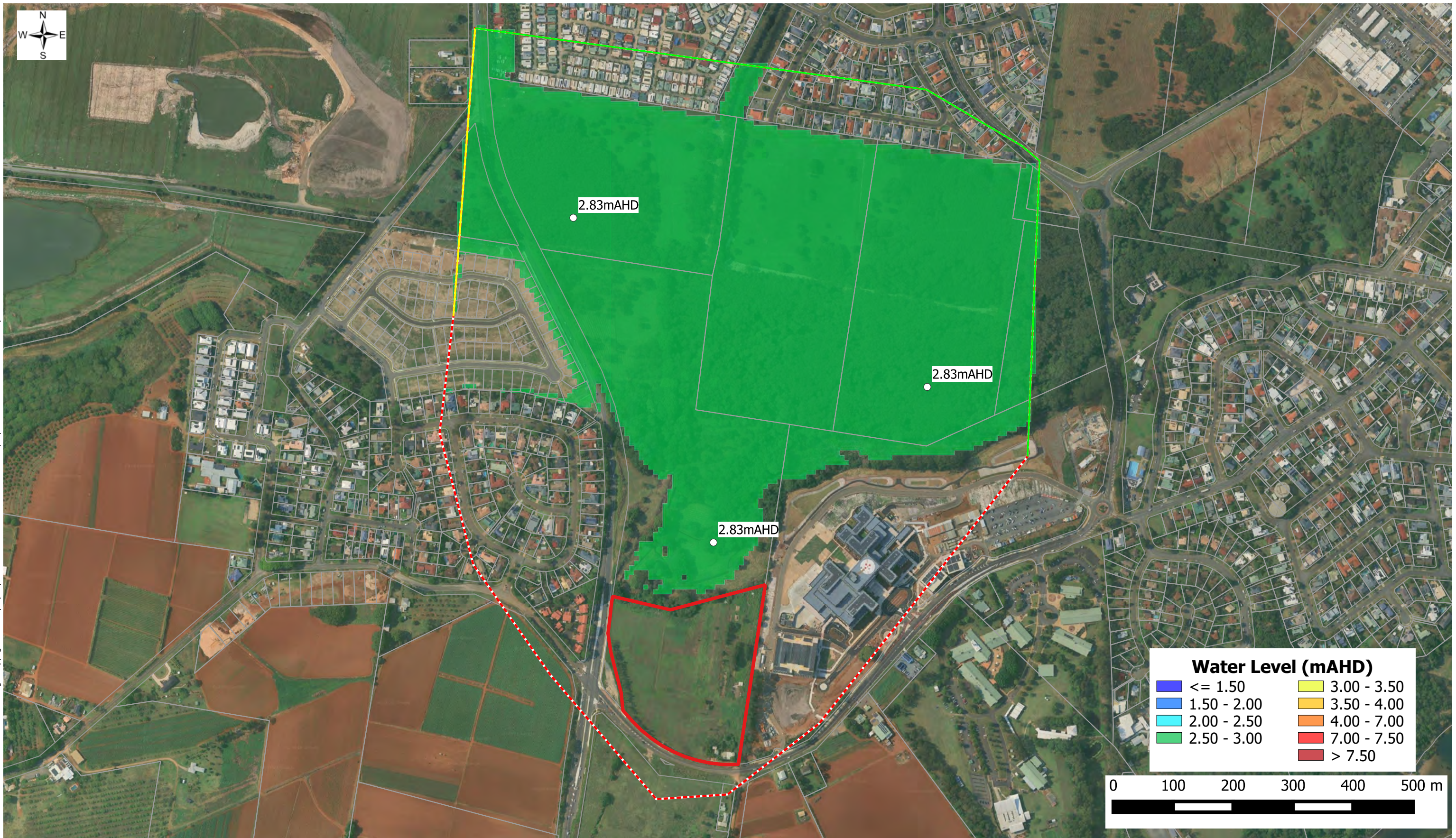


FIG A13 EXISTING CASE 1%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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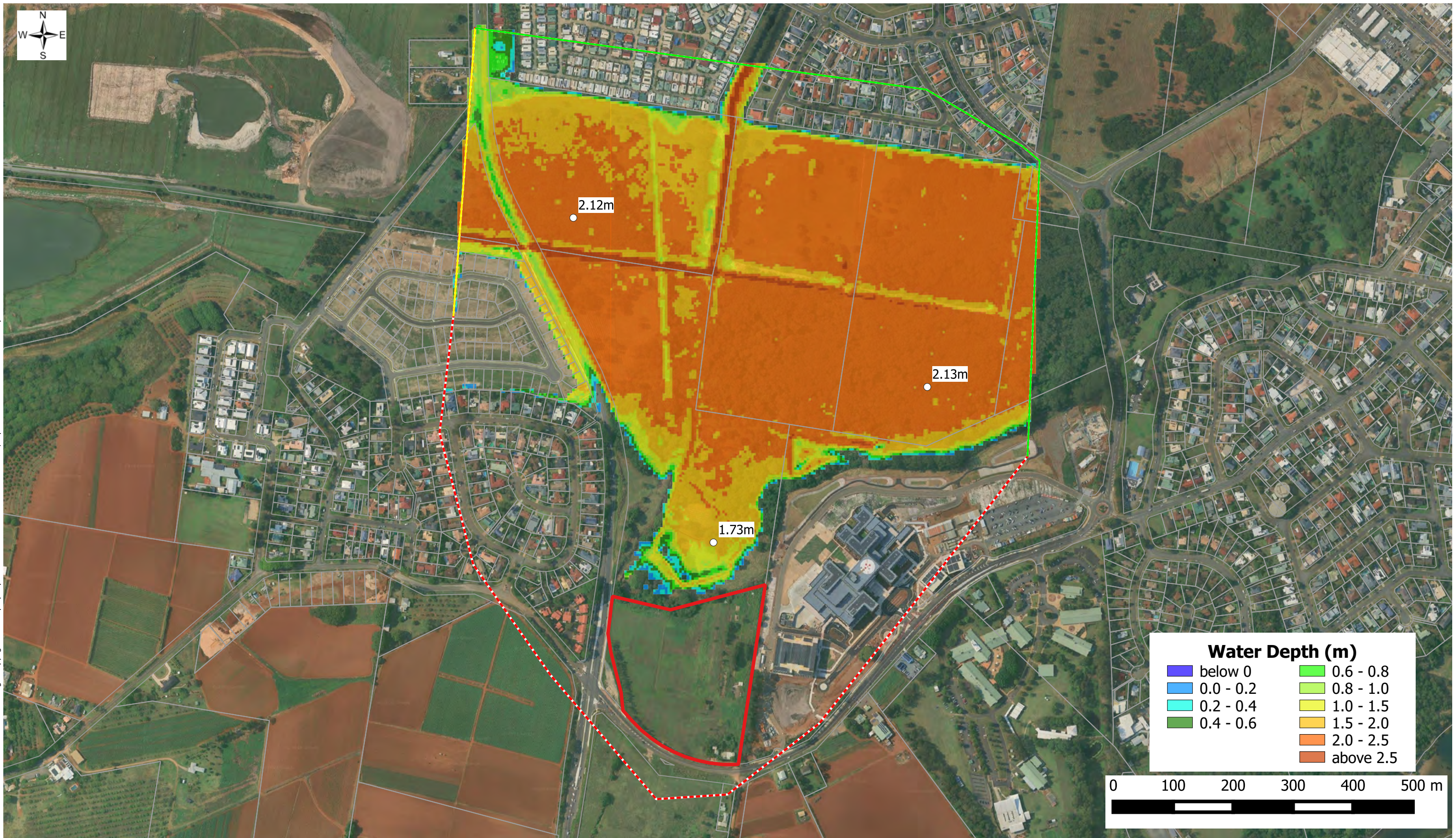


FIG A14 EXISTING CASE 1%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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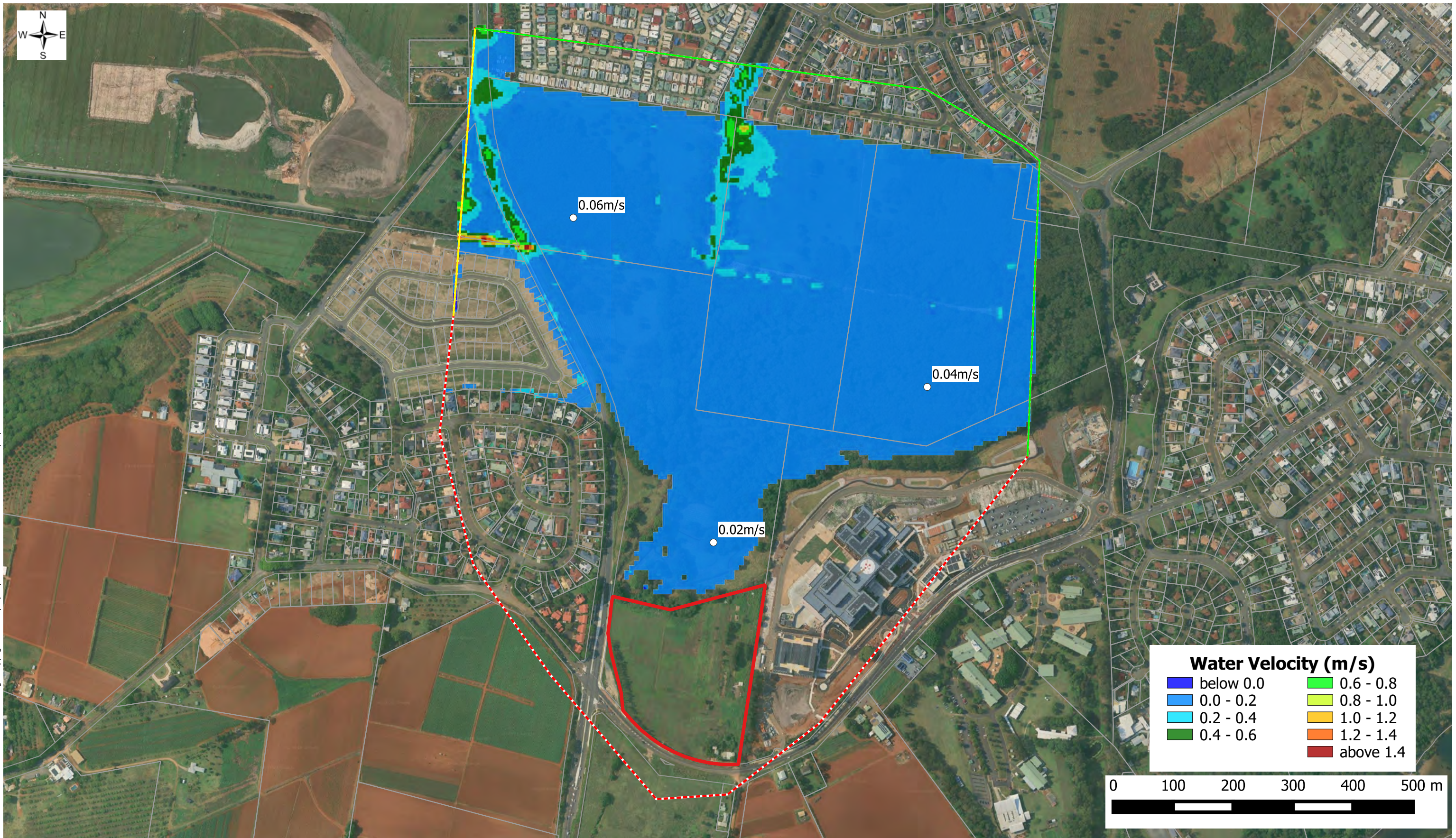


FIG A15 EXISTING CASE 1%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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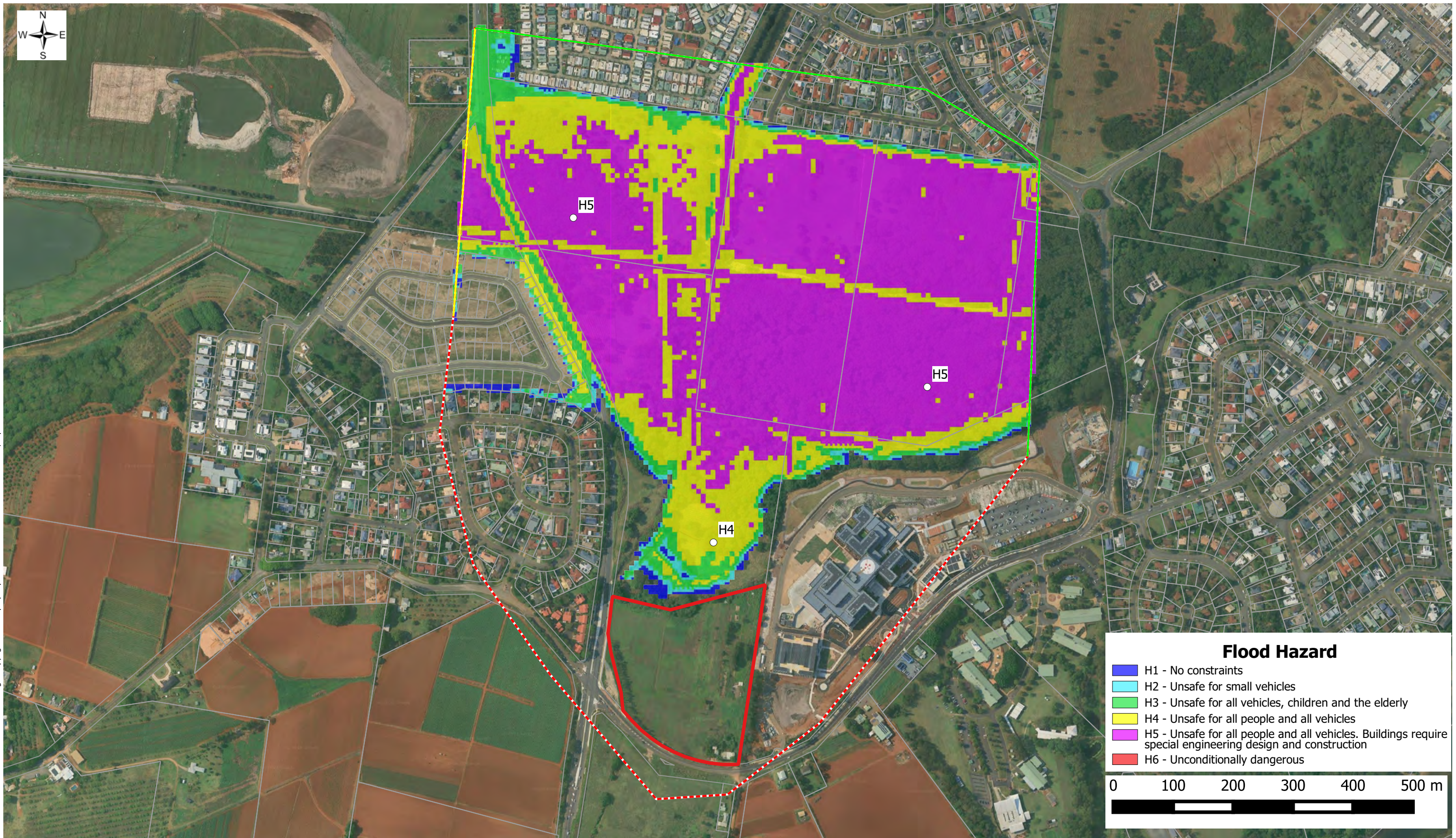


FIG A16 EXISTING CASE 1%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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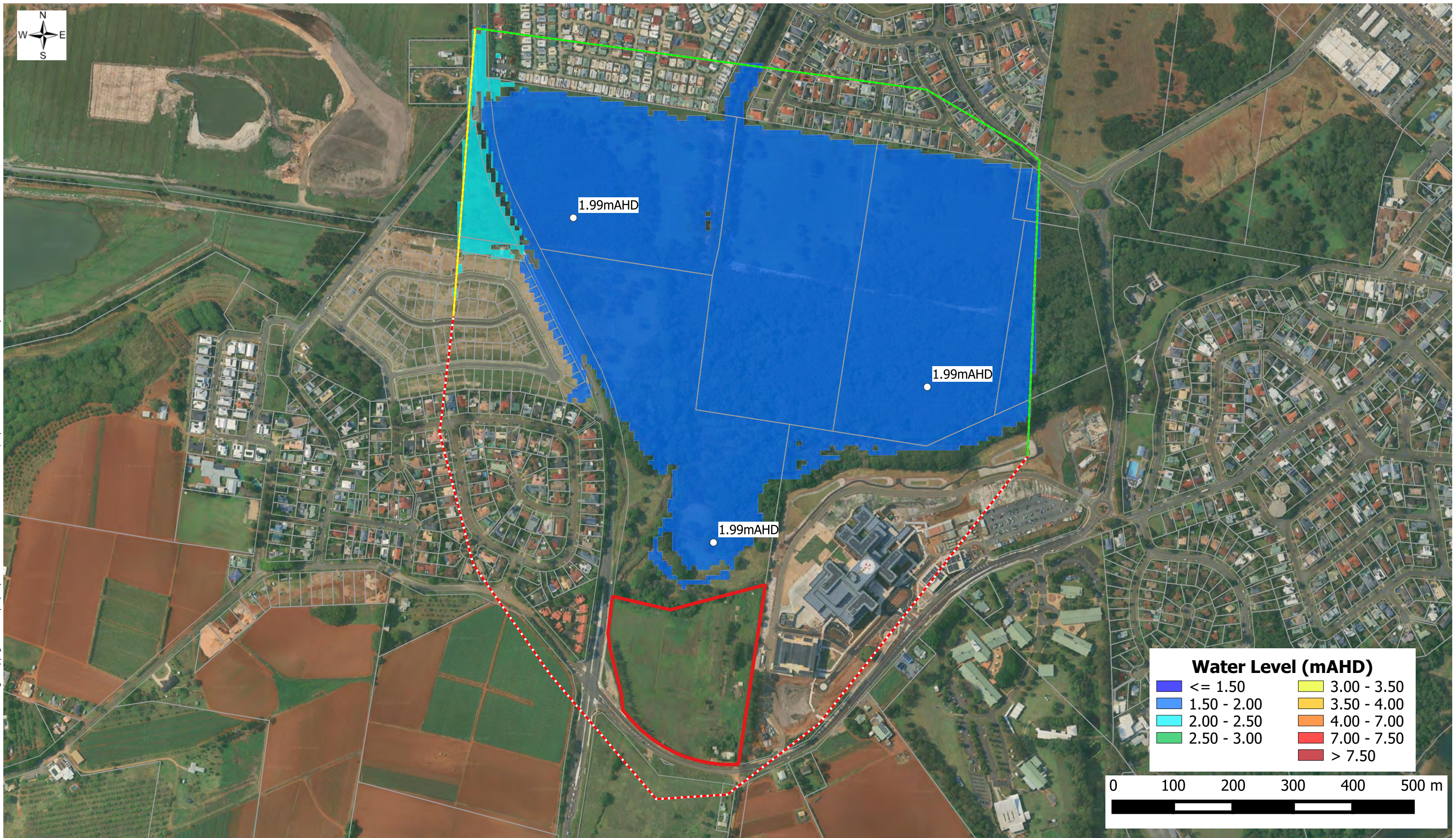


FIG A17 EXISTING CASE 5%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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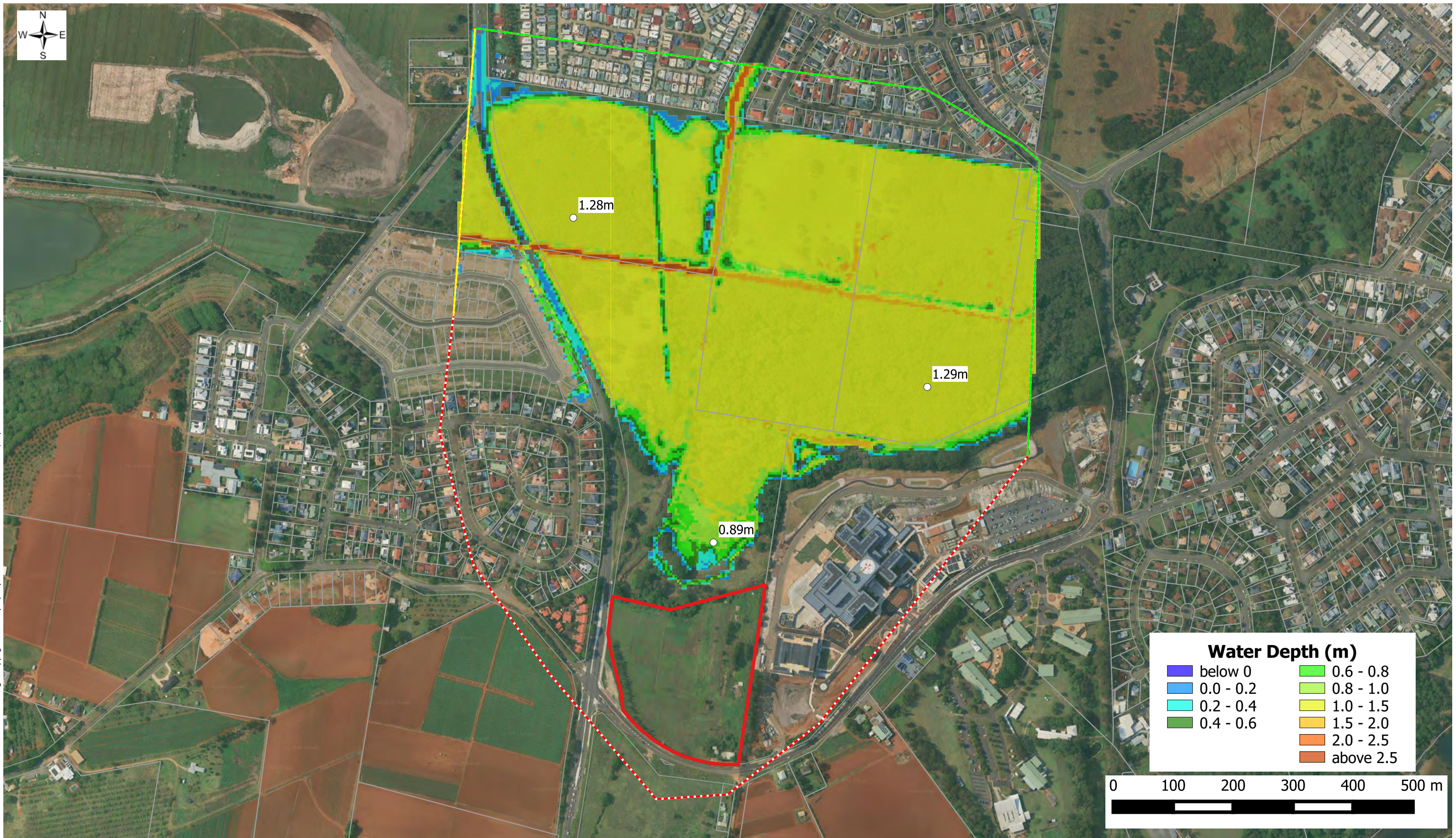


FIG A18 EXISTING CASE 5%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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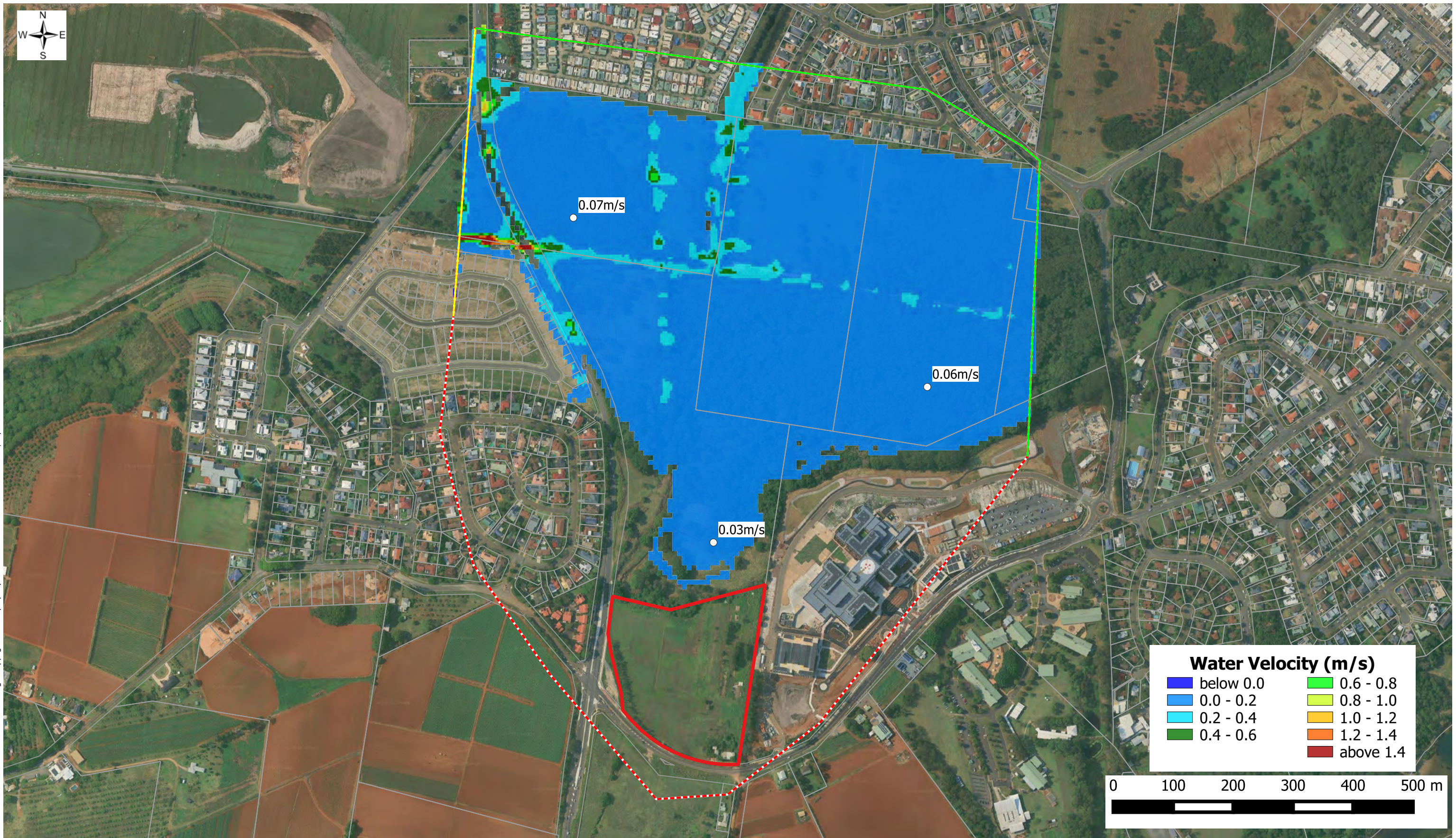


FIG A19 EXISTING CASE 5%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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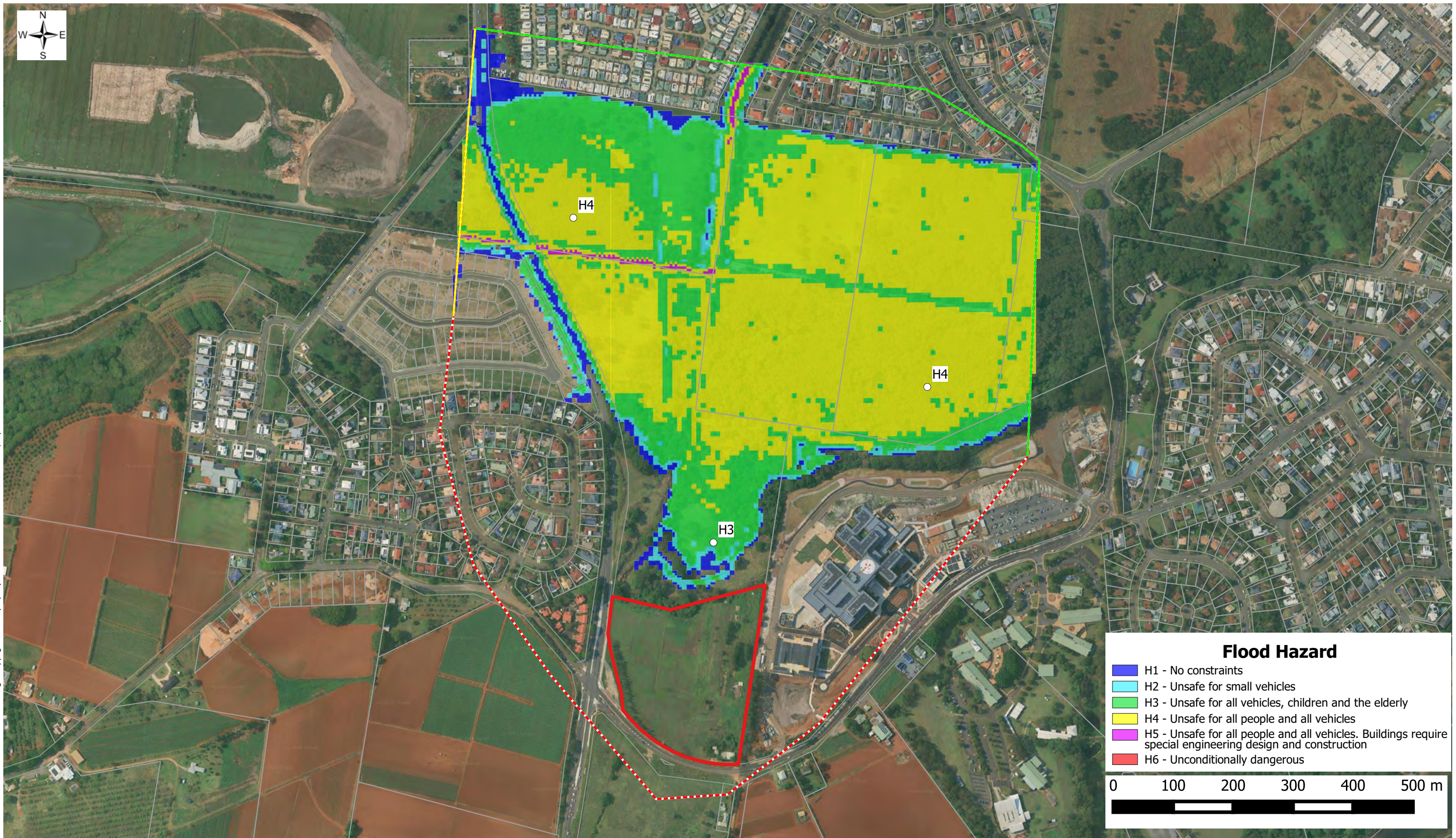


FIG A20 EXISTING CASE 5%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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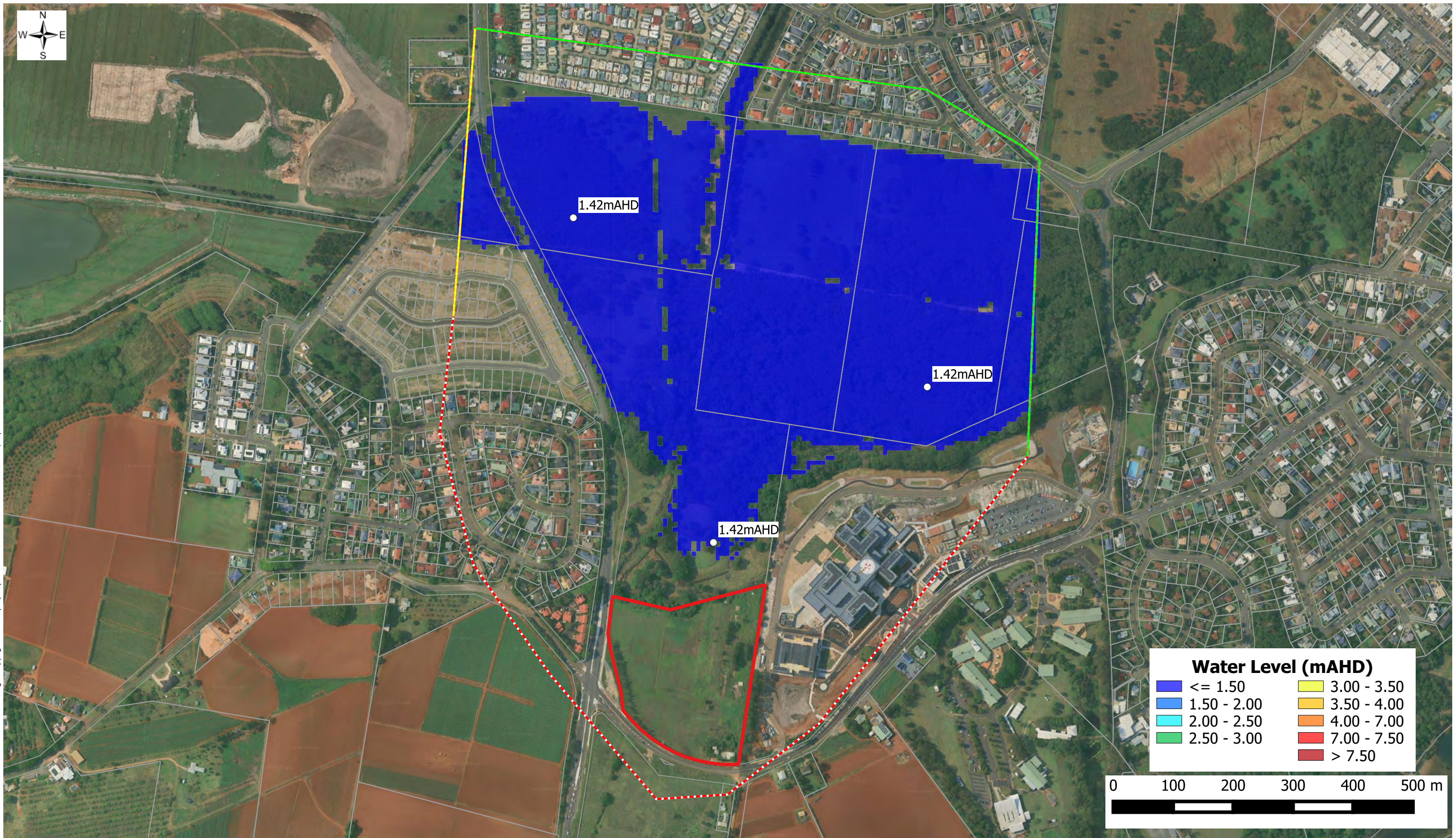


FIG A21 EXISTING CASE 20%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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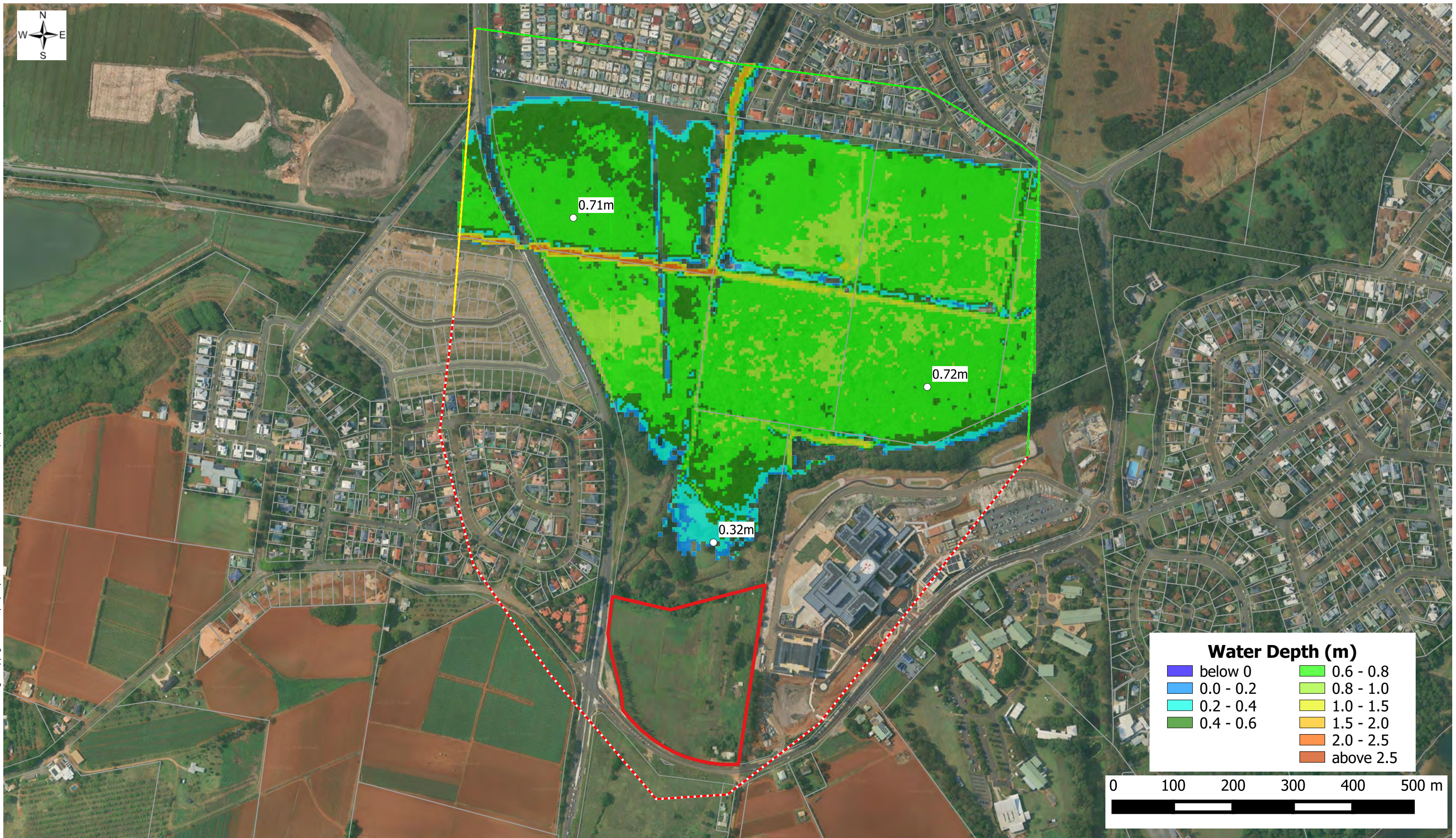


FIG A22 EXISTING CASE 20%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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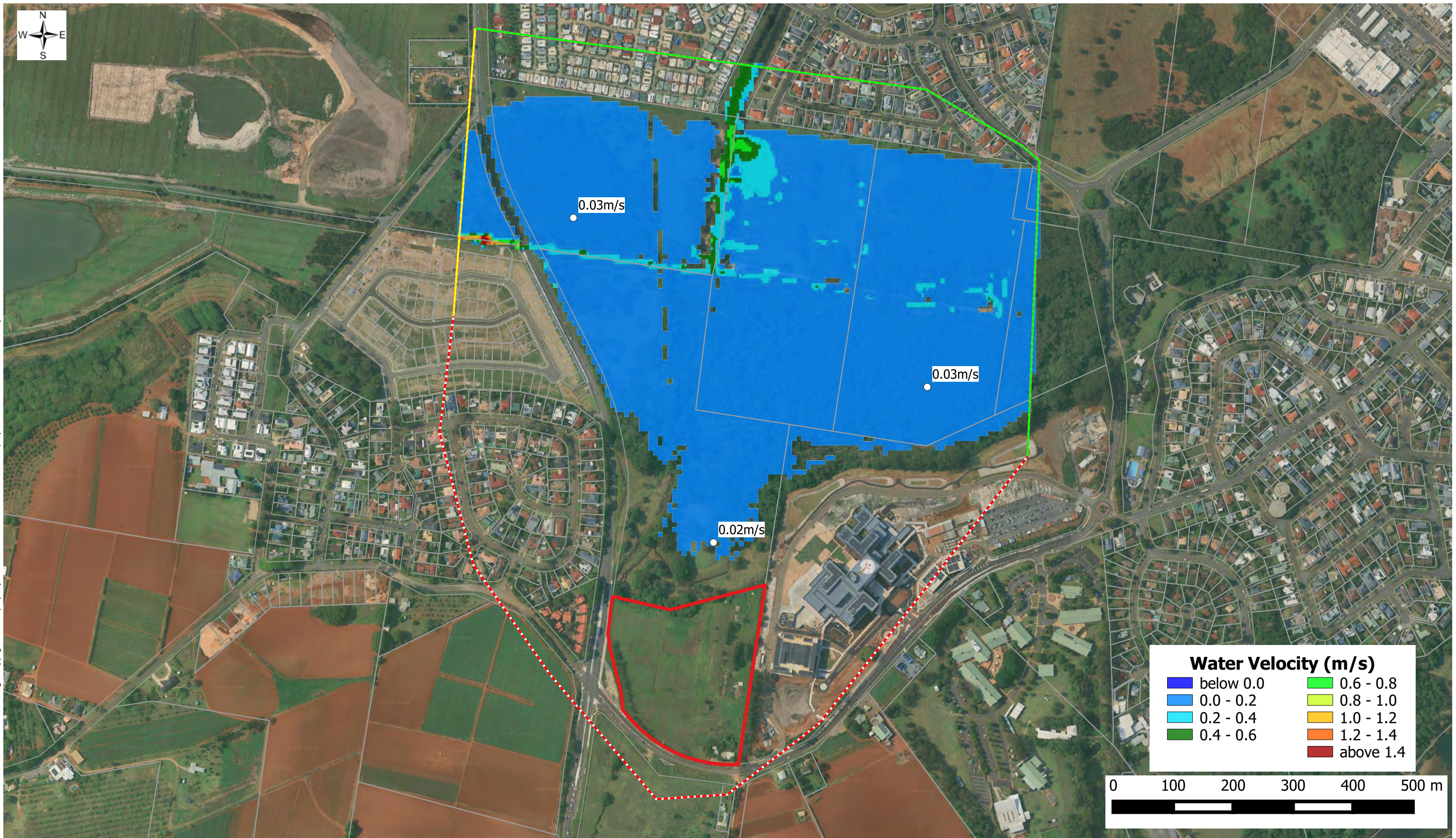


FIG A23 EXISTING CASE 20%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point

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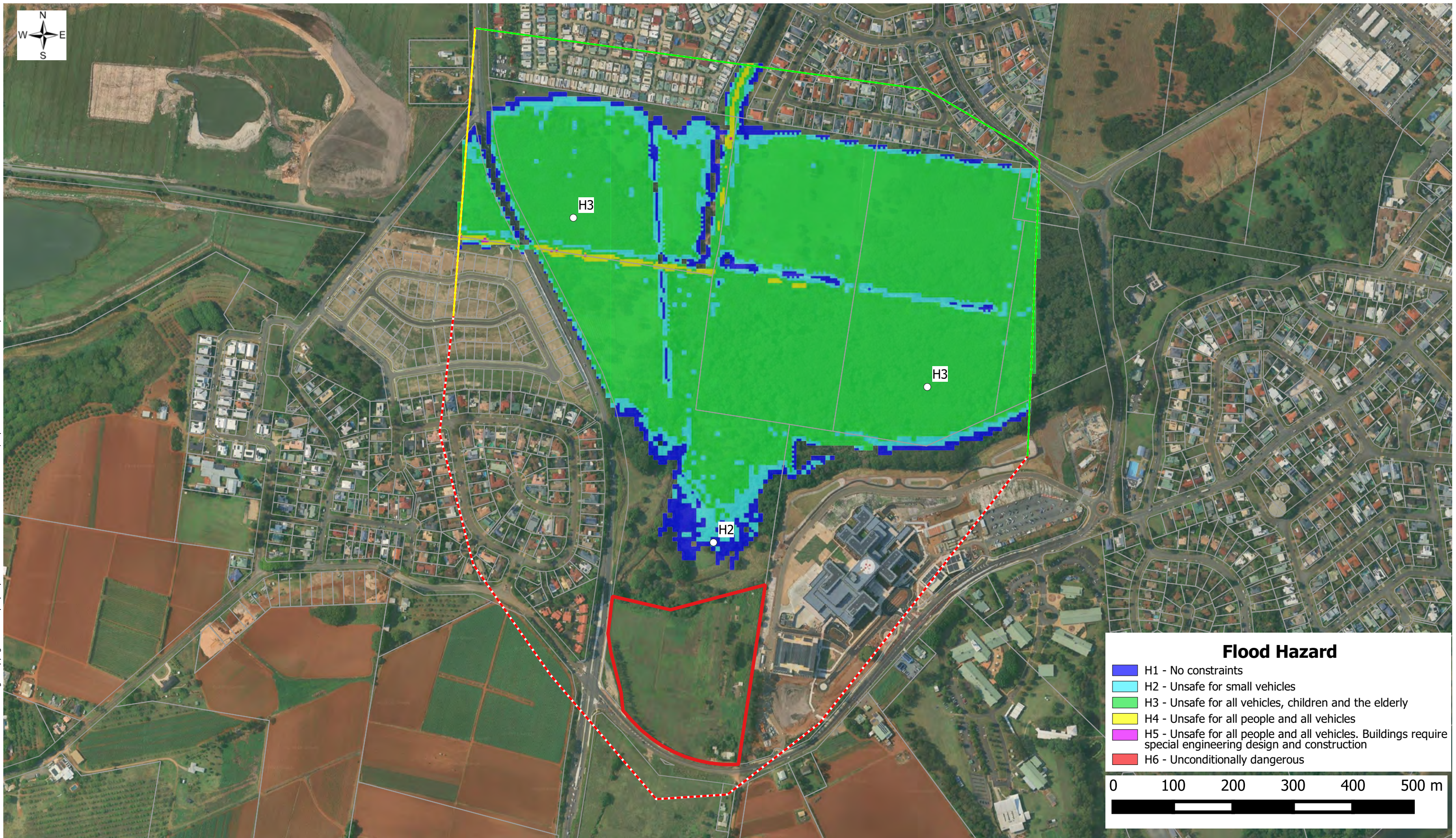


FIG A24 EXISTING CASE 20%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point



Client

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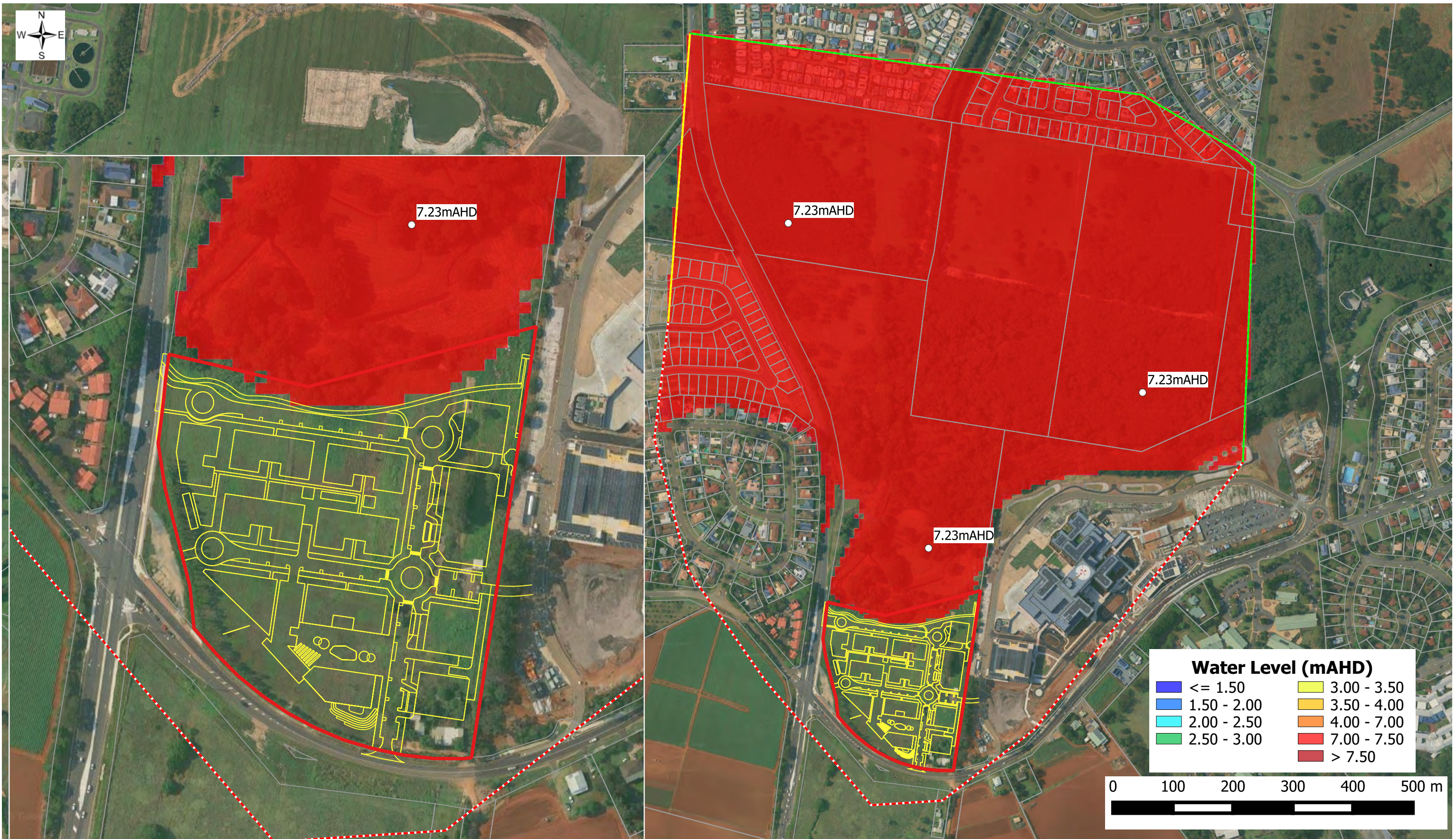


FIG B01 DEVELOPED CASE PMF EVENT FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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**FIG B02 DEVELOPED CASE
PMF EVENT
FLOOD WATER DEPTH**

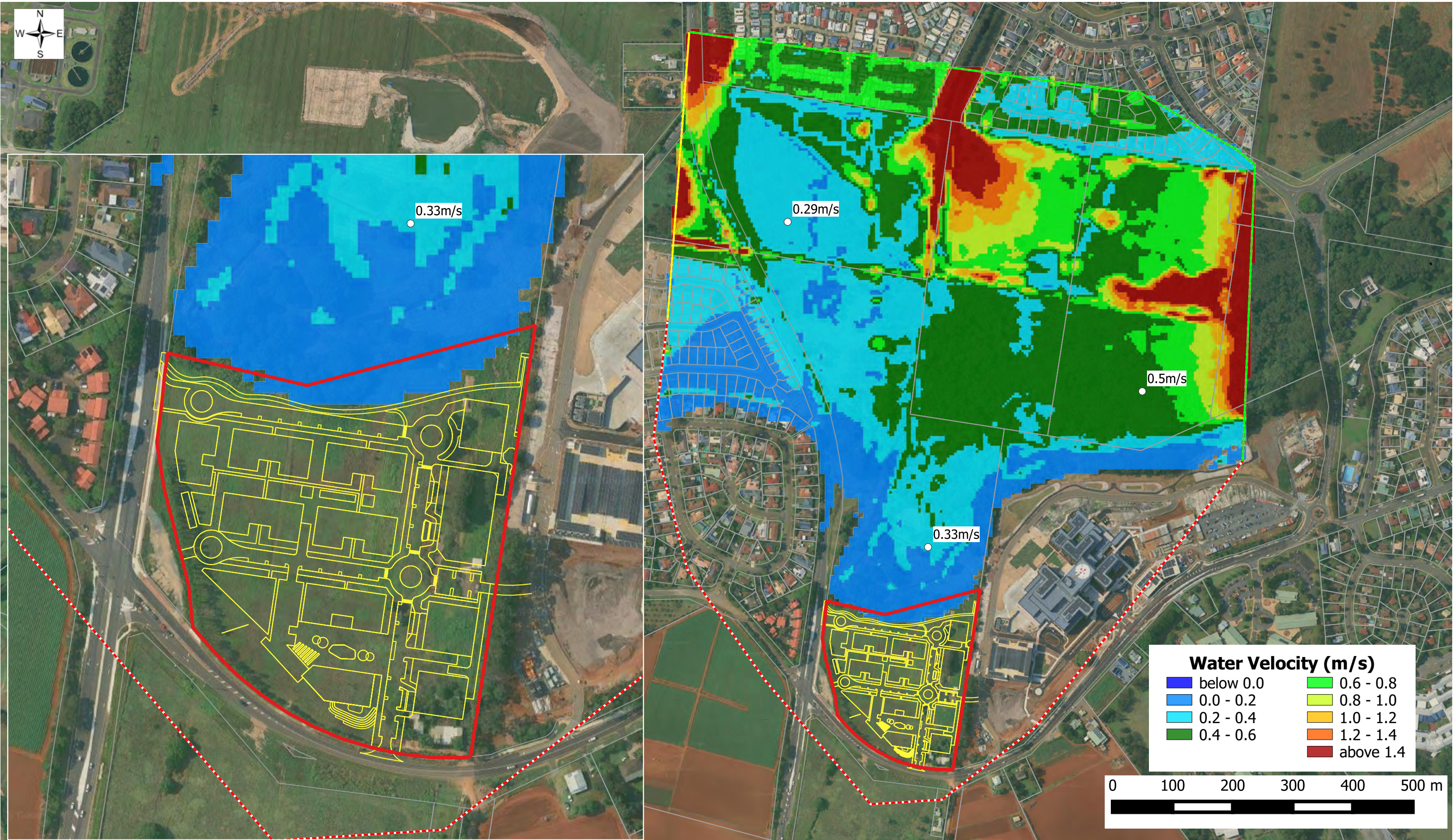
PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026



Client

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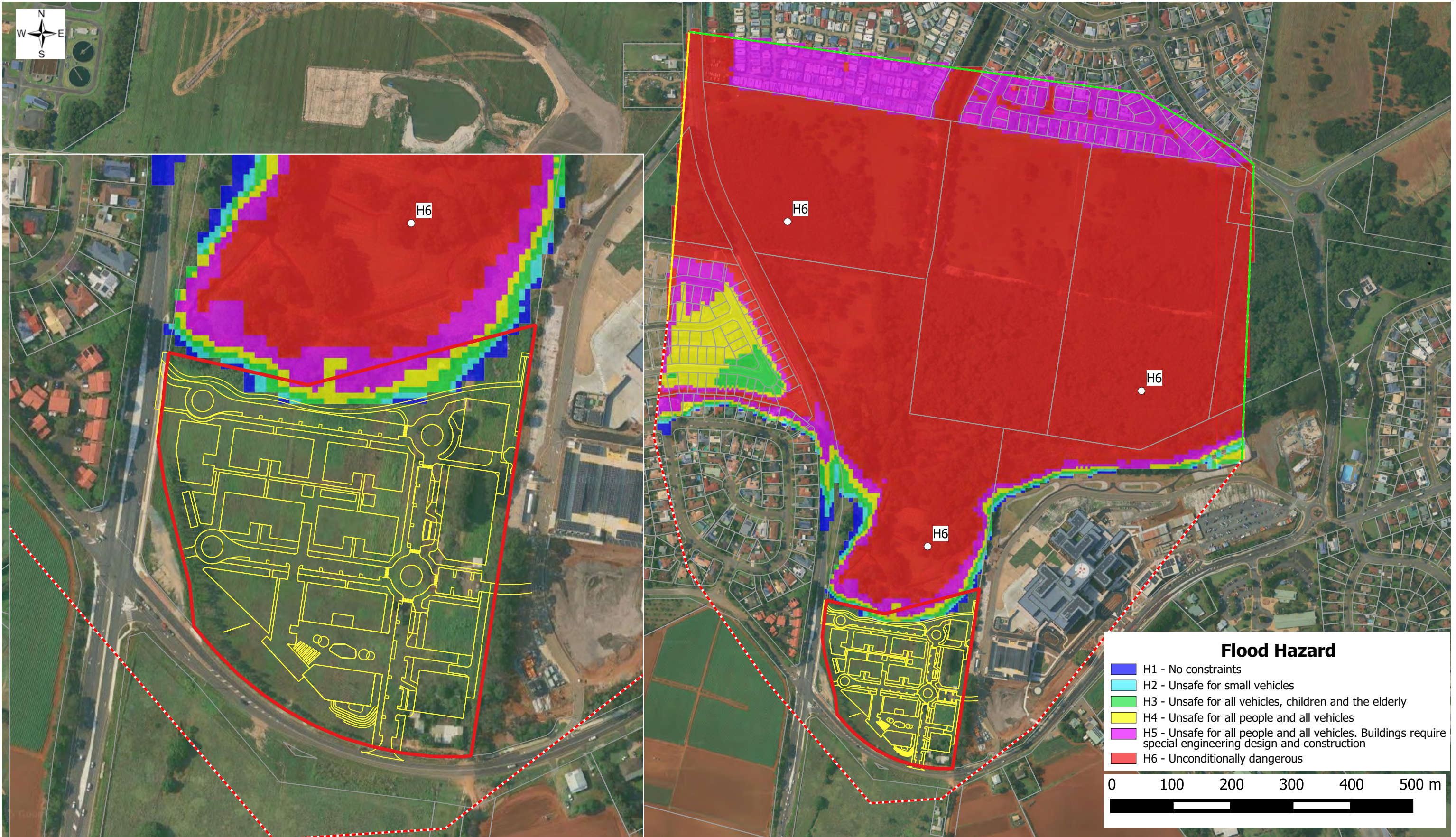


**FIG B03 DEVELOPED CASE
PMF EVENT
FLOOD WATER VELOCITY**

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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**FIG B04 DEVELOPED CASE
PMF EVENT
FLOOD HAZARD**

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026



Client

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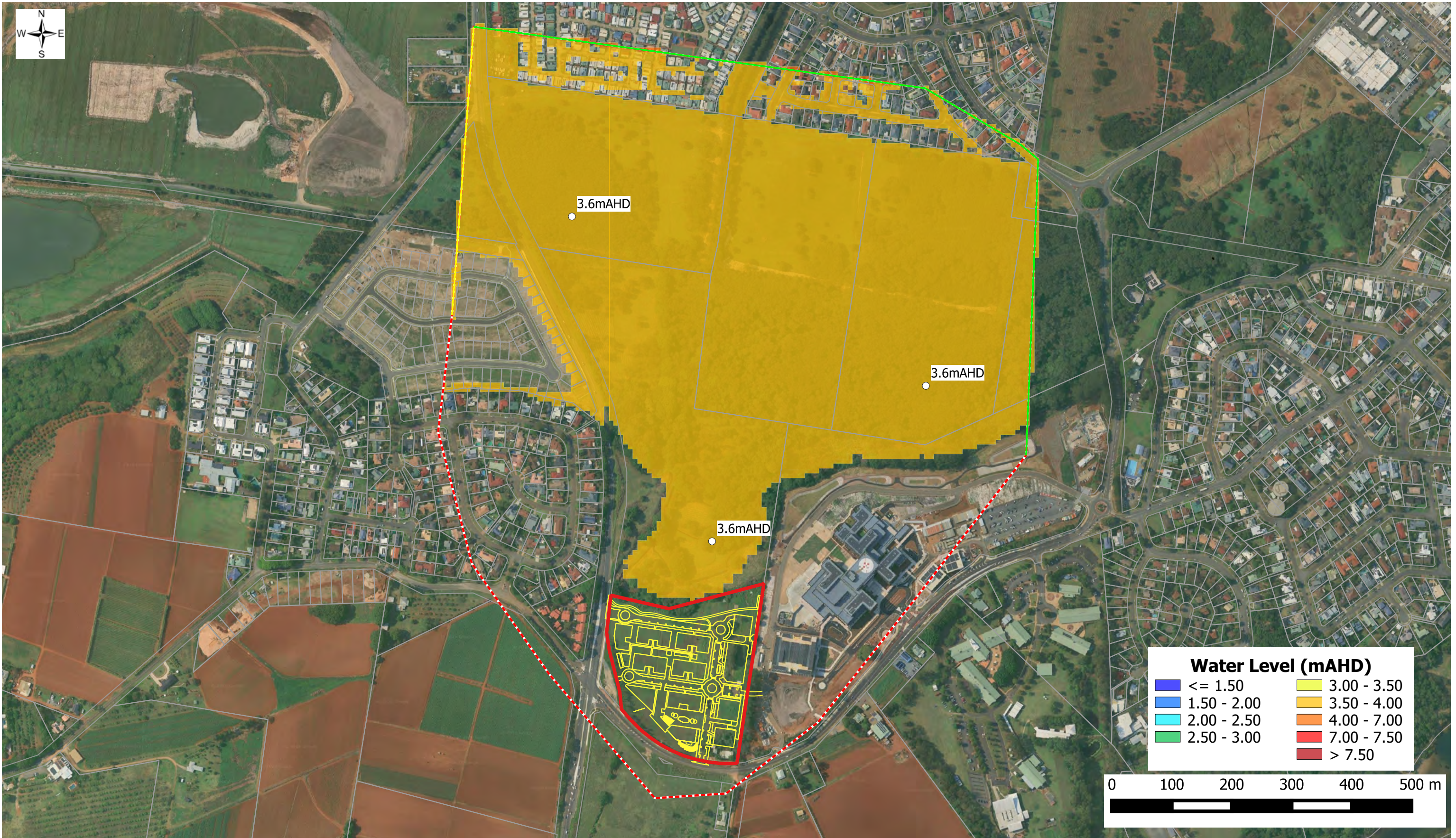


FIG B05 DEVELOPED CASE 0.2%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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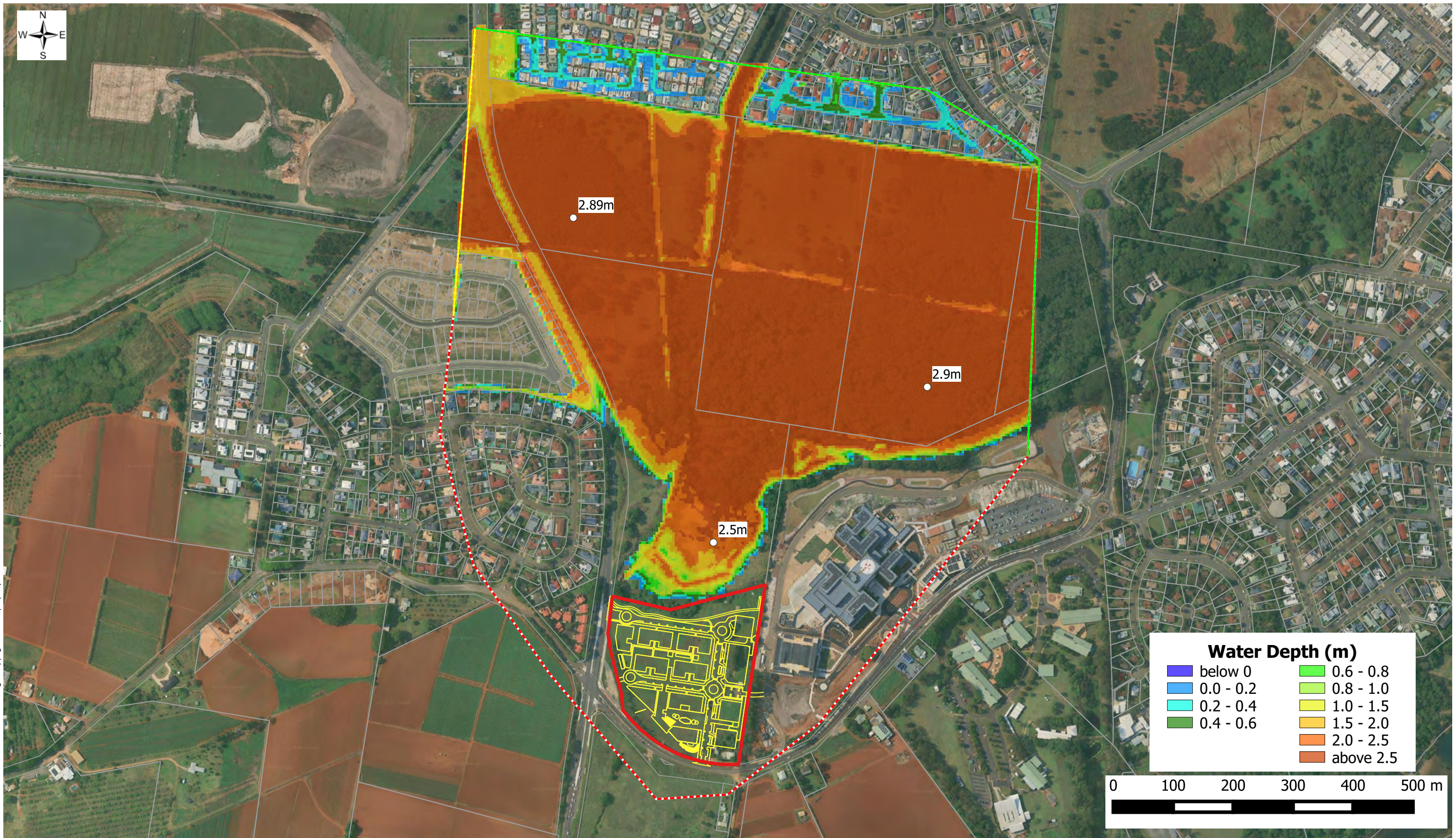


FIG B06 DEVELOPED CASE 0.2%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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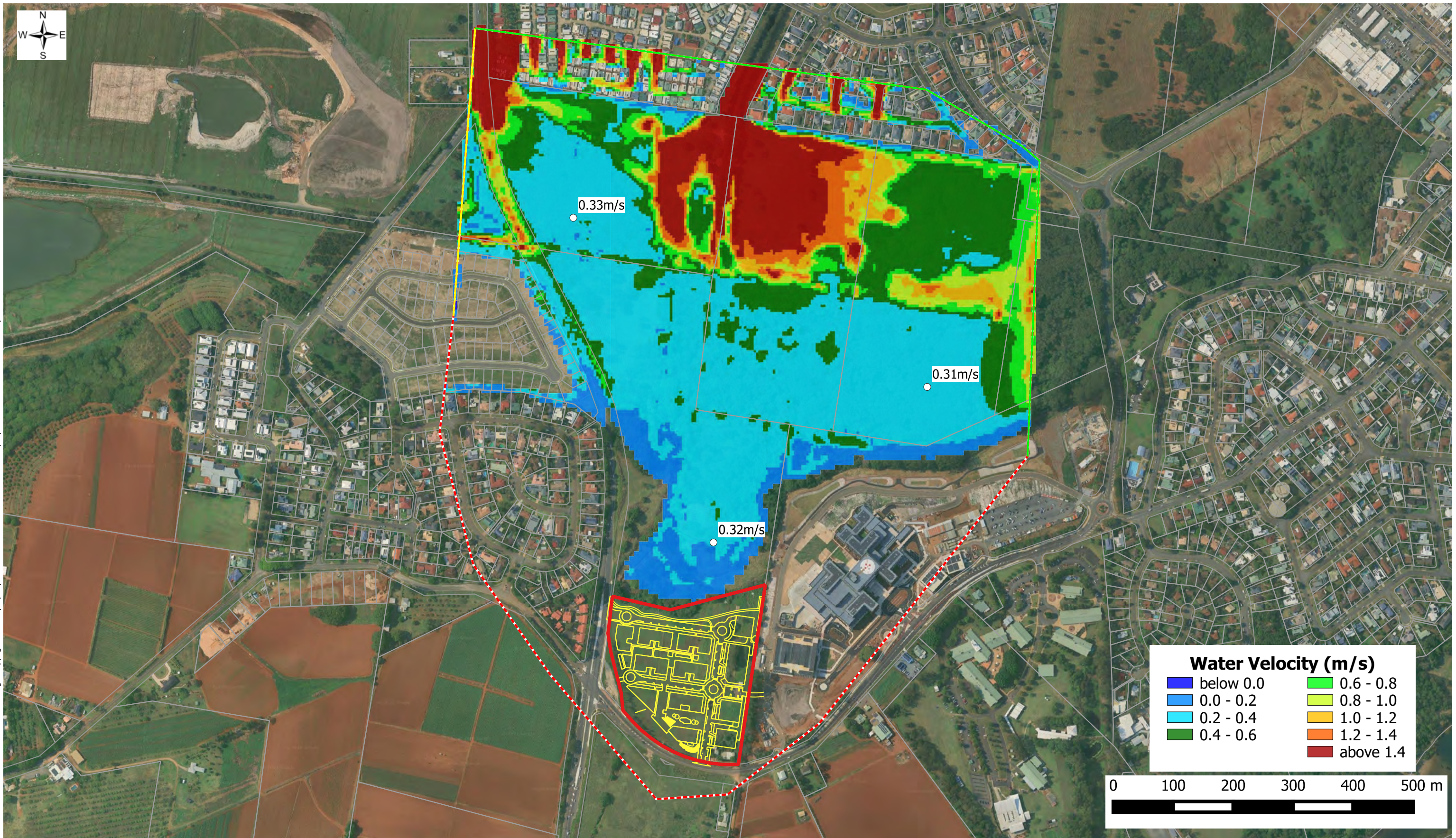


FIG B07 DEVELOPED CASE 0.2%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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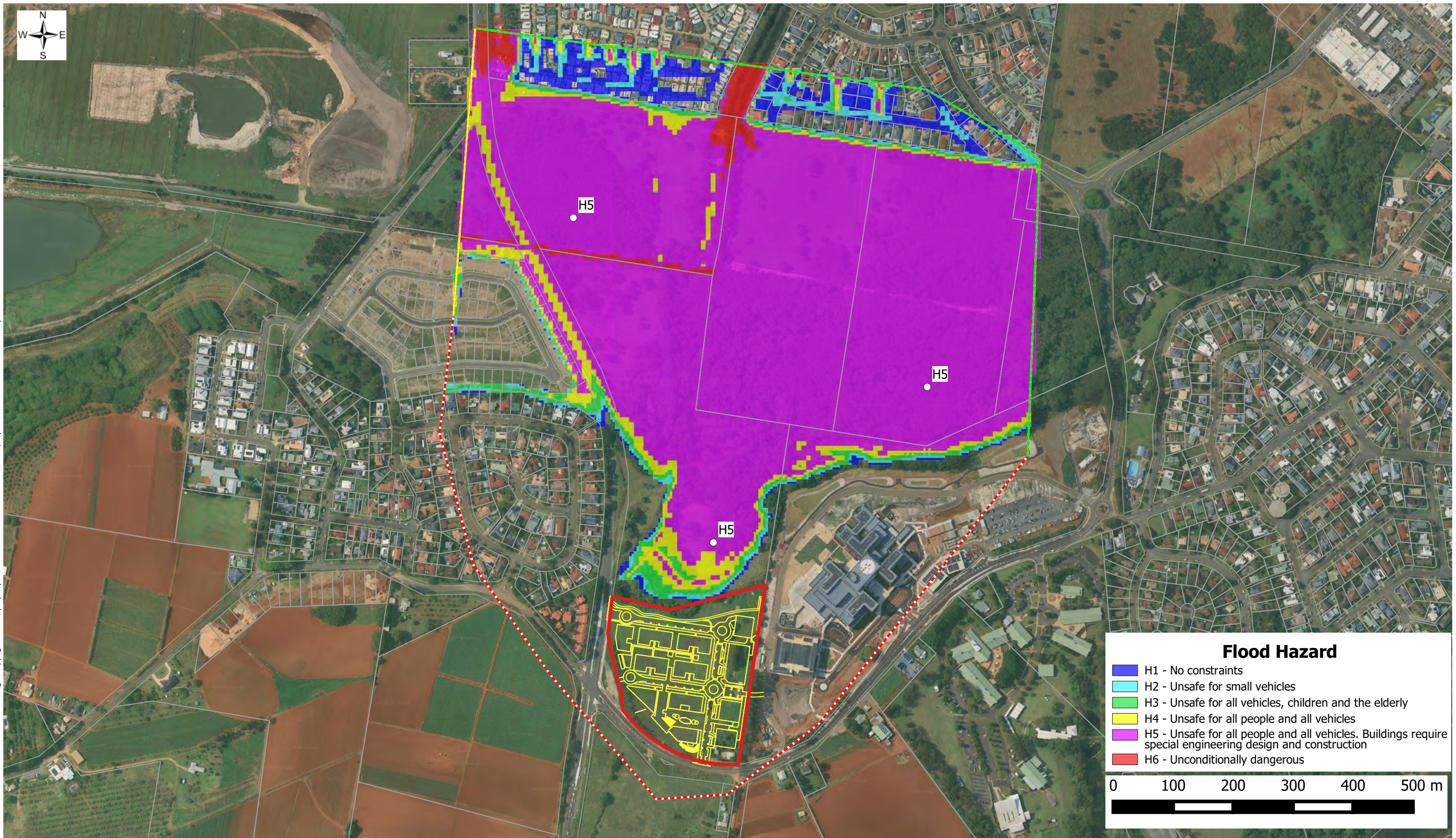


FIG B08 DEVELOPED CASE 0.2%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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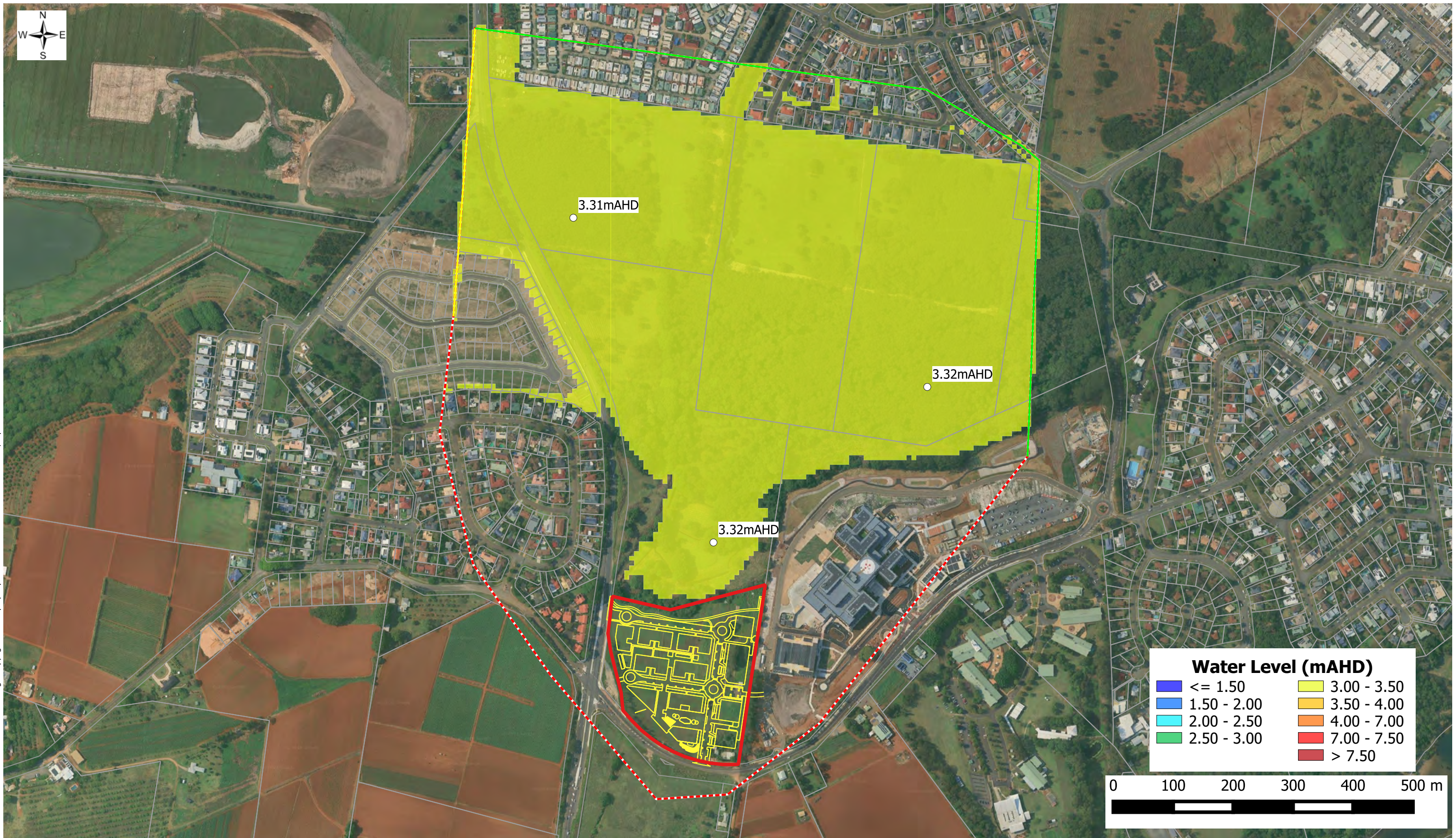


FIG B09 DEVELOPED CASE 1%AEP_CLIMATE CHANGE FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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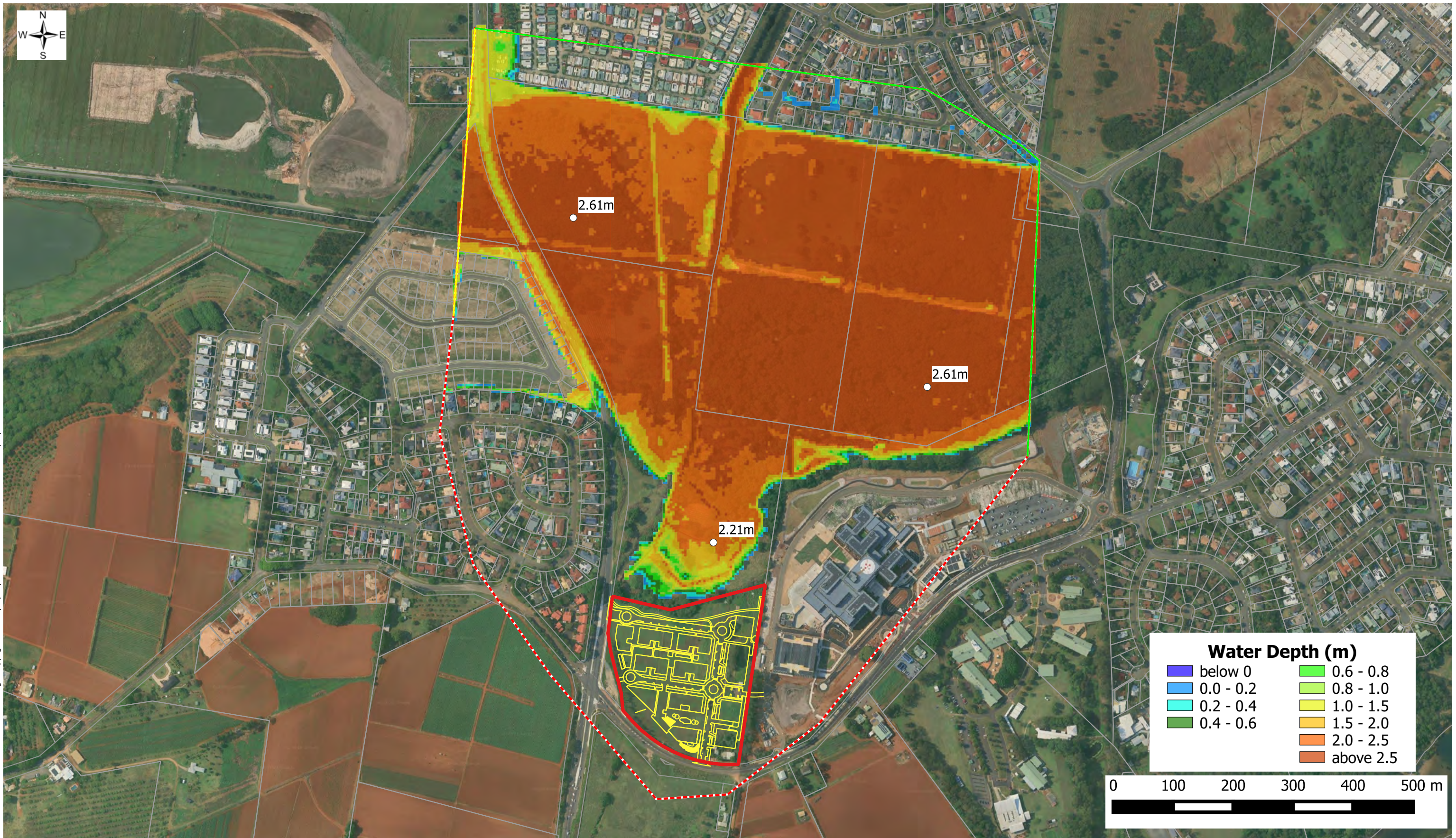


FIG B10 DEVELOPED CASE 1%AEP_CLIMATE CHANGE FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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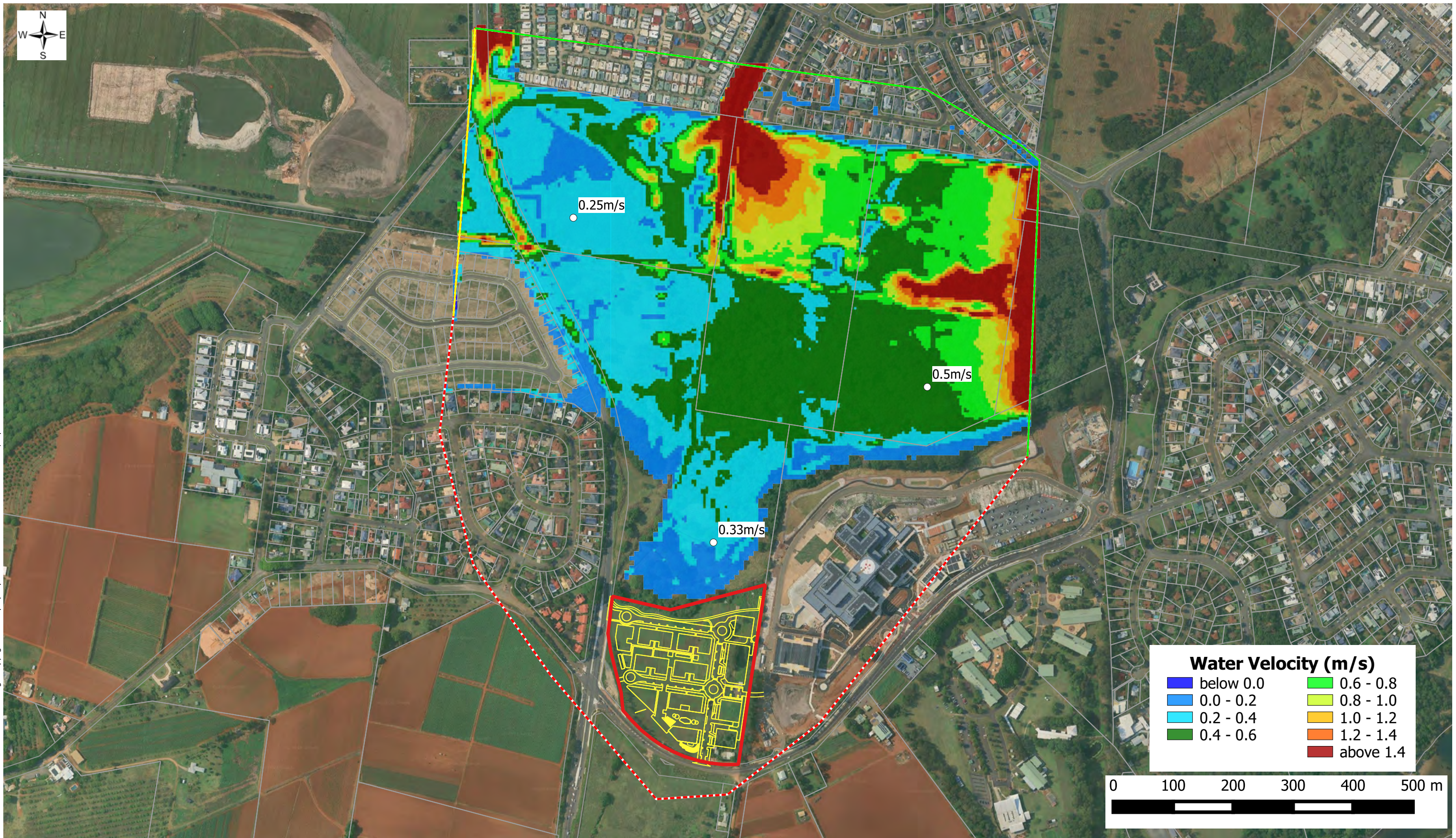


FIG B11 DEVELOPED CASE 1%AEP_CLIMATE CHANGE FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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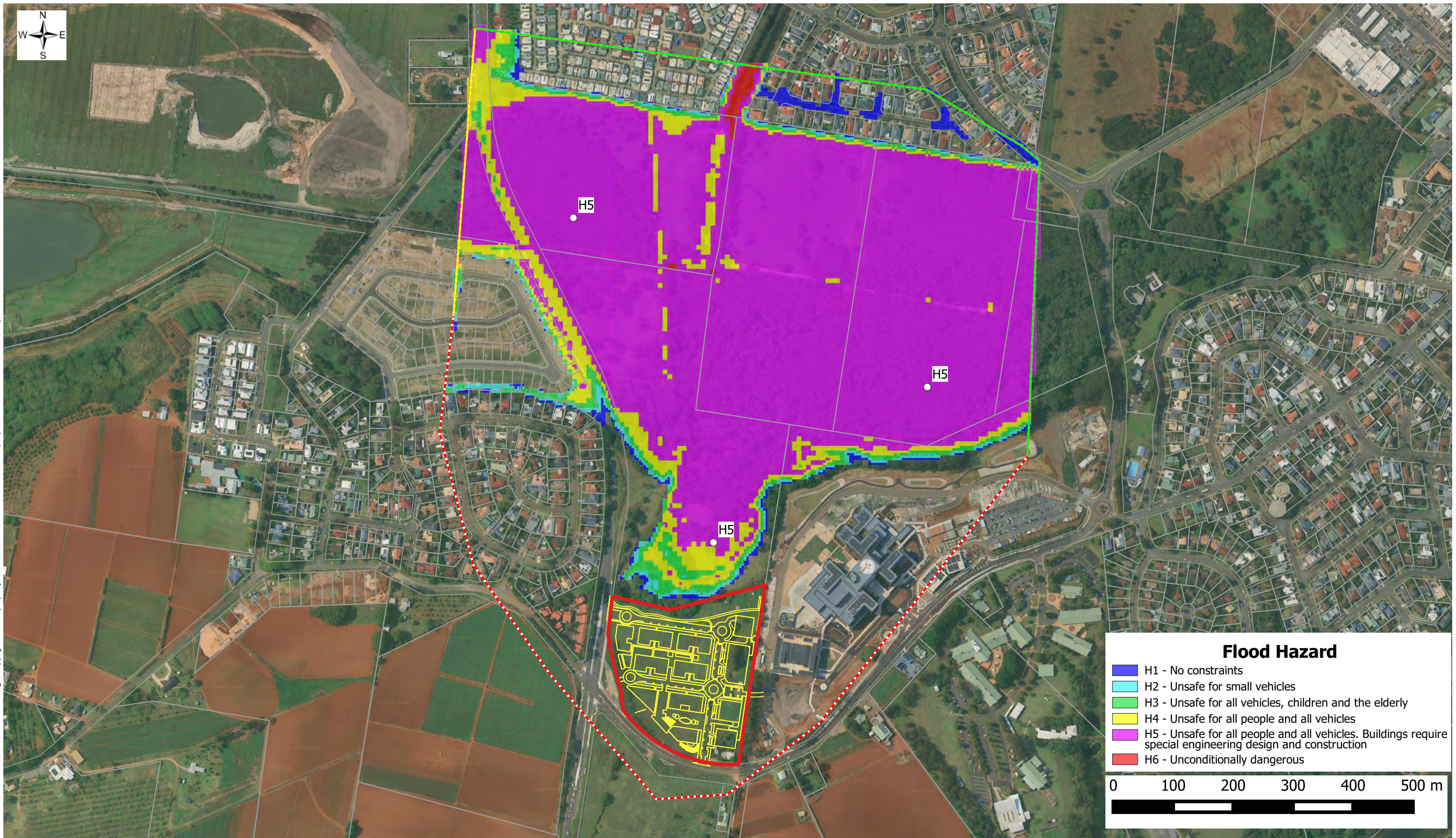


FIG B12 DEVELOPED CASE 1%AEP_CLIMATE CHANGE FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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FIG B13 DEVELOPED CASE 1%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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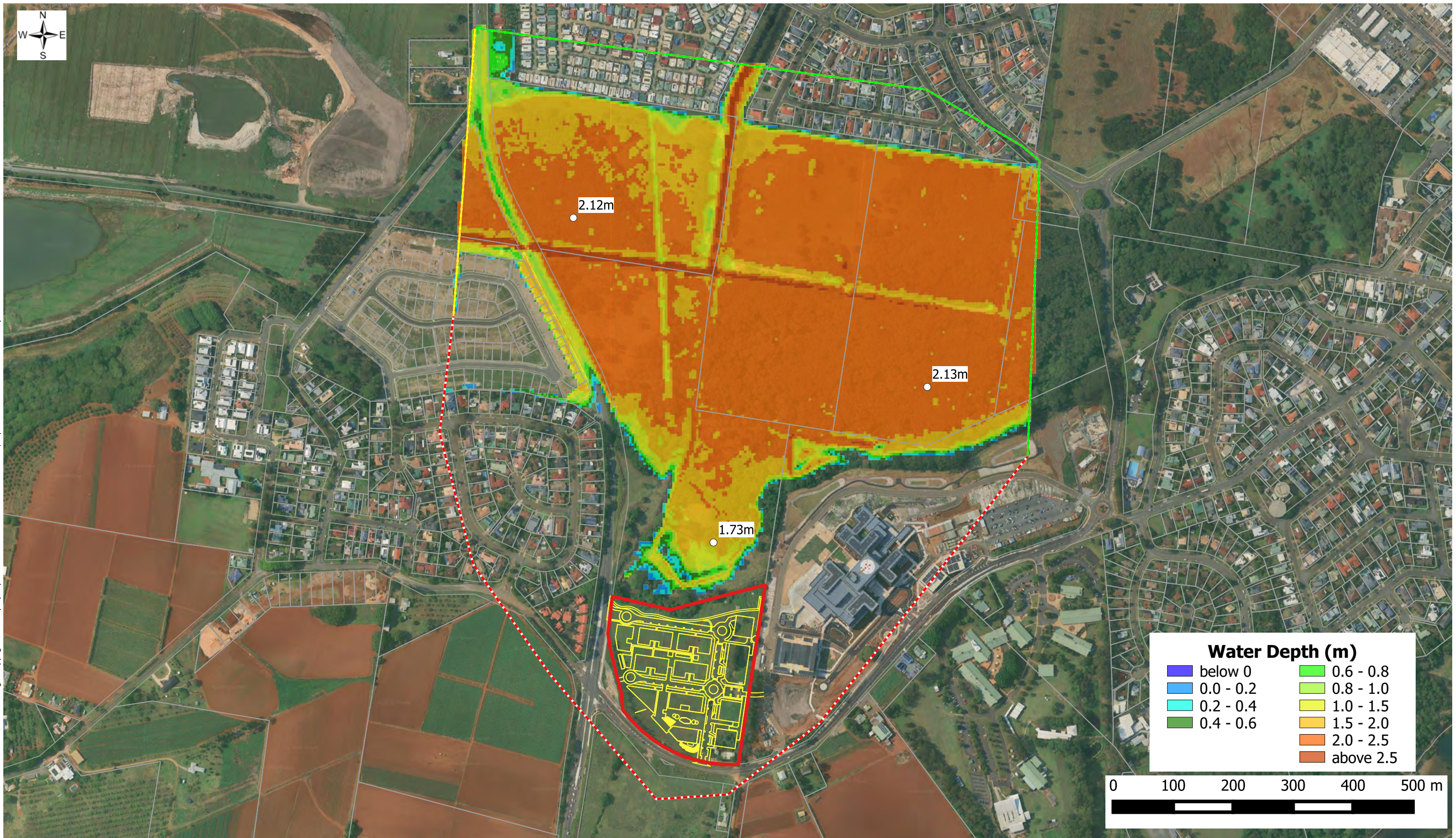


FIG B14 DEVELOPED CASE 1%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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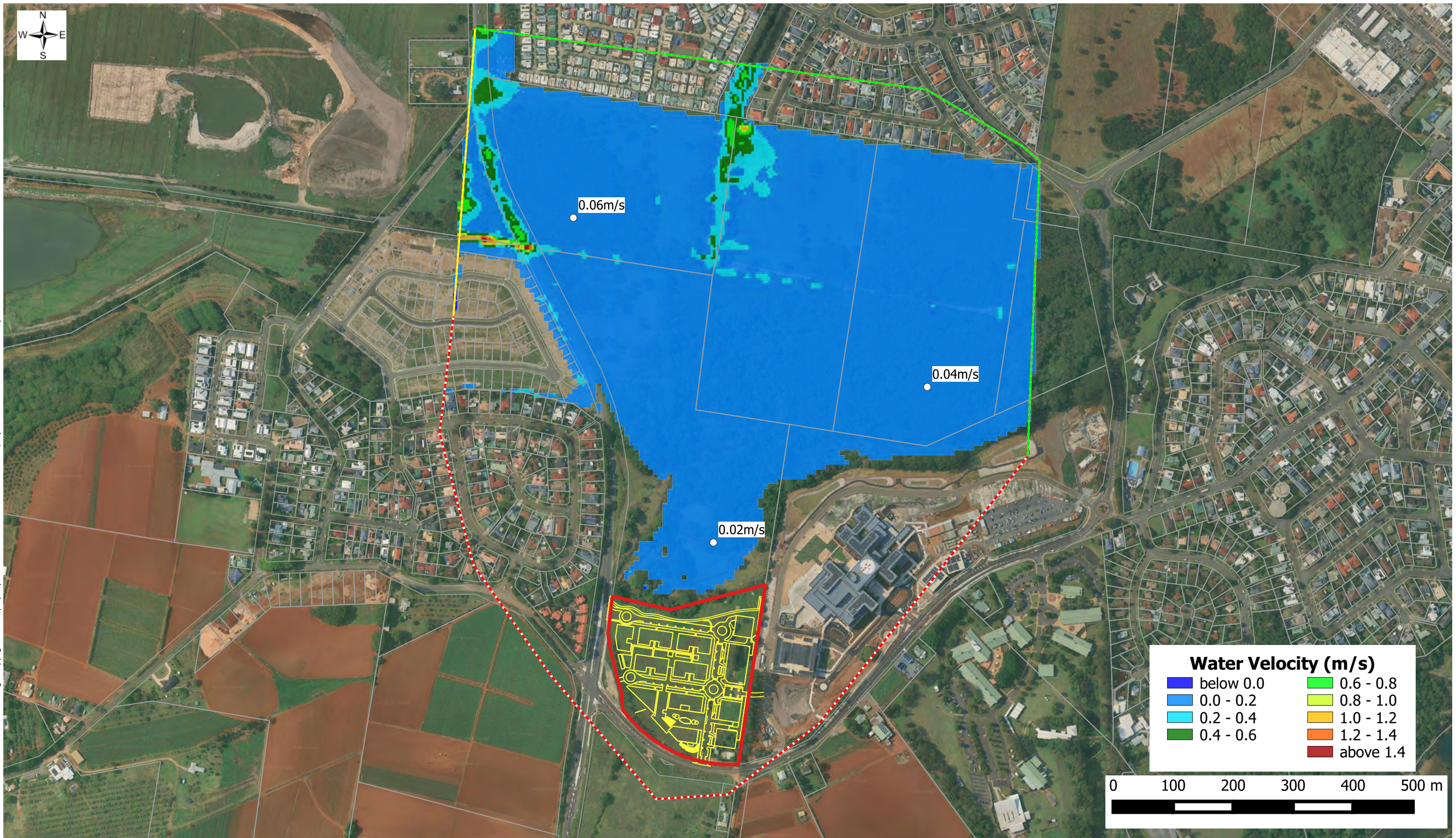


FIG B15 DEVELOPED CASE 1%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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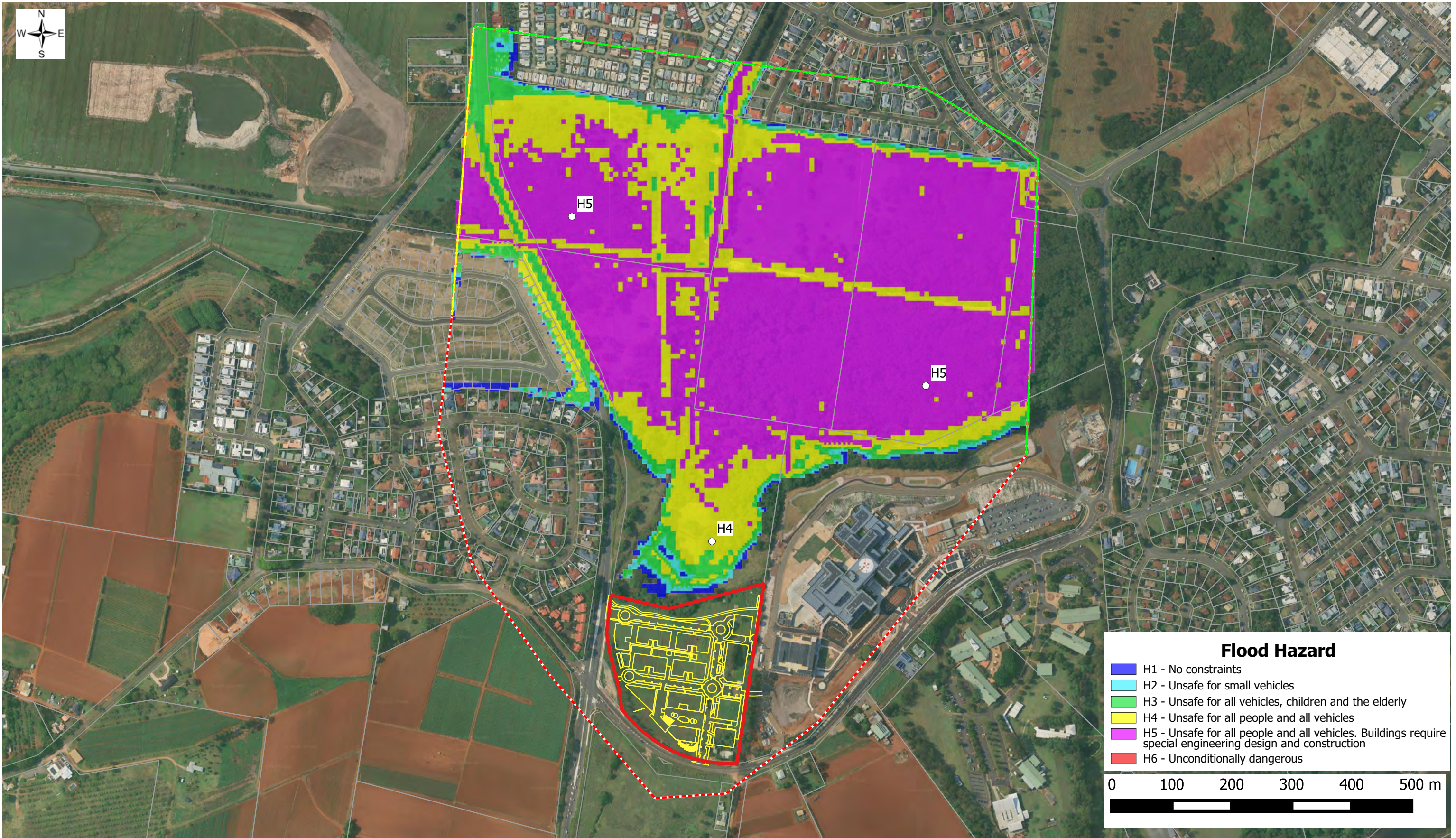


FIG B16 DEVELOPED CASE
1%AEP
FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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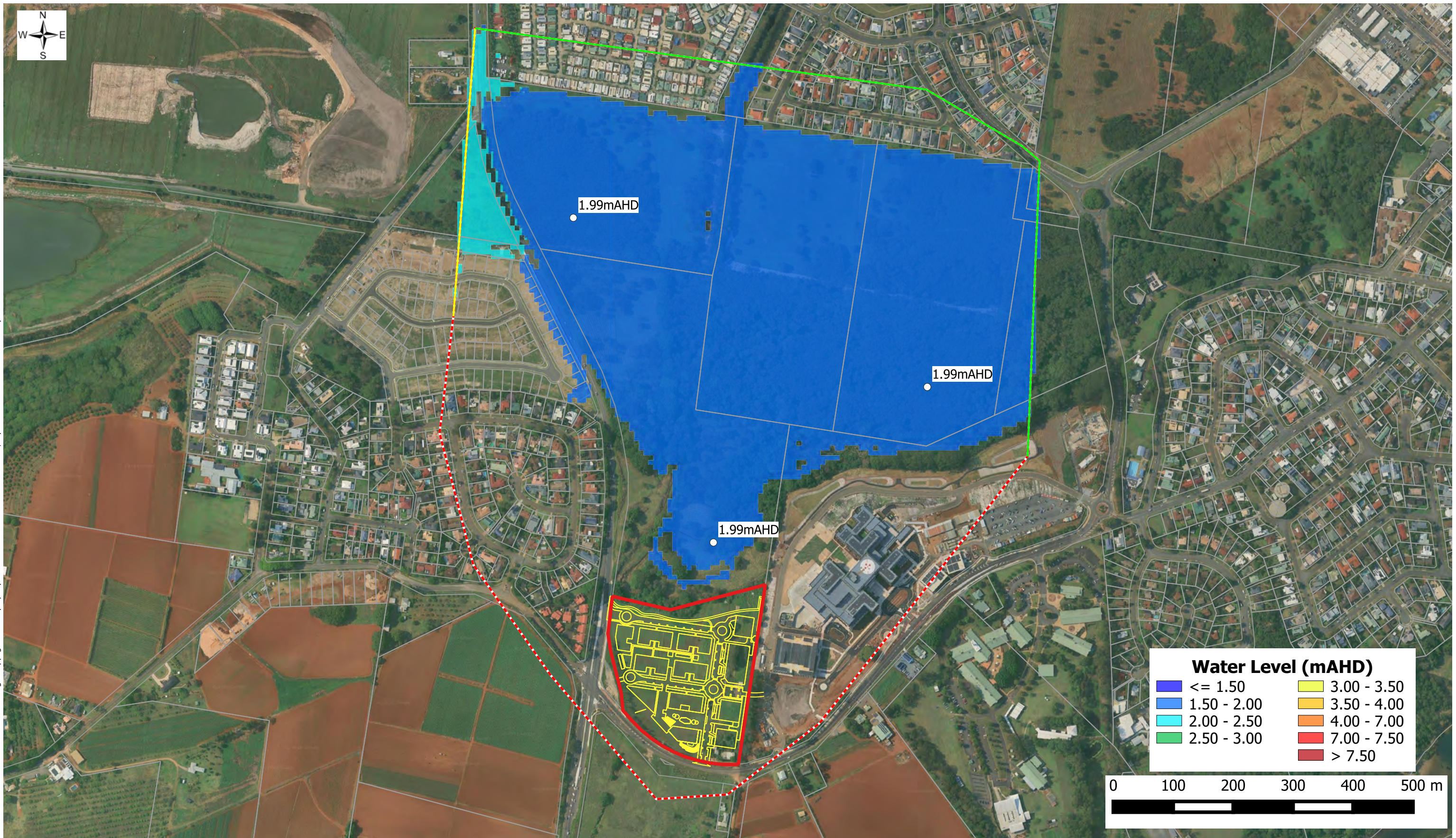


FIG B17 DEVELOPED CASE 5%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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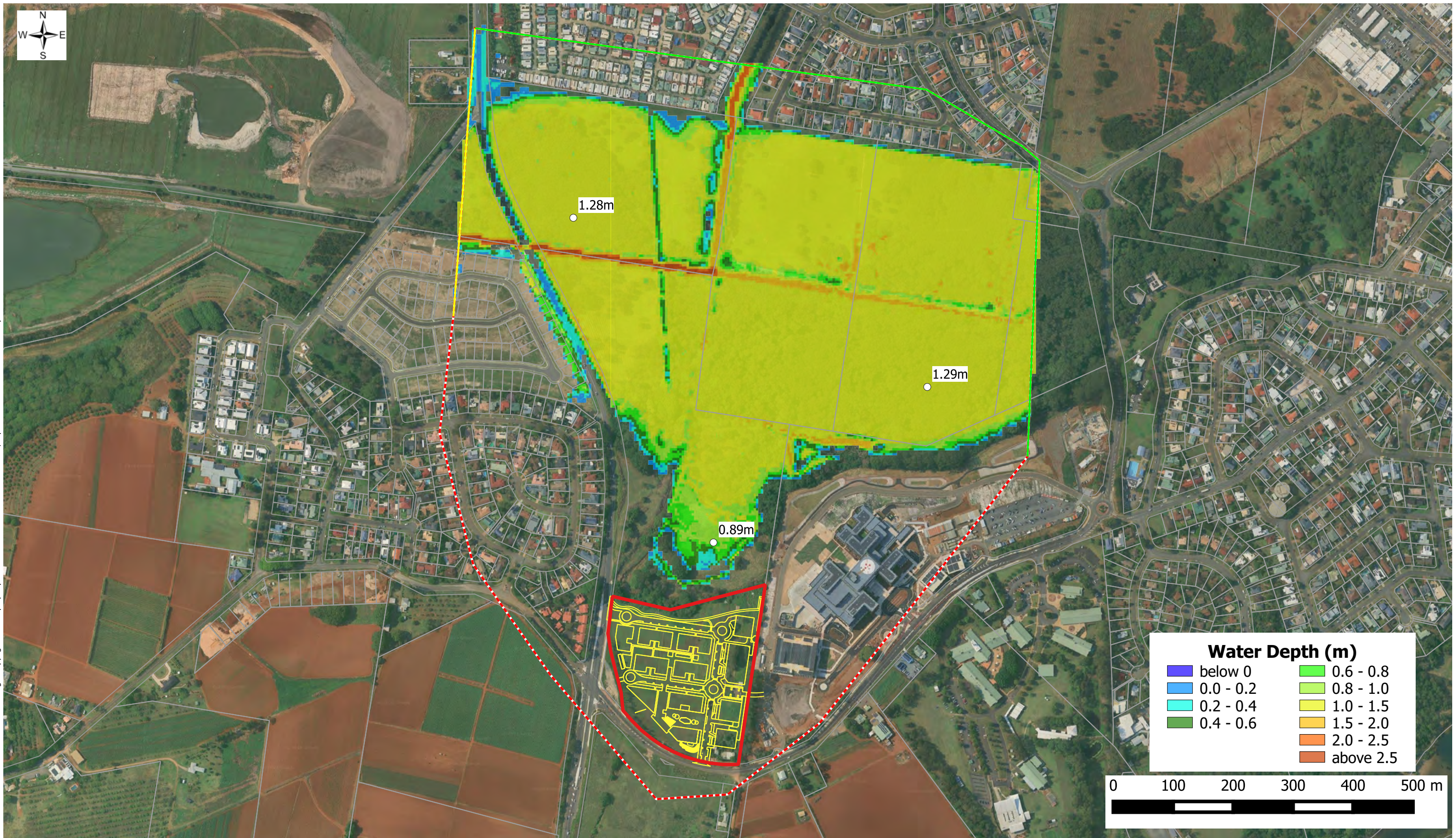


FIG B18 DEVELOPED CASE 5%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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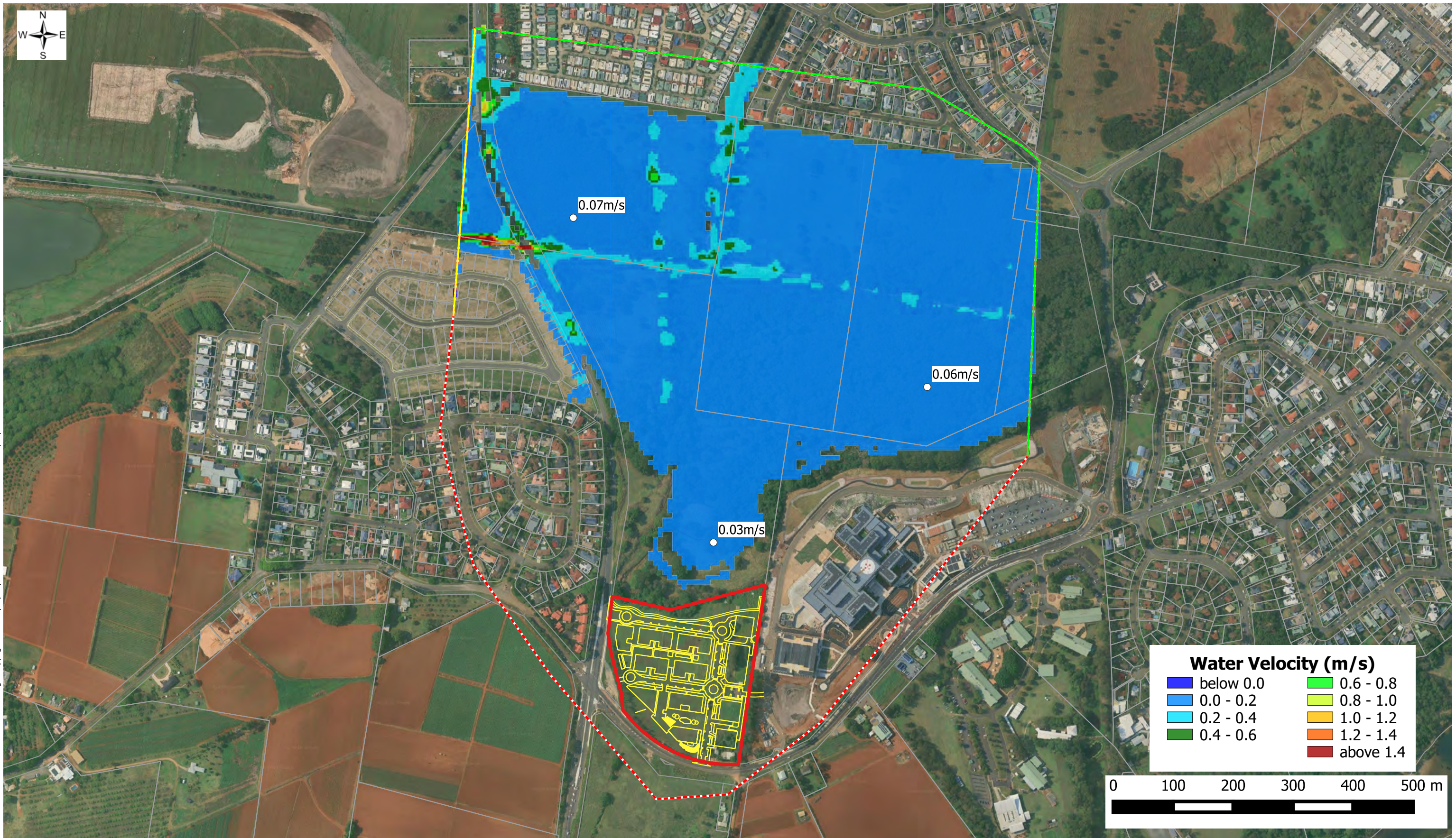


FIG B19 DEVELOPED CASE 5%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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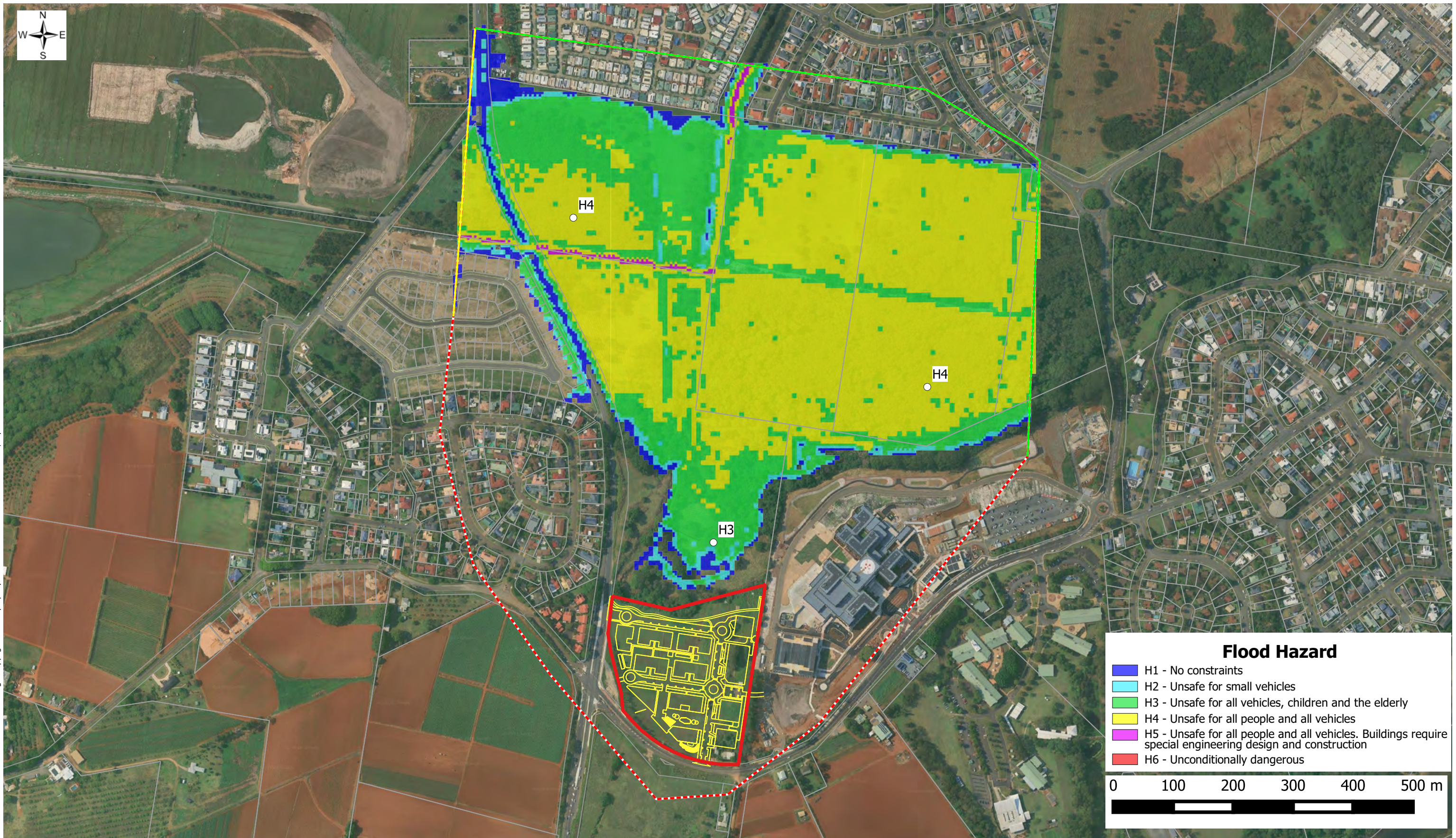


FIG B20 DEVELOPED CASE 5%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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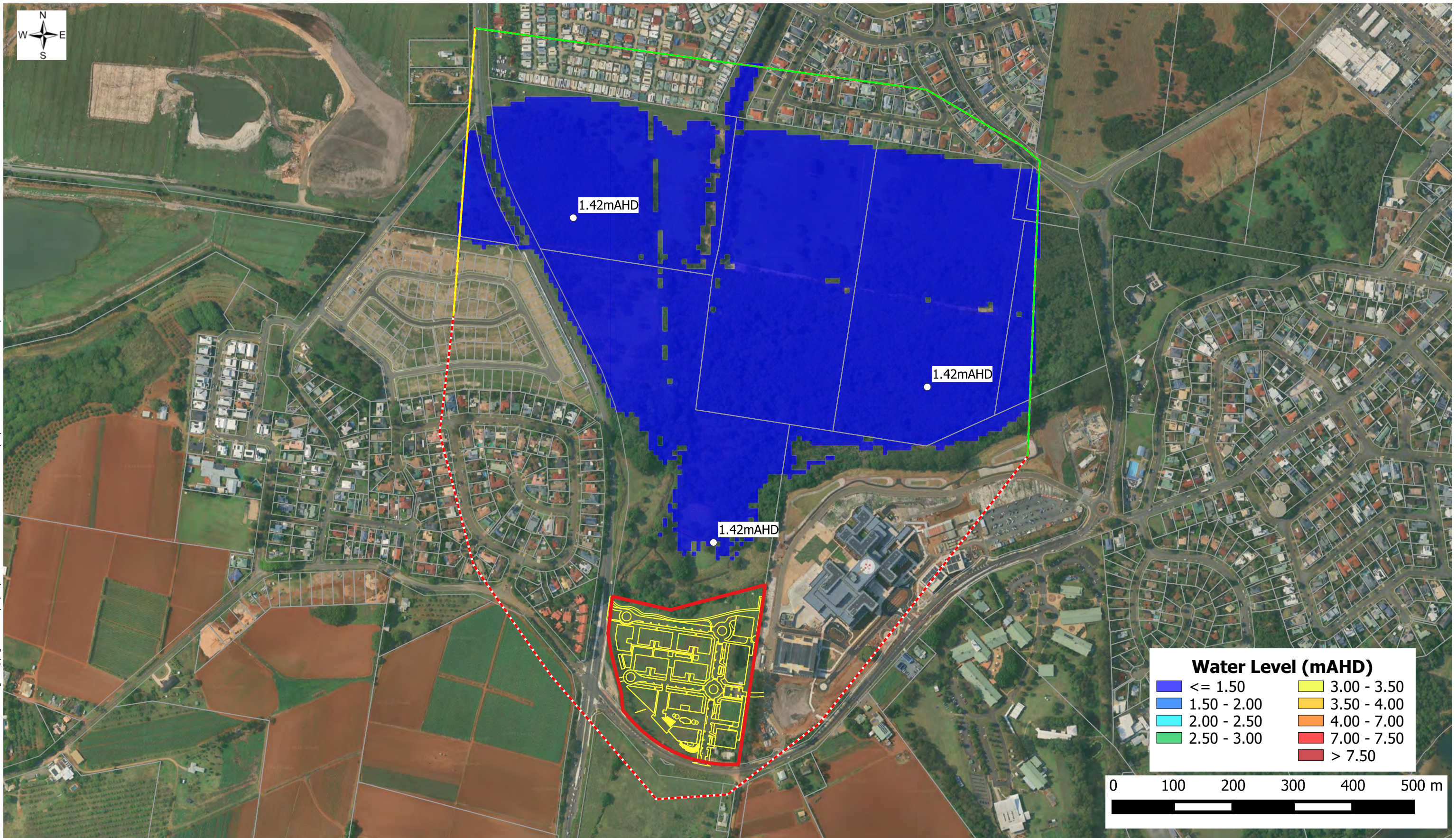


FIG B21 DEVELOPED CASE 20%AEP FLOOD WATER LEVEL

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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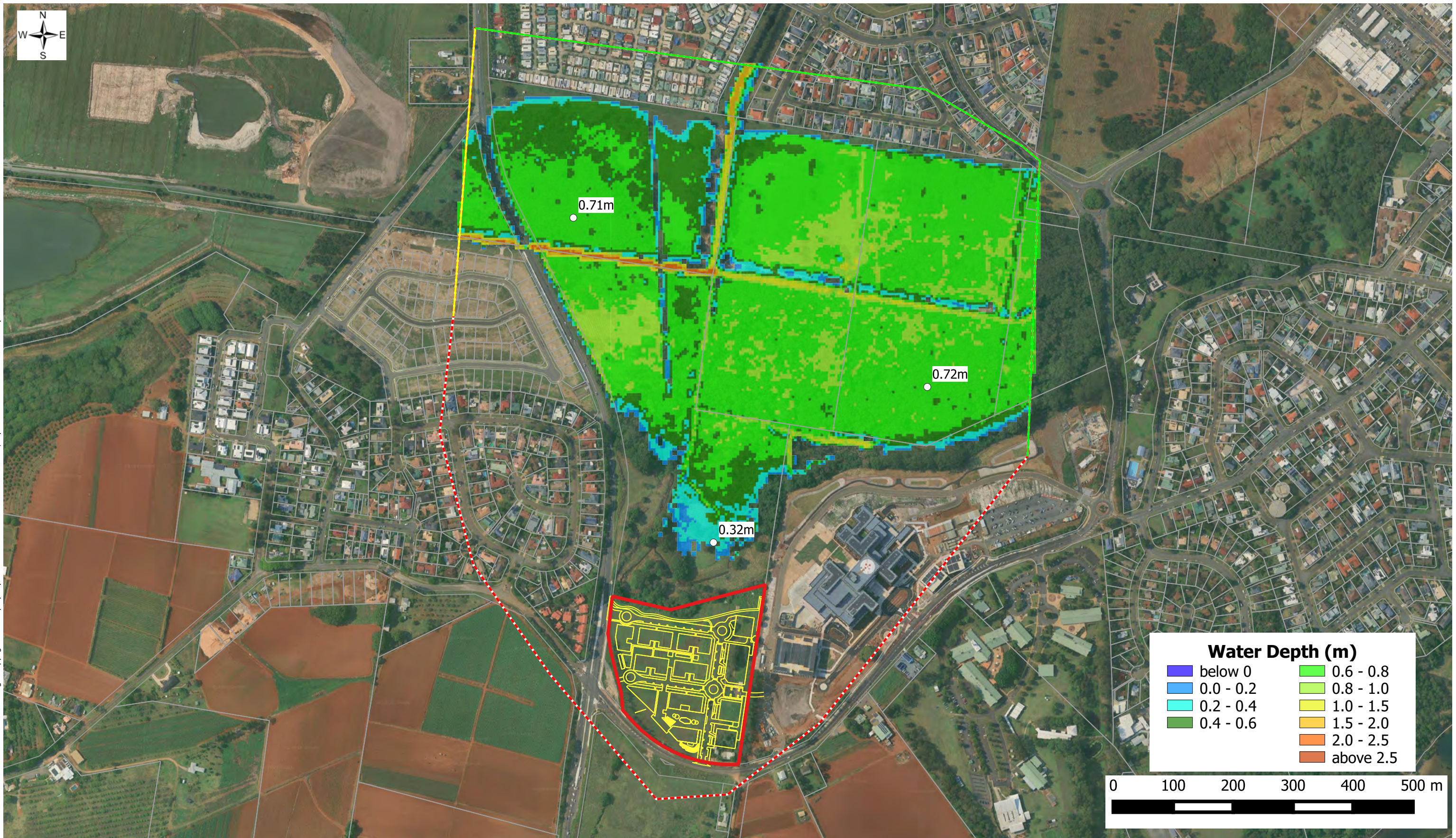


FIG B22 DEVELOPED CASE 20%AEP FLOOD WATER DEPTH

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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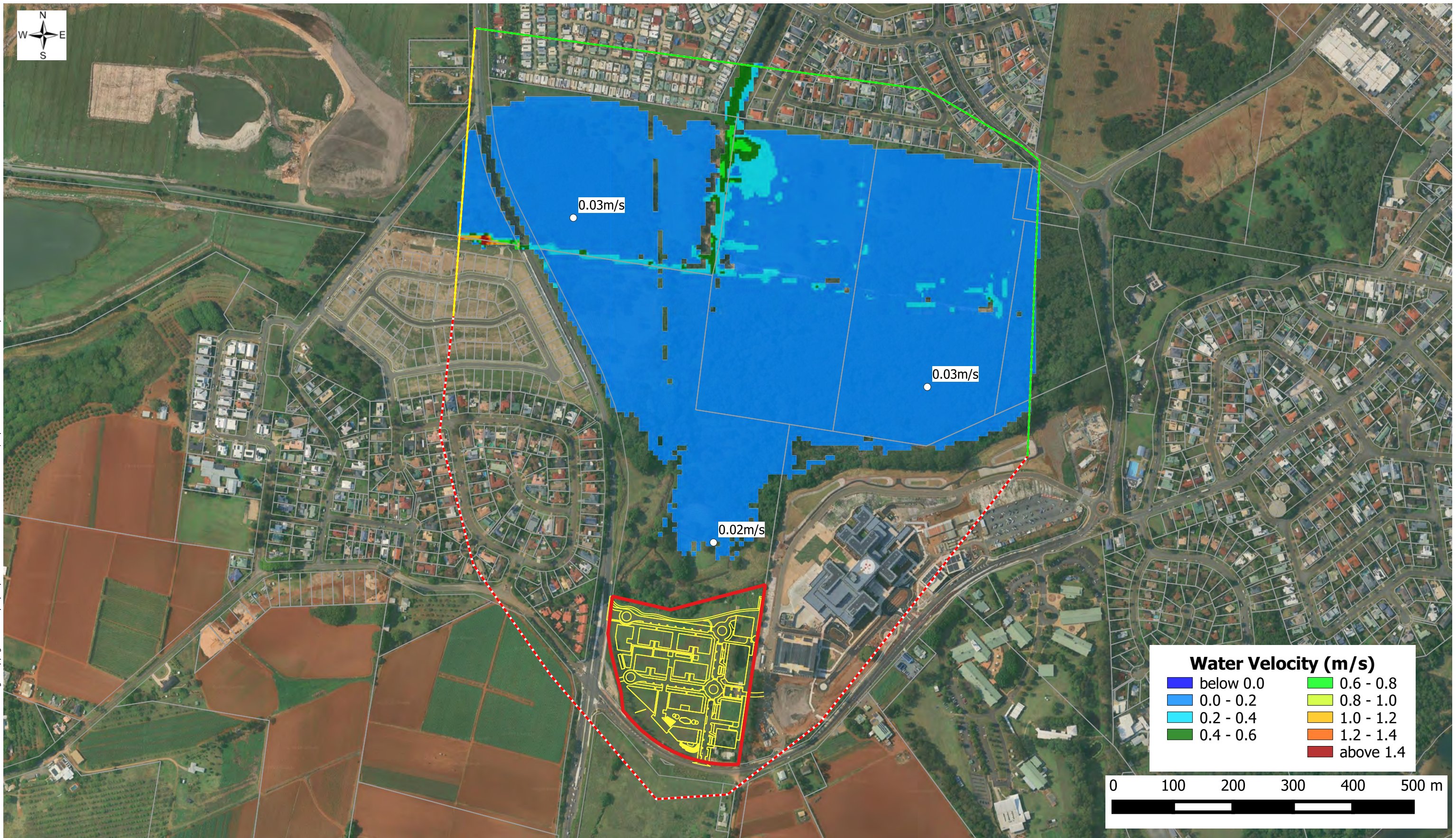


FIG B23 DEVELOPED CASE 20%AEP FLOOD WATER VELOCITY

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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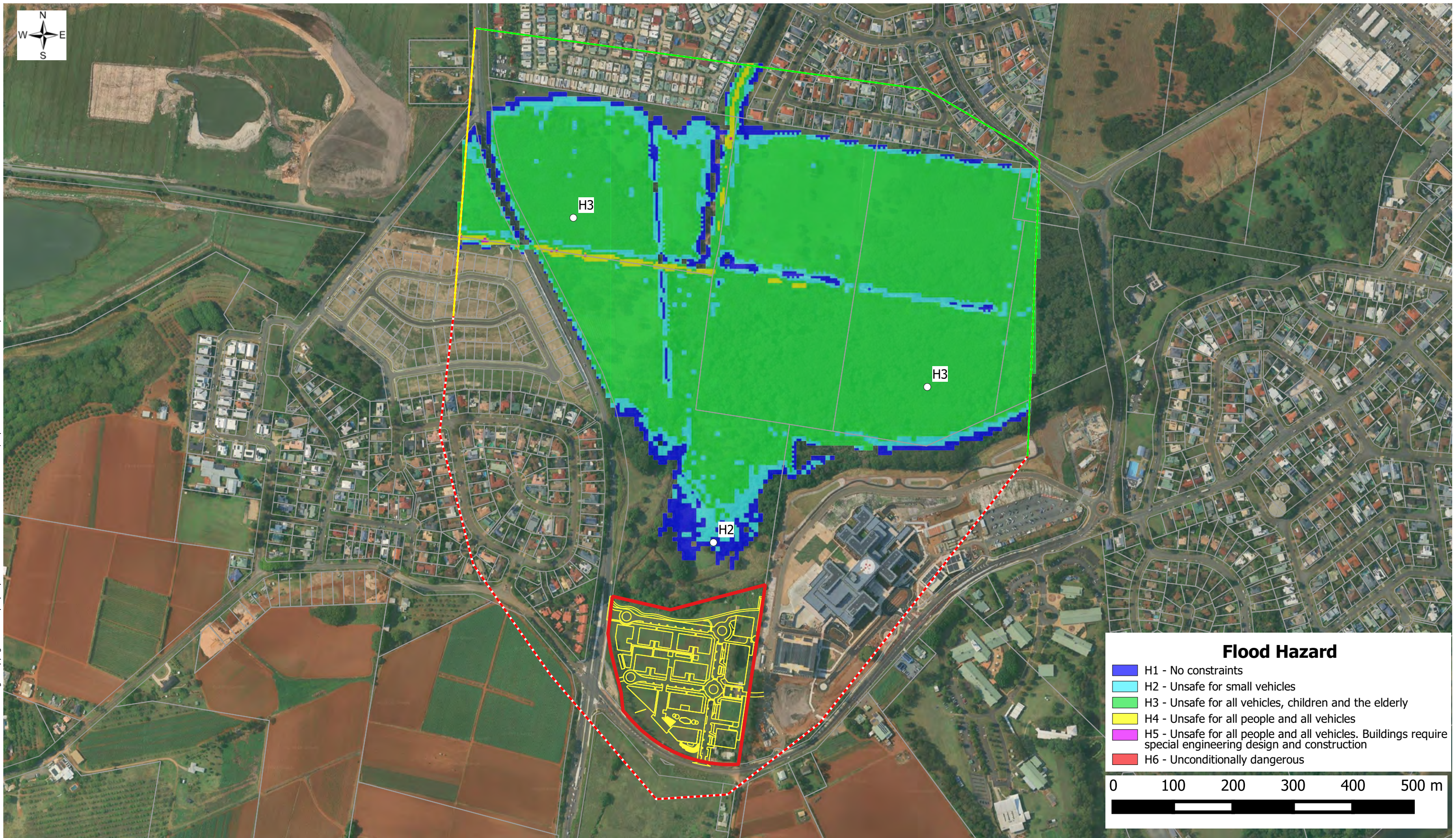


FIG B24 DEVELOPED CASE 20%AEP FLOOD HAZARD

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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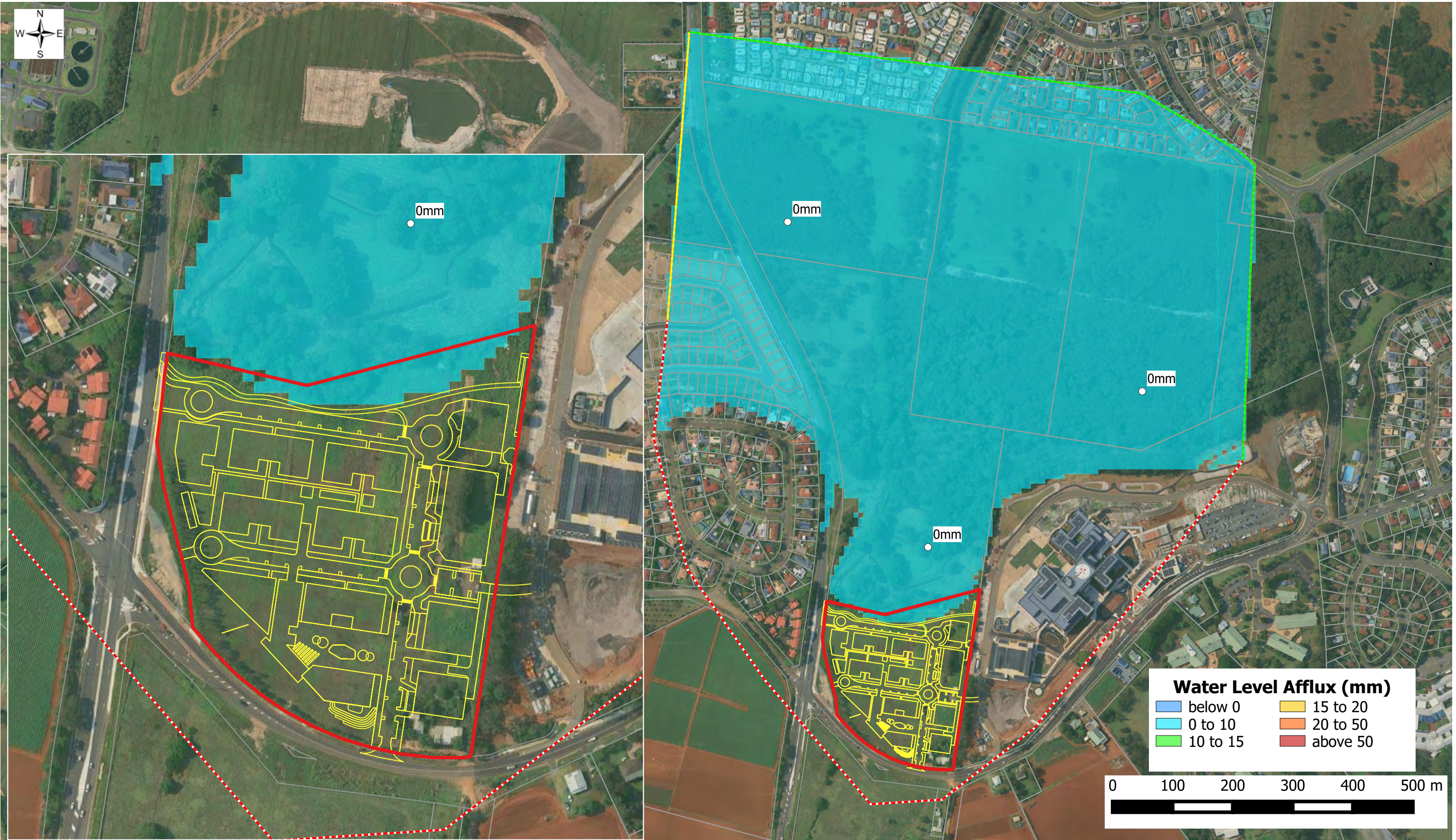


FIG C01 DEVELOPED CASE
PMF EVENT
FLOOD WATER LEVEL AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026



Client

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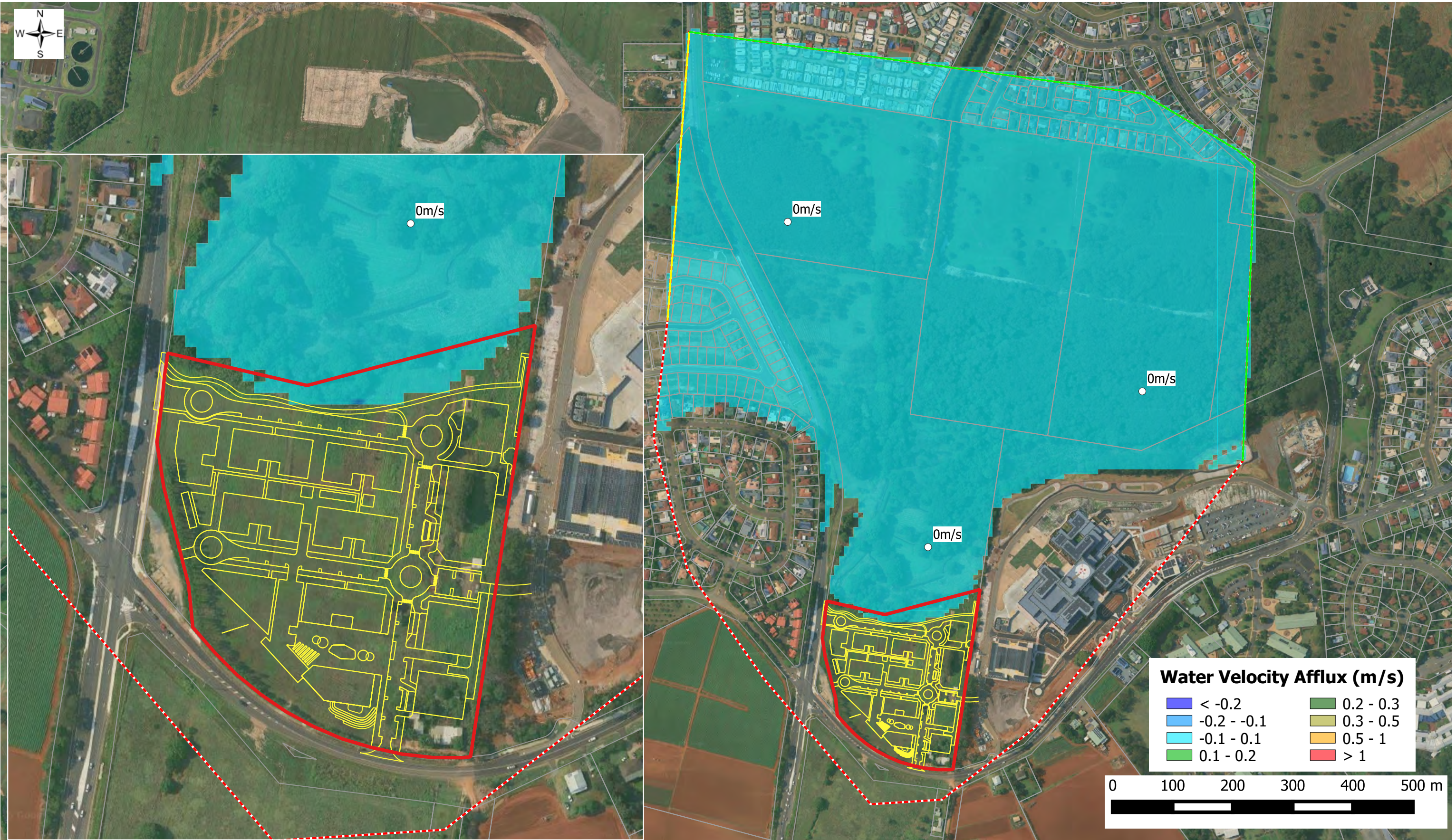


FIG C02 DEVELOPED CASE
PMF EVENT
FLOOD WATER VELOCITY AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026



Client

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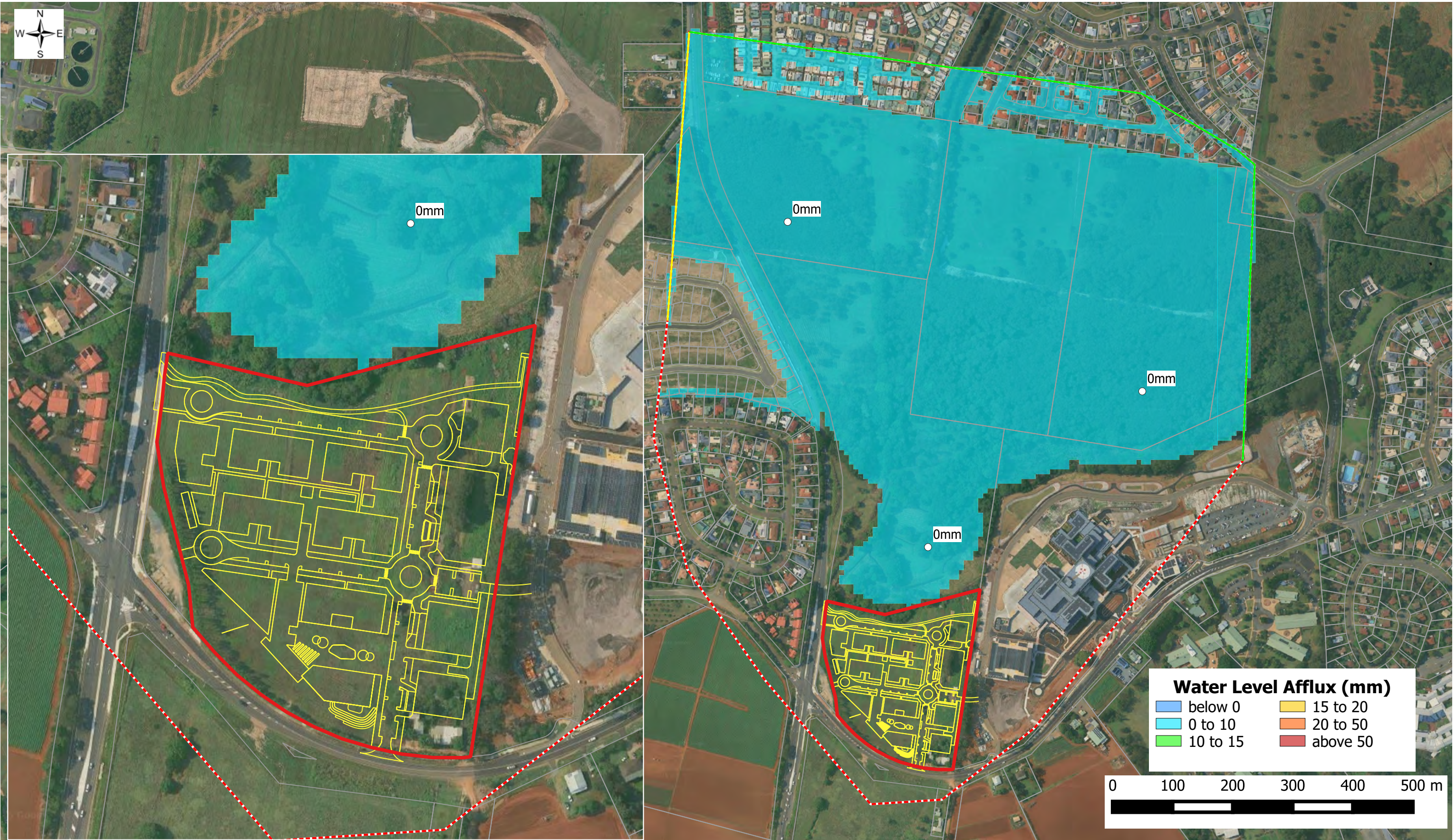


FIG C03 DEVELOPED CASE
0.2%AEP
FLOOD WATER LEVEL AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout



Client

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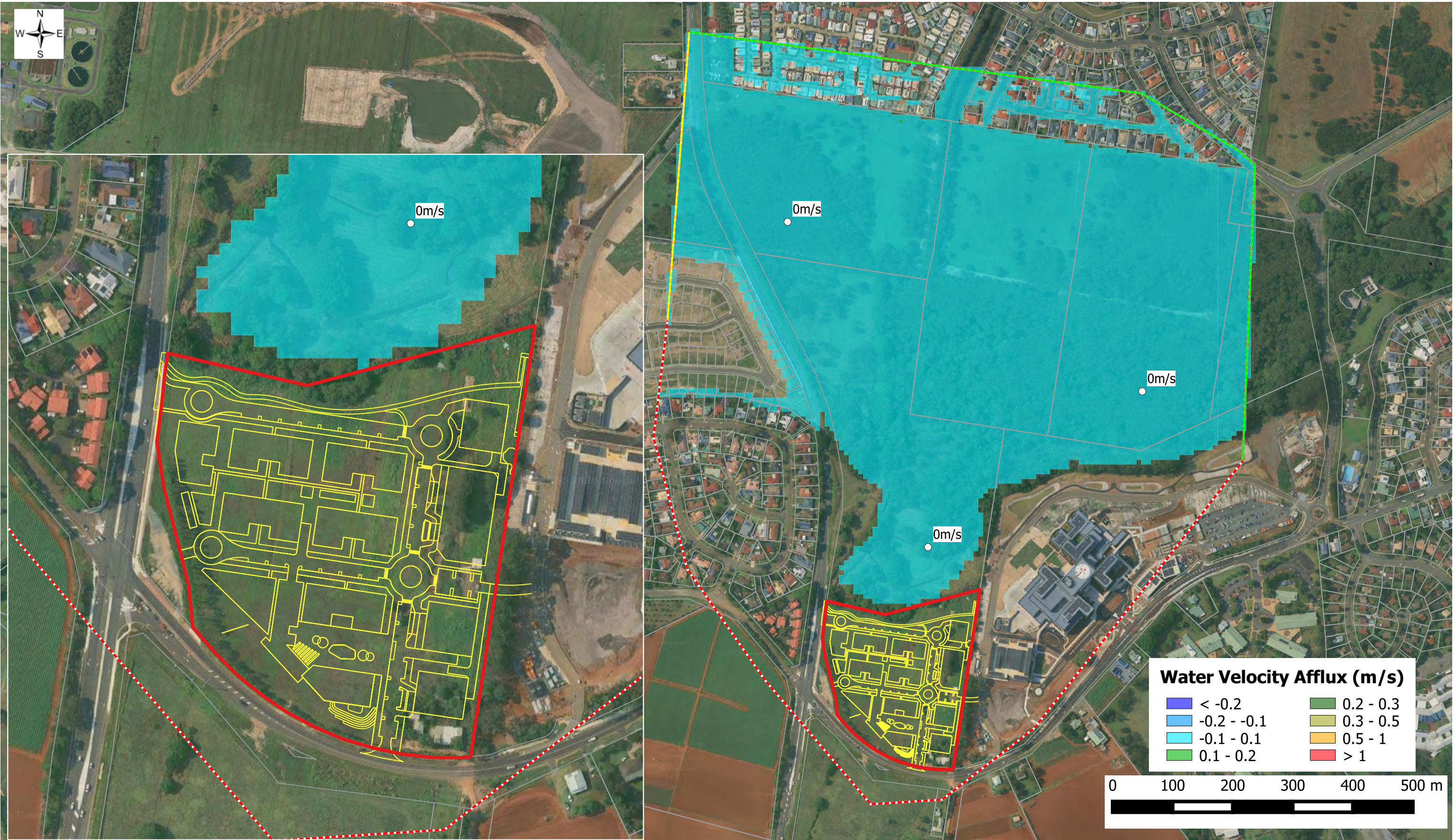
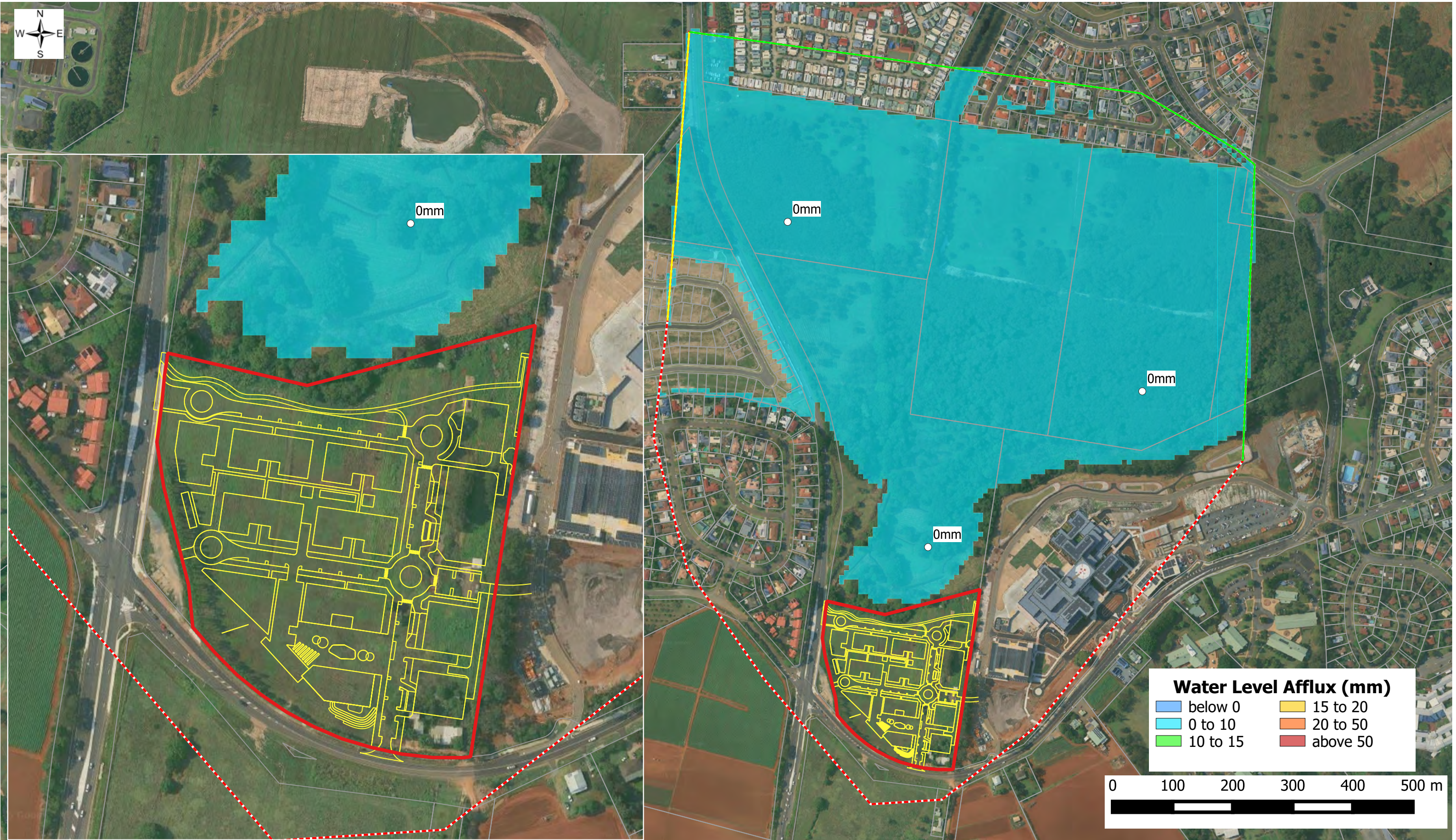


FIG C04 DEVELOPED CASE
0.2%AEP
FLOOD WATER VELOCITY AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

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**FIG C05 DEVELOPED CASE
1%AEP_CLIMATE CHANGE
FLOOD WATER LEVEL AFFLUX**

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout



Client

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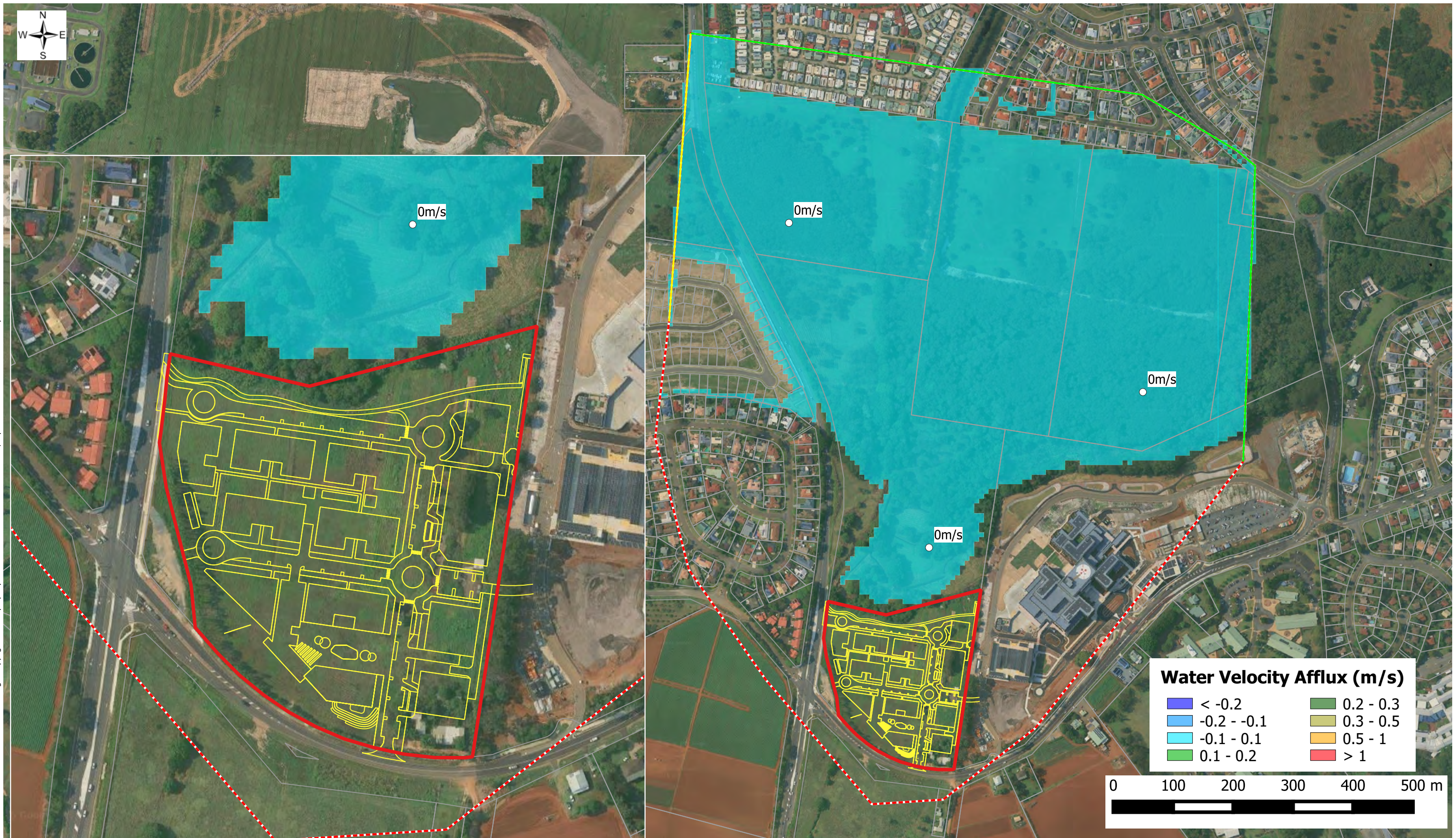


FIG C06 DEVELOPED CASE 1%AEP_CLIMATE CHANGE FLOOD WATER VELOCITY AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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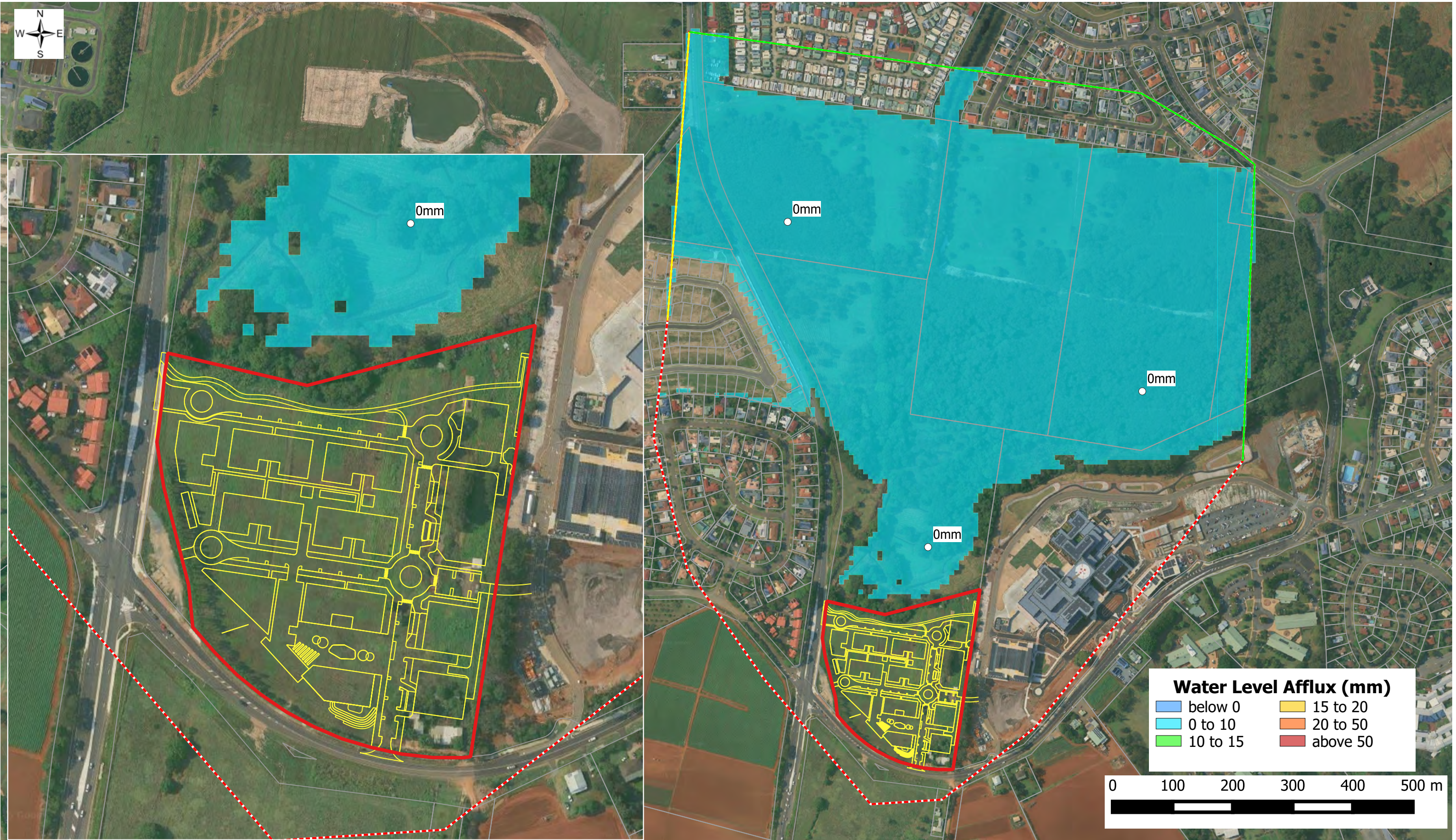


FIG C07 DEVELOPED CASE
1%AEP
FLOOD WATER LEVEL AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026



Client

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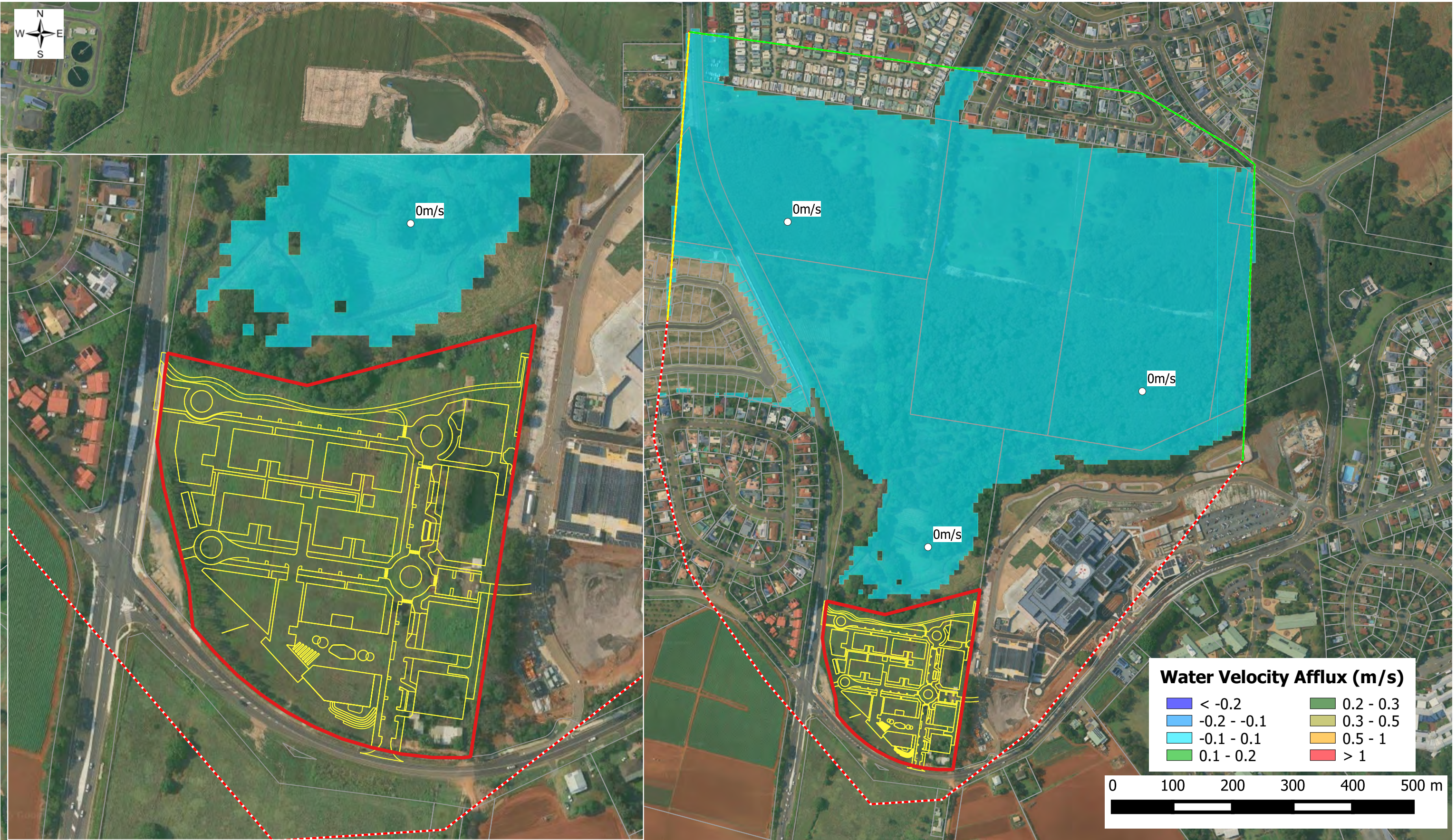


FIG C08 DEVELOPED CASE
1%AEP
FLOOD WATER VELOCITY AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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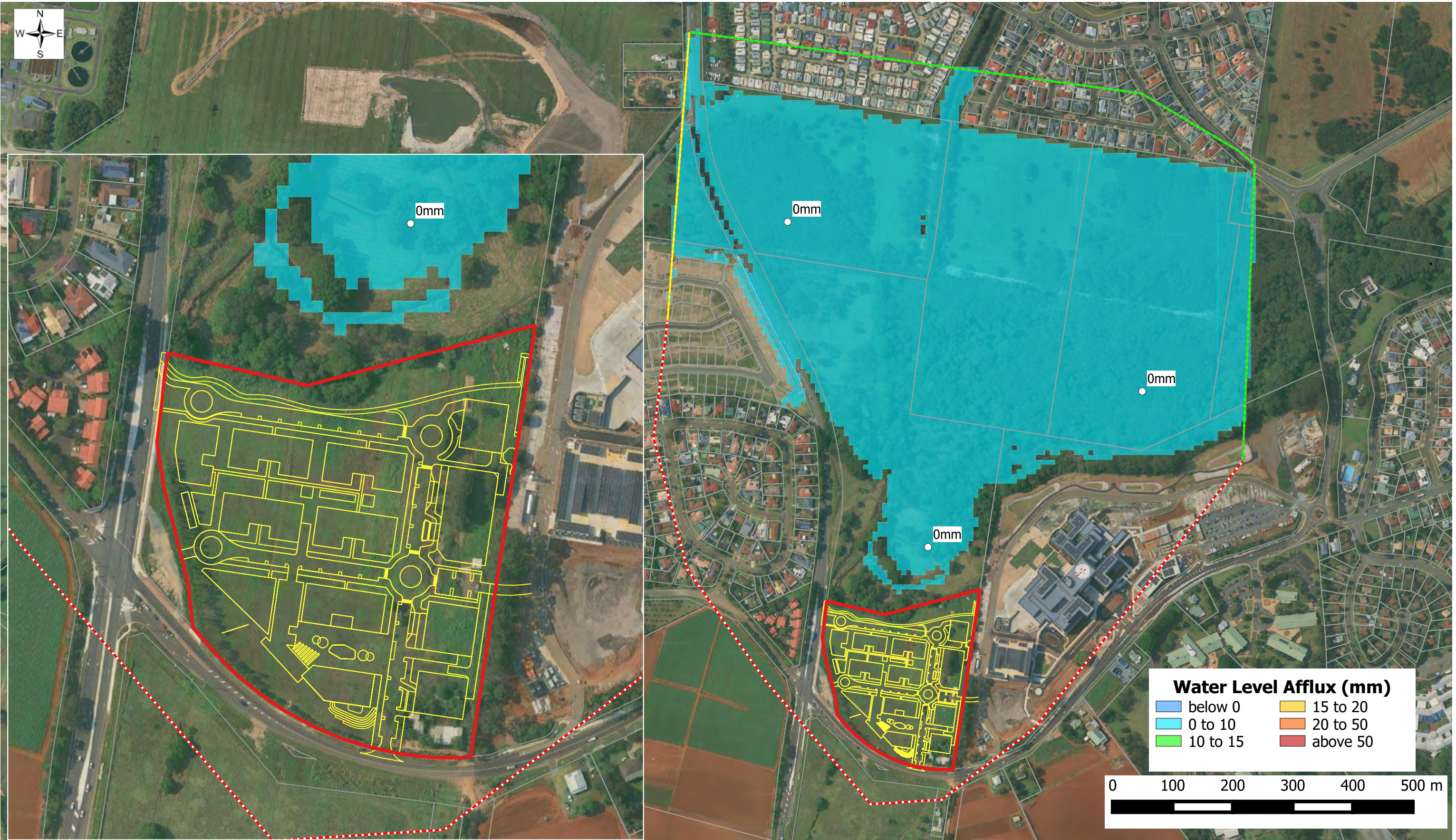


FIG C09 DEVELOPED CASE
5%AEP
FLOOD WATER LEVEL AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout



Client

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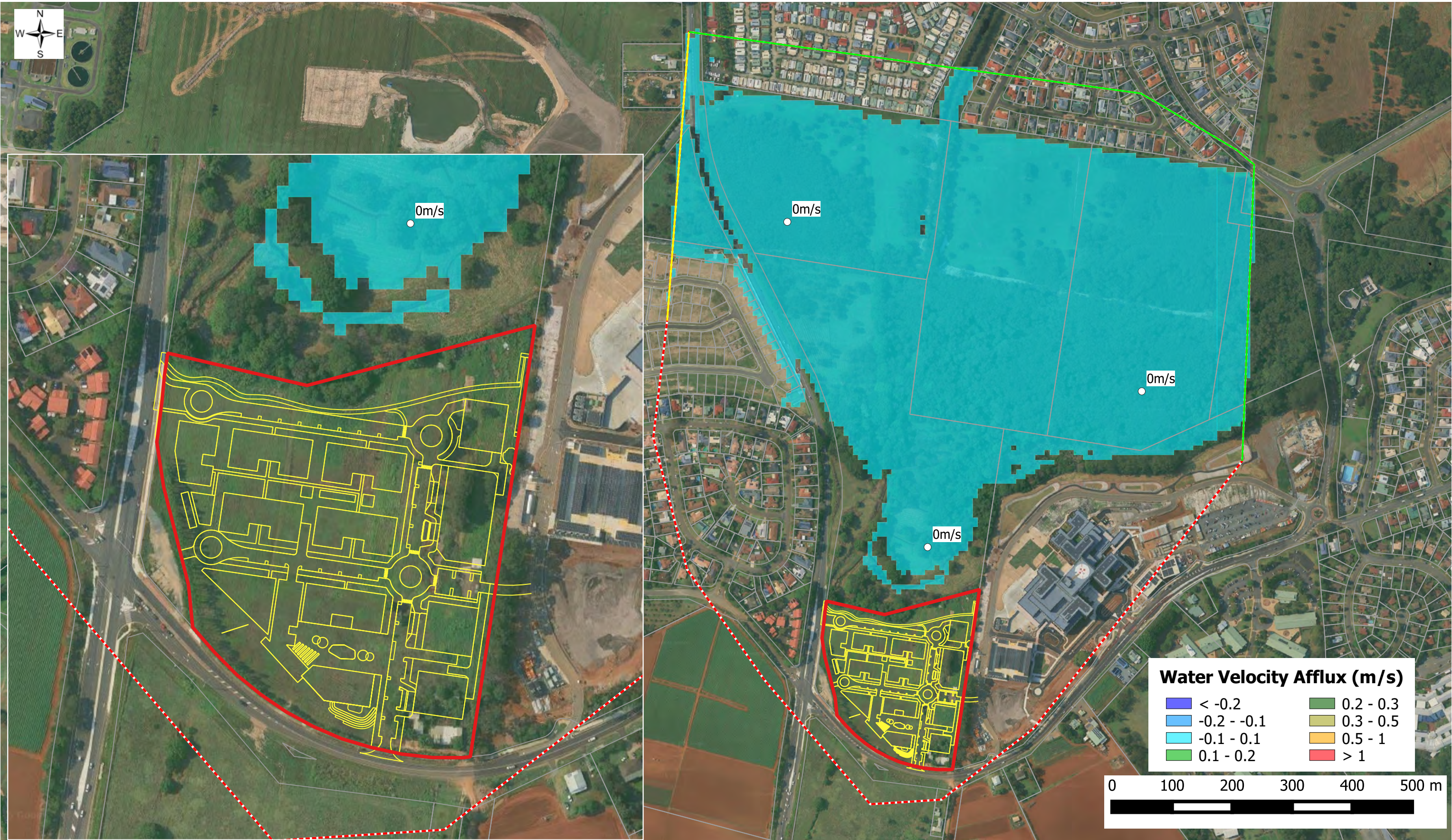


FIG C10 DEVELOPED CASE
5%AEP
FLOOD WATER VELOCITY AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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FIG C11 DEVELOPED CASE
20%AEP
FLOOD WATER LEVEL AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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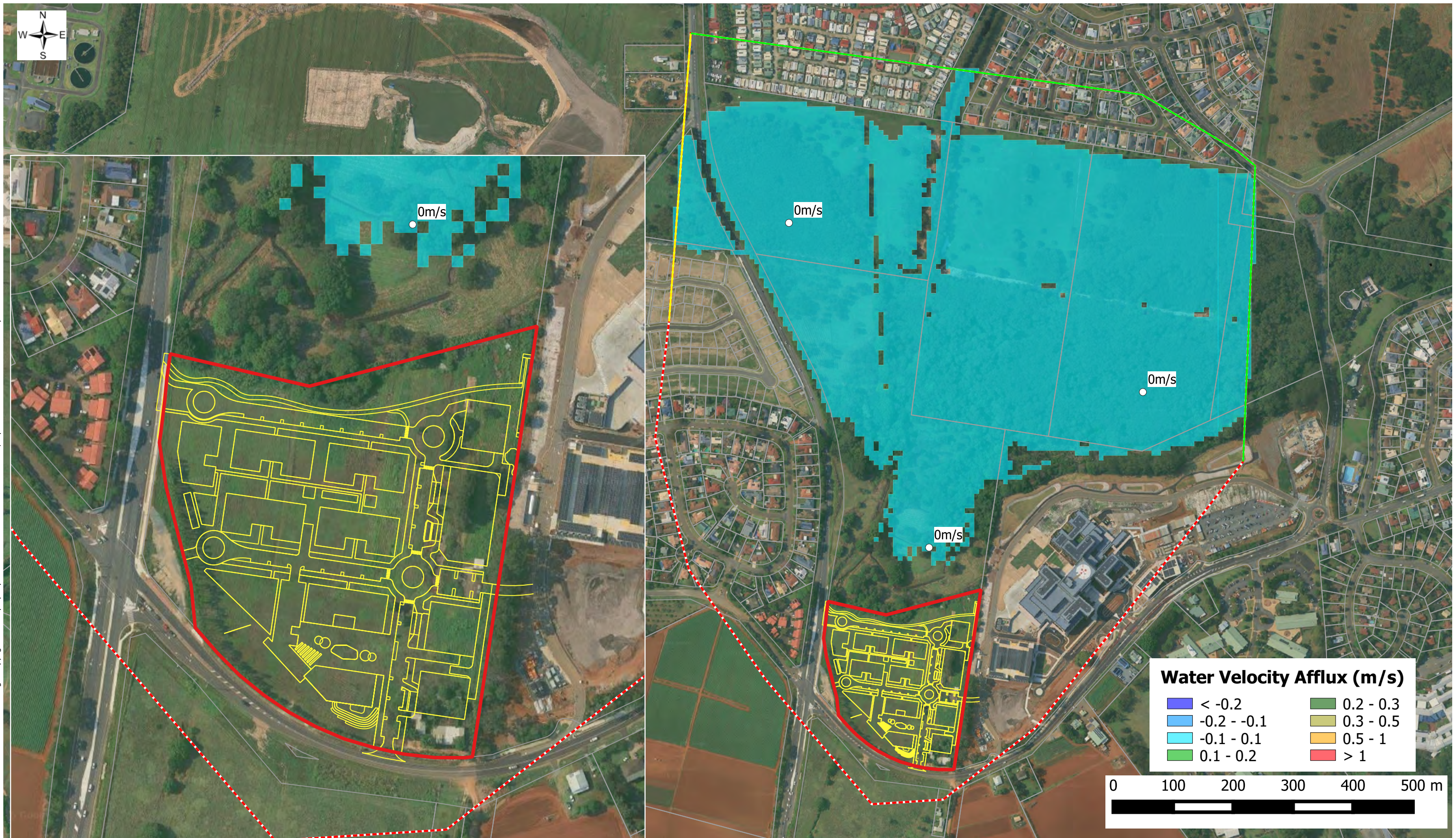


FIG C12 DEVELOPED CASE 20%AEP FLOOD WATER VELOCITY AFFLUX

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: FW00300 741 Cudgen Road Cudgen
DATE: January 2026

Legend

- Model Extent
- Site
- Inflow Boundary
- Downstream Boundary
- Cadastral_Tweeds
- Interrogation Point
- Layout

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Appendix C Flood Emergency Management Plan (FEMP)



REPORT



FLOOD EMERGENCY MANAGEMENT PLAN

CUDGEN CONNECTION

741 Cudgen Road,
Cudgen NSW

Contact us to design
the sustainable
towns and cities
of tomorrow.



FLOODWORKS

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FW00300

28 January 2026

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Version Register

Version	Status	Author	Reviewer	Change from Previous Version	Authorised for Release	
					Signature	Date
0	Draft	HN	DM		<i>D. Mackenzie</i>	27/01/26
0	Final	HN	DM		<i>D. Mackenzie</i>	28/01/26

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1 Introduction

Floods are a natural occurrence in the Tweed Valley area. This means that future flooding is inevitable, and a Flood Emergency Management Plan (also known as a Floodsafe Plan) is required to reduce risk and ensure a well-ordered flood response. A Flood Safe Plan typically includes specific triggers, actions, responsibilities, and communication methods to protect people and property. A Floodsafe Plan is a living document that requires regular review, modification, and updates to ensure its accuracy and effectiveness. Regular training and flood-safe drills are essential to the success of this plan.

Why is a Floodsafe plan important?

- Floods affect people, property and profits
- Staff and residents may be directly or indirectly impacted by flooding (including injury and potentially death)
- Building, stock, plant equipment and fittings (including vehicles) can be inundated by floodwaters and debris, including sediments
- Floods typically occur during periods of high humidity and cloud cover, resulting in mould buildup
- Electricity supply can be interrupted for an extended period during and after the flood event
- Flood Insurance may be difficult to obtain and can be expensive
- Business operations may need to close during the flood event and remain closed for an extended period afterwards. It may take many weeks/months before businesses can return to normal operations, impacting not only the business but also its customers

Benefits of a Floodsafe plan:

- Saves lives and prevents injury
- Compliance with Occupational Health and Safety (OH&S) regulations
- Reduces damage to stock, plant equipment and fittings
- Reduces the amount of time that you are unable to trade
- Ensures customers will return when trading commences
- Minimises the loss of profits
- Protects employment
- Being prepared now can significantly reduce:
 - Loss of life
 - Loss of property
 - Loss of possessions

Being prepared now can help you respond more effectively and recover more quickly when these events occur. Every disaster recovery plan has five key steps:

- Identify risks
- Minimise or eliminate risks
- Identify who has to do what should a disaster occur
- Determine and plan your recovery contingencies
- Communicate the plan to all the people it refers to

1.1 Background

Cudgen Connection (741 Cudgen Road, Cudgen NSW) is located within the Tweed Valley Flood Study area (Figure 1). Cudgen Connection will accommodate residential and commercial tenancies and therefore requires a flood emergency management plan to reduce risk in the event of flooding.



Figure 1 Cudgen Connection Concept Masterplan (as Exhibited)

2 Flooding Characteristics

The Tweed River flood mapping (Figure 2) indicates that the *development area* is not affected by events up to and including the PMF.

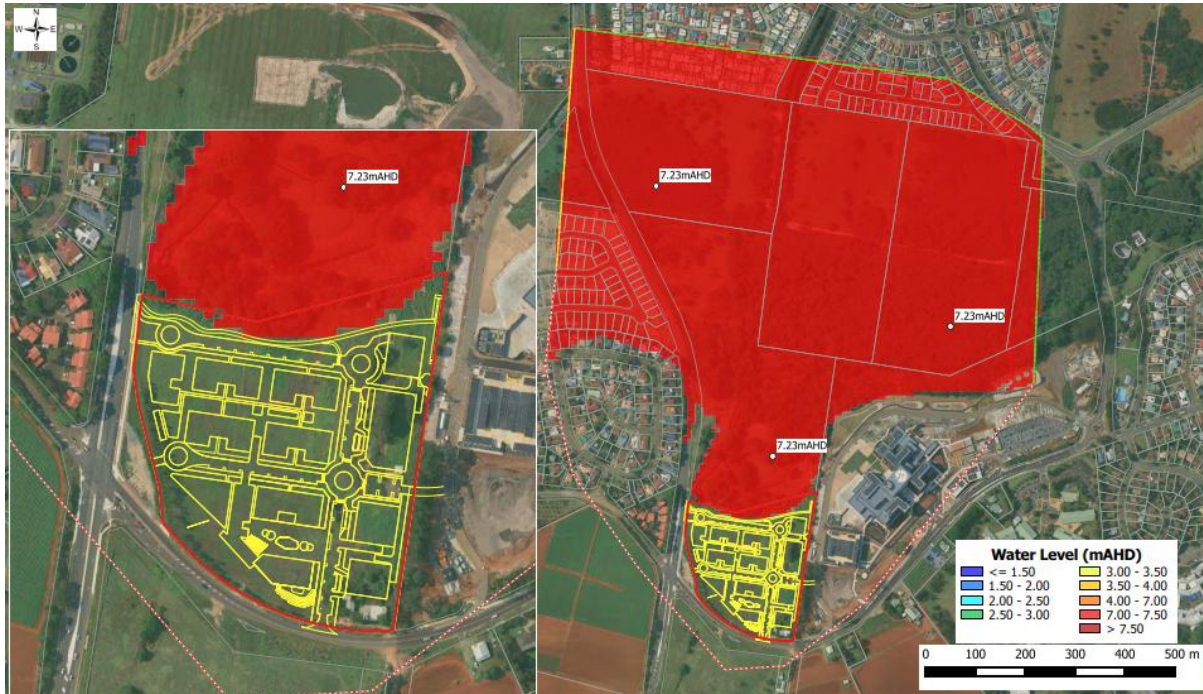


Figure 2 Probable Maximum Flood

The key flood parameters for the site are:

- Defined Flood Level (1% AEP_CC): 3.32 mAHD to the north of the site. No floodwater is expected to encroach into the development area due to the proposed earthworks.
- Flood Planning Level (1% AEP_CC + 500mm): 3.82 mAHD to the north of the site. No floodwater is expected to encroach into the development area due to the proposed earthworks.
- Probable Maximum Flood (PMF): 7.23 mAHD to the north of the site. No floodwater is expected to encroach into the development area due to the proposed earthworks.
- No identification of low or high flow flooding on the subject site
- Identification of low-hazard flood storage and flood fringe, generally aligning with the flood planning level footprint

The natural ground level ranges from approximately 1.7 (north) to 18.7 mAHD (south), adjoining Cudgen Road. The proposed development includes fill within the north of the lot to 7.3m AHD, above the flood planning level of 3.82m AHD and the probable maximum flood level of 7.23m AHD.

The access/egress to the subject site is above the Design Flood Level and Probable Maximum Flood (PMF) level, to the west and east along Cudgen Road, inclusive of access to the Tweed Valley Hospital, and the designated evacuation centre (Kingscliff TAFE) located approximately 650m east (Figure 3).

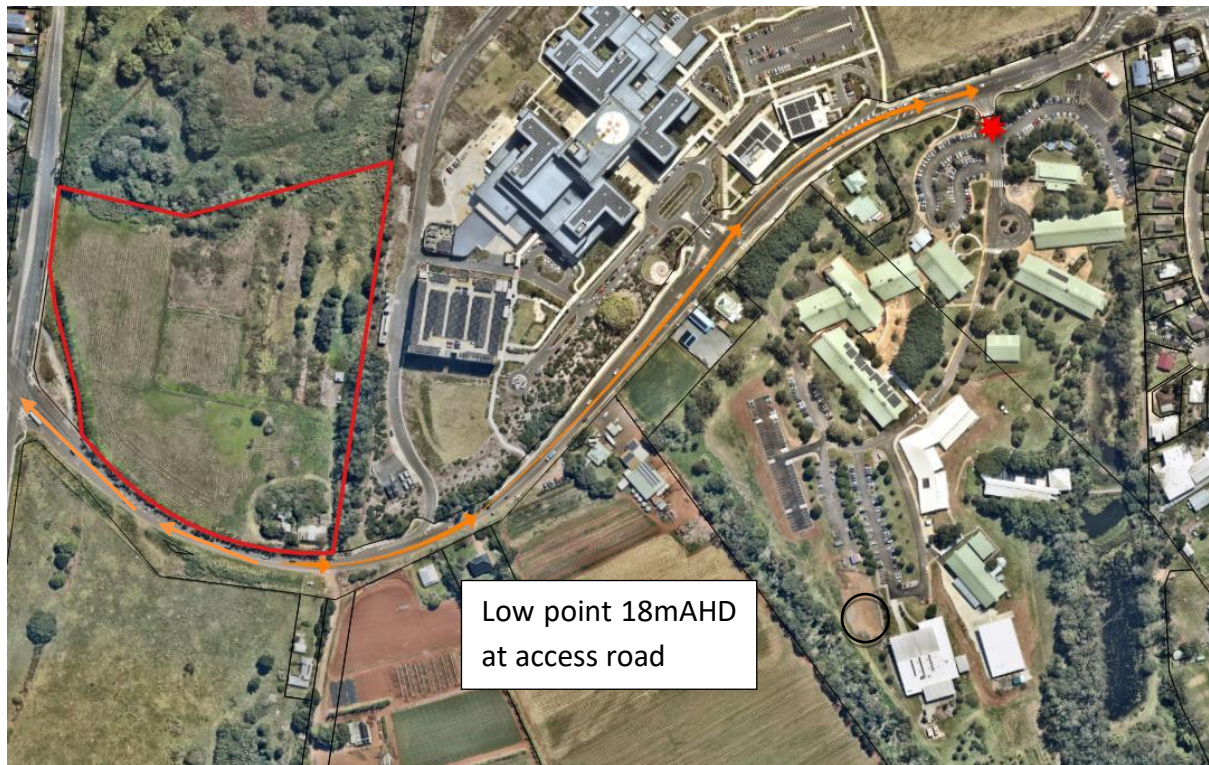


Figure 3 Last Roads Out

Please note that the SES forecasts serve as estimates only and may be significantly exceeded. While they are helpful as guides, it is advisable to take a conservative approach when planning flood responses.

2.1 Flood Hazard Categories

Flood hazard refers to the potential for a flood event to cause damage, disruption, or harm to people, property, infrastructure, or the environment. It encompasses both the magnitude of potential impacts and the likelihood of their occurrence. Flood hazard is typically characterised by parameters such as flood depth, velocity, duration, frequency, isolation during a flood, adequate warning time, and the rate of rise of floodwater, all of which inform risk mitigation strategies.

When assessing and categorising flood hazards, it's important for owners to understand the components of the hazard rating. For instance, if a site is classified as having a 'high' flood hazard, it's critical to identify the specific factors contributing to that rating—such as deep

floodwaters, fast-moving water, a combination of both, limited access during a flood, or minimal warning time. Without a clear understanding of the root causes, efforts to reduce the hazard level, such as through building design or site modifications, may not be effective.

The flood hazards presented in Figure 4 relates to the community's vulnerability when interacting with floodwaters. The flood hazard curves are divided into hazard classifications corresponding to specific vulnerability thresholds, as described in Australian Rainfall and Runoff (2019). Hazards H1-2 are considered Low Hazard, H3-4 Medium Hazard, and H5-6 High Hazard.

The pre-development hazard rating for the PMF event with H1 (low) and H5 (high) has been reduced for the subject site to H1–H2 (low hazard) by proposed fill to 7.3 mAHD (greater than the probable maximum flood 7.23m AHD). The Concept Masterplan anticipates the proposed earthworks to accommodate built structures and localised filling in the lower portions of the site to 'tie-in' access, parking, and infrastructure areas.

The subject site includes a fill pad and building to the north of the lot with a finished level of approximately 7.3m AHD (>PMF). Hydraulic modelling indicates this area is not susceptible to inundation during minor or major flood events. Flood-free evacuation is available via Cudgen Road to the west and east during minor to major flooding.

Flood levels for the site:

- 20% AEP (1:5ARI) event 1.42m AHD and is flood-free
- 5% AEP (1:20YARI) event 1.99m AHD and is flood-free
- 1% AEP (1:100YARI) event 2.83m AHD and is flood-free
- 1% AEP_CC (1:100YARI_Climate Change 2050) event 3.32 mAHD and is flood-free
- Flood Planning Level 3.82m AHD (3.32m AHD + 500mm)
- 0.2% AEP (1:500 ARI) event 3.6m AHD and is flood-free
- PMF (Probable Maximum Flood) to 7.23 mAHD flood level, and is flood-free

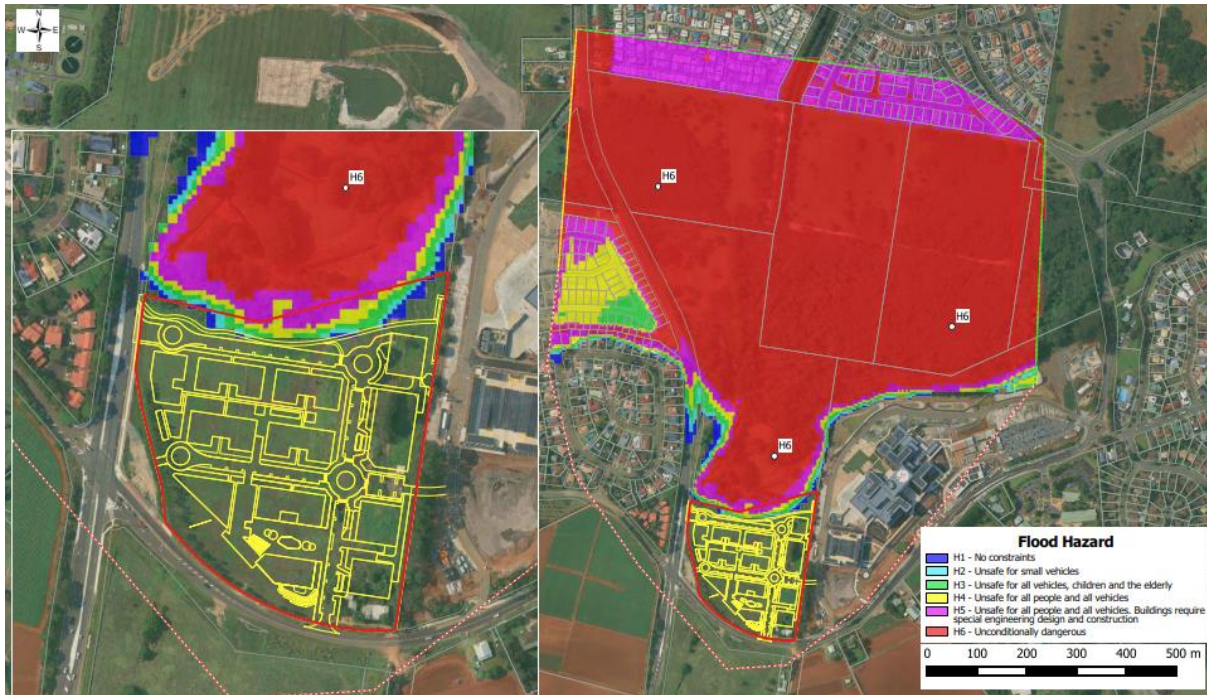


Figure 4 Hazards PMF

The Tweed River catchment generally has ample flood-warning time. Therefore, evacuation is the preferred risk-management response. Shelter-in-place on level 1 of the development is acceptable as a secondary option in the event of unexpected flooding.

The primary flood emergency management response will be:

- Evacuation is always preferred.
- Shelter in Place when the BOM (Bureau of Meteorology) issues a Moderate Flood Warning or severe storm warning for the Tweed Valley region.

The nearest local flood gauge (Chinderah 558010) is referenced to the Australian Height Datum (AHD), shown in Figure 5 and Figure 6.

- Minor flood warning 1.3 mAHD
- Moderate flood warning 1.7 mAHD
- Major flood warning 2.0 mAHD

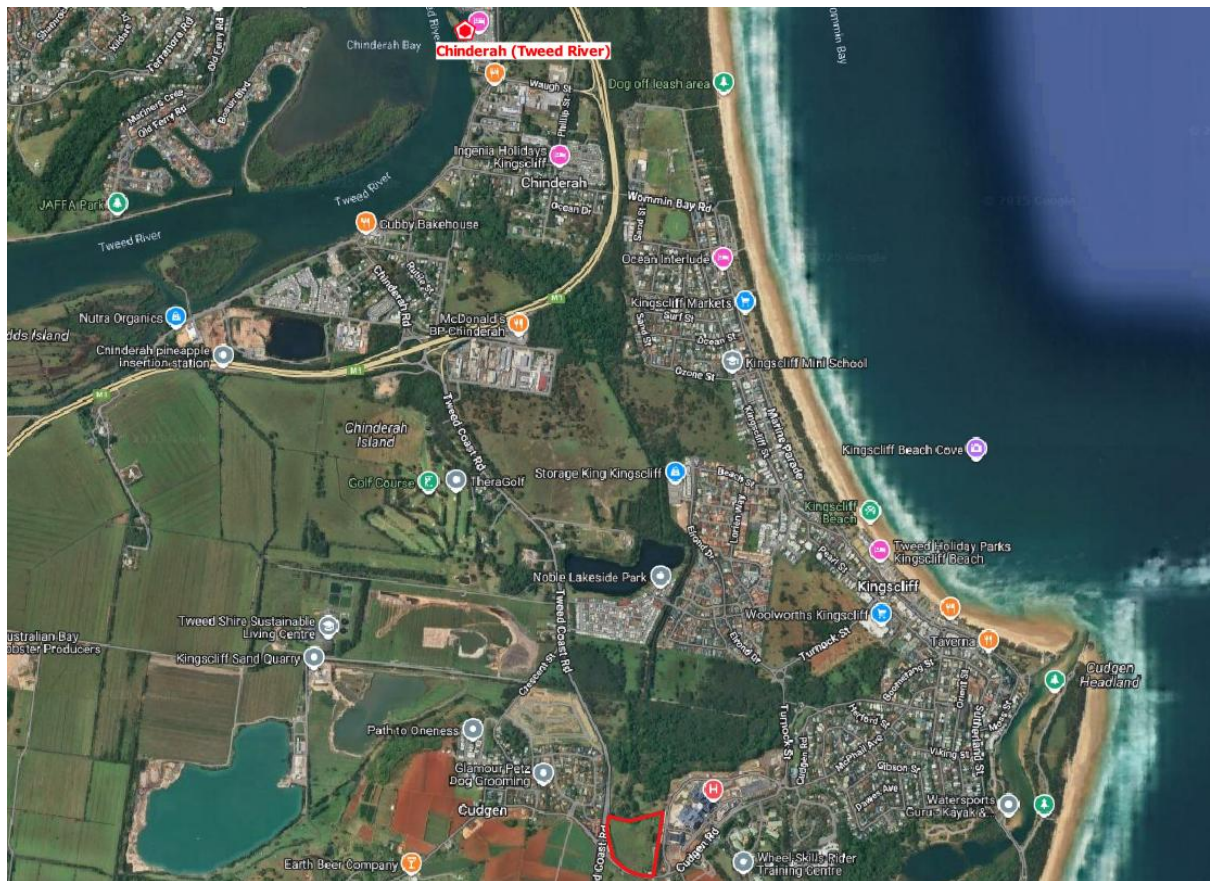


Figure 5 Tweed River at Chinderah (558010)

Latest River Heights for Tweed River at Chinderah

Issued at 03:53 PM AEDT Thursday 11 December 2025

[About river heights plots](#) | [About this Plot](#)

Station details: Station Number: 558010 Name: Tweed River at Chinderah

Flood Classification Levels: Minor: 1.30 m AHD Moderate: 1.70 m AHD Major: 2.00 m AHD

Data from the previous 7 days.

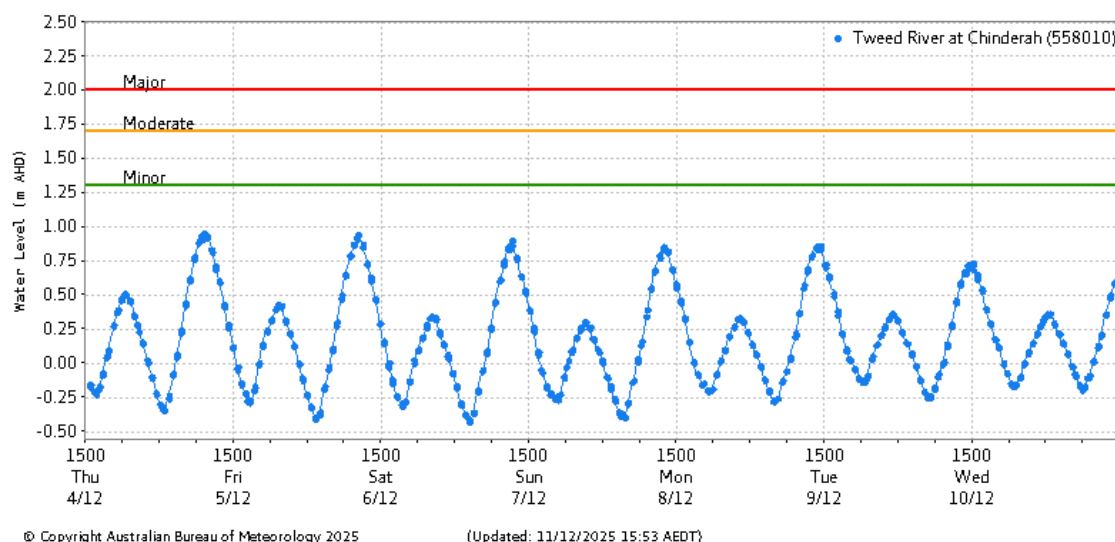


Figure 6 Latest River Heights for Tweed River at Chinderah (558010)

<https://reg.bom.gov.au/fwo/IDN60231/IDN60231.558010.plt.shtml>

2.2 Flood Classifications

The Australian Bureau of Meteorology (BOM) and New South Wales State Emergency Service (NSW SES) classify riverine flooding into three categories—**minor**, **moderate**, and **major**—based on site-specific impacts at river gauges, rather than fixed statistical probabilities.

- **Minor Flooding**

Causes inconvenience, including inundation of low-lying areas, closure of minor roads and low-level bridges, and submergence of paths. In rural areas, stock and equipment may require relocation.

- **Moderate Flooding**

In addition to minor flooding impacts, it may affect main traffic routes and some buildings above floor level. May require property evacuations and substantial stock removal in rural areas.

- **Major Flooding**

In addition to moderate flooding impacts, it may cause extensive inundation, affecting many buildings above floor level, isolating towns, closing major routes, and often necessitating large-scale evacuations and utility disruptions.

- **Relationship to Annual Exceedance Probability (AEP)**

No universal AEP applies to these classifications across Australia, as they are defined primarily by local impacts, with corresponding river heights varying by site.

Typical ranges for many Australian river systems (e.g., Hawkesbury-Nepean Valley, NSW):

- **Minor flooding:** 20% - 5% AEP (1 in 5 to 1 in 20 years).
- **Moderate flooding:** 10% - 2% AEP (1 in 10 to 1 in 50 years).
- **Major flooding:** 5% - 1% AEP (1 in 20 to 1 in 100 years) or rarer.

The 1% AEP flood often falls within the moderate to major range.



3 FLOODSAFE PLAN

Floods can occur unexpectedly and pose significant risks to individuals and property. Whether you're a resident, employee, or business operator in flood-prone areas, proactive planning is crucial for safeguarding lives and protecting the interests of staff and residents. Facility operators and residents must anticipate and prepare for potential flood threats and adverse weather conditions in advance.

In certain situations, attempting to evacuate may be more detrimental than not evacuating at all. This is especially the case where flash flooding (<6hs warning time) leaves very little time for evacuation and can result in isolation with very little notice.

This is where shelter-in-place approaches can play a role. In flash flood catchments, the time to flooding and flood duration are typically very short with minimal warning time. Warnings to the community are often limited to severe weather warnings or flood watches for the general area. There is usually no specific guidance on the local impacts of flash flooding, and there may be little time between the onset of flood-producing rainfall and flooding of roads, property, and potentially buildings.

When SIP is appropriate:

- SIP is an emergency management response, especially when the flood warning time and flood duration are both less than six hours (typically called flash floods).
- These flooding events are dangerous because of the short time frames, as well as the flood speed and depth. Under such circumstances, evacuation via vehicle may not be possible.
- *Department of Planning and Environment 2023, Draft Shelter-in-place Guideline*

Developing comprehensive emergency and continuity plans tailored to your particular needs is essential for minimising property damage and ensuring operational continuity. These plans should be crafted at an organisational level, incorporating insights from staff and residents with specialised knowledge of flood behaviour in your area.

Regularly reviewing and practising your plans, conducting annual assessments and drills, and hosting post-flood debriefs are essential steps for improving your Floodsafe plan over time. By prioritising preparedness and continuous improvement, flood-related risks can be reduced.

Please note that the SES forecasts serve as estimates only and may be significantly exceeded. While they are helpful as guides, it is advisable to take a conservative approach when planning flood responses.

3.1 Preparation Before It Floods

Understanding your flood risks and the different responses available to you is essential. Facility operators and residents should complete the following actions before any flood event, and these actions should form part of the organisation's risk management system.

The organisation should undertake the following procedures:

- Complete the business-specific Floodsafe Toolkit and Plan (Appendix E).
- Review and practice the Floodsafe Plan regularly (annually).
- Flood Evacuation Routes are known to any building occupants within the PMF footprint (Figure 3).
- Check the contents of the emergency kit. An emergency kit is required to facilitate evacuation and ongoing communication during an emergency (Appendix B).
- All contact details are up to date.
- The emergency plan is displayed in a prominent place, such as a noticeboard, and a copy is kept in the emergency kit.
- Laminated Floodsafe decision tree is displayed in prominent locations (Appendix C).
- Appointed Flood Wardens have been nominated and trained.
- Staff have been trained and are familiar with Floodsafe procedures.
- Adequate battery powered lighting is available.
- Emergency service contact details displayed. How and when to call Triple Zero (000) in an emergency (use 112 from mobile phones).
- Stockpile fuel, food, water, and cleaning products. These items are typically in short supply post-flood and should be acquired ahead of time.

3.2 Flood Warning Hierarchy

The primary form of flood preparation and response is monitoring the weather forecasts and warnings. This will be critical for potential site evacuation before the flood commences. Flood warnings typically include:

- 1. FLOODWATCH**
- 2. MINOR FLOOD WARNING**
- 3. MODERATE FLOOD WARNING**
- 4. MAJOR FLOOD WARNING**
- 5. EVACUATION ORDER**

Emergency Services use a range of methods, including radio, television, and phone via Emergency Alert messages, to warn the community about severe weather and other emergencies that require preparation and action at the local level. Pay close attention to the information and act promptly on the advice provided.

When warnings are issued, you may be directed to:

- Finalise preparations

- Secure items around your home
- Activate your Emergency Plan
- Shelter in place, or
- Commence evacuation to your predetermined safe location.

3.2.1 FLOODWATCH

A BOM issued 'Flood Watch' signals potential flooding based on forecasts, urging preparedness. It's an early alert, not confirming flooding but indicating its possibility. Residents and staff should stay informed and ready for necessary action.

Trigger 1: Flood Watch

Actions required:

- Activate your Floodsafe plan.
- Locate and check the emergency kit. Is it up to date?
- Locate and review the Floodsafe decision tree.
- Inform all staff and residents of the flood watch and/or severe weather warning.
- Move cars and belongings from low-lying and undercroft areas.
- Keep the radio tuned to the local radio station and mobile devices to the *NSW Disaster Dashboard (Tweed)*. Monitor for updates and advice.
- Ensure staff and residents are aware of flood evacuation routes. Last roads out and closure timing.
- If applicable, advise the local emergency services of the occupants present on-site.
- Locate essential papers and valuables, back up important computer files and take these offsite should this become necessary.

3.2.2 MINOR FLOOD WARNING

A BOM minor 'Flood Warning' is issued when flooding is expected to occur. It indicates a more immediate and specific flooding risk, including road closures, bridge submergence, and threats to farmland and property. Staff and residents should stay informed and ready for necessary action.

Minor Flood Behaviour

Minor flood warnings are issued when the Tweed River at Chinderah (558010) is forecast to reach minor flood levels.

- Tweed River at Chinderah (558010) is predicted to reach minor flood levels of 1.3 mAHD.
- Minor flooding: 20% - 5% AEP (1 in 5 to 1 in 20 years). Flood level at the site expected to be up to 1.99m AHD (5% AEP).

- What is the SES predicted flood level? Please note that the SES forecasts serve as an estimate only and may be significantly exceeded. While they are helpful as a guide, it is advisable to take a conservative approach when planning flood responses.
- Floodwaters are unlikely to overtop the creekbank at this stage.
- Designated low point in evacuation route is 18.0 mAHd at the site's access road connection to Cudgen Road and is flood-free during the PMF flood event.

Trigger 2: Minor Flood Warning

- Watch and act.
- What is the SES predicted flood level? Please note that the SES forecasts serve as an estimate only and may be significantly exceeded. While they are helpful as a guide, it is advisable to take a conservative approach when planning flood responses.
- Floodwaters have not yet entered the site.
- Review Floodsafe plan.
- Locate and check the emergency kit. Is it up to date and easily accessible?
- Inform all staff and residents of the minor flood warning.
- Locate the Floodsafe decision tree. Stay or evacuate?
- Ensure Flood Evacuation Routes are known by all building occupants within the PMF footprint and that they are aware of flood evacuation routes. Last roads out and closure timing (Figure 3).
- Ensure staff and residents have activated their personal Floodsafe plan.
- Move all cars as possible from low-lying areas.
- Keep the radio tuned to the local radio station and mobile devices to the *NSW Disaster Dashboard (Tweed)*. Monitor for updates and advice.
- If applicable, advise the local emergency services of the occupants present on-site.
- Locate essential papers and valuables, back up important computer files and take these offsite should this become necessary.
- Prepare to move or secure belongings from low-lying and undercroft areas.

3.2.3 MODERATE FLOOD WARNING

A moderate flood warning is issued when flooding is expected. It represents an escalation in flooding risk, indicating a more immediate and specific threat, including road closures, bridge submergence, and potential threats to plant and property. Residents and staff should stay informed and be prepared to take necessary action.

Moderate Flood Behaviour

Moderate flood warnings are issued when the Tweed River at Chinderah (558010) is forecast to reach moderate flood levels.

- Tweed River at Chinderah (558010) is predicted to reach Moderate flood levels of 1.7 mAHD.
- Moderate flooding: 10% - 2% AEP (1 in 10 to 1 in 50 years). Flood level at the site is expected to be up to 2.5 mAHD (2% AEP estimate).
- What is the SES predicted flood level? Please note that the SES forecasts serve as an estimate only and may be significantly exceeded. While they are helpful as a guide, it is advisable to take a conservative approach when planning flood responses.
- Floodwaters are unlikely to overtop the creekbank at this stage.
- Designated low point in evacuation route is 18.0 mAHD at the site's access road connection to Cudgen Road and is flood-free during the PMF flood event.

Trigger 3: Moderate Flood Warning

- Floodsafe Plan activated.
- Prepare to evacuate ground-level operations, plant and equipment.
- Inform all staff and residents of the moderate flood warning and prepare to evacuate to the evacuation centre (preferred).
- Prepare for shelter in place on Level 1 for those remaining.
- Locate and check the emergency kit. Is it up to date and easily accessible?
- Locate the Floodsafe decision tree.
 - Prepare to evacuate staff and residents (preferred).
 - Prepare to shelter in place (if appropriate).
 - Ensure any building occupants within the PMF footprint are aware of flood evacuation routes. Last roads out and closure timing (Figure 3).
 - All evacuated staff and residents are confirmed safe once the evacuation is complete.
- All cars should already be removed from low-lying areas.
- Keep the radio tuned to the local radio station and mobile devices to the *NSW Disaster Dashboard (Tweed)*. Monitor for updates and advice.
- Locate essential papers and valuables, back up important computer files and take these offsite should this become necessary.
- Escalation and preparation for evacuation.

3.2.4 MAJOR FLOOD WARNING

A BOM major flood warning is issued when flooding is expected to occur. It represents an escalation in flooding risk, indicating a more immediate and specific threat, including road closures, bridge submergence, and potential threats to farmland and property. The results of extensive inundation will be isolated communities requiring a significant emergency response. Staff and residents should stay informed and ready for necessary action.

Major Flood Behaviour

Major flood warnings are issued when the Tweed River at Chinderah (558010) is forecast to reach major flood levels.

- Tweed River at Chinderah (558010) is predicted to reach Major flood levels of 2.0 mAHd.
- Major flooding: 5% - 1% AEP (1 in 20 to 1 in 100 years or rarer). Flood level at the site expected to be up to 3.32 mAHd (1% AEP_Climate Change) up to the PMF (7.23 mAHd).
- What is the SES predicted flood level? Please note that the SES forecasts serve as an estimate only and may be significantly exceeded. While they are helpful as a guide, it is advisable to take a conservative approach when planning flood responses.
- Floodwaters are likely to overtop the creek bank and move into low lying areas and car parks.
- Designated low point in evacuation route is 18.0 mAHd at the site's access road connection to Cudgen Road and is flood-free during the PMF flood event.

Trigger 4: Major Flood Warning

- Floodsafe plan activated.
- Locate and check the emergency kit. Is it up to date and easily accessible?
- Inform all staff and occupants of the major flood warning.
- Locate the Floodsafe decision tree. Evacuation should be prioritised.
 - Evacuate staff and residents (recommended).
 - Shelter in place activated (if appropriate).
 - Ensure any building occupants within the PMF footprint are aware of flood evacuation routes, last roads out and closure timing (Figure 3)
 - All evacuated staff and residents are confirmed safe once the evacuation is complete.
- All cars should already be removed from low-lying areas.
- Keep the radio tuned to the local radio station and mobile devices to the *NSW Disaster Dashboard (Tweed)*. Monitor for updates and advice.
- If applicable, advise the local emergency services of the occupants present on-site.
- Locate essential papers and valuables, back up important computer files and take these offsite should this become necessary.
- Move or secure belongings from low lying carparks and ground-floor operations.

3.2.5 EVACUATION ORDER

An evacuation order is a direction issued by the SES when there is a significant risk of inundation or isolation due to floodwaters exceeding the major flood level and **MUST BE OBEYED.**

ABANDON SITE AND ALL BELONGINGS.

A representative of emergency services or the Chief Warden will direct the evacuation.

3.3 Recovery After It Floods

You may re-enter the building once the flooding has subsided and the SES and emergency services have deemed it safe to do so. Make sure you undertake an OH&S risk assessment before entering the building, and may include the following:

- Structural safety of buildings.
- Safety of electrical and gas supplies.
- Slips, trips and falls in mud and water (especially stairs).
- Contamination (e.g. sewage, chemicals and disease in water).
- Safety of plant and equipment.
- Sharp debris.
- Venomous animals (e.g. snakes and spiders seek refuge in buildings and debris).

Where buildings have been flooded, wiring and other electrical installations must be inspected before appliances are connected or turned on. A licensed electrician or a licensed electrical inspector must conduct such checks.

Take care moving around the hospital precinct. Low-lying roads may still be flooded, and under no circumstances should a flooded road be crossed. Reduce your speed when travelling in a vehicle, as roadways may be damaged and debris may remain.

Following the recovery, a debrief and review of the Floodsafe plan should be conducted to identify potential improvements.

Please note that essential items such as food, drinking water, fuel, cleaning products, and medicines may be in short supply immediately after a flood and should be planned for well in advance.

Recovery Actions

- Access fuel and food stockpiles.
- Contact a Level 2 electrician to certify the electrical system before restoring power. Electricity can typically be unavailable for multiple weeks.
- Access electricity generation. E.g. small portable generators.
- High-pressure water cleaner (petrol), PPE, and cleaning products/equipment are helpful in recovery.
- Roster a recovery crew for sediment and debris removal and general cleaning.
- Food rosters.

- Multiple dehumidifiers are an efficient way to remove moisture from walls and fixtures. Drying buildings typically takes multiple weeks, especially if the weather remains overcast or rainy. Mould can quickly spread if left damp.
- Restore critical records, cash, computer equipment and files.
- Cleaning up and repair.
- Ensure safe vehicular access is available to/from the site.
- Contact insurer.
- Debrief staff and residents and review the Floodsafe plan.

4 APPENDIX A – USEFUL RESOURCES

- NSW SES or call 132 500
- NSW Police or call 131 444
- Essential Energy or call 132 080
- Tweed Valley Hospital (02) 66772000

Flood Information Sources

- Tune In
 - Tune your battery powered radio to your local radio station and listen to the weather and warning updates
 - ABC Gold Coast (91.7FM)
 - North Coast ABC radio (94.5 FM)
 - HIIT (90.9FM)
 - TripleM (92.5FM)
 - Local television stations will provide warning updates
- Log on
 - The BOM website provides weather updates, weather warnings and tsunami warning information <http://www.bom.gov.au/nsw/warnings/>
 - NSW State Emergency Services (SES) website for information on preparing for floods, emergency alerts issued and current information on flood events <https://www.ses.nsw.gov.au/disaster-tabs-header/flood/>
 - A road condition report detailing any current road closures can be found at tweed.nsw.gov.au
 - Hazards Near Me app <https://www.nsw.gov.au/emergency/hazards-near-me-app>
 - The NSW Disaster Dashboard is an online tool that includes all the information you need during a flood, with links to the right authority with the best information. <https://emergency.tweed.nsw.gov.au/home>
- Monitor Flood Gauges
 - Tweed River at Chinderah (558010) <https://reg.bom.gov.au/fwo/IDN60231/IDN60231.558010.plt.shtml>
- NSW SES Tweed Head (Facebook) <https://www.facebook.com/p/NSW-SES-Tweed-Heads-100064312374953/>

5 APPENDIX B – EMERGENCY KIT

Get Your Kit Together - put together an Emergency Kit today!

An Emergency Kit can save valuable time in an emergency. It provides essential items you may need during a power outage or if you need to leave your home quickly.

Your emergency kit contents:

- Portable radio with spare batteries
- Torch with spare batteries
- First aid kit (with supplies necessary for your household)
- Candles and waterproof matches
- Important papers and documents
- Staff contact numbers
- Emergency contact numbers
- Copy of Flood Safe Plan decision tree
- Waterproof bag for valuables

When leaving or evacuating your property, place in your emergency kit:

- A supply of required medications
- Any special requirements and supplies for people with special needs
- Appropriate clothing and footwear
- Fresh food and drinking water

Keep your emergency kit in a waterproof storage container.

Check your emergency kit regularly, remembering to inspect the use-by dates on batteries and gloves. Restock items as needed.

Additionally, keep a list of emergency numbers near your phone or in a convenient location, such as the fridge.

Please note: This is an example of an elementary emergency kit and must be tailored to the building's specific needs.

6 APPENDIX C – FLOODSAFE DECISION TREE



FLOOD

FLOOD WATCH

Alert Flood Wardens
Review Floodsafe Plan
Access Emergency kit
(See Page 12)

GO

*MyRoadInfo app
Last roads out
Locate and ensure safety of
staff and residents*

STAY

MINOR FLOOD WARNING

Prepare for Evacuation and Shelter in place
Initial removal of belongings from ground
floor, low lying and undercroft areas
(See Page 12)

GO

*MyRoadInfo app
Last roads out
Locate and ensure safety of
staff and residents*

STAY

MODERATE FLOOD WARNING

Prepare for Evacuation and Shelter in place
Initial removal of belongings from ground floor, low
lying and undercroft areas
(See Page 13)

GO

*MyRoadInfo app
Last roads out
Locate and ensure safety of
staff and residents*

EVACUATE

MAJOR FLOOD WARNING

Evacuation of those that can, and Shelter in
place for the remainder.
(See Page 14)

GO

*MyRoadInfo app
Last roads out
Locate and ensure safety of
staff and residents*

EVACUATION ORDER

Evacuate all staff immediately. Abandon plant and equipment. Seek higher ground
(See Page 15)

Date :

Building:

Flood Wardens:

(name & phone number)

1.

2.

Location of Emergency Kit:

Police 000

SES 132 500

Tweed Valley Hospital
(02) 66772000

North Coast ABC radio (94.5 FM)

BOM Flood Warning:

<http://www.bom.gov.au/nsw/warnings/>

Local Road Closure Information:

tweed.nsw.gov.au

Disaster Dashboard

<https://emergency.tweed.nsw.gov.au/home>

Tweed River at Chinderah(558010)

<https://reg.bom.gov.au/fwo/IDN60231/IDN60231.558010.plt.shtml>

Hazards Near Me app

<https://www.nsw.gov.au/emergency/hazards-near-me-app>

7 APPENDIX D – USEFUL TERMS

Meters (m) – All heights are measured in meters above the mean sea level (AHD).

AEP – Annual exceedance probability. E.g. 10%AEP, 5%AEP, 2%AEP, 1%AEP

ARI – Average recurrence interval. E.g. 1 in 10 Year ARI, 20YARI, 50YARI, 100YARI

BOM – Bureau of Meteorology

DFL – Defined flood level

Evacuation

- Evacuation warning is early advice by NSW SES that evacuation may be likely
- Evacuation Order is a direction by NSW SES when evacuation is needed

Exceed, Reach and Peak

- Exceed. The river will pass this height based on the current rainfall
- Reach. The highest water level is expected based on current or forecast rainfall
- Peak. Rainfall has eased or stopped. This is the highest expected river height

Flood Gauge – unless otherwise stated, all references to BOM flood height are taken from the Tweed River at Chinderah (558010)

<https://reg.bom.gov.au/fwo/IDN60231/IDN60231.558010.plt.shtml>

Flood Planning Level (FPL) = 1%AEP Climate Change + 500mm freeboard

Minor Flooding

Causes inconvenience, including inundation of low-lying areas, closure of minor roads and low-level bridges, and submergence of paths. In rural areas, stock and equipment may require relocation.

Moderate Flooding

In addition to minor flooding impacts, it may affect main traffic routes and some buildings above floor level. May require property evacuations and substantial stock removal in rural areas.

Major Flooding

In addition to moderate flooding impacts, it may cause extensive inundation, affecting many buildings above floor level, isolating towns, closing major routes, and often necessitating large-scale evacuations and utility disruptions.

8 APPENDIX E – FLOODSAFE TOOLKIT AND PLAN

During a flood

Flood Warnings are issued by the Bureau of Meteorology (BoM) when flooding is about to happen or is already happening. A Flood Warning provides a predicted flood level on a river gauge and a time at which the river will reach, exceed or peak at that level.

During a flood, there are some simple things you can do to stay safe:

- ⚠ Never drive, ride or walk through floodwater.
- ✓ Keep listening to your local radio station for information, updates and advice.
- ✓ Keep in contact with your neighbours.
- ✓ Be prepared to evacuate if necessary.

Evacuate

During a flood the NSW SES and other emergency services may ask you to evacuate.

The NSW SES aims to keep people safe and minimise the risk to life and property when floods occur. Follow evacuation advice. Being prepared will allow you to respond quickly should you need to evacuate.

- ✓ Locate important papers, valuables and mementos. Put them in your emergency kit
- ✓ Take your emergency kit with you
- ✓ Turn off the electricity and gas at the mains before you leave and turn off and secure gas bottles
- ✓ Stack possessions, records, stock or equipment on benches and tables, placing electrical items on top
- ✓ Secure objects that are likely to float and cause damage
- ✓ Relocate waste containers, chemicals and poisons well above floor level
- ✓ Prepare to take your pets with you
- ✓ Act early before roads to high ground are closed by floodwater.

When you evacuate

You must leave well before roads to high ground are closed by flood water.

Proceed to the evacuation centre you are asked to go to. Help will be available at an evacuation centre established by the Department of Family and Community Services.

Assistance will include:

- ✓ Temporary accommodation
- ✓ Financial help
- ✓ Personal support
- ✓ Refreshments and meals
- ✓ Clothing and personal needs

After a flood

Keep away from flood affected areas until emergency services advise that is safe to return. These areas can be dangerous for the health and safety of you and your family. Discard all food that has come into contact with floodwater and clean and sanitise your belongings.

A local recovery centre may be established by a range of government departments and community agencies. You may be able to get advice on everything from insurance to counselling. In the event of a flood, information is available from Disaster Welfare Services on **13 77 88** or nsw.gov.au/resilience-nsw

How the NSW SES helps the community

The NSW SES is responsible for the emergency management of floods in NSW. This includes planning for floods and working with communities about how to protect themselves and their property.

During floods the NSW SES will provide flood information and safety advice, can arrange for the delivery of essential supplies, conduct evacuations and undertake flood rescues.

Emergency contacts & support

Police, Fire and Ambulance - 000 (triple zero)
Life-threatening emergencies.

NSW SES Emergency Assistance - 132 500
The deaf, hard of hearing or speech impaired can call Triple Zero (000) or SES on (132 500).

LiveTraffic
livetraffic.com for local road information.

Tweed Shire Council
(02) 6670 2400
tweed.nsw.gov.au
for local road closure information.

Tweed Emergency Dashboard
Can be found at emergency.tweed.nsw.gov.au/

Bureau of Meteorology
bom.gov.au/nsw for the latest flood and weather warnings.

Telstra - 132 203 telstra.com.au for service disruptions in a disaster.

Local Land Services
1300 795 299
lls.nsw.gov.au for support services where agriculture and animals are affected.

Disaster Welfare Services
13 77 88 or nsw.gov.au/resilience-nsw for flood recovery services.

NSW Dept. of Primary Industries dpi.nsw.gov.au
For support services where agriculture and animals are affected.

Essential Energy **132 080**
essentialenergy.com.au for supply and outages.

Accurate at October 2021



FOR EMERGENCY HELP IN FLOOD,
STORM AND TSUNAMI CALL

132 500

In life-threatening emergencies call 000 (triple zero)

For further information about flooding visit
ses.nsw.gov.au



Community FloodSafe



Chinderah and Fingal Head



Are you at risk from floods?

Chinderah and Fingal Head have a long history of flooding.

Every year, severe weather such as low-pressure systems, cyclones or ex tropical cyclones affect the area causing either minor nuisance flooding up to moderate or major flood events.

Significant flooding has occurred in 1954, 1974 and 2017.

Flood modelling shows that higher flood levels are possible than what was seen in these years.

Riverine flooding is the main cause of the flooding in Chinderah and Fingal Head.

This flooding can be held up from escaping the river mouth by high tides and storm surges.

In a major flood, low-lying areas of Chinderah and Fingal will become isolated, with some properties experiencing over floor flooding.

Some residents and businesses, including several caravan parks will require evacuation.

Flash flooding and overflow from stormwater drains also contribute to flooding in the area.

In June 2005, a low pressure system stalled over the Qld border causing torrential rain and flash flooding to the whole Tweed area causing road closures, power and communication outages and inundations.

It is important that residents and businesses in the low-lying areas of Chinderah and Fingal Head are aware of their flood risk related to both riverine and flash flooding, have a plan and know when to act.

Chinderah and Fingal Head will flood again. That's a fact!

Assistance for animals

NSW Local Land Services coordinate animal welfare and relief services for livestock, wildlife and companion animals.

This may include assistance for animal care services and emergency fodder supply in areas affected by a flood emergency.

What happens in Chinderah floods?

Heights at gauge	Expected consequence
4.40m	The main centre of Fingal Head is impacted by flooding.
3.10m	Peak Height - February 1954. Extensive inundation and over floor flooding is expected for low lying properties in Kingscliff, Tweed Heads, Chinderah and low-lying coastal caravan parks
2.55m	Flood water may close the Pacific Motorway and access is cut between Tweed Heads and Kingscliff.
2.40m	Peak Height - January 1974
2.25m	Peak Height - March 2017
2.21m	Peak Height - March 1974
2.20m	Large areas of Chinderah experience flooding with depths up to 1.5 metres in low lying areas adjacent to the Kingscliff drain and Letitia Road to the north. Fingal Road leading into Fingal Head from the south and adjacent properties are predicted to be inundated in this size flood event..
2.00m	Major Flood Height. Most of Chinderah is inundated. Some houses in Chinderah will have water over their floors.
1.75m	Flood water starts to inundate low lying properties in the Chinderah area including Caravan Parks.
1.70m	Moderate Flood Height
1.60m	Water over Fingal Head Road. Possible inundation of low-lying properties in Fingal Head. North lane of Chinderah Bay Road may close at Wommin Bay Road. Wommin Lake can contribute to flooding on Fingal Road. Inundation starts in Tweed Caravan Park and Tweed Heritage Caravan Park.
1.56m	Peak Height - January 2008
1.30m	Minor Flood Height Flood water may close Fingal Road near the corner of Wommin Lake Crescent, isolating Fingal Head.

Key heights in metres at the Barney's Point (Chinderah) flood gauge

Stay informed

Tweed Shire Council provides information on the height at which your property may be affected by floodwater. Flood information, road closures and advice on evacuations will be broadcast over local radio stations:

91.7FM
ABC Gold Coast

94.5FM
ABC North Coast

90.9FM
HIIT

92.5FM
TripleM

Flood predictions and river height information are available from the Bureau of Meteorology. NSW SES issue flood bulletins on what may happen and safe actions. It is important to know the height that affects your property.

What you can do now



For further information on your local or regional flood risk please visit ses.nsw.gov.au and search for "Local Flood Plan".

When flooding is likely

A Flood Watch is issued by the Bureau of Meteorology when flooding is likely. Act early should flooding occur.

RESIDENTS:

- ✓ Listen to your local radio station for information, updates and advice.
- ✓ Locate and check your emergency kit and follow your Emergency Plan. Go to ses.nsw.gov.au
- ✓ Check on your neighbours and make sure they are aware of possible flooding.
- ✓ Prepare to move pets, including agisted animals to high ground.

BUSINESS OWNERS AND MANAGERS:

- ✓ Follow your Business FloodSafe Plan, developed by working through the Emergency Business Continuity Kit on the NSW SES website ses.nsw.gov.au
- ✓ Check neighbouring businesses are aware of possible flooding.
- ✓ Back up records and store off-site.
- ✓ Make preparations to raise or relocate stock, records and equipment.
- ✓ Check the evacuation routes for your business and make sure your employees know when they are likely to close. This will ensure they can leave before flooding occurs.



Image courtesy of Tweed Valley Weekly

Business FloodSafe Toolkit and Plan

Never drive, ride or walk through floodwater If you need assistance during a flood, call the SES on 132 500 If an emergency is life threatening call 000



Don't let your business go under

Riverine Flooding

www.ses.vic.gov.au



In this Toolkit:

Why Should You Plan for Flooding? 3

**How will Riverine Floods Impact on Your
Business? 4**

How Much Could a Flood Cost Your Business? 5

OH&S 7

A Guide to Using the Business FloodSafe Toolkit 8

Your Business FloodSafe Plan 12

*Water height marker
during flood in 2005.*

Why Should You Plan for Flooding?

...because flooding is inevitable

Floods are a natural occurrence where your business is located. In fact, over time, floods have helped form the land on which your business is built. This means that future flooding for you is inevitable and is a high risk for your business.

Flooding is extremely variable in Australia. You may experience extended dry conditions but this can quickly change. It is therefore critical that you prepare for flooding.

IT'S ONLY A MATTER OF TIME

“Only those who are not prepared get caught out”

Never drive through floodwater, it is the main cause of death during flooding.



How Will Floods Impact on Your Business?

Floods can be a threat to:

Life

- Floods can be life-threatening to you, your employees and your customers.

Property

- Floods cause hundreds of thousands of dollars worth of damage to business stock, plant, equipment, furniture and fittings every year
- Damage can be caused by water inundation, debris, humidity, contamination, mould and power disruption
- Insurance policies that cover your business for flood damage may be difficult to obtain and can be expensive.

Profits

- It usually takes a week or more to clean up after a flood, adding to your costs and stress. Your business may have to close for an extended period of time
- It can take several weeks or months for your business to return to normal. Your customers may take their business elsewhere.

Being prepared can reduce the economic cost of floods.

Developing a Business FloodSafe Plan can:

- Save lives and prevent injury
- Comply with Occupational Health and Safety (OH&S) regulations
- Reduce damage to stock, plant, equipment and fittings
- Reduce the amount of time that you can't trade
- Ensure customers will return when trading commences
- Minimise the loss of profits
- Protect employment
- Protect your business reputation and image.

“Damage could have been reduced by an estimated eighty per cent if businesses had developed a flood action plan”





Businesses need a FloodSafe Plan to minimise damage to stock.

How Much Could a Flood Cost Your Business?

Answer these questions to find out.

1. What is the replacement cost (\$) of stock, plant, equipment and fittings located up to 1.5m above your floor level?		
	STOCK	\$
	EQUIPMENT	\$
	FITTINGS	\$
	TOTAL	\$
2. If closed for one week to clean up, what would be the value of fixed costs such as wages, rent and loan repayments that require payment regardless of whether or not your business is operating?		
	RENT/LOAN	\$
	WAGES	\$
	OTHER	\$
	TOTAL	\$
3. What would be the profit (\$) loss if your business was closed for a week?		
	WEEKLY PROFIT	\$
Total Loss (add all three categories):		\$

The flood calculator produces an estimated amount that your business may lose if it were flooded to approximately one and a half metres above floor level. Losses will increase with greater depths of flooding.

*Being FloodSafe is not expensive or time consuming...
it is your best insurance*



A commercial centre
floods in 2009.

Before You Begin

It is important to understand what type of flooding could affect your business and what are the chances of a flood event occurring. It is also important to realise the implications that flooding has on OH&S obligations and practices.

Riverine Flooding

Your area has a history of flooding. Contact your council for further information.

Extended periods of high rainfall over a catchment area may result in inundation from river and/or creek systems.

You can also be affected by flooding indirectly, even if your premises are not actually inundated as access roads may be closed and power, water and the telephone may be cut.

Employees who are away from the business premises should be told not to return until floodwater has receded. Never drive, ride or walk through floodwater. This is the largest cause of death during floods.

Chance of Flooding

It is important you understand the chance of your business being flooded as well as the possible impacts. This information can be obtained from your local council or State Emergency Service (SES).

The table below allows you to work out the chance of your business being flooded in a 10 and 20 year period. For example, if you are in the 1 in 100 year flood level, there is a 10% chance that you will experience a flood this high or higher at least once in the next 10 years.

However, it is important to remember that events can occur at a more regular interval, with many cases of 1 in 100 year floods occurring in consecutive or even the same year.

Flood Level	Chance in next 10 years	Chance in next 20 years
1 in 20	40%	64%
1 in 50	18%	33%
1 in 100	10%	18%
1 in 500	2%	4%

*“At least 275 Australians have died in floods
from work-related causes”*

OH&S

If flooding is imminent, your main priority is to ensure the safety of your employees and customers.

Flooding is a known risk to your business. As such, you must minimise OH&S risks relating to flooding for your employees and customers. There are numerous potential risks to the health and safety of your employees associated with flooding, as well as potentially posing a risk to your customers, particularly if you provide accommodation.

It is important to identify procedures to be followed during and after a flood and provide details of how you will manage the risks in these areas in your business OH&S plan. There may be additional risks to those listed below.

During a Flood

- Evacuation (e.g. ensure that employees and occupants have enough time to evacuate safely to a location if they are instructed to)
- Manual handling and raising of stock, plant, equipment and furniture
- Darkness (e.g. make sure there is adequate light as flood preparations may need to be made at night or in overcast conditions)
- Protective clothing (solid non-slip footwear is essential as a minimum)
- Coming into contact with floodwater
- Avoid entering floodwater outside the building on foot or in vehicles (e.g. risk of electrocution, drowning, injury from submerged objects or uneven ground).

After a Flood

Only re-enter the premises after floodwater has completely subsided and the SES have advised it is safe to do so. Make sure you undertake an OH&S risk assessment before entering the building.

- Structural safety of buildings
- Safety of electrical and gas supplies
- Slips, trips and falls in mud and water
- Cleaning up, repairing and re-stock
- Contamination (e.g. sewage, chemicals and disease in water)
- Safety of plant and equipment
- Sharp debris
- Venomous animals (e.g. snakes and spiders seek refuge in buildings and debris).

Where businesses have been flooded, it is imperative that checks of wiring and other electrical installations are made before appliances are connected and turned on. Such checks must be carried out by a licensed electrician or licensed electrical inspector.

Do not use any water damaged electrical appliances until they have been checked for safety by a qualified electrical technician.

Do not expect them to work safely once they have dried out.

Some useful websites for further flooding and OHS information:

- www.ses.vic.gov.au
- www.education.vic.gov.au/hr/ohs/hazards/default.htm
- www.health.gov.au
- www.bom.gov.au/water/floods/document/What_todo_floods.pdf

Whole business districts can be affected.





The SES is the primary response agency in the event of a flood.

A Guide to Using the Business FloodSafe Toolkit

This toolkit will help you prepare a plan to assist you to prepare for possible flooding that can impact your business.

The plan you develop using the toolkit is called a Business FloodSafe Plan and it should be part of your business continuity management. Continuity management minimises the impacts of situations that can prevent the business running for extended periods of time. These situations may include fires, earthquakes, storms, floods, tsunamis, terrorist attacks and major electrical failures. Many of the actions in your Business FloodSafe Plan are applicable to the other situations.

How to Create a Business FloodSafe Plan

1. Online

The quickest and easiest way to create and manage your Business FloodSafe Plan is to go the SES's website at www.ses.vic.gov.au and click on the Business FloodSafe section. This will take you to the Business FloodSafe Toolkit where you can begin to build a Business FloodSafe Plan.

The online Business FloodSafe Toolkit is an interactive and flexible template which is self-guided to allow a quick and easy development of your Business FloodSafe Plan. You can customise the plan as much as you like or you can simply use the suggested details in the template.

You will be asked to create a username with an email address and to choose a password. Once you have entered in these details, you will be able to log on at any time to review, change and update your plan. Your plan will be saved on the SES server so even if your computer is damaged or lost, your FloodSafe Plan will be stored. The Plan can also be printed out or downloaded and saved to a computer.

2. Hard copy

A hard copy version of the plan has been provided on page 12 of this toolkit, which you can fill in with details relating to your business.

Top Tips

- Involve as many employees as possible in the creation and management of the plan to build ownership and understanding. This can increase employees' performance when a flood does occur
- Duplicate your plan so that you have at least three copies. One should be displayed at your business premises, one should be stored in your Emergency Kit and the other should be stored off site
- Display FloodSafe posters available from the SES website to help develop your employees's awareness of flooding and understanding of the Business FloodSafe Plan.

Creating Your Business FloodSafe Plan

Whether you complete the plan online, or use the sheets in this toolkit, there are three easy parts which must be completed to have an effective plan in place for when a flood occurs.

Part A		Part B			Part C
Understanding your problem		Develop your plan			Manage your plan
Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Impacts	Priorities	Actions	Triggers	Contacts	Your plan

Part A: Understanding Your Problem

Step 1 Identify the Impacts

You need to identify what the main impacts are on your business if it is affected by flooding. There are four recommended impacts that are included in the plan which affect every business:

- People's health and safety are compromised
- Property is damaged or destroyed
- Profits are lost or service provision stopped
- Paperwork and records are ruined.

You should also add any other potential impacts that are specific to your business.

TASK – In your Business FloodSafe Plan, either online or using the plan in this toolkit, list any other business specific impacts of flooding that could affect your business in the Impacts Table.

Step 2 Prioritise the Impacts

Some of the impacts you write down are possibly more important to your business than others so you should prioritise your impacts and keep these priorities in mind when you are developing the rest of your Business FloodSafe Plan.

For example:

People's health and safety are compromised – High priority
Paperwork and Records are ruined – Low priority

TASK – Prioritise your list of impacts using the scale Very High, High, Medium and Low in the Impacts Table

Part B: Develop Your Plan

Step 3: Identify Actions

Actions need to be identified that can minimise the impacts of flooding on your business. They need to be broken up into four categories:

- Now and/or Always
- When flooding is likely
- During a flash flood
- After a flash flood.

A list of actions that should be included in your Business FloodSafe Plan is provided in the Business FloodSafe Toolkit template at the back of this booklet. These actions can be edited to better suit your business needs or not used if not appropriate. You should also add actions for impacts that you have identified as being specific to your business and identify when these should be undertaken. You can customise your plan with as much detail as you wish in the "How Do I?" section for each action.

TASK – Fill in any other actions that you can identify as being specific to your business. Fill out specific details regarding how to carry out the actions listed in the table under the How Do I section.

Step 4 Identify When to Undertake Your Actions

There are certain situations or triggers that should prompt your actions when a flood occurs. Most river catchments have a flood height prediction system consisting of Flood Watches and Flood Warnings. In these areas, a Flood Watch is issued when forecast weather conditions could result in flooding. Flood Warnings are issued when rainfall shows flooding will occur and include predicted river heights at the local river gauge, their arrival time and the magnitude expected (minor, moderate or major). A Flood Warning may be issued without a Flood Watch having first been issued.

If you have access to a flood height prediction system, your triggers should relate to river height predictions at the local river gauge. There may also be other local triggers in your area that can be used to inform you of the chance of flooding.

Other information issued by the Bureau of Meteorology (BoM) that may indicate flooding include Severe Weather Warnings or a Severe Thunderstorm Warning. These warn of sudden heavy rainfall that can cause flash flooding and are triggers to prompt you into action.

Local radio stations broadcast these warnings which often refer to areas or regions rather than specific suburbs or towns. Listen carefully to determine if your business is about to experience possible flooding.

The triggers should also be broken up where possible into the three stages of flooding;

- When flooding is likely
- During a flash flood
- After a flash flood.

A list of potential triggers has been inserted into the Business FloodSafe Plan template at the back of this booklet, these can be edited to suit your business or not used if not appropriate.

However, there may also be other triggers specific to your area that will need to be considered.

Being prepared can also save lives.

Top Tips

- When developing your triggers it is important to estimate how long it will take to carry out actions compared with the time it takes floodwater to reach height predictions. Also consider the resources required to complete actions (e.g. employees, equipment, vehicles)
- Be aware that in the case of flash flooding, the first warning you could get might be intense rainfall or rising floodwater. Warnings may be self-evidenced and not come from the BoM or other emergency services. Your business needs to monitor the weather situation and be prepared to put in place your Business FloodSafe Plan without a trigger from other services
- Most businesses are unattended for two-thirds of the time. A flood trigger could occur while the business is closed. You need to consider this when planning your flood actions.

TASK – Check the list of triggers that apply to your local area and ensure they are put in your Business FloodSafe Toolkit at the top section of the Actions Table

Step 5 Contact lists

Your Business FloodSafe Plan should include a copy of an up-to-date contacts list including employees. A copy should also be kept





in your Emergency Kit and another located off-site (and out of the floodplain).

The SES has included their details in the contacts list in the Business FloodSafe Plan template. Other relevant sources have also been suggested for you to complete their contact details.

Your emergency contacts list should also include other surrounding businesses that you could warn in the event of a flood or have reciprocal help arrangements with.

TASK – Fill in the employees contact list and the emergency contact list and store one copy with your Emergency Kit, one copy with your Business FloodSafe Plan and one copy off-site.

Part C: Manage Your Plan

Step 6: Your Plan (Implementation, Maintenance and Review)

Whether you have completed your Business FloodSafe Plan online or using the hard copy template in the Business FloodSafe Toolkit, the SES suggests that you print three copies:

- One to display in your workplace
- One for your Emergency Kit
- One to be stored off-site.

If you have completed your Business FloodSafe Plan online, you can download, edit, print and save a copy on to your local computer by logging in with your username and password.

You should implement your Business FloodSafe Plan by training employees to have knowledge and understanding of the actions and requirements included and training should be conducted regularly.

You should also maintain your Business FloodSafe Plan by ensuring that all details are kept up-to-date and those things needed to prepare for a flood (e.g. Emergency Kit) are in place.

You also need to regularly review your Business FloodSafe Plan. Reviews should critically examine all aspects including making sure the Business FloodSafe Plan works as it is supposed to, accounting for changes in risk, improvements, lessons learnt and changes on the floodplain. Employees should be involved in reviewing the Business FloodSafe Plan and be trained and exercised accordingly if needed.

Reviews should also be completed after:

- Training drills and exercises
- Flooding
- Changes to your building design and layout
- Changes in employees responsibilities
- Changes in business activities
- Changes in the river catchment.

Task – fill in details of the Plan Review table at the end of the Business FloodSafe Plan, including when your annual review is due and any other circumstances that requires a review.

Computer and office equipment should be kept off the floor.

Your Business FloodSafe Plan

Business Name	
Business Contact Person	
Address	
Telephone Number	
This copy to be kept at	

Impacts

[illegible]

Actions and Triggers

NOW AND/OR ALWAYS						
TRIGGERS						
• Actions that can be done immediately and maintained to reduce the potential impact of flooding on your business • •						
ACTIONS		HOW DO I?				
Action		How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)
Create, update and review a Business FloodSafe Plan using the Business FloodSafe Toolkit (www.ses.vic.gov.au)						
Prepare an Emergency Kit which includes a battery powered radio, spare batteries, torch, first aid kit, emergency contacts numbers, a copy of your Business FloodSafe Plan and any other emergency items relevant to your business						
Display your Business FloodSafe Plan and poster at your business premises, keep another copy of your plan off-site (and out of the floodplain) and also keep a copy in your Emergency Kit						
Inform staff of the risks that flooding can pose to them and to the business						
Ensure OH&S procedures cover specific flood risks for your business						
Encourage staff to participate in the development and implementation of the Business FloodSafe Plan						

ACTIONS	HOW DO I?				
	Action	How to do it	Who will do it	What you will need	Est. time needed
	Incorporate flood awareness in staff induction training				Completed (✓)
	Train staff in flood response procedures				
	Maintain an up-to-date list of emergency contact numbers for staff and services. Keep a copy in your Business FloodSafe Plan, Emergency Kit and another off-site				
	Investigate options to flood-proof your business. Where possible, use furniture, floor coverings and fittings made of flood resistant materials and store essential equipment and fittings well above floor level				
	Ensure that stock, plant, equipment, furniture and fittings can be raised and/or removed quickly and easily				
	Keep computer equipment off the floor				
	Investigate the use of flood-proofing devices for your business				
	Identify evacuation priorities and time lines (sequences)				
	Identify an alternative business location and have call diversion arrangements to allow the continuation of business operations off-site				
	Have alternative supply arrangements				

ACTIONS	HOW DO I?					
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)	
Have reciprocal help agreements with similar businesses in areas that are unlikely to flood at the same time						
Have strategies for re-stocking						
Identify ways to win back customers						
Identify critical functions to be maintained during and after flooding eg. payroll						
Backup important computer files each time they are updated and store those backups off-site and out of the floodplain						
Store critical archival paper-based records off-site and out of the floodplain						

Actions and Triggers

WHEN FLOODING IS LIKELY						
TRIGGERS						
• The BoM issuing a Flood Watch • The BoM issuing a Severe Weather Warning or Severe Thunderstorm Warning indicating a likelihood of flash flooding • Heavy rainfall. • •						
ACTIONS		HOW TO DO				
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)	
Be aware: A Flood Watch or a Severe Weather Warning is issued when forecast weather conditions could result in flooding. They are not Flood Warnings but messages to listen for Flood Warnings in the near future. A Flood Warning may be issued without a Flood Watch or Severe Weather Warning having first been issued						
Locate and activate your Business FloodSafe Plan						
Tell staff, guests or contractors of the Flood Watch or Severe Weather Warning						
Check that your Emergency Kit is ready for use						
Check that you have spare batteries for your portable radio and torch						
Ensure staff know local evacuation routes and flood heights when these could close						

ACTIONS	HOW TO DO				
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)
Listen to the local radio station for information, updates and advice					
Ensure neighbouring businesses are aware of the Flood Watch or Severe Weather Warning					
Check the quantity of stock, plant, equipment, furniture and fittings that would need to be moved					
Check the availability of staff and resources to move stock, plant, equipment, furniture and fittings as required					
Ensure any flood-proofing devices are ready for use					
Relocate chemicals and waste containers well above the maximum flood level					
Secure any objects that are likely to float					
Ensure you can communicate (e.g. by call diversion) with customers and suppliers during a flood					
Maintain critical business functions e.g. payroll					
Contact any business with which you have a reciprocal help agreement					
Check your ability to re-stock & re-staff					

ACTIONS	HOW TO DO					Completed (✓)
	Action	How to do it	Who will do it	What you will need	Est. time needed	
	Back up important computer files and take these off-site and out of the floodplain					
	Copy critical paper-based records and take these off-site and out of the floodplain					

Actions and Triggers

DURING A FLOOD						
TRIGGERS						
- The BoM issuing a Flood Warning - The BoM issuing a Severe Weather Warning or Severe Thunderstorm Warning indicating a likelihood of flash flooding - Announcements through your local media.						
ACTIONS		HOW TO DO				
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)	
Carry out actions related to triggers in your Business FloodSafe Plan early, particularly when there is a flood warning or you know flooding is imminent						
Your Emergency Kit can be used to store items that need to be removed						
Remind employees of OH&S procedures						
Keep listening to the local radio station for information, updates and advice						
Evacuate all employees and customers, via safe evacuation routes, before the premises are affected by flooding. Be aware that evacuation routes may close early						

ACTIONS	HOW TO DO				
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)
When evacuating, take your Emergency Kit and turn off electricity, gas and water at the mains. Lock the premises and notify security					
Keep in contact with staff and keep them updated on the situation					
Never drive, ride or walk through floodwater					
Install flood-proofing devices, block toilets, sinks and floor drains with sandbags					
Relocate chemicals and waste containers well above the maximum flood level					
Secure any objects that are likely to float					
Mobilise staff and resources to move stock, plant, equipment, furniture and fittings					
Move as much stock, plant, equipment, furniture and fittings as practical above the likely flood level					
Maintain critical business functions e.g. payroll					
Postpone supply deliveries					
Divert business calls to an alternative phone					

Actions and Triggers

AFTER A FLOOD

TRIGGERS

- The BoM issuing a Final Flood Warning
- The SES issuing an All Clear message.
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-
-

ACTIONS	HOW TO DO					
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)	
Never drive, ride or walk through floodwater						
Keep listening to the local radio station for information, updates and advice						
Before re-occupying the premises undertake an OH&S risk assessment						
Check with SES before allowing people back onto the site						
Wear protective clothing including enclosed, waterproof, puncture-resistant gloves, sturdy shoes and long pants						
Ensure you wash properly after cleaning flood damaged premises						
Review your flood actions & revise your Business FloodSafe Plan						
Have utilities professionally checked						

ACTIONS	HOW TO DO					
Action	How to do it	Who will do it	What you will need	Est. time needed	Completed (✓)	
Remove debris and clean, repair and disinfect premises						
Replace essential plant, equipment and stock as soon as possible with flood-resistant products						
Replace lost furniture, floor coverings and fittings with more flood resistant products						
Salvage, clean and dry as much as possible						
Notify customers or clients as soon as you resume trading						
Maintain critical business functions e.g. payroll						
Re-stock and increase staff if your business will be critical to the communities flood recovery work						
Implement any reciprocal help arrangements						
Implement incentives to stimulate trade if you experience a down turn						
Restore critical records, cash, computer equipment and files						
Evaluate storage procedures after flood event						

ACTIONS	HOW TO DO					Completed (✓)
	Action	How to do it	Who will do it	What you will need	Est. time needed	

Employees Emergency Contacts

[illegible]

Plan Review

Carry out a review of your Business FloodSafe Plan, at least annually and when circumstances change, to make sure it works like it is supposed to and to account for any change in risks.

Record the details of the review in the table below.



Acknowledgement: the Business FloodSafe program was originally developed by the NSW State Emergency Service through the Hawkesbury Nepean Project.